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Preface

The International Conference on Business and Policy Studies (CONF-BPS) is an annual conference focusing on research areas including applied economics, enterprise management, and policy studies. It aims to establish a broad and interdisciplinary platform for experts, researchers, and students worldwide to present, exchange, and discuss the latest advance and development in business and policy studies.

This volume contains the papers of the 2nd International Conference on Business and Policy Studies (CONF-BPS 2023). Each of these papers has gained a comprehensive review by the editorial team and professional reviewers. Each paper has been examined and evaluated for its theme, structure, method, content, language, and format.

Cooperating with prestigious universities, CONF-BPS 2023 organized three workshops in Sydney, London and Cardiff. Dr. Kristle Romero Cortés chaired the workshop “Behavioral Finance Factors in Applied Finance”, which was held at UNSW Business School. Dr. Canh Thien Dang chaired the workshop “Sustainability: Latest Research in Economics, Finance, and Management” at King's College London. Prof. Arman Eshraghi chaired the workshop “Recent Advances in Behavioral Finance”, which was held at Cardiff Business School.

Besides these workshops, CONF-BPS 2023 also held an online session. Eminent professors from top universities worldwide were invited to deliver keynote speeches in this online session, including Prof. Arman Eshraghi from Cardiff Business School, Dr. Canh Thien Dang from King's College London, Dr. Kausar Abbas from Monarch Business School Switzerland, Dr. Kristle Romero Cortes from University of New South Wales, Dr. Chinny Nzekwe-Excel from University of Wolverhampton, Dr. Muhammad Abrar from GC University Faisalabad and Dr. Javier Cifuentes-Faura from University of Murcia. They have given keynote speeches on related topics of applied economics, enterprise management, and policy studies.

On behalf of the committee, we would like to give sincere gratitude to all authors and speakers who have made their contributions to CONF-BPS 2023, editors and reviewers who have guaranteed the quality of papers with their expertise, and the committee members who have devoted themselves to the success of CONF-BPS 2023.

Dr. Canh Thien Dang

General Chair of Conference Committee

Workshop

Workshop – Sydney: Behavioral Finance Factors in Applied Finance

February 3rd, 2023 (AEDT)

Business School, The University of New South Wales (UNSW)

Workshop Chair: Dr. Kristle Romero Cortés, Associate Professor in UNSW Business School

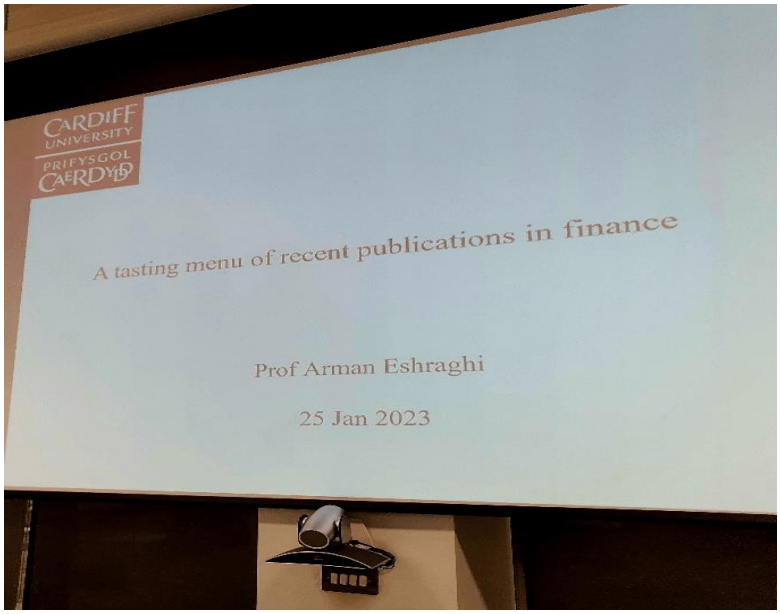
Workshop – London: Sustainability: Latest Research in Economics, Finance, and Management

February 8th, 2023 (GMT)

Department of Economics, King's Business School, King's College London

Workshop Chair: Dr. Canh Thien Dang, Lecturer in King's College London

Workshop – Cardiff: Recent Advances in Behavioral Finance



January 25th, 2023 (GMT)

Cardiff Business School

Workshop Chair: Prof. Arman Eshraghi, Professor in Cardiff Business School

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Research on Interaction Between Chinese and American Stock Index: A VAR Approach

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Abstract: Today's world is a changing world and Economic globalization will be an irresistible trend. There are so many uncertain event factors like the global covid-19 epidemic, global China–United States trade war and Brexit etc. Those events are all affecting the global economic growth. However, will the affection be one-way or two-way? This paper focus on investigating the interaction between China and American's Stock Index. In this study, the stock index Standard and Poor's 500 (S&P 500) in America and China Securities Index 300 (CSI 300) in China from 01/09/2021 to 01/09/2022 are selected as data, and the VAR model is established to capture the relationship between China's and America's stock variation. The following conclusions can be drawn from a study of the results: first, VAR model is convergent as the period of the time increases. Second, the impact of the Impulse response will last for about 10-14 periods. Third, from the variance decomposition, the affection from CSI 300 to S&P 500 will stabilised at around 10.993% and from S&P 500 to CSI 300 will stabilised at around 2.77%. The results in this paper benefit the related investors in financial markets.

Keywords: VAR model, variance decomposition, S&P 500, CSI 300

1. Introduction

The stock index is one of the most significant indicators of a nation's stock market performance. Almost all investors must analyse the trend of the stock index, which may indicate investor attitude regarding the state of the economy. The United States and China, hold market shares of 24% and 14% worldwide, respectively. The consistency of the stock market's development tendency in two nations with distinct economic systems over the past few years, under the influence of different policies and against the backdrop of diverse events, will have a direct impact on economists' assessment of economic globalization. At the same time, this problem's examination will help us appreciate the relationship between the two stock markets so that the potential of stock market crash caused by other country's stock volatility could be prevented. S&P 500 and CSI 300, as the two most representative comprehensive stock indices in these two countries, will be useful in determining if the fluctuation of one country's stock market will affect other countries.

Various investigations have been launched on the Chinese and American stock markets in recent years. Using wavelet analysis, Gao and Ren have determined the affection of COVID-19 on the volatility of the Chinese and U.S. stock markets [1]. They believe that the COVID-19 has a substantial leverage effect on the U.S. and Chinese stock markets. Feng, Lucey, and Wang have explored the

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impact of the trade war between U.S. and China on the stock markets [2]. Using the VAR model to examine the SSE Composite Index and the S&P 500, the authors discover that the trade war has a beneficial effect on the U.S. stock market but a negative effect on the Chinese stock market. David, Broadstock, and George Filis analysed the oil price variation affection to the stock market [3]. Using the VAR model, they conclude that the U.S. stock market is more susceptible to swings in oil prices than the Chinese stock market. Amanjot SINGH and Parneet KAUR have identified the impact of the subprime mortgage crisis on the U.S., Indian, and Chinese stock markets [4]. Using the Tri-Variable Vector Autoregression approach, it was determined that the volatility of the U.S. stock market has an indirect effect on the volatility of the Chinese market via the Indian market. Caroline Geetha, Rosle Mohidin, Vivin Vincent Chandran, and Victoria Chong investigated the relationship between inflation and the stock market and discovered that the United States and Malaysia have a long-term equilibrium relationship between the inflation variables, whereas China has only a short-term equilibrium relationship [5]. Goh, Jiang, Tu, and Wang have examined if US economics can predict the Chinese stock market [6]. They conclude that the Chinese market is less predictable than the U.S. stock market using a basic predictive regression model. Farzad Farsio and Shokoofeh Fazel have conducted research on the relevance of predicting unemployment and the stock market [7]. Utilizing a discount cash flow model, they determined that using the unemployment rate to predict the stock market movement would be a mistake.

All of the aforementioned articles attempt to analyse single or numerous events that affect the two country's stock market. However, few academics analyse the impact between those two countries stock markets directly. Hence, there is a greater impetus to perform extensive research on this area. Firstly, the stationarity of the model was examined using the data acquired from two stock indexes and plugged into the VAR model using the ADF and AR roots approach. Secondly, generating the influence time phase between two stock indices by utilising the impulse response function. Thirdly, quantify the influence between two stock indices using the variance decomposition method.

The remaining parts of this paper are constructed as follow. Part 2 depicts the data collection, part 3 introduce the method, part 4 reveal the results, part 5 shows the conclusion.

2. Data Collection

The data in this article are all collected from Investing (https://www.investing.com/). This paper selects the two representative stock indices from America and China. Those stock indices are S&P 500 (INDEXSP: .INX) and CSI 300 (SHA: 000300) for change percentage from 01/09/2021 to 01/09/2022. Since U.S. and Chinese stocks open times are different, then the data should be adjust and let the date match up. The change rate summarized in one chart is shown below in Table 1.

Table 1: Stock indices comparison statistic.

	Mean	Median	Min	Max	Var
S&P 500	-0.0007	-0.0008	-0.0404	0.0306	0.0002
CSI 300	-0.0008	-0.0007	-0.0494	0.0432	0.0001

According to the table above, compare between the two stock indices, S&P 500 has the higher average return, the higher variance of return and the lower minimum rate of return. Vice versa, CSI 300 has the better Median return rate and higher maximum return rate. However, apart from the maximum data in the table, almost all other data are the same. That is a pretty good situation when continuing the study on the VAR model.

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3. Methods

To start with, the Vector auto-regression (VAR) model is a stochastic process [8] model that is used to describe the relationship between variables when variation occurs. It is one of the most important model used in economics and natural sciences. By allowing multivariate time series, VAR models could generate stable single-variable auto-regressive model [9].

The VAR model with 2 variables are normally shown by 2 equations. The two equations are shown below,

$$Y_{1,t} = C_1 + \alpha_{11}Y_{1,t-1} + \cdots \ldots + \alpha_{n1}Y_{1,t-n} + \beta_{11}Y_{2,t-1} + \cdots \ldots + \beta_{n1}Y_{2,t-n} + \epsilon_{1,t} \quad (1)$$

$$Y_{2,t} = C_2 + \alpha_{12}Y_{1,t-1} + \cdots \ldots + \alpha_{n2}Y_{1,t-n} + \beta_{12}Y_{2,t-1} + \cdots \ldots + \beta_{n2}Y_{2,t-n} + \epsilon_{2,t} \quad (2)$$

In those above equations, C_1 and C_2 are the intercept which is the constant value. Combining C_1 and C_2, could provide a 2×1 constant vector. $\epsilon_{1,t}$ and $\epsilon_{2,t}$ are the error value. Combining $\epsilon_{1,t}$ and $\epsilon_{2,t}$ could provide a 2×1 error vector. In the equation, from α_{11} to α_{n1} be the coefficients of the Y_1 lags up to order n, where order n denotes that up to p Y_1 lags are employed as predictors. Variables $Y_{1,t-1}$ to $Y_{1,t-n}$ describe the value Y_1 from period t-n to t-1. Similarly, from β_{11} to β_{n1} be the coefficients of the Y_2 lags up to order n, where order n denotes that up to p Y_2 lags are employed as predictors. Variables $Y_{2,t-1}$ to $Y_{2,t-n}$ describe the value Y_2 from period t-n to t-1. α_{11} to α_{n1}, β_{11} to β_{n1}, α_{12} to α_{n2} and β_{12} to β_{n2} will form an 1×n order matrix. In light of the aforementioned information, it is possible to deduce that the VAR model describes that A is affected by the prior periods of A's affectation and B's affection. Likewise, $Y_{2,t}$ is also constructed with the same structure.

4. Results

The first section of the outcome describes the Augmented Dickey-Fuller test (ADF). The second section of the results pertains to the stability test, which is depicted by the graph of AR roots. In the third section of the results, the impulse response function and its accompanying images are discussed. In the concluding portion of the results section, the variance decomposition analysis is discussed.

4.1. ADF Tests

The initial step of our experiment is to find the number of difference required to make the series stationary. The ADF test is one of the most convenient and frequently performed test methods for testing stationary; therefore, the ADF test has been chosen to test the stationary. The ADF test is basically a statistical significant test. Normally the null hypothesis will be: series has a unit root. However, according to the result chart of CSI 300 shown below in Table 2. It indicates that the null hypothesis cannot be accepted. Therefore, the test of CSI 300 is stationary (See Table 2).

Table 2: ADF test for CSI 300.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.08033	0.0000
Test critical values:	1% level	-3.458347	
	5% level	-2.873755	
	10% level	-2.573355	

Similarly, the test of S&P 500 is also stationary (See Table 3).

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Table 3: ADF test for S&P 500.

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-16.47900	0.0000
Test critical values:	1% level	-3.458347	
	5% level	-2.873755	
	10% level	-2.573355	

4.2. Stability Test of VAR

It is required to assess the model's stability in order to produce a credible model estimate.When a model is stable, any variable sensitive to an external force can, as time passes, become less affected by the force until the system finds a new equilibrium. Nevertheless, if the model's stability is insufficient, the model will become meaningless as time passes. Hence, it worth to test the stability more carefully.

Initially, determining the optimal lag order in the criterion. The lag number has been set to 8 to determine the optimal lag sequence. The findings are shown in the table below in Table 4.

Table 4: Lag order test.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1338.437	NA	2.50e-08	-11.82688	-11.79661*	-11.81466
1	1347.446	17.77852*	2.50e-08	-11.87120*	-11.78039	-11.83456*
2	1349.435	3.890083	2.50e-08	-11.85341	-11.70206	-11.79233
3	1352.702	6.330906	2.50e-08	-11.84692	-11.63503	-11.76141
4	1355.504	5.380586	2.50e-08	-11.83632	-11.56388	-11.72637
5	1358.086	4.913703	2.50e-08	-11.82377	-11.49080	-11.68940
6	1358.720	1.195206	2.50e-08	-11.79398	-11.40047	-11.63518
7	1359.073	0.657770	2.50e-08	-11.76170	-11.30765	-11.57847
8	1360.292	2.256166	2.50e-08	-11.73710	-11.22251	-11.52943

The lag order selection above is based on sequential modified LR test statistic, Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. Due to the fact that lag order 1 has the greatest number of indicators. The lag order would then be set to 1.

According to the lag order 1 from above, the VAR estimation could be generated as below.

Table 5: VAR estimation.

	S&P 500	CSI 300
S&P 500	0.066581	0.013837
	(0.0637)	(0.05917)
	[1.04452]	[0.23384]
CSI 300	0.274857	-0.083435
	(0.07099)	(0.06590)
	[3.87184]	[-1.26616]
C	-0.000393	-0.000827
	(0.00084)	(0.00078)
	[-0.46626]	[-1.05771]

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Table 5: (continued).

R-squared	0.066677	0.007066

Consequently, the AR root graph has been formed due to the data produced above. All the numbers in this graph are confirmed to be less than one, and all the points are contained within the unit circle. Therefore, the model under construction is stable (See Figure 1).

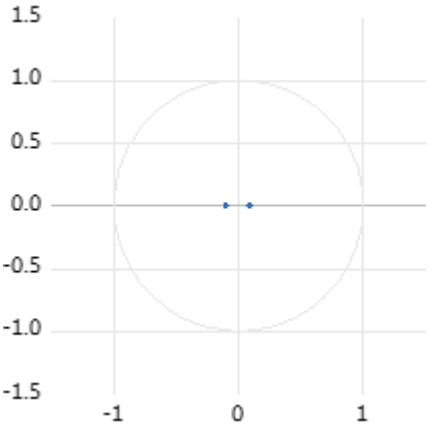

Figure 1: AR root graph.

4.3. Impulse Response Function

Based on the results demonstrated in the previous two sections, it is reasonable to believe that the data system is stationary. In the stationary system, the variation of the system to the input will be tracked by the impulse response function and being record as the following graphs. Figure 2 and Figure 3 depict the VAR model's impulse response diagram for the two stock indices rate of change. The horizontal axis displays the respective response time periods, while the vertical axis depicts the variable's response to a standard deviation shock of one unit. The area within the two red dotted lines are the 95% CI and the black line in the middle is the impulse response locus.

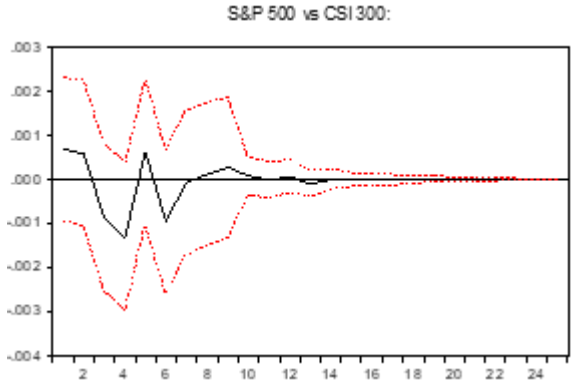

Figure 2: Response of S&P 500 to CSI 300.

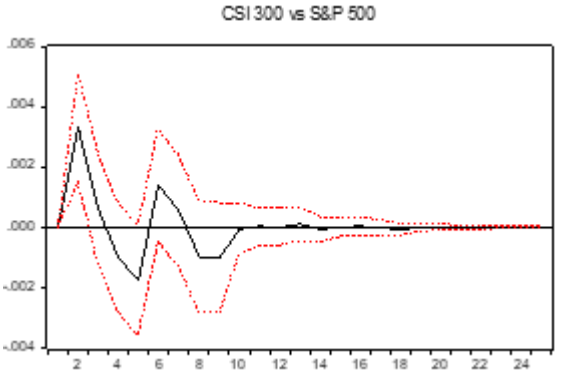

Figure 3: Response of CSI 300 to S&P 500.

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Figure 2 shows the response of S&P 500 to CSI 300 index. In the first time period, the initial impact of one standard deviation on the rate of change of CSI 300 for the S&P 500 is around 0.0006. Then, the positive and negative influences are continue alternating. The most negative impact appears in the 4-th period which roughly reaches -0.0013. As the lag time period increases, the figure shows that the impulse response locus will eventually trend to 0. The impact from S&P 500 to CSI 300 will finally disappear approximately in the 14-th time period. According to the above graphic, it is possible to conclude that the influence of S&P 500 change rate fluctuations on CSI 300 is complex, involving both positive and negative effects.

The impact of CSI 300 on the S&P 500 could potentially be analysed from a different angle. Figure 3 shows the response of CSI 300 to S&P 500 index. In the first time period, the initial impact of one standard deviation on the rate of change of S&P 500 for the CSI 300 is hardly any. Then, start from the second time period the impact start to appear. The most positive impact appears in the second period which roughly reaches 0.0032 and the most negative impact appears in the 5-th time period which roughly reaches -0.0019. After that, the positive and negative influences are continue alternating. As the lag time period lengthens, it becomes evident that the impulse response location will eventually tend toward zero. The CSI 300's influence on the S&P 500 will cease to exist around the 10-th time period. According to the two charts produced above, the conclusion could be reached is that: both CSI 300 and S&P 500 have a high capacity for self-adjustment.

4.4. VAR Variance Decomposition Analysis

There is a traditional statistical technique in multivariate analysis for revealing structures that simplify a large number of variables which is named variance decomposition [10]. Variance decomposition will generate the contribution of impact of all endogenous variables in the data set from the MSE of all the endogenous variables. In order to pinpoint the time period more precisely, it would be beneficial to analyse the stock index's rate of change in greater detail. In the variance decomposition table, it has 4 columns. The first column represents the lag time period, and being fixed to 30 periods. The column S.E. represents the variable's forecast error for each forecast horizon. The last two columns are the impact of all endogenous variables in the data set on the basis of their origin.

Table 6: S&P 500 variance decomposition.

S&P 500 variance decomposition			
Period	S.E.	CSI 300	S&P 500
1	0.012735	0.320504	99.67950
2	0.013193	6.766837	93.23316
3	0.013224	6.976355	93.02365
4	0.013331	7.339000	92.66100
5	0.013468	8.968247	91.03175
6	0.013553	9.891749	90.10825
7	0.013567	10.04589	89.95411
8	0.013601	10.50088	89.49912
9	0.013639	10.99084	89.00916
10	0.013642	10.98668	89.01332
11	0.013644	10.98450	89.01550
12	0.013644	10.98431	89.01569
13	0.013645	10.98989	89.01011
14	0.013645	10.99002	89.00998
15	0.013646	10.99041	89.00959

Table 7: CSI 300 variance decomposition.

CSI 300 variance decomposition:			
Period	S.E.	CSI 300	S&P 500
1	0.012111	100.0000	0.000000
2	0.012170	99.71916	0.280842
3	0.012207	99.23282	0.767179
4	0.012321	98.19737	1.802628
5	0.012341	97.92846	2.071540
6	0.012405	97.30379	2.696214
7	0.012406	97.30177	2.698235
8	0.012408	97.29380	2.706202
9	0.012425	97.24022	2.759783
10	0.012429	97.23968	2.760318
11	0.012430	97.23965	2.760349
12	0.012430	97.23630	2.763703
13	0.012430	97.23050	2.769502
14	0.012430	97.23054	2.769456
15	0.012430	97.23046	2.769542

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16	0.013646	10.99076	89.00924
17	0.013646	10.99078	89.00922
18	0.013646	10.99272	89.00728
19	0.013646	10.99286	89.00714
20	0.013646	10.99300	89.00700
21	0.013646	10.99302	89.00698
22	0.013646	10.99305	89.00695
23	0.013646	10.99305	89.00695
24	0.013646	10.99306	89.00694
25	0.013646	10.99306	89.00694

Table 5: (continued).

26	0.013646	10.99307	89.00693
27	0.013646	10.99307	89.00693
28	0.013646	10.99307	89.00693
29	0.013646	10.99307	89.00693
30	0.013646	10.99307	89.00693

16	0.012431	97.23035	2.769652
17	0.012431	97.23013	2.769874
18	0.012431	97.23002	2.769980
19	0.012431	97.22997	2.770031
20	0.012431	97.22996	2.770040
21	0.012431	97.22994	2.770062
22	0.012431	97.22993	2.770067
23	0.012431	97.22993	2.770067
24	0.012431	97.22993	2.770071
25	0.012431	97.22993	2.770071

Table 6: (continued).

26	0.012431	97.22993	2.770072
27	0.012431	97.22993	2.770073
28	0.012431	97.22993	2.770073
29	0.012431	97.22993	2.770073
30	0.012431	97.22993	2.770073

The Table 5 is the variance decomposition table of S&P 500.The table reveals that the affectation of CSI 300 to S&P 500 has stabilised at approximately 10.993% over time. The fluctuation between affectations becomes stable at the tenth period according to Table 5, which corresponds to the graph in the previous part.

The Table 6 is the variance decomposition table of CSI 300. The table reveals that the affectation of S&P 500 to CSI 300 has stabilised at approximately 2.77% over time. The fluctuation between affectations becomes stable at the fourteenth period according to Table 5, which is consistent with the graph in Section 5.3.

5. Conclusion

Recent information data indicate that the majority of study on the VAR model focuses on certain disciplines or industries. However, few academics analyse the correlation between the stock index change rates of two countries. This research examines the extent to which the S&P 500 and CSI 300 affect each other and themselves. By using the ADF test and AR root graph, the system's stability and stationary have been verified. Impulse Response function and variance decomposition function has analysed the affectation period. This essay could help the investors to analysis one stock and make better decision based on the other stock index. At the same time, it could help economist and politician to prevent the potential stock market crash caused by another country’s stock volatility.

Although the stock index change rate of the 2 investigated stock indices seems similar, some potential problems exist. The top three industries with the most significant weight in the CSI 300 are metals and non-metals (15%), finance and insurance (10.94%), and machinery and equipment (10.74%). The top three industries with the most significant weight in the S&P 500 are information technology (27.3%), health care (14.1%), and consumer discretionary (11.4%). Those data are collected from https://business.sohu.com/. The above data shows a vast difference between the index structures. That means the result and conclusion proven previously might be temporary. As the stock index structure varies, the result might also vary in the future.

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The Role of Fintech in the Innovation and Transformation of the Banking Industry

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Abstract: The rapid development and large-scale application of artificial intelligence, data mining, big data, and cloud computing have already led to dramatic changes in the ecological conditions of social and economic agents. Under the rapid technological development, traditional commercial banks are facing problems such as insufficient development momentum. Therefore, to accelerate its digital transformation, financial technology (fintech) has prompted the banking industry, so as to keep up with the development trend of the times and empower the innovation of commercial banks. Specifically, by analysing the current situation and the impact of the relevant major fintech on the development of the banking industry, this paper aims to gain insight into the advantages and directions of the transformation. The final conclusion of this paper is that, currently, all regions are spending more money on investing in the fintech industry. However, the underlying technological strengths are unevenly developed, with Europe and the US being the most prominent and the Asia-Pacific region catching behind. Fintech represented by artificial intelligence, big data, and cloud computing, can reduce banks' operating costs, helping them accurately profile their customers and intelligently do marketing.

Keywords: fintech, banks, digital transformation, innovation

1. Introduction

The rapid penetration and widespread use of new financial technologies have not only promoted the development of the banking industry but also brought it new challenges. To keep up with the development trend of the times, fintech accelerates the digital transformation of the banking industry. In this paper, the concept and the history of fintech are introduced first. Then, through the comparative analysis and literature research, the current stage of fintech application in the banking industry is explained from two perspectives: the underlying technology of fintech and investment. The representative technologies of fintech, such as artificial intelligence, data mining, big data, and cloud computing, are introduced in detail and their role in the banking industry is also analysed. Finally, the digital transformation in banks is analysed using a case study. This paper can provide a theoretical basis for the banking industry and promote its development and improvement. It affords a detailed introduction to the transformation of the banking industry with the help of fintech, giving inspiration to its future innovation and transformation.

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2. Background Information

2.1. The Concept of Fintech

The term fintech was first coined in the early 1990s by John Reid, the Chairman of Citibank, in the context of the group's 'Smart Card Forum' alliance [1]. However, it is only in recent years that fintech has become popular (see Figure 1 for more details). Fintech offers many different services to different industries, such as mobile payment processing in banks, robot investing, and cryptocurrencies. As fintech continues to develop and be used today, international organisations and academics at home and abroad have defined fintech. However, the use of fintech in different scenarios is often inconsistent, so there is as yet no single definition. According to the Financial Stability Board (FSB), fintech refers to financial innovation driven by emerging frontier technologies such as artificial intelligence, big data, blockchain, and cloud computing.

Specifically, the creation of emerging business models, the application of new technology, and the appearance of new product services have significantly impacted financial markets and the supply of financial service businesses. Douglas W. Arner et al. argued that fintech refers to the use of technology to deliver financial solutions [2]. Schueffel P. provided a comprehensive review of around 200 papers that refer to fintech and ultimately attempted to define a new financial industry by applying semantic analysis to the application of technology to improve financial activities [3]. In summary, fintech is a portmanteau of the words 'finance' and 'technology'. 'Finance' is the economic activity of adding value to money by financing money itself, such as issuing and repatriating money, taking and paying deposits, and buying and selling foreign exchange. ‘Technology’ is the scientific solution to theoretical problems and the technical solution to practical problems. Therefore, in this paper, fintech is defined as the innovation of technology, so as to solve the problems faced by traditional finance [4].

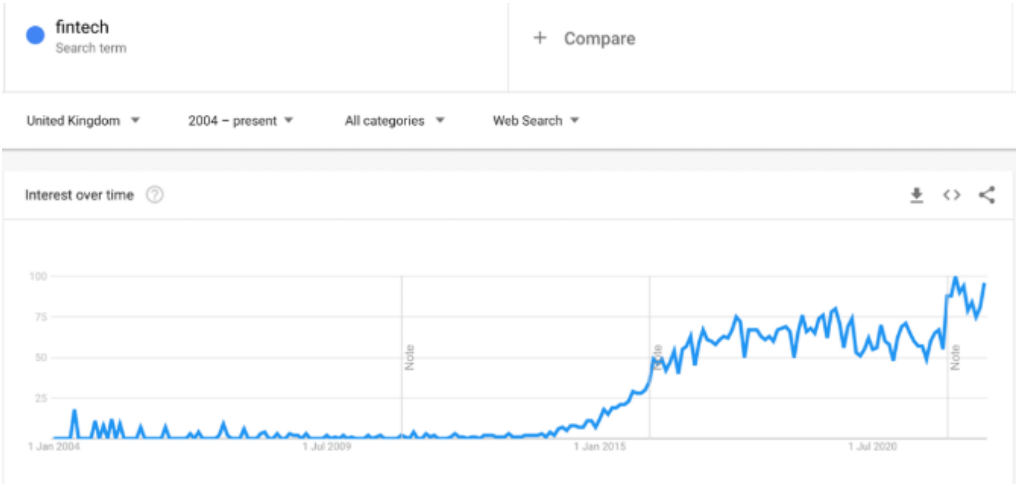

Figure 1: The search volume of fintech on Google from 2004 to present (Source: Google Trends).

2.2. The Leading Role of Technology in the Banking Industry

Technology has been a vital cornerstone driving the banking industry for centuries. The successful application of financial technology has often led to technological innovation in general economic scenarios. Starting with the oldest counter-entry cards, the birth of electronic computers in the 1940s and 1950s led to the gradual electronification and automation of banking operations, with ATMs and POS machines being typical products of this phase. After the 2000s, internet technology developed

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at a rapid pace and became popular, with banks using internet and mobile terminal channels to migrate their offline business online. The user scale and usage rate of online banking in China have induced a long-term upward trend since 2008 (see Figure 2 for details) [5]. The financial sector's face recognition payment system was also a biometric technology born during that period and deeply applied to various life scenarios. With the advent of the big digital era, the banking industry has gradually started to seek digital transformation and entered a high-speed development phase of fintech integration and upgrading (see Figure 3).

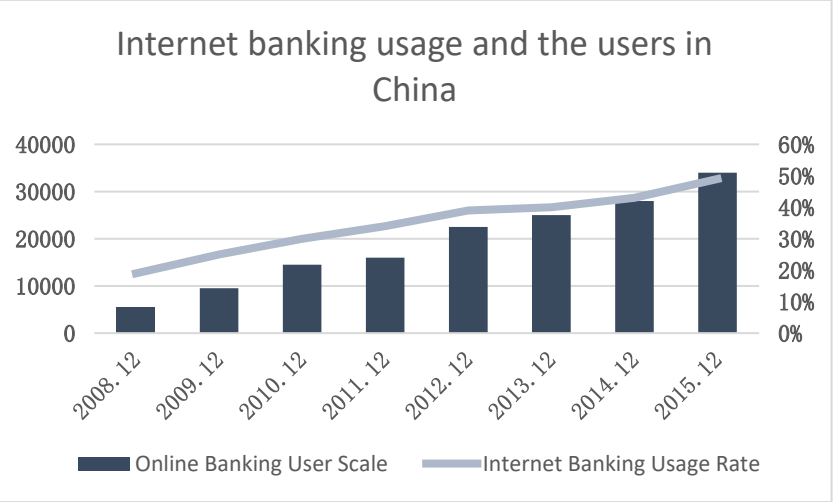

Figure 2: Scale of Internet banking users and Internet banking usage rate in China (Source: Wind, China Merchants Securities).

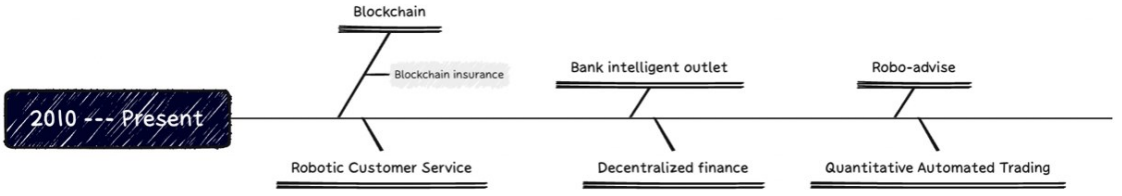

Figure 3: Fintech's rapid growth phase from 2010 to present.

3. Current Development of Fintech in the Banking Sector

This section provides a comparative analysis of the underlying financial technologies in different regions and the level of investment in fintech in the banking sector, thereby understanding the development of the fintech sector in the banking industry in recent years.

3.1. Underlying Financial Technologies

Globally, countries have made financial technology innovation an essential strategic objective to enhance international competitiveness and maintain national security. They have also formulated corresponding strategic plans and policies. In terms of artificial intelligence in the fintech segment, the US and Europe are world leaders in the development and application of AI technology. The US has always focused on the research and development of technology in this area and has been at the forefront of AI research. This is also due to the government's support, which has laid a strong

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foundation for AI research and development in the US. In addition, the 2020 regional report on global AI patent publications shows that North America has the highest number of patent publications [6]. Artificial intelligence technologies are bringing great changes to various fields. According to a study by data analytics provider IRI 2020, China and the US lead the way in terms of AI research and development, spending $622 billion and $599 billion, respectively. Countries such as Japan, Germany, India, and South Korea are also investing a large amount of money in research in this area [7]. In short, the US and Europe are early and strong in research and development in the field of fintech; but the huge market brought by the vast population base in the Asia Pacific region and the large amount of funding invested in the field of fintech in recent years have contributed to its rapid development.

3.2. Fintech Investments

Scott Woepke, former head of global financial service strategy at Acxiom, said "Bank-tech partnerships are not just a new trend. They are the new core competency of financial institutions. As the number of partners grows, the structure continues to evolve. Fintech, large technology companies, co-branders and others, whose collaboration with marketing, sales, and customer service has become particularly important." In 2018, Cornerstone conducted a survey of bank executives and found that only 1 in 5 thought that fintech collaboration was crucial in their overall business strategy. Then two years later in 2021, nearly half of the respondents said that collaboration made sense [8]. Thereby, for larger commercial banks, the integration and collaboration with fintech are becoming a fundamental form of innovation. Fintech can improve banks' workflows as well as their infrastructure, enhancing their efficiency and banking effectiveness. The inclusion of fintech partners facilitates the expansion of the bank's business scope and enhances user experience and satisfaction.

In the US, bank investment in fintech is also extremely elevated. The average annual investment in the banking sector for the fintech sector is growing from $2.3 million in 2019 to $9.68 million in 2021 [9]. Driven by the background of the era of big data, more and more US banks focus on the application of banking fintech and also regard fintech partners as a strong driving force for the growth of the banking industry. In the recent Statistical Report on the Development of the Internet in China released by the China Internet Information Center (CNNIC), it was revealed that by June 2022, the size of China's Internet users exceeded 1 billion, having reached 1.051 billion and that the Internet penetration rate was approximately 75%. This environment is undoubtedly an ideal breeding ground for thriving the fintech industry. In addition, China is a world leader in fintech development and has the world's most dynamic fintech company. Ant Group (a subsidiary of Chinese technology company Alibaba Group) is the world's most valuable fintech entity with a value of US$150 billion in 2020. This market capitalisation is more than four times higher than the second-ranked fintech company (valued at $36 billion by Stripe) [10].

In such a favourable environment, China's major banks are also following the direction of the times and seeking innovation and transformation, thus increasing their investment in the direction of financial technology. As of 2020, ICBC has invested nearly 2.38 billion RMB in fintech, followed by China Construction Bank with 2.21 billion RMB. The agricultural Bank of China came in third with an investment of nearly 1.83 billion RMB [11]. Secondly, five banks in China have invested more than 1 billion RMB in fintech, which shows that banks are focusing on fintech development and that fintech is also conducive to the competitiveness of the banking industry and its sustainable and prosperous development.

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4. Fintech-related Technical Support

Today's smart financial technology is driven by technologies represented by artificial intelligence, big data, cloud computing, etc. to bring disruptive changes to the development of the financial market. With artificial intelligence as the core technology and big data analysis as the basis. This section will focus on the related technologies and analyze their application in banking scenarios.

4.1. Artificial Intelligence

Artificial intelligence is a discipline that studies computers to simulate human behaviour and thinking, so that computers have the ability to execute, perceive, learn and reason, and make decisions. With advances in computer vision, machine learning, natural language processing, robotics, and biometrics, AI has made great strides in fintech. Nowadays, more and more artificial intelligence robots appear in bank business halls to provide customers with intelligent customer service, business guidance, and other services. While improving service quality and efficiency reduces the bank's operating costs. Specifically, intelligent robots integrate multiple artificial intelligence technologies such as speech recognition, language understanding, deep learning, and face recognition. The intelligent robots can communicate with customers and provide them with professional answers. They can also help the bank lobby manager to guide customers who come to handle businesses and guide the different businesses handled by customers. Secondly, the intelligent robot identifies customers through its biometric function, extracts customer information from the bank data lake, and provides precise customized services. This can significantly reduce the pressure of manual services and improve service efficiency and accuracy while reducing costs.

4.2. Data Mining

Data mining is an interdisciplinary and diversified technical field, including database technology, statistics, machine learning, visualization, and high-performance computing. Due to high data density and high-quality characteristics, data mining technology has been widely used in commercial banks. Banks at home and abroad have also set up data warehouse application departments to carry out important work such as data mining and data extraction. For example, according to the newly compiled guest script, the monthly newly compiled customer information of each branch of the bank is extracted. This is conducive to the rational analysis of the bank's business scale and business capabilities within the bank. Secondly, data mining can also carry out intelligent marketing to customers. Analyze customer needs to establish customer portraits and match products to achieve personalized product recommendations and precise marketing.

4.3. Big Data

The National Science Foundation (NSF) has defined Big Data as large, diverse, complex, longitudinal and/or distributed data sets generated from instruments, sensors, Internet transactions, email, video, clickstreams and/or all other digital sources [12]. De Mauro and colleagues argue that Big Data represents a large, fast, and diverse information asset requiring specific technologies and analytical methods to transform it into a valuable product [13]. The global market for Big Data has also been increasing in recent years and is expected to reach US$116.07 billion by 2027 [14]. Figure 4 illustrates the market share of big data in the financial sector and other sectors in 2019. Banking, financial services and insurance (BFSI for short) is the sector with the highest rate of big data adoption. The application of big data will not only broaden the business development of banks but also help commercial banks to innovate their products. The widespread use of big data in the banking industry

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also contributes to improving customer satisfaction and optimising banks' internal management, thus enhancing their core competitiveness.

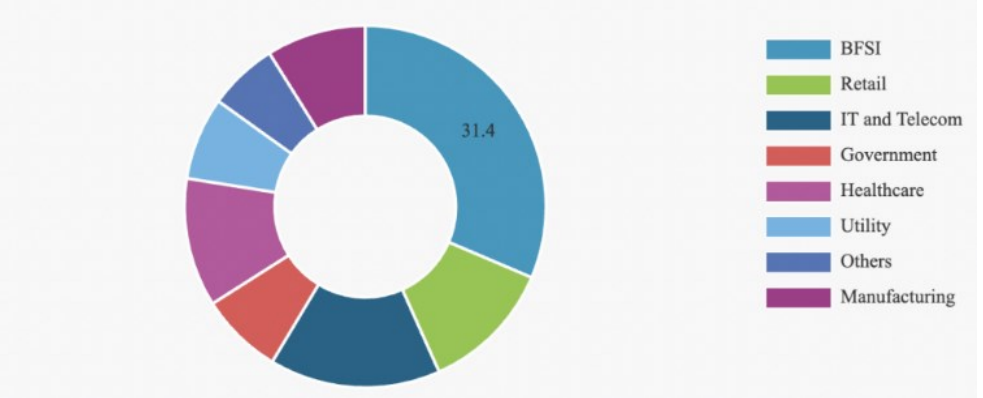

Figure 4: Global big data technology market share, by end-use industry, 2019 (Source: www.fortunebusinessinsights.com).

4.4. Cloud Computing

Cloud computing is not a single technology. In fact, it is a product of the convergence of traditional computer and network technologies, such as distributed computing, parallel computing, utility computing, network storage, virtualisation, load balancing and other developments [15]. Cloud computing has revolutionised the development of today's banking industry by enabling more flexible and convenient aggregation of computing-based businesses for more efficient and closer multi-party collaboration. In the retail business of banks, cloud computing services play an important role in product sales, branch services, account information and many other areas. For example, cloud computing can be used for one-stop product marketing, where customers can access all financial products released by all banks and other financial institutions through a unified interface across different channels (Internet banking, mobile apps, or other channels) and purchase the required financial products with any bank card they hold.

5. Case Studies of Digital Transformation

Banks have also started to explore digital transformation in response to the call of the times. ICBC, for example, is using financial technology to help digital transformation in four areas: digital ecology, digital technology, digital infrastructure and digital genes. So far, the results have been remarkable, and the response has been good. One of the cases is building digital halls to help with digital insights in branches. Building digital showrooms and smart halls is undoubtedly a powerful tool in banks' digital transformation. Through the panoramic view of the branch, the surrounding resources score, the radar navigation for account expansion, the GBC fund undertaking, the intelligent comparison of branches, the potential customer function, the credit card area and other platform functions, the digital hall transforms the complex resource information and performance indicators of the branch into simple values displayed by dimensions in a "one-click" manner, so that the strengths and weaknesses of the branch's operation and development can be clearly seen. The platform provides a clear view of the branch's strengths and weaknesses. It provides an entry point for outlets to understand their operational status fully and gives full play to the positive effects of big data in empowering grassroots management strategies and enhancing the competitiveness of outlets. The digital lobby operation will fully play its data-driven role, thoroughly combining core technologies such as data introduction, data mining, data analysis and visualisation. The value of data will be used to guide the marketing direction

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of the bank, combining product sales with branch characteristics and planning marketing strategies for different branch characteristics. The digital lobby system has gained a high level of attention from the industry after it was put into production. The head office of the Industrial and Commercial Bank of China has gained a comprehensive understanding of the construction of the system and has introduced it, with plans to promote it across the bank. The main results so far are: achieving full coverage of users: after the digital hall platform was officially launched, more than 1,000 platform users were opened for the whole bank, and 100% coverage of branch users was achieved, with the branch user activity rate reaching 96.1%. High effectiveness in account expansion: During the development stage of the digital hall platform, the Group Customer Financial Services Department relied on the platform data to sort out the business cooperation between the central and municipal enterprises, institutional interbank customers and small and medium-sized enterprises and institutions of ICBC Beijing Branch, establish a list of target customers and push the enterprises and institutions to market and expand. As a result, more than 300 new settlement accounts were opened, 260 million RMB of new public deposits were made, 39 new payroll accounts were created, 32 new credit accounts were created, and 13.48 million RMB of loans were placed. It also achieved a breakthrough in new business development for 127 existing customers, adding more than 20 new business cooperation items such as digital RMB, corporate wealth management, letters of credit and bank cards, effectively enhancing the product coverage of existing customers (Case from internal information of ICBC).

6. Conclusion

In the era of fintech, technology has revolutionised traditional forms of finance and brought a great impact on banks. Fintech is currently becoming a booster for the transformation of commercial banks. Commercial banks must reposition their business philosophy and operation methods, and apply technologies such as artificial intelligence, data mining, big data, and cloud computing to the transformation of their businesses. Therefore, it is important to study the transformation of commercial banks facilitated by technology in the context of financial technology. This paper is based on a study of the domestic and international literature on fintech and digital transformation in the banking industry. It illustrates and analyses the current situation of commercial bank transformation and points out the problems in the transformation process of commercial banks in various regions and the extent of penetration of fintech in the banking industry. The paper selects a case study of the digital transformation of the famous Chinese bank ICBC. The author also analyses its typical transformation measures and summarises its transformation practices to provide some development ideas for the innovative transformation of the banking industry in the context of fintech. Given that fintech is still a new thing and the author's knowledge of it is relatively insufficient, this paper only discusses the development of fintech in the banking industry from a theoretical perspective, and the depth of its research needs to be further deepened. In the subsequent research and study, the author will continue to dig deeper into the research direction and issues, striving for a more in-depth exploration of the transformation of commercial banks with the help of fintech.

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Exploring the Causes of "Civil Servant Craze"

-A Case Study of Zhanjiang

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Abstract: The number of applicants for civil service posts has increased year by year, and the phenomenon of "Civil Servant Craze" has heated up again. Some scholars have made a quantitative analysis of the causes and effects of this phenomenon from the perspective of sociology and economics, but there are still few literatures using case studies. Therefore, this study will take Zhanjiang as an example to conduct case analysis, collect the employment information of civil servants in Zhanjiang in recent years, and understand the current academic background of the employed civil servants in the city and its changes. The "Civil Servant Craze" may be related to traditional concepts, civil servants' income, and its job stability. In addition, most of the people employed in Zhanjiang are graduates of non-key undergraduate colleges, which may be related to the city preference of high-level (Overseas, Project 985, Project 211, Key undergraduate) universities students for employment and the different employment pressures of graduates of different levels during the epidemic.

Keywords: "Civil Servant Craze", Zhanjiang, academic background

1. Introduction

For a long time, the phenomenon of "Civil Servant Craze" has attracted much attention. Civil servants, with some advantages such as "within the system", "good welfare", "stable work", and "iron rice bowl", have attracted many college students to apply for the examination after graduation. For college students, the common examination for admissions to the civil service can be divided into three categories, national examination, provincial examination and selective examination. The national examination belongs to the central examination sequence, which is recruited by the central authorities or institutions directly under the state controlling, the provincial examination and selection examination belong to the local examination sequence and are recruited by units directly under provincial and municipal administrations. In 2020, a total of 24,000 national civil servants were recruited, and in 2021, 25,000 national civil servants were recruited, that is, the number of candidates has not changed much [1]. However, in the past three or four years, the number of applicants for examination for admissions to the civil service has shown a rapid upward trend. Taking the national examination as an example, the number of applicants in 2019 was 1,271,978, but this year, the number of applicants rose to 2,023,641, an increase of 59% (Figure 1). According to the data, the "Civil Servant Craze" continues, and more and more college students have taken civil servants as one of their employment preferences.

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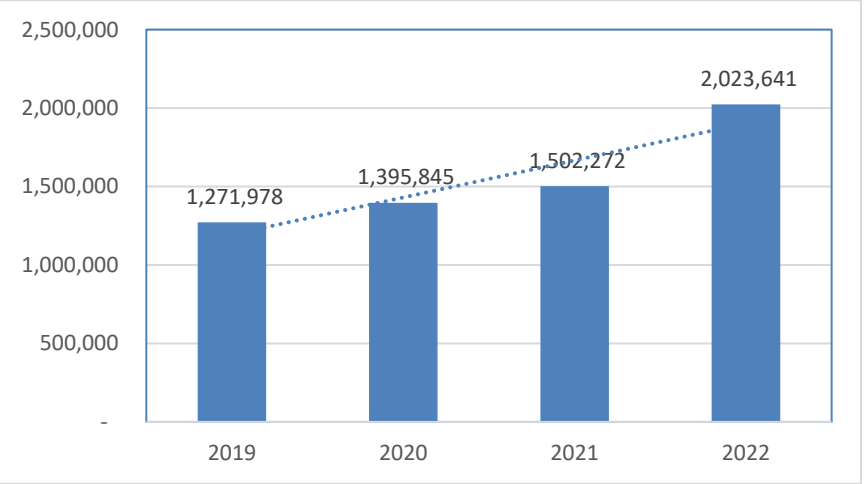

Figure 1: Number of applicants for the national examination for admissions to the civil service from 2019 to 2022 [2-5].

Analyzing the reasons behind and understanding this phenomenon in depth will help optimize the employment allocation of the society. This paper will analyze why taking the examination for admissions to the civil service is a job choice for many young people or universities' students after graduation. In addition, this paper takes the "Civil Servant Craze" in Zhanjiang as a case study and uses admission data to analyze the proportion of different types of colleges or universities. The types of colleges or universities are divided into Junior college, Non-key undergraduate, Key undergraduate, Project 211, Project 985 and Overseas, so as to further understand the "Civil Servant Craze".

In the previous literature, some scholars used qualitative analysis methods to analyze the "civil servant craze" from the perspective of economics or sociology, but there are still few literatures using case studies. This paper will use the method of case study and use data to assist analysis.

2. Reasons

2.1. Influenced by Traditional Ideas

Since the ancient dynasties, China has had the traditional idea of obtaining official status, which is the most effective way for poor people to change their destiny. Such a idea has a profound impact on the Chinese. Many parents hope their sons and daughters can become civil servants. Due to the unequal distribution of welfare in real life, civil servants still have certain privileges. Thus, under the thought of utilitarianism, parents want their sons and daughters apply for the examination [6]. In addition to their parents, a lot of young people still adhere to this traditional idea. They regard the examination as a way to improve their status, enjoying the highest honor [7].

2.2. Civil Servants Have Considerable Income

From the perspective of income level, civil servants are high-yield occupations. Civil servants not only have legal income such as wages and subsidies, but also have certain hidden income, which is more attractive than most jobs in society.

In terms of legal income, the wage of civil servants has been increasing continuously, and it has basically exceeded the average of the society. Civil servants also enjoy housing benefits, they not only have housing subsidies, but are also eligible to live in some privileged rooms, such as price-limited rooms [8]. In addition, civil servants have a series of expected benefits such as medical

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insurance, social security, pension and so on. When the civil servants' cash payment for general outpatient clinics has accumulated to 1,000 yuan, the medical subsidy is 80%, while some urban workers need to accumulate up to 2,000 yuan, the subsidy ratio is only 50%, and the total subsidy cannot exceed 20,000 yuan within a year. For pensions, the standard of civil servants is higher than that of employees of enterprises, and the general gap is between 3 and 5 times [9].

More importantly, civil servants have certain hidden income. They can use their power to carry out a certain "rent-seeking behavior", and through economic intervention, benefit individuals and some private companies or enterprises, so as to complete the transaction of power and money. This kind of power-money transaction can often bring huge benefits to civil servants, even far greater than the normal and legal income [8].

On the other hand, the total cost of civil servants before their entry, including written examination, interview registration fees and training fees, is less than 10000 yuan, and the time cost is three months. Many units have their own restaurants, and the price of food is far lower than the normal level of restaurants outside, even a meal only costs a few yuan [8].

It can be seen that the benefits of civil servants are far greater than their costs, and more importantly, their income is higher than that of many enterprise employees. Therefore, civil servants are a good choice for colleges and universities' students after graduation.

2.3. Affected by Employment Stability

During the epidemic period, China introduced a series of prevention and control measures for the health of the people, such as home quarantine, business closure, etc. These measures effectively prevented the spread of the virus. But almost all industries have been affected due to the strict methods, especially the catering industry and entertainment industry. In 2020, the number of college and university graduates in China reached more than 8.7 million, and many companies reduce the number of recruitment due to the epidemic, resulting in increased employment pressure on graduates. The number of unemployed people caused by the epidemic in 2020 was at least 20 million [10]. According to the data of the National Bureau of Statistics (Figure 2), from 2019 to 2020, the number of urban unemployed people increased from 9.45 million to 11.6 million, and the unemployment rate increased from 3.6% to 4.2%. Although the number of urban unemployed people had decreased in 2021, it still was 10% higher than that in 2019 [11]. There are some differences between employment stability within and outside the system.

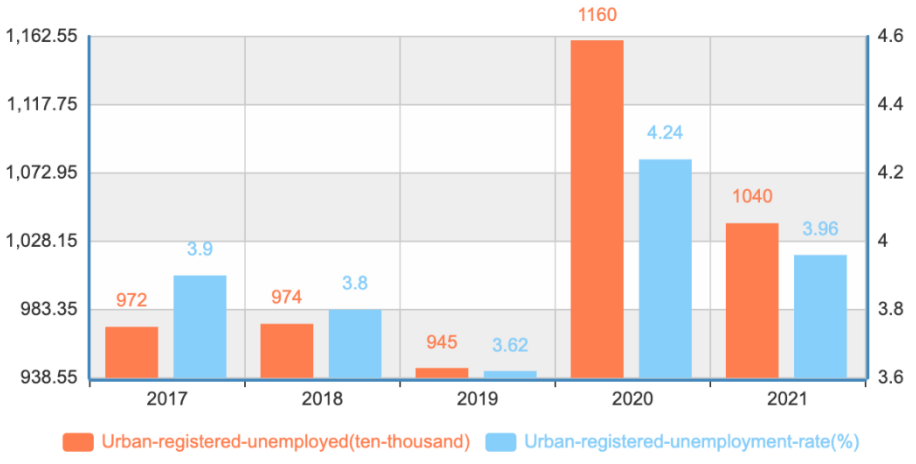

Figure 2: Urban registered unemployed persons and unemployment rate from 2017 to 2021 [11].

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2.3.1. Working Within the System

The employment stability within the system is relatively high. According to the data released by the National Bureau of Statistics (Figure 3), during the epidemic period, compared with the over-all increase in the unemployed, the employment of state-owned units not only did not decrease but instead increased, from 54.73 million in 2019 to 2020. 55.63 million people in the year.

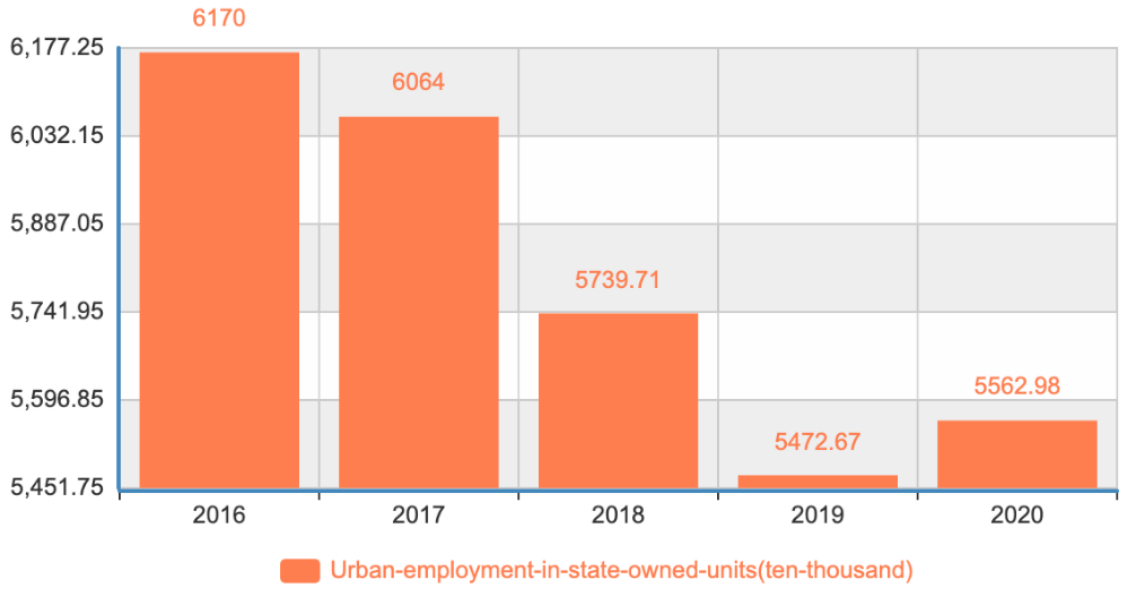

Figure 3: Urban employment in state-owned units (ten thousand) [11].

For civil servants, the occupation appears to be more stable. Some scholars pointed out that in a survey conducted by Hebei Youth Daily, 67% of the civil servant candidates interviewed said that they applied for the exam based on the stable characteristic of this job [12]. Although the Ministry of Human Resources and Social Security issued the "Regulations on Dismissal of Civil Servants (Trial)" in 2019 to dismiss some civil servants who failed the assessment or had low work efficiency, scholars believed that the conditions for dismissing civil servants were vague and difficult to follow. Most grassroots units put the emphasis of annual assessment on the allocation of outstanding civil servants, rather than the assessment of unqualified civil servants. In addition, the current regulations do not have clear penalties for some bad behaviors of civil servants, such as entering entertainment places, which makes the work of civil servants more stable [13]. In addition, during the epidemic period, the demand for civil servants has risen. In addition to abiding by epidemic prevention regulations, civil servants have more important responsibilities as the vanguard of epidemic prevention. Civil servants are responsible for publicizing epidemic prevention and control policies, organizing and mobilizing the masses, implementing prevention and control measures and other important responsibilities. During this period, civil servants are busy and arduous in their work. In order to enhance the sense of responsibility and mission of the civil servants, the government realizes effective incentives measures [14]. Therefore, during the epidemic, the stability of the employment of civil servants is relatively high.

2.3.2. Working Outside the System

Compared with those within the system, the employment stability of people outside the system during the epidemic is much lower. According to a report by Xinhuanet, from January to Novem-ber 2020, over 3 million self-employed individual businesses and enterprises have been deregis-tered in China.

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After deducting some mobile vendors and online stores, there are still more than 1 million shops closed. According to the data of the fourth national economic census in 2019, a self-employed individual employs 2.37 persons [15]. Under the epidemic, the closure of more than 3 million self-employed individual businesses could lead to the unemployment of a large number of people outside the system.

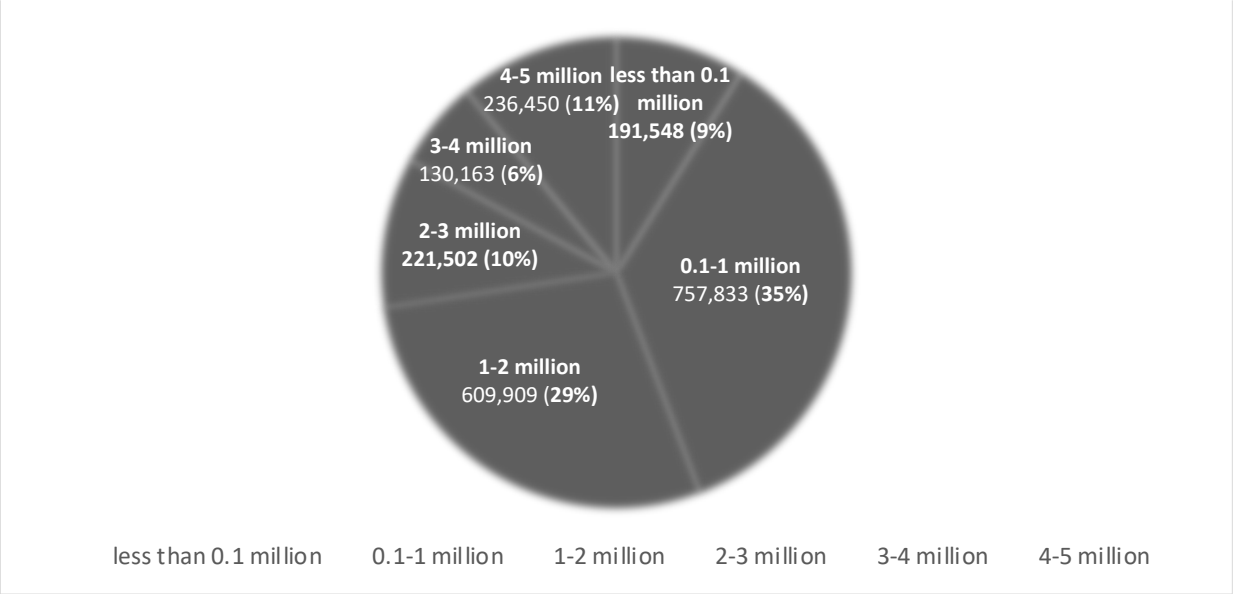

Figure 4: Registered capital distribution of "small stores" enterprises cancelled from January to November 2020 [15].

The epidemic situation has a greater impact on the floating population. During the epidemic, the labor-intensive factories need to stop production according to the epidemic prevention regulations, and most of the workers recruited by these factories belong to the floating population. Zang (2022) believes that most of the floating population is not covered by the urban social security. During the epidemic, this particular population faces greater uncertainty and be more likely to lose their jobs compared with urban registered residents under the discrimination [16].

There is a huge difference between the stability within and outside the system. Under such a big difference, colleges and universities' graduates more prefer to work within the system, and the civil service is the most respectable profession within the system, so the "Civil Servant Crazy" continues to rise during the epidemic.

3. Case Study

3.1. Case Description

Zhanjiang is one of the 14 cities in the early days of the reform and opening up. It is also a typical coastal city in the southeast. Zhanjiang has five county-level cities (Wuchuan, Lianjiang, Leizhou, Suixi, Xuwen) and five municipal districts (Chikan, Xiashan, Potou, Mazhang, and Jingkai).

In 2019, 25,157 people signed up for the civil service examination; in 2020, 32,963 people signed up for the civil service examination; in 2021, 4,750 people signed up for the civil service examination; and in 2022, 5,886 people signed up for the civil service examination.

In the past, there was a traditional impression that the north paid more attention to civil servants and the south paid more attention to business. Why did the number of applicants for the civil service examination in Zhanjiang rise increase during the epidemic? What is the academic background of the

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employed people? An in-depth understanding of the topic of civil servants in Zhanjiang is conducive to optimizing the allocation of employment in this city.

3.2. Case Analysis

3.2.1. The Number of Applicants is on the Rise

The wage of civil servants in the southeast coast are relatively high, and the "civil servant craze" in Zhanjiang may be related to the salaries of civil servants. There are regional differences in the "civil servant craze", and the regional differences are consistent with the regional economic de-velopment differences in China, the proportion of applicants and admissions in the eastern re-gion is higher than that in the central and western regions [17]. Relying on favorable geograph-ical advantages and preferential policies at the beginning of reform and opening up, the south-east coastal provinces have developed rapidly in the past 40 years. Guangdong's annual GDP is ahead of most provinces in China. There is a positive relationship between wages and average monthly GDP, which means that compared with most provinces, people in Guangdong have higher wages [18]. As for the salary of civil servants, some scholars found that the salary of civil servants in Inner Mongolia, Tibet, Qinghai, Sichuan, municipalities directly under the Central Government, eastern and southern coastal areas is at a high level [19]. As a city in Guangdong Province and a coastal city in the southeast, and one of the 14 cities in the early days of the re-form and opening up, Zhanjiang has certain attraction for candidates.

3.2.2. The Academic Background of the Admitted Population

This study is based on the epidemic period as a specific period, so the selected samples are all in 2019~2022. There were 208 data samples in 2019, 884 samples in 2020, 742 samples in 2021, and 863 samples in 2022. A total of 2,697 samples were collected. All samples are from the official websites of all counties and districts in Zhanjiang. The main purpose of this analysis is to explore the proportion and change of various types of colleges and universities in each year through data. Colleges and universities are divided into junior colleges, non-key universities, key universities, Project 211 universities, Project 985 universities and overseas universities, so as to deeply understand the background of civil servants in third tier cities.

The analysis results are as shown in Figure 5. Compared with the pre-epidemic situation, the proportion of background population in key universities has decreased rather than increased. In 2020, the proportion of people with backgrounds in all colleges and universities will change greatly, the proportion of people with backgrounds in non-key undergraduate colleges and universities increased from 38.94% to 53.51%, the proportion of people with backgrounds in junior colleges increased from 4.33% to 6.67%, while the proportion of people with backgrounds in high-level undergraduate universities (key universities, Project 211 universities, Project 985 universities) decreased. For example, the proportion of people with backgrounds in Project 985 universities decreased from 6.73% to 3.17%, and the proportion of people with backgrounds in key universities decreased from 37.02% to 28.96%. In addition, from 2020 to 2022, the proportion of the number of people with backgrounds in various colleges and universities were relatively stable. The employed civil servants are mainly those with backgrounds in non-key undergraduate colleges and universities, accounting for more than 50%.

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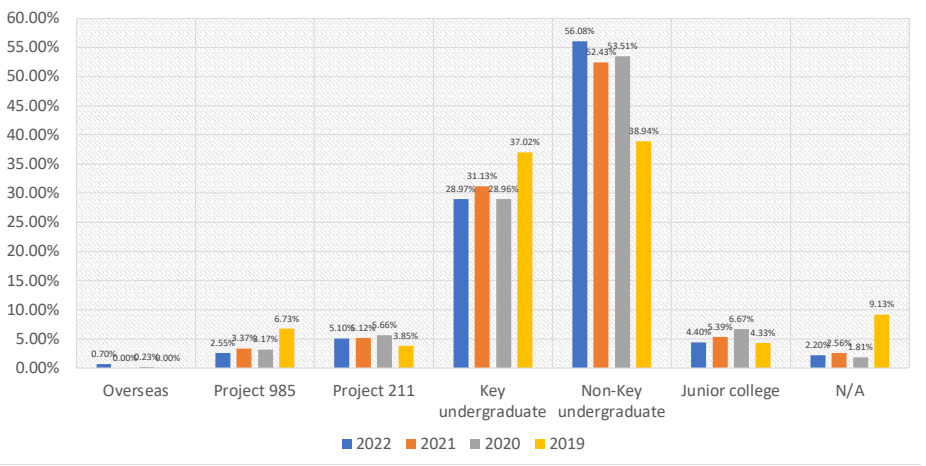

Figure 5: College/University background of civil servants employed from 2019 to 2022, based on the employment lists of each county-level and district-level government in Zhanjiang.

4. Discussion

There may be two reasons for the majority of employed civil servants with backgrounds from non-key undergraduate colleges. On the one hand, there are differences in the choice of cities for graduates of different types of colleges and universities, and on the other hand, the employment pressures faced by graduates from different types of colleges and universities are different.

4.1. Differences in the Choice of Cities for Graduates

Graduates from high-level universities are more likely to find employment in high-level cities. In the first and second tier cities, they can enjoy better social resources, have more employment opportunities, and their income level is significantly higher than that of the third-tier cities. Their willingness to work in the third-tier cities is generally not high. Some scholars believed that the level of colleges and universities will affect graduates' choice of employment cities. The higher the level of colleges and universities, the more likely the graduates are to be in big cities with more opportunities and greater benefits, because they can find more jobs that can match their knowledge [20]. Therefore, the number of graduates from key universities preferring to work in third tier cities is small, making the number of graduates from non-key universities working in third tier cities relatively high.

4.2. Different Employment Pressures Faced by Graduates

Another reason may be related to the stability of employment outside the system mentioned above. HR generally prefers to recruit graduates from high-level universities. In addition, the employment instability during the epidemic has increased, a large number of campus recruitment activities have been cancelled. Therefore, graduates from non-key undergraduate universities are under much greater pressure to obtain employment outside the system than graduates from high-level universities. They more prefer to obtain employment within the system. Some scholars found that the distribution of university resources is uneven, high-level universities not only have more resources, but also have higher enrollment scores, leading to a wider gap between the comprehensive quality of graduates from those universities and non-key colleges and universities. At the same time, generally, students from high-level universities are more proactive than those from non-key universities, so the recognition of high-level universities in the society is generally higher [21]. In March 2020, 46.9% of fresh graduates from Project 985 universities had found a job, while only 17.7% of fresh graduates

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from ordinary undergraduate colleges and universities had found a job. In addition, 70% of fresh graduates from Project 985 universities are confident of finding satisfactory jobs, but only 56.6% of fresh graduates from ordinary undergraduate colleges and universities are confident of finding jobs [22]. It can be seen that graduates of high-level undergraduate graduates of non-key undergraduate colleges and universities face different situations and pressures in employment outside the system, which causes non-key undergraduate graduates to more prefer to be a civil servant.

The limitation of this study is that the research data comes from the information published on the official website of the local government, and there may be missing sample data. This research data also has the problem of incomplete household registration information of many employees, which makes it impossible to classify and analyze the household registration of the employed civil servants, and to judge whether the candidates are from other provinces. In addition, there is also a lack of information on the academic qualifications and degrees of many personnel, which makes it impossible to conduct research and analysis on the academic qualifications and degrees of the employed civil servants.

5. Conclusion

Through the studies, it is found that the "Civil Servant Craze" is related to people's traditional ideas, civil servants' income and job stability. In addition to the legal income higher than the average level of society, civil servants also have the possibility of huge hidden income. Civil servants can achieve power-money trade in some illegal ways, which has a great temptation for graduates. In addition, during the epidemic period, compared with the work outside the system, the civil servants have higher stability, and people do not need to worry about being dismissed. Civil servants in Zhanjiang have a good salary, which has certain attraction for graduates. And through data analysis, it is found that most of the civil servants employed in Zhanjiang graduated from non-key universities, which may be related to two reasons. First of all, the graduates of high-level universities tend to develop in the first and second-tier cities with more resources, opportunities and income, while the third-tier cities are not attractive to high-level talents. Therefore, the civil servants employed in Zhanjiang is mainly graduates from non-key undergraduate universities. Secondly, during the epidemic, graduates from non-key universities faced more difficulties than those from high-level universities, and they were more vulnerable to the negative impact of epidemic. Therefore, they preferred the work within the system, especially the civil servant occupation.

This paper analyzes the causes and reality of the "Civil Servant Craze" during the epidemic by case analysis, which can help people further understand the phenomenon and facilitate the follow-up investigation of the phenomenon by scholars. In addition, this paper takes Zhanjiang as a case study example, it is a third-tier city. Future research can take some first-tier and second-tier cities as study samples and then make a comparative analysis. At the same time, it can also analyze the qualifications and degrees of the employed civil servants after classification of qualifications and degrees.

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Explaining the Employment Situation of Chinese Students after Studying in the US

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Abstract: In the context of the increasing awareness of sovereignty in the world and the changing relationship between China and the United States, the employment situation of Chinese students after studying in the United States is one of the hot issues of concern in today's society. For international students, the employment situation at home and abroad is changing and has changed dramatically, and the phenomenon of devaluation of "returnees" is becoming more and more common compared to the early days of reform and opening up. The research method of this paper is SWOT analysis, and the specific research methods are as follows: collecting the employment-related data of Chinese international students in the US in recent years, comparing the employment situation of international students at home and abroad by using SWOT analysis, and making a comprehensive analysis and evaluation of the employment situation of Chinese international students returning to China and staying in the US. To sum up, in the age of information technology, a large amount of information can be collected beyond geographical and spatial restrictions, and international students can even obtain information on time abroad. From the above, if the barriers to learning are removed, international students can overcome the obstacles and make up for the shortcomings with their own efforts.

Keywords: Chinese students, employment situation, study abroad, US

1. Introduction

The employment situation of Chinese students after studying in the U.S. is one of the hot issues of concern in today's society. Researchers have found that with the increasing awareness of sovereignty in the world and the changing relationship between China and the U.S., the employment situation at home and abroad is changing and has changed dramatically for international students, and the high investment and risk of studying in the U.S. is becoming a concern as the devaluation of "returnees" is becoming more common than at the beginning of the reform and opening up. The purpose of this paper is to study the high cost and risk of studying in the U.S., collect the employment data of Chinese students in the U.S. in recent years, compare the employment situation of international students at

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home and abroad by using swot analysis and make a comprehensive analysis and evaluation of the employment situation of Chinese students returning to China and staying in the U.S [1]. Most of the existing papers just presented the strengths and weaknesses of economic trends and employment in China. But this paper not only introduced the strengths and weaknesses of international students returning to China for employment, this paper also introduced the opportunities and threats of international students returning to China for employment. This makes our paper more careful to introduce the advantages and disadvantages of international students returning to work in China to our readers. The main purpose of our paper is to give international students studying in the United States a better understanding of recent employment trends in China and to be able to seek employment at the right time. return to China for employment, our paper can be a good help.

2. SWOT Analysis on Employment Prospects of Chinese Overseas Students in USA

2.1. Analysis on Internal Environment on Employment Prospects of Chinese Overseas Students in USA

Strength: Overseas students have hard-core advantage in employment. HR care about what university the applicants graduate and in what majors they are. The fact that they are enrolled by famous universities implies that they possess good ability of learning and professional quality, which has surpassed many of their opponents in interviews [2]. For those students, whose university ranks high and whose major is suitable, will win more opportunities than any other their contemporaries, with a wider range of making choice [3].

Strength: Overseas students have intangible advantages in employment. When seeking for employment, the applicants' comprehensive abilities and some workplace skills etc. is advantageous, such as the ability to learn, to communicate and to handle emergent situation etc.

Weakness: generally unacceptable of the workplace culture. Overseas students lead a life and study in overseas university; they adapt to the life pace and manners of living there. However, the life in China and working pace is not as open and liberal as in oversea. The procedures are complicated and miscellaneous, which an Email can't fix; instead, you should do them in person, abiding by the procedure regulations.

Weakness: unfamiliar with the employment demand of enterprises in China, weak in connection resources. Not long after their coming back from abroad, some students are surely rebuild their own social circle in China [4]. Connections need to be accumulated from scratch again. They are not suitable for those jobs which rely on connections and relationships.

Weakness: Some of the learning contents are not suitable for circumstance in China. Undergraduate students learning laws abroad need to take different judicial examinations again when returning to China. Because the legal system is completely different [5]. Besides, students learning accounting in Australia need to learn accounting mechanism in China again, if they plan to go to an ordinary enterprise in China. Because the accounting system in Australia is very close to that in Britain, but different with that in China in some degree [6].

Weakness: Some of the overseas students are weak in their internship experience. Due to different education manner both home and abroad, many overseas master program is no more than two years. To safeguard a high GPA score and to do other projects and overseas internship, they don't have time to apply to do suitable domestic jobs; compared with other domestic graduates with internship experience, they have demerits in competition obviously.

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2.2. Analysis on External Environment on Employment Prospects of Chinese Overseas Students in USA

Opportunity: China promulgates preferential policies for international students' employment. In recent years, China has issued various preferential policies for international students to encourage them to return to China for employment and entrepreneurship, and on August 26, 2022, the opening of HICOOL2022 Global Entrepreneur Summit and the signing of the cooperation framework agreement between the Ministry of Education and Beijing Municipality to build a model zone for returning talents to China mentioned that China has established the principle of "supporting students to study abroad, encouraging them to return to China, freedom to come and go, and play a role". In the framework agreement signed between the Ministry of Education and Beijing Municipality, it is mentioned that China has established the policy of "supporting study abroad, encouraging return to China, freedom to come and go, and playing a role" [6]. Beijing attaches great importance to the work of returning overseas students to China and has attracted a large number of high-level overseas students to work and start their business in Beijing by means of talent attraction, platform attraction, joint talent attraction and market attraction. One of the preferential policies is settling in Beijing, such as their children can attend public schools and purchase guaranteed housing. And state-owned enterprises need international students to support international business, and many import and export business. They also give foreign students a two-year employment guarantee. Because of the epidemic, many companies are laying off employees and reducing salaries, but on the contrary, state-owned enterprises are expanding their recruitment [7]. Because international students have the advantage of language, they are very advantageous for international business. And many people think that state-owned enterprises are equal to "iron rice bowls", and they do not have those elimination systems and do not fire employees at will. In 2021, the number of returnees submitting their resumes to SOEs increased by 3.7% year-on-year. In the survey, 30% of international students expect to work in state-owned enterprises, and 59% of international students think there is "public examination fever" among the returnee group, among which 38.3% think "public examination fever" has increased significantly in the past two years.

Opportunities: Domestic support for international students to settle in China. The Q&A related to the special support initiative for talents to help resume work and production issued by Shanghai Municipal Bureau of Human Resources and Social Security in 2022 says that the relevant authorities will refer to the Times Higher Education, U.S. News & World Report, QS World University Rankings (QS World University Rankings), and the World University Rankings (QS World University Rankings) [8]. Quacquarelli Symonds World University Rankings, and Shanghai Ranking's Academic Ranking of World Universities. The list is based on the list in the settlement reporting system. For those who graduated from the top 50 universities in the world, the requirement of social insurance premium payment base and payment time will be abolished, and they can apply for settlement directly after coming to work in the city full-time; for those who graduated from the world ranking 51-100, they can apply for settlement after coming to work in the city full-time and paying social insurance premium for 6 months.

In such a background, according to the information, the number of international students returning to China to seek jobs has increased, almost by 33.9% in both 2021 and 2020. 44.5% of the international students are concentrated in the first-tier cities new first-tier cities account for 34.4% [9]. The first-tier cities give a lot of preferential policies to international students, such as Beijing: if international students meet certain requirements, they can apply for Beijing household registration.

Threat: International students can't catch the recruitment time in time. Domestic spring recruitment is in March and April, and large spring recruitment is in September and October, many state-owned enterprises, famous enterprises and Internet companies refer to this time to recruit people

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[10]. Alibaba, for example, has very strict requirements for fresh graduates. Two-year graduates must submit in the fall and spring of their second year to be considered in the fresher batch. Like universities in the U.S., this is the most time-intensive study period, which is the opposite of what happens in China. If you are busy with your studies or if your graduation time does not correspond to your job application time, you may lose out on these big companies.

Table 1: SWOT matrix for the analysis of the return employment prospects of Chinese students in the United States.

Internal and External Environment	Strengths ·Overseas students have hard-core advantage in employment. ·Overseas students have intangible advantages in employment.	Weaknesses ·International students struggle to embrace workplace culture. ·International students do not understand the recruitment needs of domestic companies and have weak connections. ·International students do not study the same content as at home. ·Some of the overseas students are weak in their internship experience.
Opportunities ·Preferential policies enacted in China for the employment of international students ·China gives support to international students to settle in China	S-O Strategy ·Relying on the opportunities supported by the employment settlement policy, international students can make full use of the highly competitive characteristics of themselves in the workplace ·Aiming at the international vision and fluent language communication ability of international students, we will create an exclusive "critical thinking ability"	W-O Strategy ·Seize the opportunity of the employment settlement policy to integrate multi-faceted information to make up for its own shortcomings ·Explore actionable solutions around issues where the internship experience is weak
Threats ·International students can't catch up with the recruitment in time ·The "biggest wave of returnees in history" has significantly increased the pressure on job searches ·The rise of domestic universities and the strengthening of the competitiveness of local talents 4th-level heading	S-T Strategy ·Analyze their own conditions, clarify and highlight the soft and hard advantages ·Do the homework related to domestic recruitment matters and avoid the risks caused by time differences	W-T Strategy ·Strengthen the understanding of domestic enterprises, and do a good job in psychological construction of job search pressure ·Clarify the domestic internship system and increase efforts to enrich your internship experience

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Threats: "the largest wave of returnees in history" has significantly increased the pressure of job hunting. According to the research data for returnees in 2021, more than 80% of the returnees think that it is more difficult to find a job in China than before, and the first reason is "more returnees to China and more competition". Since the first batch of scholars went to the U.S. for further study in 1978, international students and returnees have been synonymous with "elite" for a long time, so they can become hot talents in any field [11]. However, as the number of returnees has increased, the number of returnees exceeded 700,000 in 2017 alone, and the original advantage has been affected by the increase of talent base, and the competitive pressure has increased sharply.

Threat: the rise of domestic universities and the strengthening of the competitiveness of local talents. Domestic universities once lagged behind the top universities in the world because of their late start and weak basic science. However, thanks to the implementation of the strategy of developing the country through science and education and the gradual attention of the country to the cultivation of talents, many domestic colleges and universities are now gradually rising. Compared with returnees, local students from prestigious universities know more about the domestic economic development and have richer regional and network resources, which make them strong competitors for returnees. Table 1 is the SWOT matrix for the analysis of the return employment prospects of Chinese students in the United States.

3. Suggestion

The government is supposed to introduce some policies for the development of students studying abroad returning to China, so as to motivate more of them to return to China after graduation.

Policies for the settlement of students studying abroad in China: It is a general concern for students studying abroad to settle in China. Over the past few years, the government has abolished the requirements of social insurance premium payment base and payment time for those who graduated from the top 50 institutions in the world, allowing them to apply for settlement in a direct manner by taking up full-time employment in the city. As for those who graduated from the top 51-100 institutions in the world, they can apply for settlement after taking up full-time employment in the city and paying social insurance premium for 6 months.

Regarding the policy of subsidies, the government is encouraged to appropriately increase the subsidies for students studying abroad to return to China for development, such as rental housing and living subsidies, so as to induce more students to return to China for development.

Regarding the preferential policies for business start-ups, the government is encouraged to grant certain funds for business start-ups and give preferential policies in terms of taxation and loans to students studying abroad returning to China.

Regarding preferential policies for children's education, some regions provide preferential policies for children of students studying abroad to enroll in schools after returning to China, which are normally arranged by the education department in a unified manner with schools of selection. For those who have lived abroad for more than 5 years, they are given extra points for enrollment during the language compliance period, while schools where teaching foreign languages are available in the district for students studying abroad to make their own choices.

4. Conclusion

International students' international outlook, fluency in language and communication and strong "critical thinking skills" are the most competitive attributes in the workplace, and the admission to a top US university means that students have excellent academic skills and professionalism. However, the "largest wave of returnees in history" has significantly increased the pressure to find a job; the

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rise of domestic universities has strengthened the competitiveness of local talent. In addition, some international students have weak internship experience. In summary, it is recommended that international students who are more articulate, more active and good at verbal communication return to China to find employment opportunities, while international students with low stress tolerance or weak internship experience are advised to focus on these two areas for self-improvement. Prepare the Certificate of Returned Overseas Student in advance and prepare for the application. Firstly, international students should adjust their mentality, secondly, they should be familiar with the employment situation and understand the domestic recruitment market. Then, be clear about their career goals. Finally, after returning to China, they should be clear about the timing of corporate recruitment and be ready to take part in online applications, written tests and interviews in a timely manner.

In conclusion, after clarifying the obstacles to studying abroad at home, international students can overcome the obstacles and make up for the deficiencies through their own efforts. To sum up, being in the age of information technology, there is a huge amount of information available to collect, and across geographical and spatial limitations, international students can get timely information even when they are abroad. What is lacking is made up for, and if disadvantages can be made up for, they can be turned into advantages. In a word, the prospects for international students to return to their home countries for employment are also very delightful.

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Analysis of Chinese Financial Market under COVID-19

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Abstract: As the world's second-largest economy with a population of 1.4 billion people, China has the world's most sophisticated industrial chain and occupies a critical position in the globalized world economic market with a strong manufacturing sector and a promising service sector. With a market mechanism that is very different from the free-market economy popular in the Western world, such as a completely different proportion of taxation, usually the influence of the political system, the Chinese market often operates with huge potential profit margins and potential crises. It is often greatly influenced by policies, especially under the epidemic in 2020. The purpose of this paper is to analyze the general future directly, exploring current trends from the domestic and international aspects and making a rational economy on a macro level by looking at market operations over the past few years, taking into account current trends, and making recommendations accordingly.

Keywords: Chinese market, COVID-19, macroeconomy, trending

1. Introduction

In early 2020, COVID-19, which has been described as the sixth public health emergency of global concern since the 21st century, interrupted the steady trend of international financial markets and led to dramatic turmoil in international financial markets, such as the four primary meltdowns in the U.S. stock market in 2020, the devaluation of the Turkish lira by more than forty percent in 2021 and the worldwide economic stimulus efforts in 2022 [1-3]. The COVID epidemic has led to a systemic and comprehensive shock to the global economy.

As part of the globalized market, China's financial markets were also hit hard, resulting in entirely new financial economics and market restructuring. These changes will dramatically impact the future of financial firms and investment markets. The trends in China's financial markets are very different from those of other markets due to the unique nature of the policies and national conditions and the lagging and persistent nature of the epidemic's impact. The epidemic embargo has changed market allocation and provided investors and entrepreneurs with new growth opportunities.

Since the winter of 2021, the frequency of domestic COVID outbreaks has increased, and the cycle duration has become longer. Due to China's particular epidemic policy, the number of confirmed cases, duration of control, regional coverage, and depth of industry caused by the new strain in the latest round of outbreaks since March 2022 have surpassed the January-March 2020 outbreak period. In addition, this round of attacks is concentrated in the core areas of China's economy, critical areas of the industrial supply chain, and window areas for foreign investment and foreign trade. It is concentrated at special times, such as high energy and other commodities prices and the Fed's monetary

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policy shift to contraction [4, 5]. For example, in the second quarter, the GDP of Shanghai, the center of the Chinese economy, fell by 13.7 percent year-on-year due to a series of control measures caused by the epidemic, which determined that the impact of the current round of the outbreak on the Chinese economy was more rapid and far-reaching [6].

China's economy in 2022 shows a variety of development patterns. China's macroeconomic recovery has slowed significantly in the first half of 2022 due to a combination of domestic and international adverse factors, especially the impact of the current epidemic round, with more significant downward pressure. According to data released by the China Bureau of Statistics, actual Gross domestic product (GDP) grew 4.8% year-on-year in the first quarter and 1.3% sequentially, which was lower than expected at the beginning of the year; GDP in the second quarter was RMB 2,924.64 billion, up 0.4% year-on-year, both lower than expected at the beginning of the year. GDP in the year's first half was 562,642 billion yuan, up 2.5% year-on-year at constant prices [7].

To understand the systemic financial risks in China in the post-epidemic era and to propose a reasonable capital allocation plan, this paper will complete an analysis of investment options in various segments of China's financial market, taking into account the historical background of the Chinese market and the changing characteristics of the financial market during the epidemic, and refer to various literature to summarize the laws of risk change and clarify the development of the future market.

2. Domestic Economy

China's domestic economy is divided into three main sectors [8]. These three significant industries can be divided into production, consumption, and investment, depending on their characteristics. However, these three categories can often be viewed through business and personal aspects. The display can reflect the success of past state and market policies and thus determine future trends; consumption is often used to determine market preferences. Therefore, future production policies and investments are based on whether past production results have been sold well and invested in more profitable industries. The smoothness of the transition between production, consumption, and investment often reflects whether a country or region has a well-functioning market and whether society is active or conservative in its use of assets.

The production market is currently characterized by sectoral differentiation. According to China's National Bureau of Statistics, driven by high export growth and the development of industrial upgrading, China's manufacturing value reached 27.4% of GDP in 2021, while the proportion was as high as 28.8% in the first half of 2022 [9]. This is the first time since 2011 that the proportion of China's manufacturing value added to GDP has risen. Although this is good for the industrial structure of developing countries, the increase in the share of manufacturing reflects the downturn in other sectors, as the part of the manufacturing industry tends to be divided into services as the signal of development of the manufacturing industry; it also increases the risk of market operation [10]. Affected by the dual control policy of energy consumption, the upstream industries, such as mining and raw materials, maintain low growth; affected by factors such as weak market demand, the downstream consumer goods manufacturing industry is relatively sluggish [9]. This has brought a financial crisis to private enterprises, causing a premature decline in manufacturing, and making the transition to high-end manufacturing more complex and riskier [11].

The combination of declining market demand and rising production costs led to a significant deterioration in corporate performance. Total corporate profits in 2022 showed negative growth in April, and the loss surface expanded. From January to April, total profits of industrial enterprises above the national scale grew by 3.5% year-on-year, down 5.0 percentage points from the growth rate in the first quarter; among them, total profits in April fell by 8.5% year-on-year, down 17.0 percentage points from the growth rate in the first quarter In April, total profits fell by 8.5% year-on-year, down

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17.0 percentage points from the first quarter growth rate [12]. From January to April, the number of industrial enterprises with losses increased by 15.5% year-on-year, accounting for 27.8%, and the number of casualties increased by 39.7% year-on-year, accounting for 20.5% of total profits [12]. 1-4 months, in 41 industrial industries, 20 industries with total profits decreased year-on-year, five more than the first quarter, and only 19 industries with total profits showed Year-on-year growth, five less than the first quarter. It should be noted that the deterioration in the performance of the service sector and MSMEs is harder to quantify and measure so the impact may be more severe than the above industrial enterprises.

The service sector's future is particularly bleak (see Fig. 1). Although the services production index rose by 1.8 percent year-on-year in August 2022, this was based on a 0.3 percent decrease in the production index from January to July. The service sector continues sluggish due to the economic crisis and policies. At the same time, due to the specificity of the clearance policy, the epidemic tends to affect the service sector in one or more cities over a period to a much greater extent than its impact on the manufacturing industry. As a result, while the services production index is relatively stable overall, it is more volatile for specific regions.

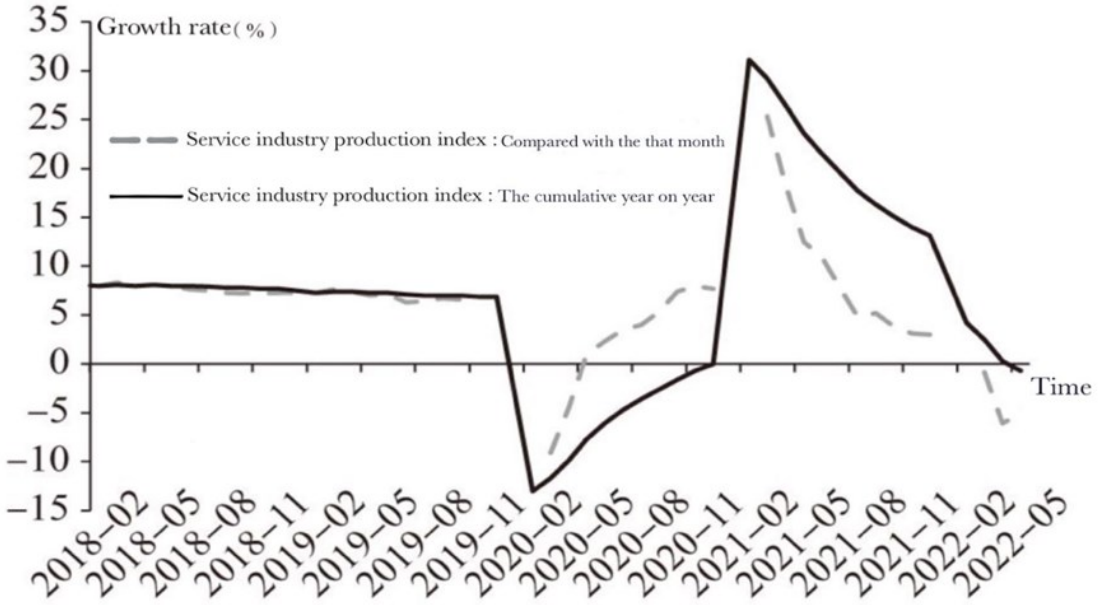

Figure 1: Service industry production index from 2018 to 2022 [12].

As for consumption, according to the National Bureau of Statistics of China, the total retail sales of consumer goods from January to July 2022 was 246.32 billion yuan, down 0.2% year-on-year [13]. What can be seen is that the overall trend of total retail sales of consumer goods is down and continued to decline sharply in March, April, and May, in contrast to the general trend in the second half of 2021 (see Fig. 2). The consumer market, which was hit hard by the epidemic and policies, did not show intense consumption growth when the market rebounded in June, but rather a slow rebound. This implies that Chinese expectations for consumption are low due to the policy impact of the first and second quarters.

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Figure 2: Growth of total retail sales of consumer goods from 2021 to 2022 [13].

In contrast to the sluggish consumer market, the investment market performs well. Despite the shrinking GDP, investment in fixed assets has been increasing. From January to July 2022, the national investment in fixed assets (excluding rural household registration) was 3198.12 billion yuan, up 5.7% year-on-year [14]. Among them, private investment in fixed assets of 178.073 billion yuan, up 2.7% year-on-year [14]. On a month-on-month basis, fixed asset investment (excluding rural household registration) grew by 0.16 percent in July (see Fig. 3) [14]. This reflects that the public continues to be conservative in their investment choices, expecting more stability and certainty and no longer pursuing high-profit and high-risk investment options. As for official investment, industrial investment grew by 10.5% year-on-year, while infrastructure investment (excluding electricity, heat, gas, and water production and supply) grew by 7.4% year-on-year [14]. Among them, investment in the water management industry grew by 14.5%, investment in the public facilities management industry grew by 11.7%, investment in the road transportation industry fell by 0.2%, and investment in the railroad transportation industry fell by 5.0% [14]. Due to the specificity of the policy, the government's investment possesses a localized and fundamental character, intended to reduce the excessive youth unemployment rate (19.9%) and to boost local consumption and business investment [15].

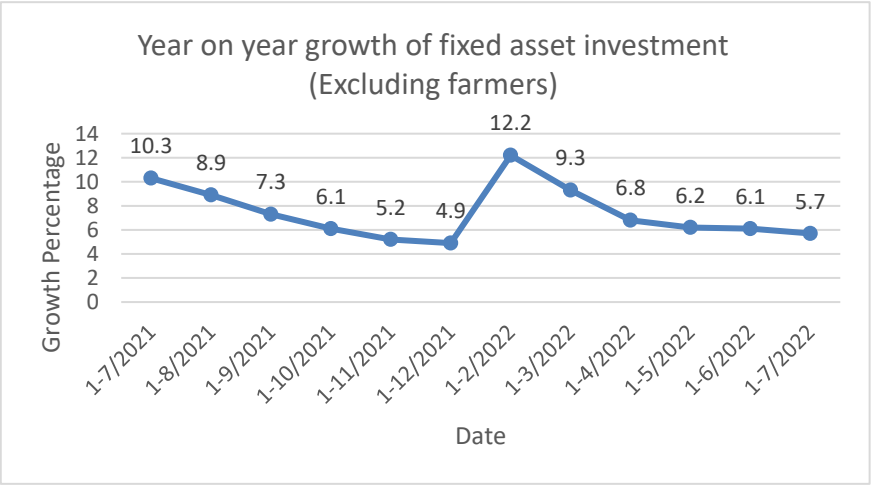

Figure 3: Growth of fixed asset investment from 2021 to 2022 [14].

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Analyzing consumer markets by type of consumption allows for a more precise analysis of the outlook for a segment of the market, allowing for a more granular and accurate political and economic impact received by a specific type of company. According to China's National Bureau of Statistics, the restaurant industry took the biggest hit, while retail goods were much better off. Total spending in the restaurant sector fell at a rate of less than 20% between March and May and had not recovered by July (see Fig. 4) [13]. It is reasonable to assume that the massive hit to the restaurant market will be challenging to recover from in the near term, as the immediate impact of a total shrinkage of more than fifty percent is readily observable. This will directly impact investors' future investment choices and leave the entire restaurant market in a negative cycle of lack of investment - declining restaurant numbers - lower ratings - less investment. It is worth noting that such a situation is often the first to hit restaurant outlets in shopping streets and malls. These stores often rely on high monthly revenues to cover their high rent and labor costs.

Retail goods, on the other hand, compare much better. Surprisingly, the retail merchandise sector has been picking up since June (see Fig. 4) [13]. Although the nearly ten percent decline in April seems severe, people rely more on retail goods than restaurants [13]. With China's well-developed e-commerce and logistics network, they have lower prices due to the lack of rent, and the number of brick-and-mortar retail stores can be predicted to decrease further after this blow. It is reasonable to assume that these stores will be transformed into stores that sell the experience, as this is something that cannot be purchased online.

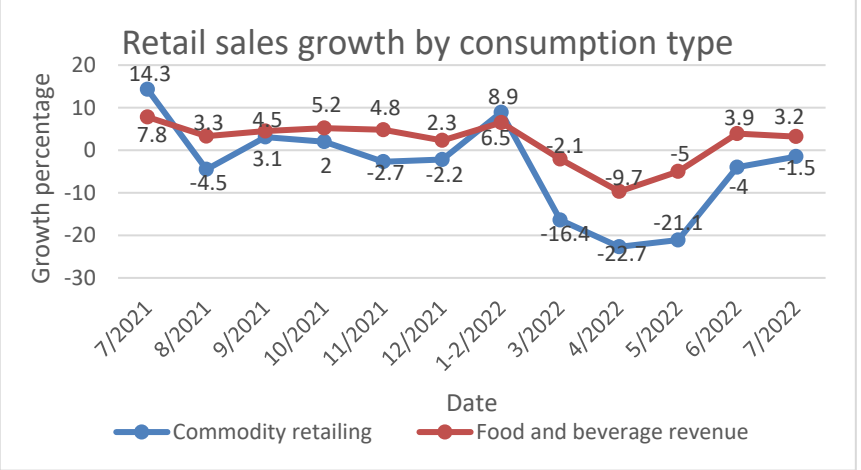

Figure 4: Retail sales growth from 2021 to 2022 [13].

According to data from the People's Bank of China, in the first half of 2022, the balance of deposits in domestic and foreign currencies of China's financial institutions reached 257.68 trillion yuan, of which the ratio of deposits was 113.69 trillion yuan, in the first half of the year alone, China's household deposits increased by 10 trillion yuan [16]. According to China's population of 1.413 billion, in the first half of the year, the per capita deposit balance has reached 80,500,000 yuan, an increase of 10% from the end of 2021 [16]. Given the low growth in total GDP and the high growth in per capita deposit balances, it is reasonable to infer that nationals across the Chinese region have a low appetite for consumption in the consumer market and tend to be more conservative in their investment choices, investing in fixed assets rather than financial assets. The nation wants to save and thus have a higher level of risk tolerance rather than consume to satisfy their short-term desires or seek risky profits.

The outlook for China's domestic economy is relatively negative, considering industry production, the consumer market, the investment market, and per capita savings. The manufacturing sector is under pressure from raw material purchases and commodity piling. The consumer market is facing a significant blow, with an overall downward trend, with the restaurant industry being particularly hard

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hit. In the investment market, national investment choices are gradually becoming more conservative, preferring fixed asset investment and savings. The negative impact of the financial sector is evident, as reflected in the slightly higher growth rate of liabilities than growth. It is foreseeable that market liberalization, increased market competition, and support for small and medium-sized real enterprises will be the leading tone of China's domestic market in the future to stimulate the national consumption economy. Considering the specificity of China's national situation and policies, how to motivate the young generation with a high unemployment rate and high competitiveness will be regarded as the focus of policies, and college students' entrepreneurship may be promoted.

3. International Economy

China's international economy can be measured mainly by the import/export trade balance, foreign investment, and the currency exchange rate. The import/export trade balance reflects the international influence of China's manufacturing sector and the extent of China's participation in the global market, foreign investment means whether the Chinese market is attractive to the international community, and the currency exchange rate acts as a leveraging agent in international trade. A comprehensive view of these three aspects can reflect whether China reaps profits and development prospects in internationalization.

On the import and export side, in August, the total import and export of goods were 3,712.4 billion yuan, up 8.6% year-on-year. Among them, exports of 212.41 billion yuan, up 11.8%; imports of 158.82 billion yuan, up 4.6%. Import and export offset, trade surplus of 535.9 billion yuan. In 1-8 months, the total import and export of goods were 273,026 billion yuan, an increase of 10.1%. Among them, exports of 154,831 billion yuan, an increase of 14.2%; imports of 118,195 billion yuan, an increase of 5.2%. 1-8 months, general trade imports and exports accounted for 64.3% of the total imports and exports, a rise of 2.3 percentage points over the same period last year. Private enterprises accounted for 50.1% of the total imports and exports, an increase of 2.1 percentage points over the same period the previous year. Exports of electrical and mechanical products increased by 9.8% year-on-year, accounting for 56.5% of the total exports [17]. It is not difficult to see that China's import and export trade is still in the profit-making stage; the electromechanical category is China's main export commodity. On the one hand, this means that China's electromechanical sort is welcomed in international trade. Still, on the other hand, it also means that the competition in the electromechanical category is going to be more intense, which gives other goods higher export possibilities.

In terms of foreign investment input, from January to June 2022, the actual amount of foreign investment used nationwide was RMB 723.31 billion, up 17.4% year-on-year on a comparable basis. From an industry perspective, the actual use of foreign investment in the service sector amounted to RMB 537.13 billion, up 9.2%. The primary benefit of foreign investment in high-tech industries increased by 33.6%, including 31.1% in high-tech manufacturing and 34.4% in high-tech services [18]. In the past, China attracted foreign investment mainly in the manufacturing sector, and foreign investment promoted China's industrialization process, but to further improve the level of development of the manufacturing industry and promote the high-quality development of the manufacturing industry is inseparable from the development of the service sector, especially high-tech services, and modern services. China has a massive demand in the fields mentioned above, and service-oriented multinational companies have the corresponding advantages. Therefore, the general and high-tech service industries are the main forces attracting foreign investment. As the domestic manufacturing industry is warming up again, it is foreseeable that China's manufacturing chain will be further improved, and the demand for service industries will be further expanded. The continued influx of foreign capital can judge the expanding market gap [19].

In terms of the currency exchange rate, starting from June 2020, with the policy advantage and rapid economic recovery, workers resumed work, and the industrial chain entire Chinese

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manufacturing industry created economic growth in the world economic downturn in 2020 with the boom of RMB appreciation. As the world economy recovers in 2021, the RMB will generally maintain a slight preference. In 2022, however, the RMB depreciates rapidly due to a slowdown in domestic economic growth, an epidemic that hits the export supply chain, moderate monetary easing by the PBoC, narrowing interest rate differentials between the U.S. and China, increased pressure on capital outflows, and a solid external U.S. dollar [20]. At the same time, the epidemic raided central cities such as Beijing and Shanghai. In addition, many towns went into city closures from time to time, causing economic expectations to deteriorate rapidly. The Chinese government's desire to save the economy is getting increasingly urgent, even requiring local governments to stimulate the economy by "all means necessary," with interest rate cuts becoming one of the most important [4]. With the Fed raising interest rates, the Chinese central bank's interest rate cuts may not stimulate the domestic economy and may even lead to capital outflows. The devaluation of the currency is evidence that this policy has had little effect. It is unacceptable for the current giant economic bubble because it would reduce the procedure's efficiency and dampen the motivation and confidence of producers and consumers [21]. But considering the relatively limited size of the overseas RMB relative to the total domestic currency and the country's complete industrialization system and supporting infrastructure, there is still much room for macro policy regulation [22, 23]. But as the epidemic continues to grow in prevalence, the effect of the policy appears to be stretched and even hurt the exchange rate in the future.

4. Suggestions

Domestic development, production, investment, and consumption have very different development patterns. Manufacturing will remain the hot spot for the show until the end of epidemic prevention and control in China. And with the unsealing of large cities, a rebound in the service sector can be expected. This is due to the continued inflow of foreign capital in the service sector and the country's need for industrial upgrading in the manufacturing industry. In other words, while the manufacturing industry will remain steady to positive for some time, the service sector has higher room for growth. Due to the blow suffered by the production sector, choosing the right time to invest may be able to catch the wave of economic recovery.

The situation in the consumer sector will be a bit more complicated. Since e-commerce has gained a higher market share after this economic fluctuation, the choice of electronic sales channels and small factory production has become a more popular business model. Considering the possible future support policies of the state for MSMEs and people's dependence on retail goods, future growth seems to be guaranteed. Meanwhile, the restaurant industry has suffered a massive blow in exchange for the rise of fast food. It is foreseeable that the restaurant industry will stumble for some time. The transition to offline after opening the market through investment in fast food will cater to the future development trend.

As far as international economic development is concerned, foreign capital will keep flowing into China for profits because China has a service market that cannot be ignored; at the same time, it becomes a challenge to keep the gains in the country because of the devaluation of the Chinese currency. What can be confirmed is that stimulating domestic manufacturing and increasing trade surplus will be the mainstream of household and international manufacturing companies in the future.

5. Conclusion

China has one of the world's most sophisticated industrial chains, which has contributed significantly to the stability of the globalized world economy in the face of the epidemic and an auspicious service sector that has raised the hopes of domestic and foreign investors. With a market mechanism that is

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very different from the free-market economy prevalent in the Western world, China's government often has significant influence over the market. This is well reflected in the continued growth of the Chinese economy in 2020 and now in the recession.

In the short term, the manufacturing sector will still be able to maintain its upward trend for a short period, while the service sector will depend entirely on the opening of policies and events; investors will focus more on fixed assets caused by the Chinese government's continuous investment in infrastructure development and water systems, as well as by the conservative choice of the market as a whole; from the consumer's point of view, due to the change of habits and the deepening of the concept of epidemic prevention, the restaurant industry It is challenging to return to the scale before the epidemic. Still, due to people's reliance on retail goods, e-commerce retail will further squeeze the profit margins of brick-and-mortar stores, which benefits entrepreneurs because of smaller costs. Still, it will additionally be a blow to large mall retail stores, and stores selling experiences and services will occupy a larger share of brick-and-mortar stores. The future Chinese market will emphasize the development of the service sector, as it is the primary channel to upgrade the manufacturing industry and sustain the real economy. Focusing on the service sector will be a good choice for producers, investors, and consumers, bringing them a broader market, higher profits, and a better consumer experience.

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Product Differentiation

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Abstract: Product differentiation is a key component of market structure, according to the theory of industrial organization, and the degree to which enterprises control the market depends on how well they differentiate their products. In addition, the company generates enough uniqueness in the components making up the product entity or in the delivery of the product to distinguish it from competing goods of a similar nature and draw in customers, earning their preference and loyalty. This paper introduces the causes of product differentiation, analyzes its application in the market and the implementable strategies for enterprises to achieve product differentiation, and uses some examples to illustrate that product differentiation is a highly visible marketing strategy, which should be widely promoted. At the same time, it also has certain limitations and instability. Products need to establish a variety of different advantages and long-term supply chain between enterprises, cannot blindly exaggerate the role of product differentiation. In the current market environment, the same product categories emerge in endlessly. Therefore, businesses must properly create differentiation in order to make their products stand out.

Keywords: competitive advantage, technical innovation, price differentiation, establishing cognition

1. Introduction

Product differentiation is the process by which a business modifies essentially identical products in a specific way to trick consumers into thinking they are distinct and engendering various preferences. Product disparities are typically common, with the exception of monopolistic markets (single items) and completely competitive markets (uniform products). Businesses have absolute monopoly rights over commodities that are distinctive from other goods, and these rights create obstacles for rival corporations to enter a market or industry and gain a competitive edge. Thus, product differentiation not only sets the enterprise apart from other businesses in the same market and competes for an advantageous position in the market competition based on product differences, but also forces external entrants to spend huge amounts of cash to win the loyalty of existing clients and thus creates some obstacles. Product differentiation is therefore extremely important to businesses' advertising strategies.

There are two types of product differentiation: vertical difference and horizontal difference. The term "vertical difference" describes items that outperform rivals. Products with level differences set them with the exception of rivals. In real life, there are countless examples of successful brand launches by alternating vertical differentiation and horizontal differentiation. For example, customers

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all very familiar with Procter & Gamble company. There are six Procter & Gamble shampoo brands in China. P&G has created individualized positioning for each of its six brands thanks to the intelligent use of product differentiation, which has helped the company establish an excellent track record in the shampoo industry. From the perspective of consumer demand, product differences include different attitudes of consumers towards similar products. Thus, the reasons for product differences include the reasons that lead a buyer to decide to buy one product over another. Specifically, the reasons for product differences can be summarized as follows:

(1) Quality or design reasons;

(2) Causes of blocked or incomplete information. The basic quality and performance of the product being purchased are not comprehended by consumers, as evidenced, for instance, by the design of sophisticated durable goods or by the fact that they are not frequently purchased;

(3) the distinction in a brand, trademark, or business name brought about by a seller's promotional activity, specifically in terms of advertising, promotion, and service;

(4) Geographical location differences of similar enterprises.

While the reasons for product differences vary, they vary in different industries. For example, because consumers have no information and are easily lured by advertising, advertising plays an important role in generating product differences, especially in soap, cigarettes and alcohol. The primary area of variation between cars and electrical appliances is product design. The researchers also discovered that the consumer goods industry has more product variation than the raw goods industry because in the latter, consumers are more knowledgeable about the technology and quality of the products they purchase, and many products are normalized, so there are fewer observable differences in the products themselves. Evidently, product variations are not important in the mining, forestry, aquaculture, or agriculture sectors, but they are in the construction, transportation, service, and wholesale sectors. [1].

2. Application

2.1. Core Level of Products

Implement technical innovation and serialization of product functions to differentiate products at the core level. The result of technical advancement is product differentiation. Therefore, businesses should increase their Focus on R&D, actively monitor the science and technology development trends in their industry and around the world, research the most recent trends in the development of the equipment and raw materials that businesses need, and make informed decisions about technology and product development. When a product is serialized with a variety of functions to meet the various needs of its customers, this practice is known as function serialization. As an illustration, if some features are added, they become luxury goods (or high-end products), and if certain functions are removed, they become middle- and low-grade consumer goods. Depending on their spending limits and personal preferences, consumers can select items with the appropriate features.

For example, the mobile phone is used for mobile communication, such as the development of its function to the depth of the direction, increase the storage function of the mobile phone, the Internet connection with the computer function, mobile stock market reflection function, and even start the home smart appliances and other functions, to meet the needs of different levels of consumers. In the face of fierce market competition in China's shampoo industry, the American Procter & Gamble Company finds out product gaps and develops products by subdividing the market. First targeted at the common dandruff diseases, launched the "Head & Shoulders" shampoo, the dandruff shampoo has become the best-selling shampoo in China in just three years. Rolled out again subsequently "vitamin original b5", "have healthy, shine of course" pan ting, "compliant" float downy "protect wet"

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sand camp. Consumers have been deeply affected by the development of such differentiated advantages, which have also significantly influenced market competitiveness [2].

2.2. Form of Products

Utilize product differentiation strategies such as brand image optimization, quality enhancement, attractive packaging design, and others. Although the brand is represented by the product layer, the value of the product goes beyond its straightforward differentiation from competing goods. The external appearance of the product is what differentiates it more than its interior composition. For instance, a business must use CI design and brand strategy to strengthen and shape the brand image, highlight the personality, and create a distinct advantage for the brand image when competing with other similar products to get consumers' attention and awareness—and ultimately, the desire—to purchase. The success of Haier brand, in addition to good quality service, the most important is in the brand image shaping. When the advertising war of domestic refrigerator manufacturers was like a fire like tea, Haier passed the 1509(X)0 certification for the first time, and its products directly entered the American market, and established an overseas company in the United States. When the domestic manufacturers praised their products, Haier CCTV camera crew invited into Haier's management site, let consumers experience Haier's scientific management; When domestic entrepreneurs entered the MBA, Zhang Ruimin was invited by Harvard University to do business mergers and acquisitions report and so on. Through a series of activities, the international image competitiveness of Haier brand has been significantly improved, and consumers have reached the recognition of the brand image difference from the concept [3].

Enhancing quality involves more than just the applicability and durability of the product, reliability, security, and economy of the natural attributes, such as narrow sense quality, and should also include its social attributes, such as the subjective feeling of the consumer, the ability to meet the specific needs and expectations, such as the gap between the social nature of quality has a very important role for product differentiation. Because packaging can enhance product appearance, increase consumer visual appeal, and inspire consumer purchase motivation, it can create product differences and increase sales.

2.3. Additional Layer of Products

With the advancement of science and technology and the escalating level of competition, imitation and penetration between businesses make the trend toward product homogenization very evident, and the difference between similar products in terms of function, quality, style, and other factors is becoming increasingly less noticeable. However, because there are no limits to the services offered, businesses can increase customer satisfaction levels through high-quality service, which will foster repeat business. Customer loyalty can be continuously increased through the word-of-mouth effect of customers by continuously accumulating customer pleasure. In this, the implementation of product differentiation. For example, Jiangsu "little swan" in many enterprises unique launch "red carpet" service, the company stipulates that maintenance personnel before entering the door must cover their own plastic shoe cover, specially prepared a red carpet, specially used for putting parts and tools, so as not to dirty the floor of consumers, maintenance after the initiative to take away the garbage and so on. These seemingly mundane things left a deep impression on consumers, created service differences and improved consumer loyalty [4]. It should be pointed out that it is necessary for enterprises to expand the level of service, not only pay attention to after-sales service, but also to pre-sale service, in-sale service, consulting service, technical guidance and other aspects.

Price differentiation is based on the full assessment of product differences, consumer demand differences, time differences, location differences, and other variations to not reflect the proportion of

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cost differences and make different prices. For instance, businesses establish different prices for various product models or forms, and the price differences between the various models or forms of items are not directly correlated with the variations in costs and expenses. Differentiating products based on price is a significant way that markets display this. Businesses can therefore reflect product differentiation through price differentiation.

According to their own product differentiation and the benefit of enterprise, there are differences in distribution for the same products, to choose the appropriate sales channels, for consumers to purchase, this requires that enterprises in the trading place, space distance and trading means, way to trade, the method of payment, delivery, provide a full range of convenient service manual. For instance, American Avon company is based on the characteristic of cosmetic, use the unique means that door to door sales directly, obtain special management result thereby [5]. Consumer preferences for product differentiation are particularly important, particularly for the limited number of commodities where many consumers do not understand its performance, quality, and style. As a result, the business should use promotion differentiation, specifically promotional tools like advertising, sales promotion, personal selling, and public relations campaigns for successful coordination, to offer customers a preference for a subjective image.

3. Strategies for Enterprises to Achieve Product Differentiation

Users should be given a cause to "select the one over others" through differentiation. It's critical to differentiate. If a company or brand lacks distinctiveness, buyers won't be devoted to it because it offers nothing special. Differentiation "fits the needs of consumers," as the saying goes. The goal of regression, regardless of the type of distinction, is to better match user needs. Companies must begin by considering user demands when developing their differentiation strategies in order to fully explore the benefits of difference. For example in daily shampoo, this mother demand, there are a lot of different needs and corresponding products, "dandruff - Head & Shoulders", "raise hair - Pantene", "anti - off - overbearing", "compliant - soft" and so on. Differentiation is reflected through a whole system, not a single point. A common misunderstanding is that many people think that differentiation is "taste", "cost performance", "packaging design" these single order, that on the other hand, in fact, consumers will choose a product because of the cost performance, but also because others choose competing products when the cost performance is higher.

To develop the differentiation strategy, first of all, there are three steps to develop the differentiation strategy: First, exploring the market opportunity, find the target market. Second, comparing the competitive products and finding the differentiation advantage. Third, spreading the differentiation advantage and establish the cognition. These three steps are centered on the three core elements of differentiation: market audience; the enterprise itself; competitors to carry out.

3.1. Market Opportunities and Target Market

A differentiation strategy is an attacking one that seeks to expand into an existing market (for industry oligopolies, it is more often a defensive strategy). Our first responsibility when determining the target market is to examine the market's target demographic and discover demands that can be better satisfied. To analyze the market audience, our core is to find out:

(1) Unmet demand: This is often referred to as the blue ocean market, there is still no product to meet the needs of consumers.

(2) Needs that can be subdivided: for example, the mother needs of skin care can be subdivided into water replenishment, whitening, repair, etc.

(3) Needs that can be upgraded: for example, mobile phones, battery capacity, screen proportion, and camera pixels are constantly being upgraded.

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This piece is easy to understand, not complicated, but there is a common mistake: when analyzing consumer needs, it's tend to focus only on what consumers want to obtain, but ignore the cost of consumers. For example, most users can't tell the difference between "Coca Cola" and "Pepsi Cola". Even if they don't realize the brand positioning of "Pepsi Cola is youthful" or "Coca Cola is more traditional and classic," they still get a good feeling when they purchase Coke. Most of the time, when people want to drink Coke, then they will buy whichever brand is sold at the snack bar next to them, and they will buy whichever brand is on sale [6]. Regardless of all the complicated decision models, the user makes a choice, and the bottom logic is the cost-benefit ratio, which choice brings higher revenue, the lower cost. To excavate consumer demand, excavating from the two dimensions of revenue and cost is very important. First, how to improve the benefits of consumer decision-making (let consumers choose merchant, the benefits will be higher), Second, how to reduce the cost of consumer decision making (let consumers choose merchant, the cost is lower). Keep in mind the following equation when examining consumer needs: benefit (functional value + emotional value) - cost (monetary cost + time cost + effort cost + trial and error risk). After all, various consumer needs will have different top concerns. Consumers typically prefer huge brands to decrease the risk of trial and error because, similar to when purchasing insurance, their perception of the advantages is delayed (the product is complex, and it is frequently unknown whether it is excellent or not until it is in danger).

3.2. Differentiation Advantages

Through the previous analysis, find the demand breakthrough, determine the target market, not only begin to look for their own differentiation advantages, but also the competitiveness based on the target market. In this part, the core is to compare the strengths and weaknesses with those of competitors, and starting from the four P's (product/service, marketing, channel and price).

The core of this step is difficult to imitate and systematic. The differentiation advantage should have a certain threshold to make it difficult for competitors to imitate, otherwise the differentiation will soon become homogenized. A salted egg yolk ice cream explosive product, cannot become the differentiation advantage, too easy to imitate. But if an explosive product can be produced every week, then this is the advantage that is difficult to be imitated. For systematic, differentiation is a whole system, not a single point. The advantage of complexity and multi-dimension not only allows merchant to have more board, but also greatly increases the difficulty of imitation of rival products.

To better understand, this paper combines the previous two steps and look at a classic case, Luckin coffee and Starbucks. First, Luckin's chosen target market is freshly ground coffee in China, a huge but under-exploited market for growth (the pie is big enough to make it worth doing). Secondly, from the perspective of consumer demand, many boutique coffee shops, Starbucks, Costa Coffee, etc., have been improving the decision-making benefits of consumers, better coffee and experience space, while ignoring the decision-making costs of consumers [7]. Luckin has just grasped this point and built its differentiation advantage from multiple dimensions from the perspective of reducing the decision-making cost, providing cheaper coffee (reducing the cost of money), opening stores in all office buildings, and making the purchase more convenient and faster (reducing the cost of time and energy).

3.3. Differentiation Cognition

After the first two steps, the next step is to spread differentiation, to establish the "differentiation" cognition in the minds of consumers. After all, if the seller does not say, no one knows the characteristics of differentiation, and, "cognition is greater than the fact" is the marketing field cannot be rejected, "Nongfu spring is a little sweet" consumers really drink out [8]. Therefore, in this step, the core is to strong perception and grab cognition. For strong perception, one's differentiation should be

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able to make consumers feel it. The failure cases are Ganten Mineral water, water aristocrat, after listening to the Slogan and watching the advertisement, may ask where is the aristocrat, just because there is a luxury car [9]. The success cases is that Nongfu Spring's core advantage is water source. By shooting the real scene of the Changbai Mountain water source, could felt strongly that "What kind of water source breeds what kind of life" [10]. For cognition grab, consumers' cognition pool is limited, and the one who grabs first will be the one who wins. Wedding photo tour, which brand can be thought of other than platinum Jue Tour. Differentiation is a highly visible marketing strategy, but also extremely important, whether for individuals or enterprises, represents a unique value. There are some views for differentiation and the understanding of its underlying logic, seek product differentiation appears to be a difficult task, but if according to the three steps mentioned in this paper, the mining market opportunities, to find the target market of the competing goods, look for differentiation advantage and differentiation advantage, build cognitive, The development of product differentiation strategy is actually not very brain - racking.

4. Conclusion

Application has a major role in product differentiation. The business incorporates enough uniqueness into the items it offers clients to elicit their preferences using a variety of techniques, enabling customers to effectively identify it from rival products while also securing a competitive advantage for the product. To achieve product differentiation, there are other issues that require consideration. Businesses should apply overall difference and conduct product differentiation through the three tiers of the overall product. It is challenging to be durable if product differentiation only appears in the main product layer because a single differentiating factor is likely to be swiftly copied by rivals. Contrarily, differentiated integration makes it challenging for rivals to quickly invest additional money to fully mimic, maintaining the endurance of the advantage. Implement the link between company supply chain and product differentiation second. To construct the groundwork for product differentiation and obtain long-term differential advantages, businesses should build tight relationships with their suppliers and create proprietary organizations on the basis of having cost advantages. It also puts barriers in the way of rivals.

Finally, master the degree of product differentiation and don't overstate it. The production of exaggerated differentiated products means that the enterprise has entered a relatively narrow market with limited capacity. The benefits provided by the differential advantages in such a highly developed sector are difficult to balance out against the related expenses. In contrast, if an organization's service or product standards go above and beyond what customers require, its position in the market is severely weakened in comparison to rivals offering equivalent prices and suitable product standards.

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Study on the Relationship Between Hang Seng Index and FTSE CHI Index in Hong Kong: Evidence from VAR Model

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Abstract: The stock index is very important to study the overall trend of the development of financial markets and the development of the stock industry. This paper mainly studies the interaction between stock indexes and the influence of the main fields included in the stock index on the index and related indexes. In this paper, Hong Kong Hang Seng Index and FTSE CHI index were selected for research, and impulse response analysis and variance decomposition analysis were carried out on the data through VAR model. By analyzing the results, the following conclusions can be drawn: First, the model is convergent. Second, the influence from one market to another market persist for several periods. Third, with the increase of lag period, FTSE CHI HK Index was influenced by HK Hang Seng Index and finally stabilized at about 96.1906% and HK Hang Seng Index was influenced by FTSE CHI HK Index and finally stabilized at about 93.995%.

Keywords: Hang Seng Index, FTSE 100 index, VAR model, impulse response function

1. Introduction

As the improvement of the global capital market system promotes the development of the financial market system, the stock industry has become the main market that many investors pay attention to. Stock is one of the ways that joint-stock companies raise money. There are lots of research on stock price return, volatility and related forecasting in recent years, which is the most concerned issue for investors and capitalists. However, the stock market contains a large number of stocks, and the volatility of stock prices makes it difficult for investors to fully grasp the overall changes in the stock market. Therefore, we can solve this problem by using the stock price index [1].

The field became more and more interesting. For example, The stock index is often called a barometer which can give an index to the political, human society and economic changes of the country or region that the market is located. We can reflect the changes of the whole stock market through the index. At present, the five major stock indexes in the world are the Dow Jones Stock Index and four other stock Index major from the US and UK. Among them, the Hang Seng Index is an important indicator of the price of the Hong Kong stock market. In the current econometric model, there are a large number of ways to solve the linear relationship between two different conveniences. Salisu, A, et, al used the Fractional cointegrated VAR (FCVAR) method of Johansen and Nielsen, it

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is found that all regional stock markets are fractional cointegrated, and this behavior may be affected by global economic conditions [2].

In recent years, Hong Kong's stock and financial market is also in the recovery stage, which is also the inspiration of this paper. In order to conduct quantitative research on the situation of Hong Kong's financial industry, the Hong Kong stock market is the main subject of our study [3]. Among them, Hong Kong's Hang Seng index provides a good opportunity for research in this paper, the index is based on majority of Hong Kong's mainstream stocks, the index is calculated in a way that takes into account the role of different stocks. Therefore, it can also be considered that the index reflects the overall trend of the current Hong Kong stock and financial market. Kot, H. W. et,al, Argyroudis, G. et, al, Chen, Y. et. al and other scholars have found that there is a certain correlation between different stock indexes, and one stock index can even be used to predict the trend of another stock index [4-6].

This paper chooses to use the form of stock price index for analysis. The Hong Kong Hang Seng Index and FTSE CHI index from October 1, 2021 to October 1, 2022 were collected through the official website of Yingwei Financial Information. ADF and PP unit root tests were conducted through Eviews software, and the convergence of the data was judged through the unit circle. Finally, the two groups of stock indices were applied to the VAR model to obtain their lag periods and the variance decomposition was carried out to reveal the interaction between the two index.

The rest of this paper is organized as follows: Section 2 presents the data and methods used in this paper. Section 3 applies the above method to calculate the data and discuss the results. Finally, Section 4 concludes.

2. Data and Method

2.1. Data

This paper needs to study the relationship between two different stock indexes. In order to make the research objects located in the same temporal dimension and spatial dimension, this paper choose Hong Kong Hang Seng Index and FTSE CHI Hong Kong Index in the Hong Kong financial market as the research objects. The paper has detailed the close correlation between the two indices in the introduction, through the data provided by the official website of UK Financial Situation, the daily data of the two stock indexes from October 1, 2021 to September 30, 2022 were collected for research. The two groups of data collected are preliminarily analyzed, and the descriptive statistical results are shown in Table 1:

Table 1: Summary statistic.

	Mean	Coefficient	Std.Err	R^2	Ad-R^2	ADF	PP
HK Hang Seng Index	0.000	-0.933	0.064	0.468	0.466	-14.651***	-14.627***
FTSE CHI HK Index	0.000	-1.062	0.086	0.472	0.468	-12.356***	-14.390***

Note: Ad-R2 denote Adjusted R-squared, ***represent passed the 1% significance test.

According to Table 1, both time series can pass the stationarity test of ADF and PP, and the stationarity of the series can represent the initial assumption of the required model.

2.2. Methodology

Vector autoregressive (VAR) model was proposed by Christopher, a Nobel Prize winner in economics, in 1980. VAR model is built by using the form of simultaneous equations. Variables on

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the right side of all equations in the system of this model are the same. In addition, the variables on the right side of the equation cover the lag value of each endogenous variable and are widely used to study the dynamic relationship between variables [7]. The basic form of VAR model is shown in Eq (1) :

$$Y_t = A_D + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_n Y_{t-n} + u_t \quad (1)$$

Vector autoregressive model is a kind of unstructured model, which includes multiple equations for the prediction of interconnected time series variable system. The model has wide compatibility. Doh and Smith [8] proposed that the existing exogenous variables could be regarded as the lagged values of endogenous variables according to the different statistical meanings of the data, so as to construct functions. VAR model can perform regression analysis on multiple groups of related time series, and is also widely used to analyze the effect of a single random variable on the whole system, and to analyze the impact of time series on each other. In this paper, a linear regression model is established between Hong Kong Hang Seng Index and FTSE CHI Hong Kong Index. The expression of the model is as follows:

$$\begin{pmatrix} y_t^{HSI} \\ y_t^{CHI} \end{pmatrix} = A_1 \begin{pmatrix} y_{t-1}^{HSI} \\ y_{t-1}^{CHI} \end{pmatrix} + \cdots + A_n \begin{pmatrix} y_{t-n}^{HSI} \\ y_{t-n}^{CHI} \end{pmatrix} + \begin{pmatrix} C_{t1} \\ C_{t2} \end{pmatrix} + \begin{pmatrix} \varepsilon_t^{HSI} \\ \varepsilon_t^{CHI} \end{pmatrix}, \ t = 1,2,3 \cdots \quad (2)$$

In Eq. (2),$y_t$denotes the two-dimensional endogenous variable, y_t^{HSI}andy_t^{CHI}denote Hong Kong Hang Seng Index and FTSE CHI Hong Kong Index respectively, $t$is the number of samples,$n$is the lag order, $A_1 \cdots A_n$ is parameter matrix, ε_t^{HSI} and ε_t^{CHI} represents the random interference term, C_{t1}andC_{t2}represent two exogenous variables.

3. Empirical Finding

The results of the first part are related to changes in two selected stock indices. The second part is about the law of Hong Kong Hang Seng Index and FTSE CHI Hong Kong index changes and the reasons. The empirical research results based on VAR model are as follows:

3.1. Determine the Lag Order

In order to obtain reliable model results, it is necessary to correctly judge the Lag order. The Lag order is shown in Table 2 through the Lag structure function in Eviews:

Table 2: Lag structure.

Lag	LagL	LR	FPE	AIC	SC	HQ
0	1703.919	NA	2.52e-09	-14.12381	-14.09489*	-14.11216*
1	1708.421	8.891272	2.51e-09	-14.12797	-14.04121	-14.09302
2	1714.738	12.37366	2.46e-09*	-14.14721*	-14.00261	-14.08895
3	1717.466	5.297272	2.49e-09	-14.13665	-13.93421	-14.05509
4	1719.679	4.259376	2.52e-09	-14.12181	-13.86154	-14.01695
5	1722.091	4.605328	2.56e-09	-14.10864	-13.79053	-14.98048
6	1727.188	9.643210*	2.53e-09	-14.11774	-13.74179	-14.96628

According to Table2 can find that the most appropriate lag order of the two indicators is 2.

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3.2. Test of Convergence

In order to ensure the reliability of VAR model results, it is necessary to ensure that the series participating in the model operation are stationary series, so we need to conduct stationarity test on the data. When the data is stable, if the impact of external unstable factors is received, the data will become stable with the passage of time. If the data is not stable and affected by external extreme conditions, the model results will be affected more and more seriously, thus making the results unreliable [9]. In the stationarity test, we used the Augmented Dickey-Fuller test statistic and Phillips-Perron test statistic to judge based on the unit circle method.

From the ADF and PP statistics in Table 1, it can be found that all test statistics can pass the significance test of 1%, so we can reject the null hypothesis and the series is stationary. At the same time, this paper uses the unit circle method to test stability. By analyzing whether the characteristic root of each variable falls within the unit circle, the modulus of the characteristic root is determined to be less than 1. As shown in Figure 1, the characteristic roots of all variables lie within the unit circle. Therefore, the constructed model is stable and reliable.

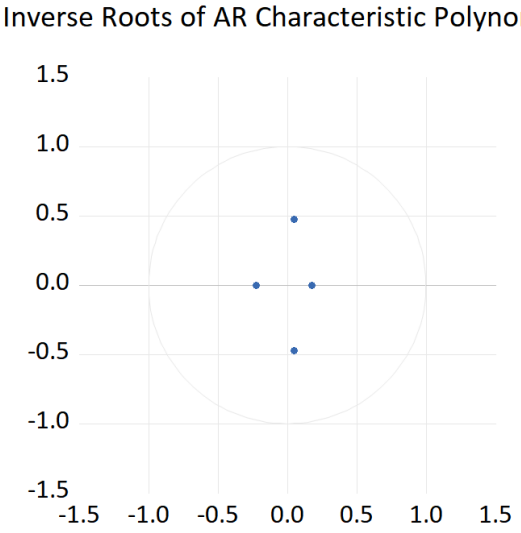

Figure 1: VAR model stability test judgment for HIS and CSI.

According to Fig. 1, I find that all points are located in the unit circle, and it can also be concluded that the sequence is stationary.

3.3. Result of VAR model

After passing the above tests, the VAR model is constructed, and the model results are shown in Table 3:

Table 3: Vector Auto-regression Estimates.

	HK Hang Seng Index	FTSE CHI HK Index
HK Hang Seng Index (-1)	-0.913499 (0.41985) [-2.17719]	-0.981443 (0.47541) [-2.06441]
HK Hang Seng Index (-2)	0.724413 (0.42134) [1.71930]	0.869184 (0.47741) [1.82062]

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Table 3: (continued).

FTSE CHI HK Index (-1)	0.900490 (0.36891) [2.44095]	0.966104 (0.41800) [2.31125]
FTSE CHI HK Index (-2)	-0.745429 (0.37245) [-2.00141]	-0.906930 (0.42201) [-2.14905]
C	-0.001221 (0.00107) [-1.13624]	-0.001511 (0.00122) [-1.24075]
R-squared	0.059450	0.062751

From Table 3, we can find that FTSE CHI index has a negative impact on Hong Kong Heng Seng Index in lag phase 1, and a positive impact in lag phase 2. However, the Hang Seng index of Hong Kong has a positive impact on the FTSE CHI index in the lag 1 period, while it has a negative impact in the lag 2 period. It can be seen that the mutual influence direction of the two indices remains consistent in lag 1 and lag 2 periods respectively, but the influence relationship will change with different lag periods. This may be due to external economic policy uncertainty or other factors at different times.

3.4. Impulse Response Function for HK Hang Seng Index and FTSE CHI HK Index

In this paper, the impulse response function is used to observe the dynamic interaction relationship and the dynamic interaction benefit between the described variables more intuitively. Impulse response analysis is a method to analyze the response degree of other variables when the random disturbance term of endogenous variables is affected by one unit standard deviation [10]. Fig. 2 and Fig. 3 below are the impulse response analysis charts of VAR model on HK Hang Seng Index and FTSE CHI HK Index. The abscissa in the figure is the response period number of impulse response, which is set as 10 in this paper. The vertical axis shows the response of a variable to a shock of one unit standard deviation. A solid line in the figure represents the impulse response trajectory, and the two dashed lines above and below represent the 95% confidence intervals. The impulse response results as follows:

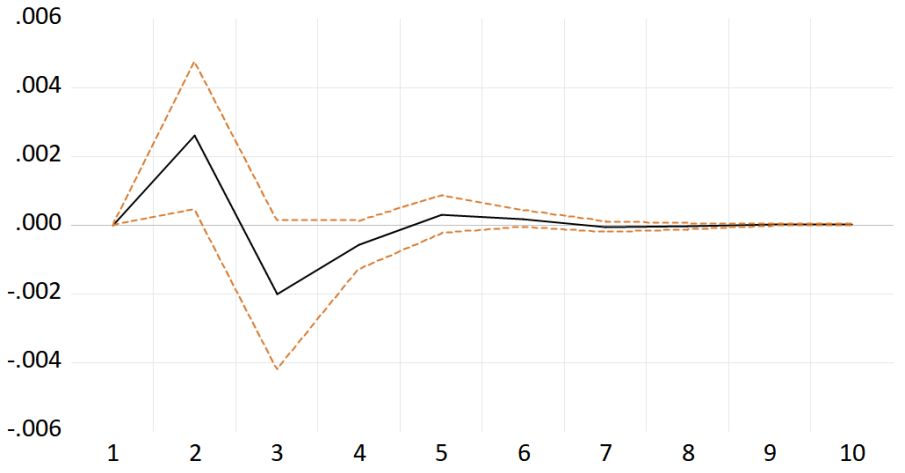

Figure 2: Impulse response of HK Hang Seng Index to FTSE CHI HK Index.

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As can be seen from Figure 2, for HK Hang Seng Index, the impact of one standard deviation of FTSE CHI HK Index in the first stage is about 0.000, and there are positive and negative effects in the alternating response fluctuations. The maximum positive response value was about 0.028 in the second stage, and the maximum negative response value was -0.002 in the third stage. As the lag period increases, the effect converges to 0 from the 8th stage. This result shows that the impact of FTSE CHI HK Index on HK Hang Seng Index is complex, with the intersection of positive and negative responses. Finally, it approaches 0, indicating that HK Hang Seng Index has strong self-regulation ability.

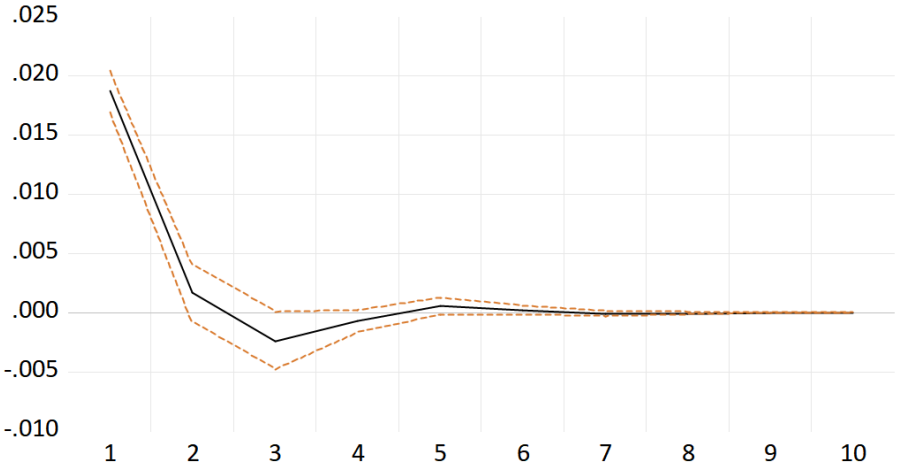

Figure 3: Impulse response of FTSE CHI HK Index to HK Hang Seng Index.

As can be seen from Figure 3, for the FTSE CHI HK Index, the impact of one standard deviation of HK Hang Seng Index in the first stage is about 0.018, and there are positive and negative effects in the alternating response fluctuations. The maximum positive response value was 0.0158 in the first stage, and the maximum negative response value was -0.0025 in the third stage. As the lag period increases, the effect converges to 0 from the seventh stage. This result shows that the impact of HK Hang Seng Index on FTSE CHI HK Index is complex, with the intersection of positive and negative responses. Finally, it approaches 0, indicating that the FTSE CHI HK Index has strong self-regulation ability.

3.5. Variance Decomposition

Variance decomposition transforms the mean square error of each endogenous variable into the contribution rate of each endogenous variable according to its causes [11], obtained the mutual influence degree of dynamic changes of HK Hang Seng Index and FTSE CHI HK Index. In this paper, the relationship between stock indexes of two different companies in Hong Kong is decomposed to different degrees, and the lag period is set as 10 cycles.

Table 4: Variance decomposition of HK Hang Seng Index.

Period	S.E.	FTSE CHI HK Index	HK Hang Seng Index
1	0.016725	100.0000	0.000000
2	0.017001	97.65363	2.346372
3	0.017213	96.33556	3.664440
4	0.017234	96.22940	3.770596
5	0.017242	96.20185	3.798151

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Table 4:(continued).

6	0.017244	96.19229	3.807713
7	0.017244	96.19132	3.808678
8	0.017244	96.19070	3.809298
9	0.017244	96.19068	3.809318
10	0.017244	96.19064	3.809356

According to variance decomposition of HK Hang Seng Index in Table 4, with the increase of lag period, FTSE CHI HK Index was influenced by HK Hang Seng Index and finally stabilized at about 96.1906%.

Table 5: Variance Decomposition of FTSE CHI HK Index.

Period	S.E.	FTSE CHI HK Index	HK Hang Seng Index
1	0.016725	97.67121	2.328789
2	0.017001	95.62700	4.372995
3	0.017213	94.15150	5.848500
4	0.017234	94.04362	5.956382
5	0.017242	94.00769	5.992312
6	0.017244	93.99780	6.002203
7	0.017244	93.99652	6.003485
8	0.017244	93.99585	6.004151
9	0.017244	93.99582	6.004181
10	0.017244	93.99578	6.004223

According to the variance decomposition of FTSE CHI HK Index in Table 5, with the increase of lag period, HK Hang Seng Index was influenced by FTSE CHI HK Index and finally stabilized at about 93.995%.

4. Conclusion

Stock index is of great significance to study the overall development trend of the whole financial market industry. Hong Kong's Hang Seng index contains the most important banks, energy and other stocks in Hong Kong, while the FTSE CHI index contains the UK's dominant banking and financial industries. Thus, the interrelation between the HSI and the FTSE CHI is very large. Through the data combined with the model analysis, it is found that the FTSE CHI index is very strongly affected by the Hong Kong Hang Seng Index, and the Hong Kong Hang Seng Index is equally strongly affected by the FTSE CHI index, but slightly less than the former. Although the influence relationship between the two is very strong, the positive and negative relationship is often not very durable, and the opposite correlation is reflected in different lag periods, which also shows the self-regulation ability of the stock financial industry. Besides, the results from the impulse response function suggest that shock from one market may last for several periods in another market, and the results from the variance decomposition suggest that the index plays a crucial role in the variation of index futures, vice versa.

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An Empirical Study of the Chinese A-share Market Based on the Fama-French Three-Factor Model

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Abstract: In recent years, the international situation has been unpredictable, changes in the economic environment have profoundly affected people's psychological expectations, and the securities market has experienced different volatility, which brings challenges to the validity of the Fama-French three-factor model. Based on this model, this paper selects 20 stocks in the Chinese A-share market, divides them into six portfolios according to their size and book-to-market ratio, conducts a regression analysis of monthly returns from August 2017 to July 2022, and then verifies the explanatory power of the market factor, size factor, and book-to-market ratio factor on the excess returns of the stocks. The results demonstrated that the three factors can partially account for the variation in returns, with SMB having a more significant impact on small-cap companies and HML on firms with a high book-to-market ratio.

Keywords: Fama-French three-factor model, regression, rate of return, Chinese A-share market

1. Introduction

China's capital market started late and still suffers from several problems, with stock market returns exhibiting more obvious uniqueness and complexity. Although some Chinese academics have studied the Fama-French three-factor model's potential application in China in earlier years, in recent years, with the outbreak of covid 19, including generally high global inflation and constant interest rate hikes by the Federal Reserve, all these factors have had varying degrees of impact on the Chinese A-share market. The shift in the situation puts the validity of the model to the test. This paper conducts regression analysis on the market risk premium factor, size factor, and book-to-market ratio factor based on the Fama-French three-factor model and using Stata software to investigate the practical value of the three factors on the portfolio returns of the Chinese A-share market during the period from August 2017 to July 2022. And according to the empirical results, some patterns are summarized to provide reference values for stock investors and further improvement of the model.

2. Literature Review

Asset pricing has always been a hot topic in the financial world, and the rationality of the related models is the focus of research. With the establishment of portfolio theory by Harry M. Markowitz in 1952, the pioneer of asset pricing was established. Immediately after, William Sharpe put forth the

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well-known Capital Asset Pricing Model (CAPM), which included the beta factor to explain why the projected return is only correlated with the security's systematic risk.

$$Rit-Rft=\alpha i+\beta i(Rmt-Rft)+\mathcal{E}it \quad (1)$$

He believed that the return is unpredictable, which is also the core idea of Fama EHM theory [1]. In 1976, Stephen Ross proposed the Arbitrage Pricing Theory (APT) to estimate the value of assets, which in a way became an alternative theory to CAPM. It was not until 1993 that Fama and French took the SMB (Small Minus Big) and HML(High Minus Low) factors into account and proposed the three-factor model, which was certainly a refinement of the CAPM [2]. The Fama-French five-factor model was proposed in 2015 based on empirical evidence, and scholars from all walks of life are still testing its validity, and there are many different opinions.

In this paper, the Fama-French three-factor (FF3) model is selected for empirical evidence, and some important domestic studies on the FF3 model are briefly reviewed:

Yi et al. show that the three-factor model cannot be used in China because the book-to-market ratio cannot be incorporated into the model as a good explanatory variable, and suggest that a two-factor model can predict stock returns in China well [3].

Yang & Teng demonstrate that the Fama-French three-factor model can explain the Chinese stock market up to a point. The Chinese stock market has a minor firm influence: between January 1995 and February 2001, the average monthly returns of small-cap value portfolios in Shanghai were significantly higher than those of large-cap value portfolios but mixed and growth stocks in Shanghai and growth stocks in Shenzhen did not have the small firm effect [4].

Liao & Shen use Fama-French three-factor model to describe cross-sectional stock return changes and find that there is indeed a significant market effect after the split-share structure reform and that the market effect is positively related to the share reform consideration and the check-and-balance of ownership, and negatively related to equity concentration [5].

By comparing and examining the contemporaneous returns of asset portfolios in the US and Chinese capital markets, Tian et al. find that, unlike the US, the book-to-market ratio effect is less pronounced in the domestic market, but the systematic risk is more prominent and the market capitalization effect is more significant [6].

Li & Li selected 85 listed companies related to the 5G industry chain in China as the research sample, and according to the empirical findings, the five-factor model has less predictive ability than the three-factor model, while the size factor has a stronger influence on small-scale high-tech enterprises [7].

Zang argues that MKT (Market Factor), SMB, and HML can account for the volatility of portfolio returns in the stock market, but other components require more empirical support, and the effects of these three factors are different in different portfolios [8].

3. Methodology

3.1. Source and Selection of Sample Data

CSMAR is World leading economic and financial database, with the most up-to-date data. It has a top-notch R&D team and an independent financial laboratory and has entered into long-term partnerships with several internationally renowned academic research institutes and financial institutions. With accurate information sources, keen financial insights, and powerful technology, it has provided innovative products and services to thousands of educational organizations, research institutions, and financial institution clients worldwide. The data in this paper was obtained from the CSMAR database, excluding companies that were suspended, with obvious errors and missing data,

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by randomly selecting 20 stocks covering different sectors and collecting their trading data from August 2017 to July 2022 as a sample.

Monthly Return on Individual Shares Rit. The monthly return of individual stocks in this article is calculated from the monthly closing price. The formula is:

$$Rit=(Pit-Pit-1)/Pit-1 \quad (2)$$

The monthly closing price in period t is denoted by Pit, while period t-1's monthly closing price is denoted by Pit-1.

Market Monthly Yield Rmt. The stocks selected for the article were listed on the A-share market before August 2017. To measure the monthly market return relatively accurately, the monthly return of the index CSI 300 is used to approximate instead of Rmt, calculated as above.

Monthly Risk-Free Rate Rft. The article pulls the values of the monthly risk-free rate for that period directly from the database, and the overall change is smooth over the five years, remaining at 0.1241%.

3.2. Model Building

To show the model's robustness in the Chinese A-share market, we evaluate the data in this study using the Fama-French three-factor model. Here's the concept:

$$Rit-Rft=ai+bi(Rmt-Rft)+siSMBt+hiHMLt+Ɛit \quad (3)$$

Rmt-Rft, one of them, exhibits market risk premium, which is consistent with that in CAPM. The book-to-market ratio factor is HMLt, while the market capitalization factor is SMBt. In general, a stock is referred to as a value stock if its book-to-market ratio is high, and a growth stock if it is low. The 20 stocks are divided into 6 portfolios in a 2x3 manner in the following form.

Table 1: Portfolio Grouping Method.

Portfolio				
		Book-to-market Ratio		
Market size		H (30%)	M (40%)	L (30%)
	S	S/H	S/M	S/L
	B	B/H	B/M	B/L

$$SMBt=(S/H+S/M+S/L)/3-(B/H+B/M+B/L)/3 \quad (4)$$

$$HMLt=(S/H+B/H)/2-(S/L+B/L)/2 \quad (5)$$

4. Empirical Results & Discussion

To ensure the accuracy of the study results, the data are first tested before regression. The following empirical procedures are completed using Stata.

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4.1. Descriptive Statistics

Table 2: Descriptive Statistics Results.

Portfolio	S/H	S/M	S/L	B/H	B/M	B/L
Mean	-0.00533	-0.00322	-0.00315	-0.00754	0.00383	0.0231
Sd	0.0800	0.0640	0.0740	0.0605	0.0712	0.0768
Min	-0.201	-0.124	-0.205	-0.131	-0.125	-0.151
Max	0.169	0.166	0.180	0.133	0.213	0.165

The dependent variables' descriptive statistics are shown in Table 2. It can be seen that only B/M and B/L have positive average excess returns, while the other groups are less favorable. The mean values of S/H and B/H are relatively smaller in negative returns, indicating that companies with high book-to-market ratios are less profitable. In addition, the standard deviation of S/H is the highest among the six groups, which shows that companies with high book-to-market ratios of small market capitalization have a higher risk. Although this is consistent with the theory, it is clear that size is not negatively related to returns by sample data alone.

4.2. DF Test

Table 3: DF Test Results.

Portfolio	S/H	S/M	S/L	B/H	B/M	B/L	Rmt
t value	-8.113	-7.656	-7.986	-6.925	-7.429	-6.931	-7.037
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

As evidenced by the data in Table 3, the t-values for each portfolio as well as the monthly market returns are significantly greater than the critical value of 1% - 3.567, there is no unit root, the null hypothesis is rejected and the test of smoothness is passed. This is in line with the reality that the monthly returns are relatively stable and generally without significant trends.

4.3. Fama-French Three-Factor Model Regression Analysis

Table 4: Fama-French Three-Factor Model Regression Results.

Portfolio	Cons.	Coefficient			F test		Goodness of Fit	
		MKTt	SMBt	HMLt	F value	P	R2	Adj R2
S/H	0.0107757	0.969811	0.7240906	0.6343191	66.30	0.0000	0.7803	0.7685
	(t=2.06 p=0.044)	(t=9.70 p=0.000)	(t=7.88 p=0.000)	(t=6.34 p=0.000)				
S/M	-0.0010365	0.9077896	0.5290806	-0.0979925	30.30	0.0000	0.6188	0.5984
	(t=-0.19 p=0.851)	(t=8.62 p=0.000)	(t=5.47 p=0.000)	(t=-0.93 p=0.375)				

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Table 4:(continued).

S/L	**-0.0009867**	**0.8368575**	**0.9855339**	**-0.395249**	**54.07**	**0.0000**	**0.7434**	**0.7269**
	(t=-0.19 p=0.851)	(t=8.37 p=0.000)	(t=10.73 p=0.000)	(t=-3.95 p=0.000)				
B/H	-0.0018476	0.8429266	-0.116448	0.516353	33.42	0.0000	0.6416	0.6224
	(t=-0.37 p=0.716)	(t=8.72 p=0.000)	(t=-1.31 p=0.195)	(t=5.34 p=0.000)				
B/M	0.0006854	0.8956515	-0.2669555	0.0788036	19.11	0.0000	0.5059	0.4794
	(t=0.10 p=0.922)	(t=6.71 p=0.000)	(t=-2.18 p=0.034)	(t=0.59 p=0.558)				
B/L	0.0099148	0.9758801	-0.3778913	-0.4540789	69.91	0.0000	0.7893	0.7780
	(t=2.02 p=0.048)	(t=10.37 p=0.000)	(t=-4.37 p=0.000)	(t=-4.82 p=0.000)				

Overall, all six sets of regressions pass the F-test, which indicates that the model is significant and the three Fama-French components can properly account for the excess return of the A-share market stock portfolio in the last five years. For the goodness of fit, the Adj R2 is greater than 0.5 except for B/M, which shows that the model fits well. Relative to H and M, S/L and B/L have better performance in the fit, suggesting that the three variables have more influence on stock returns when the book-to-market ratio is smaller.

For the constant term, except for S/H and B/L, all other groups failed the t-test at a 5% confidence level, indicating that there are other factors besides MKTt, SMBt, and HMLt that have a higher impact on the portfolio's excess return.

For the MKTt factor, it can be seen that the p-values are all equal to 0.000 and the regression results are significant. The regression coefficients for all six groups are greater than 0 and close to 1, indicating that the excess returns of the selected stocks are similar to the movements in the excess returns of the market and further demonstrating the reasonableness of the sample selection, which is representative of the market as a whole to a certain extent.

For the SMBt factor, B/H does not pass the t-test, while all small-cap groups pass the test, and the size factor has a more significant effect on the excess return of stocks in the small-cap group than in the large-cap group. In addition, regarding the correlation coefficients of the size factor SMBt, all small-cap groups are greater than 0 and all large-cap groups are less than 0. Thus, it can be seen that the excess return of small-cap stock portfolios has a positive relationship with the size factor and has better growth.

For the HMLt factor, only S/M and B/M do not pass the t-test, for which they can be neglected. The coefficients of the S/H and B/H groups are greater than 0, and the coefficients of the S/L and B/L groups are less than 0. The correlation coefficients do, to some extent, rise as the book-to-market ratio rises, which also suggests, obliquely, that portfolios of companies with high book-to-market ratios make higher returns.

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5. Conclusion

This study chooses monthly data of 20 listed businesses in the A-share market from August 2017 to July 2022 focusing on the Fama-French three-factor model, builds six portfolios for SH, SM, SL, BH, BM, and BL, respectively, and tests the explanatory power of MKT, SMB, and HML factors on their excess returns. The following conclusions are obtained: First, the Fama-French three-factor model has some applicability to China's A-share market. In the regression analysis, MKT passes the test perfectly and the return fluctuation is close to the market return change. Second, the SMB factor has better performance on small-cap stocks, and the excess return is positively related to company size. Investors should pay more attention to the small-cap effect in the Chinese stock market because the smaller the market capitalization of an individual stock, the easier it is to be manipulated by the market and the less money is available to drive the stock price up. Third, stocks with high book-to-market ratios tend to be accompanied by high returns. Although the above findings are basically consistent with the model, it cannot be denied that there are still portfolios that fail the t-test and there are additional elements that affect the excess return. This is also the shortcoming of this paper. In the subsequent research, further empirical evidence can be tried to introduce other factors, such as liquidity factors, according to the specific market environment. Meanwhile, the capacity of the sample data should be expanded. In the future, scholars may focus on a certain market segment or a specific industry to conduct relevant research and provide more specialized advice to investors.

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An Empirical Study of China's Agriculture, Forestry and Fishery Industry Based on the Fama-French Three-Factor Model

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Abstract: Agriculture, forestry, animal husbandry and fishery enterprises have performed steadily and well during the epidemic period from late 2019 to the end of February 2020. But there is still a gap in empirical analysis, which deserves further research. This study examines the Fama-French three-factor model's application to China's agricultural, forestry, animal husbandry, and fisheries sectors, and analyzing and interpreting the related results. In this study, the daily return data of 27 Chinese agriculture, forestry and fishery listed companies in the past two years were obtained through the RESSET, and divided into six groups of stock portfolios according to size and book-to-market ratio size, and the relevant empirical and regression analyses were conducted for each portfolio using Python and Eviews. The findings demonstrate that the size impact and book-to-market ratio effect are two parameters in the model that have a high explanatory power on the return of the agriculture, forestry, and fishery stock portfolio in the sample period.

Keywords: Fama-French three-factor model, agriculture, rate of return, OLS regression

1. Introduction

Agriculture, forestry, animal husbandry and fishery are the primary industries. Due to little product variation and stable social demand, China's agriculture, forestry, animal husbandry and fishery industry was less affected by the New Crown epidemic [1]. Current studies related to this industry are mainly fundamental analyses, while there are relatively few quantitative analyses. Therefore, the econometric study of agriculture, forestry, livestock and fishery is beneficial to further understanding and grasping its characteristics.

Since the Fama-French three-factor model was proposed, much attention has been paid to its application in the stock market. The applicability of Capital Asset Pricing Model (CAPM) is limited because the Chinese stock market cannot yet be fully explained by systematic risk [2]. Based on this, the Fama-French three-factor model improves the CAPM by including 2 explanatory variables [3]. In this paper, based on the model, we obtain the return of 27 listed companies through the RESSET database, and use Python and Eviews to conduct regression analysis on China's agriculture, forestry and fishery industry to test the applicability of the model and analyze the results based on the results. RESSET Database offers expert services for model checking, investment research, etc. It makes full use of the design guidelines for common worldwide databases, blends them with the reality of the Chinese financial market, and uses empirical research as the overarching design criterion.

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The qualitative econometric analysis can further improve the research related to agriculture, forestry, fishery, and animal husbandry, and reveal the industry characteristics and industry conditions after the new crown epidemic. Meanwhile, since there are not many studies on Fama-French model in individual industries, this paper hopes to provide empirical research cases for individual industries to provide references for the development and improvement of related theories and models.

2. Literature Review

In the CAPM, Sharpe discussed the market risk premium [4]. Further, Fama and French found that the stock market's beta was unable to account for differences in the returns of different stocks. As a result, two additional factors with market risk premiums were added, creating the Fama-French three-factor model, a new approach to determining asset pricing. These two variables—the size factor and the book to value factor—are thought of as additional CAPM components. In recent years, many scholars have conducted empirical studies on the applicability of CAPM and Fama-French models in the Chinese stock market. Xu Jiayu found that the model does explain more accurately than the CAPM the movements of stock returns in the Chinese KSE [5]. While Yang Zunhan analyzed that the applicability of the model is industry related [6]. Empirical studies conducted in specific industries, such as the sports industry and the real estate industry, have illustrated the validity of the Fama-French model to some extent, but there are still relatively few industry studies [7-8]. Further, with the introduction of the five-factor model, the explanatory factors became more numerous [9]. However, its applicability is controversial: the empirical analysis of the five factors in manufacturing and health industries affirmed its significance relative to the three-factor approach [10]. However, it was considered inferior to the three-factor model in Chinese A-share steel companies [11]. The number of industry studies for the three-factor is small, and the empirical performance of the model varies across countries. However, the three-factor model had been considered the best performer among multiple models [12].

3. Methodology

3.1. Fama-French Three-Factor Model

According to the Fama-French three-factor model theory.

$$R_{it} - R_{ft} = \alpha i + \beta i\left(R_{mt} - R_{ft}\right) + siSMB_t + hiHML_t + \varepsilon it \quad (1)$$

In equation (1), Rit represents the return on assets, R_{ft} represents the risk-free return; $(R_{mt} - R_{ft})$ is the excess market return; SMB_t represents the market capitalization size factor, HML_t represents the book-to-market ratio factor, bi, si, and hi are the coefficients of $(R_{mt} - R_{ft})$, SMB_t, and HML_t, respectively, eit is the residual term, and ai is the intercept term [13].

Equation (1) reflects the relationship between individual stock returns and market returns, market capitalization size, and book-to-market ratio.

3.2. Data

In this paper, 27 stocks of agriculture, forestry, animal husbandry and fishery China A-share listed companies from January 1, 2020 to December 31, 2021 are selected for empirical testing of their daily returns. 27 listed companies have different sizes and specific industries to meet the requirements of sample differences in the model. In this paper, the daily return of Agriculture, Forestry, Animal Husbandry and Fishery Index (801010) is selected as the market return, and the Shanghai Interbank

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Offered Rate is chosen as the risk-free return, using the total market capitalization and shareholders' equity of the company for analysis. Data were taken from the RESSET database, and Python and Eviews were used to process the data.

27 stocks were split into six categories using the methodology. For size, the total market capitalization of publicly traded firms at year's end is first discovered, and then the groups S and B are created based on the size numbers. The book-to-market ratio is divided into 30%, 40%, and 30%, also known as L, M, and H, based on the book-to-market ratio of listed businesses at the end of the year. The cross portfolio of equities is then discovered.

3.3. Experimental Procedure

For six groups of stock portfolios, the market risk premium $(R_{mt} - R_{ft})$ is derived using the difference between the daily return of the index and the risk-free return, and the size factor (SMB_t) and the book-to-market ratio factor (HML_t) are constructed using the daily return data. The precise formula for calculation is as follows.

$$SMBt = \frac{(SL+SM+SH)-(BL+BM+BH)}{3} \quad (2)$$

$$HMLt = \frac{(SH+BH)-(SL+BL)}{2} \quad (3)$$

Least squares regressions were conducted with the three factors as explanatory variables and each group's return as the explanatory variable.

4. Results

4.1. Descriptive Statistics

Table 1: The descriptive statistics of different groups.

Group	Mean	Std
B/L	0.000527108	0.036385044
S/L	0.00366857	0.03232243
B/M	-0.001144713	0.023435205
S/M	0.002245114	0.030381896
B/H	0.000123405	0.028644847
S/H	-0.000169714	0.02409445

During the statistical period, the mean of group B/M and group S/H is negative and the returns are in a loss position, while the rest of the portfolios are in a profit position. Broadly speaking, the mean and standard deviation of returns are positively correlated.

4.2. Stationarity Test

The ADF test for the smoothness of the daily returns of the six portfolios was performed to ensure that the test results were valid when regression analysis was performed on the data. The p-value of the t-test for all six portfolios was tested to be 0, indicating that the series are all stationary. Therefore, the four portfolios can be subjected to regression analysis.

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4.3. Regression Analysis

Table 1: The Fama-French three-factor model results of different group

Group	Intercept	Correlation coefficient			F(P)	Goodness of fit	
	αi	MKT	SMB_t	HML_t		R^2	Adj--R^2
		βi	si	hi			
BL	-0.0003 (t=-0.325, P=0.745)	0.9971 (t=19.197, P=0)	-0.7416 (t=-15.239, P=0)	-0.7993 (t=-16.131, P=0)	0	0.814	0.811
SL	-0.0005 (t=-0.529, P=0.597)	1.1579 (t=23.168, P=0)	0.9070 (t=19.251, P=0)	-0.6944 (t=-14.564, P=0)	0	0.781	0.779
BM	-0.0017 (t=-2.212, P=0.028)	1.0020 (t=26.306, P=0)	-0.0661 (t=-1.841, P=0.067)	0.0285 (t=0.784, P=0.434)	0	0.758	0.755
SM	0.0003 (t=0.226, P=0.821)	1.0219 (t=15.303, P=0)	0.6362 (t=10.106, P=0)	0.0531 (t=0.833, P=0.406)	0	0.558	0.553
BH	0.0005 (t=0.585, P=0.559)	1.1678 (t=29.395, P=0)	-0.2419 (t=-6.458, P=0)	0.3179 (t=8.388, P=0)	0	0.824	0.822
SH	-0.0013 (t=-1.726, P=0.086)	0.9872 (t=25.592, P=0)	0.4027 (t=11.074, P=0)	0.1884 (t=5.120, P=0)	0	0.766	0.763

From Table 2, the R^2 of group S/M is 0.558, and the range of R^2 of the other groups is 0.758~0.824, which indicates that the overall goodness of fit is good. Meanwhile, the p-values of the F-tests are all 0, indicating that the regression models are significant.

The following paper analyzes the intercept terms and the regression coefficients of each factor:

A. Intercept term α_i. except for group B/M, the α_i values of the remaining combinations failed the t-test at the 5% confidence level, and all α_i values were close to 0, indicating that the influence of other factors on the stocks of agriculture, forestry, animal husbandry and fishery industries was small and basically negligible.

B. Regression coefficients of market factors β_i. regression coefficients of market factors in all portfolios pass the t-test, indicating that market factors are significantly influential. bi values are all greater than 0, demonstrating that the companies' excess returns follow the path of the industry market. Overall, the beta values of all six portfolios are relatively close to 1. Among them, the bi values of group B/L and group S/H groups are slightly less than 1, while the β_i values of the rest of the portfolios are greater than 1. This indicates that the fluctuations of listed companies the industry are basically in line with the industry.

C. Regression coefficient of size factor s_i. The group B/M is significant at 10% confidence level; the rest of the portfolios are significant at 1% confidence level. The regression coefficients are negative in the large-cap portfolio and positive in the small-cap portfolio, indicating that there is a scale effect in agriculture, forestry, animal husbandry and fishery, and the returns of the large-cap portfolio are negatively correlated with SMB_t, while the returns of the small-cap portfolio are positively correlated with SMB_tt.

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D. Coefficients of regression for the h_i book-to-market ratio factor. The factor's t-test findings in the B/M and S/M groups are insufficiently significant, meaning that the influence of the HML_t factor on portfolios with medium book-to-market ratios is not significant. The other portfolios' regression coefficients are noteworthy. According to the findings, companies with low book-to-market ratios and those with high ones have a negative correlation with the book-to-market ratio factor.

5. Conclusion

In this paper, an empirical study of China's agriculture, forestry and fishery industry is conducted using the Fama-French three-factor model. According to the results: first, the model has high applicability to the industry. Second, the volatility of listed companies in the sample is basically the same as that of the industry, which may be closely related to systematic risk because it is highly influenced by natural conditions. Third, there is a scale effect in the industry, which may be due to the fact that small-scale enterprises are perceived to rise and fall more, and receive more policy support, etc. Fourth, agriculture, forestry and fisheries have a book-to-market ratio effect. Companies with the higher ratio are more financially risky, and investors demand higher risk compensation.

The sample selection and time interval have an impact on the analysis results, which may become a shortcoming of this paper. This paper provides an overall description of systematic risk based on beta values but does not reveal the specific impact factors. This is also a reference direction worthy of future research.

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Research on the Interest Rate Risk Strategy of Bond Market

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Abstract: Compared with stocks, bond investment can not only reduce relatively large risk losses, but also ensure that the investment status is healthy and stable. However, whether the product trend in the bond market can be used as a tool for monitoring economic conditions is a question worth pondering. This article's main function is discussing why the bond market is useful and the influence and difference of bond's maturity and interest rate for the economy and investor. Through the research and discussion of the article, the paper focused on the conclusion that the comparison of the interest rates of long-term bonds and short-term bonds in the bond market in the same period can reflect the overall economic situation of the market to a certain extent, and the significance of this conclusion is that, It can not only enable investors to observe the market trend through the interest rates of bonds of different maturities, and make choices for their next investment decisions, but also enhance the functionality of the financial market and strengthen the connection with the economic market.

Keywords: bond market, finance, interest rate, interest rate risk

1. Introduction

In today's era of abundant financial products, bond investment has become a relatively mainstream and stable investment method. The cited literature is mainly about the connection between the bond market and the economic market and the basic characteristics of the bond market. This paper mainly includes these articles: Gilmore, Lucey& Boscia. These authors study the linkage patterns of a set of 20 government bond market indices in developed countries in North America, Europe and Asia and get the conclusion that the linkage pattern of the government bond market index will have an impact on portfolio diversification returns [1]. Chy & Kyung. The authors examine the impact of bond market transparency on the use of debt covenants in bank lending, and the findings suggest that information in bond transactions can reduce information risk for banks when entering into debt contracts [2]. Miyakoshi & Shimada. The author conducts research and data mining on the correlation between stock returns and bond returns in various countries, and points out that financial globalization has resulted in an increase in the returns of stocks and bonds to a certain extent [3]. Yao, Sun & Gao. This paper studies the transaction records of financial institutions in China's interbank bond market and finds that shaping the network structure is very important for the integrity of the bond market [4]. Liu & Qi. Based on the background of COVID-19, This essay explores the adoption of proper economic policies to revive the stock and bond markets and comes to the conclusion that fiscal policy and

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monetary policy have more favorable effects on the stock market and bond market, respectively [5]. Kadıoğlu, & Frömmel. Analyzing whether there is evidence of various bond prices, and this article concludes that fund manager compensation can serve as evidence of manipulation [6]. Wahidin, Akimov, & Roca. This paper examines the impact of bond market developments on economic growth in selected countries in the context of the financial crisis. It was concluded that the change between the bond market and economic situation was adversely affected by the financial crisis [7]. Abuelfadl & Yamani. In an event research paradigm, this article examines the effects of currency news on global government bond markets using a sample of 27 nations and 63 currency news releases. These results demonstrate a large currency information spillover into bond markets [8]. Pagnottoni, Spelta & Pammolli. This paper examines the self-regulating ability of bond markets in the context of SARS-CoV-2 and concludes that bond markets have less ability to adjust prices than stock markets after receiving an unavoidable economic shock [9]. Tran & Uzmanoglu. This article looks at how investors are adjusting bond market pricing strategies in the face of COVID-19 and concludes that COVID-19 developments may increase bond pricing by reducing local economic activity [10].

These literatures are mainly based on the basic characteristics of the current bond market and its connection with other economic factors, and makes other functional assumptions about the bond market. To some extent, the bond market can have an impact on the economy and the market, and to a certain extent, investors can avoid future risks through the information provided by the bond market. The literature on the bond market and the economy is relatively rich, mainly including the influence and changes of bond interest rates of different maturities and how to cite examples to judge that there is a certain connection between the bond market and the economy.

This article will focus on the use of bond markets to reflect overall economic conditions. Through this research, investors can not only observe the market trend through the interest rates of bonds of different maturities, and make choices for their next investment decisions, but also enhance the functionality of the financial market and strengthen the connection with the economic market. Thus Questions raised through this article - Why is the bond market useful? Can bond rates be used as an indicator of overall market economics? -Then introduces the types of bonds and bonds with different interest rates, summarizes the different changing patterns of long-term and short-term bonds and whether the relationship between the two will have an impact on the economy; The interest rate on term bonds can reflect the current economic conditions in the market, so the bond market is useful.

The remaining of this paper is structured as follows. Section 2 Introduces the different kinds of bond including various term and maturity. Section 3 analyses Interest rate of different maturity bonds. Section 4 discusses Whether the risk of interest rate can be made for indicators to measure and role out the non-systematic risk for the investors or companies. Section 5 proposes how to face with the risk.

2. Kinds of Bonds

The topic of the article is about why the bond market is useful. To author’s perspective, the term structure of interest rate not only can help the investor to update value of investment opportunity, but also can provide the information to the economy as a indicator. There is a common sense that the term structure of interest rate is an essential factor in bond market. If somebody as an investor, the investor can use the term structure of interest rate to update the value which attach to an investment opportunities. But author suppose that this reason is not the only one factor could make bond market is useful or is not the only advantage for using term structure of interest rate. Maybe, whether the term structure of interest rate can provide the information to the economy as an indicator?

Actually, the bond can be divided into two kinds of bond based on the different maturity typically and simply (table 1). Long term bond and short term bond. If an investor holds a long term bond, this means that investors who invest in long-term bonds will only receive cash at the end of the bond's

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maturity date, which also means that the cash liquidity of long-term bonds is poor, but as the maturity grows, the bond's return The interest rate will also increase accordingly; on the contrary, the liquidity of short-term bonds is strong, and investors can quickly get their cash back, but the corresponding interest rate will be lower [11]. When the long-term bond interest rate and the short-term bond interest rate are the same, it means that the market is currently in a state of volatility, and the overall economic situation can not be made a judgment clearly whether the whole economic situation in the market will attain a stable growth tendency or a declined tendency.

Table 1: the sort of bonds and the maturity of bonds.

Sort of bonds	Long maturity	Short maturity
government bonds	5-30 years	6 months-1 year
financial bonds	2-5 years	3 months-1 year
corporate bonds	1-53 years	3 months-1 year

3. Interest Rate of Bonds

The interest rate of long-term bonds is higher than that of short-term bonds, which shows that current investors have confidence in the bond market, and long-term bonds will bring higher returns. But suppose that if the interest rate of long-term bonds is lower than that of short-term bonds, it means that the holders of short-term bonds can obtain more returns than long-term bond holders while the funds are liquid. Correspondingly, due to the market investment Those who are more pessimistic about the short- and medium-term market economic expectations have led to a large influx of funds into the long-term bond market. Long-term bond interest rates will progressively decrease due to the market's increased demand for them, though, and the market will then be in the opposite situation, which is not favorable for economic growth.

A compilation of these three scenarios can be presented to support the author's viewpoint. There are three main types of the word "interest rate structure."

Upward—The normal and unquestionable state of the economy and the development of trends arise from the fact that interest rates on long-term bonds are higher than those on short-term bonds. The theoretical action is about investing the long-term bond could have a more acceptable benefit in revenue than the short-term bond when these two kinds of bonds' maturity has been over.

Downward sloping—compared to long-term rates, short-term yields are greater. Although the short-term bond's revenue could more considerable than the long-term bond's revenue, the whole market economic situation may has the possibility to occur the recession. On the contrary, the author's opinion is that this situation can be regard as an opportunity to let investors avoid the risk in making investments.

Unstable—When faced with a situation where long-term bond rates and short-term bond rates have similar or almost the same values, such a phenomenon indicates that the future direction of the economic situation will become vague and unpredictable, so it is unstable.

4. Interest Rate Risk of Bonds

Interest rate risk exists when interest rates value is unstable and undulated. The interest rate risk can be made the essential factor to make a difference on the market value. Rising interest rate risks may cause declining bond prices and vice versa because of the inverse link between interest rates and bond prices. Interest rate risk affects bond values and is a concern for all bondholders. It's important to remember that bond prices fall when interest rates rise, as was already said. On the other side, bond prices normally rise when interest rates fall. As interest rates decrease and the market releases new

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bonds with lower yields than older fixed-income instruments, investors are less likely to buy new bonds. Consequently, the value of older bonds with higher yields tends to increase.

Actually, the interest rate of different maturity bonds' tend and change can be an essential factor to make the judgement for investors or company's managers who have ability to catch the opportunities to diversify the risk (figure 1). For the investment managers of some large companies, the significance of a normal market is that the long-term interest rate value of bonds is greater than the short-term interest rate value of bonds. The company's investment managers have reason to believe that the investment bond market has good prospects to buy. Corresponding long-term bonds and make appropriate investments; if they observe in advance that most short-term bonds in the bond market have higher interest rates than long-term bonds, this shows that most investors are not optimistic about the future development prospects of the bond market. At the same time, it will continue to bring about a certain degree of economic recession in the follow-up process. For the company, the economic recession caused by interest rate changes will affect the company's target customers to reduce the purchase and use of the company's products and services to a certain extent, thus affecting the company. At the same time, this is not conducive to the company's long-term holding of long-term bonds purchased before. It should sell long-term bonds at the right time and rationalize asset allocation to avoid risks.

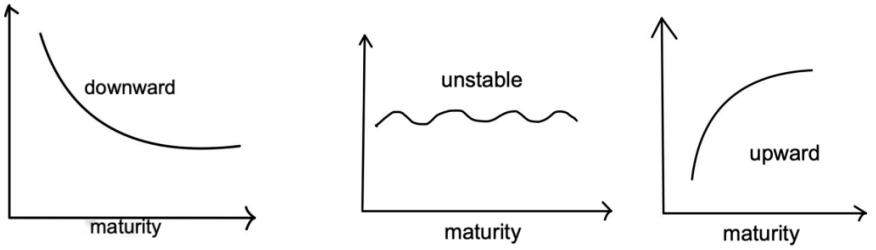

Figure 1: different situation between interest rate and economic situation.

Taking the 6-month term bonds and 10-year bonds of U.S. Treasury bonds as an example (as shown in figure 2), and obtaining their 5-year historical data, we can find that the long-term interest rate of U.S. Treasury bonds in 2020 is lower than the short-term interest rate, which also shows that the development of the COVID-19 virus. The American economic situation was hit, and when the economy recovered, the long-term interest rate returned to a level higher than the short-term interest rate. According to the influence of COVID-19, most long-term bond rates are lower than short-term bond rates, illustrating the current investment environment in the market that is influenced by outsiders. The influence of factors has led to the deterioration of the market investment environment. From this, it can be seen that the term structure of interest rate can be used as an indicator of the state of the economy.

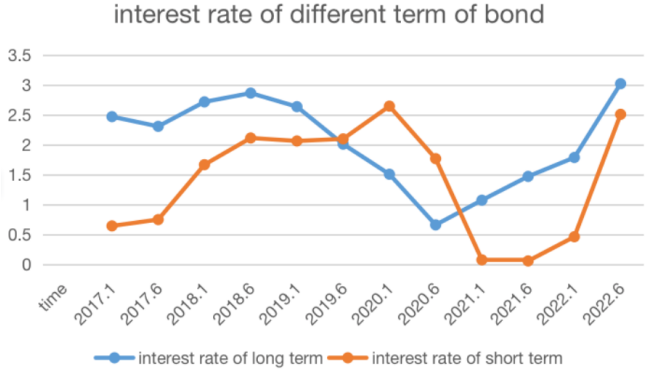

Figure 2: 6-month term bonds and 10-year bonds of U.S. treasury bonds.

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5. The Strategy to Resolve the Risk of Interest Rate

Bond default is a crucial factor for investors and businesses to take into account when engaging in bond investment activities since it continues to influence investment risk. When bondholders fail to pay the required interest or principal, for creditors, such a similar act is called default. Bond defaults are possible for individuals, companies and even entire nations. For creditors, default risk is an important factor. Defaults subject borrowers to legal claims and may restrict their access to credit in the future. A bond default for a nation could increase that nation's overall economic strain and impede its long-term economic growth. In addition, pertinent laws are required to address the negative consequences of bond defaults. For instance, Puerto Rico defaulted in 2015 after making only a $628,000 payment to settle a $58 million bond. Hurricane Maria's damage in 2017 made the island's economic and debt situation worse. In the biggest bankruptcy in American history, Puerto Rico announced intentions in 2019 to reduce its debt from $129 billion to approximately $86 billion. The bankruptcy filing was permitted by a provision that Congress passed in 2016. A Financial Oversight Commission was established under the Puerto Rico Oversight, Regulation, and Economic Stabilization Act (PROMESA) to manage the region's public finances. The company's creditworthiness, as well as the belief and attitude of investment companies in the company's long-term future development, will also be shaken by the default of the bonds, lowering or eliminating the company's investment options. For instance, Shanghai Chaori Solar's failure to complete payments of 89 million yuan ($14.5 million) in the beginning of 2014 led to China experiencing its first corporate default in nearly 20 years [12]. It had additional significance because it was the nation's first-ever onshore bond default. This has led to worries about other Chinese businesses and a certain level of fear in the country's fixed income market. The paper can offer some solutions to the interest rate risk based on the instances above.

Leveraged strategies, which require investors to hold longer-duration bonds and hedge them with a very short-duration bond fund [13]. Replacing shorter-term bonds issued by the same company or government with cheaper, longer-duration bonds to earn excess returns before the premium disappears. Bond premiums fall rapidly two years before their maturity because bonds can only be paid at face value, while longer-term bonds have higher time value due to their long duration [14].

Strengthen the regulation of government. In order to prevent the impact of interest rate risks brought about by the unpredictable economic crisis, government departments can strengthen supervision and monitor the relevant liquidity data in real time. When abnormal situations occur, they can be fed back to relevant companies in a timely manner, so as to avoid risks to the greatest extent.

6. Conclusion

This paper analyzes whether the bond market can provide risk-averse information for the overall economic situation. The main research conclusions are: firstly, the interest rate of long-term bonds and short-term bonds in the same period will affect the future economic trend; secondly, The bond market can provide risk-averse information about the overall state of the economy.

This article's implication is not only to enable investors to observe market trends through the interest rates of bonds of different maturities, and to make choices for their next investment decisions, but also to enhance the functionality of the financial market and strengthen the connection with the economic market. Meanwhile, this paper still points out that the market can use the leverage strategy and the strategy of strengthen the regulation of government to resolve the risk of interest rate.

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Analysis of the Development of the Social Media Industry in the Context of the Internet

- Taking the Little Red Book App as an Example

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Abstract: When the 5G era comes, everyone is inseparable from the Internet, and the media industry has gradually entered the Internet era. Around the Internet, the media industry has undergone multiple changes. Some researchers believe that the Internet has played a role in promoting the development of the media industry, while other researchers believe that the widespread use of the Internet is not good for the media industry. In response to this issue, researchers hold their own opinions, and there is no unified explanation. The research topic of this essay is the media industry under the background of the Internet, and the SWOT model is used for analysis. The results show that although there are some problems in the development of the media under the background of the Internet, it is not impossible to solve. Once handled properly, the two are not mutually exclusive, but can achieve perfect integration, and the Internet will be a major catalyst for the development of the media industry.

Keywords: social media, digital technologies, Little Red Book, SWOT model

1. Introduction

The current era is one of rapid development of the Internet, and the advancement of Internet technology has also promoted the innovation, transformation and development of traditional media. Since 2000, the widespread emergence and rapid popularity of the Internet has led to the rapid development of new media, and has brought huge impact and challenges to traditional media such as radio and television. The comprehensive development of digital technology and network technology has accelerated the pace of social development, the growth of information media is very rapid and covers a very wide area. Digital technologies such as mobile smart phones and laptops have enabled users to access social media easily and frequently, and have greatly increased social media usage. Such as Facebook and Linked In, which connect with others with similar interests and backgrounds and allow profiles to be created; YouTube allows media such as pictures and videos to be uploaded and shared [1].

When the Internet era came, the media gradually stepped into the digital era, and the related industries began to change around digitalisation. Digital production and communication put more emphasis on content, which has an important impact on media development and promotes the future

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media towards a stage of deep integration and development. With the rapid development of Internet technology, massive amounts of fragmented information are affecting everyone on all fronts. Compared to the limited processing capacity of the media in the early days of public opinion monitoring, today's use of big data technology, the accuracy of big data algorithms can be measured, the ability to link and analyze network content and a large amount of other information can be precisely controlled, and for complex and variable episodic factors, information can be obtained from a wider range, more areas and for a longer period of time from both online and offline, and by establishing a closer information network and using statistical means for comparison and analysis, more By establishing a tighter information network and using statistical methods to compare and analyze, we can more accurately grasp the characteristics of samples, observe changes in public opinion more quickly and accurately, predict the development trend of public opinion, and improve the effectiveness of public opinion management.

The current hot platforms such as Tiktok, Red book, Headline and major entertainment and news are the more successful works of the initial cross-border integration with the Internet and big data as the traditional media industry develops into the Internet era. These platforms bring a full range of free information content to people and thus gradually become mainstream media trunk stations with a high level of user activity and influence. The Internet relies on media information to attract users and earn their reliance and stickiness, while the media rely on the Internet to collect user data and accumulate user volume, which is the most basic media integration. When the media converge with the Internet, it will have an all-round impact on the media, not so much as a boost to media production and dissemination, but as a subversion of the concept of media content asset management and operation. Nowadays, the media industry is practicing a lot, which is improving the depth and breadth of media economics, and making media economics an emerging and promising discipline, using the theory of the economic discipline to further enrich and improve the theory of media content asset management and operation, and to guide the media to successfully achieve industrial integration and scale development.

Therefore, in this essay I would like to use the example of Red book app, which has a wide audience in China in recent years, to analyze the transformation and development of the media industry in the context of the Internet economy using the SWOT model. In this essay I will first analyze the development of the Internet on the transformation and development direction of the media industry, then use Little Red Book as a case for qualitative analysis, and finally, give a conclusion on what impact the Internet actually has on the media industry. Using Little Red Book as an example, the reasons and impact of the new media explosion will be analyzed. Thus providing a new way out for more platforms.

1.1. The Impact of the Development of the Internet on the Transformation of the Social Media Industry

When the Internet era came, the media gradually stepped into the digital era, and the related industries began to change around digitalisation. Digital production and communication put more emphasis on content, which has an important impact on media development and promotes the future media towards a stage of deep integration and development. With the rapid development of Internet technology, massive amounts of fragmented information are affecting everyone on all fronts. Compared to the limited processing capacity of the media in the early days of public opinion monitoring, today's use of big data technology, the accuracy of big data algorithms can be measured, the ability to link and analyze network content and a large amount of other information can be precisely controlled, and for complex and variable episodic factors, information can be obtained from a wider range, more areas and for a longer period of time from both online and offline, and by establishing a closer information network and using statistical means for comparison

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The current hot platforms such as Tiktok, Red book, Headline and major entertainment and news are the more successful works of the initial cross-border integration with the Internet and big data as the traditional media industry develops into the Internet era. These platforms bring a full range of free information content to people and thus gradually become mainstream media trunk stations with a high level of user activity and influence. The Internet relies on media information to attract users and earn their reliance and stickiness, while the media rely on the Internet to collect user data and accumulate user volume, which is the most basic media integration.

As network information technology continues to iterate and upgrade is also accelerating, the birth of new media technology supported by new hardware and software has led to the continuous development of big data derived from many uses, including the collection of big data, data cleaning and data use, some of the digital means of improvement and upgrading, also giving rise to innovation in marketing models, promoting the management of media content assets and operational upgrades. With mobile phones becoming the main tool for receiving information from the outside world after computers, online media readers are rapidly moving to mobile phones and the media is transforming and upgrading towards the next crossroads. As a basic internet with many users and content producers, the iterative upgrade of self-expansion also provides technical support and data resources for cooperation in the transformation of newspaper media. Combining traditional newspaper media with the Internet not only gives the newspaper media the advantage of news authority and public opinion influence, but also extends the appealing penetration of traditional media content by bringing into play the powerful technical functions of the Internet, realizing the integration from internal to external capital.

When the media converge with the Internet, it will have an all-round impact on the media, not so much as a boost to media production and dissemination, but as a subversion of the concept of media content asset management and operation. Nowadays, the media industry is practicing a lot, which is improving the depth and breadth of media economics, and making media economics an emerging and promising discipline, using the theory of the economic discipline to further enrich and improve the theory of media content asset management and operation, and to guide the media to successfully achieve industrial integration and scale development.

2. Analysis of the Social Media Industry Development

2.1. Case Description

Red book app is a new media platform that was born out of the Internet. Founded in 2013 by Mao Wenchao and Qu Fang in Shanghai, China, it is dedicated to bringing the world's good life within reach. At Red book app, users mark their lives, plant and pluck products through short videos and illustrations. At the end of February 2019, Fast Company magazine, a leading American business magazine, released its list of "Top 10 Best Innovative Companies in China 2019". Three companies, Meituan, Alibaba and Red book app, were ranked among the top three. As of March 2019, Red book app has over 220 million users and continues to grow rapidly. Its success has attracted the attention of the public.

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2.2. SWOT Analysis

Strengths -- the reason why new media is hot (the advantages of Red Book).

Strength 1: Continuous iterative dynamics. In 2014, China's cross-border e-commerce industry exploded in full force. With the advantage of its accumulated users, Red book app introduced the e-commerce company "Welfare Club" and transformed into a seafood e-commerce company. Unlike other vertical cross-border e-merchants, Red book app has given cross-border e-merchants the attribute of 'community'. Through the community, it collects tips from users around the world and provides detailed and reliable buying strategies for users who like to shop in the same situation. At the same time, a shopping mall is set up to support users to make online purchases for the products recommended by users. Since the debut of Red Book's brand account in March 2019, numerous major luxury brands (including YSL, Fendi) have gone into official collaborations with KOL, helping to create more interest in their products [2].

Advantage 2: Accurate positioning of user groups. At present, the most active user group of Red book app is mostly post-90s and post-95s. The characteristics of this group of young users are that their ideology and acceptance of new things are stronger than those of the middle-aged and elderly, which in a way can stimulate the desire to consume more, coupled with strong female consumption power, Little Red Book has gained more lucrative profits.

Advantage 3: A diverse selling model. Red book app is not selling because it sells, but rather a different approach, through sharing to drive food, wear, play and buy type of consumption. This sales model of sharing to drive consumption gives Red book app a strong shopping guide scenario. Combined with the strong female consumer power and the presence of larger categories and celebrities, the content and user attributes drive Red book app steadily to profit. With each advancement, Red book app is moving towards a direction closer to profit [3].

Advantage 4: Highly sticky quality content. While the traditional e-commerce traffic dividend has already entered a bottleneck, Red book is making great strides and is still creating new traffic dividends. Little Red Book focuses on a variety of fashion and beauty goodies recommendations. The majority of female users are happy to discuss and share with their friends during the beauty and skincare process, and are accustomed to revealing the beautiful things and good products, so Red book has precisely hit the pain point of these users' needs - "see, buy, use and share". The tagging of Red book makes the content more obvious, and the massive, high-quality content creates a basic "search scene" for Red book, so that even if you are not a core user of Red book, you may still use it for a specific point of need.

Advantage 5: Big data marketing improves accuracy and creates value for customers. With the increasing popularity of the Internet, new media and new technologies are widely used, and Internet technology has penetrated into all aspects of people's lives, bringing with it a new marketing concept - precision marketing. Mining people's views can disclose market research information, resulting in better commercial decision making [4]. However, effective methodologies and analytical approaches for dealing with the ever-growing data created by numerous social media apps are critical [5]. To enhance the precision of marketing is to build a personalized customer communication service system based on accurate positioning, relying on modern information technology means, and to complete the transformation from precision marketing to effect marketing. The integrated marketing concept of Red book comes from its constant construction of friendships and constant discovery of potential user needs, from recording to sharing and from sharing to communication, forming a huge flow that can allow the platform operator to build a circle culture while marketing is to create Internet trends by deepening various circles and penetrating diverse users.

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Big data to precisely configure needs. Red Book has strong data algorithms capable of fast and accurate pushing. On Red Book, every browsing, liking and collecting behavior of users generates a large amount of underlying data. Through the analysis of these data, Red Book can more accurately analyze the real needs of users to ensure that the products sold can be highly respected by users. Ali is the best at selling goods, but relatively weak in social and content; while Tencent has excellent social attributes, but less e-commerce genes, Red Book has both quality content and the strongest e-commerce attributes in playing community.

Weaknesses -- the weakness of new media development

The new media also has some disadvantages. For example: the phenomenon of news reversal, the reduced credibility of online news and the great impact on the paper media. The immediacy of the internet and new media has facilitated people's access to information, which not only accelerates the creation of online public opinion, but also increases the incidence of public opinion and the uncontrollability of public opinion [6].

The phenomenon of news reversal. Reversal news belongs to news misrepresentation, which is false news that gets spread rapidly after satisfying the audience's beliefs or emotional outlets, and is more likely to form and influence public opinion than objective and rational facts. The main reasons for the phenomenon of news reversal are the rapid dissemination of information due to the advancement of digital technology and the increased difficulty in gate-keeping, the failure of the media management system and the low media literacy of the audience. In order to reduce the recurrence of reversal of news, it is necessary to impose constraints or regulation on the key factors in the communication channels. In the Internet era, the media, netizens and regulators are the three key factors, so targeted measures or suggestions should be taken for these three factors. With regard to the frequent occurrence of reversed news in the Internet era, we should learn from the experience and lessons of past incidents to improve the credibility of the media and maintain social harmony and stability.

The credibility of network news decreased. Trust in traditional print and broadcast news publishers is relatively high, while trust in news published on channels such as social media is low. According to further scientific information on the internet consumption of accurate and false news, fake news travels quicker and farther on social networking platforms. Algorithm-driven news distribution systems lower market entry costs while increasing news producers' and viewers' market reach. At the same time, they divide the duties of content editor and news dissemination curator. The latter became algorithm-driven, with the goal of increasing traffic and advertising income. This weakens trustworthy editors' function as quality mediators and fosters the spread of bogus news information. It has the potential to create a dysfunctional news market. Platforms for news delivery have lately recognized the necessity to address these possible flaws. Non-regulatory activities such as fact-checking, improved media literacy, and news media standards of behavior can also play a role [7].

Paper media have been hit hard. The emergence of new media has had a significant impact on the paper media." The 17th National National Reading Survey Report," issued on April 20, 2020, demonstrates that more than half of individuals prefer digital reading, with a steady growth from 24.5% in 2008 to 79.3% in 2019. Paper media has a high cost, imaginary, and interactive problems as compared to modern media. In such a context, paper media should take a position and figure out how to develop themselves based on their own advantages and market variables [8]. Thus, the transition of the press to streaming media requires a conceptual follow-up that will drive a change in the way of working.

Opportunities - convergence of Internet and Media Industries.

The development of the Internet promotes the transformation and development of the media industry. On the one hand, there is the demise of traditional media, and on the other hand, there is

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the rise of new media. Rather than the Internet impacting the media industry, the Internet is an opportunity for the media industry to evolve. There is no doubt that the media industry will be reshaped in a new form under the influence of the mobile internet. Firstly, traditional media are embracing the Internet and the boundaries of media are expanding. Traditional media and emerging media are accelerating their integration in terms of content, channels, platforms and operations. In 2016, a number of excellent cases of integration of traditional and emerging media had emerged. Because in the competitive environment of the social Internet, 'content + community' is currently the best means to enhance user stickiness. This is exactly what Red Book has repeatedly emphasized in its positioning based on lifestyle sharing community, and rich content empowerment is a key factor for Red Book's success.

National policies play a guiding role, grasp the new trend of external integration and create a win-win situation together. The integration of the media and the Internet has been characterized by mobile, intelligent and socialization. The People's Daily's mobile client has expanded to 10 types of carriers, including newspapers, microblogs, WeChat, QR codes, mobile clients and online TV; CCTV has initially achieved deeper integration of content, channels, platforms, operations and management; the Central People's Broadcasting Station has put forward the development idea of "integrating the network with the station and bringing the station with the network"; and Guangming Daily has set up a 'fusion media' center. Guangming Daily set up a "media integration" centre. As the industry leader, Shanghai Newspaper Group has taken the lead in the transformation. According to media reports, in July, Shanghai Newspaper Group's sub-brand PengPai News (the paper newspaper) and Baidu's sub-brand Baidu Bajia announced a war path cooperation. The war path contract, PengPai News content fully stationed in the Bajia platform, and through the Bajia number for content distribution and data dissemination. Bajia and PengPai News reached a strategic cooperation, the two sides joined hands to launch a virtual anchor daily broadcast type morning and evening news column, and also based on AI technology innovation application, and PengPai News in content, technology, products, brand and other levels to carry out a comprehensive, multi-level cooperation. This 'Internet + Media' integration model is a win-win model of mutual empowerment, where the Internet relies on media information to attract users and earn their reliance and stickiness.

The COVID-19 has given Little Red Book a boost, the brick and mortar industry is seeing a surge in shop visits. Due to the impact of the epidemic, travel and the physical industry have suffered from poor business in recent years, and people have been forced to stay at home and limit their spending as a result, so once the epidemic improves, the physical industry and travel will definitely see a recovery. The first two years were two years of explosive growth for Red book app, but this explosion was without the deep involvement of the physical industry, so once the food and beverage, travel and other scenarios are completely back to normal, Red book's related categories can all see rapid growth, so 2022 will see very high growth in the Red book app shop exploration category. And, Red book is a typical small company friendly platform, there are many small companies around that live entirely on Red book traffic, and as long as the content is done well on Red book, users care very little about brands. So that's the biggest difference between Red book and other platforms.

Threats and challenges

Along with the rapid development of the Internet, the development of the media industry is also facing a number of challenges. As far as the media industry is concerned, the threat to traditional media is the most obvious. The current situation of traditional media: either in transition or on the way to transition. So is there no place for traditional new country scripts? Is Little Red Book really so magical? Let's just say that in every era and under different circumstances, major brands have their own needs. Press releases are not going to disappear, and Little Red Book will have a broad future. In contrast, traditional press releases fall into the category of 'general marketing', which

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means that the marketing seems to be less targeted and can be put online for marketing and promotion by both traditional companies and traditional brands.

If traditional press releases are more inclined to use various marketing methods to give users an awareness of the brand, Red Book focuses on increasing users' trust in the brand. But either type of marketing is complementary to the other. Little Red Book notes increase the connection between the user and the brand, giving the user the most intuitive feel for the product through the process and experience of using it. Traditional press releases, on the other hand, use marketing to give users more awareness and a deeper understanding of the product and promote interaction between the user and the brand. Both Red Book notes soft copy marketing and traditional press release marketing have benefits, and the two marketing methods are synthetic with each other. Red Book's promotional notes can deepen and strengthen the connection between brands and users, and can give fans as well as consumers the most intuitive feeling of the product through the process of using it afterwards. Press release marketing, on the other hand, uses marketing to bring greater trust to consumers. The two types of marketing are used in combination to promote the image of the brand and the interaction between the brand and the consumer.

3. Conclusion

This essay scientifically and objectively analyzes the strength and weakness, opportunities and challenges of the Internet to the development of the media industry. Through the research, it is found that the development of the Internet is closely related to the transformation of the media industry. As little red book app as an example, it is found that the development of digital technology has a great impact on the development of the media industry, which promotes the development and transformation of the media industry. But there are also some problems, as mentioned in this essay, the phenomenon of news reversal, the reduced credibility of online news and the great impact on the paper media. Therefore, these problems still await the future development of the media industry to solve the problem, only by checking the gaps and filling can the Internet maximize the benefits of the media industry.

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Female Investors Regard Entrepreneurs' Workout Habit as an Important Factor for their Investment Decisions

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Abstract: The study intends to investigate whether entrepreneurs who have regular workout habits would attract investors more in the venture capital field. Depending upon the aim, a questionnaire of 19 pages combining 35 questions is provided to a sample of 110 financial practitioners in the venture capital field. The collected data was then examined with the SPSS application. The research data was analyzed using descriptive and inferential statistical approaches. The findings will be addressed in the hopes that this research will help to comprehend the relationship between entrepreneurs' workout habits and the chance of getting investments.

Keywords: workout habits, female investors, venture capital

1. Introduction

An obvious and shared commonality that could be found among top professionals in different fields is that they all have regular workout habits. Examples of this statement could be easily listed, such as Warren Buffet, Richard Branson, Barack Obama, etc. There are many researchers, scholars and journalists that are always trying to find the common characteristics among successful people, trying to figure out the recipe for success. However, the relationship between exercise and investment chances for entrepreneurs has not been examined. In this study, the definition of success is defined and limited in the venture capital field, which refers to whether the chance of the entrepreneur getting an investment would be high or low.

2. Literature Review

In Goldsby and Kuratko's work, the study investigates the exercise regimes of 366 small business owners, as well as the link between exercise frequency and the company's sales and the entrepreneur's personal goals [1]. This study specifically looks at the association between two forms of exercise—running and weightlifting—and sales volume, extrinsic incentives, and intrinsic pleasures. Running is favorably connected to all three outcome variables, while weightlifting is positively related to extrinsic and intrinsic pleasures but not to sales. The key research question was: Are entrepreneurs who follow a fitness program of strenuous exercise more effective at achieving goals as stated by intrinsic and extrinsic rewards? They believed that investigating the effect of exercise in entrepreneurial success is critical due to the high time restrictions and stressful situations that small business owners face. With personal wealth at stake in the operation of a small business, there may be a trade-off

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between exercise and time spent operating the firm. Simply said, time spent exercising is time not spent operating the business. Furthermore, bigger companies—the source of samples for previous research on exercise—can afford the luxury of wider coverage of job responsibility, better access to on-site fitness equipment, and more financial resources and corporate relationships for granting access to health club memberships. Smaller entrepreneurial enterprises, on the other hand, are less likely to be able to afford such facilities.

Kim discussed the impact of entrepreneurial fitness, dynamic capabilities, and innovative activities on business success [2]. A survey of small and medium manufacturing enterprises in Korea was conducted and evaluated, yielding the following research results. First, the fitness of entrepreneurship and dynamic capabilities, the fitness of dynamic capabilities and innovation activities, the fitness of entrepreneurship and innovation activities, and the fitness of dynamic capabilities and innovation activities all have a significant impact on business performance. Second, all three factors' fitness have a considerable beneficial influence on performance. Additional route analysis reveals that dynamic capacities and innovative activities play a role in mediating the relationship between entrepreneurship and firm performance. The findings suggest that not only does each of the entrepreneurship, dynamic capacities, and innovation activities have a good influence on business success, but that the three characteristics working together have a synergistic positive effect on business performance.

"With the concern regarding COVID-19 and physical health, I've been directing many of those anxieties into keeping a good workout and food regimen," says Christine Nguyen, Founder and CEO of Limitless Foundation [3]. Working out provides me with a much-needed vacation from screens since I spend anywhere from 7 to 15 hours each day in front of one. I would never find the time to take care of my physical health and work out if I didn't have an exercise program."

In Zoran's practical study, the team began reducing extra fat, gaining muscle mass, sleeping better, and feeling better overall after three months of training. As a result of all of this, experiment participants are more enthusiastic at work and more focused on completing their duties. Also, they progressively transitioned from cheering one another on at the gym while completing workouts to supporting each other while conducting regular duties at work. It was challenging for them at first since it was a lifestyle adjustment. A personal achievement for the researcher is that all of these folks have begun to individually research healthy behaviours and how to incorporate them into their life. Participants have learnt to better manage their time via training, and they are more tenacious in completing things. Sport has also brought individuals from various cities together. All of these folks who have altered their workout routines in the previous few months, from the researcher's perspective, are more proactive at work and in their personal life.

Through the literature review, many commonalities could be found between running business and workout habits. As everyone knows, fitness requires a lot of self-control and persistence. The thing is the same for running businesses.

3. Methodology

Our goal for this study was to test whether sharing sports habits of entrepreneurs promotes the investment intention of the venture capital and do investors with different gender would have a different attitude towards the standpoint.

3.1 Participants

We recruited a sample of 110 Chinese employees working in the financial investment industry. The average age and tenure of them are 29 (SD=3.36) and 5.7(SD=2.44), respectively. Among the participants, 42.7% are female, and 97.28% hold a degree above Bachelor. We provided each participant a 3-dollar incentive for their experimental completion.

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3.2 Manipulation

We manipulated the entrepreneurs disclosure of their sports habits by randomly presenting one of two entrepreneurial pitch videos. These videos contained three parts- including entrepreneurial motivation, project description, and introduction of the entrepreneurial founder. In the sport habits disclosure condition, the entrepreneurial founder shared he had regular daily exercise habit beyond giving a decent self introduction that involves his previous entrepreneur experiences and his educational background. By contrast, in the control condition, the entrepreneurial founder only gave a decent self introduction that involves his previous entrepreneur experiences and his educational background. All other information about the entrepreneurial founder profiles and projects was equivalent across conditions.

3.3 Measures

Perception of resilience. We measured whether participants thought that the entrepreneur in the video is resilient (1= Strongly disagree; 5 = Strongly agree) from the scale developed by Luthan, F., Avolio, B. J., Avey, J. B., &Norman, S. M. [4]. Items included, “He can handle the difficulties of starting a business”, “He can handle the pressure of starting a business in his stride”, “He will not be overwhelmed by the setbacks of entrepreneurship”, “He is comfortable with the responsibility and pressure of starting a business”, “He will not be discouraged by the difficulties in starting a business”, and “When faced with setbacks in entrepreneurship, he can quickly move on” (α = xxx).

Investment intention. We assessed the investment intention by asking the participants whether they would invest their money to the entrepreneurial project (1= Strongly disagree; 5 = Strongly agree) from the scale developed by Septyanto, D., Sayidah, N., & Assagaf, A. [5]. Items included, “You invest in it out of faith”, “You invest in it for further development”, and “You invest in it for increasing wealth” (α = xxx).

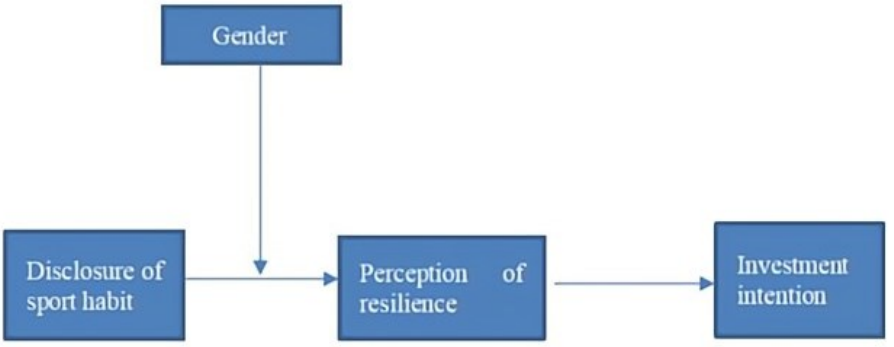

Figure 1: Gender: close to stereotype literature stereotype theory.

3.4 Research Hypothesis

In this study, we constructed the following two types of models:

H1: The exercise behavior of entrepreneur affects the investors' perception of resilience.

H2: The investors' perception of resilience affects their investment intention (Shworth, 2015).

4. Processing of Data

We would divide the data by gender of responders then process the data and review the outcome separately. For each data table, take out the variable sport habit, perception of resilience, and investment intentions. Use SPSS to find the correlation coefficient between the sport habit and perception

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of resilience, and the correlation coefficient between perception of resilience and investment intention.

4.1 Reliability and Validity Test of Questionnaire

The degree to which random error is excluded from a survey value is known as reliability. The investigation is entirely trustworthy if the random error is zero. The reliability coefficient can be used to illustrate reliability in reliability analysis results. The reliability of the questionnaire increases with the reliability coefficient. When the reliability coefficient is between 0.70 and 0.80, it indicates that the questionnaire we prepared has strong dependability and can more accurately reflect the sample's data. When the reliability coefficient is between.80 and.90, it means that the questionnaire has excellent dependability. The Cronbach's alpha coefficient is used in this case.

The degree to which a measurement tool can accurately measure the trait it is designed to measure is referred to as validity. The more accurately our measurement results reflect the traits we are attempting to gauge, the higher the validity. Here, we use the construct validity test to evaluate the questionnaire that was created. The level of correspondence between a specific structure reflected in the measurement results and the measured value is referred to as construct validity. Factor analysis is the approach used in construct validity analysis.

5. Discussions

5.1 Exercise and Resilience

Understanding resistance to brain illnesses, often known as brain or cognitive reserve, has received more attention. Physical activity has been identified as a significant protective element for the development of resilience. Exercise has been shown to have several beneficial impacts on the brain. As a result, doing exercise is a crucial tool for influencing neurodevelopment and shaping the adult brain to respond to life's difficulties. Exercise intervention has been linked to cognitive enhancement and stress resilience in people and animal models, among other benefits. As a result, an increasing number of studies have shown that exercise not only heals or decreases cognitive deficiencies by increasing neuroplasticity and cognitive reserve, but it also counteracts brain disease [7]. Physical activity has a good impact on resilience since it can elicit favorable physiological and psychological changes, defend against the consequences of stressful situations, and prevent or decrease the effects of numerous neurological illnesses.

5.2 Benefits of Workout

Regular exercise practice has benefits that extend beyond physical well-being. Fitness and mental health are inextricably linked, and exercise frequently increases energy, attention, motivation, and general happiness. There are several scientific publications that demonstrate how many benefits physical exercise and sports provide to the human body. A sound mind in a sound body. Exercise increases happiness while decreasing worry and stress. Primarily because it induces the production of the chemicals serotonin and norepinephrine, which help to alleviate sadness and create a sense of well-being. Exercise develops the brain and increases memory and thinking abilities. It increases life expectancy, improves skin health, strengthens muscles and bones, improves sleep quality, boosts metabolism, and boosts team spirit.

There are many benefits brought by doing exercises regularly. Firstly, exercise increases energy levels. When doing exercises, the body releases endorphins, serotonin and dopamine, which are usually referred to as happiness hormones. Exercise improves blood circulation and strengthens the heart muscle. This makes it easy for the body to produce energy. Besides, exercising boosts creativity and

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concentration. People could use exercise as a detachment strategy which allows them to separate themselves from daily troubles and focus on something entirely different for a short period of time, and that is something one could sense is striving to improve oneself. Another advantage of exercising is that persons who exercise tend to have fewer sick days and experience fewer injuries in everyday life. Employees who participate in some sport have a 14% increase in net value for firms when compared to employees who do not participate in any sport. People who exercise frequently - on average three times per week - have more self-confidence and are happier with themselves, which means they are often more focused at work.

5.3 Resilience and Investment

Being resilient may be required to display in an entrepreneurial attitude. Several studies have found that resilient people are more likely to start new firms, take over existing ones, and pivot their operations amid a crisis like the COVID-19 epidemic [8]. Psychological resilience is also linked to a variety of positive outcomes, including business success [9]. Resilient entrepreneurs have better mental health because psychological resilience helps cushion them from the daily stresses of business. Resilient entrepreneurs are also more likely to learn, innovate, demonstrate transformative leadership, and be happier than those who lack psychological resilience. Resilience is also linked to objective and subjective evaluations of corporate success. One study discovered that portraying personal resilience in crowdfunding campaigns leads to improved financial success, while another discovered that psychological resilience increases the likelihood of venture survival substantially [10].

Any free-market economy relies on entrepreneurship. Globally, small and medium-sized firms account for nearly 90% of all businesses and employ more than 50% of the workforce. They also provide around 45% of the gross domestic output (GDP) [11]. However, entrepreneurs confront several threats to their existence, including financial insecurity and market uncertainty. Surprisingly, about half of all new businesses fail within the first five years [12]. In a difficult environment, entrepreneurs' psychological resilience is a particularly critical personal resource and competitive edge. Hence, from the discussions above, no wonder investors pay special attention to entrepreneurs' potential resilience and count this character as one of the key considerations of whether to make the investment.

What most entrepreneurs don't realize is that maintaining mental health is like filling up your car with gas. Too many entrepreneurs wait until their cars are full of smoke before stopping to fill up. The problem with this is that the car stalls if it encounters an unexpected curve or roadblock. Worse, it could permanently damage the engine. The coronavirus pandemic has had a long-lasting impact on economic conditions around the world. The mental health of entrepreneurs is not only for their own business but also for the business to survive the crisis and move to long-term prosperity. Research shows that 72 percent of entrepreneurs will face mental health problems, and almost the same percentage are not currently receiving treatment. In situations of prolonged uncertainty, mental health distress at the founder level can lead to instability and a lack of trust in leadership. Leaders often fail to create community Spaces, belonging and play Spaces -- critical to individual and company resilience. This obsession at the top has a negative impact on morale, retention, incentives, performance, productivity, and output.

6. Conclusion

The study starts with two roadshow videos and by watching either one of the videos, participants are going to answer a questionnaire based on the impressions that the entrepreneur provided during the roadshow video. After statistical analysis of 110 respondents, it could be found that whether an entrepreneur has regular workout habit provide different impressions for investors in the venture capital

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field. The chance of having a better impression is related to having regular workout habits. Also, female investors tend to have higher sensitivity in this correlation, which means that female investors tend to provide funds for workout-habit owners higher probability of investment chances. The study is confined to sample size and future study is expected to provide more findings and information.

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Analysis of Louis Vuitton's Marketing Strategies in Chinese Luxury Fashion Market

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Abstract: The rapid growth of China's economy has made the country one of the world's most important markets for high-end goods. In the meantime, China's economic growth has slowed since entering the new normal in 2014, and luxury consumers have become more practical. For this reason, many international luxury brands are fretting over how to break into China's opulent consumer market. The LVMH Group owns a number of luxury brands, including the ubiquitous Louis Vuitton. In light of the foregoing, this research examines the Louis Vuitton brand's marketing strategy in China, specifically its product strategy, pricing strategy, promotion strategy, and positioning strategy. Several suggestions are made to enhance Louis Vuitton's marketing strategy in China based on the findings of this study, such as a push to emphasize the brand's commitment to quality. Several suggestions are made in this report to better Louis Vuitton's marketing strategy in China, including expanding efforts to promote the quality-centered brand idea in the Chinese market, adjusting prices on a case-by-case basis, and bolstering the company's online sales channels. The marketing strategy of Louis Vuitton is examined in this article, which provides not only useful information for the company but also useful information for other domestic luxury businesses.

Keywords: China's economic growth, Louis Vuitton, marketing strategy, luxury businesses

1. Introduction

The luxury fashion house Louis Vuitton is owned by the LVMH Group. The de facto significance of the Louis Vuitton brand name is the Frenchman Louis Vuitton, who dressed the French aristocracy and was respected by them for his incredible talents. As early as 1854, he established the Louis Vuitton name with the opening of his own luggage company. 44 years later, his son George created the now-iconic monogrammed canvas with signature Louis Vuitton patterns and floral themes [1-2]. Monogram canvases have been around for quite some time, but that hasn't stopped them from being a hot commodity in the high-end market. In 1987, Louis Vuitton and Moet Hennessy joined forces to form the LVMH Group, which has since expanded into a global luxury goods powerhouse. LVMH's initial focus was on leather goods, but the incorporation of a watch and jewelry company in the 1920s allowed the company to expand into the full fashion industry. LVMH has more than 4,900 stores around the world and made over 500 billion euros in 2019 [3].

This research project analyzes and assesses the Louis Vuitton brand's marketing strategy in China, including the brand's product strategy, pricing strategy, promotion strategy, and positioning strategy. Both a literature review and a case study were utilized in the research for this paper. This article draws

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on the literature on the topic at hand to provide a comprehensive understanding of the nature and classification of luxury goods, as well as the current development level of the luxury industry in China [4]. In addition, a theoretical model of luxury consumption motivation and its influencing variables is developed using the grounded theory methodology, which sheds light on the factors that influence luxury purchase decisions among Chinese consumers. To learn more about what makes premium companies tick, we used a case study approach to investigate and analyze Louis Vuitton's M&A evolution over time.

In this paper, we will take a look at Louis Vuitton's marketing strategy, which will serve as a useful benchmark for the company and a learning opportunity for other homegrown luxury brands.

2. The Style of Louis Vuitton

An item's brand style is what sets it apart from similar products and communicates the brand's personality. After 162 years, Louis Vuitton is committed to producing a wide variety of products while staying true to the brand spirit in order to cement its position as a role model in the annals of the world's premium brands. Not only has Louis Vuitton become a symbol of fashion art, but the company's great prestige, rich inventiveness, and acute craftsmanship are also responsible for creating the company's distinctive style, which is characterized by elegance, solemnity, exquisiteness, and flawlessness. Designed by George Vuitton in 1896, the "monogram" is a timeless symbol of Louis Vuitton [5]. Over Louis Vuitton's more than a century in business, the "monogram pattern" has been employed and refined. The e-element can be found on many different bags by this brand. Because of this commitment to innovation, the Louis Vuitton brand has become a timeless icon of the luxury industry.

3. The Quality of Louis Vuitton's Products

As a brand, Louis Vuitton has always put quality first. The goal of this stringent quality control is to make things simpler for the buyer. For the launch of their new "PEGASE LEGERE" bag in 2015, for instance, Louis Vuitton's product testing lab recreated tests under conditions that had been commonly used for the previous decade: Ten years of simulation resulted in 520 simulated flights, or a weekly occurrence on average. A telescoping handle on the suitcase was used repeatedly to raise and lower the bag. When the suitcase was completely stuffed, the traction force applied to the handle reached 100 kg. Over a period of ten years, the bags will cover 240 kilometers of rocky terrain. To test the durability of the suitcase's drum, a mechanical arm was used to drop the bag from 1 meter above the ground 520 times. After the test, the bag showed only minor denting. It has also been reported that a fire broke out in someone's house, destroying most of their clothing, and that the hard Louis Vuitton luggage that was recovered from the bottom of the ocean several years after the Titanic's sinking did not even let a drop of seawater through. The contents of the monogrammed viscose bag were unharmed, though the bag itself was badly burned and twisted in the fire. These stories may be exaggerated, but they do show how highly consumers regard Louis Vuitton products. This is why the Louis Vuitton name has endured for a century.

4. Price Strategy Analysis

Louis Vuitton, unlike many other luxury brands, maintains a consistent retail price for all of its products at all of its locations nationwide and rarely offers discounts. As a substitute, they have been increasing their prices nearly annually to remain competitive in the global market. Louis Vuitton has gained its customers' trust by never offering price breaks. The study found that while Louis Vuitton is more expensive than Gucci and Prada, it is more affordable than Hermes and Chanel. The high prices of luxury brands, as argued by Louis Vuitton, are justified and acceptable. However, Louis Vuitton

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argues that products that are either too cheap or discounted frequently cannot be considered luxury. If consumers in the target market understand the emotional and cultural significance of the brand, they will be willing to pay the higher price. To compensate for the widening price disparity across regions caused by the euro's precipitous decline, Chanel increased prices in the eurozone for the first time in early 2015 and decreased prices in China by an average of 20%. After seeing the effects of Chanel's price increases on the global luxury market, a number of competitors have followed suit and raised their prices. On the other hand, LVMH has said that luxury brands shouldn't "chase global prices" and that it will never do what its rivals have done to close the gap in prices around the world. Louis Vuitton's nationwide consistent pricing and non-discount pricing strategy has significantly increased brand loyalty [8]. The increasing prestige of Louis Vuitton boutiques in China is indicative of a general trend toward increased spending by affluent shoppers there.

5. Analysis of Offline Sales Methods

Many well-known luxury brands that sell internationally distribute a large number of licenses to Chinese stores when they first enter the Chinese market. This allows the stores to take advantage of local distribution networks while reducing overhead costs. However, the issue of distribution channel control is becoming more and more apparent, and retailers' inconsistent application of franchise rights can easily harm brand perception and ultimately erode brand value. Consequently, most Chinese high-end brands prefer to set up their own boutiques rather than compete with the country's more well-known retailers. Brand value is the result of an organization's commitment to its brand over time. After breaking into the Chinese market, Louis Vuitton adopted a straightforward and efficient sales channel: direct sales at exclusive stores, with an emphasis on the exclusive store's central role in the distribution chain. Still, great care is taken in the selection of new store openings, and this process can take quite some time. It will be difficult to keep up with the pace of development without compromising the modernization of these businesses. Fast expansion is not necessarily indicative of market success. That each new store is up to international standards is crucial to the development of its name recognition. In the 28 years since it entered the Chinese market, Louis Vuitton has opened 50 stores there. The Louis Vuitton store in Hangzhou follows a general strategy of not oversaturating the channel. Louis Vuitton has found success and expansion opportunities in China's secondary and tertiary cities as well as the country's first tier. [9] So far, Louis Vuitton has primarily located its stores in upscale shopping malls and other commercial hubs, as well as on busy commercial thoroughfares. For instance, the first Louis Vuitton store in Hangzhou is situated in Hangzhou Tower, the city's first large-scale luxury complex and the largest shopping mall in Hangzhou with the most luxury businesses.

6. Online Channel Analysis

Network marketing is a type of marketing that has flourished in the Internet era because of the accessibility and interactivity of digital information and network media. It has become one of the most successful advertising strategies and is rapidly expanding around the world. Companies in the luxury goods industry are increasingly using big data to learn more about their clientele. On July 15th, 2018, Louis Vuitton made public its plans to expand its e-commerce presence in China by opening a digital "flagship store" (such as shown in figure 1).

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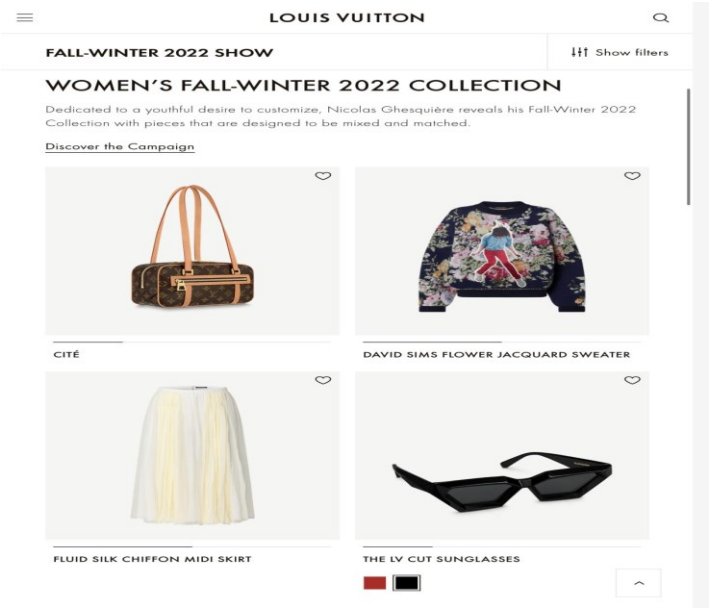

Figure 1: A screenshot of the Louis Vuitton official flagship store web-page [10].

The online marketplace serves consumers in every major city in China and accepts all major online payment systems, including WeChat and Alipay. Concurrently, the e-commerce site will gradually broaden its product offering to include more than just leather goods and accessories but also shoes, ready-to-wear, and luxury jewelry.

7. Louis Vuitton's Social Media and Other Promotional Tools

Louis Vuitton has begun focusing on new media, particularly social media and other low-cost communication channels, to sell its products in response to the increasing purchasing power of young consumers and the widespread availability of the Internet. In October of 2010, Louis Vuitton created an official Weibo account to centralize all marketing messages for the brand. In May of 2019, Louis Vuitton became the first luxury and extravagant brand to join Little Red Book by launching an official account primarily for pushing product information. The fashion house Louis Vuitton made its official debut on the Chinese version of TikTok in August 2020, inviting followers to watch a live stream of the brand's spring/summer 2021 menswear presentation. In China, two of the most widely used social content platforms are TikTok and Little Red Book. If Louis Vuitton wants to maintain its competitive edge in China and win over a new generation of shoppers, it must expand its online distribution channels.

Over the course of its 162 years, the Louis Vuitton brand has focused on narrative marketing, presenting a series of trip stories and progressively establishing the Louis Vuitton brand's travel philosophy: the pursuit of refinement, quality, and comfort makes the "travel" brand a distinct pronoun (such as shown in figure 2). In addition, "travel" was included in the brand's core values. A perfect link between Louis Vuitton's founder and the main line of products launched by Louis Vuitton when he went to Paris alone to start his business is achieved through the theme "Travel," which is positioned strategically. They bonded over a shared interest in travel. Because of this, the idea of travel is embedded into each and every one of Louis Vuitton's signature handbags, luggage, and accessories. Let's use luggage as an example. Some Louis Vuitton luggage has large storage space, some is stylish, and some is lightweight and easy to carry, all of which contribute to the brand's underlying narrative of effortless elegance while on the road.

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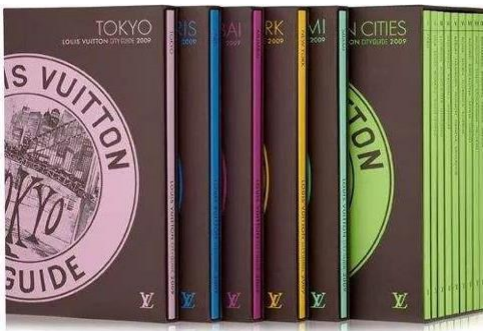

Figure 2: "Louis Vuitton City Guide" series [11].

8. Louis Vuitton Stars and KOL Spread

Louis Vuitton is committed to localized promotion in China, from A-list celebrities to the general public. This is accomplished through multi-level communication. Louis Vuitton has had a long list of celebrity spokespeople, including Madonna, Mikhail Gorbachev, Catherine de Neve, Angelina Jolie, Fan Bingbing, and many more. Beginning in early spring of 2016, Louis Vuitton used the fictional female character Red (from the "Final Fantasy" series) as the face of its "Series 4" advertising campaign. Louis Vuitton's dedication to attracting young customers is demonstrated by the company's use of a video game avatar as a brand ambassador. It was announced on Louis Vuitton's official Weibo account on October 31, 2018 that Chinese celebrity Kris would be the new face of the Louis Vuitton brand internationally [12]. A Chinese person has never before been chosen to represent Louis Vuitton as a spokesman. Brand ambassadors for Louis Vuitton include not only Kris but also Di Liba, Zhu Yilong, Liu Haoran, Ouyang Nana, and many more well-known Chinese celebrities. Clearly, Louis Vuitton has high hopes for the Chinese luxury market.

9. Conclusion

Overall, our investigation into the growth rate and advertising approach of Louis Vuitton in China revealed both opportunities and challenges for the luxury sector in China. Louis Vuitton not only creates a unique brand style founded on product excellence, but also a variety of models aimed at various segments of the market. Buyers' faith in Louis Vuitton has been bolstered by the fact that the brand has never reduced its prices. To bolster China's premium e-commerce sector, Louis Vuitton is carefully developing offline locations while aggressively expanding online sales channels. Louis Vuitton uses local Chinese social media and celebrities and key opinion leaders (KOLs) to promote its products in addition to relying on brand stories centered on travel [13].

Meanwhile, Louis Vuitton is adapting its strategy for marketing in China to the needs of the digital age. As China's middle class expands and the country's global influence grows, so too does its market for high-end consumer goods. Sales in the luxury goods sector around the world are on the rise at the moment, with Chinese consumers making up roughly a third of this sector. As the consumption gap between China and European and American countries gradually narrows, as people's disposable incomes continue to rise, and as people's attitudes toward consumption undergo a sea change, the luxury consumption market in China is poised for explosive growth.

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Strategic Choice of Intelligent Logistics Enterprises Based on Internet Platform

-- A Case Study of Zhongchu Smart Logistics Corporation

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Abstract: As an important part of the national economy, the logistics industry is on the road of Internet+ development. Intelligent logistics based on Internet platform is an effective way to cope with the challenges of rapidly changing customer expectations, seize the opportunities brought by new technologies and promote new business models. From the perspective of strategic choice, the purpose of this paper is to take the storage and intelligent transportation of China's large modern integrated logistics enterprises, Zhongchu Smart logistics, as an example to study the strategic choice of traditional freight logistics type of enterprises in terms of business model, service products, technology application, and their own organizational structure when transforming into intelligent logistics enterprises based on the Internet platform. Through the qualitative and quantitative analysis of the relevant aspects of the research object, the core elements of the strategic choice for the transformation and construction of intelligent logistics enterprises are obtained, which provides the basis and reference for relevant enterprises.In this paper, Zhongchu Smart logistics has built an intelligent online freight platform using advanced technologies such as the Internet of Things and big data to achieve enterprise marketing and transportation capacity management, logistics operation process management and services; Extend the network freight platform to the upstream and downstream services of the industrial chain, build a logistics ecology, and coordinate multimodal transport, financial and digital solution services; Building a flat, efficient and fast organizational structure will greatly enhance the competitiveness of enterprises and may occupy long-term advantages in the future development of the industry.

Keywords: internet, smart logistics, strategy management

1. Introduction

In 2015, China formally put forward the development idea of "Internet+", which defined the deep integration of "Internet+" and traditional industries to upgrade or even subvert the business model and development model of traditional industries, improve the innovation and productivity of the real economy, and promote the overall development of the industry [1]. Since 2015, all industries in China have been basically affected by the Internet, even including government poverty alleviation, government services, health care and other aspects. Industrial innovation and development models

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based on the Internet, new infrastructure, and new technology applications have been emerging, providing more strategic choices and development directions for industries and enterprises, and certainly contributing to the sudden change in the industrial competition pattern, The ecological competition with the industrial Internet platform as the core is constantly upgrading [2]. Traditional enterprises must actively embrace the Internet, take the initiative to formulate development strategies and action paths based on new technologies and new development patterns, and take the initiative to achieve the deep integration of online and offline businesses, so as to have sustained momentum and space for development.

The logistics industry plays a vital role in the economic development and is an important part of the real economy. In 2021, China's GDP will total 11.437 billion yuan, including 16.7 trillion yuan of national social logistics costs, accounting for 14.6%. In the United States, the logistics expenditure accounts for about 8% of the total GDP. In the country with the lowest efficiency, the logistics cost may be as high as 25% of GDP [3]. High logistics cost will affect the efficiency of global value chain of manufacturing industry and the competitiveness of a country's economy. The rapid development of Internet based cloud computing, the Internet of Things, artificial intelligence (AI) and the fifth generation communication technology has promoted the deep integration of the new generation of information technology and the real economy in various fields, which is an important way for China to achieve industrial innovation and structural optimization [4]. There is no doubt that developing an Internet based intelligent logistics system to improve logistics efficiency and reduce logistics costs is the future development direction of the logistics industry and logistics enterprises. At the same time, with the development of Internet+, many new and profound changes have taken place in the logistics industry. For example, from the technical point of view, logistics information technology is rapidly popularized, and all aspects of logistics are electronic and visualized from order, transportation, warehousing, loading and unloading, distribution, processing, etc; From the perspective of cost and efficiency, sales response and logistics matching are optimized and fast, services are more refined and costs are more controllable; From the perspective of business model, the logistics industry, financial industry, manufacturing industry and other industries are interconnected, and the railway, waterway and highway Multimodal transport. All of these will promote the logistics industry to integrate more closely with the real economy, and also promote the logistics industry to embrace the Internet faster and build core competitiveness.

This paper intends to discuss the Internet based intelligent logistics strategic development options of China's modern road transport enterprises and the development path of leading enterprises in the industry through the comprehensive analysis of qualitative and quantitative, static and dynamic information and data on the business model, technology applications, organizational structure and other aspects of China's large modern integrated logistics road transport enterprises, So as to discuss the development direction of China's road transport enterprises.

2. Development Process and Main Model Evolution

2.1. Development History of China's Internet+Internet Freight Industry

China's Network freight industry has experienced three stages of development:

First, in 2014-2016, the concept of "Internet+Logistics" rose, and vehicle cargo matching platforms exploded: in 2016, the Ministry of Transport of China issued the ‘Opinions of the General Office of the Ministry of Transport on Promoting the Reform Pilot and Accelerating the Innovative Development of Vehicle free Carrier Logistics’, announcing the launch of the pilot work of vehicle free carrier [5];

Second, 2016-2019, the "vehicle free carrier" stage: after three years of pilot, platform economy and economies of scale have gradually emerged. In September 2019, the Ministry of Transport and

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the State Administration of Taxation jointly issued the 'Interim Measures for the Operation and Management of Road Freight Transport on Network Platforms', which changed the name of "vehicle free carrier" to "operator of road freight transport on network platforms", marking the success of the pilot work of vehicle free carrier [5];

Third, from 2019 to now, the stage of strict supervision: with the promulgation of the 'Interim Measures for the Operation and Management of Road Freight Transport on Network Platforms', the industry reshuffle has accelerated and the industry has entered a mature stage of development [5].

In the Internet economy, core enterprises play a leading role, which can be called leading enterprises. Decisions of other enterprises will depend on the decisions of core enterprises to some extent [6]. With the road network freight industry entering the stage of strict supervision, the scale effect of the industry appears, leading enterprises grow rapidly and competition intensifies. At present, the three largest enterprises in China's network freight platform business scale are Manbang, Huolala and Zhongchu Smart logistics. Among them, Manbang is the absolute leader in the field of trunk logistics, accounting for 90% of the market share, and Huolala is the leader in the freight market in the same city, accounting for more than 50% of the market share. According to CIC data, Manbang's GTV (total platform transactions) is the largest digital freight platform in China in 2020, and the number of registered heavy and medium-sized truck drivers is more than twice that of the second to fifth largest digital freight platform as of December 31, 2020. At the same time, the average annual growth rate of GTV of the three enterprises is more than 30%, with the highest being 57% of Manbang Group, indicating that the future market space is still vast and the growth of the head enterprises is good. As a traditional logistics enterprise, the transformation of Zhongchu Smart logistics into an Internet+smart logistics enterprise has achieved initial results [5]. As the focus of this study, it provides reference for the transformation and upgrading of traditional enterprises in the industry.

2.2. Research and Analysis of Zhongchu Smart Logistics

2.2.1. Current Situation of Zhongchu Smart Logistic

The parent company of Zhongchu Smart logistics, CMST Development Co.,Ltd. (Hereinafter referred to as "CMST") is an A-share listed company. The main businesses of CMST include time and spot delivery logistics, bulk commodity supply chain, Internet+logistics, engineering logistics, consumer goods logistics, financial logistics, etc. (see Figure 1 for details). Since 2013, CMST has successively invested in the establishment of China Storage Hengke Internet of Things System Co., Ltd. and China Storage Nanjing Intelligent Logistics Technology Co., Ltd. (Hereinafter referred to as "Zhongchu Smart logistics"), basically forming the strategic business sector of "logistics+Internet".

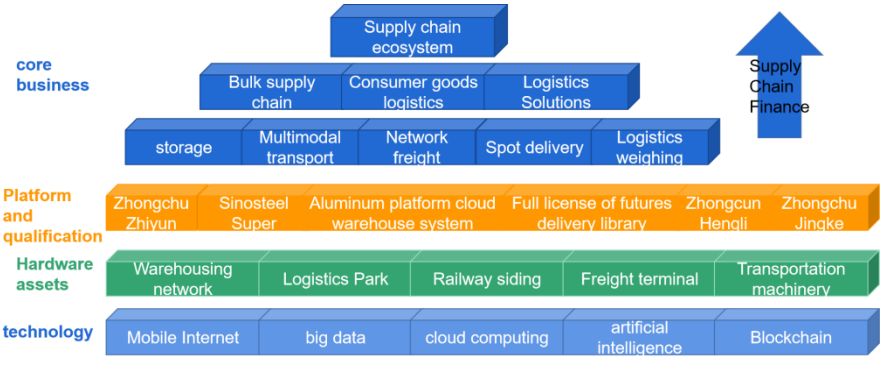

Figure 1: Structure of commercial sector of China Reserve Bank.

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Zhongchu Smart logistics is an Internet based national network intelligent freight platform enterprise built by CMST In 2021, it will achieve revenue of 27.688 billion yuan, with a year-on-year growth of 35.31%; The total transaction tonnage was 276 million tons, up 29.6% year on year; The total number of orders was 7.03 million, up 26.3% year on year; 406100 new senior members; 6545 new owners were added [7] . In 2021, the main business income will rank the second among domestic key road freight enterprises, second only to downwind express.

2.2.2. Analysis of Zhongchu Smart Logistics's Business Model

The overall goal of the construction of the business model of Zhongchu Smart logistics (Figure 2) is to realize the development path of low cost, high efficiency, high-quality service and green environmental protection [8], and form the core competitiveness in the logistics industry.

Table 1: Commercial Canvas of Zhongchu Smart logistics.

Important cooperation	**Key business**	**Value proposition**	**Customer relationship**	**Customer segmentation**
● Transportation companies, fleets and individual drivers providing transportation capacity ● Banks and other financial institutions providing funds ● Insurance companies providing cargo transportation insurance services ● Companies providing system support, vehicle positioning services and other services	● Logistics capacity transaction business ● Financial business embedded in transport capacity transaction scenario ● Multimodal transport business ● Freight ecological services ● Transportation management system platform construction business	● Provide customers with intelligent logistics integrated services and digital supply chain solutions to promote the coordinated development of the industrial chain ● The freight ecosystem business built by adopting the horizontal and vertical expansion strategy around the freight business promotes the sound development of the ecological chain [9]	● VIP customer department is responsible for the maintenance of key customers with a certain delivery volume ● Other customers are maintained by corresponding marketing personnel	● Manufacturers and their subordinate logistics companies ● Traders ● Other transportation companies and information departments ● Fleet ● Individual driver

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Table 1: (continued).

	Core resources ● Intelligent logistics platform system ● Rich transportation resources ● Long term business accumulated full scenario data ● Professional operation support system ● Digital and information-based logistics management system ● Self owned software R&D team	**Channel access** ● Development and expansion of marketing personnel ● Agent development	
cost structure ● Freight paid to the driver ● Personnel cost, depreciation of fixed assets, capital cost, system usage costs such as Beidou and Huawei Cloud		**Source of income** ● Freight ● Government tax refund ● Other value-added business income and diversion business share	

2.2.2.1. Value Proposition

By building a core intelligent logistics platform and a third-party digital supply chain public platform (see 2.2.2.2 Core Resources - Intelligent Logistics Platform System for details), Zhongchu Smart logistics provides customers with intelligent logistics integrated services and digital supply chain solutions to promote the coordinated development of the industrial chain; At the same time, we will take a horizontal and vertical expansion strategy around the smart logistics business to carry out the construction of related ecological diversification, build a "digital logistics, supply chain ecosystem" (Figure 3) with logistics and supply chain, logistics finance, logistics new consumption, and logistics big data as the system, and promote the healthy development of the industrial ecological chain [9].

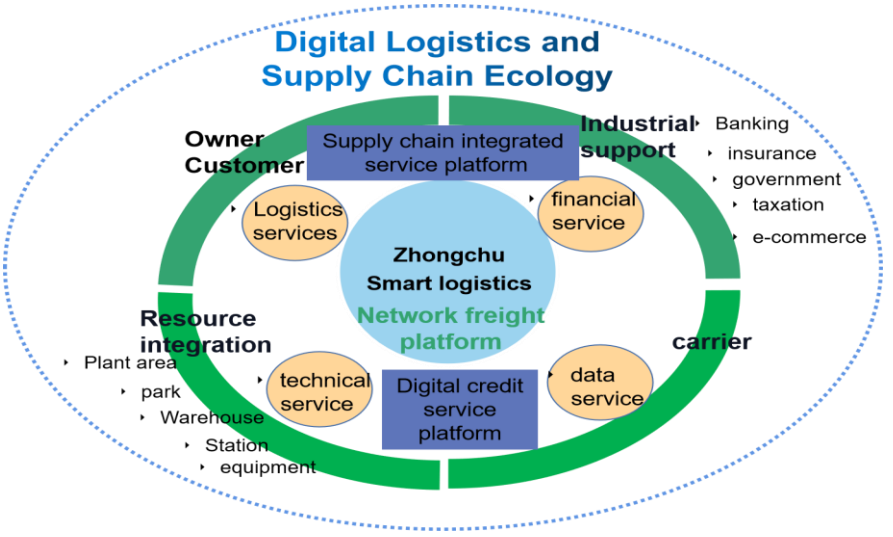

Figure 2: Digital logistics and supply chain ecosystem of Zhongchu Smart logistics.

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2.2.2.2. Core Resources

1) Intelligent logistics platform system. First, the "Logistics Capacity Trading Sharing Platform" and "Network Freight Platform" were built to integrate the national vehicle and freight resources, which can not only break the "information island" situation of the distribution station, but also solve the transportation security problems that cannot be guaranteed by the logistics information matching platform. At the same time, the vehicle positioning function is used to monitor the freight dynamics throughout the process. As of December 31, 2021, the business scope of the platform has covered 31 provinces and autonomous regions, 450 cities across the country, 162800 transport routes, daily transport volume of more than 959700 tons, and monthly transaction amount of more than 2.9 billion yuan [7] . Second, based on the two logistics platforms, the blockchain technology is used to build a third-party digital supply chain public platform that aggregates various data elements such as logistics, commodity trading, payment and settlement, and financing of upstream and downstream enterprises in the supply chain, providing the underlying foundation for value-added services of the logistics ecological chain.

2) Rich transportation resources. Zhongchu Smart logistics has established a national transportation service network in important logistics node cities, forming a strong supply advantage and specialized freight capacity. More than 160 special railway lines can realize the national network transportation, and 2.7 million socialized transport vehicles have been integrated through the network freight platform, which can realize the national trunk and branch highway transportation [7].

3) Long term business accumulated full scenario data. Since the establishment of the enterprise eight years ago, the annual cargo volume of the core network freight transport platform has exceeded 210 million tons, involving all kinds of bulk means of production and living materials, and covering the whole country [7] . Since the online freight platform has adhered to the "over-the-counter transaction" mode from the very beginning, the platform directly signs electronic contracts with upstream cargo owners and downstream drivers to ensure that shipment from cargo owners, driver picking, on-site loading and unloading, in transit transportation, receipt confirmation, and freight settlement are all completed on the platform, and the platform has accumulated massive full scene data.

4) Professional operation support service system. According to the characteristics of upstream and downstream enterprises of China's logistics and freight transport, Zhongchu Smart logistics carries out offline+online "stereoscopic service" around customers by relying on the logistics big data accumulated on the platform and using prism system, CRM system and other tools. Upgrade from basic on-site service to integrated service, eliminate offline missing links of general network platforms, and effectively serve customers.

5) Digital and information-based logistics and management system. The enterprise attaches importance to the application of information and technology, keeps upgrading technology iteratively, and is in a leading position in the industry. In 2021, 1746 requirements will be developed, covering business system, mobile terminal, industry finance integration project, TMS project, WMS project, internal management ODBMS, etc. Online smart park management system to achieve interconnection with the network freight system; Intelligent logistics management system of the manufacturer; Complete the top-level design of intelligent supply chain public service platform products [7].

6) Self owned software R&D team: Since its establishment, Zhongchu Smart logistics has established a self research technology team, with a strong R&D team of more than 400 people, strong independent R&D capability, and a forward-looking technology research base as the goal to promote the construction of a national R&D center in Shanghai. After years of research and development, the company has formed its own product matrix system in the field of digital logistics and supply chain. At the technical architecture level, the company has formed a set of architecture systems that can be

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expanded to customers, quickly respond to customers, and efficiently collaborate within the enterprise; In the application layer, the company has mastered a series of core algorithms; At the product level, the ability of standardized products and external output has been formed.

2.2.2.3. Key Business

1) Logistics capacity transaction business. As the main business of the company, the company has established a national transportation service network in important logistics node cities, forming a strong source of goods advantage and specialized freight capacity; 2) Financial business embedded in capacity transaction scenario. The financial service embedded in the freight logistics business scenario uses the platform to monitor the whole logistics process and control the risk of the business data accumulated for a long time by mining the capital needs of upstream and downstream customers. Including freight prepaid, freight loan, driver loan, etc. It also explores the development of new Internet financial logistics business models through the Internet platform, and connects with banks through the Internet platform, so that banks can find safe capital exports and customers can obtain fast, low interest rate funds[10];3) Multimodal transport business. Massive transport capacity resources have been integrated through the network freight platform. Relying on the parent company, CMST, in some inland and port logistics bases and the public rail and water multimodal transport sharing and trading platform, it has opened roads, railways, waterways, aviation and other comprehensive transport channels, realized the interconnection and resource sharing between upstream and downstream enterprises of multimodal transport, and provided customers with customized logistics solutions throughout the process and domestic Foreign multimodal transport service;4) Freight ecological services. The freight ecosystem business built by adopting the horizontal and vertical expansion strategy around the freight business, including oil and gas, cargo security, after car market, etc; 5) Transportation management system platform construction business. It provides large customers with digital logistics solutions integrating software, hardware, algorithms and blockchain technologies. From logistics scheme design, deployment to implementation, it improves customers' logistics management ability and logistics information level in an all-round way, creates value for customers, and steadily improves industry influence.

2.2.2.4. Customers, Channels and Partners

1) Main customers of the company: First, the cargo owner enterprise provides logistics transportation, multimodal transportation, financial and digital supply chain product services. Including the manufacturer and its subordinate logistics companies; Traders. Second, transport capacity providers provide freight ecology, finance and digital supply chain product services. Including other transportation companies and information departments; fleet; Individual drivers, etc.

2) Important partners: transport companies, fleets and individual drivers providing transport capacity; Banks and other financial institutions providing funds; Insurance companies providing cargo transportation insurance services; Companies providing system support, vehicle positioning services and other services.

3) Sales channel development: mainly developed by the company's marketing personnel or by the sales agency.

4) Customer relationship management: VIP customer department is responsible for the maintenance of large customers with a certain delivery volume; Other customers are maintained by the corresponding marketing personnel.

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2.2.2.5. Revenue and Costs

1) Revenue source: freight; Government tax refund; Other value-added business income and diversion business share.

2) Cost structure: Logistics cost control is one of the most important objectives of logistics management. In order to reduce logistics cost, we should not only pay attention to the control of single logistics cost, but also manage it from the perspective of system cost, and study the daily relationship between logistics elements [12]. The main cost structure of Zhongchu Smart logistics includes the freight paid to drivers; Personnel cost, depreciation of fixed assets, capital cost, system use costs such as Beidou and Huawei Cloud. In recent years, enterprises have made efforts to integrate the logistics system according to the requirements of the lowest cost, and strengthen cost management and control.

2.2.3. R&D Investment and Technology Application of Zhongchu Smart Logistics

1) R&D investment

In the past two years, the R&D investment of Zhongchu Smart logistics has been increasing, and the importance of R&D has become increasingly prominent. See Table 1 for details.

Table 2: List of R&D investment and personnel of Zhongchu smart logistics [13,7].

project	2020	2021	Increase(%)
Total R&D investment (10000 yuan)	6050.39	9077.75	+50%
Proportion of total R&D investment in operating revenue (%)	0.12	0.12	——
Number of R&D personnel	235	257	+9.36%
Proportion of R&D personnel in the total number of the company (%)	4.8	5.2	+8.33%

2) Technology application

Zhongchu Smart logistics can keep up with the changes in the market and constantly innovate and improve its products and businesses. By using mobile Internet, cloud computing, big data, artificial intelligence and other technologies, Zhongchu Smart logistics has built a logistics capacity trading sharing platform to help logistics demanders, suppliers and other enterprises conduct free logistics capacity trading, and effectively operate and manage logistics through the online freight platform to achieve the organic unity of "business flow" and "logistics". On this basis, the blockchain technology is used to build a third-party digital supply chain public platform that aggregates various data elements such as logistics, commodity trading, payment and settlement, and financing of upstream and downstream enterprises in the supply chain. At the same time, it also provides large customers with a digital logistics solution integrating software, hardware, algorithms and blockchain technologies. From logistics scheme design, deployment to implementation, it comprehensively improves customers' logistics management ability and logistics information level, creating value for customers. Zhongchu Smart logistics has carried out the related ecological diversification construction around the two core platforms of "logistics transportation capacity trading sharing platform" and "network freight platform", and built a "digital logistics and supply chain ecosystem" composed of four business segments, namely, logistics and supply chain, logistics finance, logistics new consumption, and logistics big data.

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2.2.4. Organizational Structure of Zhongchu Smart Logistics

Zhongchu Smart logistics has adopted the flat organizational structure commonly used by Internet enterprises (see Figure 4). Compared with traditional enterprises, Zhongchu Smart logistics has a relatively sound function, and its decision-making and market response are faster.

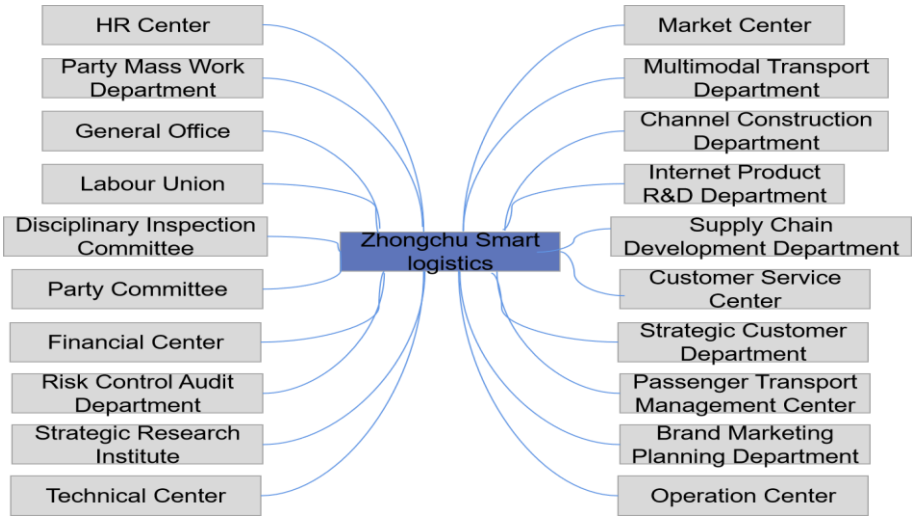

Figure 3: Organizational structure of Zhongchu smart logistics.

3. Discussion

Although the enterprise has developed rapidly in recent years, it still faces external challenges and its own related risks. At the same time, however, research shows that state-owned enterprises in China have institutional advantages in developing intelligent logistics, and can obtain more positive market reactions than non-state-owned enterprises [14]. Therefore, the Zhongchu Smart logistics is also actively responding to challenges, grasping trends and seizing opportunities to lead the development of the logistics industry in the future.

1) Coping with the aggravation of global economic risks: Although the trend of anti globalization is obvious and the impact of the new epidemic highlights [15], globalization is still the mainstream, and supply chain and industrial chain security will rise to the height of national security. In this process, a new round of technological and industrial revolution will continue to evolve, which objectively supports the localization, regionalization and decentralization of the global supply chain. The industry includes enterprises using two markets and two resources at home and abroad, which will achieve more robust and sustainable development in the long run.

2) Inadequate industrial standards and supervision: In September 2020, at the eighth meeting of the Central Financial and Economic Commission, it was again emphasized that the construction of a modern circulation system must be taken as an important strategic task. We will promote the construction of hardware and software for the modern circulation system as a whole, develop new circulation technologies, new forms of business, and new models, improve the institutional norms and standards in the circulation field, and foster and strengthen modern logistics enterprises with international competitiveness. In this context, the logistics standardization is being actively promoted. At the same time, with the promulgation of the Interim Measures for the Operation and Management of Road Freight Transport on Network Platforms, the industry operation will become more standardized [16] .

3) Low industry concentration and low profitability: With the rapid development of unmanned technology, Internet of Things, big data, artificial intelligence and other innovative technologies of

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the Internet platform, building a modern logistics information system and improving the industry threshold will become an effective way for the logistics industry to improve concentration, reduce costs and increase efficiency, and improve operational efficiency. This is also an effective way to solve the problem of low freight rates and limited profit space for enterprises.

4) Unbalanced development of regional business: The regions with relatively large year-on-year growth of main business income in recent two years are mainly caused by the expansion of smart logistics business in the region. Therefore, the application of new technologies and the promotion of business transformation and upgrading as soon as possible are effective means to solve the imbalance of business development.

5) Business transformation risk: According to the "Fourteenth Five Year Plan", while leading the strategic business, Zhongchu Smart logistics will actively promote the development of characteristic business and innovative business, and strive to find new profit growth points through transformation, upgrading, capital operation and other ways and means, which may affect the company's phased operating results. However, from the perspective of industry development trend and operating results in recent two years, as long as the planning strategy is firmly and correctly implemented, Seize the first opportunity and maintain the leading position of the enterprise, which will further realize the competitive advantage of the enterprise in the future.

4. Conclusion

In this paper, the strategic choice path of intelligent logistics enterprises based on the Internet platform is outlined with the example of Zhongchu Smart logistics. We start with the Internet's entry into China and its impact on the logistics industry. Then, we analyzed the current situation of China's Internet based freight industry; Then, it introduces the current situation of Zhongchu Smart logistics, one of the leading enterprises of network freight transportation, and focuses on the strategic selection points for the transformation of Zhongchu Smart logistics to an intelligent logistics enterprise based on Internet platform, mainly from four aspects: business model, service products, technology application, and organizational structure. This paper also discusses the opportunities and challenges of intelligent logistics enterprises in the network freight industry with the example of Zhongchu Smart logistics. To sum up, under the current complex international and domestic economic situation and the industry's own development status quo, intelligent logistics enterprises based on the Internet platform are still facing many research and challenges in strategy formulation and path selection. At the same time, due to the imperfect rules and standards of the industry and the regulatory system, the application of new technologies, especially "smart" technologies, is not yet mature in China, and new business models and new platform operations need to be built and expanded, In particular, the innovation of intelligent logistics value-added services and network platform collaboration have not been discussed in depth [17], which also relates to the future growth direction of the industry. To sum up, challenges and deficiencies also breed opportunities and development. The enterprise strategic planning includes business model, service products, technology application, organizational structure, smart platform direction, etc. With the change of internal and external environment and the development of the enterprise itself, there will be more mature or innovative initiatives or direction choices. Of course, this paper mainly selects one of the more typical leading enterprises in the industry as the research object, and the research conclusions are both representative and limited. It is hoped that the discussion in this paper can help promote the innovative development of China's intelligent logistics enterprises, improve the application ability of Internet based platforms and advanced technologies, and improve the efficiency and competitiveness of the industry in the future.

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Research on Marketing Strategies of Internet Enterprises During COVID-19

——Taking ByteDance as an Example

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Abstract: After the outbreak of COVID-19, a huge number of enterprises have been traumatized. This sudden outbreak has had a huge impact on many industries. The first to bear the brunt is the restaurant industry. Almost devastated by the blow, many of the current suspension of business. The tourism industry is also the same. When all industries are in a downturn, the Internet industry has been able to maintain profit growth. In the Internet industry, the growth rate of ByteDance is particularly prominent. This research focused on the strategies ByteDance used during the epidemic that promoted its markets The method of this paper is literature reading and analysis. The data is obtained from the internet. It can be concluded that the success of ByteDance was not a coincidence but had been planned for a long time. ByteDance provides us with an idea of the response strategy for companies in the event of an epidemic, and does a good job of showing how to change out of that painful mindset. It brightens the way of the internet industry's future for the coming years.

Keywords: marketing strategies, ByteDance, Tik Tok, AI algorithm, UI design

1. Introduction

Since 2019, COVID-19 has had a greater impact on the human economy and life. Some internet companies have had more success during COVID-19, such as ByteDance. ByteDance's profits are rising, both in China and the U.S. market. What makes it so successful and how? Therefore, this paper will discuss the marketing strategies and changes Byte Dance has made during this pandemic. The method used for researching this paper is literature reading and analysis, and this paper wants to acknowledge the popularity of Tik Tok among people and how they enjoy it. Thus, it will be able to discuss the prospect of this market and the future development of digital entertainment. The meaning of this essay is to make people aware of the trend of this industry and to discover the potential risks of it.

2. The Basic Information of Byte Dance

Byte Dance Ltd. was founded in 2012 and it is one of the first technology companies to apply artificial intelligence to the mobile Internet scene. Its independently developed "Today's Headlines" client has created a new model of news reading by intelligently recommending personalized

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information for users through massive information collection, deep data mining and user behavior analysis. Byte Dance has made continuous efforts in the fields of graphics, video, Q&A and pictures, and its product matrix includes various products such as Today's Headlines, Jitterbug, Watermelon Video, Volcano Small Video, TopBuzz, Faceu Xingmeng, Tuwu, and Know Your Car Emperor. “As of July 2019, the total global DAU of Byte Dance's products exceeded 700 million and the total MAU exceeded 1.5 billion. Byte Dance is also actively deploying internationalization, with its products covering more than 150 countries and regions and 75 languages, and ranking at the top of the total list of app stores in more than 40 countries and regions.” [1]. It's not hard to find that Byte Dance is involved in a comprehensive range of areas. There is everything from life and entertainment to beauty and trading apps. In addition to the domestic, many foreign regions also have their own markets. The speed of development of the market size of Byte Jump is amazing. As he mentioned, the daily active users of all Byte Dance products have reached a terrifying 700 million, which is about one tenth of the world's total population, indicating that one out of every ten people is using the software developed by Byte Dance.

3. The Analysis of the Marketing Strategies of Byte Dance During COVID-19

3.1. The Technological Advantage of Byte Dance

In response to the crisis, major brands have been launching their own apps one after another, as they have realized that the offline industry is not desirable during the epidemic. According to the report, after the outbreak of the epidemic, Today's Headline launched the "Fight Pneumonia" channel, and simultaneously provided content and data support for internal Byte Dance products and external third parties on the epidemic. As of December 2020, the "Fight Pneumonia" channel had served 410 million people. During the peak of the epidemic, an average of 80 million users followed the epidemic prevention and control information through Today's Headline every day, with a daily average reading and viewing volume of over 1.05 billion times. [2]. Byte Dance will recommend some current news for users based on the current hot spots, and make sure the report is authentic so that the user can fully acknowledge what is happening right now. During the outbreak of COVID-19, this became considerably significant because due to the policy of the Chinese government, citizens had to be quarantined at home until the local officials ensured that there was no potential risk. Therefore, the only way for people to learn about current news is to go online. The user will choose either the one that has the most accurate report of news or the one that has the most aesthetic UI interface. Byte Dance’s Douyin, or we can call it Tik Tok, is popular among users in these two fields.

“People in China like to use the phrase “swipe Tik Tok” to describe themselves when they are watching it, which means that what users need to do is to swipe up and down so they can get access to the next video.” [3]. For instance, on YouTube, the user has to type in some keywords in order to look for the video, then they have to click on the video, and after they finish watching it, they need to quit the video by clicking the angle on the top left corner. It will be so complicated after the user has experienced the easie of interaction with Tik Tok. People always say that they cannot stop themselves from watching Tik Tok. The reason why is that Tik Tok has made them addicted to it. Anything that is easily addictive tends to give our brain a sense of satisfaction, or can be demonstrated as a secretion of dopamine. The brain will keep sending instructions to the body to repeat this exercise for more satisfaction because of dopamine.

At the same time, compared to other video platforms, Tik Tok uses a way to watch new videos by swiping down. This interaction reduces the cost of gaining dopamine. Consequently, it can make people more satisfied more easily, which is why they can not stop swiping. During the pandemic, Tik Tok reorganized the UI interface many times in order to provide users with a better experience. They switch the color schemes to dark gray, lime green, and red. They also moved the “like”, “comments”

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and “collection” buttons to a more suitable position to optimize the video quality while adding animation to each button to promote the users’ experience.

During the epidemic, ByteDance has a considerable number of employees dedicated to developing its own artificial intelligence algorithms, which will be used on Tik Tok. “The algorithm mechanism is like the law of plant growth. People can affect their production results by modifying external factors such as seeds, fertilizers, and the planting environment so that plants can shorten the growth cycle and increase production.” [4]. The AI system obtains the user's detailed information from the user's preferences, the user's schedule, and the user's personal information. After storing it in big data, the system will be very familiar to users. Therefore, the video shown to the user will be considered high quality, because these videos are pushed by the system according to the user's preferences.

3.2. Live Shopping Platform

As of June 2021, the number of Chinese netizens reached 1.011 billion, an increase of 21.75 million from December 2020, and the Internet penetration rate reached 71.6%. China has more than 1 billion users connected to the Internet. The Chinese market has become the largest and most dynamic digital society in the world. Massive Internet users have created a huge demand for the digital industry. Online shopping and takeout will be the main trends in the next few years. Such a large market means huge consumption potential. To this end, ByteDance has launched a live shopping method on the Tik Tok platform.

The live broadcast platform or enterprise will invite celebrities, movie stars, singers or people with a high reputation on Tik Tok to advertise products for the manufacturers to come to the live broadcast room. The celebrity effect will greatly increase the sales of products and create high profits for product manufacturers. At the same time, it also introduces a large number of consumers to Tik Tok and ByteDance.

In 2021, Tik Tok live e-commerce transaction scale continues to improve. The live e-commerce transaction scale is close to a trillion market. The scale of live broadcast e-commerce maintained a high level of year-on-year growth compared with August.

In 2021, the number of Douyin live-streaming sessions exceeded 75 million, up 100% year-on-year, and the number of live-streaming goods links exceeded 390 million, up 308% year-on-year.

“In addition, the number of stores, the number of brands, the number of live-streamed arrivals, etc. all show higher growth year-on-year in 2020, and live e-commerce with goods remains hot.” [5].

The huge base of internet users in China creates this kind of situation where e-commerce is growing rapidly. The elaboration of the products upgraded the industry standard. Consequently, all the products sold by live streaming all gained unanimous positive reviews. As a result, consumers were affected by others and followed the tendency.

With the development of the e-commerce market, Tik Tok extends this field and releases an individual app especially for online shopping, marking Taobao and T-mall, which are the two largest online shopping platforms with a user base of more than 500 million as its goal.

4. Areas for Improvement

To be sure, Byte Dance has a massive market in Chinese Mainland, but they should expand their market further into North America and Europe, where there are many international students from China, potentially creating a large demand for goods. The foreign version of Tik Tok does not have as many functions as the domestic version, although they are from the same company. It only has some basic functions, and the live streaming interface has very rough work. Byte Dance should enter the global market and show people around the world how beneficial it is. The problem they have to face

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after entering the overseas market is the infrastructure that needs to be built. The products will not be able to be transported from China to overseas regions because the cost of transportation will be so huge that it cannot be compensated by the profit. Therefore, an assembly line from raw materials to production then to processing and logistics needs to be set up properly. Nevertheless, these hypotheses are all set up under the premise of having clout. It will be extremely difficult but worth a try.

5. Conclusion

To be sure, Byte Dance has a massive market in the Chinese Mainland, but they should expand their market further into North America and Europe, where there are many international students from China, potentially creating a large demand for goods. The Chinese and American versions of Tik Tok, although from the same company, do not have as many features as the American version does not have as many features as the Chinese version. The American version only havs some basic functions, and the live streaming interface has very rough work. Byte Dance should enter global market and show people around the world how beneficial it is. The problem they have to face after entering the overseas market is the infrastructure that needs to be built. The products will not be able to transport from China to overseas regions because the cost of transportation will be huge and it cannot be compensate by the profit. Therefore, an assembly line from raw materials to production to processing to logistics needs to be set up correctly. Nonetheless, these assumptions are based on influential premises. Although it will be very difficult, it is worth a try.

In conclusion, the outbreak of COVID-19 can be seen to some extent as an iteration of "old" industries and "new" industries. This paper argues that more and more emerging industries appear in this revolution, providing people with countless breakthroughs to increase their income.

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How to Use Different Hedging Strategies to Make Your Company Profitable

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Abstract: The profitability of investors through arbitrage decisions is a topical issue in the economy, and some researchers have found that the study of corporate stocks bonds and markets has a significant impact on investors' hedging, however, there is a lack of uniform explanation of the operational methods and scope of influence behind it. Therefore, this article focuses on four different portfolios to further analyze the importance of market analysis for hedge fund investments. The methodology of this paper is to first select the hedging method we will use, then select two different companies based on various factors such as the recent market and the future trend of stocks and bonds, hedge these two companies on stocktrack, and accept the results after two weeks of hedging. In this paper, four sets of portfolios will be used to enhance the credibility of the article. The results of the study show that the direction of the stock and the general trend of the market are particularly important for investors to make hedging transactions, and that if arbitrage strategies are used arbitrarily without taking into account the actual situation there is a high risk of investment failure. Thus, it is necessary to choose the appropriate arbitrage strategy for hedging based on the future direction of the market and stocks.

Keywords: go long and short, hedging strategies, peg ratio, arbitrage

1. Introduction

This thesis focuses on how different arbitrage methods can be used to go long and short so that investors can make profits, as well as choosing the appropriate arbitrage decision based on the company's situation. In the stock and bond markets, many investors trade long and short to earn profit spreads by properly analyzing the market and the direction of stocks and bonds. This has been studied before, but in this four different portfolios will be listed to explain how to properly analyze a company's situation and go long and short. These four portfolio mainly utilize the momentum strategy, value arbitrage, credit arbitrage and peg ratio., which would be used to go long and short under the analysis of sorts of the companies.

2. Literature Review

Many people consider hedge funds and private equity to be predatory capitalism, but others believe they are an integral part of the investment industry. When focusing on the field of speculation, the researcher has to pay more attention to the analysis of the market, because the theory is not effective

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to solve the downturn of the market, and the financial companies will be considered as moral stakeholders, in this context, the author has developed a new field and found a new research direction. Economic and moral arguments will promote to deal with criticism on hedge funds and private equity companies on a factual basis [1]. to invest in a mean-reverting assest that follows an Ornstein-Uhlenbeck price process,suzuki solves the optimal, finitelyiterative, three-regime switching problrm [2].

The authors describe an earnings and earnings growth model and demonstrate how the model can be used to estimate expected returns on equity. These estimates are compared to estimates of expected returns implied by commonly used heuristics (PEG ratios and P/E ratios.) Proponents of PEG ratios (P/E ratios divided by short-term earnings growth rates) argue that the ratios take into account differences in short-term earnings growth and provide rankings superior to those based on PE ratios [3].

This is the first study to examine a 52-week high momentum strategy that takes into account economic policy uncertainty (EPU). Empirically, the authors find that China is the second largest stock market in the world with its high 52-week momentum and their findings confirm the US results [4].

The authors provide new firm-level evidence on the impact of capital account liberalization. Based on data on firms' foreign currency credit ratings and a novel index of capital account restrictions, the authors find that capital controls can significantly limit the acquisition of foreign currency debt and raise its cost, especially for firms without foreign currency revenues. As an identification strategy, the authors exploit domestic differences in a firm's access to foreign currency through a differentiation approach, measured by whether the firm is in a non-trading industry. The finding that non-trading firms benefit much more from capital account liberalization than other firms is robust to a broad alternative specification [5].

Ralph Lauren has seen an impressive recovery in revenues and cash flow since the pandemic started.However, a rising cost base could place pressure on the stock going forward[6].

Hedge funds have always caused problems, problems that arise because hedge funds can operate with fewer assets than banks and still have a greater impact on the market. Skilled and explicit use of off-balance sheet instruments allows them to have a much greater impact on the market than their assets would indicate. Changes in market positions that lead to price changes are a key feature of this type of fund, which has given rise to debates on various analyses of speculation and financial markets [7]. Given the uncertainty operating environment, the company decided not to provide Q3 guidance for revenue or adjusted EBITDA [8].

Proposals to regulate credit rating agencies have focused on microprudential issues, aiming to reduce conflicts of interest and increase transparency and competition. In contrast, this paper argues that macro-prudential regulation is necessary to address the systemic risks inherent in ratings [9].

Regulatory arbitrage has a large share in the financial markets and it not only leads to better products for firms, but also to higher returns for them. Regulatory arbitrage strengthens the degree of demand from firms for regulators [10].

although PVH's stock price has fallen significantly this year, the company's capital position is optimistic and the Chinese market is slowly opening up, so there is a good chance that PVH's stock will rebound [11].

3. Strategy

When investors trade, people usually like to earn profits by going long and short, going long is simple, it is a term describing the purchase, on the other hand, short refers to the prediction of stocks and other downward trend, first borrow the corresponding shares, and then sell them to get cash, wait until the stock price drops to the lowest point, then use the cash in hand to buy shares, so that not only can pay off the previous debt and can gain income. Shorting is a very useful tool to deal with high volatility in the stock market or depressed market conditions. But if the stock price does not fall as

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expected instead of rising, then the shorting investor faces a huge loss. In particular, the long and short strategies are based on four different strategies.

3.1. Momentum Strategy

To begin with, the first strategy is momentum arbitrage. Momentum investing is a key and useful investment method that involves buying stocks or bonds with high returns over the past few months and selling stocks or bonds with low returns over the same period. Because of the high risk associated with momentum investing, it is only logical that the investor's beauty can be highly rewarded, and momentum investing can be used in a variety of sectors and markets

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3.2. Peg Ratio

Regarding the peg ratio, generally speaking, the higher the growth rate, the greater the future potential of the company, while the P/E ratio only takes into account the company's current profit, which is only static profit, and does not take into account the company's growth rate, so the peg ratio can make up for the lack of dynamic growth of the company's P/E ratio

3.3. Value Arbitrage Strategy

The value arbitrage strategy is based on the price-to-book ratio that compares a company's market value to its book value. The PE ratio is the ratio of stock price divided by earnings per share, or interest attributable to shareholders in the first year of a company's market capitalization

3.4. Credit Arbitrage Strategy

The principle of credit arbitrage is credit rating. Credit ratings exist as a method of assessing the credit risk of people and companies, not only to predict whether they will be able to pay their debts but also to predict whether the person or company will default on their debts.

4. Data

4.1. My First Portfolio Is Formed by Tesla and Netflix

Tesla Inc. is an American electric car and energy company with a market capitalization of $210 billion. The company sells electric cars, energy panels, and energy storage devices.

Figure 1: Stock price of Tesla. (Source from Seeking Alpha [11].)

Netflix is an American company that focuses on streaming services as well as production, providing websites for people to watch movies and TV series. In particular, Netflix plays a large role in the film industry and is a member of the Motion Picture Association.

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Figure 2: Stock price of Netflix. (Source from Seeking Alpha [11].)

4.2. The Second Portfolio Is Formed by Snapchat and PVH

Snapchat is an American technology company that focuses on researching multimedia communication applications and services. The products produced by this company（snapchat） are very popular among young people because they can make more friends through this software.

Figure 3: Price of snapchat. (Source from Seeking Alpha [11].)

In addition, I searched some information about PVH(Fig.4), it is an American clothing firm, and the service mainly includes manufacturing and retailing. In regard to the third trade.

Figure 4: Price of PVH. (Source from Seeking Alpha [11].)

4.3. The Third Portfolio Is Formed by RL and AAPL

Ralph Lauren (RL) is an American clothing brand, the brand mainly sells high-end casual men's clothing.

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Figure 5: Price of RL. (Source from Seeking Alpha [11].)

Apple (AAPL) is an American high-tech company specializing in the production of computer software, electronic products, etc., and is one of the top five information companies in the United States. In terms of the last trade, iShares is a collection of exchange-traded funds (ETFs) managed by BlackRock, which acquired the brand and business from Barclays in 2009.

Figure 6: Price of Apple. (Source from Seeking Alpha [11].)

4.4. The Last Portfolio is Formed by Ishares Tips 0-5 years ETF and Ishares 10+ years Investment Corporate Bonds ETF

iShares is a collection of exchange-traded funds (ETFs) managed by BlackRock, which acquired the brand and business from Barclays in 2009.

5. Result

5.1. Tesla and Netflix

My first trade is based on momentum arbitrage. According to this strategy, I long NFLX and short Tesla. (fig.1) In terms of taking the short position to tesla, there are many self-inflicted problems, and many have yet to be resolved. The latest are claims by California's DMV that Tesla overstated its autopilot capabilities. This returners article tells more about that. California is Tesla's largest U.S. market. The company sold 121,000 vehicles there in 2021, out of an estimated 352,000 sold nationwide. The DMV is seeking remedies that could include suspending Tesla's license to sell vehicles in California and requiring the company to make restitution to drivers. There is no other reputable company that has stirred up so much controversy. Musk believes that self-driving technology is fatal for the company, according to the latest reports, Tesla has recalled nearly one million vehicles worldwide, half a million vehicles in the United States alone, and in order to solve these problems, Tesla must solve these problems for free during the warranty period They all require the vehicle to be returned to a dealer to be fixed. They are a nuisance for the owners and costly for Tesla shareholders.

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For NFLX, Netflix has been making decisions based on financial metrics as opposed to subraces for years, and it is a healthier market now that WBD is joining them in this logical approach. In the first quarter of this year, due to some external factors such as the Russia-Ukraine war, (Fig.2) NFLX lost most of its users in Russia and its stock price fell sharply. However, in the second quarter, the situation was eased to a certain extent, so the trade need to take a long position in NFLX, because no matter what to do, the trade will not lose too much. (Table 1)

Table 1: Tesla and Netflix.

Momentum				
firms	positions	quantity	Price paid	Percentage return
tesla	short	50	914.14	2.135%
netflix	long	50	9.69	11.558%

5.2. Snapchat and Pvh

The second deal is based on the peg ratio, The PEG ratio is a measure of a company's price-to-earnings ratio divided by its rate of earnings growth. When he was picking stocks, he was picking companies that had low P/E ratios and high growth rates, and they typically had very low PEG ratios. It should be noted that the numerator and denominator of PEG value are related to the forecast of future earnings growth, which is likely to be wrong. peg ratio>1, sell. Peg ratio<1, invest. The growth stock always has a high peg ratio, so it has fast growing revenue and great profit. On the contrary, the value stock always have low peg ratio, it means that the performance is stable, the risk is small and the dividend yield is high.

The trade goes short the stock just because peg ratio. This trade should pay attention to the stock of other information, the snap on July 20th shares dropped 17.5%, (fig.3) probably because the market condition is not very good and the relationship between inflation, so in this trade, he will continue to fall short, but he has gone up a little.

Actually, the economic status of this company has been stable, therefore, the trade shorts SNAP.

Table 2: Snap and PVH.

PEG				
firms	positions	quantity	Price paid	Percentage return
snapchat	short	50	914.14	2.135%
PVH	long	50	9.69	11.558%

5.3. RL and AAPL

Then come the third trade. It employed the value arbitrage. This kind of arbitrage is based on the PE ratio and PB ratio. So this trade need to decide which to take the long position and which to take the short position according to the PB ratio and PE ratio. Firstly, considered a premium brand in Europe and Asia relative to North America, RL is expecting most of its growth will come from international markets. (Fif.5) RL has solid profitability metrics and an overall B+ profitability grade, with $868M in Cash from Operations.(table 3) Moreover, RL is a growth stock so revenue grows fast and going to have incredible p/e ratio. According to p/b ratio, the investment value is higher than AAPL. So I long it.

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The stock price of Apple Inc. had been falling until June 15, and then gradually recovered after June 15. (Fig.6) However, due to the poor state of the international market economy and the continuous downturn of the mobile phone market, so this situation will not be long.

Table 3: RL and AAPL.

VALUE ARBITRAGE					
firms	positions	quantity	Price paid	Percentage return	p/e ratio
aapl	short	50	162.51	-3.089%	27.69
rl	long	50	96.53	-1.502%	12.48

5.4. Ishares Tips 0-5 Years ETF and Ishares 10+ Years Investment Corporate Bonds ETF

The next is the worst trade, this trade is based on credit arbitrage and the principle of credit arbitrage is a credit rating, The credit rating represents an evaluation of a credit rating agency of the qualitative and quantitative information for the prospective debtor, including information provided by the prospective debtor and other non-public information obtained by the credit rating agency's analysts. This trade should long the iShares tips bond ETF and short the iShares INVESTMENT GRADE corporate bond ETF.(table 4) The reason that this trade gain a loss in this deal is that I thought this trade can only short triple b and long triple according to the credit arbitrage. I could actually go the other way and go long BBB to achieve a margin difference.

Table 4: ETF.

Credit arbitrage					
firms	positions	quantity	Price paid	Percentage return	Credit ratings
Ishares 0-5 years tips bond ETF	Long	50	101.2	-0.089%	AAA
ISHARES 10+ years investment corporate bond ETF	Short	50	55.69	-0.833%	BBB

6. Comparison

These four trades, while all applying a hedging mindset, are using different strategies. In the first trade I mainly shorted tesla by predicting the future direction of the company, because according to my analysis of tesla, the company has had more or less problems in recent years, both in production and sales, and these problems will undoubtedly cause their stock price to fall, so I chose to short the company. The specific approach is to borrow fifty stocks, and then sell them, wait until the price drops to a point and then use the money obtained from the sale to buy more shares, so that not only can pay off the previous debt can also gain profits. The second trade uses the peg ratio, and there is a

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formula for this ratio (peg ratio <1, invest, peg ratio>1 sell) When trading according to this formula, you will generally not lose money. About the third trade (but stock with low p/e and p/b ratio) Generally when a company's P/E and P/N ratio is less than 1, this trade should be going long. The fourth trade was a losing trade, because this transaction can not be traded with too much risk, resulting in a loss of capital, so this trade did not choose to go long BBB, but chose to go long AAA, but this trade did not pay attention to other information about ETF, so that this trade could not take the risk but ended up losing money. So sometimes going long BBB is also a choice, so although you take a high risk but also get a high return.

7. Conclusion

The results of the study show that the direction of the stock and the general trend of the market are particularly important for investors to make hedging transactions, and that if arbitrage decisions are used arbitrarily without taking into account the actual situation, there is a high risk of investment failure. In the four portfolios in this paper, the first group is based on the analysis of the two companies, the economic situation of Tesla is less optimistic, but the economic situation of Netflix has been more stable, so this trade choose to go long Netflix. But in fact, long BBB is the more appropriate choice, because although the credit rating is low, but the interest rate is also very high, this transaction can choose to long BBB company-issued etfs to take a risk, and then short AAA.I suggest that the investors should make a decision which are based on the future movement of the bonds and stocks when they make a hedge fund investing. This article will provide insight and help to those who want to understand hedging strategies or those who are not yet exposed to hedging, how to hedge and how to anticipate market movements to choose the right arbitrage strategy.

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Trend Evaluation of Venture Capital Investment in Mainland China's Semiconductor Industry

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Abstract: As chips become more prevalent in daily life, many countries understand that in order to become self-sufficient, they must build their own semiconductor supply chains. China, a country that has stalled behind in developing chips, is also aware of this. To this end, the government started vigorously promoting investments in semiconductors, turning them into popular business opportunities. Venture capitalists (VC), who typically prefer high risks but greater returns, are responsible for the greatest growth. They think that even though politics and technology have placed restrictions on the industry, there is still room for growth in the semiconductor market. This paper breaks down the recent trends in the semiconductor industry of mainland China, with a particular focus on sensitive points such as political treaties and social phenomena. According to results, the mainland semiconductor industry merits attention and has a promising future. Venture capitalists should look for companies with the following characteristics: highly educated and experienced employees, the ability to design chips independently, and a stable supply chain.

Keywords: semiconductor, Chinese chips, venture capital, PEST model, POCD framework

1. Introduction

In recent years, semiconductor companies have enjoyed rapid growth and share prices, and such firms are in the strategic opportunity period of outstanding achievements [1]. However, due to the complex market environment, the industry faces numerous risks and challenges. Politically, China's semiconductor industry is constantly under attack from other countries, with wars and various policies posing threats to the industry. In the trade war between China and the United States (U.S.), the U.S. repeatedly imposed tariffs, blocking the supply chain. The Chips Act 2022, introduced in July, promised to fund supplier research but prohibits those companies which receive subsidies from expanding chip production in China or any other "specified country that poses a national security threat to the United States" for ten years. Such a targeted act has further curbed Chinese semiconductors' growth [2]. Technically, the lack of connectivity with the West has kept China behind other countries. The semiconductor is a technological and talent-intensive industry that

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requires high-end and often highly specialized R&D expertise. Due to the shortage of professionals, it is not optimistic for China to have a strong presence in chip design.

Nevertheless, the semiconductor industry continues to be a popular business, attracting millions of startups. Its boom is evidenced by the integrated circuit (IC) industry. In recent years, the financing volume of IC in mainland China has been on a substantial rise: in 2021, there were 641 investment rounds with 18 billion USD; while as of August 2022, the number has reached 421 rounds with nearly 10 billion USD, which is expected to reach another record high by the end of the year [3]. According to Professor Wei Shaojun, the number of mainland chip design companies would reach 2,810 by the end of 2021, up 26.7% yearly [4]. The huge potential is primarily thanks to the consumer market: China remains by far the largest semiconductor consumer, accounting for nearly 60% of the global market share. Even the United States is in second place, with about 12 percent [5]. The enormous consumption share and the lack of technology in production have led to China's dependence on chip imports. As a result, achieving domestic supply chain perfection has become the first major problem for China. Hence, the Chinese government fully began to support the semiconductor industry's development, proposing large fund programs almost every year, thus triggering a full-fledged VC focus on this industry. With the growing follow-the-leader financing, Venture Capitalists require an objective reassessment of the current situation to test whether they have lost themselves in the oasis of the semiconductor boom and valuation inflation.

This paper will utilize the PEST model to discuss the industry prospect from four aspects: Politics, Economics, Society, and Technology. Furthermore, an exemplary Chinese semiconductor startup—SD Technology— will be evaluated in a POCD framework, demonstrating the characteristics of a VC-worthy firm. Through this research, VC investors will refine their perceptions of this high-return industry to find the most rewarding deal in the wave of technology firms.

2. Factors That Influence the Current Situation

2.1. Political Issues

The performance of semiconductors in the high technology industry determines the level and strength of a country and its interest in it. Thus it has evolved into a political weapon over time, with U.S. restrictions being the biggest contributing factor. Given the competition between the U.S. and China, the U.S. government has expressed its commitment to fostering and strengthening the semiconductor industry, with plans to enhance not only the attraction of production bases but also the development of technology. In 2018, the President of the United States announced to direct the Office of the United States Trade Representative (USTR) to impose tariffs on imports from China under Section 301 of the (Trade Act of 1974) to “punish China for theft of U.S. intellectual property and trade secrets’’ [6]. In addition, the introduction of the “Chips Act” has greatly subsidized the production industry and blocked China's development. These actions completely cut off any possibility of interaction between the two countries on semiconductors. The ripple effect brought by the U.S. is massive as well. On August 2, 2022, U.S. House Speaker Pelosi made a visit to Taiwan, which infuriated China.With a potential civil war, China sent numerous troops to be stationed on the Taiwan-Mainland border for an extended period. As a long-time semiconductor supplier to the mainland, Taiwan will likely stop doing business with it in the future, which will significantly impact the Chinese supply chain. The present political situation is forcing China to act immediately, whether it be internal or external.

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2.2. Economic Issues

From 2008 to 2021, China's semiconductor sales rose significantly in all sectors, including a 22.8-fold increase in the equipment field, a 13.2-fold increase in the design field, and an 8.1-fold rise in the manufacturing field [7]. And behind these increases stand three points: national funding support, tariff preferences, and the rise of the electronics. In terms of funding, China has established the National Semiconductor Industry Fund, which raised a total of about 50 billion in two phases in 2014 and 2019, providing sufficient financial support for the overall development. In addition to funding, China tried to benefit the midstream companies such as raw material suppliers on the tax front. According to the document "Notice of the National Development and Reform Commission of the Ministry of Finance, the Ministry of Industry and Information Technology, the General Administration of Customs, the General Administration of Taxation on the management of import tax policies to support the development of integrated circuit industry and software industry" issued by the Ministry of Finance, the General Administration of Customs and five other ministries and commissions, semiconductor companies are exempt from tariffs on the import of equipment and software for their use [8]. The elimination of import tariffs facilitates the customs pass of raw materials. It also reduces the cost of the semiconductor industry simultaneously, solving the problem of over-consumption of upstream companies and downstream companies. This shows that the Chinese government attaches great importance to the reduction of capital. Even with the government's efforts, there is still a conundrum: the extreme imbalance between supply and demand. This imbalance is mainly because downstream companies are far outpacing upstream and midstream development. For example, China's electronics, as one of the significant downstream, has stayed at the top in the global market during the past few years. Besides, China owns the largest consumer market for electronics, with 1.02 billion internet users, but most semiconductor companies can still not catch up with the gap [9]. If the development of the semiconductor industry and electronics industries continue to polarize with each other, then the disparity will only worsen, so China is trying to enhance the supply of semiconductors at all costs. From these three observations, support at the national level determines the prospects for economic development, and China is performing excellently in this regard.

2.3. Societal Issues

In China, the development of the semiconductor industry relies on several social trends. First, within the last decade, many families have chosen to send their children abroad to pursue education. Despite the trend slowing down after 2019 due to the epidemic, China is still the most significant origin of international students worldwide. The increasing number of international talents has enabled many Chinese to learn western production technology, contributing immensely to the growth of China's semiconductor industry. Even more, fortunately, Covid-19 has increased the willingness of those students to go home. According to the Survey Report on 2020 China Returnee Employment and Entrepreneurship released by Zhaopin in January 2021, overseas talents are more willing to return to China in 2020, and the return of the overseas is unstoppable, as "better control of domestic epidemic" is the first reason for international students to choose to return to China (56.8%) [10]. To keep this trend growing, the Ministry of Education and Beijing Municipality officially signed the Cooperation Framework Agreement of Ministry and Municipality Jointly Building Demonstration Zone for Returned Overseas Talents Service on August 26 at the opening ceremony of the HICOOL2022 Global Entrepreneur Summit in Beijing. At the ceremony, Minister Huai Jinpeng stated that the country had established a new era of "supporting study abroad, encouraging return to China, freedom

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to come and go, and play a role" [11]. From the above, the current years are the most talented people returning: the willingness of spending time with their families has risen and the support of the country are reinforced. In this new era, there will be great potential for human resources in the semiconductor industry.

2.4. Technological Issues

The biggest problem facing China's semiconductor industry now is the lack of technology. A key factor is timing: semiconductors were invented in the United States in the 1700s, and the Japanese semiconductor industry has been booming since the 1980s. By contrast, it was only in 1988 that China noticed this production and started to develop it. In addition, China has only become one of the largest economies in the last decade, and they had to prioritize manufacturing due to the most considerable advantage. And the gap widened further as it dragged on. After missing the timing, China's development is even worse than South Korea which started much later in the semiconductor. According to Sakamoto Yukio, president of Micro Memory Japan, Changxin Memory Technology, which is at the top level in China in the DRAM field, is about 4 generations behind Samsung. In the field of NAND flash memory, it is said that China's top Yangtze Memory Technology (YMTC) has too few manufacturers to reach the level of competitiveness. In the field of logic chips for computing, even China's top-tier Semiconductor Manufacturing International Corporation, the thinnest circuit line width of its products is only 14 nanometers, which was a technology 7 or 8 years ago. The world's top TSMC is developing 2nm products, and the gap is still ongoing [12]. The lack of equipment also leads to backwardness in science and technology. Shortage of necessary production auxiliary equipment such as lithography machines and photoresists further reduces China's competitiveness. Obviously, the major barrier to investment right now is technology. Since the semiconductor industry has a long supply chain, startups that are not competitive risk being eliminated by the industry giants, wasting all of the VC capital. However, given how quickly and significantly China has developed over the past ten years, the timing and equipment problems will eventually be resolved.

3. POCD Analysis of a Potential Investment for Venture Capitalists

The previous section analyzed the current situation of the semiconductor industry in China; this section will focus on selecting a worthy semiconductor company specifically for venture investors using a POCD framework (People, Opportunity, Context and Deal). According to Figure 1, 67.2% of the investments are focused on the design sector, showing a general trend for venture capitalists. This paper will explore the SD Technology, a chip design startup, as the primary target for analysis.

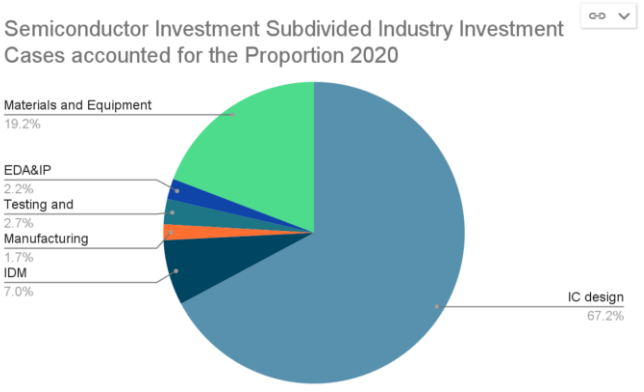

Figure 1: Semiconductor investments breakdown share 2020 [13].

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3.1. Company Overview

SD Technology was established in 2018 and is headquartered in Nanjing, China. It has design and R&D centers in Shanghai, Beijing and offices in Shenzhen. SD Technology focuses on automotive intelligence and aims to serve the global automotive industry with high-performance and highly reliable chips. At present, 9 series of high-performance SoCs have been released for the intelligent cockpit, autonomous driving, and central gateway, and the lower-level domain control chip of the vehicle with a higher functional safety level has been completed in the same period. With foreseen potential, SD Technology has built a rich industrial ecology with more than 70 partners [14].

3.2. People

SD Technology's CEO and Chairman are the key personnel. The chairman plays a crucial role in product positioning and research. He has over 20 years of experience in product, market and sales in the automotive electronics and semiconductor industries, responsible for the Greater China Automotive Division in Delphi Automotive Electronics, Philips Semiconductors, Infineon, Freescale and NXP. With his experience, he led the team to invest in the research of safer and more reliable automotive chips, provided intelligent automotive core chip products and system solutions for the industry, positioned the product market with strategic thinking, and made an entire five-year plan for each product to be launched [15]. The company's current CEO studied in the Department of Radio Engineering of Southeast University as an undergraduate. She entered the University of Wisconsin-Madison for further studies and received a master's degree. The CEO has worked in Silicon Valley in the United States and successively joined Neomagic, Catamaran and Serverengines, focusing on the research and development of optical fibre communication chips. She has also participated in related work in integrated circuits' R&D and production stages. Later, she joined Freescale in 2011 and led the team to develop products with the largest market share among the global automotive-grade processors. In 2018, when the rise of new car-making forces, the two business partners, who have more than 20 years of experience in the automotive semiconductor industry and have known each other for 10 years, saw the impact of intelligent domestic networking and autonomous driving on chip computing. In response to the commercial needs of the power, the two established SD Technology [16].

3.3. Opportunity

Since the outbreak of Covid-19, there has been a significant shortage of automotive chips in mainland China due to limitations in shipping convenience. According to a study by JP Morgan, in the second half of 2021 alone, 2.6 to 3.6 million vehicles were affected, reducing production by more than 10 million vehicles for the year [17]. In this situation, improving the supply chain in China and expanding the production volume became urgent. SD Technology has vast potential in this area. In one way, they have achieved a fully independent design of core IP and have over 100 intellectual property rights within three years, proving that they do not need to rely on a foreign power. The other way, because SD Technology is the only automotive chip company in China that can provide all major chips on automotive electronic and electrical architecture, the "integrated " strategy creates strong linkage and high compatibility among various products [18]. Both points highlight an industry-wide trend: chip companies and related enterprises are strengthening internal communication. Due to the Western crackdown and the pandemic, more firms realize that relying on imports is unstable if they want to get a timely and reasonably priced supply of chip sources, and the only solution is to establish in-depth communication with domestic chip suppliers. To improve interaction and keep

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track of production capacity, some businesses established a dedicated docking chip department, and some even began to look into the design of alternative solutions starting at the chip level [19]. All these signs signal that the prospect of domestic semiconductor firms is promising. However, the domestic supply chain could be volatile too. While other nations attempt to lessen the effects of Covid by opening their borders, China has remained circumspect, maintaining its quarantine and Covid test system, which creates tougher shipments. With the two-sided impact, internal communication, while necessary, will only be able to proceed successfully once the covid factor is removed. But all in all, the epidemic's effect will only fade away over time, and the overall development of SD Technology is still worth investment.

3.4. Context

The context is described exhaustively in the PEST analysis, but a summarization will be shown here to help in comprehension. The semiconductor industry is currently experiencing the worst shortage in twenty years. Semiconductors have developed into an essential strategic material in both the military and civilian sectors, and they now represent the strategic commanding heights from which nations compete for development. As a result of U.S. sanctions against China, the Chinese government has also intensified its focus on semiconductor development. However, due to their extremely high levels of market capital, scarcity of human resources, and lagging technological levels, other countries have developed years ahead of China. The major impact of government subsidies is that they encourage many people to enter the market, raising competition. For instance, other setups like "LinearX" and "Enjoy Move" can take its place.

3.5. Deal

Table 1: SD technology's financial history [20].

Announced Date	Transaction Name	Money Raised	Lead Investors
26-Apr-22	Series B+	Unknown	W&W Fund Management
25-Jul-21	Series B	CN￥1B	Pro-Capital, V Fund Management, CTC Capital
27-Sep-20	Series A	CN￥500M	CTC Capital, Matrix Management, Lenovo Appliance Defender
19-May-19	Series Pre-A	Unknown	Matrix Management, Vertex Ventures China, Lenovo Appliance Defender
18-Sep-18	Seed Round	CN￥100M	Walden International, Lenovo Appliance Defender, Sequoia Capital China

In the Deal part, due to the lack of financial statements for startups, this paper will concentrate on SD Technology's financial history by analyzing the amount raised and lead investors. Since the time it was founded in 2018, it has continued to raise money each year. By September 2022, it had raised $227.7 M (based on the number of publicly known rounds).

In particular, the seed round amounted to CN$100M, which is far more than the common size. According to Figure.2, 57% of Chinese unicorns lacked an angel or seed round, and their first round of funding came in Series A. The remaining 43%, however, tend to show a high level of attractiveness in terms of idea, prototype, business model, etc., which makes investors willing to take a huge risk to invest their capital. SD Technology, which received a huge seed round of investment, certainly shows

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great potential. In SeriesA and SeriesB, SD Technology raised CN$500M and CN￥1B respectively; the amount quantity and continuity also proved the vision of the early seed round investors. SD Technology's lead investors include Sequoia Capital China, Lenovo Appliance Defender, Matrix Management, CTC Capital, ProCapital, V Fund Management, and Vertex Venture China. Of these, Sequoia and Matrix are ranked among the top 10 unicorn investors in China, while the former is even the top 1 in the world, with 234 unicorns as of 2022 [22]. Despite the lack of financial reports, the prediction is that investing in SD Technology is a good choice given the current funding and reliable follow-on VCs.

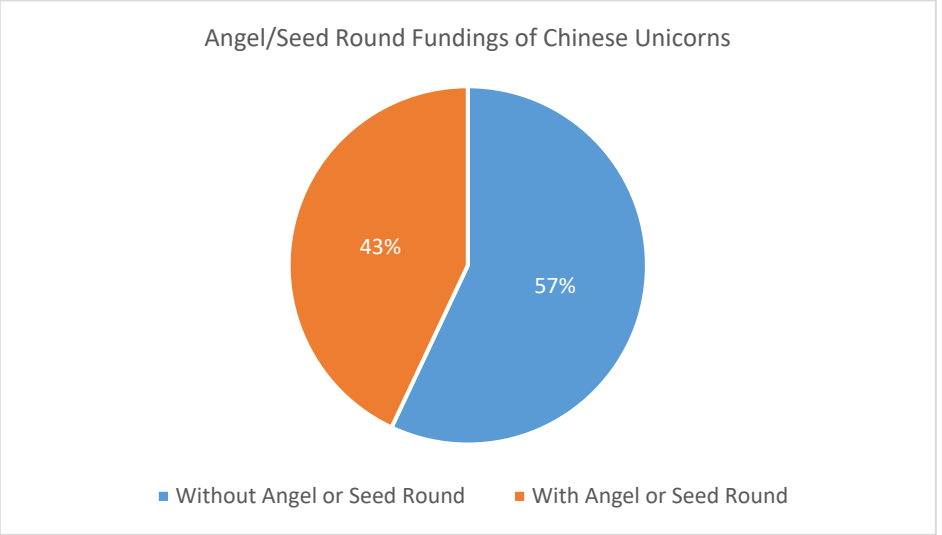

Figure 2: Angel / Seed round fundings of Chinese unicorns [21].

4. Conclusion

This paper examines the growth of the semiconductor sector and the potential of a representative unicorn company in mainland China using the PEST model and POCD framework. From a macro perspective, the entire industry is favourably trending. Although there is technical and political pressure, such pressure is transformed into motivation for further efforts. China's sufficient funding and huge consumer market also determine the future of the industry. Furthermore, an up-and-coming unicorn business in Mainland China named SD Technology has demonstrated good standards from a micro perspective. Its position in the market—making semiconductors for cars—along with its workforce, rate of expansion, and funding all point to a semiconductor company with limitless potential.

The main contribution of this paper is to include a summary of the challenges facing the Chinese semiconductor market, a justification for investing in Chinese semiconductors, and an illustration of a creditable semiconductor company for venture capitalists who are still keeping an eye on the market. This study will help more semiconductor workers comprehend the industry's advantages and disadvantages, as well as help venture capitalists, gain insights into their investments.

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Information Asymmetry in Webcasting with Goods and Strategies to Solve It

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Abstract: This paper aimed to study the information asymmetry and its causes in the special online shopping method of live-streaming with goods and give related suggestions. A questionnaire was distributed to collect information about consumers' situation in live-streaming with goods and analyze the relevant data. It was found that respondents were not confident about the quality of products on live-streaming platforms, and not satisfied with current situation of live-streaming, Additionally, most consumers had received goods that did not match the description and were skeptical about the character settings of anchors in live-streaming platforms. It is important to strengthen the quality control of goods in live-streaming, improve the identity authentication of anchors, and encourage consumers to consume rationally.

Keywords: information asymmetry, live broadcast with goods, customer satisfaction

1. Introduction

With the development of modern society, Internet technology has becoming more mature, online shopping has become a favorite shopping method for consumers, live with goods which has developed very rapidly in recent years. However, in online shopping because consumers are unable to observe and use the products in field, information asymmetry occurs. A large amount of literature have discussed the information asymmetry phenomenon in online shopping and some of the problems of live-carrying platforms, but few studies have systematically investigated the phenomenon in the specific online shopping method of live-carrying and its causes and effects on consumers and solutions [1-3]. In this paper, conducted a questionnaire to, collected data and investigate the relevant issues.

2. Literature Review

China has the world's largest number of online consumer groups, and in recent years, China's live-streaming industry has been developing rapidly, with many industries closely integrated with live-streaming. However, there are also many real problems, such as: tax evasion by anchors, traffic falsification, false propaganda advertising, uneven product quality, price fraud, difficulties in consumer rights protection, lack of supervision There are many information asymmetries in e-commerce, including [1]: information asymmetry of commodity transactions, information asymmetry of logistics and distribution, and information asymmetry of capital payment, where information asymmetry of commodity transactions consists of information asymmetry of commodity price, information

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asymmetry of commodity quality, information asymmetry of merchant, and information asymmetry of merchant service. These information asymmetries will increase the risk of online shopping [2]. We can take some measures to reduce the information asymmetry phenomenon and reduce the risks in online shopping, such as: improve the legal mechanism of online shopping platform, consumer education, and implement price transparency [3]. This paper will synthesize relevant literature and conduct relevant surveys to study the current situation of the live banding industry, examine its information asymmetry phenomenon and give suggestions.

3. Methodology

I randomly distributed questionnaires in the WeChat applet, which were used to understand the basic situation of respondents' participation in online shopping and live banding activities, their satisfaction with live banding and online shopping, and the problems they had The questionnaire was divided into three parts. First part was to collect respondents' basic information such as gender, age, income level, the second part was to collect the information of respondents' participation in e-commerce activities, In this part, I can find out whether the respondents have the habit of online shopping and shopping on live streaming platform. The third part provided statistics on the information asymmetry respondents encountered in shopping on the live-streaming platform and understands respondents' concerns about live-streaming. The questions in the questionnaire cover single and multiple choice questions, fill in the blank questions. Participants came from various provinces in China, and in order to improve the quality of the questionnaire, I removed those questionnaires that were not filled out completely, and finally a total of 65 valid questionnaires were collected.

4. Result

This research conducted statistics on all the recovered samples and found that among all respondents, those aged 21 to 30 years old accounted for 57.58% of all respondents, and those aged 31 to 40 years old accounted for 27.27%, indicating a relative concentration of respondents' ages. Respondents with a monthly income between 8001 and 10000 RMB accounted for 25.76%.

Table 1: Respondents' basic information record table.

Gender		quantity	Proportion (%)
	Male	15	22.73
	Female	51	77.27
Ages			
	<10	1	1.52
	11~20	5	7.58
	21~30	38	57.58
	31~40	18	27.27
	41~50	3	4.55
	51~60	0	0
	>60	1	1.52
Income (RMB)			
	<2000	9	13.64
	2001~4000	10	15.15
	4001~6000	12	18.18
	6001~8000	8	12.12
	8001~10000	17	27.76

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Table 1:(continued).

	10001~15000	5	7.58
	>15001	5	7.58

After the second part of the questionnaire, This research found that almost all respondents have the habit of online shopping (95.45%), and 86.36% of them have the experience of shopping on the live platform. These data very clearly indicate that there is a high level of participation in e-commerce and live platform shopping among the respondents. However, 40 respondents (60.61%) said they felt average and not very satisfied with the current status of live-streaming with goods, and 54.55% of them were not very confident with the number of products purchased on the live-streaming platform. The number of respondents who received products that differed greatly from the description of the merchant reached 62.12%, and 87.88% of respondents would take measures to defend their rights for the products they received that differed greatly from the description, but there were still respondents who would choose to accept the products without taking measures.

Table 2: Respondents' online shopping situation table.

Whether you have the habit of online shopping		quantity	Proportion (%)
	Yes	63	95.45
	No	3	4.55
Whether the habit of live with the goods			
	Yes	57	86.36
	No	9	13.64
Are you satisfied with the current status of live banding			
	satisfied	27	40.91
	average	36	54.55
	Terrible	3	4.55
Have you ever received an item that differs greatly from the description			
	Yes	41	62.12
	No	17	25.76
	Not sure	8	12.12
How to handle if you receive an item with a huge difference in description (multiple choice)			
	No measures	13	19.7
	Request a Return	58	87.88
	Find the relevant agency to complain	23	35.85
	Other	1	1.52

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The third part of the statistics shows that the majority (84.85%) of consumers have impulse spending in live with goods, and the most important reasons for impulse spending are price discount (68.18%) and the description of the merchant (63.64%). This research counted the possible problems with live-streaming and found that respondents were skeptical of the persona of some anchors on live-streaming platforms (74.24%), worried about the quality of products in live-streaming (69.7%) and thought that the after-sales service of live-streaming was poor.

Table 3: Respondents' impulse spending in live banding and concerns about live banding table.

Whether there is impulsive consumption experience in live banding		quantity	Proportion (%)
	Yes	56	84.85
	No	7	10.61
	Not sure	3	4.55
Causes of your impulsive consumption in live banding (multiple choice)			
	Low price	45	68.18
	Fine descriptions from merchants	42	63.64
	Netflix and celebrity endorsement	23	34.85
	Buy more and get discount	40	60.61
	Discounted quality of products	21	31.82
	Other	2	3.03
What do you think are the problems in live banding (multiple choice)			
	Poor quality of merchandise	46	69.7
	False persona of some anchors	49	74.24
	Poor after-sales service	47	71.21
	Expensive merchandise	19	28.79
	Other	2	3.03

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5. Discussion

The collected data show that people today are highly involved in live banding, but there are still problems and information asymmetry exit in live banding. Consumers have certain concerns about live banding, and their overall satisfaction is low. Most consumers have experienced receiving products with large gaps, and there is irrational behavior such as impulsive consumption when people participate in online shopping.

In online shopping and live banding, consumers can be exposed to a large number of similar goods in a short period of time. Since online shopping does not allow consumers to observe and try products in the field, they can only choose based on very limited resources such as descriptions and prices, which makes it easier for customers to choose products with good descriptions and lower prices rather than based on the quality of the products. In order to attract more consumers, merchants may embellish the description and lower the price, etc. An excessive embellishment of product descriptions can lead to serious discrepancies between the description and the real product, which is one of the reasons for information asymmetry. Merchants may maintain profits by reducing costs while lowering prices, which leads to more use of poorer quality raw materials, while consumers only have access to limited information, which may eventually form a lemon market. In live banding, certain anchors attract consumers through the setting of their own characters, but the internet is a virtual environment, leading consumers to be suspicious of the image setting of the anchors. This research synthesize the recovered questionnaires to give the following solutions.

5.1. Strengthen the Supervision of the Quality of Products on Live Streaming Platforms

Some merchants use lower quality raw materials to reduce costs in order to attract consumers with lower prices, resulting in problems with the quality of the products. And the descriptions of merchants are often very fine, which is one of the main reasons for information asymmetry. The establishment of a good product supervision mechanism can effectively compensate for this information asymmetry. Market supervision departments, live streaming platforms and relevant merchants should jointly participate and jointly supervise to improve supervision efficiency and enhance consumer satisfaction.

5.2. Improve the Identity Authentication System

After the questionnaire survey This research found that the false persona of anchors is the biggest problem (74.24%) that respondents think may exist in current live-streaming with goods. Some live broadcasters attract consumers and sell goods through false personas. The identity information of the live streamers should be verified, especially the key information involving their persona settings. In this way, information asymmetry is reduced and consumers' concerns are reduced. However, due to the large variety of character phenomenon settings of anchors, the problems of verification difficulties and verification costs in identity verification are yet to be solved.

5.3. Encourage Consumers to Consume Rationally

Among the interviewees, 84.85% of consumers have experienced impulsive consumption, which is partly due to the information asymmetry in live banding, and partly due to the irrational behavior of consumers themselves. Consumers should be encouraged to buy the products they need from their own needs, rather than just pursuing low prices.

6. Limitations

Through the analysis of the randomly collected samples, This research found that the data had some limitations, mainly because the respondents were more concentrated in certain data. The total number

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of samples is small (only 66 valid samples), the gender distribution of respondents is very different with 77.27% female, the age distribution of respondents is concentrated with 84.85% of the total number of respondents aged 21-40, and the income range is mainly distributed between RMB 2001-6000 and RMB 8001-10000.

7. Conclusion

The main purpose of this study is to investigate the information asymmetry phenomenon and its impact of in live-streaming with goods and give corresponding solution strategies. This research collected the relevant data by issuing questionnaires, and through the analysis of the data, This research found that there are information asymmetry phenomena in live-streaming with goods such as the discrepancy between the description of goods and the real goods, the doubt of consumers about the setting of the anchor character and the poor satisfaction of consumers with the status quo of live-streaming with goods, and the irrational behavior of consumers who will make impulsive consumption when participating in live-streaming with goods because of the information asymmetry. Recommendations were also given to improve the relevant regulatory and certification systems and to encourage consumers to contact shopping. However, it is also found that there are certain limitations in the sample, such as the large proportion of female consumers and middle-aged and young people, and subsequent research can have more investigation and research on male consumers and other age groups as well as in-depth discussion on how to verify the information of the anchor's characters. In this paper, based on the information asymmetry phenomenon in online shopping, This research conduct an in-depth study on the special online shopping method of live-streaming with goods. Our findings in the questionnaire support the conclusions of the literature on the information asymmetry phenomenon in online shopping, and This research also found some information asymmetry phenomena specific to live-streaming with goods, the most obvious one is the character setting of the anchor, which is also the most worrying problem for consumers.

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All-cause Excess Mortality Cross-sectional Correlation Analysis at Global Scale During COVID-19, 2020-22

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Abstract: The excess mortality during COVID-19 is significantly higher than the reported death due to COVID-19 infections. This study conducts a cross-sectional correlation analysis between excess mortality and reported COVID-19 death, aging rate, GHS (Global Health Security) index, and government response stringency index in the timeframe from January 2020 to September 2022. This study aims to explore the main contributors to excess mortality, hence to provide guidance on future diagnosis and control of the pandemic. A cross-sectional log-linear model is fitted with 79 observations to estimate the explanatory power of reported COVID-19 death, aging rate, GHS index and stringency index on excess mortality at a global scale. The correlation between excess mortality and reported COVID-19 death is also examined on a nation level by calculating the Spearman correlation coefficient on the time series of the two. The cross-sectional log-linear model has adjusted $R^2 = 0.77$, F statistic $= 61.09$. The estimate for log of reported COVID death is 1.02 ± 0.06; aging rate is -0.04 ± 0.02; GHS index is -0.03 ± 0.01; stringency index is not significant. On a nation level, Brazil and United States have high correlations between reported and excess death ($r = 0.81, r = 0.68$), the reported death takes up 85% and 86% respectively, of excess death. India and Japan, similarly, have high correlation coefficient ($r = 0.71, r = 0.63$), but with COVID-19 death accounting 9% and 47% of excess death. Germany and China have relatively small correlations between reported and excess death ($r = 0.71, r = 0.63$), but Germany has reported death taking up 89% of excess death, whereas in China the ratio is 4%. At a global scale, the reported COVID-19 death has the most explanatory power in excess mortality, which means that most of excess mortality is attributed to death from COVID-19 infections. Aging rate has a negative correlation between excess mortality, this is partly because of the preference of aged population to live in countries with better health care capacities. There is no significant explanatory power of stringency index on excess mortality, suggesting that the impact of government responses on COVID-19 vary by each nation. On a country level, the correlation between COVID-19 death and excess mortality can also vary, mostly due to the different levels of health care disruptions, efficiency and impact of government measures and other COVID-19 unrelated events such as wars and heat waves.

Keywords: excess mortality, COVID-19, all-cause excess mortality, government response, population aging, health care disruption

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1. Introduction

The impact of COVID-19 on the mortality of the general population is usually assessed by the number of deaths reported on public data sources such as the World Health Organization. However, the explanatory power of this metric can be limited due to various reasons, such as the testing availability of each country and the definitions of deaths due to COVID-19 [1]. In order to give a more accurate estimate of the true death toll of COVID-19, as well as other extreme events, excess mortality is one of the appropriate measures. Excess mortality is defined as the difference between the observed death from all causes and the estimated death based on historical trends. It captures both the deaths directly caused by COVID-19 infection and indirectly caused by the consequence of the pandemic [2].

Current studies on excess mortality of COVID-19 mostly focus on the estimation process and descriptive analyses of excess mortality, and most correlation analyses are done qualitatively and are done on the country basis. Thanks to the excess mortality data available from previous studies such as The Economist [3] and the World Mortality Dataset [1], this study conducts a cross-sectional correlation analysis between excess mortality and reported COVID-19 death, aging rate, GHS (Global Health Security) index, and government response stringency index in the timeframe from January 2020 to September 2022. The authors aim to explore the main contributors to excess mortality, hence to provide guidance on future diagnosis and control of the pandemic.

2. Method

2.1. Data Source

The excess mortality data and reported death is obtained from The Economists [3], which includes panel data of 247 countries on a weekly basis from January 2020 to September 2022. The projected death data is obtained from World Mortality Dataset [4], which contains panel data from 123 countries from January 2020 to September 2022, the time intervals differ from each country, but mostly on a monthly basis. For issues of interdependence between the calculations of excess mortality and projected death, it is tested that there is no statistically significant difference ($p=0.28$) between excess mortality data from The Economists and that of World Mortality Database, so it should not significantly impact on the results if both datasets are used in conjunction. The government response stringency index is obtained from Oxford COVID-19 Government Response Tracker (OxCGRT) [5], which contains the average stringency index from January 2020 to September 2022 of 102 countries. The Chinese yearly all-cause mortality data is obtained from 2010-2019 from Chinese National Bureau of Statistics [6]. The aging rates data is obtained from The World Bank [7], which consists of the 2021 aging rates of 266 countries. The GHS (Global Health Security) index is obtained from [8] Bloomberg School of Public Health, which contains the 2021 GHS index for 195 countries.

2.2. Key Variables and Calculation

Excess mortality: The difference between the reported number of deaths in a given time interval in 2020–2022 and an estimate of the number of deaths for that period had the COVID-19 pandemic not occurred.

$$\text{Excess mortality} = \text{Reported death} - \text{Projected death} \tag{1}$$

Excess mortality rate: The percentage difference between the reported death and projected death in a given time interval.

$$\text{Excess mortality rate} = \frac{\text{Excess mortality}}{\text{Projected death}} * 100 \tag{2}$$

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Cumulative excess mortality rate: The total percentage difference between the reported death and projected death up to a given time.

$$\text{Cumulative excess mortality rate} = \frac{\text{Total excess mortality}}{\text{Total projected death}} * 100 \quad (3)$$

Aging rate: The percentage of population of ages 65 and above.

Stringency index: A measure of the level of stringency of government responses based on 21 indicators of government response imposed by each country [5]. Stringency index ranges from 0-100, with 0 being the least stringent, 100 being the most stringent.

Global Health Security Index: A measure of assessment of countries' health capabilities and preparedness for pandemic across six categories and 37 indicators [8]. GHS index ranges from 0-100, with 0 being the least capable and 100 being the most capable.

2.3. Analysis Method

Model for predicting expected death in 2020-2022 for China. Due to the absence of China's projected death data from World Mortality Dataset, a linear time series model is built for China using the model of Karlinsky and Kobak [1]. Yearly mortality data from 2010-2019 is used to estimate the projected mortality for each year from 2020 to 2022, in order to compute cumulative excess mortality rate. The following regression model is fitted:

$$D_t = \beta_0 + \beta_1 t + \epsilon_t \quad (4)$$

Here, D_t is the number of deaths observed in a year, β_0 is the intercept, β_1 is a linear slope across years, and $\epsilon_t \sim N(0, \sigma^2)$ is a Gaussian noise. Since this model is on yearly basis, it only captures yearly trend and does not account for seasonality within a year.

The estimate for β_0 is -9306.06 ± 574.22, β_1 is 5.10 ± 0.29, and the adjusted $R^2 = 0.97, F = 320.5$.

Cross-section regression model for excess mortality. The cross-sectional data is computed by summing the excess mortality and reported COVID-19 death (from January 2020 to September 2022) for each country. A stepwise variable selection based on AIC (Akaike Information Criterion) is used to select the variables included in the model. Then the log-linear model is fitted using `lm` function in R base package. Since the OLS method is used to fit the model, the model is examined to ensure each assumption had been met. Specifically, the normality of log of excess mortality is tested by Shapiro test (p-value=0.24), heteroskedasticity by studentized Breusch-Pagan test (p-value=0.03), and multi-collinearity by VIF (Variance Inflation Factor) (VIF<2 for every independent variable). The OLS standard errors is replaced by HC (heteroskedasticity consistent) standard errors to account for heteroskedasticity. The goodness of fit is evaluated by conducting F test of overall significance, t tests for slope estimates, and adjusted R^2.

Correlation between reported COVID-19 death and excess death for each country. The correlation analysis is conducted between reported COVID-19 death and excess death for each country by doing Spearman's rank correlation test using the weekly time series data for each country.

Visualizations and computations. All visualizations and computations are done in RStudio (R version 4.2.0.).

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3. Results

3.1. Summary Statistics of the Excess Mortality Stratified by Six Continents

Table 1: Summary statistics of excess mortality of six continents (Antarctica not included), including total excess death in absolute term, average, median, standard deviation (s.d.), maximum and minimum of excess mortality rate. (credit: original)

Continent	Total exess deaths	average Excess mortality rate(%)	Median Excess mortality rate(%)	s.d. of Excess mortality rate(%)	Max Excess mortality rate(%)	Min pExcess mortality rate(%)
Africa	1569843.74	14.05	17.98	10.42	26.86	-6.47
Asia	1819157.85	15.24	11.28	11.90	43.64	-0.95
North America	2125654.56	12.95	14.00	11.42	32.70	-7.56
Oceania	19430.36	3.01	-1.01	9.26	16.03	-5.43
South America	781263.58	23.45	18.63	17.07	52.65	1.23
The European	3369867.14	13.29	11.20	8.62	32.60	-2.97
TOTAL	9685217.24	14.25	11.64	11.28	52.64	-7.56

In 121 countries and regions, the total number of excess deaths was 9.68 million, with an average excess mortality rate of 14.25%. Europe had the highest number of excess deaths, at 3.36 million, while Oceania had the lowest, at 19,000. South America had the highest average excess mortality rate at 23.45%, while Oceania had the lowest excess mortality rate at 3.01%. The highest median excess mortality rate was found in South America at 18.63% and the lowest in Oceania at -1.01%. South America had the highest standard deviation of excess mortality (17.07%) and Europe had the lowest standard deviation (8.62%). The country with the highest excess mortality rate is Peru in South America (52.65%), while the country with the lowest excess mortality rate is Greenland in North America (-7.56%).

3.2. Regression Model of Excess Death at Global Scale

Table 2: Summary of the cross-sectional log-linear model of excess mortality, including the intercept and slope estimates and the HC standard errors shown in brackets, the number of observations, R^2 and adjusted R^2, residual standard error, F statistic and significance level of each estimate. (credit: original)

	Dependent variable:
	Log(Excess death)
Intercept	4.0144^{***}
	(1.3114)
Log(Reported COVID death)	1.0183^{***}
	(0.0649)
Aging rate	-0.0381^{*}

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Table 3: (continued).

	(0.0215)	
GHS index	-0.0277***	
	(0.0100)	
Stringency index		-0.0348
	(0.0215)	
Observations		79
R^2		0.7676
Adjusted R^2		0.755
Residual Std. Error	0.8909 (df = 74)	
F Statistic	61.0887*** (df = 4; 74)	
Note:	*p<0.1;**p<0.05;***p<0.01	

The reported COVID death, aging rate, GHS index and Stringency index of each country are included to fit a log-linear model with HC standard errors for excess mortality. Figure 2 is the summary of the model. Note that there are only 79 observations (79 countries of data) available since only countries with all 4 variables data available are included. The model has adjusted $R^2 = 0.77$, F statistic $= 61.09$. The estimate for log of reported COVID death is 1.02 ± 0.06, and is significant at 1% level; the estimate for aging rate is -0.04 ± 0.02, and is significant at 10% level; the estimate for GHS index is -0.03 ± 0.01, and is significant at 5% level; the estimate for stringency index is -0.03 ± 0.02, and is not significant.

3.3. Correlation Between COVID-19 Death and Excess Death on Country Scale

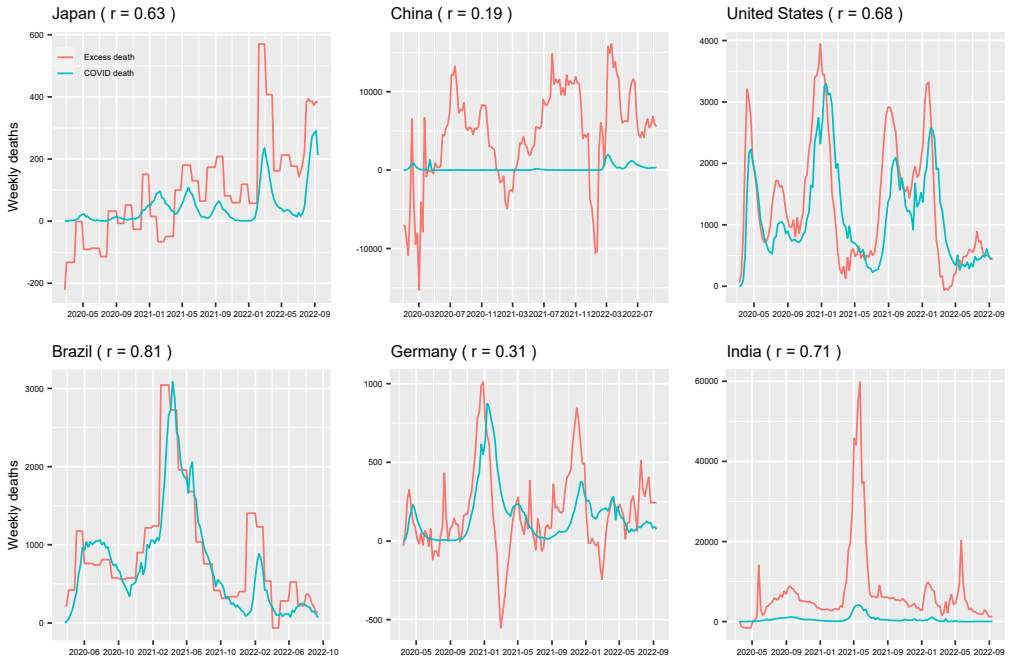

Figure 1: Excess mortality vs reported COVID-19 death weekly time series of six selected countries, with the Spearman correlation coefficient (r) between the two series, starting from week 1 in 2020. (credit: original)

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The correlation between the reported COVID-19 death and excess death is high at global scale ($r = 0.6$). However, this is not the case for all countries, figure 3 shows the heterogenous patterns and trends in six representative countries.

Brazil and United States have high correlations between reported and excess death ($r = 0.81, r = 0.68$), as well as a small gap between them. The reported death takes up 85% and 86% respectively, of excess death. India and Japan, similarly, have high correlation coefficient ($r = 0.71, r = 0.63$), but larger gaps between reported and excess death, with COVID-19 death accounting 9% and 47% of excess death. Germany and China have relatively small correlations between reported and excess death ($r = 0.31, r = 0.19$), but Germany has reported death taking up 89% of excess death, whereas in China the ratio is 4%.

It is also notable that the gap between excess and reported death can sometimes be negative, this is mostly seen in China and Germany, during the first quarters of 2020, 2021 and 2022. Negative gap is also present in Japan during 2020 and the first half of 2021, and in first quarters of 2021 and 2022 in United States.

4. Discussion

4.1. Overview of the Excess Mortality Stratified by Six Continents

Between January 2020 and September 2022, the number of excess deaths was 9.68 million in 121 countries counted, and 6.53 million people died of COVID-19 infection during the period.The number of excess deaths is far exceeding the number of people who died of COVID-19 infection.

Oceania was the continent with the least excess deaths and the lowest excess mortality rate, with only 19 thousand more deaths than expected, among which Australia alone accounted for 18 thousand excess deaths, accounting for a large part of the excess deaths in Oceania.

With 3.37 million excess deaths, Europe has the highest number of excess deaths of any continent. Russia has the highest number of excess deaths among all the countries counted, with 1.29 million, which is the one of the reasons for the high number of excess deaths in Europe. This figure is far higher than that of Italy (230,000), which is the second highest in Europe.In addition, the standard deviation of excess mortality in Europe is the smallest, which means that the distribution of excess mortality in Europe is relatively concentrated.

Among the countries counted, Bolivia, Kuwait and Peru had the highest excess mortality rates, with 52, 44 and 43 percent respectively. Among them, Bolivia and Peru are both South American countries, and their excess mortality rates raise the average excess mortality rate in South America, which is one of the reasons why South America has the highest average excess mortality rate.

4.2. Regression Model of Excess Death at Global Scale

The log of Reported COVID-19 death, aging rate, GHS index, and stringency index are included as input variables to the model, based on data availability. The adjusted R^2 is 0.77 (p-value=0), meaning that 77% of variations in log of excess mortality can be explained by the input variables, which shows that the model is useful in explaining excess mortality at global scale.

The estimate for log of reported COVID-19 death is 1.02 ± 0.06, which means that a 1% increase in reported COVID-19 death is expected to increase excess mortality by 1.02%, holding other variables constant.

The estimate for aging rate is -0.04 ± 0.02, which means that a 1% increase in aging rate is expected to decrease excess mortality by 0.04%, holding other variables constant. Although small in magnitude, this result may be counterintuitive, since aging is a predominant risk factor of COVID-19 [9], and it may be reasonable to expect a positive relationship between aging rate and excess mortality.

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However, it is also discovered that aging is positively correlated with GHS index (r=0.63), suggesting that aged population tend to live in countries with better health care capacities. This may help to explain the negative correlation between aging rate and excess mortality, since better health care capacities will lower excess mortality. However, there is still a possibility that aging rate may be endogenous, given its negative estimate and high significance level (10%) even after controlling for GHS index.

The estimate for GHS index is -0.03 ± 0.01, which means that a 1 unit increase in GHS index is expected to decrease excess mortality by 0.03%, holding other variables constant. This is again, small in magnitude, however makes intuitive sense: the better health care capacities and the more preparedness to COVID-19, the lower the excess mortality.

The estimate for stringency index is not statistically significant. This is because excess mortality in most countries can been affected, either positively or negatively, by the government prevention strategies, therefore the correlation between stringency index and excess mortality is ambivalent. Some countries with low stringency index, such as Greenland (34) and Faeroe Islands (30), both have negative excess mortality rates, whereas Nicaragua, whose stringency index (11) is the lowest among the 102 countries, has an excess mortality rate in the 94% percentile. Similarly, countries with relatively high stringency index such as China (72), Malaysia (59) and Australia (52), have kept their excess mortality rate at low levels, whereas Peru has both a high stringency index (65) and a high excess mortality rate (42.7%) among the 102 countries. Small stringency index and low excess morality rate often occurs in island countries whose geographic location is separated from continents, therefore are likely to be insulated from COVID-19. Countries benefited the most from government responses are those with high stringency indices and small excess mortality rates such as China and Australia. On the contrary, Peru's high stringency index and excess mortality rate can be explained by its weak health system and inefficient government measures [10]. In general, the impact of the stringency of government responses on excess mortality appears to be country specific.

4.3. Correlation Between COVID-19 Death and Excess Death on Country Scale

On a global scale, the reported COVID-19 deaths alone can explain 68% of variations in excess mortality, and therefore is the variable with the most explanatory power amongst all included variables (aging rate, GHS index and stringency index). This suggests that COVID-19 death is, in most regions, the main contributor to the excess death. However, when examined on a country scale, heterogeneity appears in patterns of the co-movements between the two.

Conceptually, excess mortality consists of the following components: 1. Death directly caused by COVID infections. 2. Death caused by medical system collapse or the scarcity of health care resources due to COVID-19 pandemic. 3. Death indirectly caused by government's regulation such as medical inconvenience, severe side effects of vaccinations and strikes on mental health. 4. All other deaths from extreme events such as wars and natural disasters [1] For factors 2 and 3, their effect cannot be separated easily since the most predominant reason for disruptions is intentional service delivery modifications [11](mostly imposed by the government), which implies they are interrelated to each other.

For most countries, deaths directly resulted from COVID-19 infections (factor 1) account for most variations in excess death, such as Brazil and United States, where the gap between excess and reported deaths is small, and the correlation coefficient is high. However, for factors 2-4, there is no homogenous pattern for all countries. On global average, health care disruptions (factor 2) are reported in almost half of the public health services [11], implying that these disruptions may be the second significant contributor to excess death. One exception is Germany, which did particularly well in health care services during the pandemic, it is ranked first in 'Healthcare readiness' amongst 250

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countries in the regional safety assessment conducted by Deep Knowledge Group [12]. This is also reflected in the small gap between its excess and reported death, and sometimes even negative.

Government measures (factor 3) can either positively or negatively impact on excess death. Positive effect can be reduced social contact, and hence lower mortality resulted from other infectious diseases [1] due to lockdowns and social-distancing. Negative effect is mostly attributed to the above-mentioned health service disruptions, but impact on mental health cannot be neglected [13]. Countries benefited from government measures include (not limited to) Australia, New Zealand and China, which have reported lower all-cause mortality rates after the pandemic [14]. For China, this is evident in the negative gap between excess and reported death during the first quarters of 2020 and 2022, when government interventions were the most stringent. Similarly, negative gap in Brazil is coincided with decrease in cardiovascular diseases, respiratory diseases and other external causes [15]. Countries negatively impacted by government interventions, particularly on mental health, include Japan and United States. Suicide rate increased in Japan during the pandemic, and opioid deaths have increased in some US states [13].

Natural disasters and extreme events (factor 4) such as Russia Ukraine War and heat waves across the globe are also responsible for excess mortality, especially the latter one, whose effect on mortality is expected to increase in the coming half century [16]. It is also notable that the large gap between excess mortality and COVID death in China may be attributed to aging effects. China has the largest elderly population in the world and the process of aging is accelerating in recent years [17], excess deaths in China may well be attributed to elderly death when the care given does not meet the acceleration rate of aging.

4.4. Comparison with Similar Studies

Two other analyses of excess mortality conducted on global scale are studied[1,13]. These studies reported the excess mortality of 103 and 74 countries in 2020 and 2021, and ours included 79 countries in the timeframe 2020-2022. The linear model developed by Karlinsky and Kobak [1] for estimation of projected in death is particularly useful for the estimation of China's death ($R^2 = 0.99$). Both studies mention several factors contributing to excess mortality including age, health service availability and other cause-specific deaths, most interpretations are similar to those of this study. In addition, Karlinsky and Kobak reports a strong positive correlation between excess death and reported COVID deaths, although this is true at the global scale, it is found that there is weak positive correlation or even negative correlations in some countries. Furthermore, both studies do not explicitly account for the possible effect of government measures on excess mortality, whereas this study includes the stringency index data from Oxford University to study its correlation with excess mortality.

5. Conclusions

ßIn summary, the reported COVID-19 death has the most explanatory power in excess mortality at a global scale, which means that most of excess mortality is attributed to death from COVID-19 infections. Aging rate has a negative correlation between excess mortality, this is partly because of the preference of aged population to live in countries with better health care capacities. There is no significant explanatory power of stringency index on excess mortality, suggesting that the impact of government responses on COVID-19 vary by each nation. On a country level, the correlation between COVID-19 death and excess mortality can also vary, mostly due to the different levels of health care disruptions, efficiency and impact of government measures and other COVID-19 unrelated events such as wars and heat waves.

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This study has a number of limitations. First is the constraints from data, the model only included 79 countries, there are still some countries not included due to unavailability of weekly updated time-series data or other input data. Second, other possible causes or covariates of excess mortality may not be quantifiable or hard to obtain data, such as the amount of decrease in access to local health services due to lockdowns, or cause-specific mortality data. Third, the model for China's weekly projected death may be robust since one average value of the year is assigned for all weeks in that year and did not account for seasonality within a year (due to data constraints). Future analyses are recommended to account for cause-specific excess mortality and health service disruptions if those data become available [13]. It is also expected that future studies to conclude a more accurate correlation between aging and excess mortality. Lastly, analyses in the impact of vaccination, including vaccination coverage and side effects of vaccinations, on excess mortality, are also recommended.

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Analysis of the Impact of COVID-19 on Macao's Gambling Industry

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Abstract: Macao, known as the "Monte Carlo of the East" and the "Las Vegas of Asia", has suffered a huge impact and unprecedented impact from the COVID-19 pandemic since its return to China. The negative impact of the pandemic has hampered the flow of people, reducing the number of tourists to Macao and the profitability of related industries, which has affected the revenue of Macao's gambling industry. This study used data research to study Macao's gambling industry and analyzed the impact of COVID-19 on Macao's gambling industry through relevant data before and after the epidemic, obtained from the Macao Bureau of Gaming Supervision, the Macao Bureau of Statistics, news media, and other channels. In addition, according to the current situation in Macao, if the gambling industry wants to recover from the status quo of difficult long-term development caused by the single industrial chain and the impact of physical casinos caused by the epidemic, it is necessary to clarify the development ideas, improve the industrial chain, and establish a diversified industrial system.

Keywords: COVID-19, Macao gambling industry, Macao tourism, development strategy

1. Introduction

As a very special industry in the world and the pillar industry of Macao, the gambling industry plays an extremely important role in the development of Macao. As the only legal gambling industry in China, Macao's gambling industry has been its pillar industry since its return to China. It can be said that its economic level is inextricably linked to the development of the gambling industry. Since the outbreak of COVID-19 in late 2019, when Chinese people responded to the government's call to stay at home, the pandemic has affected all walks of life to varying degrees. The media industry has paid great attention to many industries during the epidemic, but few scholars and experts have analyzed the impact of the epidemic on the gambling industry. So the research to the "new crown outbreak on the impact and future development of Macao's gambling strategy analysis" as the theme, mainly on the impact of the new champions outbreak of Macao's gambling. This research aims to put forward some strategies for Macao's future development under the uncertain situation of the epidemic.

2. The Gambling Industry in Macao

Since 2002, the average annual growth rate of Macao's GDP has been about 15%. In 2007, Macao's per capital GDP surpassed that of Hong Kong for the first time; In 2010, Macao's per capital GDP

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reached $51,000, the most in Asia [1]. The development of Macao's per capital GDP is closely related to its major industry--the gambling industry. From 2003 to 2019, the proportion of gross profit of gambling industry in total revenue of Macao is shown in the following table [2] (Data of eight years during the period are captured. In 1999, Macao returned to China, and in 2003, the official website of Macao began to record the data of gambling revenue).

Table 1: The ratio of gross gaming profits to Macau's annual GDP. (Unit: Million Mop)

Year	Gross gaming profit	Macao's annual GDP	Proportion
2003	28773	66146	43.5%
2005	46046	97416	47.3%
2008	108769	168639	64.5%
2011	267868	295438	91%
2013	360748	411729	87.6%
2015	230840	359708	64.2%
2017	265743	404839	65.6%
2019	292455	445530	65.6%

From the data above, it can be seen that since the official data record of Macao was established in 2003, the revenue of the gaming industry has accounted for a huge proportion of the Macao economy. Since 2008, it has exceeded 60%, and the data in the following years has been very stable. This is enough to see the gaming industry plays a key role in Macao's economic development and deserves to be regarded as Macao's main industry.

Since the outbreak of the coronavirus in 2020, most sectors in China have been hit, with the service sector hit the hardest. China's tourism industry has been hit harder than ever by the government's call for people to stay at home to prevent the spread of the virus. Gambling and tourism are Macao's main industries. After the epidemic, Macao's tourism industry has also suffered a huge impact, as gambling and tourism are closely related. Statistics from Macao's Statistics and Census Bureau show that the number of arrivals in Macao in December 2019 was 3,083,406, while the number of arrivals in February 2020 was only 5.1 percent of December 2019, with 156,394 arrivals.

3. Data Analysis

3.1. During Outbreak of the Pandemic

Table 2: Monthly lucky gaming gross revenue in 2020 and 2019. (Unit: Million Mop)

Monthly Lucky Gaming Gross Revenue in 2020 and 2019						
	Monthly Gross Income			Cumulative Gross Income		
	Y2020	Y2019	Rate of Change	Y2020	Y2019	Rate of Change
January	22,126	24,942	-11.3%	22,126	24,942	-11.3%
February	3,104	25,370	-87.8%	25,229	50,312	-49.9%
March	5,257	25,840	-79.7%	30,486	76,152	-60.0%
April	754	23,588	-96.8%	31,240	99,739	-68.7%
May	1,764	25,952	-93.2%	33,004	125,691	-73.7%
June	716	23,812	-97.0%	33,720	149,503	-77.4%

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Table 2:(continued).

July	1,344	24,453	-94.5%	35,064	173,956	-79.8%
August	1,330	24,262	-94.5%	36,394	198,218	-81.6%
September	2,211	22,079	-90.0%	38,605	220,297	-82.5%
October	7,270	26,443	-72.5%	45,875	246,740	-81.4%
November	6,748	22,877	-70.5%	52,623	269,617	-80.5%
December	7,818	22,838	-65.8%	60,441	292,455	-79.3%

The Table 2 compares Macao's gross gaming revenue in 2019 and 2020. In 2020, the first year of the outbreak, from February (the first month of the outbreak), the gross revenue of the gambling industry fell extremely, from 22126 million MOP in January to 3104 million MOP, a decline of 86%, compared with a decline of 87.8 percent in February 2021. In the following ten months, the income remained below 10 million MOP, and the income remained at a very low level from April to September, with a change rate of more than 90%. It was not until October that the income improved significantly, but it was still less than half of that in January. From the perspective of cumulative gross income, the change rate of cumulative gross income from February to September shows a trend of continuous increase, and since February, the change rate has maintained a large value in 2020.

In order to prevent the occurrence of high gambling revenue in 2019 due to the influence of economic and political factors, the data of 2020 is compared with the data of years before 2019, and the following analysis is made in this study.

Table3: Monthly lucky gaming gross revenue in 2018 and 2017.(Unit: Million Mop)

Monthly Lucky Gaming Gross Revenue in 2018 and 2017						
	Monthly Gross Income			Cumulative Gross Income		
	Y2018	Y2017	Rate of Change	Y2018	Y2017	Rate of Change
January	26,260	19,255	+36.4%	26,260	19,255	+36.4%
February	24,300	22,991	+5.7%	50,560	42,246	+19.7%
March	25,950	21,232	+22.2%	76,510	63,479	+20.5%
April	25,728	20,162	+27.6%	102,239	83,640	+22.2%
May	25,489	22,742	+12.1%	127,727	106,382	+20.1%
June	22,490	19,994	+12.5%	150,217	126,377	+18.9%
July	25,327	22,964	+10.3%	175,544	149,340	+17.5%
August	26,559	22,676	+17.1%	202,103	172,016	+17.5%
September	21,952	21,362	+2.8%	224,055	193,378	+15.9%
October	27,328	26,633	+2.6%	251,383	220,010	+14.3%
November	24,995	23,033	+8.5%	276,378	243,043	+13.7%
December	26,468	22,699	+16.6%	302,846	265,743	+14.0%

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Table 4: Monthly lucky gaming gross revenue in 2019 and 2018. (Unit: Million Mop)

Monthly Lucky Gaming Gross Revenue in 2019 and 2018						
	Monthly Gross Income			Cumulative Gross Income		
	Y2019	Y2018	Rate of Change	Y2019	Y2018	Rate of Change
January	24,942	26,260	-5.0%	24,942	26,260	-5.0%
February	25,370	24,300	+4.4%	50,312	50,560	-0.5%
March	25,840	25,950	-0.4%	76,152	76,510	-0.5%
April	23,588	25,728	-8.3%	99,739	102,239	-2.4%
May	25,952	25,489	+1.8%	125,691	127,727	-1.6%
June	23,812	22,490	+5.9%	149,503	150,217	-0.5%
July	24,453	25,327	-3.5%	173,956	175,544	-0.9%
August	24,262	26,559	-8.6%	198,218	202,103	-1.9%
September	22,079	21,952	+0.6%	220,297	224,055	-1.7%
October	26,443	27,328	-3.2%	246,740	251,383	-1.8%
November	22,877	24,995	-8.5%	269,617	276,378	-2.4%
December	22,838	26,468	-13.7%	292,455	302,846	-3.4%

As can be seen from the data in the above two tables (Table 3 and Table 4), compared with the gross revenue of the gambling industry in 2017, the gross revenue of the gambling industry in 2018 has been greatly improved, with some months exceeding 20% or 30%, which is the result of economic development and other factors. The profile also shows that the development of the gambling industry in Macao was very good before the epidemic. Compared with the revenue in 2018, the revenue of the gambling industry in 2019 shows a stable development situation and is less affected by other factors, so it is possible to exclude other factors that have a significant impact on the revenue of the gambling industry in this year. From the above data and analysis, it can be concluded that the COVID-19 epidemic has had a huge impact on Macao's gambling industry. From the above data and analysis, it can be concluded that the COVID-19 pandemic has had a huge impact on Macao's gambling industry.

3.2. Post-pandemic Period

Although the epidemic situation is still in an unstable state after 2021, compared with 2020, the epidemic situation has been basically controlled except for small outbreaks in some areas.

Table 5: Monthly lucky gaming gross revenue in 2021 and 2020. (Unit: Million Mop)

Monthly Lucky Gaming Gross Revenue in 2021 and 2020						
	Monthly Gross Income			Cumulative Gross Income		
	Y2021	Y2020	Rate of Change	Y2021	Y2020	Rate of Change
January	8,024	22,126	-63.7%	8,024	22,126	-63.7%
February	7,312	3,104	+135.6%	15,336	25,229	-39.2%
March	8,306	5,257	+58.0%	23,642	30,486	-22.5%
April	8,401	754	+1014.4%	32,043	31,240	+2.6%
May	10,445	1,764	+492.2%	42,487	33,004	+28.7%
June	6,535	716	+812.5%	49,023	33,720	+45.4%

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Table 5:(continued).

July	8,444	1,344	+528.1%	57,467	35,064	+63.9%
August	4,442	1,330	+234.0%	61,908	36,394	+70.1%
September	5,879	2,211	+165.9%	67,787	38,605	+75.6%
October	4,365	7,270	-40.0%	72,152	45,875	+57.3%
November	6,749	6,748	+0.01%	78,901	52,623	+49.9%
December	7,962	7,818	+1.8%	86,863	60,441	+43.7%

Although the epidemic situation is still in an unstable state after 2021, compared with 2020, the epidemic situation has been basically controlled except for small outbreaks in some areas. As can be seen from the figure above (Table 5), gambling revenue recovered to some extent in 2021. Compared with the same month data in 2020, the revenue in April 2021 was 8401 million MOP. Compared with April 2020, the change rate reached 1014.4%. May, June, and July also reached 492.2%, 812.5%, and 528.1%. But even with such a high rate of change, income is still statistically below pre-pandemic levels and less than half of 2019 gross income when compared to 2019 figures, proving that in the post-pandemic era, even if the pandemic is largely contained, its impact on gambling revenues is still impossible to change fundamentally.

Table 6: Monthly lucky gaming gross revenue in 2022 and 2021. (Unit: Million Mop)

Monthly Lucky Gaming Gross Revenue in 2022 and 2021						
	Monthly Gross Income			Cumulative Gross Income		
	Y2022	Y2021	Rate of Change	Y2022	Y2021	Rate of Change
January	6,344	8,024	-20.9%	6,344	8,024	-20.9%
February	7,759	7,312	+6.1%	14,102	15,336	-8.0%
March	3,672	8,306	-55.8%	17,774	23,642	-24.8%
April	2,677	8,401	-68.1%	20,452	32,043	-36.2%
May	3,341	10,445	-68.0%	23,792	42,487	-44.0%
June	2,477	6,535	-62.1%	26,269	49,023	-46.4%
July	398	8,444	-95.3%	26,668	57,467	-53.6%
August	2,189	4,442	-50.7%	28,857	61,908	-53.4%

In mid-June 2022, the first large-scale outbreak occurred in Macao. As a result, offline casinos were forced to close due to the epidemic for the first time in July, and did not open until early August. Because of the pandemic and casino closures, gross revenue for the whole of July was 39.8m MOP, the lowest since Macao's gambling industry began keeping official statistics. The outbreak hit Macao in June, July and August, which are prime time for tourism, so it also dealt a huge blow to Macao's tourism industry.

4. Analysis of Future Development Strategy

4.1. Current Limitations

Gambling industry has such a high status in Macao, and its income also accounts for a high proportion of the total income of Macao, which reflects the relatively simple industrial structure of Macao from the side. The fact that the pandemic has had such a big impact on the gaming industry also speaks to

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the relatively unitary structure of Macao's gaming industry. However, if there is no management strategy for future uncertainties, Macao's gambling industry will probably fall into crisis again.

The casinos in Macao mainly target mainland Chinese tourists, which is related to the habit of gambling in mainland China. In 2010, Singapore legalized gambling. In addition, the Philippines, Malaysia and other Southeast Asian countries also established legal casinos, which directly affected Macao's gambling industry [3]. Southeast Asian countries are relatively close to China. Besides, the tourism resources of Southeast Asian countries are richer than Macao and the landscape is very different, which is very attractive to Chinese tourists. Although in the past few years, seeing led to difficulty in traveling abroad, making a large part of the mainland tourists' travel plans and gambling will be directed by the southeast Asian countries to Macao, but the countries of southeast Asia's tourism gradually perfecting and maturing might be at the end of the outbreak "steal" a big part of tourists.

Secondly, the development of the gambling industry has provided a large number of local jobs, and nearly three-quarters of the local residents are engaged in the gambling industry. However, even though such a large number of people are engaged in the gambling industry, the quality of human resources is low. Talents with high-level management experience and knowledge in the gambling industry are scarce, and most of the employees have a low level of education. Such a huge number of people are engaged in the gambling industry. In the future, if there are changes in the gambling industry in Macao, which leads to salary cuts or layoffs, it will directly affect the decrease of Macao's per capital income and the straight decline of unemployment rate, and various social discordancy events will occur in a short time. So it is dangerous for Macao to rely so heavily on the growth of gambling without a plan for the future.

4.2. Strategy of Sustainable Development

Las Vegas has had casinos for more than 70 years before Macao developed its gambling industry. Although the establishment of Macao's gambling industry depends on policies while that of Las Vegas depends on the market, in terms of development approaches and changes in surrounding industries, Macao and Las Vegas are very similar. But in the 1980s and 1990s Las Vegas transformed itself from a casino economy to a combination of sightseeing, shopping, food and family travel. In 2007 gambling revenues were $9 billion, but non-gambling revenues were $11 billion [4]. Therefore, in the future development, Macao should reduce the proportion of gambling industry in the local economic income and develop diversified tourism to ensure sustainable development in the future.

For the lack of Macao's high-level management experience and knowledge of talents, the government should strengthen the importance of education, the establishment of more colleges and universities, attract overseas talent, strengthen the gaming industry, and connect science and technology for the future development of Macao's gambling and management tactics to provide more and also to Macao tourists from different regions to provide more kinds of service.

In addition, Macao should actively participate in the development of Hengqin New Area. To a large extent, the construction of Hengqin New Area has solved the disadvantage of Macao's small land and provided Macao with more development space. Based on Hengqin, Macao should establish a comprehensive tourism service group with the mainland to provide different levels of services. In addition, with the support of government policies, Macao should actively invest in the development of high-tech industries, introduce large enterprises with international competitiveness, well-known brands and independent property rights, and incubate innovative new small and medium-sized enterprises [5]. According to the local advantages of Macao and the development status of the mainland, online games, software development, gambling technology, electronic (entertainment) equipment and its supporting design, energy and environmental protection technology, marine

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pharmaceuticals and Chinese patent medicine, health care products research and development can become the development direction of the science and technology industry [6].

5. Conclusion

The coronavirus pandemic has had a huge impact on Macao's gaming industry. Data from the first seven years of 2020 and from 2020 to the present show that the decline in tourist numbers due to the coronavirus pandemic has significantly reduced revenue at Macao's major casinos. The uncertainty over when the current coronavirus pandemic will end means Macao's gaming industry will have to adjust for the future. At the same time, it is necessary to reduce the number of employment in the gambling industry, increase the construction of universities, take advantage of Hengqin New Area to develop diversified tourism, develop innovative industrial clusters and high-tech industries, and prevent the uncertain impact of the epidemic on the income of local employees. In this study, the data of the paper are all based on the papers and reports of the Bureau of Statistics of Macao, Macao Bureau of Sport Supervision, and scholars and researchers. Due to age restrictions and school rules and regulations, it is impossible to enter the casino for field investigation, which is also an unavoidable defect of this study. It is hoped that other researchers can conduct internal investigations in future studies to improve the study on the impact of the epidemic on Macao's gambling industry. After industrial adjustment and upgrading, other researchers are also expected to conduct further investigation and research on how to settle the excess employees of casinos, how to replan the number and scale of casinos, and whether there is a better adjustment direction.

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A Study of the Business Modes of Lululemon and Alo Yoga

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Abstract: Fitness brands are on the rise in recent days, with the increading demand of people's requirements of health. These fitness brands are further developed under the era of the pandemic. With their rapid development, the business modes of them are therefore of particular interest to the author. Furthermore, it is found that few research have been conducted in this area. Therefore, there existed a research gap in it. This research aims to take on this opportunity to build up on existing research in the business modes of fitness brands. It uses a comparative and case study approach to study two fitness brands, Lululemon and Alo yoga, to investigate their business modes and patterns. The result found that there are some similar modes and patterns while they remain unique in other asepcts of their businesses.

Keywords: Lululemon, Alo Yoga, business modes and patterns, comparative study, case study

1. Introduction

In modern days, people start putting more attention on health, which also has led to the rapid rise of many health and fitness related brands. According to data collected from recent years: in 2021, the entire sports equipment market was valued at around 15 billion dollars; the value of fitness equipment for home use was estimated around 6.4 billion dollars in total, which is largely due to the outbreak of Covid-19 pandemic. It is very self-evident that the pandemic and its consequential quarantine has made a lot of sports brands as well as organic food brands the biggest beneficiaries and set up a solid foundation for their future development. Among this field, Lululemon and Alo yoga have been two great subjects to study and compare, as both of them first started as pure yoga brands with inspiring beliefs and core values, with shared target audience to a large extent and similar development paths. The case study will be specially focused on how those two influential brands came to their current position through different marketing strategies, and investigate, why Alo Yoga, which is younger than Lululemon with later entrance to the market, can also take a share while sharing some similarities with Lululemon, instead of being eliminated by this market.

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2. Main Body

2.1. Lululemon's Business Mode

Lululemon was initially started in Vancouver, Canada, as a yoga retail store with a vision that it will be a community for people to share healthy lifestyles and help build up real relationships with customers as a friend [1]. Lululemon has now expanded with more athletic gears to fulfill people's sweaty pursuits not only just based on yoga, which was their first product for and only designed for women [2]. As a successful sports gear brand, lululemon has opened 574 stores globally, with 370 in North America, and the current stock price is 317.8$. It can be seen from the stock summary below that since its initial public offering started in July, 2007, it was growing slowly and its unremarkable performance did not make it outstanding until 2018, when things started to take a turn. Its stock price went above 100$ and was heading in a great direction. Although there was a decline when the pandemic hit in early 2020, it seemed to be a juncture as the stock price started to rise sharply from March, 2020 until now.

Due to the pandemic, a lot of industries were hit heavily, and a lot of people could only stay at home because of unemployment everywhere, and some countries' strict policies have made many outside activities restricted. In addition, because of the severity of the influence the rampant virus brought to us, people began to realize how important and precious our actual physical conditions and health are. With sufficient time and more flexibility, more people joined fitness and sports, especially the concepts of eating organic and getting fit are already turning into a trend potentially. What the author has seen around me is people working out whenever and wherever they want. What is more surprising is that Lululemon has actually become a part of a lot of people's daily outfits and it can literally be seen that the shiny symbols of "omega" are everywhere.

Lululemon's marketing strategies have undoubtedly succeeded, especially the 4P's marketing mix that includes products, place, price, and promotions [1]. Lululemon has very specifically classified leggings, shorts, pants, accessories for both women and men, and the diverse arrangements actually make the brand more professional and appealing to fulfill all kinds of needs [3]. Even the sports bras are divided into so many sections based on different intensities and sizes. In addition, in order to not to be easily replaced, Lululemon has had 31 patents for its own exclusive products and materials that cause less competition. For example, its most famous material is luon, which is "breathable and cottony soft" (as described by the website) and composed of 86% nylon and 14% lycra. It perfectly possesses abilities that make people's exercise experience better, such as light, stretchy, absorbing sweat, etc. Lululemon not only has influence domestically, being super popular in North America, but also internationally, prevailing in the rest of the world too. There are always stores set in large/medium-sized shopping centers or downtown that provide convenience to a large degree and could easily get people's attention with tos noticeable red logo. Plus at every location, there are well trained employees helping the customers find the best fit and discussing personal workout goals that help them become the better version of themselves. Because of its high quality and stylish products, it attracts the ones who really care about health issues and often exercise, which helps the brand locate precisely on their targets, upper-middle class who have a secured money source and value the quality more than the price. This helps with the adoption of premium pricing strategy with its qualitative products. Also, due to the fact that the price will not really fluctuate because of any holidays or big sales that other stores always have, its consistent pricing strategy makes it stand out more among the rest. Furthermore, although Lululemon barely has any discounts or promotions, its word of mouth reputation and easy-to-access online web pages, all help create a great environment for the customers with better shopping experience. Besides, the 4P's, Lululemon has been devoted to creating a community that makes people more connected and helps spread its core values. With such engagements, people gain not only advantages brought by the actual products, but also mental

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satisfaction and elevation from its positive and attaching atmosphere [4]. Most importantly, in the author's opinion, since it is already a well-known and customary brand to a lot of people, existing customers will purchase again and again, and more potential customers will be attracted to try out as long as its high quality and fundamental concepts remain.

2.2. Alo Yoga's Business Mode

However, in spite of the huge success Lululemon has achieved, Alo yoga, as a rising star, also has taken a place in this extremely competitive market. Based on the concept of "spreading good by bringing yoga to the world", Alo first started in Los Angeles in 2007 and was hoped to not only elevate people's yoga experience but also be a stylish brand that people can wear besides on the yoga mat [5]. Although its annual revenue is only about $250 million [6], which seems it still has a long way to go compared to Lululemon's $7 billion, as an unlisted subsidiary company, its rising reputation and popularity already foresees its huge potential in the future.

According to Stylophane, a digital marketing agency, Alo Yoga was ranked #46 among Instagram Most Engaged Brands, even higher than luxury brands Alexander Wang (49), Tom Ford (62), and its direct competitor Lululemon (86). 2017 was also the time when Kendall Jenner, one of the most influential fashion icons in the world, was introduced to this brand and started actively wearing this brand on social media posts.

Unlike Lululemon, Alo yoga knows how to drive traffic to its website and new items through the active interaction and use on social media as its brand ambassadors or social media influencers (especially on instagram) have contributed a lot to the popularity and brought people's attention to this fashion yoga brand. For example, high-waist moto legging, has been worn by Gigi Hadid, Hailey Biber, Kendall Jenner (who had officially became an ambassador for alo yoga in March, 2021), Taylor Swift, etc, and the high exposure has made the leggings one of the best sellers. Knowing the importance of influencers in marketing, Alo yoga has been utilizing the impact and influence an internet celebrity has to advertise its products, which could be proven by its $1,627.88 average cost per post.

Because of its most publicity on social media, another example of successful combination between bringing up awareness and building good reputation is its famous #AloGivesWater [7]. It was created for 2022 Earth Day, and with every single post with this hashtag, collaborated with Water.org, Alo Yoga will give out access to clean and safe water to 1 person for 1 year, mostly women and children in developing countries.

As stated in Alo Yoga's Website [8], the founders' intention was to make the world a better place by bringing out the concept of yoga to everyone, such as people who are experiencing the power and beauty of yoga, to yogis who can benefit from the professional clothing and have a better experience, to celebrities, fashionista, and the ones who care about fashion as "it's the perfect street brand, comfortable, contemporary," and designed not just for the mat. In order to achieve its goal to be "mindfully modern", Alo has been dedicated to create garments that can be blended into every aspect of life, largely extended from its original purpose. "Luxury meets performance" can be seen in its collections for both women and men that are combined with the contemporary trendings.

In addition to that, by sharing and spreading the belief in "mindful movements and transformative, healing power" of yoga, Alo has gathered many of the most influential yogis in the world at its headquarters in California to teach yoga. And in order to make Alo culture a real and authentic yoga living style, Alo has a solar-powered office, yoga twice a day at its studio, an advanced recycling program, and meetings in nature, etc. All those display an uplifting and motivated image of this company.

Only having great concepts and ideas are not enough, Alo Yoga also has its own signature fabrics: Airlift, Airbrush, Alosoft, Seamless, Vapor, Alolux. Airlift specializes in lightweight, help lift and

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sculpt shapes, and as a double-knit and fully opaque material, it is perfect for high-intensity workout, pilates and yoga. Airbrush focuses more on breathable material with a strong cottony texture and matte finish, and its soft and cotton-like feeling make it a great choice for daily outfit, which could be a great example of "studio-to-street." Alosoft is ultra sketchy compared to others, and its velvety finish and breathable material all fit hot yoga pretty well. Seamless can be the go-to for everything, as it is lightweight and airy, more importantly, it works perfectly both inside and outside of the studio and is a great street outfit. Vapor, as it can tell from its name, its performance on quick-dry and lightweight is amazing. When working out in high intensity, this line works the best by cooling in the high heat. Last but not least, Alolux, its cashmere and plushy feel is the best for giving a soft and chilling feeling, as well as being the best transition from workout to work. It is a great option for fall and winter while providing warmness but not super heavy.

Alo also has very fresh colors which is another characteristic that makes it outstanding among the athleisure. Not only has the basic and traditional bright colors, like the ones Lululemon has, Alo Yoga now has its new color drop almost every season which fits its new theme and season perfectly. Take Chalk Blue, the newest color drop as an example, its keywords are "fresh, cool, icy, bringing on the chill," and its organized web page on Chalk Blue products all make it refreshing and unique, especially when compared to the traditional color filtering.

2.3. Comparison of the Two Brands

Unlike Lululemon, Alo Yoga's main target audience still focuses on the North American continent, while the United States occupies around 80.19% and Canada occupies around 4.98%. The current gender distribution is 72.69% female and 27.21% male, while among Lululemon, female consumers is around 66.39% and male consumers is around 33.61%. This could be partially due to the fact that on Alo Yoga's main page, there are way more items and categories for women, while for men, it is just basic clothes without fancy propaganda and titles, and the bright and special colors that other brands do not have are probably not as attractive to them as to female customers. While on Lululemon's website, although there are still different focuses and categories on female's and male's products, there is no obvious blank on either one's intro page, and a more compact page with fewer pop-ups could probably explain the extra 8% male customers for Lululemon. However, there is no distinction between the age distribution of the two brands. The only difference is within the 35-44 group for Lululemon, it is 2% higher than Alo's, and among the 18-24 age group, the percentage for Alo is slightly higher, from which it can be concluded that Alo Yoga is slightly more popular among teenagers and younger people, and people who are more mature age wise have a higher chance to choose Lululemon.

3. Conclusion

This research investigates two fitness brands, Lululemon and Alo Yoga. It is found out that the two brands have developed successfully with a series of characteristics in their business modes. They as a result benefit from the successful business mode and are in the significant rise. A comparison was made roughly with regards to the geographical and age distribution of the audiences from the two companies. In light of the limitations of this research, there are some points to mention. First, the reliability of the source needs further investigation. Some of the sources are from the internet and the author needs to check if they are reliable and proven. Second, the research lacks a comprehensive comparison of the business modes of the two brands. This is again linked to the literature gathered, and if the methodology of the research is further improved, such as setting up one or two dimensions to compare, it would be more clear as they are categorised. In the future research, the researcher can

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build upon this existing work, and improve the literature part and the methodology designed. In this way, the research could be more convincing in guiding the research direction moving in this area.

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The Application of Institutional Economics Theory in Solving Developing Countries Market Problems - Taking Ethiopia Grain Market and China Tomato Market as Examples

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Abstract: Since the 1990s, when the new institutional economics was first introduced, many economists have been looking for a way to incorporate its ideas into the field of development economics. In this paper, we investigate the prospects of using development economics theory, which is grounded in institutional economics, to address the economic challenges faced by developing nations. In this paper, we conclude that institutional economics theory can be successfully applied to the problem of economic development in low-income countries. Developing nations shouldn't discount the harm caused by irrational trading decisions. When people act irrationally in the market, it can have a negative impact on the economy as a whole. As such, developing countries could benefit from implementing brokerage institutions to lessen the blow of irrational behavior on economic growth.

Keywords: instutional economis, development economis, developing countries, Ethopia, market

1. Introduction

In 1990, with the release of Douglass C. North's Institutions, Institutional Change, and Economic Performance, the neoclassical economics assumption began to shift. Prior to 1990, the vast majority of economists held the view that all economic models could benefit from applying the same three foundational assumptions of economics (methodological individualism, methodological instrumentalism, and methodological equilibration) [1-3]. But as Douglass and other non-neoclassical economists argue, that's only half the story [4].

Ethnicity and racism, Marcel Fafchamps and other economists find, can be a serious problem or a tremendous hindrance when attempting to solve economic problems in developing countries like Ethiopia and Kenya [4]. However, neoclassical economic theory rarely distinguished between the economic models of developing countries and developed countries. The assumptions made for individual behavior in developing countries and developed countries are actually the same in conventional economic theory and case studies. In fact, according to neoclassical economists, consumers in all economies follow the same basic rules. However, Fafchamps and Gabre-Madhin argue that, contrary to popular belief, it is not a reasonable economic assumption to hold that all individuals act identically [2]. People in developing countries behave differently from people in developed countries because of issues like racism and asymmetric information, which are much more

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severe in developing countries than in developed countries [2]. Then, without a doubt, it is time to reconsider the paper's initial introductory assumptions.

Using current research data on the economies of Kenya, Zimbabwe, and Ethiopia, the author discusses how the new institutional economic assumption helps us to understand the problems of ethnicity and gender discrimination there, and suggests ways forward. The ultimate aim of development economics is to stimulate the economy in developing countries, and this goal will be made more achievable if more options for addressing development issues in these countries are made available. When developing nations' economic situations improve, so too do their citizens' living conditions.

2. Introduction and Comparison of Neo-classical Economics and New Institutional Economics Behavior Assumptions

Douglass C. North has previously done this reevaluation of development in his book, Institutions, Institutional Change, and Economic Performance. The neo-classical economics behavior assumption that Douglass modified in Chapter 3 is depicted below, along with the new institutional economics behavior assumption that he coined to describe it.

2.1. Neo-classical Economics Behavior Assumption

To begin, it seems fair to say that global economic conditions are stable. The second is that people who participate in the economy are constantly put through the same, or very similar, series of decision-making scenarios. Third, the actors' preferences are consistent, so they use consistent standards to assess the results of individuals' decisions. Fourth, businesses would be forced to take advantage of any opportunity to improve their outcomes if they were exposed to it often enough, or risk being driven out of business. Fifth, this means that there is no possible equilibrium in which all players' preferences are not maximized. Sixth, because the world is roughly in equilibrium, the patterns used by the maximizing actors are roughly visible. And finally, seventh, the specifics of the adaptive process are likely to vary depending on the actor and the circumstances. The regularities associated with optimization equilibrium, on the other hand, are relatively simple; therefore, considerations of parsimony dictate that the way to advance in economic understanding is to explore these regularities theoretically and compare the results with other observations [3].

2.2. New Institutional Economics Behavior Assumption

First, the concept of equilibrium is a useful tool of analysis for some purposes, but there is not a single equilibrium for most of the issues that we care about. Second, although individuals face many recurring situations and can act rationally in these cases, they also face many nonrecurring choices where information is limited and outcomes are uncertain. Third, the stability issue is not so easily dismissed, even though Becker and Stigler have made an impressive case for relative price changes accounting for many apparent changes in preferences. Anomalies manifest themselves at the disaggregated level at which psychological research has been done, and there is no doubt that preferences change over time, as evidenced by historical records. The author has been unable to come up with an explanation for slavery's decline in the nineteenth century that does not involve a shift in public opinion about whether or not it is moral to own another person. And finally, fourth, actors want to do well, but they may not know how to do so because the information they receive is inadequate. When competition is low and signals are muddled, adaptation can be sluggish or misguided, and typical evolutionary outcomes may not hold true for very long epochs of time. Sixth, there is abundant proof of much more than simple rational noncooperative behavior in the state of the world throughout history. Seventh, economists' assumptions about human nature can be applied to

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practical problems. They are the primary roadblock to understanding the genesis, development, and persistence of institutions [3], and they are woefully inadequate to address many of the challenges faced by social scientists.

This paper has shown that unlike neo-classical economics, the assumption of individual behavior in new institutional economics theory now accepts more diversity of people's behavior and would take into account different individual action. Some economists apply the new theory of institutional economics to the question of how the actions of people in developing countries differ from those of people in developed countries and what effect those differences have on the markets and economies of those countries. Fafchamps and Gabre-Madhin have conducted studies like "Ethnicity and Credit in African Manufacturing" and "Market Intuitions, Transaction Costs, and Social Capital in the Ethiopian Grain Market" to determine how well the current new institutional economics theory explains economic issues in developing countries. For instance, Fafchamps claims that when he applies case study data on manufacturing firms in Kenya and Zimbabwe, he discovers that an ethnic and gender bias is noticeable in the attribution of supplier credit, which, in other words, will drastically alter the market situation in both countries [4]. People in Zimbabwe and Kenya are more likely to act irrationally than those who are not affected by ethnic and gender bias [3]. While this summary satisfactorily addresses the posed question of how new institutional economics assumptions improve our understanding of the market situation in developing countries, the central issue of how to solve the economic problems of developing countries remains unresolved. Most studies addressing this issue have focused on the causes and consequences of people's increased conformity to the new institutional economists' working assumptions, rather than on how to mitigate the problem it presents. According to Fafchamps, "the bulk of the evidence indicates that network effects play an important role in explaining this bias [4]," but he offers no way to exclude the possibility of discrimination in the market.

3. Situations in Kenya, Zimbabwe and Ethiopia

3.1. Kenya and Zimbabwe

In Kenya, men of Asian descent make up the majority of the country's business elite. Particularly in Kenya's food markets, males of Asian descent are the go-to traders. Male Luos, for example, predominate in the fish trade, while male Kenyan-Asians do particularly well in the textile industry [4]. Bart Minten asserts that the most crucial element of business success for traders and suppliers in Kenya and other African countries is the quality of their personal relationships [5]. Given the current climate, it is safe to assume that the majority of Kenyans will look to males of Asian descent as the only potential source of supply. Most economists probably see this as a recipe for the other, equally reliable suppliers to leave the market and go elsewhere. Therefore, market buyers are restricted to conducting business with male Kenyan-Asians, even though some of these vendors are unreliable. Choosing a business partner solely on the basis of their ethics rather than the maximization of the buyers' own utility is not, in any sense, a rational action.

As in Kenya, many merchants identify with a specific race. In Zimbabwe, however, they are overwhelmingly white males, in contrast to Kenya. Despite the fact that they may provide a perfect food supply or high-quality production, traders who are not male Kenyan-Asians or whites have a very low chance of establishing trade credit in either country.

Irrational actions may have disastrous consequences for market efficiency. The new institutional economics differs from neo-classical economics in its belief that the consequences of ignoring the harm done by irrational actions will be dire. The market is failing when most participants don't choose the option that maximizes their profit or utility. If the market's optimal quantity or price does not correspond to the actual quantity or price, then the market is inefficient even if there is a generally

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accepted price. A strong adjustment policy is necessary for such a market, which means that the government must step in to either fix the problem or at least mitigate its negative effects.

3.2. Ethiopia

The Ethiopian grain market illustrates the failure of a market unfettered by government intervention due to discrimination based on gender and ethnicity. Prior to 2003, the bulk of the trade between sellers and buyers in Ethiopia's grain market was conducted through personal connections, which raised concerns about the potential for severe information asymmetry and ethnic tensions. The government imposed strict regulations as well, but that all changed in 2003. The less government intervention policy is used, the more self-sufficient the market will be, so says neoclassical economics. For this reason, in March of 2003, the government of Ethiopia lifted all grain market restrictions in an effort to boost the market's economic performance [6]. Unfortunately, the market economy's performance gets even worse [6]. The elimination of government restrictions on the grain market has little effect on price and quantity because of the heavy reliance on personal relationship during trading. Even though the price restriction has been lifted, there is still not enough grain on the market to sustain Ethiopia's population [6].

Based on current events in Ethiopia's grain market, it's fair to assume that decreased government intervention isn't the only factor contributing to the market's undersupply. New insights from the field of institutional economics suggest that irrational decisions may be to blame for developing countries' poor economic performance. In this paper, the author does not claim that there is no other explanation for the poor economic performance in some developing countries; however, the irrational behavior that the author will go on to discuss could be a very attractive answer for how we are going to improve the economic performance in developing countries.

4. Main Problems and Reason

The economic performance of developing countries, and in particular their irrational choice of trade partners, can be improved by identifying the root causes of this behavior and then working to address those causes. The root of any issue can be pinpointed and addressed more effectively once its cause has been isolated. This paper will concentrate on two particular issues.

4.1. Ethnicity and Racism

It was no secret that entrepreneurs favor working with those of their own gender or ethnicity, given the long-established link between these factors [5]. However, things become more difficult when some people stereotype all people of a different race or gender as being incapable. People in developing nations may feel helpless in the face of discrimination because of a lack of education or other factors.

4.2. Asymmetric Information Caused by Reliance on Personal Relationship

The extreme lack of sophistication in business practice contributes to the importance of relationships [5]. In developing nations, the issue of inadequate business practices is much more pervasive and difficult to rectify. In less developed markets, there may be no reputation mechanisms to punish opportunistic breaches of contract, no checks, no invoices, very little trade credit, and no visual inspection of quality by the trader or a trusted associate at each transaction [5]. Many economists and organizations like the World Bank have acknowledged that the lack of sophistication on the part of developing country governments is not entirely unexpected. However, the government in some of

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these countries may lack the motivation to adjust these problems because they are still reaping benefits from the personal relationship trading mode.

5. Discussion: Possible Solutions

5.1. Ethnicity and Racism

It is unlikely that discrimination does not exist, as Fafchamps argues in his paper "Ethnicity and Credit in African Manufacturing" [4-5], but we can now try to mitigate its impact through alternative means. First, it is necessary to emphasize that decreasing ethnic tensions and racial prejudice is directly correlated to rising educational attainment. However, in the long run, it will be really changeling for a government to raise the education level if the economic situation of the country is execrable and the market in developing countries keeps in insufficient.

So, how do we stop discrimination from harming people? Possible solutions include having the government formally recognize a brokers' union. An intermediary between an investor and a securities exchange, brokers are either individuals or businesses. They should aid suppliers and buyers in determining the best option for each other, and they should not share the same ethic group or gender as the market's dominant members. Suppliers' gender or ethnicity should never be revealed, and neither sellers nor buyers have any say in which brokers they'll be working with. In order to avoid corrupt practices, the government should pay the brokers directly instead of the supplier or the buyer. In addition, it is important that every local supplier and buyer have access to a comprehensive list of brokers, which includes contact information. Last but not least, if there is still room in the government's budget, the brokers who connect suppliers and buyers should be exempt from taxes.
First, the brokers' solution can lessen the likelihood of irrational choices due to discrimination, as the sellers and buyers might be able to remain completely anonymous to one another. Since they are completely oblivious to one another's gender and cultural background, they are likely to be more concerned with increasing their financial gain. Second, in the long run, people in the trade market might figure out that choosing who to trade with based on gender or ethnic group is not a profitable strategy, and so they might stop using such data.

5.2. Asymmetric Information Caused by Reliance on Personal Relationship

The asymmetric information problems in a trade market can be mitigated by brokers' solution, and the former will benefit from the latter. Existence of brokers will reduce the time that suppliers and buyers spend trying to find each other in the market, as previous research into African markets has found that the brokerage institution minimizes transaction costs and facilitates exchange [1]. Foreseen because the brokerage institution ensures that all sellers and buyers, no matter their size, are aware of the market's full range of pricing, quality, and quantity. In a perfect competition market, all buyers have access to product information, allowing them to quickly and cheaply determine which product will provide them with the greatest net benefit. People are not dependent on a single source, where they have no guarantee of receiving accurate information about the market price and quantity.

Brokers' existence will undoubtedly assist consumers in the market in making more informed decisions, but the government must play a crucial role in preventing corruption and bribery among brokers to ensure the continued success of brokerage instruction. According to the foregoing, brokers should be assigned to each seller and buyer at random, and they should be barred from receiving any form of compensation from any party other than the local government. It is indeed possible that the tax incentives and subsides will get more people to hire brokers.

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6. Conclusion

In this paper, we investigate the prospects of using development economics theory, which is grounded in institutional economics, to address the economic challenges faced by developing nations. In this paper, we conclude that institutional economics theory can be successfully applied to the problem of economic development in low-income countries. Developing nations shouldn't discount the harm caused by irrational trading decisions. When people act irrationally in the market, it can have a negative impact on the economy as a whole. As such, developing countries could benefit from implementing brokerage institutions to lessen the blow of irrational behavior on economic growth.
It is indeed important to note that implementing any of these policies or pursuing any of these potential solutions will take time. Seeing the results of a policy or solution may take longer than three years. When deciding between possible solutions or policies, it's important to factor in the opportunity cost of each.

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Research on TikTok's Development Strategy in the Context of the Internet Celebrity Economy: Case Analysis Based on the SWOT Analysis Method

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Abstract: Mobile short videos are developing rapidly in the market with a powerful attitude under the background of the rapid development of digital, network, and mobile technologies. Especially since the outbreak of the epidemic in the past two years, netizens have been isolated at home. TikTok's simple operation steps provide a broad space for the development of mobile short videos. Our country has gradually realized the "popularization of TikTok." As a short video platform with the largest number of users and the best development in China, TikTok APP can represent the development level of China's new media field to a certain extent. Based on the SWOT analysis method, this paper studies TikTok from the four aspects of strengths, weaknesses, opportunities, and threats, and, combined with the conclusion, put forward rich policy recommendations with certain practical significance.

Keywords: information cocoons, PGC, UGC, copyright, fragmentation

1. Introduction

With the rise of mobile Internet and big data, users are increasingly favoring short videos for their ease of creation and sharing. The short video has ranked in the top three in all segments of the industry in terms of the proportion of total time spent by mobile Internet users, and it is constantly innovating in its development process. New media represented by short videos have gradually become the first-hand information source for social hot spots and emergencies and the key channel for the development of public opinion.

In the past two years, TikTok, as the head product of the short video industry, has been deeply loved by young people. TikTok is a short video platform owned by ByteDance, which is defined as "recording a good life". The length of a short video is 15 seconds to 5 minutes. It is a kind of vertical-screen video content creation platform that uses mobile smart devices to shoot, make, watch, interact, and push high-frequency. It is also a short video social software with a low creation threshold, strong entertainment, and interactivity. TikTok makes the public more and more inclined to share what they see and hear on social media, and makes people more active in participating in social public affairs. But for teens, TikTok has a powerful allure, and we should do a better job of adapting the teen model to create a proper TikTok platform for teens.

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Therefore, this paper will take TikTok as the research object and analyze its strengths, weaknesses, opportunities, and threats based on the SWOT analysis method and give corresponding strategies, with a view to contributing to the healthy and vigorous development of an important economic platform for Internet celebrities.

2. Literature Review

With the continuous maturity of information technology and the continuous development of the new media industry in China, the TikTok industry has been continuously upgraded under the empowerment of mature digitalization, which has triggered extensive discussion among scholars. Xie Jintinganalyzed TikTok's ethics derived from big data based on the continuous upgrading and diversified development of short videos [1]. Man Zhihao and Ma Lingling analyzed the learning effects of students using TikTok by taking advantage of TikTok's characteristics of fast dissemination and strong interest and studied the feasibility of students using TikTok for English autonomous learning [2]. Shi Kui and Zhao Zhiying believe that colleges and universities can actively create and use official TikTok to strengthen the communication power of mainstream ideology under the characteristics of continuous innovation and production of content and form [3].

In the new media industry, scholars seize the three giants "Weibo, WeChat, and TikTok" for comparative research. He Yuman analyzed the characteristics and connections of these three apps in film marketing [4]. Gao Xin et al. also investigated libraries from three aspects: WeChat, Weibo, and TikTok, and analyzed the positioning [5], role of the three platforms, and the multi-platform collaborative service strategy. Liu Xinyu said that the wide application of new media platforms in colleges and universities has diversified the development of employment work. For example, colleges and universities use new media such as WeChat, Weibo, and TikTok to ensure innovation and start businesses [6].

Scholars have also combined the short video industry with the economic format of Internet celebrities to elaborate and analyze. Feng Shuxun put forward the innovative development model of "e-commerce + live broadcast" based on the rapid development of the Internet era and network broadcast industry and the core of Internet celebrities and e-commerce [7]. Su Luwei analyzed the communication strategies and problems of the cosmetics brand Huazizi after it entered the e-commerce field of TikTok and proposed solutions [8]. Lei Dan took the rapid development of the new media era as the breakthrough point to analyze the development mode and trend of network broadcasts, which led to the analysis of the influence of network celebrity broadcasts on college students' consumption behavior [9].

Based on the above literature, this paper makes the following three contributions: First, the selected subject is new. Although there is research on the short video industry today, the research topics of opportunities and challenges are relatively few regarding the advantages and disadvantages of TikTok, a mobile short video platform. The content of this paper is very novel as can be seen from its research content. The research on the development strategy of TikTok based on SWOT analysis is just the shortcomings of the existing research literature. Second, the research method is new. Using SWOT analysis, this paper examines the strengths, weaknesses, opportunities, and threats of Tiktok, as well as the negative impact the "information cocoon room" has on the platform. Third, the contribution of reality is greater. This paper puts forward targeted and personal policy suggestions for the healthy development of the short video industry and Internet celebrity economy and provides Chinese cases, Chinese facts, and Chinese experiences for the development of short videos in other developing countries in the world.

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3. SWOT Analysis

SWOT analysis is composed of S (strengths), W (weaknesses), O (opportunities), and T (threats). SWOT analysis can conduct a comprehensive, systematic, and accurate study of the situation in which the research object is located. It is an organic combination of what a company "can do" (the strengths and weaknesses of the organization) and what it "may do" (the opportunities and threats of the environment). This analysis method will be closely related to the research object of various major internal strengths, weaknesses, and external opportunities and threats, with the idea of system analysis for situation analysis, from which a series of certain decision-making conclusions can be derived.

3.1. Strengths

"UGC+PGC" Coexist. TikTok mainly produces video content in five ways, namely user-generated content (UGC), professionally-generated content (PGC), and occupationally-generated content (OGC). The UGC model can ensure user engagement, and the PGC model can ensure the output of high-quality professional content. The combination of PGC and UGC makes TikTok the characteristics of a wide range of participants and a wide range of development areas, and then it can attract thousands of producers to participate in the creation and release of videos. On the one hand, due to the limitations of the shooting time and location, most of the UGC content comes from the secondary processing and editing of other videos or UGC content captured by users themselves, and the overall visual perception will be reduced. But the UGC model provides TikTok with a constant stream of video content and a very wide range of users. On the other hand, TikTok's UGC production model delegates the power of content production and publishing to platform users, so its low threshold and lack of strict design features lead to a large number of users. In order to prevent the occurrence of adverse effects, the PGC model is carried out and used to ensure that the video is produced in the form of high-quality professional content.

Diverse Fields and Rich Content. TikTok focuses on content created by creators, which includes not only ordinary people in related fields but also leaders in a variety of professional fields. The text content on the platform ranges from astronomy and geography to daily necessities, basically covering all aspects of human life. It includes the display of the different living conditions of 56 ethnic groups; the participation of foreign friends in various forms; the knowledge and skills teaching of knowledge-based text producers in various fields; the daily life of stars; and the happiness and sorrow of ordinary people, etc. At present, TikTok has many popular categories, such as travel, funny, emotional, food, and life. Since its launch, TikTok has paid attention to the diversified creation atmosphere in the field of creators, thereby promoting the enrichment of content categories and even launching special support projects on the production of content by various users. This allows it to document life and create content in richer ways, ultimately creating the full matrix of TikTok content.

Simple Operation and Convenient Use. Compared with long videos, TikTok has a low barrier to entry. People of all ages can be photographed. Its operation is simple. Users can choose from TikTok's built-in filters, special effects, background music, and a variety of beautification stickers at the touch of a button. The simple and easy-to-use TikTok app provides users with a wealth of ways to socialize and entertain. In TikTok, users swipe up to see the next video and swipe down to return to the previous video. The operation is simple and conforms to the user's browsing habits. This low barrier to entry and simple way of producing content has attracted a large number of users to TikTok. This creates a participatory cultural space that gives everyone access to TikTok in a universal sense. TikTok's simple operation, convenient use, fast information replacement and exten-

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sive dissemination of content has become the current trend and gradually become a symbol of people's life.

3.2. Weaknesses

The Formation of Information Cocoons. TikTok has its recommendation algorithm and personalized recommendation technology. In the process of continuous browsing, the platform can deduce the user's preferences through browsing, liking, and commenting, to recommend similar or user-recognized related videos and comments. In the process, users get stuck in a cocoon of information. Based on TikTok's current algorithm rules, when users find like-minded "netizens" in the comment section, they become dependent on the TikTok platform and even regard TikTok as the only online community.

Lack of Depth, Over-entertainment. The length of videos in TikTok is limited to 15 to 60 seconds, which also determines that the content of the videos lacks depth and is overly entertaining. Most of the early works focus on soft news. Its theme lacks depth, focuses too much on fun, and makes people follow the thinking of others unconsciously. People are unable to think deeply and form mental anesthesia. The biggest propagation feature of short videos lacking knowledge depth is fragmentation. Short video platforms use the fragmented time of users to provide users with information. Such transmission characteristics tend to divide knowledge into many small segments and lose the integrity of knowledge. And such pieces of knowledge often lack depth. Although there are many active individual users in TikTok, there are few influential opinion leaders, and the content of Internet celebrities lacks originality. Data show that the most popular content on TikTok includes pets, celebrities, and funny, and the topics are mainly entertainment and leisure, with relatively little serious political news information.

It Is Difficult to Check the Theme Content and Video Quality. Although the TikTok platform encourages users to actively upload produced content and increases the amount of content produced, the content created by this model is mainly focused on the areas of interest and understanding of the disseminators. It is undeniable that its content compliance, professionalism, and extensibility are still lacking. At the same time, the content transmitted by users may have problems such as violation, vulgarity, and plagiarism. In many cases, TikTok ignores strict checks on content sources and lacks the ability to comprehensively utilize information and integrate resources. As a result, the content is vulgar, lacks depth, and has no cultural nutrition and other issues.

Copyright Issues Are Difficult to Judge. On TikTok, if a user introduces someone else's original music without the creator's permission, it must be an act of copyright infringement. However, if bloggers share music and its related content in the form of sharing during live streaming, how to define whether it is profitable? Moreover, does the resulting improvement of the image value and popularity of the host belong to profit? How to calculate the hidden benefits brought by sharing and spreading again by others? All these problems bring a variety of troubles to the judgment of copyright. For example, the re-creation of TikTok TV series is now more likely to cause copyright infringement. TikTok's video editing has formed a profitable industrial chain, and many internet celebrities in the video editing category directly profit from their editing works.

3.3. Opportunities

The Fragmentation of Leisure Time. In today's fast-paced life, whether students or office workers, everyone's time is fragmented. TikTok is convenient. You don't need to spend too much time searching, and you don't need to worry about the psychology of wanting to read it all the time, which will affect the next study and work. Therefore, the fragmented reading habits of users fit the

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short-duration form of TikTok, further boosting the growth of TikTok users with content duration constraints.

Performance Improvement of Internet Devices. On the one hand, with the improvement of the Internet, the continuous development of new media technology, and the expansion of the scope of Internet applications, there are more and more netizens. Whether in urban or rural areas, the use of electronic intelligent products is more and more widely used. Almost every family has a smartphone or other smart electronic product. Whether teenagers or old people, they can get different information through various media every day. At the same time, people are increasingly dependent on the Internet. On the other hand, the rapid development of "Internet +" has made many companies start to carry out marketing and publicity through TikTok and other Internet platforms with large traffic users, and actively build their websites for product sales and services. They use the Internet to solve the problem of information asymmetry to the greatest extent possible. Therefore, TikTok's further development will be greatly boosted by the improved performance of Internet devices.

The Strengthening of National Support for Short Video Platforms. The state has introduced several policies for short video platforms such as TikTok. The government supports knowledge accounts such as culture and education, attracting high-quality cultural platforms to enter. With the increase of elite intellectuals, professionals, and official cultural platforms, short video platforms have undergone great changes. These platforms transfer from simple self-expression to commercial operation and dissemination of publicity and knowledge; from mass entertainment, and commercial content to the in-depth development of vertical subdivisions.

3.4. Threats

Harsh Competitive Environment. At present, domestic short video platforms have rapidly occupied the market in a short period of time. In the competitive environment of high industrial concentration, non-obvious product differences, and high barriers, they can occupy a place and open a new era of domestic short videos, and the algorithm team behind it is indispensable. At the same time, the strong entry of Internet giants such as Unicom, Alibaba, and Tencent, as well as the intervention of Little Red Book and Bilibili, will intensify the market competition environment for TikTok.

The Awareness of Protecting Original Copyright is Gradually Enhanced. Copyright problem is a common problem in the process of content generation on short video platforms. With the continuous expansion of the user scale of short video platforms, copyright infringement greatly hits the enthusiasm of users to generate original content, which is not conducive to the long-term development of short video platforms. Many netizens do not know enough about the policies related to copyright infringement and network management and use media technology to violate others' privacy and copyright, such as the remake of movie resources being released on short video platforms. These pirated resources spread indiscriminately, making producers make illegal profits from them, seriously damaging the interests of the issuer, and so on. At the same time, the original consciousness and copyright consciousness of the masses are gradually awakening and becoming stronger. In order to make full use of the commercial value of short videos, short video platforms have lowered the censorship threshold, and even become video copyright infringers by means of technical concealment or direct infringement. This kind of behavior by platforms is very bad for long-term development.

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4. Conclusion

4.1. Conclusion

This paper expounds and analyzes the coexistence of the "UGC+PGC" mode in TikTok. As well as its diverse fields, rich content, simple operation, and convenient use of the advantages. But there are users who will be trapped in the information cocoon; Lack of depth and excessive entertainment; The disadvantages of subject content, product quality control difficulties, and copyright judgment difficulties. TikTok has an opportunity brought about by the fragmentation of users' leisure time, the improvement of Internet devices, and increased state support for short video platforms. However, it may also be threatened by the harsh competitive environment and the gradually increasing awareness of creators to protect the original copyright. The specific content can also be seen in Table 1.

Table 1: SWOT analysis.

SWOT	Content
Strengths	"UGC+PGC" coexist; diverse fields, rich content, simple operation, and convenient use
Weaknesses	The formation of Information cocoons; lack of Depth and over-entertainment; difficult to check the theme content and video quality
Opportunities	The fragmentation of leisure time; performance improvement of Internet devices; the strengthening of national support for short video platforms
Threats	The harsh competitive environment and the awareness of protecting original copyright is gradually enhanced

4.2. Policy Suggestion

Based on the above conclusions, this paper puts forward the following policy recommendations:
First, in view of the disadvantages of the information cocoon, TikTok's management should be aware of the harm of the information cocoon. We should take the initiative to adjust the algorithm recommendation mechanism, increase the diversity of content recommendations, and give the audience more autonomy. We should timely and appropriately integrate into the mainstream ideological discourse, gradually inculcate the authority of the mainstream ideology, and get rid of the value closure and emotional tear of the information cocoon room.

Second, given the lack of depth and excessive entertainment of the content, TikTok should transform from entertainment to knowledge. We need to guide and regulate the unreasonable online life content, and then reshape the life world in the real-life scene.

Third, in response to the threat of an increasingly competitive environment, TikTok could develop gaming platforms that use the coins people earn through games directly into its marketplace. This increases the number of time users spends on TikTok, preventing it from being replaced by other apps.

Fourth, in response to the threat from the gradually increasing awareness of protecting the original copyright and the disadvantage of the difficulty in judging the copyright of short videos, TikTok can do corresponding copyright maintenance. We need to improve the channels for users to report, clean up the TikTok accounts of infringers, and optimize the feedback and complaint mechanism of TikTok platform to prevent the spread of such problems.

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Reference of European Carbon Market to China's Carbon Market under the Unified National Market

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Abstract: Under the goal of global net zero emissions, China has established a carbon market to limit and allocate carbon emissions. Based on the establishment of China's national unified market and the official operation of China's carbon market, this paper compares China's carbon market with Europe's carbon market. Firstly, this paper first reviews the relevant papers, mainly including the summary of the development experience of the four stages of the European carbon market, the reference significance of the European carbon market for China's carbon market, and the scale advantage in the carbon market. Then, the paper compares and analyzes the European carbon market and China's carbon market from three aspects: regional development imbalance, financial attributes and limitations of the carbon market. It also analyzes the role that China's national unified market can play in the development of carbon market. Finally, this paper puts forward suggestions for China to use the national unified market to develop the carbon market from two aspects: reducing regional development imbalance and developing carbon financial instruments and financial products.

Keywords: unified national market, EU ETS, carbon finance

1. Introduction

Carbon finance refers to the low-carbon economic investment and financing activities arising from the Kyoto Protocol. Together with carbon trading, it constitutes two important elements of the carbon market. As Europe (Including the EU and UK, the same below), which is currently the world leader in carbon finance, has developed the financial industry, and its carbon market has a financial attribute since its emergence, there is no clear definition of carbon finance in the world. In the common understanding, carbon finance in a narrow sense refers to relevant financial activities generated in the process of carbon credit trading, including carbon emissions trading, carbon financial derivatives trading, and carbon asset management business. In a broad sense, carbon finance refers to the economic activities that support carbon neutral goals, efficient and economical utilization of resources, and limited emission of greenhouse gases, that is, financial services such as project investment and financing, project operation, and risk management in the fields of clean energy, environmental protection, and energy conservation. The trading products of the carbon financial market include various carbon financial instruments developed based on two basic carbon assets, namely, carbon emission quota and project emission reduction, mainly including trading instruments (carbon futures, carbon forward, carbon swaps, carbon options, etc.), financing instruments (carbon pledge,

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carbon repurchase, carbon custody, etc.) and supporting instruments (carbon index and carbon insurance, etc.).

Against the background of global carbon neutrality, the world's major economies have launched policies to establish a carbon market. By the end of January 2022, 33 carbon markets were operating in the world, covering nearly one-fifth of the total global greenhouse gas emissions, more than 30% of the global population, and more than half of the global GDP. Among them, Europe established the first and largest carbon market in 2005, and China established the carbon trading market with the widest coverage of greenhouse gas emissions in the world in 2017. The development of China's financial industry lags behind that of Europe, and China's carbon market has been established for a relatively short time. Therefore, China's current carbon market is mainly based on basic carbon trading, that is, the accounting, allocation, verification, and settlement of carbon emission quotas, but the financial content of the carbon market has not been fully developed. The problem of few trading industries and lack of participation in social capital is very prominent. For example, carbon financial instruments such as carbon futures and carbon mortgages do not play their due role in the carbon market, and only a few institutions and enterprises can participate in the carbon market, many institutional investors and individual investors are not accepted by the carbon market. This means that the financial attribute of China's carbon market is underdeveloped, so its scale advantage cannot be utilized. In April 2022, the Chinese government announced that it would start to build a national unified market, aiming to give play to the advantages of China's super large market. At present, China's carbon market covers a wide range, and because of China's huge financial market and emissions, the scale of the carbon market has great room for growth, so it is an inevitable trend that the carbon market will become a large-scale market in the future. In 2021, China's seven pilot carbon market exchanges completed a total of about 36.26242 million tons of carbon emission quota transactions, with a transaction volume of about 1.167 billion yuan. At present, there are many studies on the reference of the European carbon market to the Chinese carbon market, but the research on the reference of the development of the European carbon market to China's further development of carbon market by virtue of the market scale advantage under the unified national market is still blank. Based on these backgrounds, this paper reviews the relevant literature and summarizes carbon finance based on the rich experience of the four stages of the European carbon market and the research of scholars on European carbon finance, to increase the understanding of carbon finance and lay a foundation for China to further develop the carbon finance under unified national market.

2. Related Literature

The references in this paper are mainly composed of two parts. The first part is about the financial content of the European carbon market. Fossland introduced the carbon market in detail, especially the EU carbon market, analyzed the relationship between the European stock market and the price of EUA futures in the carbon market, and found that there is no linear relationship between the return of EUA futures and the return of the entire European stock market [1]. Busch paid attention to the capital constraints faced by many enterprises in the carbon market, especially emission-intensive enterprises, and the strong relationship between emissions trading and the financial market, and proposed that a large number of financial institutions should participate in the carbon market [2]. Kalaitzoglou and Ibrahim observed the European carbon futures market, analyzed the trading behavior of the carbon futures market at the early stage of development, and tested the over-the-counter trading and conventional trading under different market transparency conditions by using the enhanced ACD model [3]; Andersen and Greaker established the theory of fiscal externality, analyzed the impact of the initial allocation of national emission permits on its cost, price and globalization, and laid a certain theoretical foundation for European countries to trade emission rights

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with all emissions outside the European Emission Trading System [4]; Karpf, Mandel and Battiston regarded the European emissions trading system as a trading network, explained the reasons for the hierarchical structure in the trading network, and found that the asymmetry in the network leads to the low efficiency and information asymmetry of the market [5].

The other part is the research on the impact of the European carbon market on the Chinese carbon market and the scale advantage of a carbon market. Boute and Zhang critically questioned the legal and economic basis of environmental market price control by comparing the Emissions Trading Schemes of the EU and China, and analyzed the impact of regulatory agencies and governments of the EU and China on the carbon market [6]; Zhang, Liu and Su compared the ETS mechanism between the EU and China, and analyzed the differences in distribution mode, regulatory mode, trading mode, market risk management, market linkage mechanism, legislative guarantee, etc. [7]; Liu summarized and commented on the characteristics and performance of the EU carbon finance market and products [8], and put forward some policy suggestions and development directions for China to establish a carbon market; Meng, Hu and Mo studied the dynamic relationship between the European carbon emission price (EUA) and the Shenzhen carbon emission price (SZA) in the time and frequency domain, described the tail-depend through a wide range of static and time-varying link functions, and found that under different time scales, the construction of the dependency between EUA and SZA has significant time-varying characteristics [9]. Cao and Zhou proposed that when the market scale is large, the responsibilities of the state and local governments should be separated to take into account the development differences of different regions, improve efficiency, and ensure the normal and orderly development of the carbon market and the subsequent financial markets [10]. Ren studied the establishment of the carbon trading market mechanism and pointed out that China's carbon market is a huge space in the world financial market and properly introducing the financial market into the large-scale carbon market can achieve a win-win situation for the environment and finance, and summarized the role of investment banks in carbon finance [11].

3. Compare and Discuss

3.1. Unbalanced Regional Development

The carbon markets in Europe and China have many similarities. Carbon markets in Europe and China include many countries or provinces. Europe's carbon market includes 27 EU Member States, as well as Iceland, Norway, and Liechtenstein, and linked with Switzerland in 2020. Although the UK has withdrawn from EU ETS in 2021 and implemented a separate carbon trading mechanism after Brexit, the London carbon market is still under its framework. China's carbon market currently includes 31 provincial administrative regions, excluding Hong Kong, Macao, and Taiwan. Among these provincial-level administrative regions included in China's carbon market, the development situation is very different. According to Table 1, emission-intensive enterprises are concentrated in North China and Northeast China, accounting for most of the key emission enterprises included in the carbon market. The eastern province is developed, while the western province is underdeveloped. Therefore, as show in Table 2, the developed provinces in the East usually have higher emissions. To sum up, there are problems of unbalanced industrial distribution and large differences in development levels. These problems are very similar to those in Europe because EU member states have different resource endowments and economic development levels.

To solve this problem, the EU has adopted decentralized governance. EU ETS gives its member states greater independent decision-making power, mainly in the setting, allocation, and transaction registration of total emissions. The decentralized governance model can not only achieve the overall emission reduction plan of the EU but also take into account the differences among the Member States and balance the interests of countries and the EU. This system was proposed by the European

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Union in the second stage of its carbon market. Judging from the current situation, it has achieved good results in coordinating the interests of Member States and helping the development of less developed countries. China can learn from the mature system of the European Union and give provinces the power to make decisions independently. Provinces can independently determine the setting and allocation of total emissions according to their industrial structure and economic development, and then submit it to the state for assessment and final determination of provincial quotas. As a general rule, during economic development, at a certain stage of development, economic growth is highly correlated with pollutant emissions. After the peak of pollutant emissions, economic growth will be fully decoupled from pollutant emissions. Therefore, the Chinese government can make overall plans to determine the most appropriate quota for each province by virtue of the unified national market. Less developed provinces get relatively more emission quotas to ensure their economic development. Developed provinces receive relatively few emission quotas. In this way, it can promote the orderly transfer of emission-intensive industries in the east to the western region rich in new energy, so as to realize the transformation from the "high energy consumption and high carbon emission" mode to the "high energy consumption and low carbon emission" mode. And it is conducive to the formation of industrial clusters, promoting the economic development of underdeveloped provinces.

On the other hand, China can give play to the advantages of a unified national market and break regional trade protection. Now, the western region of China, that is, the underdeveloped region of China, is developing the clean energy industry by virtue of its resource endowment, a typical example of which is Gansu Province. Gansu Province is building a power generation industry cluster, using wind or solar power, and has built the largest wind power base in China. Gansu Province plans to sell this electricity to Hunan Province, one of the ten most developed provinces in China, as can be seen in Table 1. Therefore, they built the Jiuquan-Hunan UHV DC transmission project. However, the theoretical design transmission capacity of this UHV DC transmission project can reach 8 million kilowatts, and the conventional plan is about 5-6 million, but the actual use is only 2-3 million, which is equivalent to using only one-third. This is because Hunan Province wants to protect local power plants, so it is unwilling to receive electricity from other provinces, even if it is generated with clean energy. Such examples are quite common. This phenomenon of trade protection has caused the development of clean energy enterprises to be hindered and the development opportunities of backward regions to be limited. With the help of the national unified market, the Chinese government makes an overall plan for power generation using clean energy like Gansu Province and power generation using thermal power in other regions and provides policy support for clean energy power generation, which can greatly promote the development of clean energy enterprises and the development of the carbon market.

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Table 1: Top ten provinces in the number of key emission enterprises covered by China's carbon market (As of December 31, 2021). Source: Review and Prospect of China's Carbon Market (2022).

Region	GDP (Billion Yuan)	Population (Thousand)	Province Sectoral CO2 Emissions (Mt CO2)	Ranking of Emissions	Geographic Location
Guangdong	10,767.11	115,210	585.81	4	Southeast
Jiangsu	9,963.15	80,700	804.59	3	East
Shandong	7,106.75	100,702	937.12	1	East
Zhejiang	6,235.20	58,500	381.41	11	Southeast
Henan	5,425.92	96,400	460.63	8	Mid-east
Sichuan	4,611.58	83,750	315.16	13	Southwest
Hubei	4,582.83	59,270	354.75	12	Mid
Fujian	4,239.50	39,730	278.11	17	Southeast
Hunan	3,975.21	69,184	310.64	14	Southeast
Shanghai	3,815.53	24,281	192.91	23	East

Table 2: Emissions of the top ten provinces with the highest GDP (2019). Source: China Statistical Yearbook (2020), Carbon Emission Accounts & Datasets (CEADs) (15, 16, 17, 18).

Region	GDP (Billion Yuan)	Population (Thousand)	Province Sectoral CO2 Emissions (Mt CO2)	Ranking of Emissions	Geographic Location
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Hubei	4,582.83	59,270	354.75	12	Mid
Fujian	4,239.50	39,730	278.11	17	Southeast
Hunan	3,975.21	69,184	310.64	14	Southeast
Shanghai	3,815.53	24,281	192.91	23	East

3.2. Development of Carbon Finance Products

The participants of European carbon finance are divided into three categories: suppliers, end users, and intermediaries, involving enterprises or countries subject to emission constraints, developers of carbon finance projects, consulting institutions, and financial institutions. Its coverage is very wide, including government-led carbon funds, private enterprises, exchanges, as well as international organizations (such as the World Bank), commercial banks and investment banks, and private equity investment funds. The EU carbon trading market has developed financial instruments such as EUA, CER, and ERU futures, forwards, options, and swaps, and has built exchanges such as the European Climate Exchange (ECX), Nord Pool, and GreenX to trade carbon futures and carbon derivatives. These financial instruments enable enterprises to prevent the risk of price changes, bring liquidity to the market, improve the effectiveness of the market, and also enable more investors to participate in the carbon market, increasing the amount of capital in the market. In 2020, the carbon trading volume of the EU carbon market reached about 169 billion euros; On a year-on-year basis, the turnover of China's carbon trading market 2020 was 1.267 billion yuan, far less than the amount of capital in the EU carbon market. The increase of funds in the market can enable innovative enterprises or pro-

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jects to obtain sufficient financial support and financing arrangements, thus promoting their development. Therefore, in the European carbon market, enterprises and projects related to renewable energy and alternative energy have developed well. At present, the listed companies of China's carbon neutral concept mainly include Longi (601012. SH), Sungrow (300274. SZ), Yangtze Power (600900. SH), Shenhua Energy (601088. SH), etc. The number, market value, and coverage are far smaller than those of similar European companies. In the EU carbon market, in addition to emission-limiting enterprises and clean energy enterprises, investment banks, insurance companies, and retail investors also invest a lot of money in the market and maintain the market's vitality. The main participants in China's carbon market are related enterprises, and financial intermediaries, financial institutions, and retail investors rarely participate in it, which not only makes the amount of capital in the market small but also makes the market less active. According to the daily trading volume fluctuation of China's carbon market (see Fig. 1), since there are almost only relevant enterprises in the market, the trading in China's carbon market mainly occurs at the end of the carbon emission compliance cycle at the end of each year.

In the context of the national unified market, the Chinese government is guiding different markets to integrate through policy support and other methods to improve market efficiency. It is a good opportunity to introduce the financial market into the carbon market. Compared with the EU, the state-owned capital in the Chinese market has a strong leading role. With the development of financial products such as carbon futures and carbon options by state-owned capital, and the entry of financial intermediaries and financial institutions such as investment banks into the market, China's carbon market can attract capital in a short time and enrich trading products. And the development of the carbon market can in turn promote the further development of the financial market. The public's carbon financial behavior also plays an important role in promoting the development of the carbon market. Financial institutions, such as banks, can launch deposit products to reduce the threshold for retail investors to enter, so as to expand the source of funds for low-carbon investment projects. China's financial market is very large, with a large number of retail investors and financial institutions. Introducing the financial market into the carbon market will bring a huge amount of capital to the carbon market and give play to the scale advantage of China's huge market. The improvement of the utilization of financial attributes of China's carbon market will promote the industrial transformation to low-carbon and high-quality development. At the same time, the exchanges used to trade carbon derivatives and the laws and policies guaranteeing carbon derivatives trading are also essential, which will ensure that the carbon market can play its market role normally.

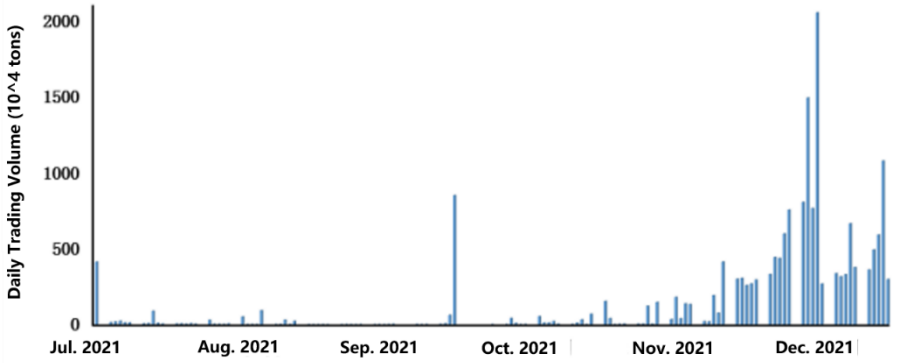

Figure 1: Daily trading volume fluctuation of China's carbon market (2021).
Source: Review and Prospect of China's Carbon Market (2022).

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3.3. Limitations

These proposals have their limitations. When local governments set carbon emission quotas, how much autonomy they have is a difficult problem. If the carbon emission quota of backward regions is high enough, some regions may choose to build many high emission enterprises, which can often bring huge economic growth in the short term, but is not conducive to long-term development. In the Chinese market, state-owned capital, personal capital, and foreign capital are mixed, which makes the situation more complicated than that in the European market. Therefore, during the development of carbon financial instruments, how to balance the relationship between these kinds of capital and let each kind of capital play a role is a difficult problem. The state-owned capital with great influence on the market must ensure that they choose the right direction. Moreover, when the carbon price or carbon futures price is linked to the stock market, it is likely to generate a new big bubble economy. Since carbon finance is linked to carbon emissions, its externality is also an important issue to be considered.

4. Conclusion

Based on the advanced experience of the European carbon market and the implementation and utilization of the national unified large market, this paper puts forward some suggestions from two aspects: reducing regional development imbalance and developing carbon financial instruments and financial products. Local governments need higher decision-making power, while the central government needs to make overall planning to enable regions with different development conditions to obtain appropriate carbon emission quotas, to promote the development of backward regions. In addition, regional trade protection needs to be broken so that the clean energy industry in backward areas can develop. China's state-owned capital in the carbon market needs to play its unique guiding role compared with the EU to develop suitable carbon financial instruments. At the same time, China's carbon market needs to allow more financial institutions, financial intermediaries, and retail investors to enter the carbon market to obtain more capital and higher activity. Through these two aspects, the current problems in China's carbon market will be solved to a great extent.

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Problems and Recommendations for the Development of Pre-owned Car Market in China

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Abstract: The pre-owned car market has ushered in a new opportunity for development with the constant economic growth and the rise in the number of cars owned by Chinese residents in the past decade. However, there are still huge systematic and strategic loopholes in China's pre-owned car market at present. Therefore, improving China's used car market and promoting its sustainable development is a significant challenge that has to be overcome at the moment. This paper mainly relies on the research of China's pre-owned car market in recent years to explore the mainstream marketing strategies and the problems that exist in the current stage. These problems include information asymmetry, lack of integrity mechanisms and industry standards, inadequate evaluation systems, and outdated marketing strategies. To address these problems, this paper suggests that the market ought to alleviate information asymmetry through multiple channels, strengthen used car transaction management, optimize the expansion of national trading platforms, and further improve marketing strategies.

Keywords: pre-owned car, marketing environment, marketing strategy, competitive strategy

1. Introduction

The rapid socioeconomic development of China in recent decades has led to a continuous improvement in the standard of living of the people, accompanied by fast urban expansion and rural modernization. The increasing demand for private vehicles has resulted in the growth of car ownership in both cities and rural areas. In the meantime, the demand for the replacement of vehicles owned by families or businesses, as well as the increased recognition and acceptance of used goods by the public, have contributed to the emergence and development of the used car market. As a result, the used car sales market in China has been continuously expanding, and the number and scale of transactions have maintained a high growth rate. According to the data published by the Ministry of Public Security on its official website on January 11, 2022, the nation's car ownership has reached 302 million [1]. The huge number of car owners has also created a huge market for vehicle circulation and the sales of used cars witnessed rapid growth from 2013 to 2021 [2].

Despite the fact that the used car market is booming at the moment, there are still shortcomings in the overall perspective for both the industry and enterprises operating in this market, which affects the long-term development of this huge market. The significance of this paper is, on the one hand, to comprehensively analyze the situation of the used car market in China, to find the factors

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that hinder its development, to analyze the existing problems for the majority of used car dealers, and also to provide information on the used car market situation to the majority of consumers. On the other hand, this study takes the situation and the problems faced by the used car market in China as an example, proposes multi-facet resolutions for coping with the problems, and eventually promotes the proper development of the used car market in China. This paper primarily adopted a literature review and theoretical tools as the major methodology. The research results of domestic and foreign scholars on China's pre-owned car market are firstly sorted out and summarized to form the theoretical research basis for this paper. After that, PEST analysis is adopted for analyzing the external macro-environment.

2. Analysis of the Chinese Pre-owned Car Market Using the PEST Model

2.1. Political Factors

The development of China's pre-owned car industry is heavily influenced by national policies, and enterprises in this industry have to analyze various policies issued by national and local governments to provide effective guidance on the direction of their operations. In particular, with the rapid rise of used car e-commerce platforms and the rise in market demand for the cross-regional circulation of used cars in 2015, the government has made further regulatory requirements for the used car market [3]. The introduction of various policies at different stages illustrates the increasing importance the government attaches to the used car market, and such importance also proves the increasingly prominent status of the used car market in China's consumer market. Among the national and local policies, the followings have a particularly significant impact on the development of the used car market.

First of all, the Chinese government abolished the policy of restricting the relocation of pre-owned cars to other cities in 2022 [4]. Before 2016, 95% of prefecture-level cities in China were implementing regional relocation restrictions targeting used cars based on emission standards, a regional policy that restricted the flow of used cars in China nationwide. The work report of the government in March 2021 mentioned the need to remove the used car trade restrictions. In August 2022, the State Council of China explicitly called for the full abolition of the used car relocation restriction policy in the "Package of Policy Measures to Solidly Stabilize the Economy" [5]. The measure was further refined and implemented to ensure that the measure is implemented as soon as possible. The policy requires the implementation of the policy nationwide, including the key areas of air pollution prevention and control, to promote the national emission standard used cars to achieve free circulation. After the full abolition of the relocation policy, used cars will achieve nationwide circulation, which can greatly enrich the supply of automotive products, enhance the supply and demand suitability, and achieve positive economical and social benefits.

Furthermore, the reform of China's tax policy has been a catalyst for the rapid development of the used car market. Chinese taxpayers engaged in the sale of used cars are charged VAT at 2% on the sale of their acquired used cars, but all along individual transactions are invoiced in the used car market without paying VAT, and only a small amount of invoicing fees need to be paid to the used car market for the transfer. Therefore, in the actual operation before the tax policy adjustment, many used car business enterprises also use the used car trading market invoicing to avoid paying taxes. This not only causes the loss of national tax revenue, but also allows these used car enterprises that do not comply with national laws and regulations to escape from the responsibility of the vehicle after-sales, adding to the market chaos. In 2020, the Ministry of Finance and the State Administration of Taxation have clarified that VAT will be levied at 0.5% from May 1, 2020 to December 31, 2023 [6]. This is a significant benefit for used car business enterprises operating in

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compliance with the law. At the same time, the phased tax reduction policy also means that the state tax authorities are concerned about the used car industry.

2.2. Economic Factors

The rise in living standards and purchasing power of Chinese residents has contributed to the increase in demand for used car consumption. In China, cars are the second largest household consumer product after houses in most families, and their demand is closely related to residents' purchasing power. Since China's accession to the World Trade Organization, the entire automotive industry has maintained a high level of development, with growth and high stability in all years except 2008 when it was affected by the world economic crisis. China is the most populous country in the world with a broad market and a big stage for economic consumption. Currently, the main direction of China's economic development has changed from the original manufacturing industry to the service industry. For example, the proportion of luxury consumer goods has gradually increased, and the automobile, as the original luxury consumption, is becoming affordable in people's lives and becoming an important industry serving people's commutation [7]. In this context, the sales volume of new cars in China has been increasing, and the sales of new cars directly provide a large number of used car sources for the used car market.

According to the data related to used car transactions released by China Automobile Dealers Association since 2013, the national used car transaction volume grew from 5.2 million units in 2013 to 17.5 million units in 2021, and the transaction amount grew from RMB 291.649 billion in 2013 to RMB 111.692 billion in 2021 [8]. Except for 2020, which is affected by the epidemic, the rest of the years are on a year-on-year upward trend. And the used car market volume and transaction amount will increase by more than 20% in 2021. Meanwhile, the used car transaction volume in Southwest China (Sichuan, Chongqing, Yunnan, Guizhou, and Tibet) reached 2,503,500 units in 2021, second only to East China (Guangdong, Guangxi, Hunan, Hubei, Henan, and Hainan province) and South Central China (Shanghai, Jiangsu, Zhejiang, Annex, Jiangxi, Anhui, and Shandong province). With the national used car transaction scale continuing to expand, the future development prospects of the used market are promising [9].

2.3. Socio-cultural Factors

In the Chinese social and cultural tradition, the items a person owns including clothes, cars and houses can represent his or her social status to a certain extent. However, used products inevitably create a negative impression and perception of inferiority in the public consciousness. In the past, the choice of second-hand products was often a non-ideal one based on price. With the development of social culture and the popularity of environmental awareness, the concept and acceptance of used product consumption have started to change, and people are willing to sell their unused items in the used goods market or platform, and there are an increasing number of people who are willing to accept the purchase of used goods with high-cost performance. Used cars are one of the most rapidly growing and voluminous product branches in the used goods market [10].

However, the used car market is characterized by significant information asymmetry, which leads to a lack of trust in the used car business and the used car market. It is also true that China has a mix of quality used car business enterprises and various agents in the trading market. The entry of internet e-commerce into the used car industry in 2015 has increased the channels for consumers to purchase used car products and established online used car product information display standards, which has led to an increase in information transparency in the entire used car industry. In the meantime, the major used car e-commerce platform companies were bombarded with a large number of advertisements in various media channels and the intensive marketing not only expanded

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the national awareness of used cars, but also educated consumers and further increased the acceptance of used cars by the public [11].

2.4. Technical Factors

Used cars have different conditions and vehicle values due to various factors such as the frequency of use, original owners' habits, and maintenance. Thus used car appraisal is a necessary process for every enterprise in the market. Used car appraisal is the process of identifying and confirming all information about the vehicle's condition and giving an appropriate valuation based on the market situation. Generally speaking, vehicle appraisal involves 7 basic indicators and 17 current technical indicators in China. Basic indicators include vehicle type, the specified service life, accumulated mileage, manufacturing quality, maintenance, nature of work and working conditions. Current technical indicators are appearance, interior, chassis, engine, driving system, steering system, clutch, suspension, braking system, lubrication system, transmission, cooling system, the number of overhauls, sewage indicators, smoothness, operational stability and acceleration power [12]. Enterprises that serve used car businesses usually promote and implement their own technical standards for appraisal and evaluation in the actual business development. However, due to the lack of effective industry supervision, some used car dealers will cut corners or even falsify the testing process in order to save costs.

3. Identify the Problems in the Development of China's Pre-owned Car Market

According to the PEST analysis, the first problem in China's used car market is a serious information asymmetry. On a national scale, the delay in building a credit system for citizens has resulted in important information such as maintenance records and accident records of private cars not being systematically stored and shared. As a result, information on used cars currently flowing into the market may be unsound and consumers' trust in used car dealers will also degrade. Furthermore, some car owners choose to conceal actual information about their cars in order to gain greater financial benefits when selling their cars. Used car dealers currently rely on professional used car appraisers to assess used cars technically and price-wise to obtain basic information. However, the current construction of used car appraisal agencies in China is not robust enough, and human evaluation also leads to a lack of authenticity in the appraisal results. Secondly, the management and supervision of third-party appraisal agencies in China are in its initial stage, which means there is no comprehensive system and mechanism to regulate their behavior, which is likely to have loopholes and affect the appraisal results. At present, China Used Car Network is an evaluation platform for used cars with relatively transparent information. With the involvement and supervision of the relevant government departments, the website staffs have received rigorous training. They can analyze and filter vehicle information from a more professional perspective, and strive to serve many consumers with the greatest degree of information transparency [13]. However, this website is obscure at the moment and does not fully solve the problem of information asymmetry in the used car market.

The second problem that can be observed from the analysis of technical factors is the inadequacy of the evaluation and testing system. The quality and performance of used cars are the main concerns of consumers, which also directly determine the value and price of the car. Therefore, the evaluation of used cars is an extremely important part of the used car trading process. The Chinese government stipulates that personnel engaged in the assessment of the quality of used vehicles must have a certificate of "used car appraiser" issued by the state. However, at present, only a small portion of people in China receive training in car value assessment every year, which is far from enough for the whole huge used car market [14]. On the other hand, because of the large regional

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differences in China, there are differences in training standards from region to region, which also leads to arbitrariness in the assessment of the results in used car transactions. Thus, this problem puts the average consumer in a vulnerable position, which makes it difficult for them to distinguish between the truth of information and the quality of the car in a transaction.

The third problem that China's used car market faces is the lack of an innovative marketing model. The advanced marketing concept is a guide for the reasonable operation of used car operators, and without the support of the advanced marketing concept, some enterprises will only pursue immediate interests, which is not conducive to long-term development. Besides, used car dealers do not usually provide sufficient service to their customers. It is not uncommon that many used car dealers and agencies consider the sale as one-time cooperation, unlike other enterprises that can carry out long-term and stable cooperation with their customers [15]. Thus they only focus on the transaction process without paying attention to the post-sale service, causing many problems for buyers, which directly affects the purchase confidence of used car buyers and the positive development of the whole market.

4. Countermeasures and Suggestions for China's Pre-owned Car Market

In response to the problems mentioned above, China's used car market can be improved through the following three aspects. Firstly, industry regulators should adopt multiple methods, such as big data and blockchain technologies to alleviate information asymmetry. Before the transaction of used cars, sellers should make a disclosure of vehicle information including accident records and maintenance status. During the transaction process, vehicles should be inspected by a qualified third-party trading platform or institution to prevent information asymmetry condition of the vehicle. After the transaction is completed, all data should be uploaded to an official certified platform or blockchain so that all data about the vehicle becomes transparent and untamerable. If consumers or dealers have any questions about the vehicle's information, they can access the vehicle's information at any time. Meanwhile, future potential consumers can also find reliable and thorough vehicle information from the platform or blockchain when choosing a used car.

Secondly, the government departments concerned should establish a sophisticated system for evaluating the price of used cars. This evaluation system can help customers build confidence as they can get the right price, which effectively solves the problem of information asymmetry to a certain extent. In addition, the establishment of such a system is important for regulating the used car market because it can make the transaction reasonable and fair as well as reduce the emergence of market fraud. Furthermore, this system can also play a supervisory role in the used car market. The trading behavior of used car dealers and intermediaries can be well restrained, which can greatly reduce illegal operations.

Finally, the used car market should develop diverse and innovative marketing strategies. The majority of used car dealers are currently focused on physical stores, along with the internet channel for sales. However, the number of physical stores in the business is small and it is quite difficult to fully cover all areas in China. Therefore, used car dealers, on the one hand, should proactively promote the layout of physical stores, using self-operated as well as franchising models to gain access to more areas and cover more customer groups. On the other hand, used car dealers should work with local financial institutions to seek more financing methods because the size of the business can be considered the core competitiveness of an enterprise. In addition to spreading physical stores, enterprises also need to pay attention to the construction of online channels because the advantages of low cost, wide coverage, no time and space restrictions. Enterprises should also optimize their website design, and emphasize the quality of online products as well as payment security to dispel customers' purchase concerns.

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5. Conclusion

This paper offers a more profound analysis of the current situation and problems of China's used car market using theoretical research methods. Firstly, drawing upon the PEST model, this paper analyzes the current situation of China's pre-owned car market from four macro aspects. Secondly, this paper proposes that China's pre-owned car market faces three major problems including information asymmetry, an unsound evaluation system and a lack of innovation in marketing strategy in light of the current development status. Finally, this paper puts forward some specific suggestions for coping with these problems, such as eliminating information asymmetry through various channels, establishing and building a complete used car appraisal system and opening up a multi-channel marketing model combining online and offline strategies.

There are two main shortcomings in the research of this paper. On the one hand, it is the problem of being in-depth and comprehensive enough in analyzing the problems of China's used car market. On the other hand, in the discussion of used car marketing strategies, the countermeasures proposed in this paper are rather broad and may have limited feasibility. The main reason is that the research direction of this paper is relatively broad and no special research is conducted for specific regions and used car companies. Therefore, the validity of the research findings needs to be further tested in practice. However, this research has a part to play in attracting more scholars to reflect this topic, so as to further enrich the research results in the field of used car market in China.

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The Economic, Environmental Issues and Future Development of Avocado Industry

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Abstract: The purpose of this article is to provide part of the answer to three questions that are about the avocado industry in China: (i) Why do avocados enter the Chinese market successfully, which is usually researched by interviewing people who buy avocados often and asking the reasons why they make the purchase; (ii) How will avocados develop in the future with such environmental problems, which is often faced by many products in agriculture practices; and (iii) How should consumers behave in light of rational actor model and human decision bias, which is what ordinary people should do to help settle global issues. These questions are common and inevitable worldwide but are yet to be solved. Understanding these questions could help people make better purchases and improve consciousness and action to solve global issues.

Keywords: avocado industry, environment, sustainability, economy

1. Introduction

Modern people are so busy that they often ignore elements in their everyday life. Avocados are so popular that we see them in a myriad of dishes from countries worldwide, and avocado toast sure is a symbol of high-quality life. However, has anyone thought of the rationale behind the avocado industry? This paper aims to identify avocados' economic and environmental issues: how avocados became a smash hit among the Chinese middle-class young people? How could environmental problems affect the trade and development of the avocado economy? What should average consumers do? I am studying avocado problems and future developments because I want to generally understand how a smash hit is promoted and spread around the globe, why the economic status quo of agricultural products, and the developing dilemma and future transition of those products, in order to help my readers learn about the extensive network behind a seemingly ordinary fruit and the avocado industry so that readers can better decide their purchase of an array of products and learn to care about hows and whys of global issues. To this end, an anecdotal interview was implemented through Wechat voice calls with 50 middle schoolers. Mathematical and behavioral economics models were adopted to examine why target consumers buy avocados and the rationale. An empirical experiment was also conducted to find out the major accused problem of avocado plantations. The subjects gave their opinion about those problems through a more profound interview. It is found that there are many different factors influencing purchase, including advertisements, availability, unreliable scientific results, etc. The rational actor model and game theory do not apply to this situation in some ways. People rely on a limited number of heuristic principles that reduce the

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complex tasks of assessing probabilities and making predictions to simple judgmental operations [1]. Human decisions can be overwhelmingly irrational, not as assumed in behavioral economics. Avocados do consume a large quantity of water, and middle schoolers care about environmental issues to a great extent. This finding bridges the avocado economy's gulf and future development in Chinese middle-class families. However, further research and a larger sample are needed to overcome the limits of the research scope due to the lack of research equipment and funds.

2. Background

Some scholars have studied the same topic about the relationship between economic and environmental problems in recent years. Consumer interest in avocados increased significantly recently [2]. According to Migliore et al., avocados have become famous for various reasons: neophilia attitudes, credence attributes, etc [3]. There are many problems behind this popularity. In light of Y Sharon, B Bravdo, and N Bar, from the environmental aspect, avocado plantation causes an energy crunch and the depletion of many resources, in particular water [4]. Deforestation is also a huge problem. Chávez-León G et al. studied the correlation between avocado crop expansion and deforestation in Michoacán, Mexico [5]. According to Khan, Kakabadse, and Skouloudis, avocados hurt the sustainability of Mexico's environment. There are also economic problems [6]. González-Estudillo et al. implemented a study about the avocado economy in social ecology and sustainability development [7]. The economy cannot be robust if the natural resources are at risk, and the human capital is also not good enough because of their health problems. Denvir et al. and A Madariaga, A Maillet, and J Rozas also researched the relationship between the ecological and economic problems of avocados [8-9]. The environmental problems are severe. Although there are benefits economically, avocado production also results in inequality and other issues.

3. Research Procedure

So this study followed. First, I calculated the volume of water consumed by the two avocado trees contrary to the other two bougainvilleas trees I planted, controlling the other factors such as sunshine, amount of dirt, and plant age. This experiment lasted for about a month. Conducting an empirical experiment by myself would add to the reliability of the material supplied for the subjects of the following experiment: the interview part. Because of limited access to cutting-edge technology, abundant resources, or a wide range of people willing and able to participate in my study, I chose convenient sampling, which means I chose my classmates as experimental subjects. Their consumption behavior may still tell us something about the consumption behavior of teenage avocado buyers in China. They were all teenagers aged 15-17. Half of them were male, and half were female. I used video calls to interview them about their opinions by asking them five questions about the avocado industry. Below is the list of questions I used in the semi-structured interviews:

1. How many avocados does your family buy each year?
2. Describe the reasons why you buy avocados.
3. (The following is a random section, 1/3 of the people did not need to answer the following part.)

Avocado production causes damage to the environment. Here is an experiment and some further information about the development problems of avocados. Please read it through.

4. How many avocados do you plan to buy each year now (It is OK if there is no change.)?
5. Could you give some suggestions on avocados' environmentally friendly trade in the future?
6. Any other thoughts about the future development of avocados?

The purpose is to test the popularity of avocados in our teenagers' lives and why they are attached to them. It is also essential to know how much they care about the environmental and eco-

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nomic problems caused by the production of avocados. Moreover, some peculiar ideas are received from youngsters about the future development of avocados concerning the economy and environment simultaneously.

Then a WeChat poll of the same questions above is carried out to broaden the limit of my research. I changed the six questions into multiple-choice questions in light of the answers from my classmates. I used a random function to let only half the people receive the water consumption data about the avocado tree and further information. By analyzing the poll results, avocado marketing in China is unraveled to a greater extent. Comparing the two halves also tells us how people's minds changed about the purchase, and we know how much people care about environmental issues and the relationship between the economy and the environment.

4. Findings

From the empirical experiment, water consumed by avocado trees is three times more than that consumed by bougainvilleas, a typical tree type. That is to say that avocados consume too much water, as most other researchers suggest. According to my interview, the average range of avocado purchases is approximately four to twenty each year. The mean, mode, and median are 8.7, 4, and 8. Most people give out reasons like avocados are delicious, healthy, and green. Many cuisines include avocados, so the menus remind them to buy avocados.

On top of that, others say avocados are sugar-free, which is a bonus. Many bloggers recommend avocados on social media, so avocados are trendy. As for the people who read the article, 80% said they would buy fewer avocados, caring more about environmental problems than expected. There is also a myriad of suggestions for future avocado development. Many say the avocado exporter countries can develop a tourism industry, allowing tourists to pick fruits and buy those they pick when they leave. The gangster problem can also be partly solved since more attention is paid to avocado plantations through tourism.

Moreover, others say that exporter countries can promote cooperation with the largest importers to deal with gangsters. To make money, local gangsters set the price high and rob the profit of local farmers, and the importers will be willing to lower the cost while settling a human right problem. Regarding environmental problems, technology is a demand curve shifter, so if universities research to analyze the actual value of avocados and let the bubble burst, the demand will decrease. On top of that, some also mentioned the Fair-Trade movement, which seeks to help farmers in developing countries get a fair price for their products, such as avocados, while promoting environmentally sustainable practices and the ethical treatment of farmers.

Table 1: The results from the WeChat poll.

The results from the WeChat poll	
mean	10.6
mode	6
median	10
Reasons to buy	50% eat avocados for a change 23% think avocados are sugar-free and healthy 18% stress avocados are delicious for them 5% admit they are affected by social media 4% others (do not know)
After reading the article	On average, they say their purchase will decrease by 46.4%

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Above is all the data available, and the following will be the analysis. I used economic theories to analyze human decision-making. Why are those people affected by avocado marketing? What is the rationale behind those purchase reasons? How can we become more rational (deal with the economic and environmental problems as we want) while making a decision? Learning about how we can make rational purchases concerning global issues is the best ordinary people can do to contribute, which is more helpful than the macroscopic suggestions above. This is also part of the point of this paper. I will explain it through the debate between rational choice and psychological approaches to consumer behavior. It is assumed in behavioral economics that humans are rational agents with precise information, sufficient time, and capability who seek to maximize their utility. This is the rational actor model, or game theory, where agents can be modeled as the maximization of a preference action subject to constraint. However, those constraints already make them irrational. Preferences are state and social context-dependent, and the probability an agent attaches to a possible event can depend on how much the agent likes or dislikes the outcome, namely confirmation bias. There are specific marketing strategies in light of the principles above, so what consumers should do is know it to avoid it. Belief updating can be socially rational but is rarely an individual, socially isolated process, so that is why social media plays such an important role. Consumers should learn to treat social media more rationally. As the phycological approaches say, because of the psychological limits of the organism, actual human rationality-striving can, at best, be an extremely crude and simplified approximation to the kind of global rationality that is implied, for example, by game-theoretical models [10].

People often lack perfect information about outcomes and probabilities and do not have the time and cognitive capabilities to make the calculations implied by the rational choice theory. Of course, it is not necessary to be perfect, but consumers should learn to be aware of their irritation and try to be more comprehensive. So it is inevitable to talk about heuristics here: consumers are satisfiers. People rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and making predictions to simple judgmental operations. These heuristics are generally quite helpful, but sometimes they lead to severe and systematic errors [1]. According to Tversky and Kahneman, 1974, there are two probability-assessment heuristics consumers need to avoid: representativeness and availability [1]. As for representativeness, it is easier to assess similarity than to compute probabilities.

Avocados look like a healthy fruit, but there is no comprehensive scientific report on the probability of becoming healthier, so consumers must recognize this. If a set of the class is more available by being likely to be recalled, it will seem more frequent and reasonable to agents. As a result, when consumers see avocado products everywhere, they should realize that something is everywhere, but it does not mean it is reasonable. Moreover, this particular thing should be paid attention to and researched. The popularity of avocados is also maintained by status quo bias. As long as people have in mind that avocados are popular and stylish, they will be reluctant to change this idea. So what consumers should do is challenge their old ideas. People can better fulfill their obligation to deal with economic and environmental problems by making themselves more rational buyers.

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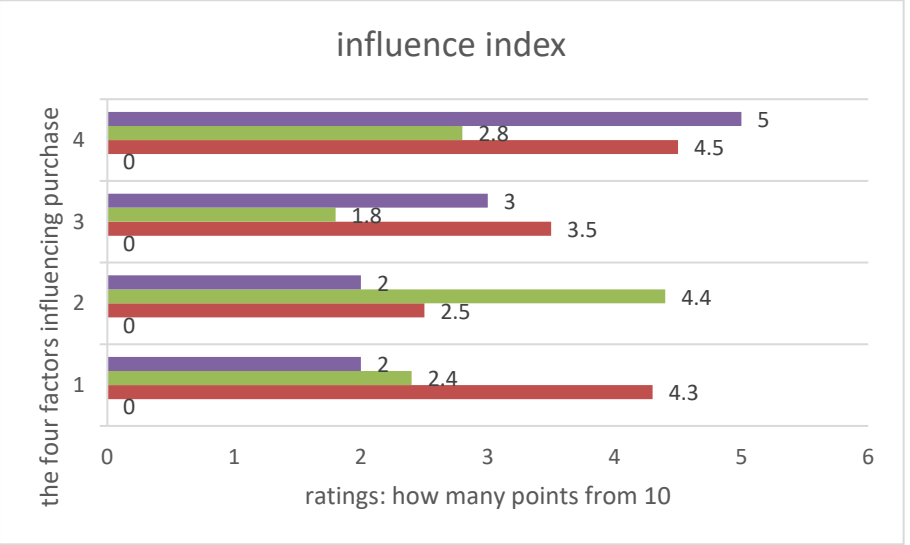

Figure 1: This table indicates the ratings the interviewees give out about how many points out of ten points they would say this factor influences their purchase. Yellow bars represent the 50 middle schoolers. Grey bars represent people who participate in the Wechat poll. Orange bars represent a mix of the two groups above. Number 1 represents healthy and delicious. Number 2 represents green and sugar-free. Number 3 represents inspiration from cuisines. Number 4 represents social media advertisements.

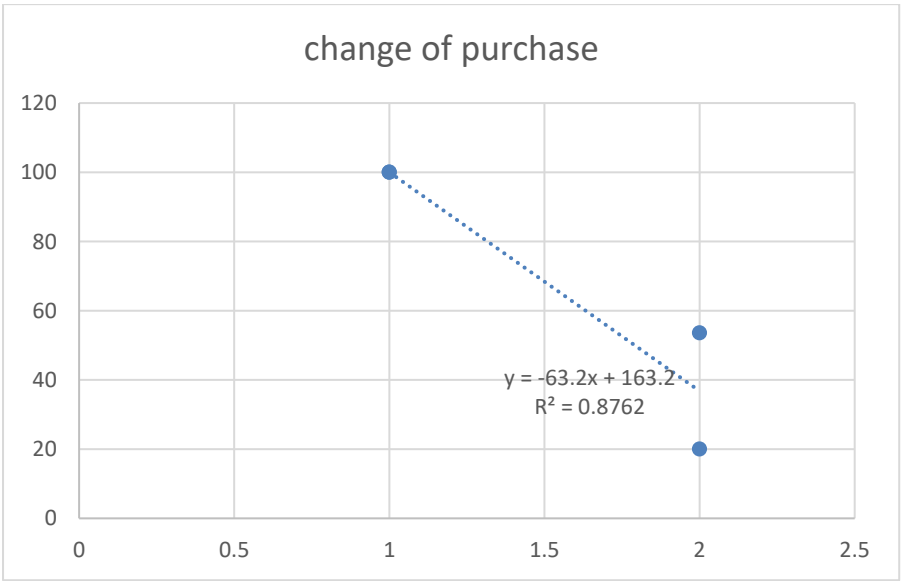

Figure 2: This graph represents how people change their minds about how many avocados they buy after learning about environmental issues. (2,20) represents middle schoolers, while (2,53.6) represents people participating in the Wechat poll.

5. Conclusion

The main point of this study is to learn about the economic phenomenon of avocados becoming stylish in China, the environmental issues, and the relationship between the future development of avocados and their environmental impact. Several ways in which consumers should behave to solve those issues are suggested. The history of avocados becoming fashionable is mainly because of ad-

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vertisements, but they damage the environment in some ways. A transition of this trade is needed, and the best to start is with rational decisions from ordinary people. Admittedly, my research was hamstrung by some setbacks. First, my samples are convenient, not representing a broad picture of Chinese avocado consumers, let alone avocado consumers worldwide. In light of my research, what future researchers can do is send emails to more representative samples and offer monetary incentives if they finish the questionnaire. Another challenge is that the samples I chose might not have acted naturally. They knew I was researching, so they might have wanted to say they would buy fewer avocados in the future, but there was no action.

Given that I could only interview my classmates in this phase, the possibility of a Hawthorne effect was inevitable. However, what future researchers can do is not ask the audience my fourth question immediately but wait until two months later. Instead, they can just simply ask the audience again how many avocados they bought in the past two months. Data will be more reliable if the research is conducted this way.

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Crude Oil Price and Inflation in the US since Covid-19

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Abstract: Focusing the period of Covid-19 since January of 2020, this research empirically study how inflation and the price of crude oil are related within the US data. The linear regression with ARCH(1) model is employed and our empirical results illustrate the significantly positive correlation between these two factors. We find that the CPI increase 9% with one unit increase in the crude oil price during Covid-19 period. Crude oil price, however, does not show such a significant effect on the other macroeconomic variable in the US during Covid-19 period, for example, real consumption and GDP.

Keywords: crude oil price, inflation, relationship, significantly positive, Covid-19 period

1. Introduction

Oil is not only the motivation of industrial production, but also a crucial driver of consumption. Oil price volatility is a complex and important issue, which basically results from changes of the balance between demand and supply. For example, a sudden rise in the price of oil is always accompanied by the decrease of oil supply, which even could drive the oil crisis. Oil crisis can endanger the stability of economy and politics, the effect of which even spreads to the whole world, as oil is a key component for production.

The post-WWII period has experienced three major oil crises. The first occurred in 1973, when OPEC (Organization of the Petroleum Exporting Countries) decided to quadruple the price of oil to almost $12 a barrel. Oil exports to western Europe, United States and Japan, were also prohibited. OPEC's decision was made in response to depreciation of U.S. dollar and also in retaliation for Western support of Israel against Egypt and Syria. This oil crises accompanied with a serious recession accompanied by the rise of inflation, which forces US military action to secure the free energy access. The oil embargo was proposed in 1974, oil prices still remained at high level, which make the industrial countries continue to be trapped into stagnation throughout the 1970s.

The second oil crisis happened in 1979, because of Iranian Revolution (1978–79). The situation becomes even worse next due to the outbreak of the Iran-Iraq War (1980–88), during which oil production in Iran nearly stopped, and Iraq's oil production was severely cut as well. Oil prices decline gradually as the shortfalls from Iran and Iraq began to be filled by other countries. Particularly, the more-efficient methods of production has been adapted, the oil shortage during the 1970s then was transformed into a relative oversupply of oil.

The third oil price shock occurred in response to the Iraqi invasion of Kuwait in 1990, which causes the decrease in the oil production. As the US-led coalition experienced military success against

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Iraqi forces, concerns of long-term supply shortages reduced and prices of crude oil began to fall. The economic conjecture and geopolitical tension could directly and indirectly affect the oil price.

Between 2014 and 2015, the whole crude oil industry has experienced a profound change of the shale revolution, which originally generated the US. This technology innovation currently contributes more than a third of onshore crude oil production [1]. This technology revolution has led to a boom in US domestic crude oil production. In addition to Russia and OPEC, America is another important oil producer. The US produces and consumes the largest amount of oil in the world and play a significant impact on the oil trade and pricing. Due to the large production of shale oil in Canada and US, the supply shock of crude oil becomes less often. This structural change introduces more complexity of oil pricing policy [2]. For example, US joined the oil producers' cartel, which makes the oil producing countries experience considerable difficultly in reaching a common agreement on oil supply that is directly affected the oil prices. On the other hand, the oil production is still limited within several countries and regions, and its supply quite depends on those oil producing countries.

Covid-19 brings new challenges of crude oil market and creates much more volatility of crude oil prices. The wide spread of Covid-19 occurred in the early of 2020. As shown in Figure 1, the price of the West Texas Intermediate (WTI) crude plummeted to $16.8 per barrel, marking an unprecedented 300% drop in price, in April 2020. The pandemic halted global economic activities, and reduce the demand of oil to the least. In other words, the demand shock due to Covid-19 which is the main factor for the plummet of oil price. Narayan et al. summarize three specific government responses brought by COVID-19, including travel ban, lockdown, and stimulus package [3]. Particularly, lockdown and travel ban directly halted economic activities, including travelling across countries, thus reducing the demand for oil. Devpura and Narayan propose that global demand for oil has fallen impacting both the oil price and uncertainty surrounding it, as shown in oil price volatility [4]. They establish the connection between oil price volatility and COVID-19.

In figure 1, we can see that the post-April 2020 period witnesses a persistent increase in crude oil price, despite the significant volatility. The crude oil price WTI has increase almost 6 times since Covid-19, from the bottom $16.8 per barrel in April 2020 to the top $114.84 in June 2022. With the success of vaccine for Covid-19, there are less fears and more optimistic projection of economy. It takes one year for the oil price to recover to pre-covid period. The escalating tension between Russia and Ukrainian becomes a Russo-Ukrainian War, generating a supply shock and further rise of oil price. The histogram in figure 1 illustrates that the largest density of WTI crude oil price since Covid-19, lie within $ 40-70 per barrel, and the extreme prices distribute within $ 20-30 per barrel and $ 100-120 per barrel.

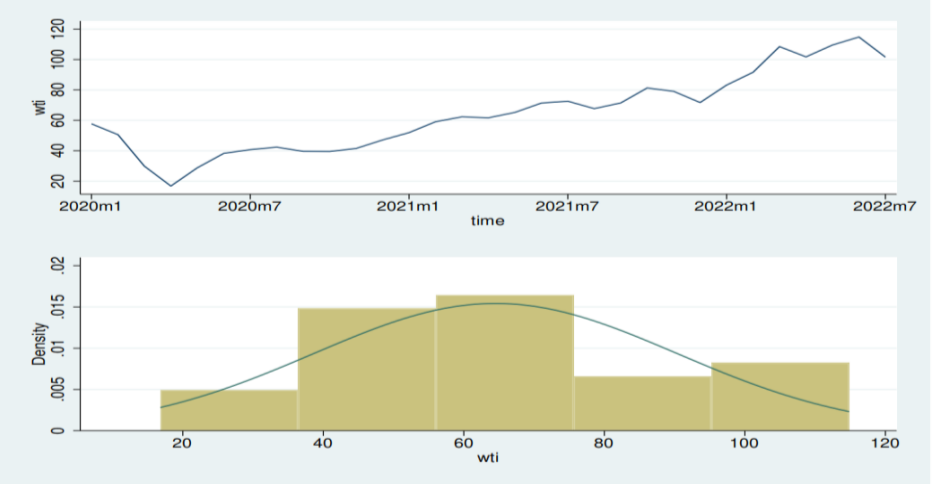

Figure 1: WTI crude oil price since Covid.

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The similar dynamics of crude oil prices of Brent can be seen in figure 2, as follows. Since Covid-19, Brent crude oil price decrease from $ 65 per barrel in December 2019 to $ 23.33 per barrel in June 2022, and then the price increases to $ 122 per barrel within 18 months. The density of Brent crude oil price distributes also consistent with the one of WTI.

The transmission channels from crude oil price volatility to macroeconomy are proposed in existing literature. First, the increases in oil price may lead to increases in the overall price level, thereby reducing real money balances and purchasing power of households and firms, which ultimately affect aggregate demand. This process is called the real balances and monetary policy channel. Second, income-transfer channel emphasizes the effect of crude oil price volatility is different among the oil-importing and oil-exporting countries, as the income from oil-importing countries transfers to oil-exporting countries. Third, energy prices may also affect labor and capital productivity, which is another possible channel to affect the economic activity. It is worth noting that the US is a unique existence, as the country to produce and consume oil with the largest amount in the world. This paper is aimed to explore the effect of volatile oil price since Covid on US economy, particularly inflation.

During the post-Covid period, developed economies are facing challenges of high pressure of inflation. For example, the rising oil prices recently increases the consumption and production cost, which push inflation to the highest rate since 1981. The rising cost of production and living has been squeezing business and households, which put high pressure on policymakers to take responsible actions. The US central bank began to increase interest rates since March, and the moves seem effective to cool economic activity and ease the price pressures. The conflict and tension between Russia and Ukraine, is another challenge that increases of the price of crude oil and commodities like wheat as it disrupts exports from the two countries. Compared to May 2021, food prices were up more than 10% in April, while energy surged more than 34%. Overall, as shown in figure 3, CPI of the US has increased about three times currently compared to the pre-Covid period.

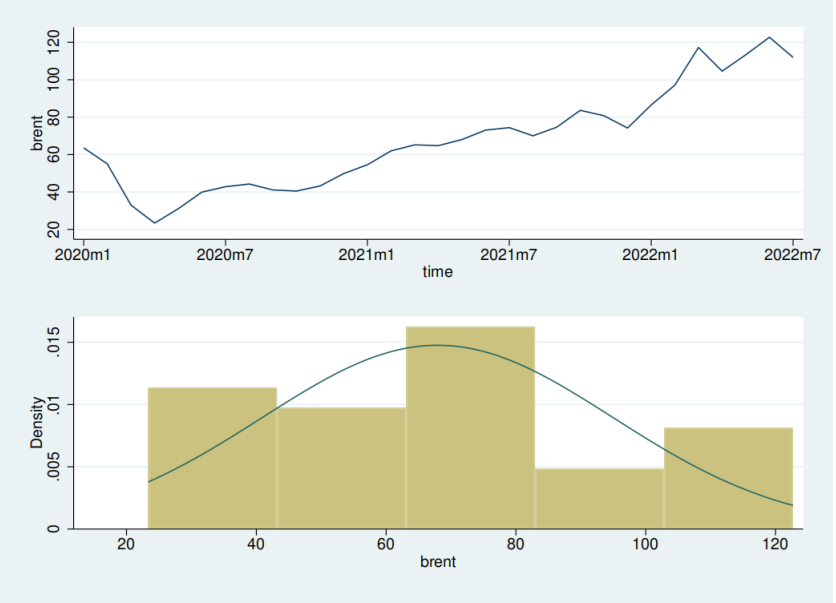

Figure 2: Brent crude oil price since Covid.

Compared with inflation, the real consumption is less volatile, which recovers significantly since Covid-19. As shown in Figure 4, from the bottom in April 2020, the real consumption increases gradually consistently and currently has even reached even higher level than that of pre-covid period.

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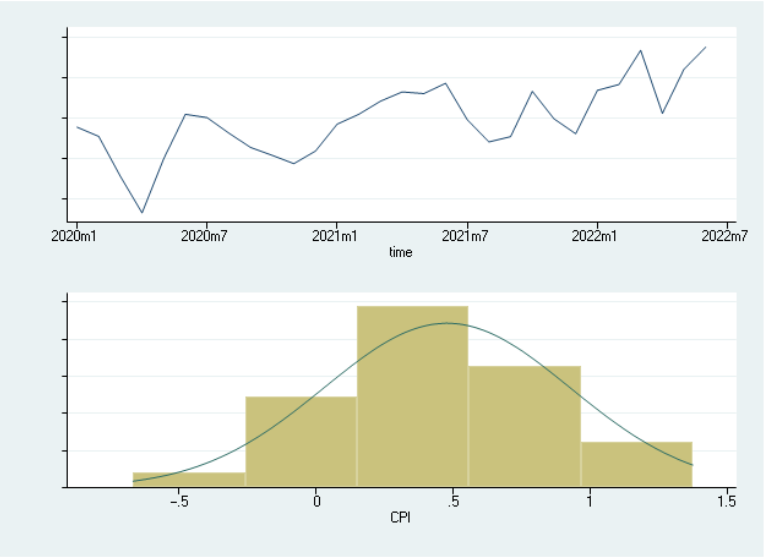

Figure 3: Real consumption of US since Covid.

This research using the US data since Covid to study whether the oil price affects inflation and to what extent inflation is affect by price rise since Covid. The paper is arranged as follows: section 2 presents the data and methodology, section 3 illustrate the empirical results and discussion, section 4 is conclusion and future work.

2. Data and Methodology

2.1. Data

In order to gather more time points as possible, we use monthly data. Five variables, including WTI and Brent crude oil prices, CPI, real consumption and GDP indicators. It is worth noting that here we choose GDP indicator, rather real GDP itself, in order to be consistent with the other variables, like CPI and crude oil prices. And there is not monthly data for the real GDP, although it is a better choice as a general macroeconomic variable. This research focuses the study since Covid. Therefore the time period chosen is from 2020 January to 2022 July for each variable.

2.2. Methodology

Our dataset is panel data, and considering the feature of time series, we choose the Arch(1) variance regression model. An ARCH (autoregressive conditionally heteroscedastic) model structures variations of a time series. The basic regression through least squares model assumes the same expected value of all error terms at any given point, which is called homoskedasticity. The error terms' variances are not necessarily equal, and instead they could be reasonably larger or smaller for some ranges or points. Thus, the homoskedasticity assumption in least squares model is questioned and heteroskedasticity assumption is proposed. Even if the heteroskedasticity existing, the OLS regression coefficients are still unbiased. However, the standard errors and confidence intervals estimated by conventional methods can be too narrow, leading to a false precision. ARCH and GARCH models treat heteroskedasticity as a variance to be modeled. Through ARCH and GARCH models, the deficiencies of least squares can be corrected, and also the variance of each error term can be better predicted.

This paper utilizes the ARCH model to describe time-varying variances, as discussed previously. ARCH model can capture short periods of increased or decreased variations. The advantages of ARCH model are appropriate for our data set. Suppose one variable with time series y_t. The

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ARCH(1) model considers one-lag auto-regressive correlation, namely the variance of y_t is conditional on y_{t-1}, as follows:

$$Var\ (y_t \mid y_{t-1}) = \sigma_t^2 = a_0 + a_1 y_{t-1}^2 \quad (1)$$

where the coefficient a0 and a1 are non-zero to avoid negative variance. We have tested the ARCH (1) for each variable. The significant correlation has been found between yt and y_{t-1} for each time series.

Then ARCH (1) is incorporated into the regression estimates. Regression model estimates to what extent and how the independent variables affect dependent variable (target variables). The linear regression, the most basic regression, can be written as follows:

$$y_t = \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \beta_0 \quad (2)$$

where $x_n t$ is the independent variables andy_t is the dependent variable. In this paper, the independent variable is the crude oil price and dependent variable are the macroeconomics ones, such as inflation, real consumption and GDP. Particularly, we take the auto-regression correlation as estimated by ARCH(1) into the general regression estimate.

3. Empirical Results

Firstly, we regard crude oil price as the independent variable and estimate its effect on inflation as shown in figure 5, while using GDP indicators and real consumption as the control variables.

In the table above, the overall model assumed is significant as shown by the overall P value that is close to zero smaller than 1%. Meanwhile we find that the P values for variable crude oil price WTI is 0.014, which is smaller than 5%, indicating the significance of oil price is at 5% level. Thus, we conclude that that crude oil price positively affect CPI. When the crude oil price increases by one unit, CPI increases by about 9%, if we control all the other factors constant.

As the significant positive effect of crude oil price on CPI has been confirmed, we examine whether inflation measured by CPI can in turn affect crude oil price as shown in figure 6. As estimated by P value, the model assumed is significant overall. The P value for crude oil price WTI is closed to zero with the positive coefficient 17. 723. This result indicates that the CPI affects crude oil price WTI positively. The other variables, however, do not show a significant relationship with the changes of CPI (inflation).

Two regression results together confirm the significantly positive relationship between crude oil price and inflation. Those two factors interact each other significantly. Such results confirm that the crude oil price is an important force driving inflation rise since Covid-19, and the inflation pressure in return pushes the crude oil price increase further. The existing literature has reached an agreement on the volatility of crude oil prices on overall price level and other macroeconomic variables. Its effects, however, may vary across countries. Bruno and Sachs (1982) found that increase of oil price leads to rise in the level of price and real output [5]. The study from IMF (2000) illustrated that the increase of oil price by $5 leads to increase in inflation by 1.3% after a year. On the other hand, the effective monetary policy and other policy adjustments are also efficient ways to reduce the negative effect of the increase in crude oil prices on macroeconomy. Hamilton empirically confirmed the significant correlation between oil price increase and economic slowdown since during 1948–1972 [6]. In further, Davis and Hamilton [7] found nonlinear and asymmetric relationship between oil price and inflation. Hooker concluded that the effect of oil price on inflation has reduced because of reduced dependency on oil [8].

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The findings of this paper are consistent with the conclusions in current literature. While existing literature focuses on the long-run relationship between crude oil price and inflation, this research narrow the study window into the period over Covid-19. Covid-19 as an exogenous shock, a black swan imposes great effect on crude oil price volatility, and the demand shock on price become supply shock now.

Meanwhile, the rise of inflation is great challenge rising in the same period. This research focuses the relationship between those two factors during Covid-19. Our results show that increase of crude oil price a key driving inflation rise.

ARCH family regression

Sample: 2020m1 thru 2022m5 — Number of obs = 29
Log likelihood = 3.367225 — Wald chi2(3) = 51.59, Prob > chi2 = 0.0000

cpi	Coefficient	OPG std. err.	z	P>|z|	[95% conf.	interval]
cpi						
wti	.0091162	.0036993	2.46	0.014	.0018657	.0163667
gdp_indicator	-.0938127	.0448672	-2.09	0.037	-.1817508	-.0058746
real_consumption	.0004777	.0002425	1.97	0.049	2.50e-06	.000953
_cons	2.775526	2.90734	0.95	0.340	-2.922756	8.473807
ARCH						
arch						
L1.	.07579	.4291986	0.18	0.860	-.7654238	.9170038
_cons	.0428979	.031301	1.37	0.171	-.0184509	.1042466

Figure 4: Regression result (independent variable: crude oil price WTI).

Sample: 2020m2 thru 2022m5 — Number of obs = 28
Log likelihood = -95.25769 — Wald chi2(3) = 175.00, Prob > chi2 = 0.0000

wti	Coefficient	OPG std. err.	z	P>|z|	[95% conf.	interval]
wti						
cpi	17.72559	4.524546	3.92	0.000	8.857645	26.59354
gdp_indicator	3.196341	.6689251	4.78	0.000	1.885271	4.50741
g_real_consumption	21.70219	44.78315	0.48	0.628	-66.07118	109.4756
_cons	-268.4859	64.34855	-4.17	0.000	-394.6067	-142.365
ARCH						
arch						
L1.	1.404329	1.318934	1.06	0.287	-1.180734	3.989392
_cons	1.451463	9.963203	0.15	0.884	-18.07606	20.97898

Figure 5: Regression result (independent variable: crude oil price WTI).

4. Conclusion

This research studies the relationship between inflation and crude oil price since Covid-19 with the empirical study of US data. The US produces and consumes the largest amount of crude oil, which makes us to study this topic with US data. Our regression results confirm the significantly positive relationship between those two factors. The the rise of crude oil price is confirmed as a key driver of

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current high inflation. We also realise that such results are limited with in the US, and the other countries do not necessarily show the exact same correlation between inflation and crude oil price. The heterogeneous effect of individual country could be an extension for this research in the future. For example, we will examine this relationship within other developed and developing countries and identify whether there is such difference in current findings across countries .

In the future, we will also estimate the non-linear and asymmetric relationship between oil price and inflation, as proposed by Davis and Hamilton [7]. Recently Shitile (2020) have illustrated a long-term asymmetric relationship between those two factors using the nonlinear autoregressive distributed lag method [9].

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How Pop Mart Is a Major Player in the Market

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Abstract: The rapid development of the fashion game industry in recent years is a microcosm of the national pursuit of spiritual and cultural satisfaction. After nearly a decade of development, China's fashion game market is still in a period of rapid growth. In the field of fashion games, Pop mart is the pioneer of its industrialization and the industry benchmark. Pop mart has grown rapidly and come into the spotlight in a short period of time, with substantial annual revenue growth every year. In this case, it is important for people to know why Pop mart is the leader of this industry in detail and some thoughts about their future business direction post-pandemic. This paper scrutinizes and analyzes why Pop mart dominates this market in terms of business model, product planning, sales approach, and consumer psychology. It also indicates how to maintain the company's development and economic growth in the face of a serious epidemic.

Keywords: fashion games, Pop mart, strategy

1. Introduction

In an era of rapid development, toys are no longer the exclusive property of children. Some adults will still be willing to spend money for an ornamental toy that is no more than a dozen centimeters in size. So, the market is starting to focus more and more on toys for different age groups. Then gradually the name Pop mart came into the public eye.

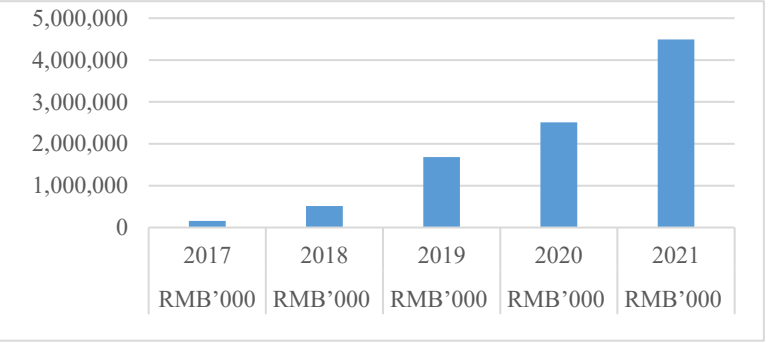

Figure 1: Revenue report (for the year ended 31 December).

According to the 2021 annual report provided by pop mart, and as shown in the Fig. 1, the company's revenue in 2021 increased by almost 10X compared to 2017 [1], which shows a tremendous increasing trend. Given that the company's revenue has already increased to 25 billion

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yuan, they still almost doubled up their revenue in 2021. Also, “According to a report published by MobTech, the country's mystery box market is to exceed 30 billion yuan (about US$4.59 billion) by 2024” [2]. It points out that pop mart is a company that still has potential for future growth that cannot be underestimated. But it is still incredible to people that a toy company can grow so fast. So, it is very valuable for people to explore how pop mart, as a toy company, can use new concepts of products and marketing models, and how it can enter the consumers' view in a very short time, get high revenue and then occupy the main position in the market.

2. Innovation in Different Areas

2.1. Innovation of Sales Model

For a new company in a new field, innovation in any aspect will have a positive impact on the company that cannot be ignored. In the case of pop mart, the company has been able to innovate in different aspects. First of all, in terms of sales model, as a toy company, pop mart has its unique means of selling its products. They have a special perspective on how to stimulate consumers to buy their products. Under a specific theme of characters, there are about 12 different styles of products packed in the same box. People buy without knowing what's inside and won't know what's inside until after they buy. “Under the premise of rational economic man, the marginal benefit is diminishing, buying an additional unit of product will cause the additional benefit to decrease. Whereas, for consumers of blind boxes, the more they buy, the more they want” [3]. This is because “consumers, often driven by a certain gambling mentality, are keen to spend on blind boxes, which could deliver high levels of emotional or social satisfaction for a relatively low price” [4]. It states that this indicates a special economic model is the blind box economy, they use the consumer's gambling psychology to motivate consumers to buy more blind boxes. At the same time, “With its high degree of uncertainty and playability, it has won the support and love of contemporary young people and gradually formed a blind box fever” [5]. Under this situation, especially young people are more willing to go after some exciting psychology, and this form of product can better stimulate their desire to consume.

But what is even more special is that in addition to the 12 normal products in a set, the pop mart will randomly put a hidden model in a set of blind boxes, and this special product is many times less likely than people buying a blind box to draw a normal product. When people want this hidden style, they will buy more blind boxes. If people buy the product they like, they will get a high level of satisfaction. If they don't get the product they want, most people's choice is to buy another box or just make a whole set purchase. This way even a single individual will contribute a very high amount of product sales. On the other hand, the pricing system for pop mart is worth noting aspect. The price for pop mart products ranges from 40RMB/box (common product) to more than 2000RMB/box (limited collection series). Board product line with a wide pricing range can target different customer wealth level, as I mentioned before, this pricing system leverage people’s gambling and collocation psychology, specifically, the consumer can buy (“bet”) at a low price (as low as 40 RMB), if consumer look for more stimulation, they can always spend more money to start collecting a more precious collection. As you can see in the chart below, even though the higher price collection may be contributed to very little of pop mart’s sales quantity (for example the last segment), it helps pop mart to seize the market and brings sales.

2.2. Innovation of Products

“If blind boxes were POP MART’s catalyst to the art toy craze, their IP (Intellectual Properties) operation, as well as creation and design, are the pillars of POP MART’s success” [6]. Also, the pop mart annual report indicates that “IP operation, as well as creative designs, are essential to our

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products, and the key driving forces for the development of Pop Mart. We continuously enrich our types of IP and launch products of diversified styles to meet the demands of different groups of customers" [1]. In the creation of the product, the Pop mart has spent a lot of thought, and it is easy to see that the successful original IPs have really brought the company revenue that should not be underestimated, not living up to the investment in the original IPs.

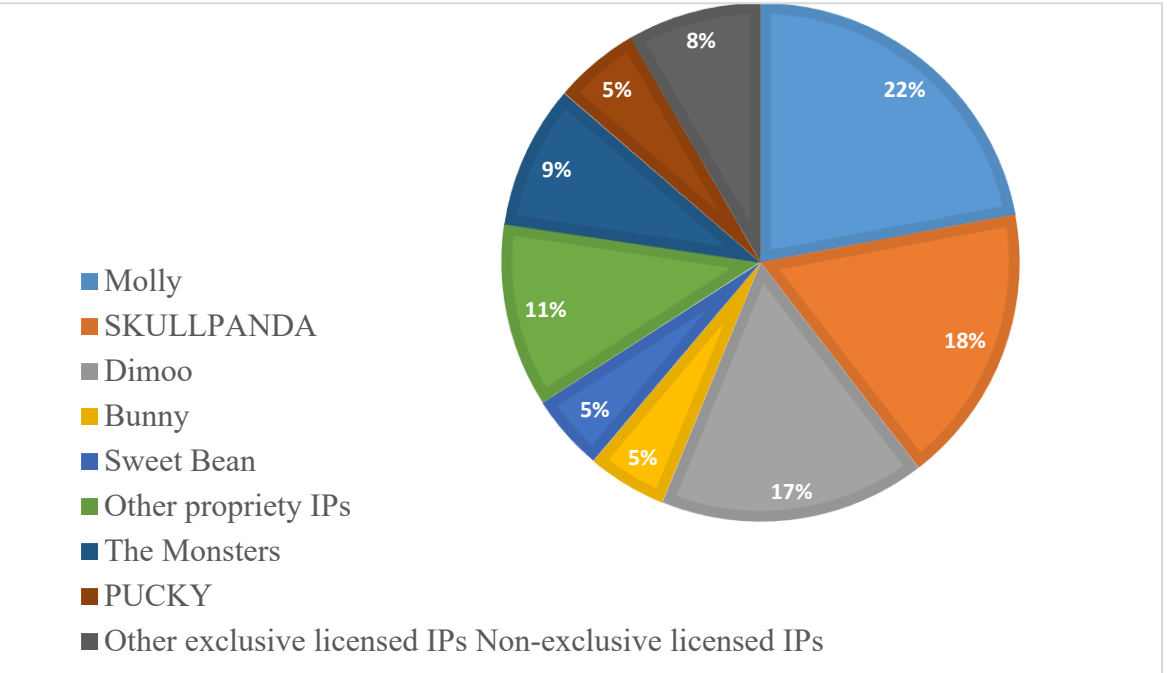

Figure 2: Percentage of revenue from different Ips.

In the beginning, Pop mart only focused on the Molly IP (As shown in Fig.2). But since the Molly series of blind boxes were very popular among people and had good sales, Pop mart started to design more Molly series of blind boxes. Although there was a successful case of Molly, they didn't stop there but invited more designers to design new IPs. For example, Dimoo appeared afterward. The design style of each individual IP was very different, and although the audience was not very active, each IP had accumulated a large number of consumers. For example, the table contains many IPs. Since Molly, Dimoo, and SKULLPANDA were popular with consumers at an early stage, they accounted for the majority of the company's profits.

3. Collaboration with Other Brands

Pop mart is also very good at observing consumers' needs and doing co-branding activities with some big-hit IPs of other brands. This is because, "Co-branding can be a win-win strategy to help drive sales, develop brand images, and save marketing or advertising cost in the restaurant industry" [7]. This is usually a mutually beneficial marketing tool, which means that people can learn about other brands through Pop mart and buy Pop mart's products because they like other brands. It's wise that the brands Pop mart chose to have a large fan base and hit new sales highs in that period of time. In the annual report, it indicates that "Pop Mart also maintains a close partnership with various internationally renowned IP enterprises, such as Disney, Universal, Warner Bros., Sanrio, NBA, etc. Based on IP diversification, we have also made great progress in the innovation of pop toys" [1]. And usually, these co-branding activities are limited time, and people don't want to miss these precious opportunities, so it will stimulate people to spend more. Pop mart is not only focusing on the blind box but also investing in more areas, such as clothing.

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4. Early Market Entry

In the early days, there were only a few companies to produce the blind box market. It was only because of the explosion of Molly that Pop mart was brought to the public's attention, and thus the blind box market began to develop. Because Pop mart occupied an important part of the market in the early days, and because of its broad product lines with a wide pricing range, pop mart attracts consumers from different wealth levels, it built barriers so that other companies could not enter the market so easily. And "Barriers to entry are factors which prevent or deter the entry of new firms into an industry even when incumbent firms are earning excess profits" [8]. This also gave Pop mart a strong advantage for its subsequent development. As stated in "Innovation and Entrepreneurship Observation": "The original price of Pan Shen's hidden Christmas money was 59 yuan, which was sold at a high price of 2350 yuan on the second-hand mart, up 40 times" [9]. This shows that Pop mart products also have an investment property. Although many new blind box companies and new IPs emerged, later, Pop Mart is still the hottest blind box company because of these favorable conditions, and will not be easily compared to other companies, nor will it be easily replaced by other companies.

5. Strategies for Dealing with the Pandemic

What has to be admitted is that people prefer to experience what it's like to draw a blind box in an offline store, but because malls in China are often closed due to the epidemic after an outbreak, offline stores are not always open to people. This can lead to a very big impact on sales in offline stores, this is an inevitable negative for all businesses which have offline stores. But pop mart geared towards online platforms quickly. According to the annual report, we know that "As a pioneer and key promoter of pop toy culture in China, despite being affected by the recurrence of COVID-19 pandemic, we still maintain fast growth of our business and experienced a year-on-year increase of 78.7% in revenue in 2021" [1]. This is because Pop mart has shifted its sales focus more to online stores, and they are rapidly developing online stores for sales, with their stores on many different online sales platforms. In major cities in China such as Beijing, Shanghai, and Hangzhou, Pop mart's online store can deliver the product within a few hours, this fast delivery service also attracts a lot of new customers. When people quarantine at home, collecting pop mart products provides a sense of joy in an affordable way (in comparison, skincare and cosmetic products and luxury brands' sales drop dramatically due to the pandemic). Especially for younger generations, can collect and post photos on the internet with the hashtag, social media also help to brand pop mart and stimulate sales. For consumers to experience the fun of drawing blind boxes online, Pop mart also developed the function of drawing blind boxes in their online stores, so that they can know which one of the series they are getting after paying for it.

Also, there are other strategies for this. Because the blind box fever has gradually increased in the last two years, Pop mart has also started to develop its products not only in mainland China but also in Hong Kong. "Mainland toymaker Pop Mart International Group made a stellar debut on the Hong Kong stock market on Friday, closing nearly 80 percent higher than its issue price to end the day with a market capitalization of US$12.5 billion" [10]. This shows that the development of Pop mart has a very obvious effect.

Moreover, the Pop mart is definitely the leading company in the blind box market in China. Although it may not be the case in the overseas market, in order to expand their business territory, they are also gradually moving to overseas markets. "Pop Mart is currently present in 23 overseas countries and regions, including Korea, Japan, the United States, Canada, the United Kingdom, Singapore, etc" [1]. Since people have to admit that the overseas market also plays a very important role in increasing the company's revenue.

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6. Conclusion

People have to admit that the toy market is changing a lot nowadays, but Pop mart is a company that has seized this opportunity and has made a good income in a very short time. They are innovative in different areas, first, the sales model, they take advantage of the consumer's psychology of seeking excitement and gambling to choose the model of blind box, so as to stimulate people's consumption. On the other hand, Pop mart has many original IPs and is co-branded with many brands, which are mutually beneficial in the market. After 12 years of exploration, the Pop mart has developed from a channel dealer to a fashion game IP incubation operator. In terms of consumption habits, consumers are easy to become loyal customers and spend a lot of money on their favorite styles; In terms of brand loyalty, consumers have high loyalty to the Pop mart. After the pandemic, Pop mart quickly adapted to change and seized the online market. Because Pop mart has adopted a lot of active policies, one is to gradually develop online platforms, so that consumers can easily buy products online, so that even if there is an epidemic, it will not affect product sales. Second, they started to sell their products not only in mainland China but also in Hong Kong and foreign markets. These are the reason why it is able to develop quickly and stabilize its position in the market.

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Research on the Mathematical Application in Economics

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Abstract: In the field of economics, the research and description of the basic laws of economic operation and economic phenomena should be fully combined with the current relevant mathematical ideas and methods to ensure the standardization and scientificity of the entire economic operation. Mathematics belongs to an important theoretical discipline, which is abstract and logical, and also belongs to a strong tool discipline. Through the analysis of mathematical learning and the actual attributes of economics, we should use certain mathematical methods to carry out quantitative and qualitative analysis on the knowledge points of the whole economy, so as to provide important tool resources for the development of economics. At present, mathematics has become an important part of life, and the relationship between mathematics and the economy is becoming more and more close. In real life, many economic problems need to be solved with mathematical knowledge. This paper summarizes the important role of numbers in economics, and analyzes their specific applications, so that we can have a deeper understanding of mathematical knowledge. In the field of economics, the research and description of the basic laws of economic operation and economic phenomena should be fully combined with the current relevant mathematical ideas and methods to ensure the standardization and scientificity of the entire economic operation. Mathematics belongs to an important theoretical discipline, which is abstract and logical, and also belongs to a strong tool discipline.

Keywords: economic operation, mathematics, mathematical methods

1. Introduction

As a discipline to explore spatial models, numerical measurements, structures and changes, mathematics is well known. In the development process of mathematics, the main characteristics of contemporary mathematics are the mutual penetration between its internal parts, the mutual penetration between it and other disciplines, and the advent of electronic computers [1]. Mathematics observes the shape and operation of objects, calculates and measures them, and abstracts them for processing and logical reasoning. It has deeply and widely penetrated into all fields of social science, and the role of mathematics in economics is even more unusual. It has expanded the breadth and depth of economics and provided a scientific methodology for its breakthrough development. The research questions in this paper mainly include the importance of applying mathematics to economics, how to make economic research more rational, and the position and role of mathematical methods in economics. With the help of mathematical thinking,

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we can make the relevant research objectives of economics and the actual relationship between economic variables more clear, and then improve the standardization and preciseness of the implementation of logical reasoning so that the resulting theory will be more clear and explicit, so as to moderately reduce the probability of the occurrence of uncertain factors and meet the actual development needs of economics. For example, in economics, elastic analysis, cluster analysis, an economic growth model, marginal analysis, regression analysis, and other knowledge points have been widely used, and these knowledge points are used to explain and solve economic problems with mathematical methods.

2. The Necessity of Applying Mathematics to Economics

2.1. The Inevitable Requirement of Economic Development

Mathematics plays a more and more important role in economics, and the mainstream of economic research is inseparable from mathematics. In addition to the special issue of the annual meeting of the American Economic Association, almost every article in internationally renowned economic magazines, such as the American Economic Review, contains mathematics [2]. Since the promulgation of the Nobel Prize in Economics in 1969, there have been many winners who do not use mathematics, but the number is much smaller. As of 2007, the Nobel Prize for Economics has been issued for 39 times, with 62 winners, while only 5 economists do not use mathematics at all.

Before neoclassical economics, from the 1930s, some scholars adopted mathematics; During the period of marginal revolution, mathematics was further used; However, after the neoclassical economics, the application of mathematics in economics has been strengthened in at least three different aspects: first, the development of econometrics and its role in empirical research of economic theory; Second, the development of mathematical economics; Third, game theory rewrites economics. From the perspective of linguistic economics, the mathematical instrument is only a language for expressing economic thoughts or principles [3]. It must conform to the principle of economy, that is, the least or the most concise language should be used to express the same thoughts or ideas, and as many views or ideas as possible should be expressed under the same language and words. To be sure, as a practical tool, mathematics plays an irreplaceable role in explaining economic theory. For example, marginal analysis, a tool originated from calculus, is widely used in the research fields of economics such as econometrics, macroeconomics, linear analytical programming, etc. Through this example, we can draw a conclusion that it is essential to flexibly apply mathematical principles when elaborating economic theories. As a tool for demonstration, analysis and research, whether mathematics can produce effective results depends on whether there are errors in the mathematical theory applied in the economic field. Although mathematical methods can help the development of correct theories, they may also become the cornerstone of wrong theories. Therefore, the application of mathematics in economics must be cautious and not trifle with. In the field of economics, the research and description of the basic laws of economic operation and economic phenomena should be fully combined with the current relevant mathematical ideas and methods to ensure the standardization and scientificity of the entire economic operation. Mathematics belongs to an important theoretical discipline, which is abstract and logical, and also belongs to a strong tool discipline. Through the analysis of mathematical learning and the actual attributes of economics, we should use certain mathematical methods to carry out quantitative and qualitative analysis on the knowledge points of the whole economy, so as to provide important tool resources for the development of economics.

Today, in the process of economic development, people's knowledge of economic theory has been constantly improved, and their economic awareness has been constantly enhanced [4]. Facing the test of the new era, when carrying out research on economic knowledge, if only the past words

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are used to express and implement speculative reasoning, the standardization, preciseness, logical consistency, etc. of economic discussions cannot be fully guaranteed, and the accuracy, precision, etc. of conclusions cannot be guaranteed, This is not conducive to the accuracy of economic knowledge points.

2.2. Make Economic Research and Reasoning More Accurate and Rigorous

A series of behaviors and breakthroughs in the field of economics are closely related to mathematics. The transition from classical economics to new classical economics, as well as from the marginal revolution to the Keynesian revolution, is critical to the application of mathematical knowledge [5]. Applying mathematical knowledge points to the field of economics can clarify the close relationship between economics and mathematics, which also has a great impact on people's economic thinking and thinking mode, making people more quantitative in their behavior and thinking. Mathematics is a rigorous and logical discipline. When many people use language to express logical relations, it often happens that the language is not rigorous, making the whole mathematical thinking full of holes. In the face of such problems, it is necessary to transform the less rigorous written language into professional mathematical language in a timely manner under the condition of economic exchange and discussion. When using mathematical language, it makes the language more concise, rigorous, and more accurate and precise in expression.

2.3. The History of the Application and Development of Mathematics in Economics

The development of mathematical economics in the 20th century was driven by many events. Among them, the most important may be the proof of the general economic equilibrium theory. After Vallas put forward the general economic equilibrium, he did not give an accurate mathematical proof. Since then, many scholars have devoted themselves to proving the theorem. In the West, many economists have tried to apply a lot of mathematics to economics. They just hope to explain the world in a more explicit way, and they hope to develop western modern economics into a more accurate science. In general, the application of mathematics in economics can be divided into three different stages: before the marginal revolution, mathematics began to be used in economics; Between marginal revolution and neoclassical economics, mathematics began to show its importance in economics; After neoclassical economics, mathematics has been widely used in economics. In the economic system, the earliest examples of the application of mathematical methods are believed to be the Political Arithmetic by Petit in the middle of the 17th century. But in fact, it was in the middle of the 19th century that mathematics and economics were really closely linked. In other words, in the middle of the 19th century, the application of economics to mathematics began. After the middle of the 19th century, the trend of mathematization of economics began to appear, and the field of economics began to accept the all-round penetration of mathematics. In particular, differential calculus and other advanced mathematics have been integrated into the field of economics.

After the 1960s, Deborah applied the axiomatic method of mathematics to economics, opening up a wider range for the application of mathematics in the field of economics. However, economics constantly puts forward various problems to mathematics according to its own needs. In 1969, a great event happened, that is, the establishment of the Nobel Prize in Economics, which effectively promoted the mathematization of the economy. After careful observation, it is not difficult to find that more than half of the people who have won the Nobel Prize in Economics are economists or mathematicians who have studied mathematics. From 1969 to 2006, a total of 58 mathematicians or economists won the Nobel Prize in Economics. They have one thing in common, they basically

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combine economics and mathematics effectively, and develop modern economic theories through some mathematical tools and methods.

For example, the first Nobel Prize in economics was awarded in 1969 to Norwegian economist Frisch and Dutch economist Dimbergen [6]. They effectively used dynamic models in the process of analyzing economic activities and created econometrics. In addition, Tymbogen also put forward the famous "cobweb model" and successfully completed the dynamic analysis through the difference equation, and used mathematical methods to verify it in the cyclical movement of the capitalist economy.

From the perspective of the development of mathematical application in economics, mathematics either deepens economic research or facilitates the expression of economic theories, propositions and hypotheses. The development of economics from the primary to the intermediate to the advanced has deepened and refined the process of research questions and argumentation, because only by using mathematics as a tool for reasoning and expression can we more accurately and deeply explain the theory and proposition of economics. From the perspective of people's acceptance of the mathematical language of economics, it also reflects the function of mathematics as an economic language for communication and transmission of information. Language has network characteristics; that is, with the gradual increase in the number of recipients, its role will become greater and greater, and its effectiveness for the recipients will also become greater and greater. When Cournot first used mathematical language to express wealth theory, no economist accepted it. It was because other economists did not know Cournot's mathematical language to express economic theories and ideas; At the time of the marginal revolution, Menger, Vallas and Jervens used mathematics in economics. Although most economists did not use mathematics, the degree of resistance was significantly reduced; After the 20th century, with the development of game theory and econometrics, Hicks published Value and Capital in 1939, and Samuelson published Fundamentals of Economic Analysis in 1947. There was less resistance and opposition; After the 1950s, more and more economists used mathematical language to establish economic models and analyze economic problems. Mathematics became the tool and language used by most economists, so that it was impossible to integrate into mainstream economics without using mathematics as a basic tool and language. To publish papers in the world's top economic journals, mathematics must be used as a tool and language. Thus, economics has become inseparable from mathematics.

2.4. The Role of Mathematical Methods in Economics

In terms of breaking through the existing theoretical barriers in economics, mathematical methods have made great contributions. It can not only promote the research of economics, but also show the scientific methodology for it. As one of the important tools for analyzing economics, mathematical methods play an extremely important role in updating economic theories. As a methodology or tool, mathematical methods are indispensable, whether in simple operational algebraic expressions, in many applications of higher mathematics in mathematical economics, or by reference to econometrics, or even in the close relationship between modern economic theories and modern mathematics. Through the application of mathematical methods, we can get the economic theories that can not be described by specific words and language, thus breaking through the existing economic theories.

First of all, through the application of mathematical methods, the breadth and depth of the economic discipline have been improved, and the process of its analysis and reasoning has become rigorous. Mathematics has been widely used. However, due to the application of mathematics in economics, emerging disciplines such as probability theory and mathematical statistics, econometrics, stochastic processes, time series analysis, numerical analysis and optimization theory

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are emerging in endlessly. Therefore, mathematical methods can greatly extend the economic discipline. In addition, generally speaking, the expression of words is often uncertain and fuzzy, while the mathematical expression is more definite and accurate. When analyzing economic problems, the combination of economic and mathematical models will make the logical analysis and reasoning process more accurate.

Secondly, the qualitative analysis of economics is carried out with mathematical methods. The rise and development of non-linear economics has opened up a new field of qualitative analysis of methods in economic research, indicating that the instability of the market economy and the complexity of economic behavior are the essential manifestations of economics. The application of fuzzy mathematics has produced a mathematical method of fuzzy decision-making that can combine human knowledge and experience. It can computerize complex problems through mathematical modeling and become a powerful tool for economic research. Thus, the essence of economic phenomena can be revealed and grasped by people through quantitative mathematical analysis.

Finally, through the application of mathematical methods to make economic policy scientific and economic theory practical, because mathematics is logically rigorous, the conclusions of economics are generally clear. For example, the relationship between various economic factors can be clearly and intuitively expressed through a simple formula, so that the quantitative relationship between economic variables can be analyzed and used as an effective basis for formulating new economic policies.

5. Conclusion

For economic research, mathematics plays a very important role in the derivation of propositions or hypotheses, because the logic of mathematics is very strict, but as a tool or rational logic, mathematics is different from the real objective world. In mathematical economics, game theory and econometrics, there are a lot of assumptions. For example, game theory assumes that all Boben subjects are homogeneous and completely rational. Under this assumption, all subjects are the same as "lifeless", "irrational" or "unable to exist individual rationality" objects in nature, which is really applicable to the research of natural science. However, it is also a question of how applicable or to what extent the rational thinking ability is to individuals with differences in the study of the complex world. However, it is also a question of how applicable or to what extent rational thinking ability is to individuals who differ in their approach to studying the complex world. As a result, economics derived or expressed in mathematical language inevitably deviates from reality, and the use of mathematical language is critical for research, discovery, and expression of economic propositions or hypotheses, so a trade-off must be made, that is, the distortion of economic real propositions or hypotheses caused by mathematics must be weighed against the importance of mathematics to the derivation or discovery of economic propositions or hypotheses. In fact, it also reflects that the problem of how to select or apply mathematical language in economics also requires economic analysis. As both a tool and a method, mathematics has been widely used in the study of economics. Chinese economists are also increasingly adopting mathematical methods. But after all, mathematics is only a tool and a language of economic expression and reasoning. Its application in economics must also implement the basic principles of economics, namely, saving, allocating limited time and resources to the most efficient place, rather than using mathematics without limitation and purpose, let alone mathematics for mathematics. Otherwise, it will be divorced from the original purpose of economic research. Economics is a practical science, which serves to explain practical problems and predict the future. If economics is divorced from the basis of reality, it will violate the basic principles of economics. As a discipline to explore spatial models, digital measurements, structures and changes, mathematics provides a solid foundation for breaking

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through the existing theories of economics. In the process of economics marching towards science, mathematical methods will exist as an important means. At the same time, it can also make the economic policy scientific and the theory practical, and provide a solid theoretical support for China's economic development.

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A Comparative Study on Carbon Emission Trade System Between China and US

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Abstract: It has been years since the Paris Agreement and most states are still struggling with their goals to reduce the carbon emission. Many ways and measures are taken but few show effectiveness. Because the industrial development and daily lives of the common people count on the activities that emit much carbon dioxide. Most governments are reluctant to restrict the carbon emission of local industry. What's more, in the international level, the developed countries refused to take all reduction responsibilities based on their historical emission volume. While the developing ones are eager to pursue more progress in industry. To overcome such difficulty, the market-orientation carbon emission regulations are created to tackle with the challenges that the normal order-control regulations cannot deal with. In contrast to the carbon tax that is more direct and obvious, the carbon emission trade system is favored by both China and US. The system of carbon emission trade system is much younger and less experienced than it is in the US. The comparative study on the carbon emission trade system needs to be done to find more possible solutions to improve the current carbon emission trading system of China. In the paper, main research method is the comparative research and system analysis. In conclusion, the carbon emission trade system of China is relatively immature, lacking the legal support and clear regulations. The carbon emission trade system in China needs stronger laws to support, achieving more active flexible form of trading. The central and local governments should also provide the proper policies like open auction and third-party supervision.

Keywords: carbon emission trade system, carbon emission right, RGGI

1. Introduction

After the United Nations Climate Change conference in Copenhagen, there was an impressive interview broadcasting on CCTV that caused many debates and even discords among the public. The bone of contention focused on the obligation to restrict the carbon emission of developing countries. While the interviewer, a famous hostess, questioned why it would take such effort to accept these duties. The interviewee, a leader of Chinese Academy of Science strongly reputed her idea and pointed out that these obligations would have great impact on the rights to develop in the future. The controversy is, in fact, quite simple that whether the carbon restriction is a scam to deceive the developing country into giving up their own rights.

Nowadays, the carbon neutralization and emission peak have become a vital part of China's national policy. Many laws and regulations have already been made after the publishing of central

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government's documents on the relative issues. Yet even after all those important measures taken in few years. There are still some practical matters to concern like the lack of united system and law base to manage and supervise the carbon emission trade system. To search on the China Judgements Online by the phrase Carbon Emission, the only result of administrative proceedings is the case that an industrial company was charged and fined for not paying for the over-emission carbon quota in Shenzhen.

To look at a bigger picture, the only country that has the obligation to restrict its carbon emission in such scale and face the challenges for matched population and industrialization is the United States. It would be necessary to have a comparative study on both states' laws and regulations on carbon emission trade system.

2. The Legal Attribute of the Carbon Emission Right of China and US

2.1. Theoretical Debate on the Legal Attribute of the Carbon Emission Rights

About the legal attribute of the carbon emission rights, the theoretical debate focuses on whether it is quasi real right or administrative licensing. Clearly the corresponding duty of carbon emission right is to reduce the carbon emission, which is an obligation under the international treaties and domestic law. Yet the increasing need to control the carbon emission emphasizes the necessity to recognize it as a real right to avoid the tragedy of the commons. There are Chinese scholars on both sides.

The foundation of the carbon emission right in China resembles that in United States, deriving from the pollution emission right. Some scholars point out that the carbon emission obligation bases on the environment capacity theory [1]. That leads to the scarcity of its corresponding right. Despite of the publicity of it as a kind of resource, it needs to be set as a real right to clarify the property boundaries between people. In this way, the carbon emission right could be seen as a tool to prevent the so-called collective irresponsibility. It would also help the government to manage the carbon emission trade system, even create economic interest.

Unfortunately, lots of problems need to be dealt with before confirming it as a real right. The right in rem needs to follow the rule that every category being listed in official law in the system of civil law. It's hard to expect that to be fulfilled in a short term for all kinds of real right (and their corresponding duties) relate too much in current law. What's more, the carbon emission right bases on the environment, which is hard to be regarded as the objective of right in rem. In other word, such right of natural environment lacks the exclusiveness required in right in rem. To correct this, some argues that the carbon emission right should be recognized as an usufructuary right [2], but that did not solve the problem that it is difficult to separate the carbon emission right from the public environment as an independent object.

The compromise does not satisfy, bringing us back to the start point that the carbon emission right is an administrative licensing. According to the UNFCCC and the Kyoto Protocol, the carbon emission obligation is the need to assure the environmental capacity and being assigned to states. Supported by the domestic laws and regulations, the emission under the capacity is legal and rightful. The administrative licensing is the assurance and effective tool to manage the emission goal. Such right pertains to be subjected to the level of state since it is the natural environment obligations assigned by the international treaty. Besides, the ultimate purpose of the carbon emission trade system is to tackle with climate change and reduce the emission. The aims of update the industrial structure and create more economic interests subordinate to the former one. The total volume of carbon emission must be lowered gradually in the future, so as the right. If the carbon emission right is property right or right in rem. There will be plenty of troubles in administrative expropriation and administrative compensation [3]. To the contrary, the carbon emission right based on the

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administrative licensing is much easier to be managed to guarantee the gradual reduction of carbon emission, reaching the promise of the state.

2.2. Laws and Regulations on the Legal Attribute of Carbon Emission Right of China and US

Though it has been discussed thoroughly in the academic aspect, there is no official law on the carbon emission trade system approved by the People's Congress. Till now, the highest legal document of this section is Administrative Procedures for Carbon Emission trade system (drafted) published by the Ministry of Ecology and Environment. In the Article 33. Explanation of Terms, the carbon emission right is defined as the carbon emission quota assigned to the specific emission units in prescribed time. The official explanation states that the carbon emission right is rooted in government management and supervision, basically equals the concept of administrative licensing of China.

The US Energy Law (2010) prescribed that United States would implement the national system of emission quota and emission licensing trade from 2013. The Clean Air Act (1990 amendment) Chapter 4. states that quota is the licensing to emit sulfur dioxide, not a property right. The Climate Security Act Chapter 2. also claims that any emission quotas should not be property rights. Meanwhile, the Environmental Protection Agency has been authorized to halt or reduce the emission quota, whose authority should not be limited by any other laws or regulations [4].

3. The Carbon Emission Trade System of China and US

3.1. The Current Regulations on the Carbon Emission Trade System of China

The carbon emission trade system regulations of China are perfected gradually in recent years. Yet there is no official law of carbon emission trade system passed by the congress till now. The current highest legal regulation is the Administrative Procedures for Carbon Emission trade system (drafted) published by the Ministry of Ecology and Environment. After the carbon emission trade systems were experimented in serval cities like Beijing, Shanghai and Shenzhen, the local laws and regulations were made to cover the vast ground of carbon emission trade system. The recognized public carbon emission trade systems for registration were also founded in those cities, achieving considerable total trading volume. With the first national administrative procedure, the carbon emission trade market has come to the new era of unity.

According to the Administrative Procedure, the emission unit has the duty to make the emission report based on the technical regulations every year, being responsible to it. And the report should be made public except for the parts relating to the national or trading secrets.

The total carbon emission volume is decided by the Ministry of Ecology and Environment, and then being distributed by the provincial administrative department. The administrative procedure prescribes that the exact distribution to the emission units ought to be gratis. But it makes the reservation that paid forms could also being introduced when the state is necessary to do so. Such arrangement comes from the practical experiments in Guangzhou and Shenzhen. The paid parts were significantly smaller than the gratis parts since the most emission are created by the inflexible industry like energy. Furthermore, the limited paid parts raised the fund to support the district low-carbon foundation. It has been proven to be a guide outside the normal system.

Besides, the administrative procedure states that the provincial administrative department would supervise the reports of emission volume. The emission unit could have the offset of emission quota by voluntary emission reduction, which encourages the emission unit to take efforts to make cut.

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3.2. The Laws and System on Carbon Emission Trade System of US

The United States of America is the first country that use the market-orientation regulations to tackle with environmental challenges. It has the experience to control acid rain, smoke and other pollutants for over 30 years [5]. Yet the complex political environment of US leads it to a variable issue. Generally, there are two major directions, centralized and decentralized federalism. One of the most successful measures of centralized federalism of environment issue is the rule of the final obligatory report on greenhouse gases based on Clean Air Act by the Environmental Protection Agency, which also prescribes that the carbon dioxide is under the Clean Air Act like other pollutants. However, Trump government adjusted the policies greatly after 2017. The new commissioner of Environmental Protection Agency, Scott Pruitt is a firm cooperation federalist of environment. According to the Back-to-Basics Agenda, the administration creed of this commissioner, the Trump government canceled a great deal of regulations made in the Obama government period such as the application of SCC, pulling back to the areas of federal management in advance. What's more, the government pursued closer cooperation with states, distributing power to the lower levels. Though the new democratic government is turning the odds to some extents, many vital systems have already been changed permanently.

The Regional Greenhouse Gas Initiative (RGGI) is the first reduction and trading project for carbon emission in US. It did not just bring an income of 2.7 billion dollars by the auction of emission quota, but also create thousands of green jobs by pushing for more healthy industry system. Unexpectedly, the reduction of carbon emission did not have an impact on the local economic growth. In fact, the economic growth rates of RGGI area are averagely 4.3% higher than the non-RGGI area. More importantly, the profits gained by the carbon emission trade system are asked to invest further improvements and other related measures. That is the core structure of this sustainable system. Either considered integrally or separately, just like projects of California, the RGGI is no doubt the most successful sample for comparative study [6].

The memo signed by the member state provides the basic rules and structure of RGGI. To assure the daily run, every state assign two representatives as the members of the executive board. The Model Rule are made by all members, including the unified emission standard and project's structure. To stabilize and reduce the carbon emission, the regional organization focus on the local laws of each state aiming at the power plants to reduce the carbon emission.

The total carbon emission volume is decided by the regional organization, and then being distributed to the member states by the proportion regarding the historical emission volume. Yet the specific emission volume needs to be confirmed by the domestic law of each state, containing under the total volume given by the RGGI of course. And the state's environment agency would supervise the units' emission status. After the quota is set, the auction would be held in public. No restriction on the subject qualification or the form of subject matter. Yet it limits the quota of a single buyers within the 25% of the total volume. Though every state maintains the authority to supervise the auction, the supervision is, in fact, performed by the third-party institution Potomac Economics.

Every three years as a period, the emission unit ought to submit the quota based on its carbon emission volume. Surprisingly, during the first period of RGGI, the actual emission volume is outnumbered by the total volume decided by the regional organization. The consequence is severe that the price of carbon faced great decline, contributing to the low activity of the trade market. The fundamental goal of the system, reduction of carbon emission, failed completely. To correct it, the annual emission quota is cut greatly. Within the 2014, the total volume was reduced by 45%, and was required to decline by the annual rate of 2.5% since 2015. Eventually, it has been proven effective by the fact that the RGGI meets 90% of its total volume and creates 1.3 billion pure profits for three

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periods. Decisively, the power of RGGI member states relied on coal and oil is reduced from 33% to 7% within 11 years [7]. It would be safe to conclude that the RGGI fulfilled its destiny perfectly.

4. The Comparison of Carbon Emission Trade System and Revelation

4.1. The Legal Obstacles of Carbon Emission Trade System' s Regulation of China

The most significant problem of current carbon emission trade system of China is the low level of legal documents on the regulations. For example, the carbon emission trade systems of most cities depend on the local policies and official documents, lacking the support of national laws. Beijing and Shenzhen are the few cities that own the specific local laws to regulate the carbon emission trade system. It might seem that compared with the system in US, China has sufficient local laws and regulations for carbon emission trade system. Yet a vital fact needs to be taken into consideration as well that policies and regulations in China highly relied on the support of central government, in other word, the official law confirmed by the people's congress. In fact, even local laws have much more benefits than policies in many ways such as the authority to set up penalties and the access to create substantial rights.

To the contrary, the MOU of RGGI assures the Model Rule of different member states without an over-states law. The Model Rule would facilitate the legislation of member states on the systems of quota distribution, offset and penalties. Moreover, the RGGI has a united trading market, a united quota management platform and a united auction institution, while the authorities of supervision and penalties' regulation remain in the member states, emphasizing the autonomy of each state. In this way, the RGGI offers plenty room for member states to develop proper systems to adapt with their own situations [8].

The distribution is the second challenge that the carbon emission trade system of China faces. Firstly, the distribution is controlled by the administrative power of all levels, meaning that fairness counts on the local government inevitably. What's more, the administrative procedure prescribes that the emission quota should be distributed based on the historical and current emission records of units. This discourages the emission unit to reduce the volume since more carbon dioxide they emit looser quota they would get in future. Lastly, the gratis quota brings the threshold to the new enterprises for they need to pay for the newly added quota. For instance, the regulation of Guangzhou requires the newcomers to promise to purchase enough paid quota in the next few years, which is clearly unfair and violating the market principle. And the gratis quota is obviously usurping the public resources that ought to be shared with all people. The public would have to pay a lot to gain clean products and environment. Conversely, the auction systems of RGGI make sure that the quota is distributed by the market in public. The auction participants do not only need to register in the RGGI COAT, but also gain the confirmation of the member states. As what mentioned in the former part of auction, it is widely open to all subjects in the market for the same price and opportunities. The profits would be used to improve the environment projects by the member states in advance [9].

4.2. The Possible Solution and Improvements

The most vital solution is the official national law of carbon emission trade system. It should give the clear legal attribute of the carbon emission rights. And it needs to provide sufficient room for local laws to complete the content of local emission trade systems. The real rights must be listed in the Civil Code. While the administrative licensing only requires the local government to establish the procedure of application and examination. Therefore, the most proper attribute of carbon emission right defined in the law should be the administrative licensing which is allowed to be traded in certain market under the regulations of the government. In that way, the local government could set the local

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carbon emission systems according to their conditions, bound by the united national law of carbon emission [10].

Respecting the differences between the provinces, proper autonomy will allow the offset procedures and information platform to be more flexible, maximizing the potential trading volume of market [11]. For the distribution, the application of auction form should be promoted step by step. Starting with the flexible industry, paid quota would help the system to be more open and active. Since the local government tends to favor the local and established enterprise due to the tax. The national law of carbon emission must forbid them to erect the barricade for the newcomers. Additionally, third-party institution could join the supervision along with the government to verify the angles of management. The system should be open and fair with the support of both administrative and legal powers.

5. Conclusion

It is a difficult task to pursue the goal of reducing carbon emission while keep a high economic growth rate. The carbon emission trade system, however, is a possible solution to strike a balance between them. Considering the population and both historical and current emission volume, China and the US are certainly the two of the most suitable countries to carry out the practice. The difference is that the US has the experience of that practice over thirty years and a better tradition of market environment. Through the comparation, it is obvious that the national law of carbon emission is required by the market and the system should be flexible to offer local government sufficient autonomy. Either the introduction of auction or the authorization of local governments is to coordinate the economy with the current situation. With these measures being taken, there might be a way that keep the perfect balance between the economy and the reduction of carbon emission in China.

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Research on Climate Change Legislation in UK

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Abstract: Since the 1760s, the first Industrial Revolution began in England, the steam engine which burns coal appeared. The steam engine could produce many kinds of poisonous gases such as CO, SO2 and NO2, these gases turned London into The City Of Fog. About one hundred years later, With the advent of the second Industrial Revolution, our human beings entered. The age of electricity, but limited by the technology of the time, in order to produce electricity, people still need to burn coal, this could also produce much greenhouse gas. For about a century, with the development of technology, our human step into the information age. Although the technology has advanced rapidly, there are even more fields that need fossil fuels to be burnt. Especially there are more and more cars on the rod and a large amount of them use petrol to run. There are also more and more industrial and residential use of fossil fuels also leads to the production of greenhouse gas like CO2. Besides, the wide use of the air-conditioner and refrigerator has caused a large amount of freon leak and leads to the problem of the Ozone layer hole above the South Pole. Because the greenhouse effect is becoming more and more serious and cannot be ignored,and other extreme natural misadventures happen around the world from time to time, how to solve these problems has become a hot topic to be discussed and it has become an urgent problem to be solved.

Keywords: climate change, international law, UK

1. Introduction

Environmental problems have received more and more attention in recent years. The reason is that the earth is our home for survival and development, and the frequent occurrence of extreme weather events in recent years has greatly threatened our human beings. Based on the analysis and research of the current climate situation and climate legislation in the UK, combined with the greenhouse gas emissions caused by the plastic industry, this paper puts forward suggestions for the UK to reduce the production and use of plastic to reduce carbon emissions. This paper mainly uses the methods of literature research and case study to study the existing legislation in the UK, such as the Climate Change Act and the carbon emissions of plastic industry. After the literature research and case study process, the conclusion is that the British government should maintain current law and based on this new for personal about reducing carbon emissions, reduce use of plastic products, such as providing a basic law to make local policies such as paid use of plastic bags, plastic coffee cup, plastic straws and other plastic products as well as to the renewable materials and recycled plastics, Policy support for the use of materials such as high density polyethylene (HDPE), low density polyethylene (LDPE), polypropylene (PP) and polystyrene (PS).

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2. The Practical and Legal Situation in UK

As far as we know, in recent years, climate change on a global scale has become more and more extreme, with the higher frequency of extreme weather, such as hurricanes and bushfires, increasing around the world. The United Nations has always taken climate change, especially global warming, very seriously. Under its leadership, countries around the world have signed several agreements such as the Kyoto Protocol, the Paris Agreement and other documents to set emission reduction targets to keep climate situation from becoming worse and worse. It also calls on governments, enterprises and even the civil society organizations to take measures including but not limited to accelerating energy efficiency, phasing out the use of coal energy, and taking action to achieve climate-friendly transportation to limit global temperature rise to 0.5 degrees Celsius [1]. While calling on governments, enterprises and social organizations to take the above actions, the United Nation is also actively providing countries with the significance of energy transformation, so that governments will be more interested in energy transformation, so as to carry out their own domestic energy transformation that based on its national conditions. For example, the significance of converting traditional fossil energy into renewable energy is that renewable energy is everywhere and easy to obtain. The price is relatively lower, the use cost is low; Emissions of air pollutants and toxic substances can be significantly reduced, with less harm to human health; if the government use the Energy transition, it could create about 30 million jobs by 2030 [2]. It can be seen that not only the United Nations but also its member states have taken a positive attitude towards the control of climate extremes and have made positive responses to the control of climate deterioration, contributing their share to the control of global climate deterioration.

As an important part of the United Nations, the British government has also made many efforts to make climate change situation under control.

2.1. The Climate Change Situation

The climate of Britain is a temperate Marine climate in geography, with no severe cold in winter and no severe heat in summer. Precipitation is evenly distributed throughout the year. But in recent years Britain's climate has become more and more extreme. Britain issued its first-ever red alert for extreme heat on July 15 and declared a national emergency. As temperatures rise, so does the problem of drought appear. London, August 12 (Xinhua) -- In order to help the government, research institutions and the public to understand climate change and its impact on the country, the British government announced on December 12 that 8 out of 14 regions in England were in drought after experiencing the driest July since 1935. This is the first drought in England since 2018 [3]. On 28 July 2022, the State of the UK Climate 2021 Report was released, which reviewed the state of the climate and major meteorological events in the UK in 2021. The report points out that in the context of global warming, all parts of the UK continue to warm up and sea levels are still rising. In terms of temperature, the annual maximum temperature, the average summer temperature and the average winter temperature in 2021 increased by 0.8 ° C (reaching 32.2 ° C), 1.5 ° C and 1.8 ° C, respectively, compared with the 1960-1990 average, with the overall increase in the UK slightly higher than the global one. In terms of sea level change, around the UK sea level has risen by about 16.5cm since the 1990s, roughly in line with global sea level rise. However, the rate of increase is accelerating dramatically, from 1.5 mm/year in the last century to 3.0-5.2 mm/year in the last 30 years, and coastal areas are increasingly threatened by storm surges and wind waves [4].

2.2. The Current Legislation on Climate Change Issues

As climate conditions continue to become worse, lawmakers around the world are reexamining their methods to solve climate change problems. The UK's Climate Change Act of 2008 is one of the

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earliest and most prominent examples of climate change framework legislation around the world. Britain is not only the birthplace of the industrial revolution, but also a pioneer in the development of a low-carbon economy society in the 21st century. On 26 November 2008, a week after it was passed by Parliament, Royal assent was given to the Climate Change Act, making the UK the first country in the world to legislate unilaterally domestically to reduce emissions in response to climate change [5]. The Climate Change Act (herein after referred to as "The Act"), which sets legally binding targets for reducing greenhouse gas emissions by 80% below 1990 levels by 2050. During its passage through Parliament, the legislation was widely regarded as a historic step. Implementation initially went smoothly. Recommendations from the Committee for the first three carbon budgets (up to 2022) were agreed by the Government in 2009. A newly created Department for Energy and Climate Change was immediately set up to develop a Low Carbon Transition Plan to deliver these budgets. The 2010 general election saw the formation of a coalition Government which the new Prime Minister said that the British government would be the “greenest government ever” [6]. It enjoyed broad political support, was commented as "revolutionary" by political leaders and the media, and was widely welcomed by social groups, especially the environmentalists, trade unions, and the business community [7]. By setting ambitious targets in the UK, strengthening the implementation of tasks, strengthening the institutional framework, and clarifying the specific and normative responsibilities of the House of Commons and the highest legislative body, this initiative opens a new way to address and respond to climate change. The bill commits the UK to reducing greenhouse gas emissions by 80% by 2050, compared with 1990 levels, and sets a "carbon budget" for the next five years. It is the world's first bill to set a target for reducing greenhouse gas emissions. At the same time as the Climate Change Act was passed, a committee on Climate Change was independently set up to advise the government on how to meet the 80% target, and to make its recommendations known to the public so that in future the government could be asked to explain why one of its recommendations had not been adopted. In addition, the bill mentions measures such as climate change impact assessment, the purchase of international carbon credits, support for adaptation to climate change, and further provisions including the introduction of an "emission reduction obligation" system for local governments and large corporations that are subject to carbon trading schemes.

3. The Impact That Climate Change Brings to Relevant Legislation and Corresponding Legal Suggestions

3.1. The Impact of Climate Change

As we can see from the previous text, the United Kingdom government has a positive attitude towards climate legislation. And it is trying to climate legislation positively. It provides the countries around the world with an exemplary plan to slow and even provides a train of thought to deal with the possible situation of climate change in the predictable future [8].

3.2. Suggestions on the Legislation

In the Climate Change Act, the UK has already made several goals and suggestions to be achieved and go all out to reduce carbon emissions in many ways. However, reducing carbon emissions is only one part of the solution to stop the future climate becoming more and more extreme. In addition to reducing the consumption of fossil fuels and other measures, this paper considers that the British government should introduce relevant policies to cut down the use of plastic products in many fields especially in the food and beverage industry, food packaging, or introduce relevant policies to make factories reduce the production of plastic products since plastic has a non-negligible contribution to global greenhouse gas emissions and climate change. Because of the plastic produce industry expands rapidly around the world, the plastics industry has won the first place of industrial greenhouse gas

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emissions. A couple of facts proved that greenhouse gas emissions from oil Wells to refineries in 2015 were estimated to be 68 million tons of carbon dioxide equivalent (CO2e) by determining the weighted average carbon intensity of oil well energy production from 8,966 fields under construction in 90 countries around the world, based on the distribution of approximately 4% crude oil as a plastic feedstock. GHG emissions come not only from the process of manufacturing, but also from the process of extracting and transporting plastic raw materials and managing plastic waste and prevent plastic entering the environment. Geye reported that in 2014, 72 plastic produce factories in the United States emitted approximately 17 million tons of carbon dioxide equivalent during plastic manufacturing. Emissions from the well to production are under the control of the production facility itself and often depend on equipment efficiency, configuration, and service life. Moreover, plastic's impact on the global climate doesn't stop when it's thrown away. In fact, most of its impact on climate occurs after the end of its lifetime. Recycling, landfilling as well as burning are useful measures to manage and deal with the plastic wastes. Several facts proved that plastic packaging waste incineration produce much carbon emission, In 2015 the net emissions were estimated at 16 million tons. With the continuous production of plastic, the net emissions from plastic packaging waste incineration will increase to 84 million tons by 2030 and by 2050, the number will rise to 309 tons [9]. Thus, it can be seen, reducing the production of plastic products is a very important solution to solve the problem about how to reduce the speed of climate warming. In addition, the United Kingdom government should give more positive support to both the research and the researchers to invent new renewable materials, which aims to cut down the large amount of plastic produced and used while providing equal quality alternatives, so that the gradual elimination of plastic can be gradually achieved while keeping a balance between the needs of people and the progress of the plastic elimination. In the field of construction, the use of renewable materials is an example. Buildings are responsible for about half of the United kingdom's national CO2 emissions, but this only takes into account operational energy. However, this is just the amount of energy people use to live in a building or otherwise use it. However, this figure does not take into account the embedded energy -- the extraction or manufacturing of materials and products used in construction projects, or the transportation and assembly processes

The energy consumed in. This is often counted as operating energy in the industrial and transport sectors, but in reality, these emissions are caused by demand in the construction sector and should therefore be more accurately included in the environmental impact of that sector. Thus, it can be seen that the true impact of the construction industry in terms of life cycle assessment (LCA) accounts for almost 57% of total United Kingdom carbon emissions [10]. The goal that buildings must be carbon neutral or negative by 2030 is about to require significant to make an effort to reduce the specific impacts and operational impacts of buildings using mostly renewable materials [7]. Taking this as an example, we can see that the use of renewable materials in all walks of life can play a decisive role in reducing carbon emissions.

4. Conclusion

The purpose of this article is to analyze the current climate situation and climate legislation in the UK and analyze the greenhouse gas emissions caused by the plastic industry, the analyze if the Act is suitable of the recent situation of the climate change in the United Kingdom, then put forward suggestions for the United Kingdom about several possible measures to cut down the production and use of not-environmentally friendly plastic in industry and citizens' daily life.

In this paper, the suggestion is that the British government should maintain current law especially the Climate Change Act and based on these laws to add more restrictions to individuals about reducing carbon emissions, reduce use of plastic products, such as providing a bill to provide support to local policies, such as pay for the plastic bags in the supermarket, plastic coffee cup, plastic straws

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when people order take-out in the cafe What's more, giving both political and financial support to the research and development of the plastic products as well as the renewable materials and recyclable plastics, For example, the government should pay more attention to the research and development of high density polyethylene (HDPE), low density polyethylene (LDPE), polypropylene (PP), polystyrene (PS) and other materials and give some proper support.

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Social Inequality Caused by Climate Change and Legal Countermeasures to Achieve Social Justice: A Specific Insight Towards Africa and Middle East Regions

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Abstract: Apart from the environmental effects resulted from global climate change, social impacts can not be ignore while tackling climate issues. The association of human rights and scarce resources are causing growing consequences of social inequality,especially in Africa and some Middle East regions. This paper is targeted to explain the formation of unbalanced distribution of resources of vulnerabilities and demonstrate the countermeasures of legislation after the role of legal managements' role are clearly identified. The Uae, Saudi Arabia, Ethiopia and Kenya are countries specifically researched on as being some of the most severe region affected by rising water.

Keywords: climate change, social inequality, social justice, Africa and Middle East regions

1. Introduction

While climate change is becoming a crucial issue that are faced by human globally, people are struggling making environmental protections and ignoring a side effect caused by rising temperatures, whereas some specific groups of people are facing a severe inequality of resource allocation and deficient protections, they encounter medical deficiencies, susceptibility to infection, and homelessness, creating a vicious cycle that will grow until more and more people are harmed by the warming climate. As an example, sea level rise has negatively impacted the safety and way of life of many coastal residents, and rising temperatures are having a significant impact on the Arctic ecosystems that support many indigenous communities. Some regions are heavily impacted than others, with more obvious links to climate change. Additionally, due to recent warming trends, some high-latitude locations, such northeast China and the U.K., have seen a minor boost in production.Maps of the world showing how prepared various nations are to deal with the consequences of climate change have been revealed by specialists in the field. 192 countries are graded according to their "vulnerability" and "readiness" to provide an overall assessment of their future. Overall, the results reveal that Scandinavian countries and the UK are among the most likely to survive - butareas of sub-Saharan Africa will be hardest hit. During the longitudinal fight towards climate justice, the consensus of social justice can be more intractable than physical effects and complex to explain owing to the various interactions between climate and humanity. The duties for society to protect vulnerabilities is vague and legal frameworks currently need further well-establishments to seek a reasonable and balanced solution, this means the attributional style for

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this problem is not united yet. Given that it has long been recognized that the fulfillment of human rights, including the rights to life, health, food, and a high standard of living, depends on a clean, healthy, and functional environment, human rights are inextricably linked to this issue, whereas currently it is both physically and ideologically unsatisfied. The discussion of a balanced society is a permanent issue while all counterparts of humans are longing for a independence from their communities but also cooperation simultaneously, towards the specific issue of climate change.

2. The Formation of Social Inequality and Its Inner Causes

Regional inequality within a nation frequently intersects with inequality based on race, ethnicity, and religion and manifests itself in the form of income and asset disparity, which are some of the justifications for the identification of social inequality. Therefore, social inequality may be used to describe within-country geographical disparity. It should be highlighted that significant disparities also exist within families. Social inequality manifests itself in several ways, with women, refugees, those who are stateless, the elderly, etc. as its physical victims.

There are disparities based on demographic traits including gender, race, ethnicity, religion, and age that categorize people into social groups. Regarding assets and income, there is a second sort of inequality. Inequality in public decision-making and access to resources, such as publicly funded health, education, housing, and other services, is a third sort of inequality. It goes without saying that these many inequities are connected. As individuals are only vulnerable and unable to access existing resources when they are dealing with problems like healthcare, housing, food, and jobs as an individual at first, it appears that the impact of social inequality in inner-country areas is an indirect result of climate change. However, when the problem becomes more serious and forms a regional problem, or a regional problem for a certain group, the social inequality becomes more apparent and more difficult to solve. It illustrates how the relationship between social inequality and climate change is marked by a vicious cycle, in which initial inequality leads to disadvantaged groups experiencing the negative effects of climate change more severely than other groups, which then results in increased subsequent inequality. For instance, some persons suffer economic losses immediately following a climatic hazard, and thus are classified as a disadvantageous group. Additionally, climate risk has a negative impact on prices and markets, which can cause indirect losses for disadvantaged groups and make them more vulnerable and raise the susceptibility to the consequences of climate change over time.

3. Social Inequality, Human Rights and Social Justice

Climate change is having a profound effect on human rights, whereas the poor, women and climate refugee and other vulnerable groups towards the warming weather are suffering from losing various kinds of resources and lose their rights to access higher quality lives or sometimes even lose their ability to resist the illness and other damages that extreme climate inflicted to live healthy and stably. The African Union Commission rural economy and agricultural commissioner Josefa Leone Correia Sacko said that the weather and climate of Africa became increasingly greater, causing various disasters and damaging economic, ecological and social systems. It is estimated that by 2030, if appropriate response measures are not taken, Africa will have as many as 118 million extreme poor people (that is, living expenses less than 1.90 US dollars/day) to face the risk of drought, flood and extreme high temperature. This will significantly impede prosperity and add new obstacles on efforts to reduce poverty. She suggested: "The Sahara area of southern Africa may see a further decline in GDP to 3% by 2050 due to climate change. Additionally, there are more and more people who are afflicted." Temperatures, hydrologic conditions, ecosystem health, and agricultural output are already being impacted by climate change in numerous areas. For other populations, slike those in the Arctic

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that is fast melting and low-lying coastal areas, displacement is also a real possibility [1]. The failure of accessing resources including food resources, accommodation and healthcare are a result of the failure that the rights for certain groups of people are not satisfied. The issue of right to food accessing, right to have adequate standard of living, rights to health and right to housing should be considered and the concrete elaboration is shown below.

3.1. Water Resources

According to the 2018 World Water Development report, water consumption would rise by 20-30% by 2050 as a result of changes in wealth and population. Around 3 billion people would likely live in areas with severe water shortages as a result of the probable decline in global water supplies [2].

Apart from decreasing water resources, The increased frequency of extreme weather due to warming will exacerbate the uneven distribution of water resources, making less water available in arid areas, while flooding is more frequent in water-rich areas.

Climate change will have a significant effect on people's lives and livelihoods, especially those of the poor, by affecting coastal resources and water resources system through water-related disasters that cause fatalities, damage to infrastructure, and destruction of economic assets.

3.2. Healthcare

There is evidence to show that in certain places, climate change has already made health problems worse. The following significant health impacts might occur if climate change develops as predicted under various scenarios: a higher risk of undernutrition due to decreased food production in underdeveloped areas; health effects resulting from impaired labor capacity increased risk of food-, water- illnesses, as well as decreased work productivity in susceptible groups; and a higher risk of undernutrition due to increased risk of harm, illness, and demise brought on by more intense heat waves and fires.

3.3. Food

Due to the fact that food security is a complicated and multifaceted idea that includes availability, access, use, and stability, it affects people’s lives in various aspects.

The majority of dry subtropical regions' surface and groundwater resources will be significantly depleted as a result of the warming effect of climate change. This will make agriculture, ecosystems, urbanization, industry, and energy production more competitive for water, which will have an impact on regional water, energy, and security of food.

3.4. Human Settlement

A World Bank report released last year warned that up to 216 million people would become refugees by 2050, including 86 million from sub-Saharan Africa, 49 million from the Asia-Pacific region and 40 million from South Asia. The refugees here are “climate refugees” while this term does not have a certain identification internationally, in the paper, climate refugees are simply considered as people who loss their original settlement due to extreme water associated to climate change.

According to an April 24 report in the Nihon Keizai Shimbun, the abnormal weather accompanying global warming is creating a large number of "climate refugees" in many places, and the number is already three times the number of refugees caused by armed conflicts, and some estimates show that the size of climate refugees may exceed 200 million by 2050. Natural disasters know no borders, and countries must cooperate on disaster prevention and refugee issues.

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"While flash floods occur every rainy season, they are different in frequency and scale," said Neil Titomamer, an expert with the Office of the United Nations High Commissioner for Refugees. He traveled by helicopter to the tribal areas of northern South Sudan in March and witnessed some unusual phenomena.

4. Legal Countermeasures and Effectiveness

4.1. The Role of Law

Numerous interventions are required to meet the adaptation imperative. Although the rule of law may not be an objective in itself, many proposed adaption measures will need solid legal support.

The discussion that came before it aimed to shed light on the different functions that law can play in encouraging societal adaptation to climate change. To optimize coping capacity with unpredictability change, and to reduce injustices or disparities brought on by the uneven consequences of climate change, the implications of climate change must be taken into consideration while developing, revising, implementing, and enforcing legislation. While not specifically related to climate change, certain significant aspects of the issue when combined create an unprecedented legal difficulty that will affect the selection, creation, and implementation of adaptation policies and legislation [3].

Human rights laws will offer a significant safeguard against the creation and use of adaptation strategies. As has already been mentioned, groups and communities who are already at a disadvantage due to their socioeconomic condition, age, health, or geographic isolation can be more severely impacted by the effects of climate change. International attorneys are already studying the ramifications of the global phenomenon of climate refugees. Legislation that implements adaptation laws must itself lessen any possible discrimination or socioeconomic inequities, in contrast to how adaptation methods will need to address the social justice implications of climate change at the national level. To ensure that the creation and use of adaptation laws address inequality and do not increase pre-existing causes of social vulnerability, it is possible to apply both human rights and anti-discrimination legislation.

With the goal of limiting vulnerability to climate change and improving living circumstances, the National Strategy for Climate Change was developed for the progress of the African and Middle Eastern regions [4].

4.2. Relevant Legislation in Africa and Middle East Regions and Progressive Differences

This part mainly focuses on four countries: The Uae, Saudi Arabia, Ethiopia and Kenya as some typical places affected by climate change.

Overall Objectives and Approaches. For Kenya, in April 2010, the National Climate Change Response Strategy was established by the Ministry for Environment and Mineral Resources (NCCRS). The main goal of the paper is to make sure that adaptation and mitigation strategies are incorporated into all government planning goals. The subjects covered range from research and development (R&D) and climate governance to adaptation and mitigation, with suggestions for the establishment of carbon markets and green energy. "Promote integration of climate change adaptation in agricultural development plans and policies," the 2011 administration pledged. The Policy aims to help local communities create quick adaptation mechanisms and furthermore looking into establishing a drought management authority and a drought emergency fund to "ensure rapid response to climate change related calamities" and more efficient drought prevention, preparedness, and mitigation mechanisms.

Ethiopia wants to break the link between growth and the use of nonrenewable resources and greenhouse gas emissions. According to the GTP, in order to reach middle-income status before 2025

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and become carbon-neutral, countries must boost agricultural production, improve their industrial bases, and encourage export growth. Economically, this entails expanding quickly enough to raise GDP per capita from its current level of roughly USD 380 to USD 1,000, reducing agriculture's contribution to GDP. Using a sectoral approach, the CRGE program outlines over 60 measures that could assist Ethiopia in limiting emissions in 2030 to current levels. The CRGE also addresses Ethiopia's present climatic variability and potential future climate change by supporting climate resilience. This is crucial since Ethiopia's social stability are rather vulnerable to climate change and extremes. The economy is based on agriculture, which is mostly rain-fed and very vulnerable to variations in rainfall [4].

Fossil fuel exports, which are one of the primary causes of climate change, form the backbone of its economy nearly entirely. Saudi Arabia, on the other hand, is particularly susceptible to the negative consequences of global warming due to its desert climate.

Internationally, the UAE aggressively supports clean energy as a function of mitigation through both development aid and business investment. Through the Ministry of Foreign Affairs, the UAE hosts the International Renewable Energy Agency (IRENA), the principal international venue for cooperation in renewable energy. The first significant international organization with a Middle Eastern headquarters is IRENA [4]. A reduction in biodiversity, a major danger of coastal flooding, and serious water supply issues are all shown by research in the UAE. In this case, adaptation measures is required.

This paper also suggests utilizing religious themes to frame information about climate change. The majority of the aforementioned regions revere and are loyal to their religious leaders, hence religious leaders have a higher chance of influencing them than government officials do. The report also urges enthusiastic inclusion of climate change education in the curriculum to help kids have a thorough grasp of environmental issues, particularly the threat posed by climate change. Such a strategy will guarantee that children are made aware of this issue from a young age, as well as that they incorporate this knowledge into other areas of their lives and are aware of potential interventions [5].

Finally, considering the suddenness of climate disaster, even the emergency measures are necessary, which includes how to distribute resources to those in need in a short time, and also test the resistance of vulnerable groups.

Water Managements. Kenya approved a new water strategy for the management of its water resources. The strategy identifies certain particular actions to address issues that are directly related to climate change in view of the challenges provided by the the increasing temperature and the fact that "industrialized agriculture contributes on a huge scale to climate concerns." These include working together to implement a Disaster Management Policy. The UAE has also made energy demand management measures (particularly through sustainable policy planning) a key component of its long-term economic planning in response to rising energy consumption and its steadily expanding population [6]. Access to specific agricultural water management technology has significantly reduced poverty in Ethiopia. If this is the case, it would be helpful to know which AWM technologies had the greatest effects. In comparison to a rainfed system, the incidence of poverty was found to be reduced by 37%, 26%, 11%, and 9%, respectively. All technologies were found to have a significant impact on reducing poverty.

Food Resources. While considering the food environment and management, in Saudi Arabia, the Healthy Food Palm Dietary Guidelines were established by the Ministry of Health in 2012 to offer individuals and health care professionals culturally appropriate advice on healthy diets. These meals nutritional guidelines, which were meant to be utilized by healthcare practitioners, offered age-appropriate details on the daily recommended food group intake., included in awareness campaigns, and taught in schools [7]. All edible items must abide by the regulations set forth by the SFDA and the Gulf Standardization Organization (GSO) in KSA [8]. Technical rules that serve as a

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stand-in for national policies and norms that member countries may choose to accept are the two types of regulating documents that the GSO issues [9]. The SFDA began enforcing general labeling rules on exported and domestically made packed foods that were sold in the nation's markets in 2013. Products had to contain a thorough ingredient list that was written in Arabic and listed them in alphabetical order. All prepackaged foods and beverages sold in Saudi Arabia were subject to an updated nutritional labeling requirement in 2018, in accordance with the GSO's technical regulation [9]. This restriction did not apply to spices, tiny packets, fresh fruits and vegetables, or containers containing only one nutrient or ingredient because they had very low levels of macronutrients, SSF, and/or TFA.

Despite the hard climate, lack of water, and small amount of rich soil, the UAE is determined to grow its own food, as evidenced by its agricultural program. The UAE is committed to maintaining food security, which includes doing this [10]. The state owns 85% of the land in the United Arab Emirates, especially in the Emirate of Abu Dhabi, which nonetheless permits its citizens unfettered access to farms. Significant oversight of these farmlands is also performed by the Ministry of Environment and Water (MEW)[11]. Moreover, consideration has also been given to food waste. One of the places with the highest rates of food waste is typically thought to be the nations that make up the Gulf Cooperation Council. Food waste makes about one-third of all trash produced in the United Arab Emirates, according to study done in 2009 and released by the Abu Dhabi Waste Management Center [12]. A portion of the problem could be solved by composting and recycling much of that garbage for animal feed. Food waste accounts for 38% of daily food consumption in Dubai and 33% of garbage created annually in Abu Dhabi [13].

The existence of elements including food costs, composition, safety, labeling, advertising, availability in contexts like schools, and food trade policies is also accepted. The availability, acceptability, and appeal of food for a person or a community are all included in the category of "food settings"[14]. According to statistics from Ethiopia's Demographic and Health Survey, there are considerable differences between the dietary diversity of children in urban and rural regions, with a greater diversity in urban areas. Surprisingly, disparities in household affluence, parental education, and access to healthcare between rural and urban regions account for the majority of the rural-urban discrepancy in dietary variety [15].

Ethiopia still has limited rural market integration compared to many other nations, with an average distance of 10.9 kilometers for a rural household to travel to a weekly market [16]. However, markets are really becoming more efficient. Markets are becoming more integrated, at least for cereals, and wholesale market margins are drastically shrinking [17]. With the rising urbanization and expansion of secondary cities, market functioning is anticipated to further improve.

Energy Strategies. The emirate of Abu Dhabi created the first renewable energy goal in the area. Waste-to-energy, wind, and solar photovoltaic (PV) projects are all now in the planning stages. To reduce the emirate's high gas costs for water supply, Abu Dhabi are also testing solar desalination.

Energy access is a crucial component of Ethiopia's economic and social growth.

In 1994, Ethiopia approved its national energy policy. Only 23% of the people in the country, who make up and over 80% of the population, have access to power. In Ethiopia, conventional energy sources are the main energy sources. The other 5% of Ethiopia's energy needs are satisfied by electricity, the bulk of which is produced by hydropower, and the remaining 95% by fuel wood, agricultural waste, and human labor [4]. The study paid particular emphasis to R&D aimed at expanding technological expertise in the field and upgrading the energy industry by eschewing conventional energy sources, all while preserving and safeguarding the environment. Despite the fact that a new one is currently being produced, this energy policy paper is still in effect.

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5. Conclusion

The global climate change has strong effect on Africa and Middle East countries and social inequalities are formed due to lack of access to various resources such as water, food, energy and settlement. Meanwhile, human rights are affected as certain groups of people's ability to access resources are weak. In order to reach social justice, legal countermeasures play an important role in alleviating inequalities and issues about human rights. Compared with the environmental damage caused by climate warming, these problems are often ignored and a closed loop has been formed. The susceptibility of vulnerable groups will become stronger and stronger, so if reasonable resource distribution is not developed, social inequality will intensify. The policies in Kenya, Saudi Arabia, UAE and Ethiopia are demonstrated respectively, differences and progress can be seen. With the creation of the Ministry of Environment and Forest in Ethiopia, Middle East and North Africa have made some headway, and the Environmental Protection Agency was promoted to the status of a ministry, making it better equipped to handle the technical challenge of developing a climate-resilient green economy. Those investigated regions have made positive managements in order to mitigate and adapt climate change, especially towards agricultural and water management aspects as one of their main consideration. In the next three decades, countries will also need to strengthen the supervision of the planned plans, reasonably arrange the allocation of necessary resources to the distribution of disadvantaged groups and the use of energy, and try to solve the problem from the root. Social justice is a continuous proposition, and the negative impact on society is deeply rooted. It needs people to actively cooperate to achieve a more harmonious society. This is why adaptation is a huge challenge facing society in addition to reducing exhaust accidents. Based on the sudden nature of prevention, emergency treatment plans are also needed.

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Recommendations for Improvements under the United States Current Environmental Law

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Abstract: As the global climate became more and more unpredictable and devastating in the past few decades, the discussion on the avoidance and remediation of climate-related activities was attracted exclusive attention both in the international and national level. As a result, environmental laws and policies were enacted to urge the public as well as governmental officials to both restrict greenhouse gas emission and reduce exploitation and deforestation. This article focuses on identifying the gaps between the environmental laws in United States and international environmental laws or policies, and propose innovative or alternative solutions that the government could adopt in within a pragmatic scenario. More specifically, this article emphasizes on three approaches: climate funds, insurance, and healthcare. The three approaches altogether examine the potential improvements of U.S. environmental laws in the perspectives of economics as well as social security. Therefore, it is determined that the eventual influence on the entire society, if the nation emended the law, would be considered cross-sectionally beneficial.

Keywords: environmental law, United Nations Framework Convention on Climate Change, United States

1. Introduction

It is undeniably true that the discussion on the topic of climate change has raised public and political awareness in the past few decades. As stated by NASA, climate change refers to the alterations, which in majority emerge as consequences of greenhouse gas (GHG) emissions, in local, regional, or global weather pattern [1]. To combat this situation, more than 190 parties, including the European Union, participated in international conventions initiated by the United Nations Framework Convention on Climate Change (UNFCCC), such as the 1997 Kyoto Protocol and 2016 Paris Agreement, to align emission and temperature goals and provide climate finance to developing countries [2,3].

Serving as a central guidance, the United Nations (UN) was widely reputed for its multiple programs that stimulate the development of comprehensive and effective international environmental policies. According to Young, a researcher from the University of California, Santa Barbara, the growth of international environmental laws or regimes spurted especially in recent decades; these regimes, including the 1987 Montreal Protocol and aforementioned conventions, served the purpose of mobilizing individual nations while generalizing the applications of regulatory activities as they recognize national sovereignty and assert that only consensual epistemic narratives will eventually

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be effective [4]. Therefore, it is unanimously conceived that international environmental laws are taken into account in evaluating conduct rather than being conduct themselves.

Taking the domestic environmental laws of United States, the Constitution was empowered to first delineates general governmental capacities, then the Congress and president together are responsible for enacting statutes for implementation of the aforementioned constitutional authorities while the president also plays the role of steering administrative agencies in the alignments with the political goals, and at last the Courts are authorized for interpreting the Constitution, statutes, and agency regulations [5]. Considering the effect of this hierarchical structure, in which upcoming statutes are frequently enacted while existing ones are frequently amended, the overall legal system forbids efficiency as the process could be slow and contentious.

2. Recommended Solutions

2.1. Potential Strategies

According to the United Nations Framework Convention on Climate Change (UNFCCC), climate finance is local, national, or transnational funding from public, private and alternative sources that seek to support climate change mitigation and adaptation actions [6]. The Climate Fund is one of the United Nations' important programs to tackle climate change, so it should and needs to improve through the implementation process to address the inactivity problem in the United States and increase the efficiency to address the concerns brought by climate change. To create or dedicate funds towards the most vulnerable group, several nations have established or adopted rules to direct monies for combating climate change to the most vulnerable individuals, communities, and groups. Climate funding would be the most effective and direct way to help the vulnerable population. Significant financial expenditures are needed to combat climate change, such as new energy systems and resilient infrastructure. But ignoring the climate costs even more, strict regulation and insistence on climate funds are vital to confront climate inactivity and genuinely assist more people. This would be one of the most efficient ways to assist the most vulnerable population in avoiding and recovering from the harm caused by climate change. Due to enduring gender stereotypes and discrimination, they are frequently disproportionately impacted by the effects of climate change, which exacerbate already existing gender inequities.

From an economic and humanitarian point of view, a greater proportion of natural disaster risk should be borne by insurance companies, that is, to maximize the spread of risk. Over the past 40 years, the insurance gap has narrowed in industrialized countries, where today half of all losses are covered, up from a quarter in the 1980s. In response to the growing realization that insurance solutions can play a role in adaptation, as suggested in the UNFCCC and the Kyoto Protocol, the Munich Climate Insurance Initiative was initiated by Munich Re in April 2005 [7]. This initiative, formed by insurers, climate change and adaptation experts, NGOs, and policy researchers aims to develop insurance-related solutions to climate change, including identifying future risks and promoting measures, in cooperation with other organizations and initiatives and conducting pilot projects. On average, international assistance will only cover about 9% of the total cost of a disaster. In many cases, individual households have to pay for costs of losses and damages themselves or wait months for government assistance or donor aid [7]. By building on natural players, such as local associations, cooperatives, or savings and credit groups, insurances have access to established delivery mechanisms, ensuring payouts are timely, and well-targeted and will cover more of the damage than traditional donor payments. Quicker payouts reduce the need for households to take out a loan, migrate for work or take a child out of school to get back on their feet.

Indeed, the profound effect of climate change has ultimately undermined the physical well-being of the public. According to the United States Environmental Protection Agency, the present climate-

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related phenomena, including high temperature, bad water, and air quality, extreme weather activity, and food insecurity, have inflicted a variety of health complications, such as vector-borne diseases and mental illnesses [8]. Climate Change has affected a wide range of populations, especially those who are considered a vulnerable group, or populations of concern. These people, including children, older adults, and low-income populations, are not only sensitive and exposed to climate-related activities, but also unable to adapt to these changes. Therefore, to shield the public, particularly the vulnerable group, from catastrophic events caused by climate change, the United States Centers for Disease Control and Prevention (CDC) has developed a framework, entitled Building Resilience Against Climate Effects (BRACE), which will effectively encourage public health agencies to optimize and prioritize medical interventions [8].

2.2. Specified Methods

Climate Funds. For climate funds, these initiatives are supported through the annual State, Foreign Operations, and Related Programs (SFOPS) appropriation and are proposed in the President's budget under the International Affairs function (Function 150) [9]. Numerous initiatives are supported at the level of the agency subaccount, with allocation decisions left up to the agencies with input from Congress. Other federal agencies are funding some more overseas aid. Congress oversees and regulates American federal support for climate change projects in lower-income nations. The House and Senate Committees on Foreign Relations and appropriations, as well as the Committee on Financial Services, have jurisdiction over foreign affairs and appropriations in Congress. Regarding international climate change assistance, Congress engages in several activities, such as authorizing federal agency programs and multilateral fund contributions, allocating funds for those authorizations, advising the agencies on authorized programs and appropriations, and monitoring U.S. interests in the programs. The climate fund for vulnerable populations is mainly focusing on implementing solutions under the “adaptation” category, which aims to assist the vulnerable population in the United States with reducing their vulnerability to climate change impacts and building climate resilience. The funds raised by the climate fund are primarily directed toward and used to address the issues listed below, and the specific actions and functions are indicated.

Repairing and constructing the infrastructure of the community. It emphasizes on the enforcement of risk assessments of the community’s infrastructure after damaging and destroying, reparation of the demolished infrastructure of the vulnerable community to maintain citizens’ human rights and normal life, cooperation with local state institutions and local government, and the design of infrastructure with high durability and safety.

Urban Planning and Warning Systems. This approach incorporates risk evaluations in house design, rural development initiatives, and urban planning with a particular focus on vulnerable areas, sets up the services and infrastructure required to stop extreme weather occurrences from becoming catastrophes, disseminates warning information throughout all communities so that residents can seek safety and implement risk-reduction measures, empowers the urban poor access to "cheap and well-located land to prevent additional unplanned settlement expansions" that increase susceptibility to climate change.

Displacement and Resettlement. Next, this approach emphasizes on conducting risk analyses, offering opportunities for public input, and ensuring that human rights protections are included in all initiatives to manage migration and displacement. It will ensure that those who are momentarily displaced due to climate change-related disasters have access to sufficient resettlement opportunities, that temporary relocation must last only if necessary, and that all displaced persons should have the right to return to their homes without discrimination, eventually following the Guiding Principles on Internal Displacement, which lay out how human rights concerns ought to be included in governmental initiatives to stop and manage internal displacement.

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Access to Food. This is the emphasis on food scarcities and price spikes that are brought on by or made worse by climate-related occurrences. It aims to create social safety nets to guarantee access to food for people negatively impacted by climate change (such as through eviction or loss of livelihoods).

Insurance. In the transition to a green economy, the insurance industry can play a critical role in helping stakeholders manage risk. The Munich Climate Insurance Initiative MCII was established in 2005 by insurers, then the Climate Research Organization, and the relevant United Nations agencies. The insurance pillar has two levels.: firstly, the climate insurance pool covers extreme events and is financed by developed countries; the second is the climate insurance assistance facility, which mainly encourages the private sector to provide public or private insurance for moderate and low levels of clustering risk. Furthermore, relevant institutions should put more effort into the development of meteorological catastrophe models and integrate extreme weather events into disaster models to address the physical risks posed by climate change.

One characteristic of climate insurance here is to give individuals helps and include those population who spontaneously sign up for the insurance to be protected. When a real disaster comes over, funds are used to protect those who have been hurt the most, however, funds are limited to take care of all vulnerabilities and that is why insurance can play a role in it--- buying potential victims' insurance does have contributions for those who are affected and omitted by public funds. Furthermore, as this initiative is mainly charitable, it is expected that certain groups of people can receive the insurance in superior according to climate assessment, identified as those who may be suffering in the next 5 years. Before explaining detailed plans of the insurance industry on vulnerabilities in the policy strategy part, there are some issues that should be noticed.

Financing. First of all, to help more people in different countries to afford insurance that will safeguard their livelihood when disaster strikes, finance would be a crucial approach. In recent decades, the commitment component of the fund has not yet been fully raised, and the relationship partnerships insurers have with these governments, which are critical to finding demand-oriented insurance solutions for low-income countries, have not yet been fully developed. Therefore, Congress may have to reach commitments with the U.S. government's financial support and monitor its contribution to the climate insurance industry, moreover, and increase cooperation and exchanges with insurance companies.

Motivations. There are some objectives for government and other counterparts coincide with insurance institution: support vulnerabilities and use resources in an organized way by cooperating with professional institutions, motivate individuals and establish personal identification and self-awareness towards disasters, in which they hope to seek out public acknowledgment to satisfy a psychological or emotional need, make a positive impact on the lives of others by contributing to a specific organization’s outcomes. People are more inclined to give for public benefit when they are convinced that they will make a lasting and tangible change because of their contribution, forecast and avoid huge workforce loss and homeless people’s existence, make society work systematically and well-balanced.

Social Awareness. While considering insurance holders and complying with the principle that promotes the development and implementation of educational and public awareness programs on climate change and its effects, public access to information on climate change and its effects. US should strengthen public education on climate change and aims to focus on transmitting the uncertainty and catastrophic consequences of short-term physical climate risks to understand the risk protection role of climate insurance. At the same time, it is suggested that the government should gradually shift its focus to pre-disaster risk management to increase public willingness.

Monitoring. It is suggested that the congress should play a role by monitoring. Subsidiary body for scientific and technological advice is hereby established to provide the Conference of the Parties

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and, as appropriate, its other subsidiary bodies with timely information and advice on scientific and technological matters relating to the convention. Monitor the Insurance products which mainly need a breakthrough and sustainable development to help vulnerable groups under climate warming, to enable capital turnover in the most emergency.

Healthcare. To suggest a potential solution for the situation of healthcare for climate-related stresses in the United States, we can abide by BRACE, which was initiated by CDC. According to Marinucci and colleagues, CDC has been one of the leading entities that support public health agencies in the adaptation of climate change, which gives us the credibility of the organization. Emphasizing BRACE, it was developed under a strategic core: adaptive management, which indicates that the manager and stakeholders acknowledge the shortcomings and adjust regularly, based on new updates in information gathering [10]. In addition to the mechanism that BRACE has adopted, the framework also applies vulnerability assessment, which reassures us of its practicability in assisting the population of concern.

Anticipating Climate Impacts and Assessing Vulnerabilities. Step 1 is a combination of two tasks: elaborating on the variety of health outcomes caused by specific climate-related activity and proposing a solution for the vulnerable group. The first task produces a climate and health profile report (CHPR) that comprehensively records the diversity of health outcomes and their climate exposure pathways for a particular jurisdiction. The second task urges public health agencies to conduct vulnerability assessment in either qualitative (e.g.individual household) or quantitative (e.g. magnitude on population) measurements.

Projecting the Disease Burden. Step 2 can be divided into four individual stages: identify climate-sensitive diseases, determine population exposure scenarios, apply general circulation model (GCM) to project health outcomes, and apply geographic information system (GIS) to map the estimated disease burden while accounting for demographic shifts.

Assessing Public Health Interventions. Essentially, step 3 is the stage in which the efficacy of medical interventions is discussed to schedule into implementation. Proposed by a myriad of researchers, the evidence-based public health (EBPH) approach has gained influence. The cost-effectiveness and suitability in a wide range of settings were reassured during the examination of the approach, thus reassuring the potential of EBPH medical interventions.

Developing and Implementing a Climate and Health Adaptation Plan. Step 4 is a crucial part as it aims to develop a unified and elaborated adaptation plan, one that articulates the specific actions, including newly updated or enhanced programs that public health agencies should follow. Public health agencies are also encouraged to collaborate with other public agencies, including housing, transportation, and water quality, to yield a comprehensive and information-sufficient plan. The adaptation plan should be prepared and organized under the consideration of surveillance, feasibility (aiming to be multisectoral), and timespan.

Evaluating Impact and Improving Quality of Activities. Step 5 makes emphasis evaluating previous processes and results (of confronting and resolving climate-related risks in terms of health complications). It is important to note that although evaluation is an indispensable process as it is not only conducted constantly throughout the whole framework but also underscored as the “central tenet” of the adaptive management that is adopted by the framework, step 5 serves as a central discussion in the evaluation system. The reason behind the imperativeness of evaluation is that it validates the methods, determines stakeholders’ engagement, identifies outcomes (improved capacity, stronger partnerships, and additional needs for surveillance), and assesses the impact of implementing BRACE.

3 Conclusion

One of the main issues addressed by the climate fund is that both mitigation and adaptation need significant financial resources to achieve and that the funds invested by investors or given by other

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countries are always capped and fall short of the UN target. Technology development and information exchange will aid in the fight against climate change. Additionally, it will aid in preserving the fund, improving more populations, and aiding more people. If the security council's permanent members work together, the program will raise more money, grow more quickly, and be more successful in resolving the issue caused by climate change. From a different perspective, the Climate Fund presents an excellent chance to encourage cordial interactions between members, foster the sharing and exchange of technologies, increase economic interactions, and make contributions to the globe and human civilization all at once.

The traditional climate change models used by insurance companies and the financial industry, which make heavy use of scarce and inefficient historical data, further underestimate the ongoing evolution of climate change. For insurers and re-insurers, the increasing frequency and intensity of reserve requirements have further increased. Investors and regulators also need to further strengthen the insurance market's industry standards and its management. Solutions are always tailored to local needs and conditions, both in terms of the types of climatic risks a region or community might face, a s well as to the needs and economic abilities of potential clients. For the United States, the western cities should be attached with higher importance due to severe drought. To make insurance affordable, the product can be partially subsidized by governments or other donors. Regional risk pools can also protect the poorest and most vulnerable in case of payment plans need to be tailored to meet the personal and economic circumstances of the client. Those who still struggle to afford a premium might pay for climate risk cover through an insurance for assets (IFA) scheme. Here, they will be awarded a premium in exchange for taking part in disaster risk reduction activities, such as building flood defenses in their own communities. Moreover, Successful climate risk insurance is based on the inclusive and accountable involvement of beneficiaries and other local stakeholders: A transparent insurance that involves communities in the design and implementation is one that generates trust.

Taking the stance of healthcare under climate change, the magnitude of health-related effects has been contentiously debated as these effects intensified not only in a sense of individual severity but also the universal impact on public well-being. Decades before, due to the scarcity of clinical and pathological experiences, it was impossible to yield a comprehensive yet effective report on confronting health-related challenges posed by climate change. However, now we have acquired a framework that is not only elaborated in detail but also prospective in its viability in our society. As noted in BRACE and its methods of adaptive management, constant evaluation of previous progress with accordingly updates should be incorporated in every current or future solution.

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The Difficulties to Define the Climate Refugees and Proposed Suggestions

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Abstract: The problems caused by climate change has drawn more attention form international society. One of reasons is that millions of people are severely influenced and facing the problems of displaced owing to the disasters caused by climate change and the secondary damage, and the number keeps rising. This climate refugees problem is getting serious has not been solved effectively. Thus, it has become more urgent for both international organizations and countries to take actions. The first significant step is to find out the main reasons. However, there are multiple factors caused the current situation of climate refugees, not only environmental reasons but also political reasons. One of reasons should be noted specifically. Due to the vagueness and uncertainty of the definition of climate refugees, the legal framework and practice about protection of climate refugees has been seriously influenced. Nevertheless, there are a sum of difficulties to make a universally admitted definition of climate refugees.

Keywords: climate refugees, climate change, international law

1. Introduction

The first The problem of climate refugees has been increasingly acute. The situation Bangladesh is facing now can be regarded as one of examples. Bangladesh is a country located in the alluvial fan delta which caused by the Ganges River and Brahmaputra River and shares borders with both India and Myanmar [1]. The coastal area occupied around 30 percent of Bangladesh's whole territory [2]. Under the circumstance that most of its area are in low altitude and near rivers or sea, there are high possibility Bangladesh will be seriously affected by the rising of sea level and river level. In addition, owing to the Tropical Monsoon Climate which is in a dominating position in most of its land, tremendous amounts of precipitation which is amount to 80 percent of total annual precipitation will concentrated in summer and lead to the dramatically rising of river level. Meanwhile, the rising of sea level caused by climate change will erode the coastal areas and lead to negative impacts as well. It should also be noticed that 46 percent of Bangladesh's total population live in the low lying and costal areas [1]. This increases risks the climate change will bring. As a result, a plenty of people lost their home in past decades and forced to move away from their original homes and countries they used to live. However, the Bangladesh government did not has the enough financial resources to resettle all these people. Hence, the only available choice for some of them is to move out of Bangladesh and start a life in a foreign country. According to the statistic, the number of climate refugee has exceeded 6 million and still keeps increasing rapidly. Nevertheless, owing to the insufficiency of

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climate refugees' legal framework, especially the ambiguity of climate refugees' definition, there will be more difficulties to tackle the problem of climate refugees. In consideration of this problem, this essay will discussed the reasons why clear definition of climate refugee is necessary, the difficulties and the proposed solution.

2. Reasons Why the Definition of Climate Refugee Should be Regulated

2.1. The Current Situations of Climate Refugees

It was demonstrated by Intergovernmental Panel on Climate Change (IPCC), it is obvious that human migration could be considered as one of the greatest impact caused by climate change [2]. The number of people who suffered form climate change is enormous large and will keep climbing [3]. The statistics shows that since 2008, extreme weather disasters end up causing the displacement of around 24 million people every year [3]. In 2018, the number of people who faced the problem of displacement has exceeded 65 million. In 2019, according to the report made by UNHCR, more than 5.1 million people in 95 states and regions has moved to other countries because of climate change. It was argued by some experts that the number will reach 143 million in the following decades [4]. It was predicted by scientists that by the mid-21st century, nearly 200 million people, including who lives in Tokyo and New York, will be forced to migrate due to rising sea levels caused by greenhouse gases [5].

The number is not only the problem that should be noted. Life condition of these large amount of refugees which is seriously influenced by climate change needs more attention as well. Before these people leave their original resistance, they may suffered from extreme live environment, for example, the dearth of food or lack of medical treatment. During their journey to other countries, or when they reach their destination, there is possibility for they to be accidentally injured. After arriving to other countries, they may not able fit in the society and find new jobs quickly owing to there special status. As a result, even when they has run away from their original habitat, there is still a possibility for they to starve to death. An example of how such difficulties will influence climate refugees' life condition can be found in Teitiota v. New Zealand [6]. In this case, the claimant, Teitiota argued that the salinization of the groundwater table which caused by the rise of sea level has led to the lack of fresh water. Consequently, it was almost impossible to grow crops in his homeland Kiribati. It will be more than ten years that this area is not suitable for living and he was refused by New Zealand which meant that neither he would have income in following months nor he and his family could find a place to live. This has highly affected his and his family's life.

2.2. The Current Legal Status of Climate Refugees

The current legal status of climate refugees is rather vague due to the the insufficiency of current legal framework about climate refugee. The unclear definition of climate refugee can be considered as one of the reasons. Under the definition of 1951 Geneva Convention on Refugees, a refugee is a individual who "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable, or owing to such fear, is unwilling to avail himself of the protection of that country, or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it [7]."

Thus, according this convention, climate refugees can not be included in the category of refugee because it did not mention that the reason of being considered as refugees could be climate. However, this convention is widely applied in today's international society. For example, the United Nations High Commissioner for Refugees (UNHCR), a agency which is part of UN and established to help refugees does not admit that climate refugees possess the same rights with the refugees defined by

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Geneva Convention on Refugees. As a result, there are a number of international organization do not recognize climate refugees as actual refugees. Also, some experts named these group of people as displacement instead if using the word of climate refugees. Such uncertainty and vague in academic field will have negative impact on the legal status of climate refugees as well.

Owing to the lack of related conventions and clear definition, some scholars turn to International Human Rights law to fill the blank. There were some cases related with climate refugee applied International Human Rights law. The legal basis can be found in the United Nations resolution which was adapted by Human Rights Community. In its documents, it can be found that it was admitted that there is a connection between human rights and climate change [8]. However, it was stated by the Office of the High Commissioner for Human Rights that despite the general human rights of climate refugees, there is no right of entry for them [9]. As a result, in the field of human rights, the protection of climate refugees is not complete as well.

3. The Difficulties to Regulate the Definition

3.1. The Origin and Development of the Definition of Climate Refugee

The reasons why there are many difficulties of defining the accurate meaning of climate refugee are closely related to the conflicts in this concept. The time when the refugee issue has gradually drawn more attention of global society and the concept of refugees gradually became known to the public is the period after World War II. After the World War II, the world refugee problem has become increasingly serious because the devastating effects of war. Some of them lost their homes which were destroyed by war and were forced to move away. Thus, in order to solve this problem, Geneva convention was made. However, at that time, very few people realize that there are not only refugees caused by war, but also refugees caused by environmental reasons.

The concept of climate refugees is derived from environmental refugees which is a concept mentioned and gradually used since 1940. About thirty years later, in 1970, the United Nations Environmental Protection Agency (UNUP), as well as the United Nations High Commissioner for Refugees (UNIIRC) began to focus on the displacement caused by the environmental damage. Around 1980, the term "environmental refugees" began to be raised at conferences which were related with United Nations. However, the written form of “environmental refugees” was proposed in 1984 by Timberlake [10].

Then, Essam E1-Hinnawi, who was one of scholars working in United Nations Environment Program ("UNEP") defined the term "environmental refugees" in UNEP Document as “people who have been forced to leave their traditional habitat, temporarily or permanently, because of marked environmental disruption (natural and /or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life.” This concept has made further progress in defining environmental refugees [10].

In 1988, Jacobson (1988) defined "environmental refugees" as “those displaced temporarily because of a local disruption such as an avalanche or earthquake; those who migrate because environmental degradation has undermined their livelihood or poses unacceptable risks to health; and those who resettle because land degradation has resulted in desertification or because of other permanent and untenable changes in their habitat” [10].

In 1995, Myers defined the factors causing environmental refugees from the perspective of environment and developments: land destruction, for example, drought, flood, desertification, deforestation; lack of resources, including water shortage; urban environmental problems; Emergency issues, such as global warming effect; natural disasters, such as typhoons or earthquakes. The most recent development in the definition is the concept of environmental refugees developed by Laura to cover

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all refugees who is related with environment, for example, climate refugees, and all displaced people, including those fleeing industrial and chemical hazards.

Also, the concept of environmental refugees was defined by the Climate Institute as "people fleeing from environmental crises, whether natural or anthropogenic events, and whether short or long term." According to this institute, an environmental refugee "encompasses any person uprooted from his or her home by long-term environmental degradation, short-term incidents or development projects."

Nevertheless, some people state that the border of climate refugees should be extended. For example, people who run away form natural disasters such as earthquake should be concluded in this definition. This idea can be found in the Cartagena Declaration on Refugees 1984. It was noted in this declaration that the concept of refugees can conclude "persons who have fled their country because their lives, safety or freedom have been threatened by generalized violence, foreign aggression, internal conflicts, massive violation of human rights or other circumstances which have seriously disturbed public order. However, some experts stated that the terminology "environmental refugee" is too vague. It was argued by others that owing to the ambiguity of this term, more terminologies should be created and used to distinguish the specific categories of environmental refugees [12].

3.2. The Relevant Concepts

Climate Migrant is one of relevant concepts of climate refugee. Some experts considered that climate migrant has the some meaning with climate refugee. As the Geneva Convention did not include environment and climate elements as one of the cause of refugees and it is difficult to rewrite this convention, experts suggest that these people who are forced to move away for their original countries should be called climate migrant instead of climate refugees [13]. However, according to other scholars, the meaning of climate migrant should be distinguished from climate refugees. They insist that refer in particular to those who move within their original country on the grounds of climate reasons and exclude the people who move away from their original country. They want to distinguish these two concepts and argue that it is more easy to find if it is a international problem or a domestic problem.

Another term which can be found is climate exiles. This term has been mostly applied to describe those climate migrants who may lost their nationalities in the near future due to their migration to other countries.

In addition, the term of environmentally displaced persons (EDPs) plays an important part in the discussions about climate refugee as well.

This term "environmentally displaced persons" (EDPs) was used by U.N. to refer to those persons "who are displaced from or who feel obligated to leave their usual place of residence, because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental, ecological or climatic processes and events." This term "environmentally displaced persons" (EDPs) was distinguished with the term “climate refugees” on the grounds of refugees are usually refer to those individuals who leave their original country because of racial, religious or political reasons. However, if these environmentally displaced persons are considered to be refugees, it is a breach of convention. It was demonstrated by UNHCR that one of most significant factors of refugee which is widely admitted is that the loss of national protection [12].

All of these relevant concepts are widely adopted not only in academic papers related with international law but also in formal documents which are carried out by international organizations. It is obvious that under such circumstance, the definition of climate refugees will be confused.

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3.3. The Difficulties

There are a sum of difficulties of make an widely admitted definition of climate refugee. This essay will analysis some of them in the following paragraphs.

The first difficulty is the current conflict about whether there is real climate refugees or not. Some scholars stated that there is no enough evidence to show that the climate reason is the main reasons which forced these people to immigrate. They argued that climate reason may be one of the reasons, but there is high possibility that it is not the direct and the main reason. Also, they added that there is no need to divide climate reason with others. As a result, some scientists insist that there is no real climate refugee.

In addition, some people believe that if the existence of climate refugee is widely admitted, it will cause political risks. As mentioned before, there are many reasons which may cause the arise of refugees. They stated that some countries may use the climate reason to cover the main political reason. For example, if a individual has left his original country mainly because of his political status. It is also partly because of the climate change has effected his residence. Under the circumstance that the climate refugees are officially admitted, his original country may state that this person is a climate refugee instead of political refugee in order to get rid of its responsibilities.

Thus, many scholars refused to recognize climate refugees as real refugees. This can be regarded as the second difficult.

The third reason is that some countries worry that if climate refugees are included in refugees, their sovereignty in domestic policy may be influenced. The climate refugee problem is rather complicated, it relates to politics, industry, economy and culture. Some countries worry that other countries or international organizations will interfere their internal affairs on the ground of helping climate refugees. They are not willing to be forced to changed their policies because of the pressure of protecting climate refugees.

The last main reason is that some of international organizations worry that the recognizing of climate refugees will increase the difficulties of protecting other refugees. According to research, the number of refugees has already reached 15.2 million, and the number of long term refugee has already reached 7.2 million. It is argued that the sources which can be used to protect refugees are limited. If most of these sources are applied to help climate refugees, other refugees will in lack of protection [11].

4. The Solution to Overcome Difficulties

4.1. The Legislative Ways

The most substantive solution would be making a clear and widely admitted definition of climate refugees by making an international treaty within international entities. Among all legal sources of international law, international treaties are one of the most compulsory ones. International treaties can legally bounding the countries which has signed and passed this treaty through domestic process. Countries can make an agreement on the definition, rights and obligations of climate refugees by global negotiations. Thus, there will be less debate on climate refugees.

The advantages of this method is obvious. It can provide a clear and reliable definition. If there is any disputes in relevant problems, both party cloud refer to this definition. In addition, its stability can be seen as another advantage. When it is made, there is low possibility to change it frequently.

However, there is a unavoidable drawback. It is rather difficult to gather all the countries just for tackling the problems of climate refugees. Also, it is not easy to find out a definition which can be accepted by all countries.

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4.2. The Others Ways

The first suggestion is promoting the international cooperation within countries. For example, the original countries of climate refugees can make agreements and treaties with the countries which receive climate refugees. Such cooperation can be regraded as the foundation of further collaboration on the climate refugees issues and contributes to define climate refugees.

The second suggestion is that a consistent definition on climate refugee can be established in academic cycle. It is much easier to make a widely admitted definition in academic cycle compared to that in international society. Once scholars tend to use the same terminology, it will make a great influence not only in academic cycle but also in the practice of international law. Thus, if there is a consistent definition in academic cycle, making a definition in global society is more feasible [14].

5. Conclusion

Climate change which may be caused by natural event or human activities has always been one of the most significant global problems for many decades. As climate change has become increasingly acute, the number of climate refugees is also rising markedly year by year. Therefore, the problem of climate refugees, a branch of climate change problems has also attracted more attention from global world. However, the issue of climate refugees is a rather controversial topic since there are disputes in various aspects, such as its definition, responsibility mechanism, and solutions. Although these conflicts are not easy to resolve, the international society should still try to make some progresses owing to its urgency and importance. A consistence and widely admitted definition of climate refugees can be seem as a starting point and foundation for addressing this controversial issue. After learning the difficulties of defining definitions, for example, some people deny the existence of climate refugees, international society and organizations can target these challenges. In the legislative method, countries could sign a treaty that defines the meaning of climate refugee. Meanwhile, in other methods, the international society can also cooperate more in order to established the basis for further cooperation.

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Comparative Study of Environmental Migration Issues in Bangladesh and Singapore

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Abstract: As the global climate crisis increasingly exacerbates, many countries are faced with more frequent natural disasters and the acceleration of slow on-set environmental degradation. In such context, environmental migration, comes into the international community's view. Though not a new phenomenon, environmental migration fails to fit in the current migration framework due to its multidisciplinary nature, as a result, there're no explicit legal documents and mechanism to protect environmental migrants. In response to the inaction, this article investigates the key factors of environmental migration and possible pathways through the comparative study of Bangladesh and Singapore. In the first part, the impact of climate change on both states are examined and compared. In the next part, the difficulties in defining and tackling environmental migration issues are proposed, followed by the overview of current legal pathways of Bangladesh, Singapore and international law. In the third part, principles concerning environmental migrants' human rights protection are discussed, and viable policy options are based on those principles and previous review of Bangladesh and Singapore's situation, reflecting on how the two states could act as examples to inspire the international community.

Keywords: climate change, international law, environmental migration

1. Introduction

According to international thinktank IEP's prediction [1], over one billion people at threat of being displaced by 2050 due to environmental change, conflict and civil unrest. The prediction suggests that about 1/60 of the global population would have to migrate, whether within their countries or cross national borders, to safer places. Particularly developing countries and small island states. As such situation brings up climate displacement issues into the global view, however, effective and widely acceptable solutions has not been posed by the global community other than some ambiguous advocacies. Currently, most countries would have to tackle the situation on their own, partially due to people's common reluctance and impotence to migrate far from their familiar environment. The international reluctance and inaction is understandable that the climate displacement is such a complex issue [2].

As the threat is approaching, tropical climate conditions and geographical patterns render Southeast Asia and Southern Asia countries particularly vulnerable and susceptible to climate change, floods, typhoon and tsunami being frequent occurrences. Therefore, climate displacement issues have become an emergency. This piece of research intends to investigate in the effective mitigation

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methods of such issue by case studies of Bangladesh and Singapore, two Southeast Asian countries that are confronted with similar climate challenges and hazards. However, due to different economic conditions, their approached to climate displacement and relevant climate change mitigation are quite different. Thus, the case studies would compare the natural and social feature of these two countries, and try to inquire if they can, and how could they learn from each other and act for the common good for SE Asia as well as the global community, because such a successful practice in mitigation could be a future course of action.

2. An Overview of Climate Change and Environmental Migration in Bangladesh and Singapore

2.1. The Impact of Climate Change on Bangladesh and Singapore

While the governments having agreed on limiting global temperature rise to 1.5 degree by 2050 in the Paris Agreement, the current global warming trend is likely to fail the goal, as the global temperature is projected to rise 2 degrees by 2050. In a global scale, this rise could consequently result in changes in precipitation patterns, melting glaciers, rising sea levels and an increase in the frequency and magnitude of natural hazards. Such shifts could not only manifest in the form of threats to basic demands such as water security, food security and energy security, but also renders social aspects like economic security, personal security risky.

Bangladesh and Singapore are susceptible to the effect of climate change in the terms of natural condition, infrastructure and the exposure of population, however in different degrees respectively.

Bangladesh is naturally prone to disasters such as tropical cyclones, droughts, and floods. Located in Southern Asia, monsoon determines the pattern of precipitation and the amount of water of the Ganges [3]. Every summer, as the rich water is hindered by the flat lands, it would cause severe floods in the Ganges Delta, where most population of Bangladesh are concentrated, exceeding 1 billion. Otherwise, the lack of water in winter causes drought. The average intensity of floods has increased in the past 30 years, while in the past 50 years, Bangladesh had suffered about 20 drought conditions, more frequent than in the past. Such changes could directly impact on Bangladesh's agriculture and result in famines, economic hardships.

On the other hand, the natural condition of Singapore is more favorable [4]. Compared to its neighbors in Southeastern Asia, one of the most disaster-prone region, Singapore enjoys a rather stable weather and geological condition, the occurrence of droughts, floods, extreme weathers and earthquakes is significantly lower. Nevertheless, it is not exempt Singapore from the effects of climate change. Similar to Bangladesh and other Southeastern countries, it could be affected by global temperature rise and subsequent sea level rise, as well as the possible coastal damages like other small island countries, as Articles 4.8 and 4.10 of United Nations Framework Convention on Climate Change (UNFCCC) has pointed out in Articles 4.8 and 4.10.

A densely populated country as Singapore is, such future could result in considerable hazards, if not effectively prevented or mitigated.

2.2. Displacement Issues of the Two Countries

Natural disasters, gradual deforestation would be environmental migration could force, or trigger people to migrate to new places. The scale and pattern of environmental migration in Bangladesh and Singapore is very different. The displacement issues in Bangladesh has been a chronic problem: in the past years, due to the regular natural disasters occurrence and intrinsic poverty, millions of people from needy neighborhoods are being forced to abandon their homelands and move elsewhere, mostly within the country. Although the Bangladesh government has launched several programs such as resettlement plans in the past 20 years, these programs still fail to meet huge demands. A report by

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the United Nations comments that such failure could be attributed to inefficiency of implementation and political corruption. Such trend is considered to persist, as the World Bank predicts that Bangladesh will have more than 19 million internal climate refugees by 2050, almost half the projected number for the entire South Asia region.

In comparison, the overall mobility of Singapore is far greater than Bangladesh mostly because of its economic factors no explicit patterns, people's lifestyle choices are representative, combining with its industrial structure, with services industry comprising at about 70 percent. In 2019's World Bank's Ease of doing business rank, Singapore ranked 2nd place, being the only Southeastern country. Otherwise, Singapore exhibited outstanding ability in tackling climate change and utilizing natural disadvantages. For example, 22% of Singapore's land Singapore has been the result of land reclamation, which expands Singapore's total capacity as a country. Besides, Singapore has been importing products primarily from China, Malaysia and America, complementing its insufficiency of natural resources. In this aspect, technology has served Singapore well: in order to decrease the dependence on imports, Singapore has launched water resource management programs, collecting rainwater from both forest catchment and urban catchment run-offs and from recycled water facilities. In addition, Singapore has built desalination plants, and plans to produce NEWater-recycled water from treatment by filtration [5].

2.3. Resilience

From 1980 to 2020, the annual mean temperature of Singapore has increased from 26.9°C to 28.0°C [6]. The mean sea level in the Straits of Singapore has also increased at the rate of 1.2mm to 1.7mm per year in the period 1975 to 2009. However, according to the history of Singapore's environmental efforts, it is could be concluded that it is capable to cope with bigger hazards more effectively compared to Bangladesh.

Why is Bangladesh lagging , what condition or factor is lacking? How could Singapore succeed? Such difference, the key variable is resilience, which is fluid and adaptable, and social vulnerability.

When is taken into consideration, compared with other countries, Bangladesh could be the most vulnerable country to climate change. On the other hand, the precipitation is projected to be more irregular, possibly more climate hazards like cyclones. These natural disasters could impact on the highly dense population of Singapore in the aspect of food security, public hygiene, and hot island effect. The sketch of tropical/monsoon climate, population, representing lot of Southeast and South Asian countries' struggle. Among five regions, Southern Asia and Southeastern Asia respectively has the highest and second highest occurrence of natural disasters.

Singapore and Bangladesh's resilience difference result from various differences in social-economic aspects. Singapore's industry and economic status, international relations--so they can invest a lot more money and educated human resources, edging on high tech to mitigate climate change. On the other hand, Bangladesh is populated, poor, lack international influence. Bangladesh is currently listed among the least developed countries, though planning to graduate in 2026.

The next section would discuss how to increase both countries' resilience, based on the research on both country's laws, economy. various factors, and examine which would be the most critical to human rights protection, and how can they be achieved or enhanced through legal pathways.

Among the causes for migration, environmental causes have been increasingly significant and complex. According to one of the most widely used predictions, there could be 2 billion people displaced by 2050, such issues has become a global focus. Natural disasters directly displace people and slow onset natural degradation has been steadily driving people away in a more implicit way [7]. Since the umbrella term "environmental migration" encompasses all cases of migration related to environmental causes, it could cover diverse conditions: forced or voluntary, external or internal, temporarily or permanently. Such conditions could result in diverse difficulties in law and policy

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making to human rights protection, requiring assistance of both international community and the country.

The current migration framework could not suffice to meet demands. It's rigid. Otherwise, the UN refugee convention could not put these vulnerable people into protection.

Environmental migration could reflect a lot of things about the country, because it demands effective power to deploy different resources-resilience [8].

3. Focusing on Human Rights Protection: Overview and Discussion of Current Legal and Policies

3.1. Terminology and Causes: Ambiguity in Classification

Overall, there has been no official term for such a phenomenon describing migration that are mainly triggered by environmental causes. Centering around the key concepts of migration, environment and climate change, there has been various terms such as "climate refugee", "environmental refugee", "environmental displaced migrant" "environmental migrant" "eco-refugee". These terms, though diverse in forms, all reflect and point out a relationship between the three key concepts. This diversity and homogeneity of terms could reflect that the environmental causes as a factor for migration is a widely recognized phenomenon, and suggest the phenomenon's complex nature, rooted in migrants' interrelated motives and migration's various patterns, and possible political reluctance.

Currently, International Organization for Migration (IOM)'s definition is the most frequently used definition. IOM termed these migrants as "environmental migrants', as 'environmental migrants are persons or groups of persons who, predominantly for reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad'. However, this definition is legally acknowledged. Besides, the term covers a wider range of migrants and allows a broader space for interpretation. For example, a Norwegian who moves to Hawaii every winter for sunshine and the Bangladeshi family who are forced to live in nearby slums after hit by floods could both be termed environmental migrants.

On the other hand, The United Nations High Commissioner for Refugees (UNHCR) has identified severe natural disasters as a factor of refugee and displacement, though they do not accept the term "climate refugee" under the current framework. The Global Compact on Refugees addressed that "climate, environmental degradation and disasters increasingly interact with the drivers of refugee movements", to be more specific, only when "where the adverse effects of climate change interact with armed conflict and violence", do people may have a valid claim for refugee status and require protection.

Such ambiguity is partly due to the difficulty for the current migration framework to incorporate environmental migration, since the framework, founded around 1940s after World War II, distinguish people into refugees and economic migrants. Refugees are defined as people who forced to leave their country for political reasons. In contrast, economic migrants act based on their own interests, therefore whose protection would be limited only to States. As the environmental migration, though not a new phenomenon, falls into neither of this binary classification, such ambiguity could increase States' reluctance to form efficient legal or political responses to fill the methodological gap.

There would be abundant theoretical and practical efforts required to tackle environmental migration issues. First, the classification and treatment of environmental immigrants would vary based on their mixed motives and backgrounds, as reflected in the terminological issues above. Second, those who are most affected by climate change and consequent forced displacement are often the states who most economically disadvantaged, and they find increasing domestic resilience and advocating cooperation to sufficiently solve the problem beyond their capacity; Third, as the term is

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neither acknowledged by the international law nor does the advocacy hold compulsory force, it is of no other State's responsibility to help with these issues. Such reluctance has caused inaction in return-though there has been advocacy from the international communities, there has been no effective mechanisms enacted to tackle the problem.

Thus, seeking protection for environmental migrants would naturally demand multi-dimensional approaches, which include legal and political methods, domestic action and international cooperation, theoretical classifications and negotiations interests.

3.2. Current Legal Pathways

Currently, environmental migrants classify as migrants, instead of refugees. However, the baseline protection might not suffice to protect environmental migrants' human rights, and differential treatment would be necessary. Besides, agreements do not imply compulsory action. Environmental migrants are mostly displaced because of natural disasters, and they are more vulnerable to new environments.

Since 1990s, Bangladesh has been making policies aimed at tackling displacement issues, ranging from resettling to rebuilding, food and water security plans and programs. However, these efforts are hindered by corruption to a certain extent [9].

As to Singapore, the government mostly take preventive measures to mitigate and adapt to climate change, and proposes rather flexible policies concerning human mobility.

Besides, one ruling of the United Nations could suggest a possible pathway to climate change asylum claims [10].

4. How to Mitigate and Adapt to Environmental Migration

4.1. Principles

The principles are concluded as below from the perspective of human rights protection, hazards mitigation and international cooperation, which are important factors in designing and implementing solutions such as policies and laws targeting environmental migration issues [11].

From bilateral, regional to a wider range of world. As dealing with environmental migration should primarily be the responsibility of the state's government, a wide range of effective international cooperation could not be expected unless there a successful practice in a smaller scale, such as bilateral or regional cooperation. Accordingly, the effective cooperation could serve as an example and motivator for the international community, prompting more countries to join in the action. Moreover, since currently the majority countries that receive the most severe impact of displacement issues are developing countries, North-South cooperation should be especially noted, referring to the principle of common but differentiated responsibility and the concept of climate justice [12].

Preventive and mitigation efforts combined. Proposed in Bangladesh Climate Change Strategy and Action Plan (BCCSAP), the following six areas should be the main focus: food security, social protection and health, comprehensive disaster management, infrastructure research and knowledge management, low carbon development and capacity building and institutional strengthening. Singapore has designed implemented various environmental technologies to adapt to natural disadvantages and mitigate climate change. Over 95 percent of Singapore's electricity is now generated by natural gas, instead of fuel oil. Also, Singapore has undertaken three National Climate Change Studies to research on the impact of climate change.

Differentiated treatment. A complex issue as environmental migration is, equality should be achieved during such process. specialized protection of vulnerable groups should be recognized as well. Disaster migrants migrate might confront economic hardships and difficulties in employment

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due to lack of local resources, rendering groups such as women, disabled people and children more susceptible to poverty, disease and social isolation. The United Nations might cooperate with the states to launch programs aiming to provide protection for these people to protect their rights to health, housing and education.

Human rights based policy approach. As the OHCHR has noted in an official document, human rights should be the primacy in protecting migrants in vulnerable situations.

4.2. Domestic Policy Options

There have been attempts among states to tackle environmental migration problems by addressing policies or signing international agreements. For example, New Zealand has granted special visas to displaced oceanic islanders [13], but this policy has not received wide approval from the islanders, because they prefer to stay at their homelands. Thus, domestic capacity related subjects should be the priority to research and act on. On the other hand, Free Movement Agreements signed by Caribbean countries provide disaster-displaced people with temporary protection.

From the case studies of Bangladesh and Singapore, it could be concluded that the crucial elements of building resilience would be fund, legal pathways and executive effectiveness. Thus, to strengthen resilience, some of the solutions are proposed below.

In the case of Bangladesh, there have been millions of Bangladeshi migrated to its capital, Dhaka, challenging the city's capacity. However, the example of Mongla [14], a port city has showed people opportunities. Mongla has been successfully absorbing migrants by providing sufficient job opportunities and accommodations. To replicate the practice in Mongla require Bangladeshi government's support.

In Bangladesh's case, most displaced people in developing countries would not choose to migrate overbroad. Rather, they need resources to rebuild their homes or to accommodate them in new residence in their own country, which should primarily be the responsibility of the Bangladeshi government [15]. What the developed country, such as Singapore, could do is to contribute to climate justice by utilizing their relative economic and technological advantage to prevent future hazards and mitigate current situation. Singapore, on the other hand, would alleviate their country's own hazards in the future through participation in the global efforts in tackling climate change.

Thus, Bangladesh should learn from Singapore; however, their learning might be hindered by economic conditions. Singapore might provide funds and technologies to Bangladesh, whose practice might be momentous with sufficient help. To strengthen ties between two countries would require advocacy and endorsement from influential international organization authorities, such as the United Nations.

5. Conclusion

In summary, the mutual learning and cooperation between Bangladesh and Singapore could be significant to devising strategies towards environmental migration issues, especially in the aspect of North-South cooperation, considering their situations are representative of both sides. However, there are standing theoretical and practical difficulties in such process yet to overcome. There is no legally accepted term of environmental migrants, and the legal pathways migrants could seek are limited. Meanwhile, the countries who need resources most to mitigate and settle disaster-migration are mostly developing countries. To tackle such obstacles, firstly, human rights and other certain principles should be observed. Secondly, should focus on increasing resilience, including domestic capacity and international relations.

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Analysis on the Current Situation and Future Development of China's Mobile Game Market Based on Classification and Enterprise Strategy

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Abstract: Since the release of smartphones, mobile game market has become a market that can not be ignored. Mobile phones are easy to carry and control, making them a good game carrier in addition to their original functions. Since the development of mobile games, the market environment has undergone many changes, and the games leading the market are different from those before. This paper focuses on collecting data on the income and the active number of major mobile games at home and abroad. It also analyzes the current situation and causes of China's mobile game market by combining the concepts and methods related to management and strategy. The author conducts a SWOT analysis on some influential games and their production companies, which will more intuitively show the mainstream operation mode of the current mobile game market. The prediction of the possibility of subsequent market changes is also one of the research objectives of this paper. The analysis of the game market and the game company can reflect the market trend and the possible change to a certain extent. In the future, there are still full of opportunities and challenges in the mobile game market. Companies that intend to enter the market or are already in the market will face the rapidly changing market environment and challenges in all aspects. Whether enterprises can understand and adapt to the market trend in time will be the key to success.

Keywords: mobile game, red sea, market, player, IP, technology

1. Introduction

The first influential game in the world appeared in 1961. "Spacewar!" written by Steve Rousseau started the era of electronic games. In 2007, Jobs released the iPhone 2G, which was the prelude to the smartphone in thunderous applause [1]. In the next few years, smartphones and games, the two booming industries, gave birth to a new market: the smartphone game market. Before the advent of smartphones, there were some relatively simple games on mobile phones, which also showed that people always wanted to play games on mobile phones, even though portable game consoles had emerged at that time. However, the development of more powerful hardware, more convenient operation, larger screens, and mobile Internet of smartphones has created more room for the development of games. Since the development of mobile games, their leading products and market environment have undergone great changes. This paper focuses on the analysis of the current

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situation of China's mobile game market from the perspective of management and strategy, including the dominant games, the internal and external reasons for this achievement, and the differences between China's market and that of other countries., which are mainly related to the consumer orientation and the audience. The specific situation will be explained by the data below. A brief SWOT analysis is also made in this paper, concentrating on some representative and influential games and their production companies, and explaining what strategies and characteristics these companies can use to occupy a market place. Through the above analysis, this paper can predict the possible changes in the future mobile game market.

2. The Rise of Mobile Games

The emergence of electronic games was in the middle of the last century. Up to now, it has continued to develop for more than half a century. The game carrier has also developed from the original arcade, mainframe, and handheld computers to PCs and mobile games. With the upgrading of technology, electronic games have gone through five generations. In 2007, Jobs released the first generation iPhone, and then smartphones began to flourish. Mobile Internet also developed rapidly with smartphones. With the development of these two, the era of mobile Internet has come. Mobile games began to develop rapidly in 2010 and really ushered in its golden age. Figure 1 reflects the change and growth in the number of mobile game users in China from 2008 to 2018.

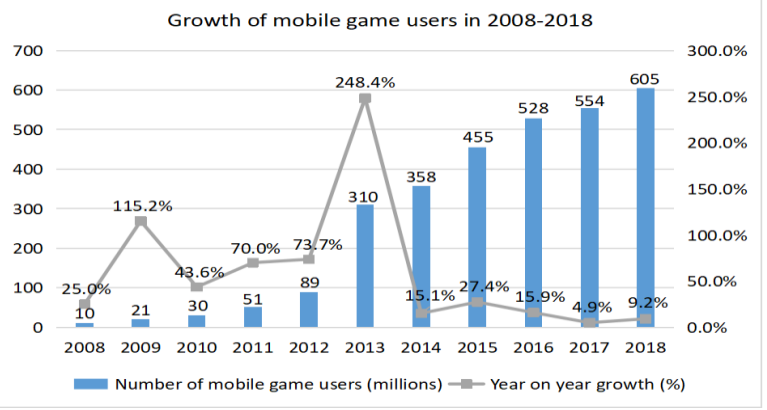

Figure 1: Growth of mobile game users in 2008-2018.

It can be seen from Figure 1 that since 2008, the number of mobile game users in China has kept growing. In 2013, the number of mobile game users increased by 248.4% year on year, and the number of mobile game users directly increased to 310 million [2]. The reason why the mobile game market broke out so violently in 2013 has a lot to do with the huge mobile user group and the high profits of mobile games. At the end of 2012, the number of mobile phone users in China reached 420 million, and the number is still rising. According to statistics, nearly 70% of mobile phone users will play games at least once every 2-3 days, and nearly 40% of users play mobile games every day. As mobile games have a certain market base, they also have strong profitability. In 2012, many games achieved an annual income of one million, which also led to explosive growth in the number of mobile games. After all, everyone wants to get a dividend from them [3]. By 2013, 18 games with a monthly flow of more than ten million have appeared, and millions of games are not rare. In this situation, many small manufacturers are still trying to enter the mobile game market. Chen Haozhi, the chief executive officer of the R&D enterprise of the famous game "Fisherman" at that time, said that there were 5000 mobile games under development in China, and 3000 mobile games entered the test. On average, a mobile game can only be divided into tens of thousands of players. This explosive growth also means that the market growth space is reduced. China's mobile game market is rapidly

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entering the Red Ocean from the Blue Ocean, and the competition is becoming increasingly fierce [4]. The Blue Ocean market refers to a new market whose boundary has not been completely determined and fully developed. The Red Ocean market refers to a market with fixed borders and fierce competition. From 2014 to 2018, the dividend of mobile Internet users has almost been exhausted, and the growth rate of mobile game users has dropped significantly. Although the number of users can still reach 554 million in 2017 and 605 million in 2018, the year-on-year growth rate is only 4.9% and 9.2%. However, in 2018, China's mobile game market will face a great impact.

3. China's Mobile Game Development Environment

To produce a game in China, there is a need to first pass the preliminary review of the Ministry of Culture and Tourism, and then the approval of the State Administration of Press, Publication, Radio, Film, and Television. The full name of the approval document approving the online operation of the relevant game publishing is "Approval of Online Game Electronic Publications", also known as the game version number. Most types of games in China need to apply for version numbers before they can be launched. This is also a document concerning the life and death of a game company. In March 2018, the release of the game version was suspended, which caused a stir in the entire Chinese game industry. Large and small players complained incessantly. Large players could barely rely on the version they had accumulated for a period of time, while small players who gambled all their efforts on their upcoming games encountered huge difficulties. However, the unreleased games are not the only ones that have suffered heavy losses. The Ministry of Education, the National Health Commission and other national departments jointly issued a Comprehensive Plan for the Prevention and Control of Myopia among Children and Adolescents, saying that they will "implement the regulation of the total amount of online games and control the number of new online game business operations". The next day after the document was issued, Tencent, Netease and other Internet companies and game companies saw their share prices fall sharply. Before that, all kinds of popular chess and card games were also pointed out to be related to "gambling", so they were rectified and even stopped taking [5]. Nine months later, in December 2018, the release of the game version number was resumed. By April 2022, more than 2000 mobile games had been launched. Although the number is not as large as that before 2018, the quality of the game has been guaranteed due to stricter reviews.

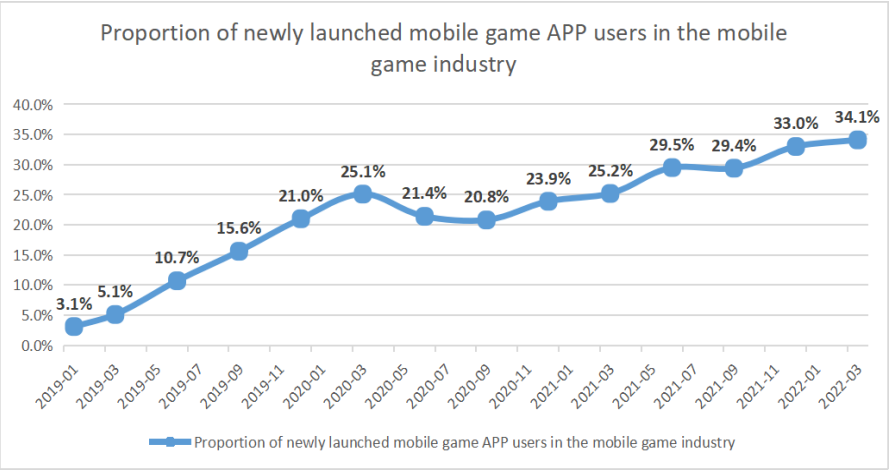

Figure 2: Proportion of newly launched mobile game APP users in the mobile game industry.

Figure 2 shows the proportion of the newly launched mobile game users to the total number of mobile game users in the mobile game industry from the release of the version number to 2022. It can

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be seen that, except for a slight decline in 2020, overall mobile game users are on the rise. In 2022, the newly launched mobile game users will account for one-third of the total market [6]. Based on the above information, since mobile games became popular, great changes have taken place in the market environment, user groups, and policy environment. As a relatively young industry, the mobile game market is still full of uncertainties. However, if enterprises want to gain an advantage in the next competition and know the current market situation, user needs and competitors are still the top priority.

4. Classification of Mobile Games

The current mobile games can be divided into two categories: original games and Intellectual Property (Hereinafter referred to as IP) adaptation games. These two categories are different in target markets, marketing strategies, and company management policies. IP-adapted games include game IP adaptation, animation IP adaptation, film and television novel IP adaptation and other types, which are characterized by high initial traffic. Because there will be many fans under the IP, including many users who want to play IP-adapted games. Such games can have a certain number of players without much publicity. Different IP sources will also bring different platform effects. For example, animation IP brings players from different platforms according to the different video platforms of animation. However, since the original IP game has no previous work accumulation, its players must strive for it by themselves. Strengthening the publicity of their own products has become an essential factor. In addition, to retain players, original games should have high quality and attract players to play for a long time without giving up quickly because of boredom or other reasons. The current situation caused by this characteristic is that IP-adapted games will get a high user peak when they are first launched, while the original games can maintain a long average usage time. However, IP-adapted games also have a limitation, that is, they can only develop games with the authorization of the corresponding IP. However, there will naturally be many competitors for the more popular IP, and it will be difficult for smaller manufacturers to win over large manufacturers such as Tencent and NetEase in this competition. Therefore, in many cases, small manufacturers can only rely on independently developed original IP games if they want to win space in the market. This phenomenon is not bad for players. Original games can only gain advantages through publicity and quality, so that players can play more high-quality games, rather than games that have no innovation in methods and are just used as money-making tools by changing skins. However, for some manufacturers with an insufficient budget, it will be more difficult to survive.

5. SWOT Analysis of Major Related Enterprises

In China, there are several manufacturers that can well cover the existing game types and mobile game operation modes. In the following parts, a SWOT analysis of these manufacturers is conducted to further analyze the current market situation.

5.1. Tencent

Founded in November 1998, Tencent Computer System Co., Ltd. has become one of the Internet enterprises serving the largest number of users in China and has been selected as one of the world's top 500 enterprises many times. Tencent has many outstanding achievements in the Internet industry, including QQ and WeChat, China's largest social platforms. It also has great achievements in the mobile game industry. Its game development and operation organization, Tencent Games, was founded in 2003. Its technology and scale are leading in the world, and it has a number of studio groups. It is also responsible for the development and operation of various games. Its famous

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products, "King Glory" and "Peace Elite", often rank among the top two in the download list and flow list of major mobile application markets.

Table 1: SWOT analysis on Tencent.

Strength:	**Weakness:**
Tencent, as China's largest Internet manufacturer, has a top level of resources, finance, and technology. In addition to original IPs such as Glory of Kings and Game for Peace, there are also many mobile games adapted from popular animation IPs, such as Naruto mobile games. And because of its top technology and talents, Tencent also guarantees the quality of its games.	Games created by Tencent lack innovation. Most of the games released by Tencent are based on the underlying design framework of existing games in the market, supplemented by some micro innovation. Games produced in this way are of low risks, and playability can be guaranteed. However, there is still a big gap between micro innovation and full innovation, so Tencent has always been the focus of public opinion. Many netizens associate Tencent with plagiarism.
Opportunity:	**Threat:**
In recent years, the popularity of domestic animation has gradually increased, and domestic attention to animation games has also increased. In this environment, games adapted from animation IP will be popular in the market. Tencent has strong financial resources, which is a great advantage in the competition of obtaining IP authorization. Compared with some small manufacturers, more IPs are gaining popularity faster through large manufacturers like Tencent, and the risk will be lower.	In China, one of Tencent's biggest competitors is NetEase. NetEase's strategy in the mobile game industry is very similar to Tencent's, and it also has many famous original IPs (such as Onmyoji) and IP-adapted games (such as Harry Potter: Magic Awakening). In addition to Tencent's games, NetEase's games are the most popular ones in the ranking of major mobile application markets.

As illustrated in Table 1, Tencent currently has an unshakable market position and promising development in China. If some changes can be made in the direction of mobile game research and development in the future, more innovations with rich resources can be achieved, and public opinion can be improved, Tencent can obtain a more stable position in China's mobile game market. Tencent Games has also added a new keyword for mobile games, namely, socialization. Both "Glory of Kings" and "Game for Peace" games encourage players to socialize, including logging in directly with WeChat accounts, automatically identifying friends who have played these two games in WeChat and adding them as game friends. In the game, players are not only pursuing the pleasure of competitive competition, but also fighting together with friends, which can make players feel good and gain a sense of identity [7]. Maslow's hierarchy of needs theory divides people's needs into five levels from low to high: physiological needs, security needs, social needs, respect needs, and self-realization needs [8]. The socialization of mobile games can meet the social needs, and self-realization needs are also likely to be met in social activities through mobile games. However, this is not something that any mobile game can emulate. Especially when the popularity is limited, too much social networking may lead to the loss of existing players because no one can be found to play with.

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5.2. Bilibili

Founded in 2009, Bilibili is now a cultural community and video platform with a high concentration of young people in China. It also has the largest ACGN (Anime, Comic, Game, Novel) network community in China. Bilibili is an important distribution channel for the ACGN games in China. Different from Tencent and Netease, Bilibili is mainly used as an agent and publisher of games, not as a developer. The introduced foreign mobile games are not rare in China's mobile game market. Due to language and network problems, it is difficult for Chinese players to play high-quality mobile games abroad, and agents can solve this problem well. For example, the Japanese company Cygames produced the mobile game "Princess Link! Re: Dive" in 2018. Because of its excellent character shaping and sufficient game benefits, the game also has great popularity in China's ACGN community.

Table 2: SWOT analysis on Bilibili.

Strength:	**Weakness:**
Bilibili has a certain brand effect. Since it was founded in the early days, it used the ACGN as the main selling point. Over the years, it has accumulated many domestic ACGN fans. In addition, reasonable publicity and the recommendation of video creators on the platform can easily attract a certain number of players. Because of its large scale and wide popularity, it]has a strong competitive ability in fighting for the agency.	The main business of Bilibili is video websites. Due to the rise of short videos in recent years, many traditional video platforms, including Bilibili, have been impacted, losing some viewers. In recent years, due to more strict audits and other reasons, the introduction speed of Bilibili in animation is not as fast as before, which has made many audiences who use Bilibili for this reason reduce the use frequency or even stop using it.
Opportunity:	**Threat:**
Similar to Tencent's opportunities, the popularity of domestic animation and the attention paid to the animation and game industry are also opportunities that Bilibili should seize. By using its own advantages to catch up with this trend, it can maintain its advantages in the next market competition.	The competitors of Bilibili are mainly other agents. Although Bilibili is currently the largest agent in China's ACGN game, due to the uncertainty of the agent product, it is likely that the agent will be attacked by the public to some extent due to the unreasonable operation strategy or improper behavior of the original manufacturer of a product. If the circumstances are more serious, it is likely to lead to the loss of market trust and affect the development of subsequent businesses.

The national service of the game was tested in China by Bilibili in 2020, which attracted a lot of players because of its popularity. The biggest advantage of this approach is that it does not need to develop a game from scratch, thus saving a lot of manpower and material resources. However, because there is no ownership of the game, there is no control over the future direction of the game, and only part of the profits can be obtained from it. In addition to foreign games, Bilibili has also undertaken the agency distribution and publicity of many small domestic manufacturers' works, and even invested in some of their works. This kind of behavior of encouraging manufacturers to make

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games has certain benefits for the development of China's mobile game market. For small manufacturers, publicity and budget are big problems.

The main business of Bilibili in the mobile game industry is the agency, so its influence on the production and operation of games is limited. Only some of the games that participate in the investment can give suggestions to a certain extent. Therefore, there is great uncertainty about the market impact of Bilibili in the mobile game industry. However, due to the small workload of agents, the number of games represented by Bilibili is hard to match that of other manufacturers, which reduces the risk to a certain extent. In the future, perhaps Bilibili can try to develop more games independently. As an Internet manufacturer, Bilibili also has some technical strength, human resources and other resources. If more independently developed games can be available, it can reduce risks to a large extent and stabilize its market position.

5.3. Mihoyo

Mihoyo Technology Co., Ltd. was registered and established in 2014. Different from Tencent and Bilibili mentioned above, original games are its main business. Mihoyo mainly focuses on superb technology, and independently developed original games are popular at home and abroad, breaking many market records. In 2016, the independently developed "Collapsed 3rd" by Mihoyo went online. 3D action games were not common in the mobile game market at that time, most of them were 2D and 2.5D, so Collapsed 3rd soon achieved good results. In addition, the collapse of 3rd also means that China's self-developed ACGN games have begun to enter the overseas market. At that time, China's mobile game market was already a Red Ocean, and large companies such as Tencent and Netease occupied a large part of the market, so many independently developed games in China focused on overseas markets. The collapse of the 3rd was an example of success in overseas markets [9]. In September 2020, another work of Mihoyo, "Genshin Impact", was launched, which completed the unprecedented global release and attracted the attention of the world. At the same time, the first month's water flow exceeded 245 million dollars (global IOS+Google Play only), becoming a phenomenal product that cannot be surpassed in the short term [10]. The success of Genshin is not accidental. Mihoyo's emphasis on technology and the experience accumulated in ACGN over the years are the key factors to achieve this achievement.

Mihoyo's IP creativity and technology have great advantages in the market, but its flaws in social evaluation cannot be ignored. In fact, in the current situation that the mobile game market is in the Red Ocean, it is very difficult to find games without any reference signs. Therefore, it is inevitable to integrate existing elements of other games into the underlying design. In any case, only innovation can promote the further development of the industry. If Mihoyou can make better use of its technological advantages in the future, add more innovative elements to the game, and stick to the high-quality products as always, it is likely to gain more advantages in the competition with Tencent, NetEase, and other big companies.

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Table 3: SWOT analysis on Mihoyo.

Strength:	**Weakness:**
Mihoyo has advanced technical capabilities, which are needed by enterprises mainly focusing on original game IP. Original games should retain players through rich systems, diversified playing methods, and good playing experience. In this regard, Mihoyo has certain advantages. Moreover, the original intention of the founders of Mihoyo is to do ACG-related work, which also means that Mihayou knows more about what players want and helps its products better meet the need of the market.	Genshin experienced a serious public opinion storm for a period of time before and after the public beta, and its influence has continued until now. The publicity and early experience of the Genshin are similar to the "Legend of Zelda: A Breath of the Wild" released by Nintendo Switch in 2017, so many people have labeled the Genshin as plagiarism. Although the subsequent travel experience did not confirm the statement of plagiarism, Liu Wei, one of the founders of Mihoyo, also explained that Genshin had referred to the legend of Zelda in the bottom design, which was not plagiarism, but the social public opinion could not be easily eliminated.
Opportunity:	**Threat:**
The success of Genshin has brought many benefits to Mihoyo. The promotion of its fame helps to recruit excellent talents, while the income of Genshin brings the economic basis for developing new games. At present, two other games that have not yet been released have entered the public business, namely, derivative works of the previous game, which destroyed the worldview IP, and completely original new IP works. If Mihoyo can show more advanced game technology and add more innovative elements in the following works, it will be possible to succeed in the current era of good prospects for the ACGN game.	Although there is still a big gap between Mihoyo and Tencent and NetEase in the overall mobile game market, Mihoyo and Tencent and NetEase have similar market shares in the ACGN mobile game market [6]. In addition, in the market of original ACGN IP games, the competition is also fierce. Even if the playing methods of two games are not very similar, there will be fierce competition between them. In the eyes of many users, the role shaping of ACGN games is more important than the playing methods.

6. Conclusion

Although the mobile game market has entered the Red Ocean many years ago, it can be seen from the subsequent development that the industry still has great room for progress. One of the important reasons for the mobile game market entering the Red Ocean is that there are too many enterprises engaged in this industry, but they do not necessarily have high quality. Therefore, in future competition, game quality will inevitably become the core element of competition. Tencent and NetEase did not pay much attention to the quality of games in the past, but they have also seen the emphasis on technology in the recent announcements of some games that have not been launched online. When large manufacturers begin to invest more resources in technology R&D, the survival space of small manufacturers will be further squeezed. In the next few years, China's mobile game market is likely to continue to undergo dramatic changes, and many products that attach importance to technology are likely to threaten existing products. Although some companies now have a certain market share, if they fail to launch more advanced new games in time, they may gradually decline in the competition. In addition, the ACGN game may also occupy a larger share of the mobile game market in the future, because the rise of domestic animation in recent two years has attracted more

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people to understand the cultural type of ACGN, which will also drive more people to try ACGN mobile games. In an environment where quality is the core competitive factor, more high-quality games will retain more players. To sum up, the development of China's mobile game market shows no signs of slowing down in the short term but maybe further accelerated to become a larger and more mature market.

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Exploring the Successful Marketing Strategy of EQLZ

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Abstract: EQLZ started as a street basketball brand which aims to provide high-quality, affordable basketball products. The brand has since expanded into other areas, such as footwear and apparel. The manager, who came from a background in street basketball, wanted to create a domestic brand of shoes that would represent grassroots players. The products are of good quality and have a reasonable price, which most street ball fans favor. In addition, the brand's good reputation has also been recognized by the majority of consumers. Nike, Under Armour, and many other equipment brands are costly, and the quality is not as good. Equalizer gives kids who love to play basketball an affordable equalizer. Thus, it is essential to analyze the reason underlying the success of EQLZ and its future market strategy. Through the investigation in real life and research online, it can be concluded that most of the people who purchase this brand are young people who do not have a lot of money to use, but they all love basketball very much. The emergence of this brand, in part, has promoted the development of Chinese basketball culture, its unique design style, and better quality, from the first draft of every design are their original works. This plagiarism era can do so out of the mud without dyeing how precious, and it is critical for EQLZ to continue innovating. It is also believed that EQLZ SOCIETY will play a pivotal role in shaping the future of the sneaker community.

Keywords: marketing strategy, EQLZ, basketball brand, sneaker community

1. Introduction

EQLZ INC., a basketball trend brand, was formed by Zhang Yi, Rocky Fan, He Xiaokang, and Jiang Yi from the core divisions of Adidas and Anta Global Brands and products and recruited former Jordan Brand founding member and Under Amour Curry Brand global general manager David Bond in 2022 to launch the Los Angeles-based US subsidiary at full speed. The team members include professional streetball players, independent musicians, product designers, independent directors, and other elites in many fields. However, they all come from the grassroots, are rooted in the ground, and make things out of nothing. When the wildfire burned out, the action was now rampant [1].

During the current era, sneaker culture has evolved beyond basketball to become more diverse. Sneaker culture is no longer only seen as a "vassal" of basketball because of its shared love for sneakers. As the sneaker community has become increasingly aware of these aspects, it has begun to consider its concurrent connections and humanistic colors embedded in the culture more significantly. Equalizer is one of the leading sneaker brands rooted in the basketball community and youth culture, as well as keeping up to date with the latest sneaker trends as sneaker culture continues to evolve.

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(Archysport)This led to EQLZ being created, a sneaker brand focusing on the various sneaker community, advocating the concept of "future sneakers." Currently, the brand has nearly one million active users aged 15-25, mainly in super-first-tier and first-tier cities in China.It recently completed a Pre-A round of financing totaling more than 10 million US dollars [2].

Equal=equality, EQUALIZE=equaling, EQUALIZER=the person who equalized the score, from zero to one, from the heart to zero. People always want to be the person who equalizes the score. People are eager for all competitions that sound like "no chance to win." This is the value logic created by the team. EQUALIZER is also often called “CAO”, meaning growing from the roots. “CAO” word is also a complete embodiment of the brand's spirit, roots, out of thin air. It covers various fields, including clothing, footwear, and jewelry. They have in-depth cooperation with many major brands and emerging brands. EQUALIZER sold its first pair of basketball shoes, EQUALIZER ZERO, on December 20, 2018, which corresponds to the process of the brand from scratch, and this is also the first pair of basketball shoes in the true sense of the "CAO" brand [2].

In 2020, the brand will be expanded into two cultural and commercial branches: EQUALIZER Black Grass and EQUALIZER Blue Grass. "Black Grass" takes root in the street basketball community and takes the independently planned city brand war alliance. "The Legend of Fights in CAO Factory," is the core platform to stimulate community imagination and incubate young sports cultural leaders to create innovative products leading in the industry. "Bluegrass Blue Grass" takes improvisational music as the core, gathers highly imaginative independent musicians eager to explore the unlimited possibilities of spontaneous music creation, and makes street cultural products with open source thinking [3].

2. Uniqueness of EQLZ

2.1. Brand Culture

Creating an EQUALIZER basketball culture brand always leaves competitors with a sense of "wild" energy that is not constrained by reality. Basketball shoe EQUALIZER ZERO was launched in 2018, vulcanized EQUALIZER FALUT shoes broke stereotypes with their incorrect design, and oasis dragging shoes EQUALIZER OASIS were released in 2018 with innovative design ingenuity. It is said that the "destruction" of current systems and principles formed the creative design of EQUALIZER. The best representation of its primary principle of "creating something out of nothing" is bold innovation and forward-thinking [2].

Every year, the Spring, Summer, and Autumn Winter collections will be launched, and some young basketball players or musicians will be invited to be spokespeople. Now, the brand Equalizer is very common on China's basketball courts. For example, people's bags, towels, clothes, shoes, tights, underpants, and socks are all "CAO" brands. Its price is not very high, and the product quality is also excellent and popular with students and street players [4].

In 2021, the brand released a pair of slippers named oasis. The price is 189 yuan. The price is not low for a pair of slippers, but it has sold out just a few seconds after the sale. Its wearing feeling is very soft, and the shoes are also very suitable for fashionable wear or relaxation tools. Its design inspiration comes from cactus. The details of the whole pair of shoes are vibrant. The surface of the shoes uses fragile cracks, which makes them feel excellent. A giant brand logo on the shoe's side is consistent with the theme of oasis, desert, and cactus. The oasis ecological texture of the sole can ensure good friction, and it also expresses the cultural theme of the brand's roots [5].

The English words "BORN WITH NOTHING EQUALIZER WITH EVERYTHING" are printed on the edge of the top of the upper to express the brand idea. It has also been co-branded with the famous sock brand - instance. In addition to the instance brand, Equalizer has also been co-branded with many other big brands. They will also promote their brands by holding street ball games and

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providing teams with jerseys and shoes. Every year, the brand will hold basketball competitions, including many famous players and stars, which will attract the attention of many basketball fans and fans of stars [1].

In 2022, it will also develop a high-end branch line - equals, which will manufacture some high-quality leisure products at a much higher price than the Equalizer. Compared with other shoe manufacturers, the "CAO" brand has always insisted on original design, independent design, and manufacturing. Since its creation, all products have been unique and dazzling.

2.2. Creative Design

On the consumer side, in the trend of sports shoes, consumers do not seem to care about or pursue the latest and best technology in shoes; instead, consumers choose many shoes that feel very "original." Today's young people receive and extract information faster than ever; they know what is good. They can also be sensitive to bad things and look for "honesty." In the era of adding things to products for a long time, the market may have to enter the stage of "deletion" [6].

Natural plants, humanistic people, and imagination are the brand's core values. The inspiration for EQLZ's first series, #1series, comes from the three major humanistic and natural elements of cells, oceans, and jungles (see Figure 1). The team researched the movement of whales/three-eyed tigers and cells, extracted abstract sense, and finally achieved the creative expression of "biological sense" after repeated debugging, which gave life to shoes [1].

Figure 1: EQLZ #1 series [2].

The design of this series differs from standard sneakers in appearance. The physical characteristics of the all-in-one sneakers give designers much creative space. It has a 3D modeling dimension far beyond the reach of traditional sneakers, which is enough to excite every designer and fully release their imagination. It leaves much room for creativity, whether it is the special-shaped foaming of the midsole, the smooth and natural texture on the inside side, or the inspiration from the ocean. Future sneakers like this have stealthily entered the public eye recently when the sneaker industry is seeing a creative upgrade. The concept of "future shoes" has become a future trend [4].

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2.3. Production Innovation

In addition to the "alienation" in outlook design, the production model of sneakers is gradually changing tradition. Not many companies will try to be environmentally friendly in producing injection-molded shoes like this. However, EQLZ tries to create a more user-friendly production environment, with minimal steps in the production process that could worsen it. The team firmly believes that "modular design" is the cornerstone of future sneaker manufacturing upgrades:

- how to get rid of harmful substances such as glue
- how to lead the innovation of integrated molding
- how to implement an intelligent shoe factory

"Compared to many sneaker brands, they are more like a technology company." New York fashion culture writer Jaxon Wang observed [1].

In the EQLZ1 series products just released in the world, the team boldly tried to add organic coffee grounds recovered in cooperation with the cutting-edge coffee brand M STAND to the EVA foam material and mixed them with the French Man Group (MANE) for the exclusive development of the brand. Of natural fragrances, creating an unprecedented user experience. Not only that, but the brand also revealed that it is building its recycling system and will reuse the colored foam waste on its new products in the future to create a more robust "playable feeling" [2].

2.4. EQLZ Community

Equalizers also organized players to participate in street basketball games in the United States so that Chinese players and NBA players could compete together and let foreigners know the strength of Chinese street basketball. They have been to New York's Rock Park, Brooklyn's home court, and Venice Beach Basketball Court, to compete with the most influential players in the United States. In September 2021, the brand opened the country's first community concept store in Taikoo Li, Qiantan, Shanghai, continuing to lead the Chinese basketball community culture [7].

Furthermore, members of the organization can turn their conceptual design ideas into actual items, producing a pair of shoes in a matter of months. According to its website, EQLZ also wants to conduct events and debates with promoters and change-makers in the sneaker industry and culture, allowing members to interact. Members also get first access to new products. They will have access to EQLZ's products before everyone else, both physically and digitally. As the company focuses on its future in the metaverse, holders will have access to content channels, community events, and benefits across the road-map [8].

The "Sky Curtain" that will open in September is EQLZ's new attempt to explore future sneakers. The EQLZ #1 Series, which fully applies the integrated structure, has achieved a high degree of 3D vision that is difficult in the traditional sneaker industry. This creative process has given sneaker design a more free dimension. Building the metaverse community EQLZ SOCIETY and introducing more creators to co-create will increase the possibility of creating future sneakers. Under the worldview of humanity, nature, and imagination, more youth communities will also resonate and sincerely participate in this novel creative process. The concept of automated manufacturing and sustainable design promoted by the EQLZ brand will also enter the minds of the youth community more deeply [4].

3. Future Envision for EQLZ

EQLZ regards sneaker culture as an independent individual and examines this ever-changing cultural form from three aspects: nature, humanities, and imagination. While developing the prototype of "future sneakers" based on this, young people are encouraged to think about and explore the new-generation sneaker culture from a variety of angles, and a "next-generation evolution" of the sneaker

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community has also begun. While concentrating on the future of the sneaker industry, EQLZ aspires to gather the creative power of the world's new generation of shoes to fulfil the vision of "future sneakers collaboratively" [9].

Sustainability in design, automation in manufacturing, and the birth of new brands are the two trends in the sneaker industry. Although everyone is talking about sustainability now, for some super-large brands, some inherent impressions and models are difficult to reverse; for new brands, this is a considerable opportunity how to make themselves in this field characteristics and, in the process, resonate with the youth community and have the opportunity to participate in it, this is what EQLZ want to achieve next. The EQLZ SOCIETY Metaverse Project is set to change the sneaker game forever by allowing for a deep integration of virtual and reality. This will open up new possibilities for future sneakers, and we can't wait to see what's in store [10].

4. Conclusions

EQLZ is still a relatively young brand. The evolution brought by EQLZ to the sneaker community is far more than what people have seen now. When encouraging young people to explore sneaker culture from different angles and pay attention to more aspects of this field, it has already set its sights on the "Metaverse Age." Perhaps soon, EQLZ SOCIETY will become a "key" to unlocking the next-generation evolution of the sneaker community.

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Understanding the Impact of Customer Reviews Through Coded Content Analysis

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Abstract: This study will analyze customer reviews using a coded content analysis style to understand the impact of consumer language and ratings in relation to their purchases. More specifically, this paper will examine an Amazon product, a refurbished iPhone 7, and perform a coded content analysis to analyze customer reviews in terms of condition, functionality, and satisfaction. Furthermore, statistical tests will be applied in order to understand the relationship between the language used by consumer's reviews and their rating of the product, along with whether that has an impact on the sales of the product. From these results, the author will discuss real-life applications for how companies can understand the significance of customer reviews and how they can encourage consumers to leave positive reviews to benefit their company.

Keywords: customer reviews, coded content analysis, statistical tests, purchasing decision, customer satisfaction, online sellers, feedback loop

1. Introduction

The world is advancing quickly in the technological sphere [1-2]. Anyone can now become an online seller and market their products and services online [3]. Sellers are able to implement the usage of various online platforms such as Amazon, Facebook Marketplace, or Craigslist to sell their products [3]. Amazon is one of the most popular sites for online sellers and customers [4]. Amazon has developed practical resources and tools to provide small businesses and sellers with the ability to reach larger audiences of potential customers and sell [4]. This peer-to-peer model of a marketplace at Amazon allows for entrepreneurs to set up businesses virtually and use the available online resources to their advantage [3].

One form of an online resource stemming from online marketplaces are customer reviews [3]. On Amazon, customers can leave a review after purchasing a product and rate the product on a five-star scale, with one being the lowest and five being the highest approval rating [5]. These customer reviews are able to be viewed by everyone and supplement information and provide personalized advice to other potential online buyers [5]. As exemplified in a case study by Mangold and Smith [1], customer reviews have been demonstrated to play a large role in making a purchase decision, especially among millennials. With the complexity of online selling and marketplaces, along with the elaborateness of customer's expectations when it comes to receiving online purchases, it can become difficult for sellers to forecast a customer's reaction [6-7]. Thus, especially in the cases of more

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expensive products, customer reviews will place larger significance on whether the buyer is converted to making a purchase [5].

One expensive and relevant product that potential buyers look to for reviews are electronic devices. Many people are now able to sell pre-owned or refurbished electronic devices, such as Apple's iPhones, online through platforms such as Amazon [8]. Therefore, customer reviews become more important and relevant to a seller: identifying key words and themes in customer reviews will benefit an online seller to improve their future transactions [9-10]. Currently, there is a gap in the research for how different variables can affect the ultimate star rating provided by the customer.

This paper will examine an Amazon product, a refurbished, rose-gold iPhone 7, and aim to understand if customers, who we will refer to as participants, are satisfied with the product based on performing a content analysis on the customer reviews and analyzing the impact. For this paper, the specific research question is as follows: are participants satisfied with the iPhone 7 they purchased in terms of the variables condition, functionality, and satisfaction based on their reviews and language and are these variables significant?

2. Research Method

This research will use random, willing participants to obtain original survey data. The original survey data will be run through SPSS software and relevant statistical tests will be applied. The conclusions will then be drawn from the results of these statistical tests.

2.1. Sample Selection

In this study, the content analysis sample was composed of 120 participant reviews recorded between the years of 2016 to 2018. The sample covers Amazon reviews for a refurbished, rose-gold iPhone 7. Reviews that were not relevant were excluded from the analysis.

2.2. Review Procedure and Variable

The participant reviews were rated by graduate students at the University of Southern California. Raters were trained in the operationalization of variables and in the coding procedures. A total of four designed variables were coded. The first of these variables, condition, was defined as whether overall the iPhone 7 received was high quality. The second variable was functionality, which is defined as whether the user felt the functionality of the iPhone 7 was good. The third variable was satisfaction, which was defined as if the reviewer was overall satisfied with their purchase of the iPhone 7. The fourth variable was the number of stars, which each reviewer had to leave a rating out of five stars for their purchase. This lists the variables that were examined in a content analysis to understand the overall impression from participants, as shown in Table 1. The full codebook can be seen in Appendix A. All data is analyzed using statistical techniques, including (1) Frequencies; (2) Correlation tests; (3) One-sample t test; (4) Paired-sample t test; (5) Chi-Square test; and (6) One-way analysis of the variance and post hoc test.

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Table 1: SPSS data table from the participants 1-20 as an example.

Participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Condition	4	5	5	4	1	1	2	1	5	5	2	5	4	2	5	5	5	1	5	5
Function	2	4	5	5	2	1	2	1	5	5	1	5	2	2	5	5	4	3	5	5
Satisfaction	2	5	5	5	1	1	3	1	5	5	1	5	4	2	5	5	5	1	5	5
Star Rating	3	5	5	5	1	1	3	1	5	5	1	5	4	1	5	5	5	1	5	5

3. Results

The survey in this research addresses two main themes and variables: aesthetics and demographics. The following results are from performing the SPSS statistical tests

3.1. Frequencies

Analysis revealed that the majority of the reviewers rated great satisfaction (55%). The least number of reviewers rated average (5%) and good satisfaction (5%).

3.2. Correlation Tests

Three correlation tests were performed on the three latent variables: condition, functionality, and satisfaction. Analysis revealed that for the 120 participant reviews, there was a significant positive relationship between condition and star ratings ($r = 0.96$, $p = < 0.001$), between functionality and the star rating that a reviewer left ($r = 0.88$, $p = < 0.001$), and between satisfaction ratings and star ratings ($r = 0.98$, $p = < 0.001$). As condition, functionality, and satisfaction increased, star ratings also increased.

3.3. One-sample t Tests

Three one-sample *t* tests were performed on condition, functionality, and satisfaction. The mean score for participant reviews on condition of the iPhone 7 was 3.6 ($SD = 1.69$). A one sample *t* test indicated that this mean value was non-significantly different from the midpoint (neutral) value of 3.0, $t(19) = 1.58$, $p = 0.131$, indicating that consumers neither significantly liked nor disliked the condition of the iPhone 7. The mean score for participant reviews on function of the iPhone 7 was 3.45 ($SD = 1.64$). A one sample *t* test indicated that this mean value was non-significantly different from the midpoint (neutral) value of 3.0, $t(19) = 1.23$, $p = 0.234$, indicating that consumers neither significantly liked nor disliked the functionality of the iPhone 7. The mean score for participant reviews on function of the iPhone 7 was 3.45 ($SD = 1.64$). A one sample *t* test indicated that this mean value was non-significantly different from the midpoint (neutral) value of 3.0, $t(19) = 1.23$, $p = 0.234$, indicating that consumers neither significantly liked nor disliked the functionality of the iPhone 7.

3.4. Paired-sample t Tests

A paired- samples *t* test was conducted to determine if potential participants were more concerned with the functionality or the condition of the iPhone 7. The results indicated the mean score for functionality ($M = 3.45$, $SD = 1.64$) was non-significantly lesser than the mean score for condition ($M = 3.6$, $SD = 1.69$), $t(19) = 0.72$, $p = 0.481$.

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3.5. Chi-square Test

A chi-square test was used to determine whether reviewers who provided a star rating were more or less likely to rate functionality lower or higher. Reviewers who provided a five-star rating were found to be significantly more likely to rate the functionality of the iPhone 7 as a five (highest score) too, $\chi 2\ (12) = 28$, $p = 0.006$.

3.6. One-way Analysis of the Variance and Post Hoc Test

A one-way analysis of the variance was conducted to evaluate if the reviewer's star rating of the iPhone differed depending on their rating of the condition of the iPhone 7. The independent variable, the condition rating, included four different scores (three stars was never offered by a review): one star ($M = 1.00$, $SD = 0.00$), two stars ($M = 1.67$, $SD = 1.15$), four stars ($M = 4.00$, $SD = 1.00$), five stars ($M = 5.00$, $SD = 0.00$). The dependent variable was the star rating a participant leaves measured on a five-star scale. The ANOVA was significant, $F\ (3, 16) = 66.6$, $p < 0.001$). Post-hoc tests utilizing Bonferroni indicated that one star and two-star ratings for condition rating resulted in a significantly lower star rating than the other ratings.

4. Discussion

By understanding customer satisfaction through the reviews, online sellers can use this analysis to better their products and services and obtain more customer fulfillment and loyalty. The frequency and correlation tests demonstrate that most customers felt great satisfaction from their purchase of the iPhone 7, but there were also many that felt very poor to poor satisfaction. This means that many reviewers felt strongly about the product, whether it was in a positive or negative light, most likely due to the positive relationship between the variables and overall star ratings. This demonstrates how rarely a participant will take the middle ground or average feeling when discussing a product. A practical implication might be to offer incentives to rate the product once it is received, as this method typically elicits a positive response and customers are more inclined to leave a positive review.

Participants who generally provided a higher star rating also thought highly of other variables. Out of the three variables, the functionality had the lowest mean and standard deviation which suggests this is the area with the greatest weakness. This online seller should focus on improving the functionality of the refurbished iPhone 7 so that participants are happier with their purchase. This can be seen as a good potential sign for sellers, because it means that delivering a good product with good functionality is often rewarded by participants with a higher star rating. This positive feedback loop is something sellers should place a larger significance on and apply this knowledge through practical implications of performing proper checks to make sure the product or service they are offering matches the descriptions provided.

5. Conclusion

By understanding customer satisfaction through the reviews, online sellers can use this analysis to better their products and services and obtain more customer fulfillment and loyalty. Based on the frequency and correlation tests, it demonstrates that most felt great satisfaction from their purchase of the iPhone 7, but there were also many that felt very poor to poor satisfaction. This means that many reviewers felt strongly about the product, whether it was in a positive or negative light, most likely due to the positive relationship between the variables and overall star ratings. This demonstrates how rarely a participant will take the middle ground or average feeling when discussing a product. A practical implication might be to offer incentives to rate the product once it is received, as this method typically elicits a positive response and customers are more inclined to leave a positive review.

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If this study were to be repeated, there would be a few adjustments. One limitation or disadvantage when having three coders; because we all had our own differing opinions at times based on the content coding we had done, we found ourselves at odds when it came to finalizing a score for the participant's reviews. If repeated, we could define more words clearly when it came to assigning specific words to score in our codebook. In addition, the author would like to have included stronger and lengthier reviews; with this set of reviews, there were many neutral responses or reviews that did not provide a lot of information or detail on where the participant stood when discussing the condition, functionality, or satisfaction. Many of the participant reviews selected were short in their review description and would fail to directly address one of the three aspects we were testing for. With more words and descriptions, we would have been able to code more accurately when it came to our analysis.

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Appendix

Coding Dictionary

- Condition of item received (latent)
    - Definition: Overall, does the comment suggest the condition of the iPhone 7 received was high quality?
    - Key Words:
        - Good phrases: “great condition”, “like new”
        - Poor phrases: “damaged”, “bad quality”
    - Concrete Examples:
        - Good condition: “It’s in excellent condition”, “everything about the device was better than expected.”
        - Poor condition: “It comes with 4 scratches on each corner”, “Damaged phone.”
    - Scale: 1-5
    - 1 = very poor condition
    - 2 = poor condition
    - 3 = average condition
    - 4 = good condition
    - 5 = great condition

- Functionality of the phone (latent)
    - Definition: Does the comment suggest the user feels functionality of the iPhone 7 is good?
    - Key Words:
        - Good phrases: “great updates”, “love the functionality”
        - Poor phrases: “bad functionality”, “don’t like the new features.”
    - Concrete Examples:
        - Good functionality: “I am very impressed with my new iPhone”,
        - Poor functionality: “...battery life is not well, in one day I have to charge it many times!”, “The only limitation is that it is not possible charging and listening to music at the same time.”
    - Scale: 1-5
    - 1 = very poor functionality
    - 2 = poor functionality
    - 3 = average functionality
    - 4 = good functionality
    - 5 = great functionality

- Satisfaction with purchase (latent)
    - Definition: Overall, does the comment suggest the reviewer is satisfied with their purchase of the iPhone 7?
    - Key Words:
        - Good phrases: “happy with purchase”, “worth it”, “very satisfied”
        - Poor phrases: “bad purchase”, “not happy”, “not worth it.”
    - Concrete Examples:
        - Good satisfaction: “As expected the phone is very good”, “my wife loves her iPhone 7”, “Pretty cool phone”

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        - Poor satisfaction: “To be honest I was very disappointed”, “Iphone.... The best.”
    - Scale: 1-5
    - 1 = very poor satisfaction
    - 2 = poor satisfaction
    - 3 = average satisfaction
    - 4 = good satisfaction
    - 5 = great satisfaction

- Star Rating Reviews, on a scale of 1-5 (manifest)

Customer Reviews Used

1. I wayan
    - 3.0 out of 5 stars good looking
    - Reviewed in the United States on October 31, 2018
    - Size: 128 GB Color: Gold Verified Purchase
    - great phone, but battery life is not well, in one day I have to charge it many times!!!

2. Kelly Crawford
    - 5.0 out of 5 stars Very nice phone. Great camera.
    - Reviewed in the United States on May 6, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - Great phone! Delivered on time. Moved the SIM card from a 5c and began updating IOS. Requires you to have all software items fully up to date. I found everything I needed with Apple.
    - One person found this helpful

3. Seren33
    - 5.0 out of 5 stars Love it!!
    - Reviewed in the United States on October 12, 2018
    - Size: 128 GB Color: Gold Verified Purchase
    - I am very impressed with my new iPhone.
    - I like that the phone already had a screen protector on it.
    - It’s in excellent condition.

4. Amazon Customer
    - 5.0 out of 5 stars Other than that it is working just fine, for now
    - Reviewed in the United States on April 13, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - It comes with 4 scratches on each corner. Other than that, it is working just fine, for now.

5. Brian P.
    - 1.0 out of 5 stars One Star
    - Reviewed in the United States on August 4, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - Said it would be Rose Gold? It is ugly silver. Not what I paid for!!
    - 2 people found this helpful

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6. Human Resources Gwinnett County BOE
    - 1.0 out of 5 stars One Star
    - Reviewed in the United States on June 8, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - This phone was LOCKED!!
    - 6 people found this helpful
7. Sneha
    - 3.0 out of 5 stars technical problems like voice volume of the other person is not audible ...
    - Reviewed in the United States on December 10, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - Need to go to the Apple Store. Technical problems like voice volume of the other person is not audible else it's good
    - One person found this helpful

8. Amazon Customer
    - 1.0 out of 5 stars Refurbished Malfunctioning device
    - Reviewed in the United States on January 26, 2018
    - Size: 128 GB Color: Gold Verified Purchase
    - Damaged phone. The device couldn’t connect to any network.
    - One person found this helpful

9. Mabrok Muhammed
    - 5.0 out of 5 stars Five Stars
    - Reviewed in the United States on December 14, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - good

10. Amazon Customer
    - 5.0 out of 5 stars. The best. Nothing more to say
    - Reviewed in the United States on July 30, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - Iphone.... The best. Nothing more to say.

11. Dharanesh Akkem
    - 1.0 out of 5 stars Ordered this phone and it did not come unlocked, ...
    - Reviewed in the United States on December 3, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - Ordered this phone and it did not come unlocked, even though the description says it got unlocked. It came with a T mobile SIM and asked for activation.
    - 4 people found this helpful

12. Amazon Customer
    - 5.0 out of 5 stars Five Stars
    - Reviewed in the United States on December 3, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - Excellent packaging and everything about the device was better than expected.

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13. Matrisa Dyer
    - 4.0 out of 5 stars iphone lover
    - Reviewed in the United States on December 29, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - my wife loves her iPhone 7, but she believes that her home button is not working right, something seems to be wrong with it.
    - One person found this helpful
14. Amazon Customer
    - 1.0 out of 5 stars worst thing
    - Reviewed in the United States on July 17, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - was stuck in a rainstorm for five seconds and my whole screen has black dot mm all over it and i can't type properly... worst thing ever
    - One person found this helpful

15. Darby Macdonald
    - 5.0 out of 5 stars Five Stars
    - Reviewed in the United States on February 20, 2017
    - Size: 128 GB Color: Gold Verified Purchase
    - Love it

16. Amazon Customer
    - 5.0 out of 5 stars Five Stars
    - Reviewed in the United States on December 3, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - Excellent packaging and everything about the device was better than expected.

17. Amazon Customer
    - 5.0 out of 5 stars as expected the phone is very good. The only limitation is that it is not ...
    - Reviewed in the United States on October 30, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - Thanks. As expected, the phone is very good. The only limitation is that it is not possible charging and listening to music at the same time.
    - 13 people found this helpful

18. Mohammed N.
    - 1.0 out of 5 stars. To be honest I was very disappointed, the phone box was opened and to me ...
    - Reviewed in the United States on November 15, 2016
    - Size: 128 GB Color: Gold Verified Purchase
    - To be honest I was very disappointed, the phone box was opened and to me the phone did not look new. I had no time to return it because it was a gift for somebody!
    - 8 people found this helpful

19. Amazon Customer

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- 5.0 out of 5 stars https: //www. amazon.
- Reviewed in the United States on March 15, 2017
- Size: 128 GB Color: Gold Verified Purchase
- https://www.amazon.com/dp/B01M1ERUWL/ref=cm_cr_ryp_prd_ttl_sol_0
- One person found this helpful

20. Crystal Brianna Ahrens
    - 5.0 out of 5 stars iPhone 7!
    - Reviewed in the United States on November 27, 2016
    - Size: 128 GB Color: Gold
    - Pretty cool phone and always been an Android user. Love it

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Development of Chinese Industries under COVID-19

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Abstract: The year 2020 saw a global outbreak of the COVID-19 virus. The world economy was hit hard by the COVID-19 outbreak. As China was the first country to experience a major outbreak of the New Coronavirus, its economy was severely affected. In response to the crisis, the Chinese government decided to impose a nationwide closure of the city and restrictions on outbound and inbound travel. As a result, the majority of enterprises within China are affected by COVID-19 to varying degrees. This paper focuses on the impact of COVID-19 on Chinese companies and how Chinese industries are addressing their own existential crisis in this environment. Through methods such as finding data and market research, this article draws out some responses. Companies can increase their digitalisation and integrate it with industry. In addition, companies can respond to unexpected epidemics by partnering with influencers for live streaming and opening online shops. Entrepreneurship is important for business development. The government should also strengthen its support for SMEs.

Keywords: COVID-19, Chinese companies, impact, online, entrepreneurship

1. Introduction

The COVID-19 pandemic is a social and economic crisis. Its serious and far-reaching effects are being felt around the world [1]. As China was the first country to experience a major outbreak of the new coronavirus, its economy was seriously affected. In response to the crisis, the Chinese government decided to impose a nationwide city closure and to restrict outbound and inbound travel. Consequently, most companies in China were affected by COVID-19 to varying degrees. This paper focuses on the impact of COVID-19 on Chinese companies and how Chinese companies can solve their own existential crisis in this environment. With the normalisation of epidemic prevention and control, many companies have worked out solutions, but some are still at risk of bankruptcy. This article begins with an analysis of the negative effects of COVID-19 on Chinese companies. The study found that COVID-19 has led to a significant drop in sales revenue, a stagnation in production order and substantial layoffs in companies. Not only were brick-and-mortar companies affected, but some online shops were also affected by factors such as courier stoppages and factory shutdowns, resulting in reduced revenues and even the closure of shops. In addition, the epidemic has also dealt a blow of varying degrees to China's foreign trade business and the development of small and medium-sized enterprises. However, some companies have also figured out how to survive under the epidemic. Companies can improve their digitalisation and combine it with industry. In addition, the company can respond to unexpected epidemics by collaborating with influencers in live streaming and opening

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an online shop. Entrepreneurship is important for business development. The government should also strengthen its support for SMEs. This study has implications and warnings for the development of various industries in the face of the COVID-19 epidemic.

2. The Impact of COVID-19 on Chinese Companies

2.1. Decline in Sales Revenue and Redundancies Across All Industries

The impact of COVID-19 has struck a big blow to Chinese companies. As a result of the shutdown, companies have no cash income and have to pay their employees' salaries and various rents, and are unable to resume work in the short term due to the overall environment of the epidemic. According to China News Website [2], under the attack of COVID-19, 10.7% of companies have suffered a drop in sales revenue of more than 50%, 31% have suffered a drop in sales revenue of 20%-50% and only around 30% have been unaffected or have seen an increase in sales revenue. In response to the epidemic, 56% of companies have or plan to scale down production, 20% have or plan to lay off staff, and 17% have or plan to take collective pay cuts. It is thus clear that COVID-19 has dealt a devastating blow to Chinese companies in terms of production, sales, and personnel.

2.2. Income does not Cover Expenditure

COVID-19 in 2020 led to the closure of large areas of the city in China. There was a large-scale shutdown of express delivery and the range of people's activities was restricted. As a result, not only physical shops have been affected but also China's well-developed online shopping has been severely affected. Due to the highly contagious nature of COVID-19, people had to be quarantined at home, and life seemed to come to a standstill. As a result, factories shut down and couriers stopped shipping, which made it impossible for sellers to produce and ship goods. Consequently, the company had no source of income during the blockade, but it took a large financial cost to run the company to support it.

2.3. Foreign Trade Industry under Attack

Moreover, due to the impact of the border closure, China's industrial output plummeted by 13.5% in January and February 2020, and retail revenue fell by 20.5%. Investment in fixed assets by Chinese companies plunged by 6.2%. Unemployment climbed to 6.2% in February 2020. As estimated by the IMF, the slowdown in the Chinese economy was about 0.4 percentage points [3]. China is one of the world's leading foreign trade nations and COVID-19 caused a halt in China's trade exchanges with the outside world for a period of time in 2020, which only slowly recovered after the epidemic was brought under control, but hardly reached the levels seen before the epidemic broke out. According to Fang et al. [4], there is no doubt that the COVID-19 pandemic has triggered further risk and uncertainty in cross-border trade.

2.4. SMEs are More Affected

Due to the impact of the COVID-19 epidemic, economic conditions across the region continue to be sluggish and small and medium-sized enterprises have been struck by varying degrees. In this environment, employment issues have also become critical. The head of the industry has a stronger ability to integrate resources, capital reserves, talent advantages, etc., and can more easily cope with the crisis. The small and medium-sized enterprises in the same industry are struggling and have to gradually withdraw from the market.

However, despite being hit by COVID-19, some companies have still managed to find ways to survive and thrive.

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2.5. Increasing Digitisation

Companies could increase their digitalisation. The epidemic acts like a catalyst to accelerate the spread of digital operations. However, running digitally can be difficult. Companies should find their own pain points and look at digitalisation soberly. Companies also need to map out the differences between different platforms and figure out what stage of digitalisation they are at. Different industries and companies at different stages have their own rules on how to cut into digitalisation. The Badaling Great Wall Tourism Company, for example, which was able to achieve an annual revenue of 800 million before the epidemic, and the entire group serves more than 20 million tourists with food, accommodation, travel, shopping and entertainment, started to study digitalisation six years ago. As tourists demand more and more from scenic spots, they want to eat special food and stay in themed hotels, preferably in a one-stop solution. The company therefore launched the "Inside and Outside the Great Wall"' Alipay mini-program, which aggregates all the local food, drink, fun and interesting things, and provides one-stop services such as ticket booking, navigation and sales. After the epidemic, with the large number of tourists declining, the drawbacks of cultural tourism attractions relying only on ticket revenue and a single revenue model began to emerge. Badaling Tourism started to create cultural IPs and develop cultural and creative products, such as a digital collection based on the ant chain with a Great Wall culture theme, and an online shop to meet young people's demand for cultural consumption. Through digitisation, the scenic spot has been turned into a cultural fulcrum. It is reported that the Great Wall scenic spot was able to maintain an annual revenue of 200-300 million during the epidemic [5]. It is thus clear that the company can overcome the negative effects of the epidemic to some extent by increasing digitalisation and innovation in the right way.

3. The Discussion on how to Restore the Momentum of Business Development

3.1. Establishing an Online Shopping Platform

Online shopping platforms have become more and more popular in China. Not only young people, even the elderly have joined the team of online shopping. Several famous online shopping platforms, such as Taobao, Jingdong, and Pinduoduo. Transactions on these platforms have exploded in the wake of pandemic. After the outbreak of the epidemic, even a number of luxury brands have chosen to enter Taobao. Brands such as Gucci and Burberry, for example, have opened online shops on Tmall to offer people the opportunity to shop online. Therefore, some companies with only physical stores can choose to enter online shopping platforms to increase their sales and popularity.

During the COVID-19 epidemic, with restrictions on going out, many fruit and vegetable shops met customer demand by establishing online links with customers to share newly picked fruit and vegetables in the form of pictures, with customers for delivery of vegetables, or through takeaway orders. This form of innovation avoided stock build-up during special times and met the consumer demand of people who could not go out. According to Yang [6], these online grocery apps have been a lifeline for stranded residents during the month-long blockade in Shanghai. Ms Song says that since the blockade began, she has purchased about 60% to 70% of her food through online apps. Without these apps, she would have run out of food.

3.2. Developing Live Streaming with Goods

Moreover, companies can promote their development through live streaming. In China, live streaming has also become a new way of sales. Some firms would add their products to live streaming rooms of some influencers to boost sales. For example, Jiaqi Li is now the most famous host of e-commerce platforms with goods in China. 'Double Eleven' has become one of the biggest online shopping carnivals in China nowadays. On the day the 'Double Eleven' began, Jiaqi Li became the

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anchor with the highest sales on all major platforms, with pre-sale deposits calculating the final payment figures and sales of 11.539 billion yuan [7]. In the twelve hours or so he was live-streaming, the highest sales of a single product in the live-streaming room reached 389 million, with an estimated number of 37.71 million single products sold. This is a staggering amount and a new high for China's live streaming sales in previous years.

3.3. Fostering Entrepreneurship

Leaders need to have an entrepreneurial spirit. Entrepreneurs perform a crucial role in any economy, by using the necessary skills and initiative to anticipate needs and bring great new ideas to market. Entrepreneurship that proves successful in taking the risks of establishing a start-up business is rewarded with profits, fame and opportunities for continued growth. Failed entrepreneurship can lead to losses and make those involved less popular in the marketplace [8]. Entrepreneurship and social mission are the cornerstones of a company's ability to weather difficult times and continue to grow. At the heart of entrepreneurship is the spirit of innovation. According to the economist Schumpeter, "economic initiative" can stimulate the potential of entrepreneurs and promote the development of entrepreneurial innovation [9]. Combining practical innovation with entrepreneurship brings innovation opportunities to business development. In addition, entrepreneurs need to be risk-takers. Especially in a world where COVID-19 is still widespread, the risk factor for business development is high. Therefore, under uncertainty, a moderate spirit of risk-taking is required from entrepreneurs, otherwise opportunities will be lost.

An entrepreneur with a sense of social mission will not be satisfied with the profitability of his business, let alone profit by destroying the environment or damaging people's physical and mental health. Instead, in times of national or social crisis, entrepreneurs will take advantage of the resources they possess to practise their sense of family and social responsibility. At the time of the COVID-19 epidemic, the entrepreneurial community became a very important social relief force. Famous Chinese entrepreneurs such as Ma Huateng and Lei Jun were quick to invest in the rush of protective clothing, thermometers, masks and disinfectant in Wuhan, Hubei, as well as in the research and development of a vaccine against the virus, and their decisions were decisive, swift and timely. This is the dedication and commitment of entrepreneurs to the interests and well-being of the public beyond the interests of their businesses. Therefore, an entrepreneur in the true sense of the word does not only pursue economic benefits, but also social and national benefits, thus reflecting an entrepreneur's commitment and mission. A coffee shop in Wuhan called Wacanda provides free coffee for doctors. Once it was reported, netizens bought it online to support the coffee shop's charitable act. In the end, the coffee shop owner decided to keep the cost and donate all the profits to Wuhan Hospital [9]. His courageous act of responsibility has created a good image for the company and won the hearts of consumers.

The crisis arising from the epidemic is only temporary, while the long-term development of the enterprise is the key. The entrepreneur's tenacity and perseverance at this time is the ballast that inspires and stabilises the enterprise out of the doldrums, driving the enterprise to work together and actively deal with the immediate setbacks.

3.4. National Policy Support

Fully interpret and make good use of the national support policies for small and medium-sized enterprises. Guaranteeing an excellent market environment. The country's policy in terms of market access should be moderately relaxed. Break down some unreasonable restrictions and create a fair competitive market atmosphere for the development of small and medium-sized enterprises. Moreover, in the negative list of market access, the relevant content should be reduced accordingly to

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create more opportunities for small and medium-sized enterprises. Take the initiative to provide assistance to small and medium-sized enterprisesin need and propose targeted solutions to the difficulties encountered by different enterprises in their development, so as to relieve their pressure.

4. Conclusion

As things stand, COVID-19 will still have an ongoing impact on China. Through the study, it was found that COVID-19 has led to a substantial drop in sales revenue, stagnant production orders, and significant layoffs in companies. Not only did brick-and-mortar businesses suffer, but some online shops were also affected by factors such as express delivery stoppages and factory shutdowns resulting in reduced revenue or even closure of shops. Furthermore, the epidemic has also dealt a blow of varying degrees to China's foreign trade business and the development of small and medium-sized enterprises. However, some companies have also found out how to survive this epidemic. Companies can increase their digitalisation and integrate it with industry. In addition, companies can respond to the sudden epidemic by partnering with influencers for live streaming and opening online shops. Entrepreneurship is essential for business development. The government should also strengthen its support for SMEs. Therefore, if companies want to survive under the impact of the covid-19 environment, it is necessary to open up new development paths for innovation. The study simply focuses on how the various industries should develop in the face of the current COVID-19 epidemic. However, times are constantly changing and future studies will look at the dilemmas faced by various industries in China and how they can better develop in light of various changes in the general environment.

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The Impact of Viral Communication on the Marketing Strategy of Enterprises

- A Case of Buy Together

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Abstract: Currently, Buy Together is the second largest e-commerce platform in China after Taobao. From an obscure online shopping platform to the second largest e-commerce platform in China, Buy Together' s marketing approach, especially the use of viral marketing, is worth studying and learning from. The marketing path of Buy Together has not been systematically studied. Therefore, this thesis will use Buy Together as a case study to examine the key to Buy Together's success. The focus of this paper will be on what role viral marketing models play in the promotion of e-commerce platforms and online shoppers, whether it is good or bad, and how to properly select and use the right marketing methods. The support for this thesis comes mainly from media reports, journal literature, etc. Information is mainly available through Google Scholar, online media platforms and China Knowledge Network. Ultimately, it has been proven that viral marketing can be extremely beneficial to users initially, but failure to shift the marketing model in time can backfire. It is important to use the right marketing approach at the right time.

Keywords: buy together, viral communication, marketing strategy, social networks, online shopping

1. Introduction

Since the emergence of Taobao, many large and small e-commerce platforms have emerged in China, such as Jingdong and the Red Book. In particular, in 2014, Jingdong and Alibaba were listed in the US and ranked among the world's ten largest Internet companies by market capitalisation, with Alibaba becoming one of the world's ten Internet companies, with Alibaba becoming the world's Alibaba has become the largest e-commerce company in the world [1]. According to the Securities Daily, by the end of 2021 Buy Together's annual revenue was RMB 93,949.9 million; annual R&D expenses reached RMB 8,992.6 million, up 30% year-on-year; and the number of annual active buyers reached 868.7 million, up 10% year-on-year. for the full year of 2021, Buy Together's multi-year turnover (GMV) was RMB 2,441 billion, up 46% year-on-year [2]. There must be something unique about Buy Together that makes it stand out from the crowd and become the second largest e-commerce platform in China. It is therefore worth examining the way in which Buy Together has succeeded. Currently, most of the literature studying Buy Together rests on its contribution to the

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development of Chinese agriculture and the sale of agricultural products, while others focus on the innovation of its business mechanism. However, this essay will focus its discussion on Buy Togetrher's marketing techniques, particularly its use of viral communication. Putting the spotlight on Buy Together's unique market positioning, the marketing decisions made based on this market positioning and the results achieved. The purpose of this paper is to demonstrate that viral communication can attract a large audience in a short period of time and can bring a certain amount of popularity and revenue to a company, but excessive communication can be offensive, so the degree of use is very important. The aim is to give some online retailers or video producers a usability marketing guide that analyses how to maximise their strengths and minimise their weaknesses.

2. The Development of Buy Together

Buy Together was founded in 2015, far later than Alibaba, which was founded in 1999, and Jingdong, which was founded in 1998. With the spread of mobile smart devices, e-commerce transactions on mobile have grown from less than 2% of total volume in 2011 to over 70% in 2017, with annual growth of over 50% [1]. In addition to this, Sina Finance's report shows that the total volume of e-commerce transactions in China grew from RMB 588 million to RMB 37 trillion in the period from 2011 to 2018 [3]. Thus, Buy Together was born in the most competitive era of e-commerce in China, which is undoubtedly both a competition and a challenge for it.

Initially, the company launched its first online shopping app Pin Hao-huo, which focuses on fruit and fresh produce group buying. Users can invite their friends for group buying through social platforms such as WeChat group and circle of friends, and the order will be successfully placed when the required number of people is reached, and users reach the purpose of buying fruit and fresh produce at low prices. Subsequently, the company changed its collocation platform to what is now known as Buy Together and repositioned the app. The company eventually positioned Buy Together as "a new e-commerce platform dedicated to providing value-for-money products and a fun and interactive shopping experience to the widest range of users" [4]. In July 2018, Buy Together was successfully listed on the NASDAQ in the United States. The 2018 e-commerce industry research report shows that in November 2018, Poundudo's DAU exceeded 60 million, while its MAU ranked second in e-commerce apps with 280 million, while Mobile Taobao ranked first with 540 million and Jingdong ranked third with 260 million. According to Buy Together's second quarter 2022 financial results released on August 29, its revenue for the second quarter was 31.44 billion yuan, up 36% year-on-year [5]. It has grown far faster than any other e-commerce platform in China and has become a well-deserved dark horse.

3. The Marketing Model Features of Buy Together

A look at Buy Together's journey along the way reveals that they have adopted a number of marketing models in a bid to reach the market and make their software and sales platform more accessible to a wider audience. The study will later focus on two of the more typical marketing models they employ and analyse the impact these two research models have had on the development of their company's operations.

3.1. Precision Marketing

Buy Together emerged at a time of intense competition in China's e-commerce industry, and in order to stand out, the company implemented a precision marketing strategy. They have repositioned their audience, focusing on the third and fourth tier female demographic in order not to compete head-on with Taobao, Jingdong and other e-commerce businesses that point to the metropolis audience. According to the survey, more than 70% of Buy Together's audience are women, 65% are from third and

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fourth tier cities and 65% are from first tier cities. The age distribution range is between 19-45 years old [6]. This segment of the audience is most focused on the pursuit of good prices, but not on the quality, quality and brand of the products. They have therefore tailored their offer to the psychological profile of their audience by reducing the price of their products and focusing their sales range on fresh fruit.

At the same time, Buy Together has solidified the positioning of its own platform. They play on the psychology of their audience to constantly reinforce their "group" character. For this reason, they have divided the shopping patterns into three. The first model is the one used by most e-commerce platforms, which means that users can purchase any product individually by themselves. The second and third models are a tie-in model, where the user initiates the collocation and participates in the collocation respectively. The page will show you the price for individual purchases and the price for a group order, which is relatively higher for individual purchases and lower for group orders. However, there is no difference in price between initiating a collocation and participating in a collocation, and users can choose to participate in either mode at will. Most users, after receiving a price incentive, opt for the collocation model in pursuit of a better price.

In addition, Buy Together will use big data to analyse each user's preferences and direction of concern. Based on this data acquisition and analysis, they can accurately push products that users may be interested in or like to the user's homepage to induce or stimulate potential purchases. Certainly, this approach has, been adopted by most e-commerce platforms.

3.2. Viral Marketing

The marketing role of viral marketing has been decisive in recent years [7]. Buy Together made good use of this theory and seized the opportunity perfectly. First of all, every time a new user signs up, a screen will automatically pop up on the platform's homepage for WeChat to receive 100 or 200 RMB for free. When the user clicks in and keeps drawing to complete the task, and when the amount is raised to a certain amount and is seemingly one step away from receiving money from WeChat, the number of times the user has drawn will be used up and the user will only have the option to share it with others, and only when others help you click into the link being shared will the user get the number of times they have drawn. Buy Together uses this to entice users to keep sharing links to their websites or apps with others so that more people will know about them and use them.

Secondly, they also offer free or low cost access to goods. However, actually acquiring the goods is certainly not that simple. Users need to keep inviting people to help them click into the link to help them cut the price, and to reach the target amount of acquisition, they need to invite a large number of people to help them. Moreover, the user can only buy the product at a low price if he reaches the target amount, and if he gives up in the middle, he still has to buy it at the original price.

Buy Together not only perfectly exploits viral marketers' consumer demand psychology, but it also satisfies their altruistic and need to belong, because when others click on the link, they also get the opportunity to get free products or withdraw cash, and they feel needed by others and that they can help others [8]. While, users will keep sharing the link to ask others for help in order to achieve their goal, and information about Buy Together will keep appearing in everyone's life, and all will know and understand this e-commerce brand, thus reaching a fission.

4. The Meaning and Considerations of Using Viral Marketing

Buy Together's marketing strategy has certainly had many benefits in their early stages of development. Firstly, accurate user profiling and targeted placement will allow to attract a large number of potential users. This group of users starts using their platform, participating in events or projects that they have developed and inviting new users to join. Thus, these users are attracted to products with

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better prices relative to other platforms, even if they do not participate in the campaign after registration. The platform is also successful in attracting and retaining customers. The platform is also successful in attracting and retaining customers. The data shows that in 2019, Buy Together achieved a turnover of 100.66 billion yuan, with an annual active buyer base of 585.2 million on the platform and annual revenue of 30.14 billion yuan [9]. There is no doubt that Buy Together has successfully used marketing to grow rapidly and become the second largest e-commerce platform in China.

However, this unique approach to marketing can also bring some drawbacks. Once the platform has a large and regular audience, it needs merchants who offer goods and services to that audience. As a result, the platform adopts a zero commission policy, meaning that the resident merchants do not need to pay commission to the platform, but some other e-commerce platforms charge a commission of 2.5% [10]. Thus, a large number of merchants have moved in, and although the products are becoming more diverse, there is no guarantee of quality or authenticity. What's more, while the constant increase in users through customer shared links has made the platform much better known, this visibility is not entirely positive. The interpersonal network of people is intricate, and when some potential users keep receiving cut-price and sweepstakes messages from other people's Buy Together, some of them will inevitably become disgusted after receiving the bombardment of messages and thus develop a bad feeling towards the brand. As a result, Buy Together's brand credibility can be significantly discounted, and when reputation is affected, it can constrain the subsequent development of the platform.

Reliable products and attentive service are the basis for a brand's success. When the cornerstones are in trouble, it is difficult for the brand to continue to grow. This is why it is imperative for Buy Together to overhaul the platform's resident merchants, clear out unqualified products and unscrupulous merchants, strengthen the platform's internal supervision, collect user feedback and suggestions, provide a better shopping experience for the platform's loyal users, and eliminate concerns for potential users.

In addition, the pool of users tapped with viral marketing is nearly saturated, and continuing to use this marketing model will only do more harm than good, not only failing to attract users, but only pushing the audience further and further away. Based on this, the platform is supposed to take two steps. The first step is to change the existing activity mechanism of the platform. However, nowadays, the platform's offer mechanism is such that user engagement is high, but the probability of actually being able to take advantage of the relevant offer is extremely low. For this item, platforms should plan their offers wisely so that users can really enjoy lower prices and win back their trust. The second step is to optimise the marketing model now used by the platform. The purpose of viral marketing has been achieved, and changing this aggressive marketing model to a more conventional and gentle approach is more acceptable to potential users. Focusing their marketing channels on formal TV commercials or various short-form social video platforms, such as the one they now use to title various variety shows to achieve promotional awareness. Short videos and various kinds of variety shows are the main positions of young people, using them as a position for marketing can win the goodwill of young people faster and expand the user base of young people. Young people are the perfect target audience for Buy Together.

5. Discussion

Buy Together's marketing strategy, while not perfect, has achieved amazing results in its early days. It also offers new marketing ideas to domestic and international e-commerce platforms that just need to be critically learned from. The environment in which Buy Together was born did not allow it to take a gentle approach to spreading its brand from the start, since if it did not promote itself in a lukewarm manner, the platform would have ended up being no different from other small e-commerce platforms. The only way to attract the attention of the audience is to be fiercely offensive, to catch their

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attention in the first place, to take advantage of the psychological characteristics of people who prefer novelty and to make the features of the platform spread successfully. However, the platform cannot give up the control of product quality because of the audience positioning, because the low price is more important to focus on the quality of the product and after-sales service. Certainly, high quality here does not mean that the product needs to be comparable to higher priced products, but rather that it is value for money. Ensuring that users buy a satisfactory and highly available product will ensure customer loyalty. After successfully expanding their footprint, e-commerce platforms need to pay attention to the maintenance of their brand reputation, i.e. a proper moratorium on the use of viral communication models. Platforms can use conversions to gentler, more accessible marketing strategies to yank audiences back over the borderline of disgust. This new marketing strategy should be based on the current state of development of the platform and the positioning of the platform, focusing on who your own audience is, what your own audience will like and what the needs of your users are.

6. Conclusion

In summary, viral marketing is an excellent option for e-commerce platforms under certain conditions. E-commerce platforms can use it to quickly capture the attention of their audience in the midst of fierce business competition, setting themselves apart in the race for the eyeball economy. However, there are no absolutes and viral marketing needs to be used in moderation; overuse will only bore users and potential customers. Instead, it can constrain the subsequent development of the business. Similarly, a marketing strategy cannot be applied to all brands. Brands need to adopt a strategy that makes sense and appeals to their audience based on their environment, product positioning and user profile. The second thing is that the brand's marketing model should be unique enough. Among the many e-commerce brands in China, only Buy Together has boldly tried viral marketing. The number of potential users is fixed and if all brands adopt this model, the marketing effect that can be achieved will be greatly reduced. This paper focuses on the more representative marketing models used by Buy Together, but a complete study of the Poundland marketing path is still lacking. It is necessary to conduct a more in-depth study on when and how to transform the viral marketing model for the various e-commerce platforms in the market.

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Research on Barriers to Implementing Business Analytics in Organizations

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Abstract: Business Analytics has been widely applied to multiple aspects with a data-explosive background. People utilize data mining tools and models to guide marketing strategy, organization management, evaluate financial budgets, etc. However, what comes after its popularity is various implemental obstacles, this is why only a few companies have the capacity to run their own business analytics teams and adopt conclusions stemming from data and models into their organizations' operation and decision-making. After reading and organizing previous related papers, and distilling and comparing the findings of different researchers this paper divides the barriers to the use of Business Analytics into six parts and summarizes the causes and possible effects of these barriers. In this context, barriers to implementing business analytics in organizations are introduced in dimensions of data quality, security and accessibility, analytical tools and knowledge, financial investment, human resources, analytics procedure, and organizational barriers. This article provides a basic overview of the barriers and may be useful to guide and improve the practical application of Business Analytics.

Keywords: business, analytics, data, barriers

1. Introduction

In the new century, Business Analytics has become a buzzword in the management field attributed to the Internet and Information Technology boom that cultivated a data-rich environment and underlies a wealth of mathematical and statistical models [1]. In general, Business Analytics is a science or method that incorporates sophisticated mathematical, statistical, machine learning, and network science methods, as well as a variety of data and expert knowledge, to guide descriptively, predictively, and prescriptively analysis and to support accurate, timely, and effective decision-making, answer questions, and solve problems [2].

The huge volume of data comes with the flourishing of the digital media ecosystem and the internet economy has provided organizations with unprecedented opportunities to utilize data to create value for customers, enrich the user experience, boost their satisfaction and loyalty and obtain value. The availability of big data is taking a wave of data-driven decision culture in companies, bringing them strategies to stand out from the market competition and improve financial performance. The need for better business decisions, availability of data, and affordability of the enablers, together with a cultural change towards evidence-based management leads to the popularity of analytics, and the diversity of

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applications of analytics span from almost every facet of business practices [3]. Applications of data-driven techniques have been widely utilized in manufacturing, services, retailing, and medical industries, and the list is still growing at a rapid speed.

While business analytics is widely used in almost every aspect of business, there are numerous barriers and challenges to adopting business analytics in organizational applications. Many institutions and scholars have conducted surveys and research on the barriers and challenges to applying Big Data, AI (Artificial Intelligence), and Analytics. Some of them concentrate their studies on the technology itself and relevant methodology, while others focus on very specific domains like Business Processes, Individual Sales, Manufacturing Supply Chain, Performance Management, Human Resources, Telecommunications, etc. Few articles and researchers work on classifying and summarizing these different barriers, especially to their implementation in organizations, and it is exactly what this paper highlights on.

After reading and organizing previous related papers, and distilling and comparing the findings of different researchers, this paper divides the barriers to the use of Business Analytics into six parts and proposes their possible causes and possible effects. In this context, barriers are introduced in dimensions of data quality, security and accessibility, analytical tools and knowledge, financial investment, human resources, analytics procedure, and organizational barriers. These barriers are constraining the availability of data and its blend with customers and market, restricting the generation of a data-driven enterprise culture and managers' effective and precise decision-making in the market. This article provides a basic overview of the barriers and may be useful to guide and improve the practical application of Business Analytics.

Research studies such as technology-organization-environment framework and IT business value in the past suggested that the extent of the organizational performance under IT impact is determined by plenty of organizational factors, which can be summarized as technological, organizational, environmental factors, business analytics' integration with other factors and the level of its adoption [4]. In the absence of these key factors, companies encounter challenges in making effective strategic decisions, in other words, barriers to the use of business analytics in organizations. The six barriers separated at different levels are explained below.

2. Data Barriers

2.1. Data Quality

Called "the oil" of the digital economy, data are playing an increasingly significant role in organizations. Managers harness data to construct and monitor customer relationships, customize products and services, and automate real-time market processes [2]. However, analysis processes can be misled if the original data, which is large in volume and sometimes unstructured, dirty, and messy, is not cleaned and standardized appropriately.

Data complexity and its inherent messiness is a big challenge for organizations to extract the value of big data and utilize it to suggest management and strategy. From the example of ICICI bank, it is observed that data is generated from the smallest to largest segment of the organization, this massive and redundant data collection work may cause duplication, loss of vital data, time and cost extension, and even accumulation of excessive unstructured data [5]. This agrees with the saying that "without the appropriate dataset from which to conduct analysis, the analytic outputs will provide irrelevant information to the decision makers" [6]. Data should be integrated across functions, geographies, and divisions. However, many companies don't have the plan to prepare sufficient addresses for the large rate of data growth. The fact is that the challenges of managing and analyzing various data from multiple sources and formats(structured and unstructured like text, images, videos, messages, maps, etc.) of data are often beyond the organization's capacity [7].

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2.2. Security and Privacy

Data contains the majority of customers' details like medical information, consumption bills, and social records, using this kind of data for a company's earnings may trigger some security issues if not properly kept [5]. The absence of backup plans might enhance firms' security-related concerns and consequently, increase their overall perceived risk [8]. Organizations encounter numerous legal and ethical challenges as excessive use of individual data from customer records may reveal and leak their privacy (medical records, financial situation, embarrassing behavior, family relationships), even though the move probably generates a great profit. The use of the personal data of customers should be prevented or highly scrutinized to protect the organization from bad publicity and public outcry, even if it is within legal boundaries [3]. Besides, the law and regulations stipulate and limit managers and organizations in how they can extract user data, increase customer lists and craft their message [9].

2.3. Open-up Data Accesses

Sharing data across organizations is another challenge, as the data must be secure while handling shared data containing different vocabularies on different platforms. What has to be blamed is the issue of data responsibility, some partners are unwilling to engage in data sharing, or it depends on providing incentives and security. Due to a lack of trust and fear of losing control over the data, they may want and should keep certain data confidential, which on the other hand can limit its usability for analytics [10][11][12]. As a result, data-sharing policies and access methods are critical for organizations to keep data for an extended period, scrub data for inaccuracies on a timely basis, and redistribute it appropriately [13].

3. Techniques Barriers

3.1. Skills and Models

The first barrier is a lack of knowledge in approaching and using data, which includes distinguishing between useful and useless data, identifying data suitable for analytics, ideas about the potential value of data, experiences with data-processing techniques, and methods to transform data into valuable information and decision-making strategies [13]. Agencies and enterprises capable to afford analytics technology may not have the expertise to utilize its fullest potential due to the limitation that both business and computer specialists need to be trained and hired. Organizations also have trouble balancing and keeping up with the rate of innovative technology to change, evolve, and advance, while contemporary techniques are working stably [9].

3.2. Tools and Infrastructure

Research has shown that a lack of appropriate data analytics tools slows down smooth production, especially in manufacturing supply chains [14]. Even if it is available, capable, and sometimes affordable, establishing an analytics infrastructure is still a big expense, as the management layer of organizations may not be willing to invest in needed technology without a clear benefit and output [3]. Only a few organizations work with analytics specialized software, meanwhile, the majority are still using office software such as PowerPoint to design organizational charts and spreadsheets to do activity analysis [15]. In addition, to develop IT infrastructure for business analytics, cloud, and heterogeneous computing architectures are although necessary, these technologies would fail to build in high probabilities either from an economic or technical point of view, thus organizations can not avoid data processing bottlenecks [7].

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Missing knowledge can lead to unreasonable expectations, impractical demands on analytics functions, and ignorance of its limitations. Considering this, firms are less likely to generate meaningful initiatives for business processes without effective analytical techniques, due to which value underestimation and investment reluctance occur.

4. Finance Barriers

The cost of analytics adoption is mainly prepared for solutions available on the market, acquiring necessary raw data, and system integration, it is considered to be a significant barrier as it is hard to predict the return of the investment in advance [13]. In this regard, Brynjolfsson once makes a point about the "IT product paradox" which points out the paradox that researchers are unable to assess the earnings growth that results when companies increase their investment spending on IT [16]. Even though the situation remains confusing, substantial investment in data recording and storage is required for organizations to develop their data analytics technology. This is an obstacle that many companies need to overcome if they want to reap the rewards of business analytics [17]. Moreover, it is hard to evaluate the breakeven point. Many executives are experiencing a hard time, especially on a big scale, since analytics are not only costly but also complex, its return on investment is difficult to justify if cannot convert the value of analytics into evaluable numbers [3].

5. Human Resource Barriers

A lack of analytically skilled human resources is a great barrier to analytics adoption within organizations.

5.1. Talent

Not only the professionals mastering the analysis of data or business management but also the operators, managers, and decision-makers involved in the process of converting data into value, these comprehensive talents with professionalism and strategic vision are also important factors that influence the application of business analytics in organizations. Given that analytics is new and relevant talents, called data scientists or quantitative geniuses are still being developed today, and are scary and hard to find. The market is in strong need of candidates having solid programming and excellent communication skills, who also should be good innovators with deep business understanding [6]. Early in 2011, Bassi pointed out that there is a demand for individuals to have the ability to use the results of analysis by involving them in business outcomes [18], and conversely, the shortage of well-trained IT personnel may increase "data input errors, data loss or confound data analysis and interpretation" [7][17].

5.2. Training

Business analytics implementation also includes training and coaching employees to adapt to the new working system. However, training could be an issue if an analytic tool was too complicated or took too much time to learn. Inefficient trainers, irrationally designed training programs, inadequate motivation, and incapacity of trainees to execute the skills into work may incur improper training and bring about a huge negative impact on the organization [19][20].

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6. Procedure Barriers

6.1. Time

Time constraint is perceived as another primary barrier in organizations owing to the lack of sufficient time to familiarize staff with analytics and its related technologies, especially in the face of a rapid change market [21]. The long period it takes for companies and staff to go from analyzing data and obtaining information to actual output can inhibit other processes that would otherwise generate profits, as it is difficult for organizations to develop parallel initiatives simultaneously [22]. The right implementation time may also be hindered by delays in vendor selection, obtaining funding, or delays due to some uncertain event. In all these cases, costs start to increase, data may become outdated, and disruptions in the organization may appear [5].

6.2. System

The issue of integrating systems impedes the integration of data resources under diverse and incompatible IT circumstances, and the mistakes in this integration of systems will result in inaccurate outcomes and wrong decisions [13][23]. Processes must be implemented, and the organization must establish an appropriate range of measurable metrics by which all project steps can be accurately estimated if completed successfully [9]. The size of the system sometimes incurs delays and administrative inflexibility in data sharing and there is a lacked a uniform, repeatable process across organizations [24]. Furthermore, the approach of implementing advanced analytics, and insufficient care in introduction possibly lead to high expenses with low returns along with low morale and excessive blame [9]. To deploy analytics, organizations must establish processes, governance structures, and teams with complementary data skills, as well as create a strategic roadmap that can leverage existing and new data assets [25].

6.3. Inefficiency

There exists a deep connection between the adoption of analytics technology and the operational efficiency of organizations. The suboptimal business decision generated from an inappropriate technological solution is very likely to impact the firm's operational efficiency [26]. What is worth thinking about is operation inefficiency damages the company's reputation and employees' satisfaction, it narrative the investment in analytics, and under this situation, the market share is adversely affected [26]–[28].

7. Organizational Barriers

No doubt that several effective and profitable transformations are generated by the adoption of analytics, nevertheless, only a few companies are proficient in its use while many more are encountering obstacles, perhaps management and culture-relevant barriers could explain it [5]. Besides, organizational bureaucracy and culture can hinder the necessarily shared vision to adopt analytics tools as well [29].

7.1. Culture

Organizations have to cultivate an analytics-driven culture since a big investment in technology cannot finish a fruitful business analytics implementation on its own [6]. More and more companies are realizing the magnitude of a data-driven culture in adopting analytics techniques into modern business. Through its assumptions, symbol, norms, and value, organizational culture has a profound impact on many facets of a company like its structure, strategy, and procedure [7]. Habits are hard to

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break, however, culture no doubt is the most difficult part to change, the shift from intuitive and empirical business judgment to data-driven decision-making is exactly a tough process. Some of these entail processes organizations must go through, including enriching the team's data processing skill set, expanding the range of decisions affected by data, and developing a data-driven decision-making manner rather than gut feelings [30]. Achieving this transition depends largely on senior management believing that the role of data and analytics should have a more prominent place in decision-making [31].

7.2. Management

An analytics-driven culture may assure that members of an organization are on the same page toward a common goal that the analytical system trying to address. The inconsistent business goals stem from the silo effect and mismanagement incurs many failures. Silos are originally set for specific labor and task division to eliminate multiple versions of the truth, nevertheless, decentralization of data authorization and functions across work teams inevitably accounts for mistrust and information asymmetry [6][13]. To acquire positive output, companies must break the barnstorming effect, and governance mechanisms may influence the extent to which the organization's culture is data-driven [32]. Given that businesses are still in the early stages of implementing business analytics, it is critical to have a 360-degree view of its implementation, evaluate time and complexity, and calculate the cost and gains. The lack of oversight of analysis has led to the cultivation of heterogeneous tools, methods, and processes that are possible to develop redundant solutions to similar problems [13]. Sometimes the manager's experience pool may not catch the rapidly changing marketing, and organizations' managerial insights about new information and strategies are somehow insufficient [31]. If a company adopts inappropriate technological solutions due to a lack of governance, it will suffer significant losses [33].

8. Conclusion

While surrounded by rich data resources, many organizations are simply not well prepared to dig the mine underneath and take advantage of its value, as the obstacles generated by data, techniques, investment, individuals, and teams are in the way. Six primary obstacles are summarized as follows. Data quality, security, and accessibility are hard to guarantee, and analysis processes can be misled if the original data are not clean and standardized appropriately. To equip personnel with advanced tools and knowledge and assure its application into practice, infrastructures consisting of hardware and software, property and precise training, and skilled talents are strongly needed, behind which is heavy found investment. Due to an unpredictable return on investment, the paradox of resources and costs is inevitable and hence hinders the adoption processes of business analytics. Besides, many organizations lack an unambiguous objective and a standard procedure of convert data into business strategies and profit, leading to information asymmetry and inefficiency. Apart from the factors mentioned above, data-driven culture and all-around management are also necessary, which require long-term trial and adjustment so that firms hardly achieve it in the early stage of implementing business analytics. Complementary to those mentioned above, key factors in deriving business value from investments include recruiting people with a good technical and managerial understanding of big data and analytics, fostering a culture of organizational learning, and embedding data-driven decisions into the organizational structure. Realizing this value has to overcome barriers caused by a variety of factors such as poor data quality, lack of expertise, outdated technologies, insufficient investment, inefficient procedures, and vulnerabilities in management. Undoubtedly, this means numerous processes need to be implemented, which requires top management commitment and a clear plan to adopt and roll out business analytics company-wide.

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This paper mainly focuses on the integration and sorting of various barriers to the application of business analytics in organizations, without much discussion on the comparative analysis of interrelated obstacles and their targeted solutions. Besides, there is a lack of case analysis referring to these hindrances of different types of barriers to specific industries and specific business activities. For research in the future, these barriers can be analyzed with examples and effective optimization and solutions can be chosen as objectives.

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The Impact of High-Tech Industries on China-US Business Negotiations

- Taking the Chip Industry as an Example

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Abstract: Since 2018, China and the US have held several rounds of high-level economic and trade consultations, which largely stopped in 2020. Subsequently, the US started a massive tax increase on China. However, faced with global inflation, the call was high to restart trade talks with China and eliminate tariffs on China. In June, US President Joe Biden said in a speech to the nation from Washington that the White House was reviewing the "penalties" imposed on China under former Donald Trump and "could opt to remove them altogether." However, the US has issued a series of containment policies in the chip industry, which further casts a shadow over the resumption of bilateral talks. The high-tech industry, with chips as the representative, has been playing an essential role in the China-US business negotiations. Compared to previous studies with more focus on the one-way research about how China-US gaming influences high-tech industries, this article attempts to analyze it from a new perspective: the China-US gaming in the chip industry. Through observational studies, the article intends to make an in-depth analysis of the significant role high-tech industries have played in the China-US business negotiations and explore where the crux lies. Through a series of observational studies, this article argues that America will not loosen controls on Chinese high-tech industries, especially on the chip industry. For the US and China - the world's first and second largest economies, the failure of business negotiations would mean no winners for either side.

Keywords: China-US business negotiations, chip industry, crux

1. Introduction

As China's status continues to rise in the global economy, the bilateral trade between China and the US has also soared. In 2020, the total trade volume between the two countries reached RMB 4.06 trillion, of which the exports to the US were RMB 3.13 trillion, growing by 8.4% and the imports from the US were RMB 931.87 billion, growing by 10.1%, making China the largest trading partner of the US then [1].

The overly close economic ties between the US and China, as well as the high US trade deficit with China, has raised great concerns from the then US President Donald Trump and has also set off a series of tariff-led trade wars between the two. In the war without smoke, business negotiations

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have become the battlefield. This follows a series of business negotiations between the US and China about the issue of tariffs and the signing of the China-US Phase-One Economic and Trade Agreement. However, for now, both sides do not think they have met their respective hopes. After Biden took office, there have been calls for renewed business talks.

Taking into account materials including official economic data, statements and opinions of government officials both in the past and present, this article attempts to analyze why it is necessary for China and the US - two countries with two different cultural backgrounds and thinking patterns, and with different negotiation objectives - to sit back down at the negotiation table, how the high-tech industry, represented by chips, becomes the largest bargaining chip, and what impacts different outcomes may bring about for both sides. In addition, this article tries to provide some suggestions for possible solutions to the China-US business negotiations.

2. Background Information: The Status Quo of China-US Relations

Both China and the US are in high demand for a resumption of business negotiations, with the focus on removing the high tariffs that America imposed on China in 2020. It comes against the backdrop of the current high inflation in the US, which failed to fall in June even under successive US dollar rate hikes, but rose by another 0.6% instead, with CPI as high as 9.1% [2]. Therefore, before the midterm congressional elections in the US in November, reducing the level of inflation will be a major objective for the Biden administration and also the biggest challenge facing the US economy. In this case, lifting the sanctions against China and allowing Chinese products to enter the US market in large volumes could stabilize the domestic economy in the US and curb inflation. Zhong Zhengsheng, the chief economist of Ping'an Securities in China, said in a speech that he had calculated that the US tariffs on China boosted the CPI by about 0.22% [3].

However, China and the US at present have not really started business negotiations about export tariffs. Moreover, the negotiations are bound to be difficult because the objectives of both sides do not coincide. The US hopes to get out of the inflation trap by resuming business negotiations with China.

According to the report by the US Bureau of Labor Statistics in August, although inflation eased slightly in July, the Consumer Price Index rose to 8.5%, compared to 9.1% in June. This was largely driven by higher costs of goods and services, such as cars, housing, food and health care [2].

High inflation has put severe financial pressure on many American families, who are forced to pay more for everyday necessities, including food and rent. More importantly, this heavy burden is largely shouldered by lower-income families, leaving their already stretched salaries greatly affected by price fluctuations.

The average American is spending an extra $717 a month because of the highest inflation in decades, according to an analysis. As said in the analysis, despite the slowdown of price increases from June to July, prices rose by 13.3% from January last year to July this year. Even if prices stop rising altogether, the inflation that occurred between August last year and July this year has added an additional $8,607 to household spending [4]. In addition, despite the drop in energy prices in July, Americans are paying a much higher share (32.9%) for gasoline than a year ago. Food prices have increased by 13.1% over the past year, the largest increase since 1979 [4].

The US has another objective for the China-US business negotiations, and that is, the US does not want the Chinese economy to overtake that of the US. On March 26, 2021, US President Joe Biden held his first press conference since entering the White House, which lasted about 62 minutes and included a total of 10 questions. On China-US relations, Biden said China would never be allowed to overtake the US as the world's top power during his tenure. He also claimed to invest more to ensure the US won in the competition with China.

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However, China, the other side of this potential negotiation, hopes that the business talks could help lower the export tariffs so as to sell more goods to the US. As shown in an official statistic, in the first four months of 2022, the US foreign trade, both exports and imports included, totaled $1,746.6191 billion, a significant year-over-year increase of 21.4%. Moreover, Canada and Mexico became the first and second largest trading partners of the US. The bilateral trade volume totaled $258,5056 billion and $249,7835 billion, respectively. By comparison, the bilateral trade volume between the US and China in the first four months was only $241.1203 billion, with China falling to be the third largest trading partner [5].

It is evident that both China and the US have a huge demand for the resumption of business negotiations. In May 2022, Chinese Vice Premier Liu Hecen held a video call with US Treasury Secretary Janet Yellen. Both had a pragmatic and frank exchange of views on macroeconomics and the stability of supply chains in global industries. However, this widely-expected business negotiation has now taken a new twist with the visit of US House Speaker Nancy Pelosi to Taiwan, China.

3. The Status of High-tech Industries in Political Gaming

If lowering tariffs on China is one of the few options available to the Biden administration as it seeks to quell inflation, why hasn't it been implemented since he took office? By contrast, his predecessor, Donald Trump, imposed tariffs on about $370 billion worth of imports from China. In fact, during the 2020 US presidential election, Biden attacked Trump's trade policy towards China and made it a campaign priority. However, he did not scrap any Trump-era tariffs on China imports. The Biden administration's hesitancy on this matter illustrates the sharp divisions within the US administration over the issue of lowering tariffs on China imports and the great significance of high-tech industries in the political gaming between the two countries.

In early July this year, The Wall Street Journal, citing people familiar with the situation, said that Biden had not made the final decision, but he might make the announcement that week to suspend tariffs on consumer goods such as clothing and school supplies, as well as simultaneously launching a broad framework to allow importers to apply for tariff waivers. However, the person also said that Biden was expected to raise tariffs on the high-tech items from China, thus maintaining the economic pressure on China.

The Wall Street Journal also reported previously that the US could open a new Section 301 investigation into China's industrial subsidies for high-tech projects, for which the Office of the US Trade Representative (USTR) has been preparing for months. The move might also lead to tariffs on a series of high-tech products.

As Biden was weighing a tariff decision towards China, he was dogged by strong divisions from members within his administration and Congress, and also from different external forces such as businesses, Wall Street, and labor unions

The prospect of adjusting tariffs on China to curb inflation is a concern for some US officials. Treasury Secretary Janet Yellen has repeatedly said that tariffs were a clear drag on the American economy, and the government was looking at ways to re-configure tariffs to help curb inflation. In the interview with ABC News on June 19, Yellen said, "... re-configuring some of those tariffs, so they make more sense and reduce some unnecessary burdens is something that's under consideration." In early June, Commerce Secretary Gina M. Raimondo told CNN in an interview that the administration had decided to keep the tariffs on steel and aluminum to protect American workers and its steel industry, and it is a matter of national security, but there are other products, household goods, bicycles, and more, and it may make sense. Others, however, wish to maintain their strength against China by imposing tariffs. Tariffs are one of the means to restrict the development of the Chinese economy, especially that of the high-tech industries.

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Officials, represented by US Trade Representative Katherine Chi Tai and National Security Advisor Jake Sullivan, have stressed that existing tariff measures are a major bargaining chip in trade talks with Beijing. They argued that it would be self-defeating to remove tariffs first when China has failed to meet the commitments to purchase American goods as part of the 2020 Trade Deal with the Trump administration and has not made new gestures on specific issues [6]. About whether to remove tariffs on China, Katherine Tai said in a Senate Hearing on June 22 that tariffs on Chinese products are "a significant piece of leverage" in the US-China trade relationship and that removing tariffs might have a limited effect on controlling short-term domestic inflation.

Moreover, major labor unions, including the American Federation of Labor and Congress of Industrial Organizations (AFL–CIO), the United Steelworkers and the Service Employees International Union (SEIU), hold that ever since the Trump's administration's Section 301 investigation, nothing has changed in China's trade practices to warrant the removal of tariffs. If anything has changed, as they stress, it is the Chinese government that has "just doubled down on their strategy and methods." On August 10, 2022, Bloomberg quoted Commerce Secretary Raymond Raimondo as saying that the Biden administration hopes to "ensure nothing is done that might hurt American workers." It is clearly a challenge for the Biden administration to bring these different views together into one unified theme and to arrive at an answer that satisfies all parties.

4. The Impact of the Chip Industry on China-US Negotiations

In the game of high-tech industries between China and the US, chips have always been a part that cannot be ignored. As the world undergoes a comprehensive transformation towards information technology and digitalization, the rapid development of new industries such as 5G, artificial intelligence, the Internet of Things, and new energy vehicles has brought about a significant rise in demand for chips. Moreover, the "chip shortage" that stirred the world last year has also highlighted the vulnerability of the global chip supply chain under the impact of the epidemic and the imbalance between supply and demand.

The chip industry is of great importance to the China-US business negotiations firstly because of its pivotal position in bilateral trade. While China has to export many goods to the US, it is also the world's largest importer of chips. Moreover, in the first seven months of 2022, among goods imported into China, "only the volume of chips and petrol exceeded 1 trillion yuan". In these months, the cumulative number of imported chips was 324.67 billion, shrinking by 11.8% year on year; the amount paid was 1.58 trillion yuan, a 5% increase from 2021, accounting for around 15% of China's total import value of RMB10.23 trillion in the first seven months [7]. The US, on the other hand, is the largest exporter of chips around the globe. During the whole year of 2021, the sales of US chip companies totaled $258 billion, representing 46% of the global market, compared to 47% in the previous year [8].

Secondly, the importance of the chip industry also lies in its essential role in the China-US competition and its leverage for the US to curb China's rapid development. On August 9, Biden signed the "$280 billion" CHIPS and Science Act of 2022. The Act, the rarely-seen high subsidy bill for a single industry, aims to increase the manufacturing capacity and technology research and development capacity of the domestic chips through massive financial subsidies and tax breaks and finally attract semiconductor factories to stay in the US. According to the Semiconductor Industry Association (SIA), in 2020, the US accounted for 12% of the world's semiconductor production capacity, down 25% from 30 years ago [9]. However, the Act also seeks to further restrict the development and upgrade of China's chip industry, requiring "any company that receives US subsidies can manufacture chips and invest in America, but cannot in mainland China." Apart from the efforts to prevent China's chip industry from obtaining more external investment, the US has been expanding its export controls to China.

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In addition to previous calls for allies to ban the sale of lithography machines to China, Bloomberg reported on July 30 that Lam Research and KLA Corp., two US chip equipment suppliers in the US, have confirmed that the restriction level on chip gear to China has been raised from 10 nanometers to 14 nanometers. On August 31, the chip-designing company Nvidia was requested by the US government to stop the export of A100 and H100 products to China, two latest flagship GPU computing chips. The US government may have done so because China and the US are the only two countries entering the first echelon around the world in artificial intelligence development [10].

Therefore, if the chip dispute is not resolved, it would be difficult to resume and effectively pursue the business negotiations between China and the US. The strict restrictions that the US and its allies have imposed on China's chip industry would make the negotiations even more difficult. China would certainly like to see all the various restrictions on its high-tech imports lifted, while the US is not expected to do so.

5. Suggestions on the Development of China-US Business Negotiations

Beneath the high demand for business negotiations between both sides, the bilateral trade between China and the US, important economic and trade partners of each other, has kept an extremely high volume despite constant frictions.From 2009 to 2021, the share of US imports from China remained between 18-22% of its total volume [11]. Customs data show that the total trade volume in the first seven months this year amounted to RMB 2.93 trillion, up 11.8% year-on-year [7]. Moreover, China is the largest potential market for US exports, and China has long been an important export market for the agricultural and machinery products of America.

However, the business negotiations on tariff reductions between the two countries are expected to be unsatisfactory, and it would be difficult to implement large-scale tariff reductions on Chinese goods.

Firstly, the US is concerned about the interdependent economic and trade relationship with China, arguing that over-dependence on China would threaten its own economic security. Therefore, the US tries every means to get rid of its dependence on China, to decouple itself from China, and to reconstruct the supply chain on a global scale, which represents the root cause of trade frictions between the two countries.

Secondly, it would be quite helpless if America were to lower tariffs on China on a large scale. With its inflation at a 40-year high, the US increased the tariffs on China, which further pushed up the CPI by 0.22%. Moreover, there was a clear positive correlation between the pressure to raise the prices of industrial products and the tariff increase in China. The tariff increase on China would directly affect companies with higher import costs, leading to a great increase in the PPI. By contrast, lower tariffs would help curb inflation and reduce the living cost of US consumers. The US government would never reduce its tariffs on China unless it is forced under public pressure. However, even then, the US will not lower its export restrictions on China in the high-tech sector, the chips included.

It can be assumed that the China-US business negotiations on tariffs succeeded and what benefits it would bring to both sides. For China, it would solve all the import/export problems it has been facing in recent years and also gives its long-stifled high-tech industry some room for development. For America, inflation, the top concern of its people, would be eased. According to a survey by the Pew Research Center, 70% of the American people say that inflation is the top problem facing America, a much higher percentage than the issues of health care affordability (55%) and violent crime (54%) [12].

However, what would be the downside of an unsuccessful China-US business negotiation on tariffs? It is actually a war with no winners. If the tariff negotiations are successful, imports from

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the US will be significantly increased, as promised by China. However, it has not been realized yet. And the restriction on China's imports of chips would worsen the relationship. On August 11, 2022, the US Department of Commerce's Bureau of Industry and Security (BIS) published in the Federal Register an interim final rule to impose extra export controls on China for four "emerging and foundational technologies", three of which are closely related to advanced chips. This move on the American side would further increase the distrust between the two sides in future business negotiations.

6. Conclusion

Firstly, as the world's first and second largest economies, the trade relationship between China and the US is of great importance not only for the economic development on both sides but for the development of the world economy as well. If the commercial negotiations on tariffs between the two countries go well, it would not only promote the economic growth of both but also add more prosperity and dynamism to the global economy. Otherwise, there would be no winners for either China or the US, with the negative impact on China much worse than that on the US.

Secondly, the US will make no concessions in the tariff negotiations, especially about export restrictions on high-tech products like chips. It would be an essential tool for the US to suppress China's rapid growth in economy and science, which will bring harm to the long-term development of the high-tech industries in China and also add negative impacts on the potential business negotiations between the two sides.

In addition, the US does not care whether the business negotiation with China succeeds or not, as it believes the US must be the final winner. At the signing of the CHIPS and Science Act 2022, President Biden declared that this Act would help the US "win the economic competition of the 21st century". It also signals that the confrontation between the two superpowers, the US and China, will be increasingly intense.

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Research on Marketing Promotion of Local Group Purchase Products in TikTok

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Abstract: With the rapid development of China's economy and Internet technology and the continuous progress of the human consumption concept, the local life group purchase application on the Internet is becoming more and more popular. Many leading enterprises in the Internet industry have gradually arranged local life group purchase businesses to promote consumers' consumption. This paper takes TikTok's local life group purchase business as the research object and analyzes the marketing strategy of TikTok local life group purchase.

Keywords: group purchase, consumption concept, TikTok, marketing strategy

1. Introduction

This paper studies the problem of short video software group purchase promoting consumption and finds out how businesses improve sales and profits through marketing. Internet local life group purchase is an Internet group purchase, which displays offline catering, beauty, leisure and entertainment, and life service physical stores on relevant platforms. Consumers can comprehensively and quickly screen out relevant business information and services that they need on relevant platform. This is also an effective channel for enterprises to expand customer market [1].

However, it is found that not all group purchase products can successfully promote the marketing level Therefore, this paper is going to study how group purchase products can promote consumers' consumption and businesses' profits. Through the analysis of the two aspects of consumers and businesses, consumers take the form of questionnaires, while businesses take the form of private letters and telephone consultations.This paper aims to help businesses improve their performance and consumers buy more favorable goods.

2. Literature Review

With the rapid development of China's Internet economy, the consumption behavior of Internet users through short video e-commerce platforms is more frequent. This study takes TikTok short video platform as an example to deeply explore the impact of TikTok short video on consumer consumption market and consumer behavior [2]. At the same time, the use of TikTok short videos and consumer consumption are clarified. In combination with the characteristics of TikTo short videos, the paper puts forward countermeasures to guide consumers to consume rationally.

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According to the principle of small profits and quick sales, a business can offer group purchase discounts lower than the retail price and high-quality services that can not be obtained by individual purchases.

After consulting the data and browsing TikTok, as an integrated short video platform for traffic, transaction, and content, many brands and individuals have opened stores on TikTok [3]. The goods they sell range from daily necessities to food, drink, and daily life. It can be seen ket consumption economy, and it can also be predicted that it will play an important role in driving the market consumption economy in the future.

According to the data in the 2021 TikTok development annual report, short videos have directly affected the consumer behavior of current consumers. The video display of short videos can provide consumers with a more intuitive online consumption experience and is gradually developing into one of the consumption modes used by current consumer groups. In addition, Tiktok short videos have strong user stickiness and are showing a year-on-year growth trend. In 2021, the total number of users exceeded 600 million, an increase of 50% over the total number of users in 2019.

The purpose of this paper is to investigate the causes and specific manifestations of these problems and study the problems and give relevant improvement suggestions, to help more businesses improve their performance and consumers buy more preferential goods.

3. Methodology

Problems in the marketing strategy of TikTok local life group purchase are as follows [4]:

1. Serious homogeneity of marketing means and lack of core competitiveness. From the perspective of marketing means, although the TikTok local life group purchase is displayed on the short video, live broadcast, or short video author's homepage in the form of window commodity links, it is only a difference in display mode. In essence, it is still a low-cost preferential group purchase to attract consumers. Some group purchases offer a price of one-fifth or even lower than the initial price of consumers to attract consumers so that consumers can change from passive viewing to active consumption.

2. Imperfect search function and inflexible marketing mode.TikTok local life group purchase is a platform that uses a big data algorithm to analyze users' browsing habits and accurately push some products to consumers according to their daily preferences. Users have no way to search for the corresponding results according to their own needs. This push mode alone seems too rigid and inflexible to meet the needs of users in all directions.

3. Lack of real evaluation, easy to makes consumers lose trust. Although most TikTok local life group purchases are more preferential than those on other platforms, the number of evaluations is small. In addition, the short videos of various online celebrities are almost unanimously praised. This will make consumers mistakenly think that the group purchase mode is the advertising of the corresponding business. This evaluation mechanism can not provide a reference for consumers to select good and inexpensive goods or services, and ultimately consumers will lose their trust in the platform group purchase.

4. Low entry threshold, unable to keep up with the after-sales service level.At the early stage of the development of TikTok local life group purchase, TikTok was eager to develop and expand its scale due to the limited number of businesses it currently owned. It lacked an assessment of the actual overall comprehensive level and business strength of the business settled in, which led to the low threshold for TikTok group purchase. Some businesses with low comprehensive strength are unable to provide high-quality services when group purchase consumers go to the store, which directly causes customer dissatisfaction. And under the temptation of strong discounts, consumers often make impulsive consumption without evaluating the product quality of the business.

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The research object of this paper is mainly to conduct a questionnaire survey on TikTok users and consumers, as well as to make statistics on the sales volume of group purchase business' products, and to consult some businesses [5]. As we are now in the period of COVID-19, the questionnaire cannot be conducted offline. This paper adopts the form of an online questionnaire. The online questionnaire is mainly targeted at consumers and investigates a series of questions about short video group purchases. The questionnaire is conducted by online questionnaire, which is distributed to the TikTok platform and the TikTok users. For businesses, they use the form of telephone consultation and TikTok private letters to understand relevant information. This questionnaire survey is mainly discussed from the following main parts, including the use of TikTok short videos and the consumption of e-commerce platforms by the respondents, and the reasons and problems related to TikTok e-commerce consumption [6]. At the same time, this paper also directly inquires about group purchase sales comments and other information through the TikTok platform to assist the research.

The questionnaire mainly involves the following aspects:

1. TikTok users have consumption ability and demand.
2. General usage time of TikTok users and proportion of group purchase-related content.
3. Users' preferences and reasons for buying group purchases
4. The consumption behavior is affected by other internal and external factors
5. Experience and evaluation after group purchase
6. Influence of short video publicity on consumption

The obtained data and information are summarized in a table for analysis. The correlation analysis is carried out on the promotion strength of TikTok video and the group purchase discount strength to consumers' purchasing attraction. Study the promotion of short videos on consumption through relevant economic knowledge. According to the research results and relevant analysis, suggestions are given to enable consumers to better carry out group purchases and businesses to improve their performance while maintaining high-quality group purchase products.

4. Result

This paper adopts the form of an online questionnaire. The online questionnaire is mainly targeted at consumers and investigates a series of questions about short video group purchases.This questionnaire is mainly discussed in the following main parts. They are the respondents' use of TikTok short videos and consumption of e-commerce platforms and the reasons and problems of TikTok e-commerce consumption. Investigated the audience's TikTok use, consumption expenditure, viewing time, purchase tendency, and consumption behavior.

4.1. Age of Respondents

The online questionnaire is distributed randomly, involving all age groups. A total of 104 valid questionnaires were collected. 4.76% of the population aged 18 to under 25 years old. 44.76% of the population aged 18 to under 25 years old. 12.38% of the population aged 25 to under 35 years old. 19.05% of the population aged 35 to under 45 years old. 12.38% of the population aged 45 to under 60 years old. 6.67% were over 60 years old. The statistical table is as follows:

Table 1: Table name.

Age range	Quantity	Proportion
<18	5	4.76%
18-25	47	44.76%
25-35	13	12.38%

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Table 2: (continued).

35-45	20	19.05%
45-60	13	12.38%
>60	7	6.67%

4.2. Usage of TikTok

A large majority of respondents know and are using short video software such as TikTok.The questionnaire results show that 76.19% of the respondents said they were using the Tiktok short video app, and another 13.33% of the survey samples said they had not used the Tiktok software but know it. But there are still 10.48% of the survey samples who have never known TikTok.The results show that TikTok short video has covered most mobile user groups. The statistical table is as follows:

Table 2: Table name.

Option	Quantity	Proportion
Contacted and in use	80	76.19%
Know but haven't use	14	13.33%
Don't know	11	10.48%

4.3. Duration of Tiktok

The user's use time determines the user's stickiness and demand for the Tiktok platform. In the user survey, it is also clear that the majority of users watch Tiktok for about one hour every day. This shows that users generally spend a long time watching Tiktok, and users have good stickiness. Tiktok short videos are gradually developing into an important entertainment mode for short video audiences. The statistical table is as follows:

Table 3: Table name.

Duration	Quantity	Proportion
<30min	25	23.81%
30-60min	41	39.05%
60-120min	14	13.33%
>120min	25	23.81%

4.4. Group Purchase Product Experience

According to the results of the questionnaire, most of the respondents have purchased or often purchased Tiktok group purchase products. This shows that this new consumption mode is also popular and has its advantages. The statistical table is as follows:

Table 4: Table name.

Option	Quantity	Proportion
Frequently	19	18.10%
Occasionally	52	49.52%
Know but haven't bought	18	17.14%
Don't know	16	15.24%

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4.5. Purchase Preference

The content of the questionnaire also includes preferences for purchasing products. Different users have different purchase needs due to their interests, life needs, and favorite anchors. Dividing product categories in the survey can accurately locate which product categories TikTok users prefer. To define the product consumption needs and content preferences of Tiktok users, the following is a survey of Tiktok users' purchase preferences. The statistical table is as follows:

Table 5: Table name.

Option	Quantity	Proportion
Food	59	56.19%
Entertainment	40	38.10%
Beauty products	35	33.33%
Clothing	36	34.29%
Learning materials	16	15.24%
Other	14	13.33%

The survey results show that most respondents prefer to buy food and entertainment products.

4.6. Main Reasons

Consumption behavior is influenced by internal and external factors. The main reasons for consumers to buy group buying were investigated. What factors affect their consumption behavior?The statistical table is as follows:

Table 6: Table name.

Reason	Quantity	Proportion
Preferential price	33	31.43%
Recommendation of netizens	19	18.10%
Attraction of short videos	30	28.57%
Recommended by friends	11	10.48%
Other factors	12	11.34%

Through the results, it is found that most consumers are attracted by Tiktok's short video content and businesses highlight sufficient preferential power.

The above is the contents and results of all the investigation reports. Through this result, we have a certain understanding of the general content of consumers' group purchase products. After clarifying the consumer behavior of TikTok users, it is found that TikTok short videos do have a strong commercial drainage capacity. TikTok can positively guide consumption and economic growth, and the effect is remarkable.

5. Discussion

Through the above investigation and analysis, Tiktok group buying becomes more popular nowadays. More people are willing to choose the method of a short video group purchases for consumption. The main reason is that businesses introduce discount products and relevant short videos to attract customers.

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In addition to the questionnaire, I also investigated and asked some consumers about Tiktok group purchase products. Most people think that Tiktok group buying is very preferential and attracts customers. Some customers are worried that the products are too preferential to guarantee product quality. So we asked some businesses by private letter and telephone to find out the relevant matters of group purchase products. The reason why business launch group purchase products are mainly to attract customers so that even if the discount is large, they can earn huge profits due to the huge passenger flow.

Many businesses simply use low prices to attract customers, which is not long-term and will bring great negative effects. While the business is busy, the customers can't get a good experience. Moreover, most of the customers they attract are wool gangs who are greedy for cheap and have no loyalty. Therefore, when setting up group purchase packages, businesses cannot blindly choose low prices. Businesses generally set up three types of group purchase products. The first type is diversion of money, which is generally no profit, just to attract customers. The second type is activity funds, which are generally the most characteristic products of businesses that are sold at low profits. The third type is profit, which is similar to single-person meals and multi-person meals. It is the main profit of the store [7]. These experiences can be used as a reference for some businesses who want to participate in group purchase of products.

To maximize the profits of the business by increasing sales, optimizing marketing methods, launching higher quality group purchase products, and letting customers buy higher quality and more preferential group purchase products, this paper gives some suggestions

5.1. For Business

The marketing methods of the products of business are all based on the 4P marketing theory(4P marketing theory can be summed up as a combination of four basic strategies, namely product, price, promotion, and place). Group purchase products also need to be considered from these four aspects. Pay attention to the functions of development, require the products to have unique selling points, and put the functional demands of the products in the first place. According to different market positioning, different price strategies are formulated. The product pricing is based on the brand strategy of the enterprise, and attention is paid to the gold content of the brand. Enterprises do not directly face consumers but pay attention to the cultivation of distributors and the establishment of sales networks. The contact between enterprises and consumers is through distributors. Promotion should be a series of marketing activities including brand promotion (advertising), public relations, and promotion.

Businesses generally set up three types of group purchase products. The first type is diversion of money, which is generally no profit, just to attract customers. The second type is activity funds, which are generally the most characteristic products of businesses that are sold at low profits. The third type is profit, which is similar to single-person meals and multi-person meals. It is the main profit of the store. These experiences can be used as a reference for some businesses who want to participate in group purchase of products.

5.2. For Internet Celebrity

When online celebrities publicize group purchase products, they need to accurately position the direction of goods. TikTok's user base has exceeded 600 million people. As a public figures with social influence, TikTok celebrities should not only maintain their appearance and personal temperament but also establish the correct "Three Outlooks", because a large part of users' consumer psychology comes from their love and trust in online celebrities.

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5.3. For Consumer

In the process of purchasing group purchase products through the platform, users should have rational thinking and reasonably judge the purchase risks. When buying, consumers should not blindly trust the anchor to blindly consume but should take the initiative to ask for commodity information from the background, interact with other consumers in the comment area to exchange product information and choose brands and products with good reputations.Consumers should set a short cooling-off period for themselves before buying, analyze the quality of products according to the price, brand, materials, specifications, and other information, and avoid impulsive consumption caused by excessive guidance of online celebrities' words and behaviors.

As a rising star in the field of e-commerce consumption, Tiktok short videos are rapidly seizing the e-commerce market, and the support of short videos has fundamentally affected consumers' purchasing ideas. Through the research on the consumption behavior and marketing mode of a short video group purchase, this paper clarifies the influencing factors of the Tiktok platform on current users' consumption and clarifies that the consumption influence and user coverage of Tiktok short video platform on users are increasing year by year, providing suggestions for better consumption by consumers and better profits for businesses.

5.4. Limitations of the Study

This paper mainly studies the marketing model of group purchase products, how to attract consumers and how businesses make profits. The main defect of the research lies in the lack of economic theoretical support and demonstration process. And the questionnaire base is small, which may be accidental.

6. Conclusions

By studying the problem of short video software group purchase promoting consumption, this paper finds out how businesses improve sales and profits through this way, that is, marketing, to help more businesses improve their performance and consumers buy more favorable goods. The results show that nowadays group buying has become a more popular form of consumption. Many businesses launch groups buying products with preferential prices to attract customers. At the same time, businesses highlight multi-category groups buying products to achieve different purposes, such as attracting publicity and making profits.

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Relationship Between Real GDP, CPI and M2 During the "Lost Decades" and Abenomics Era

--Based on Vector Autoregression Model and Cointegration Analysis

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Abstract: The "lost decades" and its solutions, especially Abenomics are famous topics when discussing about Japan's economy. This paper mainly focused on the relationship between CPI, M2 and real GDP of Japan in both short and long run using VAR model and cointegration analysis, and find out that: (1) Changes in money issuance and gross output in the short run have a positive effect on the increase in the price index; (2) The increase in monetary issuance and price level does not directly bring about an increase in output, but rather affects the demand and reduces the GDP growth rate; (3) The real GDP performance in the long run shows changes in the same direction as CPI, M2 and the time trend. CPI has a positive effect on disequilibrium, while changes in M2 have the effect of eliminating the disequilibrium.

Keywords: lost decades, Abenomics, GDP, CPI, VAR model.

1. Introduction

When discussing about Japan's economic development process, the "lost decades" is a topic that is difficult to avoid. To some scholars, the "Plaza Accord" is the main reason that caused the economic recession. In 1985, in order to deal with the increasing problems of fiscal deficit and trade deficit, the United States together with Japan, the Federal Republic of Germany, the United Kingdom and France signed the "Plaza Accord". As a result, the yen appreciated significantly against the dollar.

Having an export-led economy, the rise in the exchange rate had serious adverse effects on Japan. The Japanese government tried to expand the money supply to prevent a recession, which resulted in a severe real estate bubble. 1989 witnessed the bubble burst and an economic crisis broke out. It is discussed by more researches that other causes have been further sapping the vitality of the Japanese economy [1]. Faced with the severe challenges of economic globalization and an aging population, a series of macro policy failures have exacerbated the economic stagnation [2].

In order to bring the Japanese economy out of the downturn and rebuild the international status of Japan, Shinzo Abe, upon his re-election as Prime Minister, immediately proposed his economic goals, or Abenomics. In 2013, the Cabinet Office of Japan and the Bank of Japan issued a joint statement specifying a 2% inflation target [3]. To achieve this goal, aggressive monetary policy, flexible fiscal policy and stimulating private investment are used as the "three arrows" [4].

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In the current study, many scholars have evaluated the recessionary period and the Abe economics period from various aspects [5]. This study utilizes important macroeconomic data of Japan from 1994 to 2017 and analyzes the short-run and long-run intrinsic linkages using vector autoregressive models and cointegration analysis, aiming to explore the patterns and give an evaluation of the future trends.

2. Methodology

2.1. Research Design

There are many research methods available to study the macroeconomic performance of a country over time.

For the researched factors, Gross Domestic Product (GDP) is generally taken as an important indicator of the level of a country's economy, and this is especially true for real GDP, which excludes the inflation factor. According to the theory of the monetarism, inflation is essentially a monetary phenomenon, so the supply of M2 not only affects the price level but also indirectly affects GDP. The change of GDP is inseparable from the income level of residents, and at the same time, the income level of residents will have an impact on CPI, so GDP will indirectly have an impact on CPI.

Chen's study in 2009 and Xiao and Chen's study in 2018 both constructed vector autoregressive models and performed cointegration analysis to study the relationship of macroeconomic data in China [6-7]. In this paper, the macroeconomic data of Japan will be studied with reference to the above paper.

2.2. Data Resources

The data the research uses is from Federal Research Economic Data (FRED), a trusted online database created and maintained by the research department of the Federal Reserve Bank of St. Louis. This paper selects the seasonal adjusted real GDP, CPI and M2 data of Japan from the first quarter of 1994 to the fourth quarter of 2017 according to FRED for regression analysis. M2 and CPI are transferred into quarterly data using the first observation rule. For the research, 92 observations are available. The series are as below.

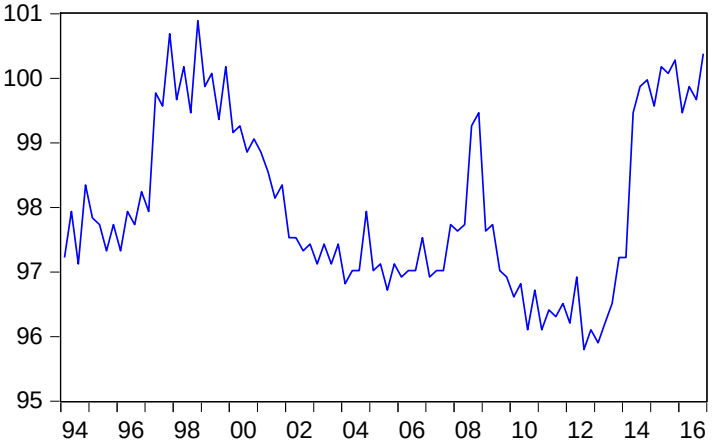

Figure 1: Japan CPI.

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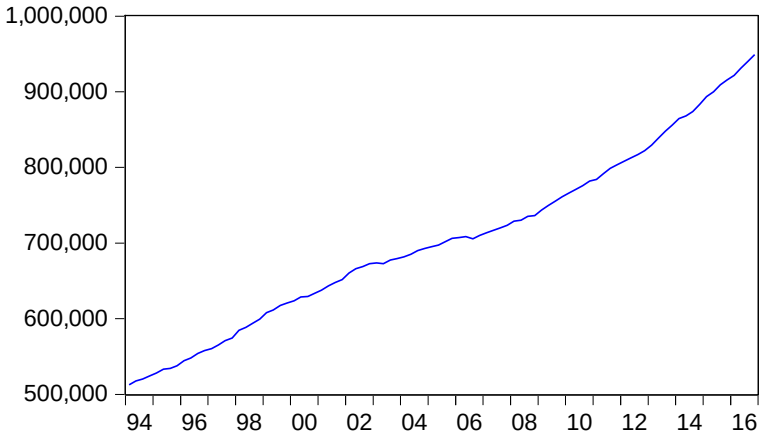

Figure 2: Japan M2.

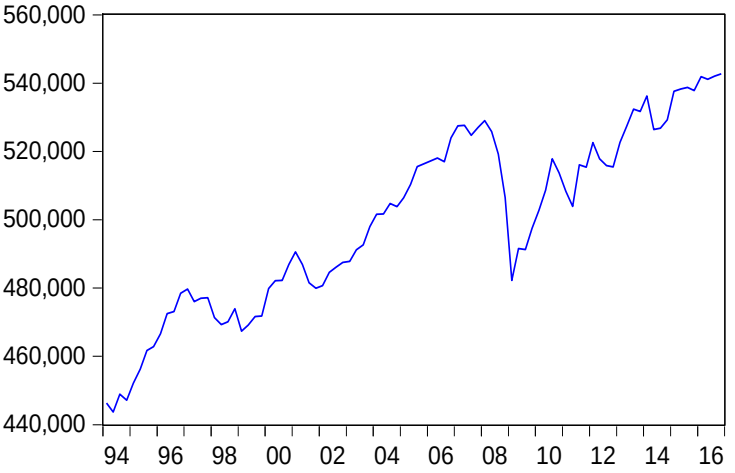

Figure 3: Japan Real GDP.

2.3. Vector Autoregression Model and Impulse Response Function

Data Pre-processing. Vector autoregression model is frequently used to study on the interaction between different factors, while it demands the series to be stationary. To avoid serial correlation and spurious regression, ADF test is taken as the basic rule of unit-root test.

Table 1: Unit-root test of each series.

Variable	Form	ADF Test	1%	5%	10%	P-value
CPI	None	0.271536	-2.59181	-1.94457	-1.61432	0.7625
GDP	None	1.946495	-2.59062	-1.9444	-1.61442	0.987322618
M2	None	4.012844	-2.5912	-1.94449	-1.61437	1
d(CPI)	None	-3.5107	-2.59181	-1.94457	-1.61432	0.0006
d(GDP)	None	-7.94295	-2.59091	-1.94444	-1.61439	0
d(M2)	Trend and intercept	-4.0927	-4.06445	-3.46109	-3.15678	0.0092

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It can be observed from above that CPI and GDP are able to be considered as processes integrated of order 1, while the 1st order differential of M2 (d(M2)) has constants and linear trend.

In order to detrend d(M2), an OLS regression with d(m2) as the explained variable and a t, the time trend and a constant as explanatory variables is conducted.

The resident of the regression is set as dm2x, and the plot is as follow. According to the unit-root test result, dm2x is a stationary series of data.

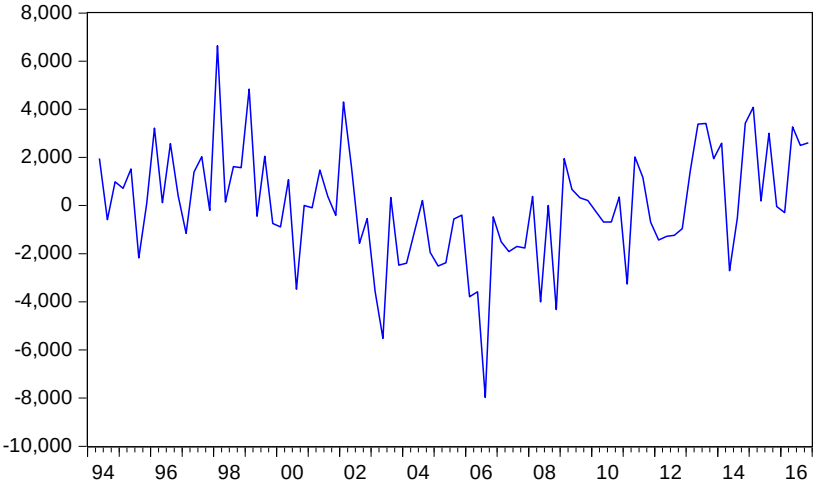

Figure 4: Detrended M2: DM2X.

Select the d(RGDP), d(CPI) and dm2x to set up a vector autoregression model, let the name be VAR1. Conduct the VAR lag order selection criteria with the max lag number be 8 (2years). It can be known that 2 is the optimal choice of lag intervals. In the following part, further research is based on this VAR (2) model.

Unit-root Test.

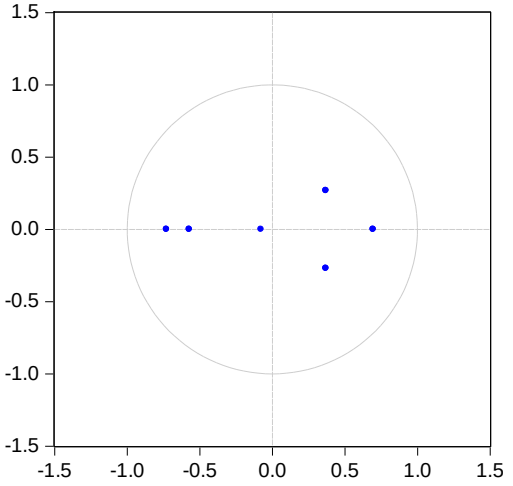

Figure 5: VAR1 unit root.

According to the plot above, all of the magnitude of roots are smaller than 1, falling inside the unit circle. This indicates that the is valid.

Granger Causality Test. The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another ones.

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Table 2: Granger causality test of VAR1.

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 09/07/22 Time: 09:43
Sample: 1994Q1 2016Q4
Included observations: 89

Dependent variable: D(CPI)

Excluded	Chi-sq	df	Prob.
D(RGDP)	3.217622	2	0.2001
DM2X	0.499061	2	0.7792
All	3.983263	4	0.4083

Dependent variable: D(RGDP)

Excluded	Chi-sq	df	Prob.
D(CPI)	9.625761	2	0.0081
DM2X	4.296898	2	0.1167
All	13.84730	4	0.0078

Dependent variable: DM2X

Excluded	Chi-sq	df	Prob.
D(CPI)	2.073089	2	0.3547
D(RGDP)	3.658136	2	0.1606
All	5.261860	4	0.2615

It can be seen from the chart that there is 1 significant Granger causality between d(CPI) and d(RGDP). This indicates that the 1st order differential of CPI can forecast d(RGDP) to some extent.

Impulse Response Function and the Result. The impulse response function reflects the dynamic impact on the other variables in the VAR model when one variable is subject to an exogenous shock. Generate the impulse response function of VAR1.

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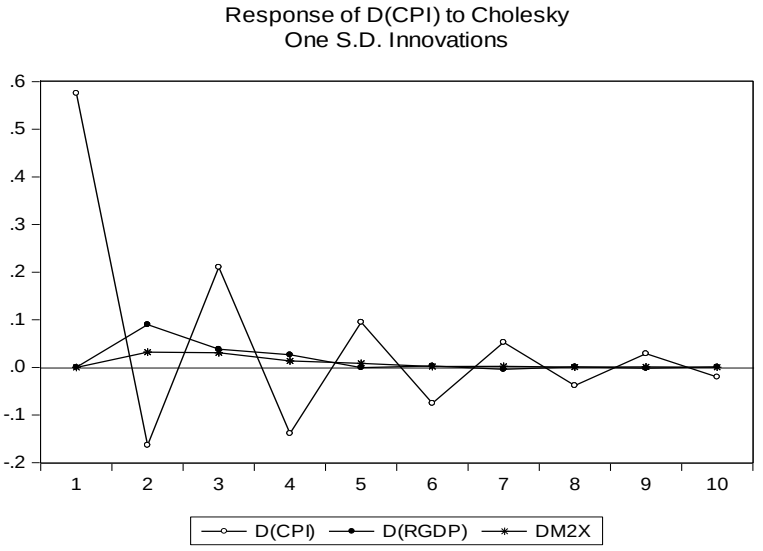

Figure 6: Impulse response of D(CPI).

Compared to M2, the impact of the first-order differential of real GDP has a greater impact on the amount of change in CPI, both shocks are positive and act as 0 in the current period, and then begin to decline after rising to a maximum in the second period. This indicates that the pulling effect of M2 and real GDP on CPI is significant in the short term and decays in the long term. It shows that changes in money issuance and gross output in the short run have a positive effect on the increase in the price index.

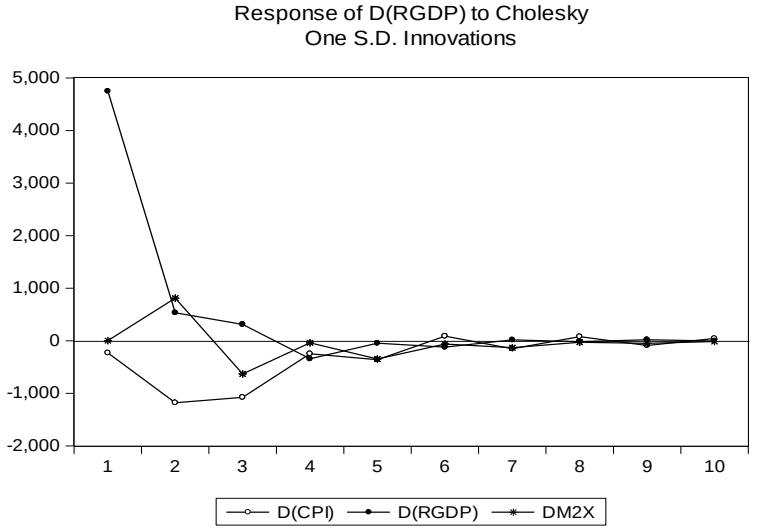

Figure 7: Impulse response of D(RGDP).

For the first-order differential of real GDP, the shock of M2 changes has a positive effect in the short term, but turns negative in the 3rd period and beyond, and then gradually decays; while the shock of CPI changes has a negative effect, and the absolute value of the effect is greater than that of M2, and the negative effect is greatest in the 1st period, and then also decays. It can be considered that the main reason is that the increase in monetary issuance and price level does not directly bring about an increase in output, but rather affects the demand and reduces the GDP growth rate.

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2.4. Cointegration Analysis and Vector Error Correction Model

Cointegration Analysis. Cointegration is a technique to analyze correlation between time series processes in long term. For this method, all the series need to be integrated of the same order.

Resulting from that the 3 original series are non-stational and the 1st order differentials are stational or with a time trend, this analysis is possible to perform.

Set up a new VAR model with original series. Conduct the VAR lag order selection criteria with the max lag number be 8.According to the chart, reset the model with the optimal lag interval 5, let the name be VAR2.

Run the Johanson cointegration test with lag intervals be 4. Knowing that the M2 has linear trend after getting the 1st order differential, select the 4th assumption.

Table 3: Johanson cointegration test of VAR2.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.306324	47.20839	42.91525	0.0175
At most 1	0.126942	15.38806	25.87211	0.5424
At most 2	0.040286	3.577480	12.51798	0.8020

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.306324	31.82033	25.82321	0.0071
At most 1	0.126942	11.81058	19.38704	0.4330
At most 2	0.040286	3.577480	12.51798	0.8020

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

It can be seen with both methods of G test and maximum eigenvalue, there are 1 cointegrating relationship detected.

Vector Error Correction Model. Vector Error Correction Model describes a short-run dynamics by VAR model and a long-run equilibrium by error correcting equations. Set up a VECM, with 4 period of lag intervals, and 1 cointegrating relationship. Select the 4th condition of trend specification according to the cointegration test. According to the result, the normalized the function is as below.

$$Z_t = RGDP_{t-1} - 5212.745CPI_{t-1} - 0.104749M2_{t-1} - 682.6823@trend + 116517.8 \quad (1)$$

The VECM function is as follow.

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$$\begin{pmatrix} \Delta RGDP \\ \Delta CPI \\ \Delta M2 \end{pmatrix} = \begin{pmatrix} -0.104887890813 \\ 3.11959277732e-05 \\ -0.0829113303597 \end{pmatrix} (Z_{t-1}) + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix} \quad (2)$$

Run a hypothesis test with the adjustment coefficients. The null hypothesis is as follow.

$$H_0: A(1,1) = A(2,1) = A(3,1) = 0 \quad (3)$$

The output is as below.

Table 4: Hypothesis test result.

H_0	A(1)=0	A(2)=0	A(3)=0
P-value	0.183998	0.000046	0.009689

Conclusin of Cointegration Analysis. From the results of the analysis above, it can be seen that the real GDP performance in the long run shows changes in the same direction as CPI, M2 and the time trend, which is also consistent with a common understanding of economic theory. By looking at the VECM model, it shows that the changes in CPI and M2 have a statistically significant effect on the previous period's deviated equilibrium state. In particular, CPI has a positive effect on disequilibrium, while changes in M2 have the effect of eliminating the disequilibrium in the prior period on a larger scale. In general, this VECM system moves toward the elimination of disequilibrium.

3. Conclusion

This paper focuses on the relationship between macroeconomic data for Japan from 1994 to 2017. As can be seen, the relationship between the various data series remains consistent with our understanding of the underlying economic logic. In order to obtain sufficient sample data, both the decline period and the Abe economics period are included in the scope of this study. The specific evaluation of each period should be studied and discussed in stages. In addition, the yen has experienced an unprecedented depreciation trend this year, which lead to unprecedented social tension. With the assassination of Prime Minister Abe, the specific utility of Abe's economics needs to be further discussed.

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The Prospect Forecast of the Market Development of Chinese Elderly Care Institutions

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Abstract: With the aggravation of population aging and economic development, China is not only facing more and more serious pension pressure, but also has greater capacity to support pension services, which has brought about the vigorousdevelopment of pension services. Obviously, it can be expected that there may be some internal relations among these indicators. For this reason, this paper selects relevant data from China's civil affairs statistical yearbook, takes the number of beds used by China's pension institutions as the main development indicator of the pension industry, establishes data links for different indicators such as GDP, the number and proportion of China's aging population, and uses linear regression with the least square method to establish mathematical models. After testing the regression coefficients, strong linear results are obtained. It can be concluded that there is a linear relationship between the development of pension services and the aging of the population and the development of GDP.

Keywords: linear regression, statistics

1. Introduction

Population of old is the trend of future development in Chinese society and a huge challenge in the process of China's modernization. Recently, the improvement of the medical system and the decrease of newborns have led to an increasing number of elderly people in Chengdu, and the pension problem has become a major problem for the country. China's aging trend has shown a growing trend since 1999. China has reached the standard of an aging country and urgently needs to solve the problem of old-age security. The national conditions of the elderly population with a large base, high proportion, rapid growth rate, and many nests have brought a series of challenges to our society: a sharp increase in social welfare expenditure, aggravation of social support burden, changes in family structure, support functions, and the needs of the elderly. Growth and changes, etc., for the government, have greatly increased the financial burden of my country's old-age security. On the other hand, Too many old people need to be taken care of, leading to the development of the pension market prospects are excellent.

In view of the above social development background, we can understand that elderly care services are a common problem faced by my country. The demand for elderly services has

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gradually increased, and social elderly care services have become increasingly important. In modern society, the elderly care industry has become an emerging industry and has gradually developed and expanded. Due to the increasing pressure of life and the tightness of time, people's needs for elderly care services are getting higher and higher, but at the same time, Problems in the senior care business have also been highlighted.The issue of senior care is becoming more prominent, and the elderly's need for institutional care services is expanding, which will present significant potential for the growth of elderly care institutions in the future [1-20].

China's economy has shown a medium-to-high-speed development, and people's consumption level has also increased. As of 2019, the low consumption level in my country has reached 27,504 yuan. The demands of the aged care market will alter as the economy develops, per capita income rises, and societal attitudes shift. It will continue to grow, and people will gradually be able to afford the consumption of elderly care services. The pressure of spending money on people on elderly care services is progressively diminishing, and market demand is rising, along with the government's financial support for the elderly care services sector. Civil affairs data show that the amount of elderly care beds in my country is on the rise as a whole. Financial investment from the central to local governments for elderly care institutions and facility construction continues to increase, and the amount of various elderly care service facilities has grown. By 2019, the amount of elderly care beds in my country reached 7.75 million. The current number of beds is still insufficient compared to the number of elderly people. The market has a huge demand for the number of elderly beds. The huge market demand makes it a trend in the future, and the popularity of the elderly care market is increasing [1-20].

There are challenges and opportunities in my country's elderly care industry market. The main problems existing in China's elderly care industry are the unbalanced supply relationship, the shortage of beds in elderly care institutions. The lack of professionalism has caused huge resistance to the development of the elderly care industry in my country. At the same time, behind these difficulties and challenges, there is a huge development space for the elderly care market in my country. Through research, analysis and prediction of the development status of my country's elderly care institution industry.Based on the data of the China Civil Affairs Statistical Yearbook in recent years, this paper selects an appropriate indicator system to forecast the development of my country's elderly care institution market, reasonably analyzes the current development of elderly care institutions, and makes correct decisions based on the results of the regression model. In response to decision-making, the service guarantee capability of my country's elderly care institutions has been continuously improved.

2. Formatting of Manuscript Components

China Civil Affairs Statistical Yearbook 2021 contains the main statistical indicators of civil affairs of all provinces, autonomous regions and municipalities in 2020 as well as some historical data, from which we take out our dataset, including year, GDP, old-age dependency ratio, number of old-age beds, consumption level, number of elderly people and their proportion, They are all numerical data.

We can see from the above, in 2007, there were only 100 million people over 65 years old, but by 2020, the number has exploded to 130 million, even if the increase rate is 30 percent, but there is an increase of 30 million people. Apparently, the average number of beds over the 14 years was 509, compared to just 242 in 2007. Let's take a look at GDP. From 2007 to 2000, the average GDP was 59,705 billion, and the median was 58,814 billion, which is far from the minimum of 27,070 billion. This means that the corresponding pension beds have a significant increase with the change of GDP and the increase of the elderly.

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The first step in data analysis is to make it easier to read and understand the data, but this step also plays an important role in our entire process. We first used Pandas Library to input data, understand the data structure, and perform descriptive statistics on the data. This gives us a comprehensive view of the data and key information such as minimum, maximum, median, and average. Then we get beautiful line maps and heat maps, and they give us a lot of information.Obviously, the variable 'over 65' seems to be most correlated with 'price'. The variable will be used as our variable to complete the linear regression process. The third step is to perform a simple linear regression.

To construct a linear model, first import the library that needs to execute linear regression. In order to better pass more samples, add constant to the dataset through ADD_constant, continue to fit regression lines through OLS, output regression results, and analyze OLS regression results. At last. The resulting graph gives us the different parameters of all the linear regressions that have been completed.

3. Mathematical Analysis

Heat map is a very common map. Its basic principle is to use color to represent numbers, so that the data can be presented more intuitively and the comparison is more obvious. It is often used to represent the expression difference of representative genes in different sample groups, the content difference of representative compounds in different sample groups, and the pairwise similarity between different samples. In fact, any table data can be converted into heat map display.

The heat map maps each value in the data matrix into a color display according to a certain rule, and uses the color change to visually compare the data. When applied to a numerical matrix, the color of each cell in the heat map shows the size of the data value at the intersection of row variables and column variables; If the behavior gene is listed as a sample, it is the expression value of the corresponding gene in the corresponding sample; If both rows and columns are samples, the correlation between the corresponding two samples may be displayed. Number mapping to color can be divided into linear mapping and interval mapping. Linear mapping is that each value corresponds to a color, and interval mapping is that the value is divided into different interval blocks, and all the numbers in each interval block are displayed in the same color. There is no good or bad difference between the two, and the specific use depends on the intention of display. The sample correlation heat map is a symmetric heat map, and each cell represents a correlation value. Consider the two random variables X and y, take samples from each of them, and record them as and, and use and to record the average value of the two groups of samples. The sample correlation coefficient is calculated based on the sample observation value, and the specific value will b different depending on the sample taken. The sample correlation coefficient is a consistent estimate of the population correlation coefficient. Characteristics of correlation coefficient knowledge are listed as follows: the value of r is between - 1 and 1; when r = 0, there is no linear relationship between the sample observations of X and Y; $0 < |r| < 1$, that is, there is a certain linear relationship between the sample observations of X and Y. When $r > 0$, X and Y are positively correlated. When $R < 0$, X and y are negatively correlated; if $| R | = 1$, it indicates that X and Y are completely linear. When r = 1, it is called full positive correlation, and when $r = -1$, it is called full negative correlation.; R is a measure of linear correlation between variables. R = 0 only indicates that there is no linear relationship between the two variables, and does not mean that there is no other type of relationship between X and y. For the possible nonlinear correlation between the two, we need to use other indicators to analyze, In regression analysis, the simplest model is a linear regression model with only one dependent variable and one independent variable, that is, a univariate linear regression model, also known as a simple linear regression model. This population regression

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shows the effect of the other factors in the equation on y. The least square method is a method for estimating regression coefficients by minimizing the sum of squares of residuals.

If the absolute value of $t_{\hat{\beta}_2}$ is greater than the absolute value of the critical value, reject the original hypothesis and accept the alternative hypothesis; Otherwise, accept the original hypothesis.

And finally we came to some pictures like this.

Table 1: OLS regression results.

Dep. Variable:	Beds(10000)	R-squared:	0.909
Model:	OLS	Adj. R-squared:	0.896
Method:	Least Squares	F-statistic:	69.98
Date:	Thu, 25 Aug 2022	Prob (F-statistic):	6.84e-05
Time:	11:05:57	Log-Likelihood:	-49.802
No. Observations:	9	AIC:	103.6
Df Residuals:	7	BIC:	104.0
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	-646.1049	141.617	-4.562	0.003	-980.976	-311.234
Over 65	0.0852	0.010	8.366	0.000	0.061	0.109

Omnibus:	1.667	Durbin-Watson:	1.915
Prob(Omnibus):	0.434	Jarque-Bera (JB):	1.029
Skew:	0.575	Prob(JB):	0.598
Kurtosis:	1.808	Cond. No.	8.51e+04

R-Squared signifies the “percentage variation in dependent that is explained by independent variables”. Here, 90.9% variation in Beds(10000) is explained by Over 65. From the value of R-Squared, it can be seen that the linear regression model can well fit the relationship between variables The Prob of const and Over 65 is less than 0.05, and the confidence interval of const and Over 65 does not contain 0, so the null hypothesis is rejected, indicating that there is a linear relationship between Beds (10000) and Over 65, and the number of people aged 65 and above under the 95% confidence interval Significant impact on the number of retirement beds After the linear regression, the const is -646.1049, and the coefficient of the 0.0852 term is 0.0825. This means that for every 10,000 increase in the percentage of people over 65 in the population , the number of pension beds increases by 0.0825 million. The model is Beds(10000)=-646.1049+0.0852*0.0852.

4. Conclusion

It can be seen from the model results that GDP, old-age dependency ratio, and consumption level do affect the number of pensions and beds in my country. The increase in GDP will bring about economic growth, the consumption level of residents will increase, and there will be more ability to bear the expenses of elderly, and The aged care institution business will grow in accordance with

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the rise in demand for such facilities. The proportion of older persons who are dependent on each adult is rising along with the old-age dependency ratio. Due to the inconvenience of life and work, residents' demand for elderly care institutions is increasing, which promotes the elderly care institution industry. The improvement of the economic situation can stimulate the consumption demand of the elderly for various elderly care services. According to the results, it can be found that the better the economic situation of the elderly, the greater the willingness to live care services and stay in elderly care institutions, that is to say, there are plans and steps. The improvement of the economic situation of the elderly can greatly increase the consumption power of the elderly and directly stimulate the great development of the economy. In terms of the law, reinforce the pertinent legislative efforts for the protection of the elderly's rights and interests, and enhance a number of long-term legal mechanisms to safeguard the elderly's fundamental rights;so as to safeguard the enormous senior population in my nation and to give the elderly social support. Taking care of the elderly creates a legal foundation. On the government side, it is necessary to strengthen planning and expand the space for the elderly care business. The reality of insufficient social pension resources, the government and relevant departments must put the cause of pensions on the agenda. In light of my country's economic and social development, the development trend of aging, and the degree of aging, scientific plans should be formulated to guide the rational allocation of resources. Combined with social security, labor and employment, explore suitable old-age service systems and mechanisms, and advance step by step. In terms of pension institutions, strengthen team building and improve service quality. Strengthen the quality training of employees, identify the qualifications of employees, promote management with quality, and promote efficiency with service, so as to achieve a positive interaction between quality and service. Attract more professional staff and provide professional services.

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Risk Analysis and Portfolio Design in Stock Investment

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Abstract: Contemporarily, it's common to see unrest in global financial market, so some corresponding analysis on investing risks have made, e.g., CAPM model. For the similar reason, in order to obtain an efficient and safe method to do stock investment in any market environment, we mainly investigate the risks caused during the process of stock investment based on stocks of ten different corporations. This study analyzes people's investment actions in bull market and in bear market, and carry out classifications of possible risks in the stock investment. According to the risk analysis, portfolio is important for reducing risks and then choose stocks of ten famous corporations to do portfolio design. On the test data, linear regression and CAMP model are adopted to obtain the β and get a covariance table of these ten stocks. In terms of these two judgement values, we judge the level of risk and acquire appropriate portfolio by Python. Based on the evaluation, one can get a clear process of risk analysis and this research will have certain guiding significance for future stock investment. These results shed light on guiding further exploration of how to reduce investing risks.

Keywords: risk, stock, portfolio, β coefficient

1. Introduction

There are two different states of global market: bull market and bear market. Bull markets have a declining hazard function although the best market gains come at the start of bull market, while volatility increases with duration in bear markets [1]. As time goes, two different states switch to each other and the market keeps the corresponding economy mode for several years. According to the International Monetary Fund (IMF), considering the usual 30 countries, an average decrease of -3% in GDP is expected in 2020 as shown in Figure 1. This situation was estimated by considering that the outbreak will be under control in approximately 1.5 months. If the process is extended to 3 months, this value is predicted to be more than 6.3%, and if it is extended to 4.5 months, it is more than 10.7 [2]. In this case, there is a tendency that bear market is coming [3].

Nowadays, most of investors know that they should invest those potential stocks though these stocks have more risks in bull market and they would like to do stable investment in bear market [4]. However, due to the lack of the knowledge of economy, they can't do right judgement completely which means they may underestimate the risks of stocks in bull market and hesitate to do stock investment in bear market. Relying too much on their own judgement instead of the analysis of science and technology tools is the reason why they often make mistakes during stock investment.

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In order to get rid of this kind of situation, the study does risk analysis in stock investment by doing classification of risks and using some specific stocks to do portfolio design. It is wished that the methods and results presented here have a guiding significance to investors', especially rookies', stock investment. The rest part of the paper is organized as follows. The Sec. 2 will classify different kinds of risks. The Sec. 3 will do describe the data origination. The Sec. 4 will present the portfolio design which is also an implementation of the risk analysis. The Sec. 5 will discuss the defects and drawbacks of the study as well as present a outlook for further study. Eventually, a brief summary is given in Sec. 6.

Figure 1: Global real GDP growth in 2020 (Economic Growth in 2020-2030 2020).

2. Classifying Risks

As usual, risks in stock investment can be divided into two different kinds [5]. One is called unsystematic risk, which is mostly caused by some microcosmic reasons. This kind of risk includes financial risk, operational risk and some other risks caused by one corporation. For instance, LETV, a corporation from China, whose stock price once peaked at ¥44.7, delisted in 2019 with only ¥0.18 due to business failures [6]. Business failures are factors beyond our control, but they are no doubt part of unsystematic risk, which must be taken into consideration.

The other risk is systematic risk, which consists of many kinds of macroscopic risks, such as policy risks, purchasing power risks and interest rate risks. The decreasing stock price of some corporations like WuXi AppTec (2359.HK) in September, 2022 is the example of systematic risk, because related party companies are sanctioned by the new policy introduced by American government.

As the old saying goes, "don't put all your eggs into one basket", which means if we put all eggs into the same basket, the risks we break more eggs will increase. Therefore, for the unsystematic risk, we can use the same method following the concepts, which is also called portfolio, to avoid risk. However, for the systematic risk, it can't be easily avoided by portfolio, but we can reduce it in portfolio. Portfolio design is also part of risk analysis in stock investment.

3. Data

Ten different corporations are selected in hk.finance.yahoo.com. As illustrated in Fig. 2, they are Ubiquiti, Amazon, Cisco System, Fedex, JPMorgan Chase&Co., General Motors Company, Tesla, Apple Inc., Twitter Inc., and Alibaba Inc. To satisfy the demand of timeliness and universality, the range of stock prices we choose are from 14, September, 2017 to 14, September, 2022, which lasts for 5 years.

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Figure 2: Five-year-round stock prices of ten famous stocks.

4. Results & Discussion

4.1. Calculation of β

The following step on portfolio design is choosing five appropriate stocks from these ten into one portfolio according to two judgement values, β coefficient and covariance. The first step is to calculate and compare β coefficient. β is a coefficient in CAPM model to reflect the correlations between stocks and market index. Low β value means there are small fluctuations in stock prices with the market environment changing [7]. There are two different ways to calculate β coefficient value, and we choose SNP as the market index and the stock of Ubiquiti Inc. (UI) as an example stock. The first way to calculate β coefficient value is using the equation as

$$r_a = r_f + \beta(r_m - r_f) \tag{1}$$

Here, r_a means the mean value of the return of one stock; r_f means risk-free rate, and we consider this variable as zero in our research; r_m means the mean value of the return of the market index. Using this equation and the tools from python, Scatters for the return of the stock(r_a) and the return of the market index(r_m) are as shown in Fig. 3 [8].

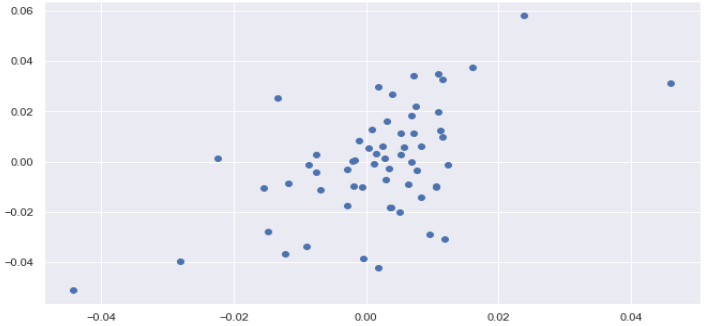

Figure 3: Scatters for the return of the stock(r_a) and the return of the market index(r_m).

In this way, the coefficient we get from linear regression is β. The β coefficient value between SNP and the stock of Ubiquiti Inc. (UI) is 0.969444. The second way to calculate β coefficient value is using the definition of β coefficient. β coefficient is given by the equation [9]:

$$\beta = \frac{Cov(r_a, r_m)}{\sigma_m^2} \tag{2}$$

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The covariance between SNP and the stock of Ubiquiti Inc. (UI) is 0.000149 and variation of the market index (SNP) is 0.000153. Therefore, according to the computational formula of β coefficient, it is easy to get that: β=0.970, which is similar to the result from linear regression. For the rest nine stocks, we can use any of these two methods to calculate. As the results listed in the Table. 1, 5 stocks with smallest β coefficient values and 5 stocks with biggest β coefficient values are found. The smallest β coefficient values are BABA, CSCO, AMZN, FDX and UI, and the biggest β coefficient values are TSLA, GM, AAPL, TWTR and JPM.

Table 1: The results of β coefficient values.

Stocks	β coefficient
UI	1.103
AMZN	1.071
JPM	1.121
CSCO	1.012
GM	1.230
AAPL	1.216
TWTR	1.180
TSLA	1.440
FDX	1.101
BABA	0.950

The second step is calculating covariance to reduce systematic risks which is caused by stocks and stocks. It means that one should make sure there are not two stocks with high correlations existing in a portfolio, because high correlations lead to the similar change between two stocks, and low correlations cam reduce the risk that caused by one stock price changes [10]. For these 10 stocks researching on, we can plot this covariance heatmap as illustrated in Figure 4. One can set a boundary covariance value to judge them. If the covariance between two stocks is larger than the boundary value, it means that these two stocks are not suitable for existing in the same portfolio.

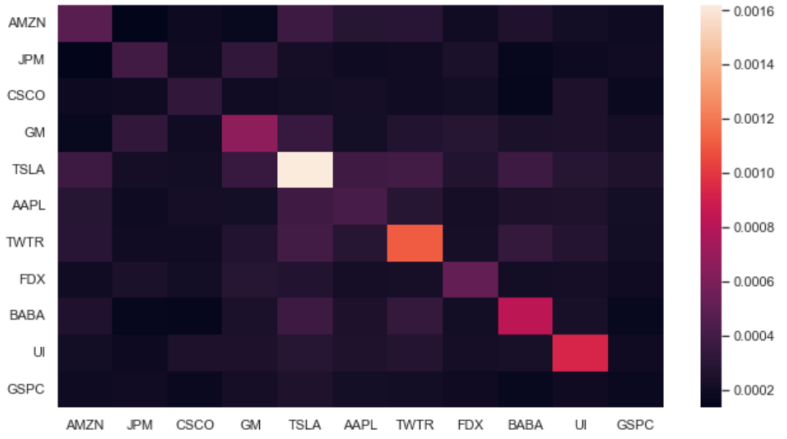

Figure 4: Covariance table of ten stocks.

4.2. Calculating Stock Weights

The final work of portfolio design is calculating stock weights, and we consider bear market as the example market state, which means we choose five smallest β coefficient values. Through the correlation analysis, we selected AMZN, CSCO, FDX, BABA, and UI as our portfolio component stocks.

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Since we have calculated the beta of each stock and the correlation between the constituent stocks in the portfolio, one can calculate the return corresponding to the standard deviation of the portfolio.

An effective portfolio is one that optimizes expected return for a given level of risk or minimizes risk for a given level of return. The aim is to search for an effective frontier because there are numerous optimal portfolios. The weights or relative amounts of each stock in the portfolio are the only information that missed because we are aware of which equities are included in it. To determine the efficient frontier, we will essentially just test a huge variety of weight combinations, compute the historical risk, and return for each portfolio, and visualize those results [11].

As shown in the Figure 5, all the points in the diagram are the risks and corresponding rewards of our portfolio under different weights. However, not every combination is meaningful to us. The formula of the Sharpe ratio is the difference between the return of the portfolio and the return of the risk-free asset divided by the standard deviation of the portfolio. Therefore, Sharpe ratio maximization means maximizing the corresponding return per unit of risk in the portfolio. This is the best Sharpe ratio when the Sharpe ratio of the portfolio is maximized. At the same time, another portfolio that makes sense to us is the portfolio with the lowest risk because it minimizes our losses. Therefore, for these portfolios with different weights, one needs to find the weight of the portfolio in the case of the portfolio with the highest overall Sharpe ratio or lowest risk.

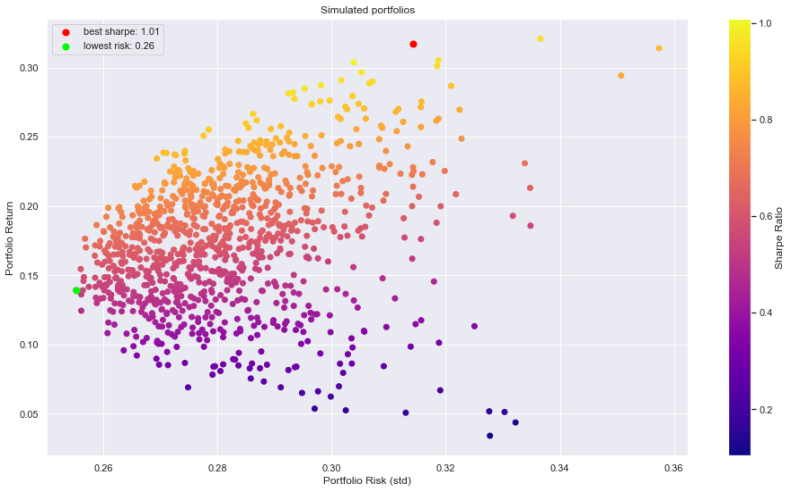

Figure 5: Simulated portfolios with five stocks.

We first use the formula to calculate the Sharpe ratio of the portfolio that is randomly weighted. Next, the max command is utilized to maximize the Sharpe ratio by assigning weights to each stock and limiting the sum of the weights to 1. The investment portfolio corresponding to the Best Sharpe ratio is the red dot in the above part of the Figure 5. The weights of each stock in the portfolio are AMZN 0.456 CSCO 0.0916, FDX 0.00905, BABA 0.0278 and UI 0.416 respectively. Under this circumstance, the α coefficient value is 0.000771.

In order to find the portfolio with the lowest risk, we also need to limit the sum of these stocks to 1. Subsequently, one calculates the total risk of the portfolio, and through the min command. Finally, the portfolio with the lowest risk is derived. The weights of each stock in the portfolio are AMZN 0.193 CSCO 0.424, FDX 0.224 and BABA 0.110 and UI 0.0486, respectively. In this way, we can get portfolios in different market state. Under this circumstance, the α coefficient value is 0.000081.

5. Limitations & Prospects

Although one can get the portfolio, which caters for some certain demands of markets and risks, some limitations still exist. For the covariance table of stocks return, the standard of selecting the boundary

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covariance value is uncertain, which can affect the accuracy of the results. Meanwhile, in the YAHOO. Finance website, we cannot get those corporations which only listed in China market. Therefore, if one wants to add them into our portfolio, this research cannot work. It is wished these results make guiding significance in the future and it is witnessed to change these python codes in the research into API in order to gather them in a convenient software. For the future development of portfolio, searching and popularizing play equally important roles, because only popularizing the knowledge well among investors can we make our research meaningful.

6. Conclusion

In summary, this paper investigates the way to reduce investing risk using a relatively conservative portfolio based on the stocks of ten different famous corporations. According to the analysis, the best way to reduce unsystematic risk is design a proper portfolio by adjusting the proportion of each stock in the portfolio. Besides, β coefficient, which reflects the correlations between stocks and market, should be low to hedge this kind of risk. In addition, high correlation stocks should be avoided existing in the same portfolio. Specifically, the conditions in bull market should be considered in an opposite method. Nevertheless, the standard of selecting the boundary covariance value is uncertain, which can affect the accuracy of results. In the future, we wish more aggregate research will be carried out on risk analysis and some helpful tools can be designed for investors. Overall, these results offer a guideline for investors to balance risks and design a relatively proper portfolio.

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The Impact of Different Trading Strategies on the Same Portfolio

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Abstract: The frequent occurrence of political events, the spread of the epidemic and changes in policies of various countries have made the market more volatile. Due to the instability of the overall economic environment, investors are increasingly focusing on using strategies to improve returns, so this article selects several hedge fund trading strategies, analyzes the same trading portfolio, and compares the performance of different trading portfolios. Different effects of the same combination give spirits to investors when making transactions. The market neutral trading strategy is effective for the trading combination of F and NVDA. Based on different data, the long-short equity trade strategies are not completely effective, and the credit arbitrage trade strategy is not suitable for this trading combination. Market neutral trading strategies and long-short equity trade strategies basically meet the combination of F and NVDA, but due to the possibility of credit rating fluctuations, credit arbitrage trade strategy does not meet this combination. These different effects reflect some of the underlying factors in the market, so the analysis in this article will improve investors' understanding of investment strategies and change their previous trading thoughts. Taking these effects into consideration can help investors effectively avoid potential risks, make better choices, or obtain more returns.

Keywords: trade strategies, portfolio return, different outcomes

1. Introduction

Due to the influence of the international political situation and changes in the fiscal and monetary policies of various countries, the economic environment has become very unstable. Therefore, people want to know more about ways to ensure or improve the returns of the stock market, and various strategies of hedge funds have also been paid attention to. This article will select three of these trading strategies to analyze the same trading portfolio, to compare the impact of different trading strategies on the same trading portfolio. People can make better choices and decisions in the stock market based on these influences.

2. Literature Review

The Equity market neutral model shows that a market neutral strategy increases stability and improves profitability [1].The new feedback control strategy shows the flexibility of trading returns decoupled from market behavior to investors, i.e., satisfying certain "market neutrality conditions", whether the

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market rises or falls, the value of the account is higher than its initial value [2].Theory suggests that long/short equity hedge funds return from stock market directional and spread betting [3].The article discusses the similarities and differences between the two strategies, although market neutral and long/short stocks are two styles that often overlap in statistical testing or in the minds of their investors [4].The evidence suggests investing based on momentum and positive feedback trading in the presence of financial anomalies, particularly in the presence of value anomalies. This result provides a plausible illustration for the feeble or negative exposure to value exceptions, i.e., active investment exposure to value/growth stocks [5].The analysis shows that simple ratios, for example, price-to-earnings (P/E) are also extensively used to quickly approximate valuations and are often used together with discounted models of cash flow [6].The parameters of interest in the proposed paper suggest that the PEG ratio serves as an important indicator, providing a future perspective for companies to estimate intrinsic value, providing statistical analysis [7].A closer analysis of the components of long-short trades shows that momentum strategies purchase countervailing contracts and sell futures contracts. There is also a lower correlation between momentum returns and traditional asset class returns [8].The results show that, in the best portfolios, the improvement brought by momentum indicators is the largest for portfolios formed by the triple-compound value measure and considering the momentum of stock price can improve the profit of the portfolio [9].Credit default swap spread data collected by credit derivatives brokers indicates that a firm's credit default swap spread is the annual cost of protecting a firm from default [10].The investigation of whether stock-credit market integration is related to arbitrage barriers suggests that temporal changes in firm stock and credit market integration are associated with firm-specific arbitrage barriers [11].This website page shows the historical daily adjust close price of F [12].This website page shows the historical daily adjust close price of NVDA [13].

3. Data

In this paper, the analysis is based on two companies by applying different strategies. Ford Motor Company (F) is an automotive company with many multinational operations and is one of the most prestigious automotive companies in the world. It is headquartered in Dearborn of Michigan. The company's core business includes a series of automotive-related businesses such as design, manufacturing, sales, and after-sales service. Vehicles produced include high-quality sedans, SUVs, electric trucks, and luxury Lincolns. In addition, Ford Motor Company provides auto credit through Financial Credit Corporation, which is committed to enhancing the company's leadership in energy conservation and autonomous driving.

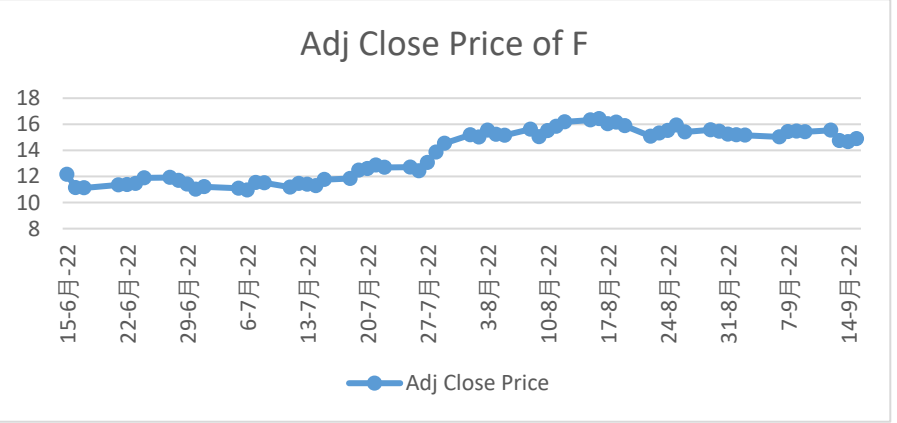

Figure 1: adjust close price of F.
Source: yahoo finance [12]

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Nvidia Corporation (NVDA) is a company that designs and sells fabless semiconductors for graphics processors. It is founded in January 1993 and headquartered in the center of Silicon Valley, which is in Santa Clara of California. NVDA also primarily designs game consoles such as the Xbox and PlayStation. NVDA's most famous product lines are the GeForce series, the Quadro series, and the Tesla series. These product lines are designed for individual gamers, professional workstations, and high-efficiency computing, respectively, according to their needs. Although NVDA started out in the graphics card business of PC computers, it has also been involved in designing mobile chips, but its response has been unsatisfactory. Instead, it has used these experience in recent years to develop into the artificial intelligence market.

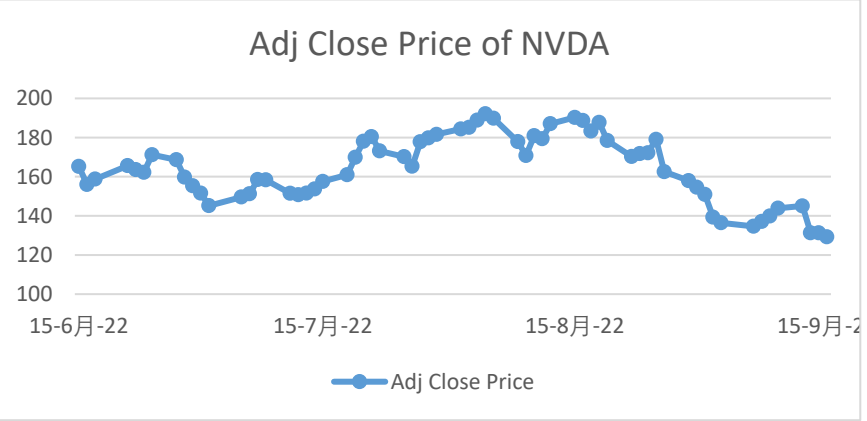

Figure 2: adjust close price of NVDA.
Source: yahoo finance [13]

4. Strategies

This article will compare the results of three different trading strategies, market neutral trade, long-short equity trade and credit arbitrage, for both F and NVDA, and analyze the theoretical basis and advantages and disadvantages of these three trading strategies.

4.1. Market Neutral Trade

A market neutral strategy is an investment strategy often employed by investors or managers in order to profit from market price fluctuations while attempting to completely avoid some other form of market risk. A market-neutral strategy typically achieves its goal by taking matching long and short positions in different stocks, reducing the impact of broader market volatility while increasing the returns for making good choices. The advantage of the market neutral strategy is that it provides a diversified portfolio and reduces risks; and with the reduction of transaction costs, the marginal profit will increase; A portfolio constructed according to a market-neutral strategy has little to do with other asset classes and has little impact on the market. However, a market-neutral investment strategy is not a completely risk-free arbitrage. The danger lies in the fact that, despite the help of complex and expensive quantitative analysis techniques, fund managers usually decide the long and short positions in the asset portfolio based on their subjective judgment. On the basis of high costs, this strategy can lead to abnormally large losses in the event of a misjudgment or if the performance of long stocks is worse than the performance of short stocks.

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4.2. Long Short Equity Trade

A long-short equity strategy is a popular strategy used by hedge funds in which long positions are invested in stocks with higher returns and short positions are invested in stocks with lower returns. The rationale is that the value of the long position is expected to increase while the value of the short position is expected to decrease. A more sophisticated approach to constructing this portfolio is to deploy equal amounts of capital in each sector's long and short positions to form a sector-neutral portfolio. A portfolio constructed in this manner helps protect against losses during a market crash, protects the portfolio's performance from any sector price declines, and makes the portfolio less volatile. By using a long-short equity strategy, it is possible to earn money by buying undervalued stocks and selling overvalued stocks. Between one buy and one sell, if the risk is assumed to be fully hedged out, the fund manager can earn a return on both stocks. Because of the short component, fund managers using a portfolio of long-short equity strategies can make money even in a bear market. In a traditional portfolio, the fund manager has to find uncorrelated or even negatively correlated stocks to diversify risk as much as possible; in long-short equity strategies, it is the opposite, their fund manager needs to find highly interrelated stocks to diversify risk. Long-short equity strategies are easier. However, the long-short equity strategy also has some disadvantages that cannot be ignored: in constructing long-short equity portfolios, managers and investors needs to hold both long and short positions, which increases trading commissions and shock costs. In addition, the cost of borrowing securities when selling short can also increase the trading cost of long-short portfolios. After the long-short trade is constructed, the fund manager often needs to rebalance the portfolio to maintain a certain risky position as the long-short stock price moves. When a bull market arrives, hedge funds with long-short equity strategies have difficulty outperforming traditional strategy funds and markets due to the presence of short positions in the long-short portfolio.

4.3. Credit Arbitrage Trade

Capital structure arbitrage and event-driven trading underlie most hedge fund credit strategies. Managers and investors focus on the relative value between senior and junior securities of the same corporate issuer. They also trade securities from different companies but of equal credit quality, or rollovers in complex capital in other structured debt instruments such as mortgage-backed securities or mortgage debt. Hedge funds' credit strategies focus more on credit than on interest rates or rates of return. During periods of strong economic growth, credit funds tend to boom when credit spreads shrink. But when the slowdown and contagion of economy erupt, they can lose money. Bond selection skills are particularly important given huge risk of default and large diversification of high-yield bonds. Rather than relying solely on accounting statements or credit ratings provided by rating agencies, seasoned fund managers conduct internal due diligence to avoid stepping on landmines.

5. Results

By understanding these three different trading strategies, the results can be interpreted and analyzed as follows.

5.1. Market Neutral Trade

People would choose to go long F and short NVDA, because the performance of F in is strong, while the situation of NVDA is not so satisfactory. In terms of volume allocation, 83% was allocated to F, 17% to NVDA, and the return of the trading portfolio was 21.56%.

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Table 1: Three trades based on market neutral strategies for F and NVDA.

Trade	Symbol	Quantity	Weight	Price Paid	Last Price	P/L	%	Total P/L	Total %
1	F	500	83%	13.18	15.03	925.00	14.04%	5258.00	21.56%
	NVDA	-100	17%	177.98	134.65	4333.00	24.35%		
2	F	128	56%	13.18	15.03	236.80	14.04%	4569.80	23.45%
	NVDA	-100	44%	177.98	134.65	4333.00	24.35%		
3	F	500	56%	13.18	15.03	925.00	14.04%	17867.03	23.45%
	NVDA	-391	44%	177.98	134.65	16942.03	24.35%		

Market Neutral means Beta for the entire portfolio is zero. The formula is Bp=$W_a\beta_a$+$W_b\beta_b$, where Bp is the beta of the portfolio, W_a is the weight of stock a, β_a is the beta of stock a, W_b is the weight of stock b, and β_b is the beta of stock b. The beta of F is 1.29, and the beta of NVDA is 1.65; In the trade(Trade 1), the amount of F is 500, and the amount of NVDA is -100. The total profit of this portfolio is 5258.00 and the total return is 21.56%. . If the overall beta of the portfolio is 0 or close to 0, the number of F should be reduced to 128(Trade 2) or the number of NVDA should be increased to 391(Trade 3). When the number of F is 128, the total profit of this portfolio is 4569.80, and the total return is 23.45%; when the number of NVDA is 391, the total profit of this portfolio is 17867.03, and the total return is 23.45 %. It is clear that the overall return of the portfolio increases significantly if Market neutral trade is used.

5.2. Long-Short Equity Trade

Under the long-short equity trade strategy, people tend to be long F and short NVDA. In addition to the recent strong performance of F, the time to make the transaction is right next to the time of F quarterly dividends. On the afternoon of July 27, Ford Motor Co. CEO Marion Harris talked about the company's second quarter 2022 results, saying that Ford's strong performance and the attitude of its executives are likely to lead to higher prices. Fortunately, I happened to make the trade on this day, so this is a good way to be long F. opportunity. In terms of volume allocation, 83% is allocated to F and 17% to NVDA, giving the portfolio a return of 21.56%.

Table 2: Trade based on long-short equity strategies for F and NVDA.

Symbol	Quantity	Weight	Price Paid	Last Price	P/L	%	Total P/L	Total %
F	500	83%	13.18	15.03	925.00	14.04%	5258.00	21.56%
NVDA	-100	17%	177.98	134.65	4333.00	24.35%		

5.2.1. Long-short Equity Trade Based on PE

Value investing is buying stocks when prices are lower, and the company is not popular. We should buy stocks with low P/B ratios (below 1 or 2), low PE ratios (below 10) and high dividend yields (> return on the USA Treasury Bonds or above 3% or 4%). The P/B ratios of F are 1.15, below 2; PE ratios are 4.61,below 10 recently, and high dividend yields is above 3%. The P/B ratios of NVDA are 16.45, far above 2; PE ratios are 47.71, far above 10, and high dividend yields is far below 3%. So, long F and short NVDA, and long-short equity trade strategy based on PE is also effective for this trading combination of F and NVDA.

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5.2.2. Long-short Equity Trade Based on PEG

PEG ratios are price earnings ratio (price/earnings) divided by growth rate. If (P/E)/(G*100) > 1, invest; if (P/E)/(G*100) < 1, sell. If we want to buy growth stocks ,we should avoid overpaying. The PEG ratios of F are below 1, and the PEG ratios of NVDA are above 1. If follow this strategy to trade, we should long NVDA short F, However, if this approach is followed, the returns of both F and NVDA will be negative, which means that such a trade will result in simultaneous losses for both stocks. Therefore, the long-short equity trade strategy based on PEG is not applicable to the F and NVDA portfolios.

5.2.3. Long-short Equity Trade Based on Momentum

Momentum Investing has a lot of statistical evidence to support it. There is a formula to calculate: 5 Day Moving Average Price=[P(-5)+P(-4)+P(-3)+P(-2)+P(-1)] /5, where P(-5) means the adjust price of countdown Day 5,P(-4) means the adjust price of countdown Day 4, P(-3) means the adjust price of countdown Day 3, P(-2) means the adjust price of countdown Day 2, P(-1) means the adjust price of countdown Day 1.If moving average > current price, buy; if moving average < current price, sell. The moving average of F is higher than current price, and it has a tendency to rise. The moving average of NVDA is lower than current price, and it has a tendency to decrease. So ,we should long F and short NVDA. Obviously, the long-short equity trade strategy based on momentum is also applicable to the trading combination of F and NVDA.

Table 3: F and NVDA's recent moving average price.

Symbol	F	NVDA
100 Day MAP	13.62	175.12
50 Day MAP	13.85	167.98
20 Day MAP	15.61	168.95
10 Day MAP	15.37	156.17
5 Day MAP	15.19	143.58
Current Price	13.18	177.98

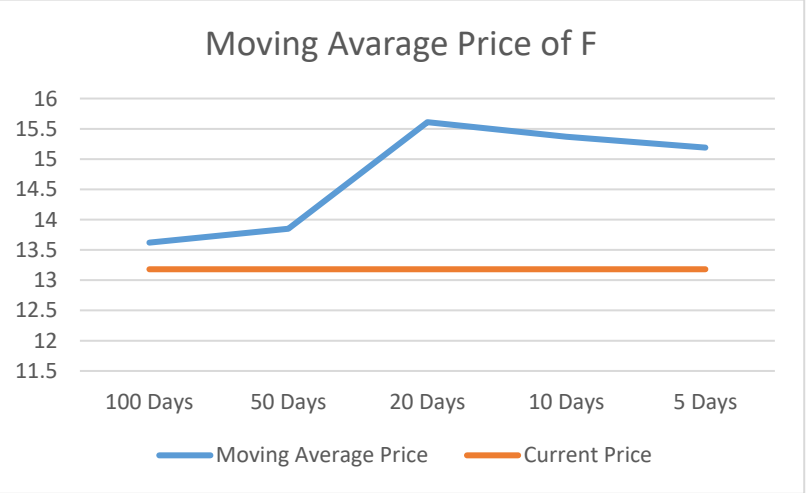

Figure 3: Moving average price and current price of F.
Source: yahoo finance [12]

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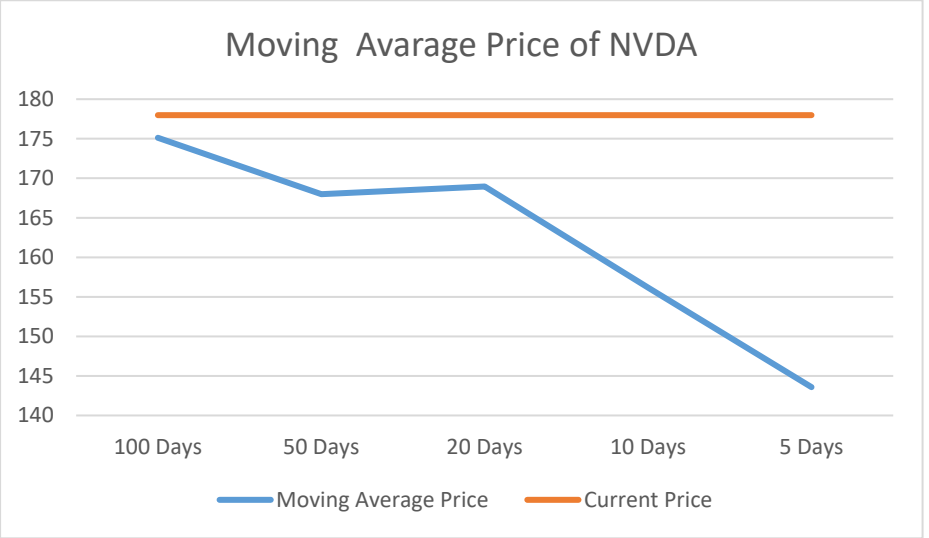

Figure 4: Moving average price and current price of NVDA.
Source: yahoo finance [13]

5.3. Credit Arbitrage Trade

In the trading strategy of credit arbitrage, I still choose to long F and short NVDA, because according to market performance and credit rating, .F's credit rating has a potential upward trend, and NVDA's credit rating has a potential downward trend. An 83% amount of F and a 17% amount of NVDA would result in a portfolio return of 21.56%.

Table 4: Trade based on credit arbitrage strategies for F and NVDA.

Symbol	Quantity	Weight	Price Paid	Last Price	P/L	%	Total P/L	Total %
F	500	83%	13.18	15.03	925.00	14.04%	5258.00	21.56%
NVDA	-100	17%	177.98	134.65	4333.00	24.35%		

Credit Rating Agencies give companies grades on their debt and their ability to pay back this debt. Industry risk has a large impact on credit ratings because the rating agencies are looking out the next few years and trying to determine if the company can survive the next recession. So, a Credit Arbitrage Trade mostly placed with investment grade (BBB or higher) and high yield (junk) bonds, we should analyze according to the long credit rating will rise and short credit rating will fall[11]. By all accounts, NVDA should have been a better investment than F. According to this trading strategy, we should be long NVDA and short F. However, due to the strong performance and attitude of executives coming in and its second quarter earnings announcement, F's rating will most likely rise; NVDA, in addition to the poor second quarter results and weak third quarter earnings guidance announced last month, has been downgraded due to signs that consumer demand for graphics processing units (GPUs) is declining, sales prices Several analysts have recently downgraded their ratings and price targets for NVDA due to signs that consumer demand for graphics processing units (GPUs) is declining, sales prices are starting to fall, and sales of some chip products are limited in China, Russia and other regions due to the epidemic and political issues. So, we should choose long F short NVDA instead of longing NVDA and shorting F. It can be seen that the credit arbitrage trade strategy is not suitable for the trading combination of F and NVDA.

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Based on the above analysis, it is easy to find that the market-neutral trading strategy can bring benefits to the F and NVDA portfolios. The long-short equity trade strategy may lead to different results according to different data analysis. Therefore, a decision should be made after comprehensive consideration of a variety of data under this strategy. The credit arbitrage trade strategy is not for this combination, because the ratings of these two stocks have a trend of change. Rather than saying that the credit arbitrage strategy should be a stock with a high rating and a stock with a low rating, it should long a stock with a upwards rating and a stock with a downgraded rating.

6. Conclusion

Different trading strategies will have different effects on the same trading portfolio, and these effects will lead people to make different choices. The three trading strategies analyzed in this article are not fully applicable in different situations. Judging from the performance of the F and NVDA combination in the past two months, the market neutral strategy is not only applicable, but if the quantity proportion is calculated according to the formula, it can even further increase the income; while the Long-short equity trade strategy is not completely applicable, based on P/E ratios and momentum strategies can bring benefits, but PEG-based strategies can lead to losses. Therefore, when using this strategy, you should consider a variety of data to make a trade-off decision; if you only make decisions based on existing credit ratings, the Credit arbitrage trade strategy is not suitable for this combination. So, when a transaction is made, the trend of the credit rating is often more important than the current credit rating. The impact of these different strategies on the same portfolio can help people make yield-enhancing decisions in today's volatile economic environment.

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Financial Market Reactions under the Russia-Ukraine Conflict

—An Empirical Study Based on a Multi-factor Model

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Abstract: This paper takes advantage of the turbulent situation in eastern Ukraine to study and examine the correlation between war conflicts and stock yields, and to study the impact on the stock returns of A-share listed companies in China. The background of this article is that with the Russian Ministry of Defense announcing the withdrawal of troops stationed on the border between Russia and Ukraine, the crisis situation in eastern Ukraine has been cooling since October 2021, until February 2022, when Ukraine announced in civilian forces that it would evacuate the local population to Russia on the same day, while the situation in eastern Ukraine deteriorated, the local government banned foreign aircraft from entering the country, and declared Ukraine a state of war. This article constructs an index factor that measures the degree of war through the cryptocurrency market price fluctuation index and the cryptocurrency market price fluctuation index. In addition, a new war impact index factor is added to the basic three-factor model, and the explanatory performance of the new multi-factor model for the stock yield of listed companies is more in-depth and whether it is more explanatory than the three-factor model. The study will test whether the Russian-Ukrainian conflict will significantly affect equity returns in China's A-share market. Helps investors better describe the expected returns of a cross-sectional stock portfolio.

Keywords: Russia-Ukraine conflict, war intensity factor, four-factor model

1. Background

Existing research on the impact of the Russian-Ukrainian conflict on financial markets has found that the impact of the Russian-Ukrainian conflict on financial markets is multidimensional [1] and that this impact includes influencing investor sentiment and beliefs as well as causing price volatility in important crude oil futures [2]. Although existing research tends to suggest that financial markets can respond to unpredictable war shocks, there is no answer in the literature to the question of how individual markets react to shocks and, in particular, whether the impact of war on financial markets, futures markets and cryptocurrency markets can be quantified. In [3]. This paper examines the impact

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of the war between Russia and Ukraine on the major stock markets, but not from the perspective of the basic three-factor model.

Firstly, the war differs from previous catastrophic events such as earthquakes and air crashes, and its impact on financial markets is worth studying in depth. Secondly, the impact of this event is widespread. Whether the most basic securities market, the more complex cryptocurrency market, or the futures market, this paper explores how to construct a new four-factor model to quantify the impact of the Russia-Ukraine conflict on the world financial markets.

This paper has used literature, comparative, quantitative, and other research methods. The literature analysis method [5] provides more insight into the basic three-factor model's development, application, and extension. The FAMA-FRENCH three-factor model divides the portfolio into different portfolios in the comparative analysis method. Then this paper compares and analyses the portfolio returns in different situations. The war intensity factor is selected and analyzed using principal component analysis in the quantitative analysis. The principal components are an index of crude oil market prices and Cryptocurrency market prices.

The final result of this paper is that, through the final factor construction and model composition and the GRS test, this paper has confirmed that this paper's newly constructed four-factor model has more substantial explanatory power for the cross-sectional returns of this paper's chosen time window of 2021.9-2022.8 compared to the original underlying three-factor model and that this paper also has considerable research implications for other anomalous applicable factor models or the establishment of new four-factor models.

2. Data

All A-share data from September 2021 to August 2022 is used to calculate daily returns as a weighted average of the market capitalization of all A-shares, all from the WIND database. In this paper, the market price data of crude oil and digital currencies from September 2021 to August 2022 are selected as the sample for the study. The price index of the digital currency, the price index of crude oil is obtained based on two aspects: the partial crude oil price return and the panic index, and finally the degree of war factor is constructed by grouping the daily log returns of the digital currency market and the log-returns of the crude oil market price in a bivariate ranking.

3. Introduction to the Model Construction

This paper first constructs a three-factor model based on the market factor Rmt-Rft, the size factor SMBt and the book-to-market ratio factor HMLt. For the market factor, where the market capitalization factor is calculated by the total market capitalization of listed companies, the risk-free yield is selected by using the 1-year treasury yield as the data, and the book-to-market ratio is calculated based on the net assets and total market capitalization in the balance sheet. As the financial reports are disclosed quarterly, this paper processes the OIT data based on the disclosure date. In this paper, this paper will use the calculation method of logarithmic return:

$$rt = Ln\left(\frac{Pt}{Pt} - 1\right) \tag{1}$$

to obtain the daily excess return of the stock market portfolio, then by splitting the stocks of the exchange into two categories, small scale S and large scale B (the first 50% are group B and the last 50% are group S in descending order of market capitalization), followed by three groups based on the book-to-market ratio of the sample stocks in descending order (the first 30% are The second group was divided into three groups (the first 30% is high, the middle 40% is the medium (M) and the bottom 30% is the low (L)) based on the book-to-market ratio of the stocks in the sample, and the

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previous two size groups to form six portfolios (SH, SM, SL, BH, BM, BL) to observe the return of the three small size portfolios (SH, SM, SL) compared to the return of the three large size portfolios (BH, SL).

$$SMBt = \frac{SHt + SMt + SLt - BHt - BMt - BLt}{3} \quad (2)$$

The difference between the returns of the two high book-to-market portfolios (SH, BH) and the two low book-to-market portfolios (SL, BL) (to investigate the different return behavior of large and small-cap stocks) is observed by grouping the high and low book-to-market and size portfolios into four portfolios:

$$HMLt = \frac{SHt + BHt - SLt - BLt}{2} \quad (3)$$

This paper uses the above approach to construct the underlying three-factor model (Table 1).

$$Rit - Rft = \alpha i + \beta\, i(Rmt - Rft) + SiSMBt + hiHMIt + eit \quad (4)$$

Table 1: One-year daily returns for the basic three factors.

	Date	Mkt.daily.ret	SMB	HML
0	2021-08-02	0.000000	0.000000	0.000000
1	2021-08-03	-0.004146	0.002663	0.003631
2	2021-08-04	0.013514	-0.003690	-0.018729
……	……	……	……	
261	2022-08-29	0.002031	0.008213	-0.000452
262	2022-08-30	-0.003450	0.001732	0.005082
263	2022-08-31	-0.011608	-0.016885	0.007337

3.1. Construction of Indicators

The study in this paper selects a crude oil price market volatility index combined with a cryptocurrency market change index as the battle intensity index. It constructs a multi-factor model based on the original three-factor model. For crude oil market prices, data from September 2021 to August 2022 were selected to analyze the liquidity impact of crude oil through the following financial attributes of crude oil: USD-based - risk appetite - liquidity. Panic Index (VIX) (Volatility Index) for risk appetite analysis: Oil prices are significantly more risky assets and less stable than equity indices and copper prices. This article uses 20 as the VIX cut-off point to measure investor panic about the overall market. **Figure 1** below shows the weekly closing price of the Chicago Board Options Exchange Volatility Index from September 2021 to August 2022 as a log-return benchmark analysis of the daily settlement price of INE crude oil.

Fig.1: It can be seen that the VIX index was highly volatile during this period, when investors lacked confidence in the crude oil market for most of the Russian-Ukrainian war, and can also side-step the fact that the volatility of crude oil prices during this war can significantly affect equity returns in the Chinese A-share market.

Secondly, for the construction of the crude oil model, a new regression equation with a β term associated with the crude oil price market volatility index and individual stock returns was finally derived by first performing a log-return calculation on the crude oil market price volatility index:

$$E(R) = Rf + \beta\ 1 * WNIT \quad (5)$$

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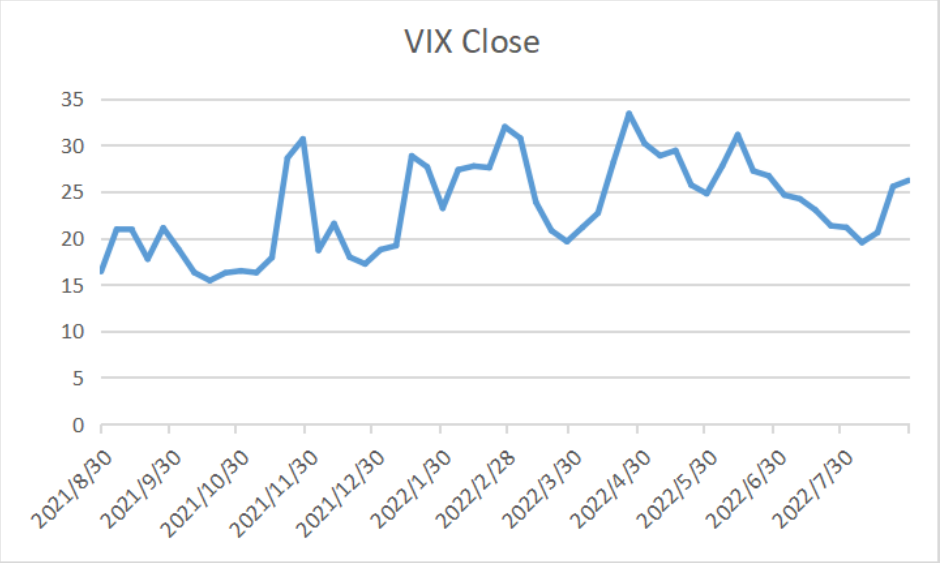

Figure 1: Panic Index VIX Line chart by period change over a year.

Fig. 2.: The daily return is obtained from the oil price and subtracted from the risk-free return to obtain the excess return. The daily excess return for each stock is used as the LHS, and a rolling 20-day regression is performed to obtain the factor exposure of the stock to the oil market.

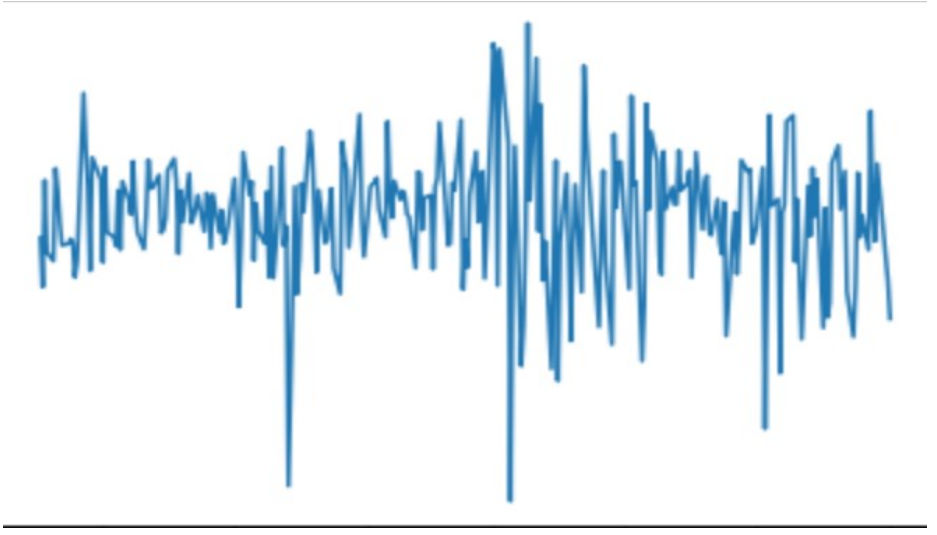

Figure 2: A chart of the daily rate of return of each stock in the factor exposure of the oil price.

For the construction of the Cryptocurrency market price volatility index, this paper still selects the window from September 2021 to August 2022, through the three mainstream currencies (BTC, ETH, XRP), from market capitalization, turnover, and liquidity to observe the data, to obtain a sufficient number of continuous data series, this paper chooses the daily return index and carries out the calculation of logarithmic return, and finally arrives at the new regression equation with β term related to the digital currency market price volatility index and individual stock returns:

$$E(R) = Rf + \beta\ 2 * CRYPTO \tag{6}$$

The Cryptocurrency index is weighted by averaging the daily returns of the three currencies to obtain the daily monthly returns of the money market. Regression is performed in the same way to obtain the factor exposure of each stock in the digital currency market.

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Fig. 3.: is a line graph of the logarithmic return on the price of the digital currency market. (The data is still for September 2021 Road September 2022)

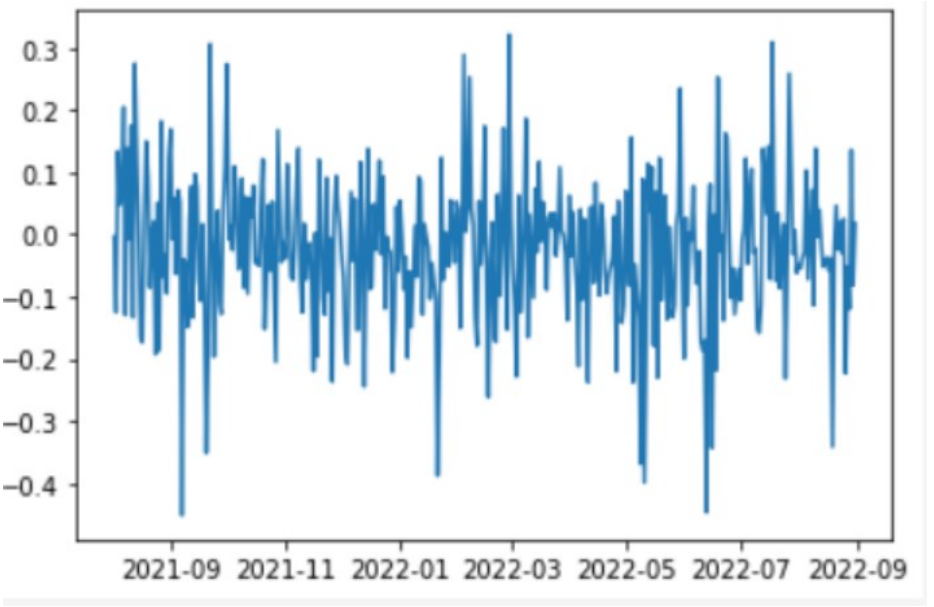

Figure 3: A chart of the daily rate of return of each stock in the factor exposure of the Cryptocurrency market.

3.2. Combination of Indicators - Four-Factor Model

In this paper, it is hypothesized that the war factor consisting of the beta of the crude oil market price volatility index and the beta of the digital currency market price volatility index will directly affect the movement of stock market returns.

This paragraph describes how the indicators are combined to form the final four-factor model, starting with a first regression using the previous time series approach to obtain two sets of βs for two different financial markets. The two groups of β in two markets were grouped into four groups: "β11 (high)", "β12 (low)", "β21 (high)," and "β22" (low), which were then combined to obtain: "β11 β21" (the group with higher sensitivity in both markets), "β11 β22" and "β11 β22", "β12 β21 " and "β12 β22 ", and then applying "β11 β21 " (the group where the sensitivity of both β is in this group is more significant in equities) minus "β12 β22 " (the group with both β sensitivities being relatively low in the stock) to obtain the war extent factor (WARt) for this study, and then adding the war impact factor (WARt) to the original three-factor model to obtain the new four-factor model:

$$Rit - Rft = \alpha i + \beta\, i(Rmt - Rft) + SiSMBt + hiHMIt + ciWARt + eit \quad (7)$$

Following the above approach, this paper further corroborates that the WAR factor is a suitable factor.

Fig. 4, Daily returns of the War factor were obtained and this paper compared them with the market returns:

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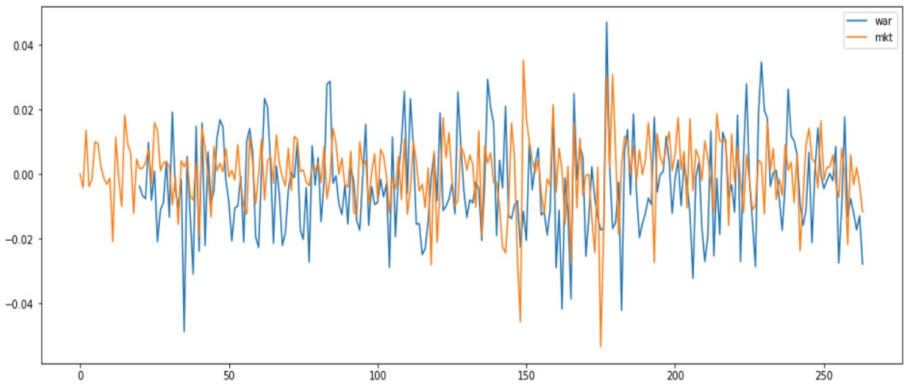

Figure 4: War Factor Daily Returns vs Market Returns.

The results are shown in Table 2. The constant term alpha is tested to see if it is significant and if it is significant, it means that the WAR factor has a cross-sectional return difference that is not explained by the FF three factors. The t-value of the constant term is found to be 4.636 and greater than 2. The constant term is then said to be significant, proving that the factor is valid and suitable as an additional pricing factor to form a multi-factor pricing model.

Table 2: Regression models for constant term tests.

OLS Regression Results			
Dep. variable:	Ret-war	R-squared:	0.088
Model:	OLS	Adj.R-squared:	0.077
Method:	Least Squares	F-statistic:	7.729
Date	Tue,04 Oct2022	Prob(F-statistic)	5.99e-05
Time:	21:40:45	Log-Likelihood	691.72
No.Obser.:	244	AIC:	-1375.
Df Residuals:	240	BIC:	-1361
Df Model:	3		
Covariance Type:	nonrobust		
	coef	stderr	t
const	0.0043	0.001	4.636
Mtk.daily.ret	-0.2172	0.086	-2.511
smb	0.0243	0.101	-0.240
hml	0.3097	0.095	3.277
Omnibus:	1.308	Durbin-Watson	1.782
Skew:	-0.153	Prob (JB):	0.586
Kurtosis	3.1-5	Cond.No.	119

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4. Test Methodology

If the model can fully explain the portfolio, then the asset pricing model developed in this study can be considered valid if the hypothesis that the intercept is simultaneously equal to zero cannot be rejected in a joint test of the total intercept.

The reason for using the GRS test in this paper, as in FF1996, is precisely because it allows us to test whether the intercept term of multiple linear regressions is 0 at the same time, i.e. the original hypothesis: H0: a1=a2=... =an and ultimately equal to 0. =an and ultimately equal to 0. The GRS statistic is expressed as follows.

$$GRS\ statistic = \frac{T}{N} \times \frac{T-N-L}{T-L-1} \times \frac{\alpha' \epsilon^{-1} \alpha}{1+\mu' \Omega^{-1} \mu} \tag{8}$$

However, at that time, Fama & French looked at the p-values, comparing them to the significance level. FF (1996) conclude that there is a significant difference and thus they reject the original hypothesis. This implies that there are other factors that have a significant impact on the return on assets. In their 2015 paper, Fama & French added two other new factors. However, the GRS test of the new model still shows that the five-factor model does not perfectly explain the variation in asset returns.

The GRS methodology used in this paper is as follows: the WAR factor and the market capitalization factor/BM are divided into five groups of 25, and two GRS tests are conducted to test whether the alpha of all intercept terms is jointly equal to 0. Suppose the model can fully explain the cross-sectional excess returns. In that case, the joint test will reject the original hypothesis that it is simultaneously equal to 0, and thus the model is considered valid.

Furthermore, by this paper's calculation of the GRS statistic, this paper gets (Fig.5): the statistic of the first GRS test (WAR factor vs. market capitalization factor) is 682.67 with a p-value of 1.1e-16, and the limit is close to 0. It can be found that the p-value limit is close to 0. The statistic of the second GRS test (WAR factor vs. BM factor) is 635.59 with a p-value of 1.11e- 16 (Fig.6), thus proving through the two GRS tests that the cross-sectional return differences are primarily explained by the four factors, proving the validity of this factor pricing model and thus also fulfilling the expectations of this paper, proving that the explanatory strength performance of this paper new multi-factor model for listed company stock returns is relatively strong. By examining the war impact factors constructed and the four-factor model completed, compared to the original, The new model is more explanatory in the presence and absence of war than the original three-factor model.

5. Conclusion

In the context of the Russia-Ukraine conflict and with reference to other literature, this paper chooses the time window of 2021.9~2011.8 and adds the war factor to the original three-factor model based on A-share data.

this paper's methodology is to obtain the daily return on oil prices and subtract the risk-free return to obtain the excess return, and the daily excess return on each stock as LHS, and perform a rolling 20-day regression to obtain the factor exposure of the stock in the oil market.

The daily returns of the three currencies are weighted and averaged to obtain the daily returns of the money market. The factor exposure of each stock in the digital currency market is obtained by regressing in the same way.

The two-factor exposures of each stock are divided into two groups of size separately to obtain a total of four groups of stocks. The WAR factor is obtained using 1s2s-1b2b as the factor return.

This article was doing the ALPH test for the multi-factor model yield test, using the WAR factor return as the LHS and the FF triple factor as the RHS. Ultimately, this paper concludes that the test

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constant term α is significant, which implies that the WAR factor has a cross-sectional return difference that cannot be explained by the basic three factors compared to the FF three factors, and by constructing the GRS, and finally obtaining the test result that the new factor War, constructed based on the crude oil market price volatility index and the digital currency market price volatility index, is added to the crude oil three factor model, indicating that for this anomaly, this paper's model has more substantial explanatory power than the basic three factor model.

Translated with www.DeepL.com/Translator (free version)The time window in this paper is small, and the data is not sufficient, as this article can only use data for all A-share stocks within one year due to the period of the war. In the future, this article can analyze more previous wars, take a long period of data, or conduct an Event study in stages. This article can then construct more accurate war factors and build a more accurate four-factor model according to the outbreak of war in the outbreak of war. The results of the different Event studies can be used to build a multi-factor model that is more appropriate for each Event study.

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The Impact of the Epidemic on Harbin Pharmaceutical Group Co., Ltd.

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Abstract: The purpose of this paper is to study the impact of the epidemic and the psychological impact of the public on the pharmaceutical industry through financial analysis. By understanding the psychological pressure that the epidemic caused on the people and the fact that the public started to believe the rumors and blindly follow them, thus causing a mass rush of Shuanghuanglian Oral Liquid during the epidemic, people can observe its impact on Harbin Pharmaceutical Group Co., Ltd. The financial statements can more visually reflect the changes in various aspects of the company during the epidemic and study whether the impact of the Shuanghuanglian incident on the company was huge and whether there were other aspects of the impact.

Keywords: analysis and evaluation, behavioral finance, COVID-19

1. Introduction

In his theory of behavioral finance, American financier Richard Taylor suggests that when individuals are exposed to risk, various behavioral cognitive biases and false beliefs prevent investors from making appropriate trade-offs, leading to irrational investment behaviour. These cognitive biases and false beliefs can be categorized as: excessive expectations, cognitive biases and preconceptions [1].

This paper focuses on the cognitive bias created by the psychological pressure the risk of COVID-19 caused on the public, resulting in people's gullibility and blind following of rumors, which led to a mad rush for Shuanghuanglian and the rapid sale of the product; in turn, the impact on the company's financial indicators. The analysis of the company's financial indicators from 2016-2021 demonstrates the changes in the company's operating capacity, solvency and growth capacity, thus understanding the extent of the impact of the event on the company, promoting research related to the impact of citizen sentiment on companies, as well as drawing attention to public sentiment and rumours.

2. Background

2.1. Background

On 31 January 2020 at 22:46, Xinhua News Agency's legal person Weibo, Xinhua Viewpoint, published a Weibo post that "Shuanghuanglian oral liquid can inhibit novel coronavirus", which was

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jointly discovered by Shanghai Institute of Pharmaceutical Sciences and Wuhan Institute of Virology. It was then reposted by mainstream media on Weibo at 22:54 on 31 January 2020 with the hashtag "Shuanghuanglian can inhibit COVID-19", further generating huge attention. Soon after the news was released, it was the number one trending topic on Weibo. In the early morning of the same day, the mainstream media released a microblog to dispel the rumour that there was no drug specifically designed to treat the COVID-19. Subsequently, the People's Daily issued a statement saying that "suppression" is not the same as "prevention and treatment" and urged not to rush to buy Shuanghuanglian Oral Liquid [2].

When the tension of the COVID-19 outbreak renders public sentiment, popular panic quickly reaches its peak. Shuang Huang Lian Oral Liquid quickly went off the market. The unrelated double-yolk lotus seed paste mooncakes were also snapped up [3].

2.2. Causes of the Incident

Ways of distortion: simplification, intensification and assimilation.

From the perspective of social psychology, Alpert categorizes the distortion process of rumors into three main ways: simplification, reinforcement and assimilation. "Simplification" means that rumors often omit a large number of details that are useful in understanding the truth; "Reinforcement" means that when some details are removed, those that remain are more prominent and important; "Assimilation "Assimilation" is the tendency of rumour spreaders to bring past experiences and present attitudes into some degree of congruence. Simplification, reinforcement and assimilation are three co-existing processes that interact and intertwine in the process of rumour distortion and dissemination [4].

2.2.1. Simplification of Key Information Elements

Compare the news released by "Xinhua Viewpoint" that "Shuanghuanglian Oral Liquid can inhibit the COVID-19" with the statement issued by the Shanghai Institute of Pharmaceutical Research. The release omits the important information element that "the discovery is still in clinical trials". The statement issued by the Shanghai Institute of Pharmaceutical Research concluded that the statement "Shuanghuanglian Oral Liquid can inhibit the COVID-19" is not fundamentally wrong, but the details of its inhibiting mechanism and dosage are still being studied. When the media released the news, it was not made clear to the public that the discovery was only at the preliminary stage of research, leading some members of the public to believe that Shuanghuanglian Oral Liquid had become an effective drug for the prevention, suppression and treatment of the COVID-19.

At the same time, Weibo, the main platform for this information, is characterized by its brief content, and fragmented reading has become a habit of use for the recipients of information on Weibo. As a result, the media often omits some news elements when publishing news on Weibo in order to adapt to the platform requirements and audience habits. This undermines the accuracy, authenticity and comprehensiveness of the news.

2.2.2. Reinforcement of Some Details

In the case of this rumour, the media focused on reinforcing the effect of suppression when publishing the information. The discovery that "Shuanghuanglian Oral Liquid can suppress the COVID-19" was still in clinical trials and there were no adequate and effective tests to prove how it suppressed the COVID-19 and to what extent. But amidst the fear and anxiety, the word "suppression" brought great comfort and hope to the public, and when this information was secondarily disseminated, the word "suppression" was again reinforced and even misrepresented as "prevention" and "treatment". "and "cure".

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2.2.3. Assimilation in Line with Psychological Expectations

Alpert suggests that people use existing knowledge with the intention of forming a more coherent and compact mental construct, and that they demonstrate not only the process of reinforcement but also the process of assimilation. When an actual perceptual fact conflicts with an expectation, the expectation may provide a more powerful determinant of perception and memory than the fact itself [4]. Therefore, people often use past experience to judge the accuracy and reliability of information, and when receiving and communicating information, they assimilate some of the information elements based on past experience and mental expectations. Shuanghuanglian Oral Liquid is well known to the public as a commonly used Chinese medicine in daily life and is widely recognised for its effectiveness in clearing heat and fighting viruses. As the COVID-19 was rampant, people had great expectations and trust in Shuanghuanglian Oral Liquid, and the news released by the media that "Shuanghuanglian Oral Liquid can inhibit the COVID-19" created psychological consistency between people's past experiences and the content of the information, which was trusted and re-disseminated by the public [5].

2.3. Basic Situation of Harbin Pharmaceutical Group Co., Ltd.

Check the State Drug Administration found that there are currently 12 domestic companies approved for the production of Shuanghuanglian Oral Liquid, five of which are listed companies, including A-share listed Harbin Pharmaceutical Group Co.,Ltd., Tai Long Pharmaceutical, Renmin Tongtai, Zhenbao Island, and Hong Kong stock Fusen Pharmaceutical.

Harbin Pharm. Group Sanjing Pharmaceuti is a holding subsidiary of Harbin Harbin Pharmaceutical Group Co., Ltd. Focusing on the pharmaceutical and health industry, Harbin Pharmaceutical Group Co., Ltd. is a large domestic high-tech pharmaceutical enterprise mainly engaged in pharmaceutical R&D and manufacturing, wholesale and retail business. In 2015, the company integrated its assets and business segments through asset swap and created its pharmaceutical commercial listing platform (Renmin Tongtai, 600829.SH), realizing the business layout of independent operation and synergistic development of pharmaceutical industry and pharmaceutical commercial (Extracted from the company's annual report).

Table 1: Components of an enterprise group.

Name of subsidiary	Main business location	Place of Registration	Type of business	shareholding ratio (%) (direct)	Acquisition method
Harbin Pharm.Group Sanjing Pharmaceutical Co.,Ltd.	Harbin	Harbin	Pharmaceutical industry	100	merger
Harbin Pharmaceutical Health Technology (Hainan) Co., Ltd	Beijing	Hainan	Pharmaceutical industry	100	establishment
Harbin Pharmaceutical Group Traditional Chinese Medicine Co., Ltd	Harbin	Harbin	Pharmaceutical investment	100	establishment

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Table 1: (continued).

Harbin Harbin Pharmaceutical Health Industry Co., Ltd	Harbin	Harbin	Pharmaceutical business	100	establishment
Harbin Pharmaceutical Group Sales Co., Ltd	Harbin	Harbin	Pharmaceutical business	99	establishment
Harbin Pharmaceutical Group Marketing Co., Ltd	Harbin	Harbin	Pharmaceutical business	99	establishment
Harbin Pharmaceutical Group Bioengineering Co., Ltd	Harbin	Harbin	Pharmaceutical industry	100	merger
Harbin Pharmaceutical Group People's Tongtai Pharmaceutical Co., Ltd	Harbin	Harbin	Pharmaceutical business	74.82	merger
Harbin Harbin Pharmaceutical Art and Culture Development Co., Ltd	Harbin	Harbin	culture	100	establishment
Beijing Haizhi Qinao Technology Co., Ltd	Beijing	Beijing	technology	51	establishment
Harbin Xiangchi Passenger Transport Service Co., Ltd. of Harbin Pharmaceutical Group	Harbin	Harbin	passenger transport	100	establishment
Harbin Pharmaceutical Group Harbin Shihakka Catering Management Co., Ltd	Harbin	Harbin	catering	100	establishment
Harbin Shenglin Property Management Co., Ltd. of Harbin Pharmaceutical Group	Harbin	Harbin	property	100	establishment
Harbin Pharmaceutical Group Harbin Boyuan Security Service Co., Ltd	Harbin	Harbin	safety and security	100	establishment
Harbin Pharmaceutical Intellectual Property Trading Center Co., Ltd	Harbin	Harbin	technology	100	establishment
Harbin Pharmaceutical Hong Kong II Limited	Hong Kong	Hong Kong	investment	100	establishment
Harbin Pharmaceutical (Shanghai) Pharmaceutical Technology Co., Ltd	Shanghai	Shanghai	biology, medicine, health care, technology	100	establishment
Harbin Pharmaceutical (Beijing) Biotechnology Co., Ltd	Beijing	Beijing	technology	100	establishment
Jian An Xi (Shanghai) Food Technology Co., Ltd	Shanghai	Shanghai	technology	65	merger

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3. Analysis of the Company's Financial Position

3.1. Indicators Per Share of Harbin Pharmaceutical Group Co.,Ltd.

Table 2: Harbin Pharmaceutical Group Co., Ltd. indicators per share.

Reporting Period	June 2016	June 2017	June 2018	June 2019	June 2020	June 2021	June 2022
Basic earnings per share ($)	0.15	0.14	0.15	-0.02	-0.13	0.14	0.05
Net assets per share (RMB)	3.15	2.89	2.57	2.13	1.96	1.71	1.82
Return on net assets (%)	5.35	4.88	5.69	0.14	5.76	8.82	3.26

Earnings per share of Harbin Pharmaceutical Group Co., Ltd. is in a stable state from 2016-2018, declining severely in 2019-2020 due to the epidemic, and starting to pick up after 2021.

Net assets per share have continued to decrease from 2016-2022 and the return on net assets is in a fluctuating state except for 2019, which is presumed to be lower due to the epidemic.

Return on net assets falls severely in 2019 and picks up rapidly in 2020. The presumed impact of the epidemic let the earnings of Harbin Pharmaceutical Group Co., Ltd. decline in 2019, while an adjusted 2020 curbs the continued decline in earnings.

3.2. Analysis of Financial Ratio Indicators

Table 3: Summary of the income statement of Harbin Pharmaceutical Group Co., Ltd. 2016-2021 (in million yuan).

Reporting Period	2016	2017	2018	2019	2020	2021
Total operating revenue (RMB million)	1,412,688.60	1,201,753.13	1,081,361.36	1,182,456.17	1,078,845.65	1,280,201.56
Operating profit	96,634.04	65,590.37	52,737.07	27,774.22	-94,210.83	64,241.30
Net profit	84,379.56	46,436.38	40,363.50	12,186.83	-104,525.02	40,984.56
Return on Net Assets/ROE (%)	10.04	5.77	5.90	1.02	-30.97	9.65
Return on Assets/ROA (%) (%)	5.86	3.23	3.15	1.00	8.59	3.32

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In terms of operating revenue, the operating revenue of Harbin Pharmaceutical Group Co., Ltd. has gradually decreased from RMB1,412,688.60 million in 2016 to RMB1,081,361.36 million in 2018, while the overall operating revenue has fluctuated from 2019 onwards, with a slight rebound in 2021.

In terms of operating profit and net profit, from 2016-2019, operating profit and net profit decreased year by year, while by 2020, operating profit and net profit dropped sharply by 439.20%,957.69% respectively; while 2021 rebounded rapidly.

ROE declines year-on-year from 2016 to 2019, falling severely by 3,136.27% in 2020, before rebounding rapidly in 2021.

ROA declined year on year from 2016-2019, recovered rapidly in 2020 by 759.00% and declined by 61.35% in 2021.

In summary, the graph above shows that the company's indicators declined year on year prior to the epidemic, and that the epidemic hit hard, and that in 2021 the company made adjustments to successfully rebound its indicators.

3.3. Operational Capacity

Table 4: Cash flows of Harbin Pharmaceutical Group Co.,Ltd. 2014-2018 (in RMB million).

Reporting Period Year	2016	2017	2018	2019	2020	2021
Net cash flow from operations	277,801.16	14,922.15	69,272.49	-28,493.85	-72,815.43	-16,243.74
Net cash flow from investments	-7,636.59	-6,798.23	-80,411.08	-137,494.92	-10,116.60	9,161.54
Net financing cash flows	11,400.04	-120,659.33	-136,165.81	28,753.27	106,141.43	39,326.50

The Company's cash flow from operations went from $277,801.16 million in 2016 to

$692,724.9 million in 2018, which shows that the Company's profit is mainly generated by operating activities prior to the 2019 outbreak.

For 2019-2020, net cash flows from operating activities are negative, net cash flows from investing activities are negative and net cash flows from financing activities are positive. This is evidence that its sources of funding are mainly financing, relying on loans while returning to productivity during the epidemic.

In 2021, the company's main sources of funding are investments prior to sale and financing activities, with net operating cash flow remaining negative, but recovering 77.69% from 2020.

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3.4. Debt Servicing Capacity

Table 5: Summary of the balance sheet of Harbin Pharmaceutical Group Co., Ltd. 2014-2018 (in million).

Reporting Period Year	2016	2017	2018	2019	2020	2021
Total assets	1,505,274.49	1,369,933.33	1,190,090.16	1,250,253.08	1,184,753.45	1,284,243.88
Total liabilities	675,464.08	621,774.49	561,997.99	655,970.95	785,896.43	842,195.40
Shareholders' equity	829,810.41	748,158.84	628,092.17	594,282.13	398,857.02	442,048.47

The company's assets declined year on year from 2016-2018 and are in a fluctuating state from 2019-2021; the company's liabilities declined year on year from 2016-2018 and started to increase year on year in 2019, presumably due to the increase in liabilities caused by the epidemic; shareholders' equity declined year on year from 2016-2020 and recovered slightly in 2021.

Table 6: Harbin Pharmaceutical Group Co., Ltd.'s debt 2016-2021.

Reporting Period	2016	2017	2018	2019	2020	2021
Gearing ratio (%)	44.87	45.39	47.22	52.47	66.33	65.58
Current assets ($ million)	1,005,942.78	907,290.40	720,358.98	730,706.90	780,787.22	873,300.60
Total assets (million)	1,505,274.49	1,369,933.33	1,190,090.16	1,250,253.08	1,184,753.45	1,284,243.88
Current assets/total assets (%)	66.83	66.23	60.53	58.44	65.90	68.00
Current liabilities ($ million)	606,964.17	564,268.76	509,328.13	606,859.09	730,678.98	785,477.25
Total liabilities ($ million)	675,464.08	621,774.49	561,997.99	655,970.95	785,896.43	842,195.40
Total current liabilities (%)	89.86	90.75	90.63	92.51	92.97	93.27

As can be seen from the table above, the company's gearing ratio has increased year on year, with total assets decreasing year on year from 2016-2018 and fluctuating from 2019-2021; while total liabilities decreased year on year from 2016-2018 and began to increase year on year in 2019; therefore the increase in gearing is a joint result of decreasing assets and increasing liabilities.

Current assets/total assets decreased year on year from 2016-2019 and increased year on year after 2020, following the same trend as current assets, therefore changes in current assets/total assets are mainly influenced by current assets.

Current liabilities/total liabilities have increased broadly year on year, while current liabilities and total liabilities have followed the same trend, and it is worth noting that both current liabilities and total liabilities have increased year on year since 2019, presumably due to the impact of the epidemic and the need for companies to raise significant debt.

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3.5. Ability to Grow

Table 7: Assets of Harbin Pharmaceutical Group Co.,Ltd. JSC 2016-2021.

Report Date	2016	2017	2018	2019	2020	2021
Total assets (million)	1,505,274.49	1,369,933.33	1,190,090.16	1,250,253.08	1,184,753.45	1,284,243.88
Working capital ($ million)	398978.61	343021.64	211030.85	123847.81	50108.24	87823.35
Working capital/total assets (%)	26.50537	25.03929	17.73234	9.905819	4.229423	6.838526
Retained earnings asset ratio(%)	31.9722	28.8266	25.4221	25.0516	17.3408	18.8869

The company's working capital/total assets declined significantly in 2019 and trended broadly upwards in the other years; the overall downward trend in the retained earnings asset ratio from 2016-2020 takes into account the downward trend in total assets to infer a significant decline in retained earnings over the years.

4. Conclusion

In summary, the Shuanghuanglian incident will have an impact on the performance of Harbin Pharmaceutical Group Co., Ltd. in 2019-2020, but the impact will be short-lived and not significant enough because of the low proportion of revenue from the main business of Chinese medicine preparations of Harbin Pharmaceutical Group Co., Ltd. Company, thus making the change insignificant; secondly, the Shuanghuanglian incident will be short-lived, so the impact caused in the long run will be small.

Table 8: Main business composition of Harbin Pharmaceutical Group Co.,Ltd. (unit: RMB billion, %).

Classification	Main Business Composition	Main revenue	Percentage of income	Main operating costs	Cost ratio	Main profit	Profit ratio	Gross margin
By Industry	Wholesale Medical customers	58.2	49.22	51.29	43.94	6.91	11.87	58.2
	Chemical preparations	22.38	18.93	10.34	8.86	12.04	53.80	22.38
	Wholesale commercial customers	12.69	10.73	11.98	10.26	0.71	5.59	12.69
	Retail	11.46	9.69	8.16	6.99	3.3	28.80	11.46
	Chinese medicine	5.75	4.86	4.05	3.47	1.7	29.57	5.75
	Other (additional)	7.77	6.57	30.91	26.48	-23.14	-297.81	7.77

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Table 8: (continued).

By product	Balance Project	83.15	70.32	72.04	61.72	11.11	13.36	83.15
	Nutritional supplements	12.73	10.77	4.09	3.50	8.64	67.87	12.73
	Anti-infection	10.04	8.49	8.04	6.89	2	19.92	10.04
	Bone sensitizer	4.18	3.53	2.27	1.94	1.91	45.69	4.18
	Other (additional)	8.15	6.89	30.29	25.95	-22.14	-271.66	8.15
By Region	Domestic area	117.04	98.98	89.03	76.27	28.01	23.93	117.04
	Foreign regions	0.67	0.57	0.75	0.64	-0.08	-11.94	0.67
	Other (additional)	0.54	0.46	0.17	0.15	0.37	68.52	0.54

The company's 2020 EPS, net income and operating margin were negative, sales growth was positive except for 2020 after the epidemic, equity fell sharply and the value of the debt to equity ratio was high, suggesting that the rumors of Shuanghuanglian had no positive effect on the company's sales growth in 2020. The loss for the year was due to other reasons, presumably due to the acquisition of overseas pharmaceutical companies by Harbin Pharmaceutical Group Co., Ltd..

On 13 February 2018, Harbin Pharmaceutical Group Co., Ltd. entered into a purchase agreement with GNC Corporation, under which Harbin Pharmaceutical Group Co.,Ltd. intends to subscribe for 300,000 preferred shares issued by it for US$300 million (approximately RMB2 billion) in cash.

In February 2019, Harbin Pharmaceutical Group Co., Ltd. completed the subscription of the preferred shares issued by GNC with an annual dividend rate of 6.5%. After the conversion of the preferred shares into common shares on the outside, Harbin Pharmaceutical Group Co.,Ltd. will hold 40.1% of GNO, thus becoming its single largest shareholder.

On June 22, 2020, Harbin Pharmaceutical Group Co., Ltd. announced that the cost of the investment in GNC totaled RMB2,063 million; as at March 31, 2020, the carrying value of GNC was RMB898 million, representing an accumulated loss of other comprehensive income of RMB1,165 million due to changes in fair value, which has been reflected in the regular reports.

In the same month as this announcement, GNC, the world's largest health food manufacturer, declared bankruptcy and will sell the company to close all its stores.

As a result of the relocation of Harbin Pharmaceutical Group Co., Ltd. General Factory and Harbin Pharmaceutical Group Co., Ltd. Sixth Factory, the integration of related companies in the Chinese medicine segment and the structural integration of the injectable product line during the reporting period, the production output was reduced, resulting in higher costs and expenses; at the same time, the Company made a provision for impairment of idle equipment in some of its plants that had outdated technical performance, high energy consumption and could no longer be renovated and utilized, which was expected to reduce the total profit by RMB69.28 million.

An accounting manipulation technique whereby a listed company intentionally depresses the results of a bad year and defers the profit to the next year to focus on the next year's results in order to achieve a large increase in the next year's results [6].

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The Economic Impact of Online Business

—Taking Amazon as an Example

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Abstract: The subject of the study is Amazon.com, which is based on the current rise of online commerce, which has a great impact on the traditional social economy. The main purpose of this article is to introduce the impact of online business on the social economy. It also aims to compare the impact on the development of brick-and-mortar businesses such as WalMart, IKEA, and even Nike by giving an example of the operation of Amazon, a representative of online business. The impact of the online economy on the real economy is illustrated by how these brick-and-mortar businesses are responding to the rapidly developing trend of online business sales, but it turns out that either way, the real economy is at a certain disadvantage in the face of the development of online business. The article also demonstrates the tremendous impact of Amazon on the social economy by parsing its membership and the countless jobs that Amazon provides to the community. The findings and conclusions of the study were derived from searching the data of the website, and the main tool of the study was the database of the university library.

Keywords: Amazon, online business, real economic, job opportunity, prime shipping

1. Introduction

Amazon.com, Inc. is the largest online e-commerce company in the United States and is located in Seattle, Washington. It was founded in 1995 and was one of the first companies to start an e-commerce business on the Internet. According to Amazon's history as shown on its official website, it began by selling books on the Internet, but now it has expanded to include a variety of other products and has become the world's largest online retailer and the second largest Internet company in the world. Some researchers believe that Amazon's growth has enhanced many aspects of the social economy and provided many jobs for society, while others believe that Amazon's growth has hindered the development of the real economy to some extent. This is the significance of this scientific research, which is to explore how the online company, on behalf of Amazon, has affected the social economy in a multidimensional way without classifying it as more good things or more bad things. The research method was to find relevant information on the Internet. The point of this study is to inform the reader that the development of a company affects all aspects of the social economy in a multidimensional way, and then to detail which are the main aspects, how they are affected, whether they are viewed objectively as positive or negative, and what changes the real economy has made to face the trend of online shopping.

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2. Amazon Economic Impact

As more and more consumers turn to the e-commerce market, many traditional brick-and-mortar retailers continue to feel stress. Also, brick-and-mortar stores still need to stock up on inventory, while online stores don't have to. Over the past 20 years, online retail sales have shown consistent growth. In the mid-1990s, online retailing accounted for 2.5% of all peddle sales.In the mid-2000s, that number twice as much to 5%, a figure that has bounced to about 10% of total peddle sales [1]. This shift towards online retailers and the shift in consumer inclination make it difficult for old retailer brands to compete productively. Traditional old fashioned retailers are finding methods to manage themselves be competing. Although some retailers, for instance, Walmart has made significant financing to develop the growth of theirs e-business side of the business, such as providing free two-day shipping on specific products, other merchant are still struggling. This also has something to do with the Amazon effect. Amazon's growth has made the Amazon effect start to emerge this time [2]. Amazon effect is a broad term, which means that with the advent of Amazon, customers' buying habits have changed. It also indicate the way in which e-business as a whole has became mature with the passage of the time. Contemporary clients are more likely to buy products than ever before. When they think of it, they can buy it immediately. They only need to click the mouse button, which is very convenient and fast. It turns out that retailers have been affected.

First of all, we have to mention Amazon's cooperation with well-known brands. In order to comply with this fast growing trend of e-commerce, Nike, Adidas, Columbia, CK and others have made strategies to cope with it. Now take Nike as an example and see what the impact of cooperation with Amazon is. Nike risks being jeopardized for offline store sales because one of the top reasons customers don't like to buy products online is that they can't get them right away. And Amazon's shipping advantage has transformed thousands of otherwise reluctant online shoppers into e-commerce shoppers by delivering online orders faster than ever before. As a result, instant gratification is no longer a part of e-commerce. Now that customers can purchase their products online and receive them within 1-2 days, a trip to Nike's offline stores may begin to feel inconvenient and unnecessary [3]. This means less revenue owned by Nike's offline stores and more revenue shared with Amazon under contractual agreements, which could affect their bottom line.

Plus, in terms of jobs, Amazon's official website says he has created many jobs for society. In the past decade, arguably no U.S. company has created more jobs than Amazon. The investment of Amazon have produced over 2.7 million jobs in America. They have over 800 thousand U.S. employees in 40 states and 250 counties. Furthermore, their investments have created a ripple effect of over than 780,000 indirect jobs that helping communities thrive across the country.[4] In addition, they backing the rapid development revenue of small and medium-sized enterprises (SMBs), launching and growing a number of social economies through online sales of products [4]. As a result of sales on Amazon, SMBs more than 1.1 million jobs have been created in communities across the United States. In the truth, according to IDC research, SMBs from all 50 states are hiring at more than twice the rate of other states when working with Amazon, at 25-50% [4]. In addition, with a $15 lowest wage, all employees have approach to premium benefits and can participate in a extensive range of programs for studying new skills for shortage positions be the piece of Amazon's 2025 Skills Upgrades program, where Amazon has committed $700 million to support all employees in gaining critical knowledge to move into higher-skilled, higher-paying technical or non-technical positions [4]. Thanks in part to these programs and benefits, they have also been recognized by Linked-In as the best company to work for. So, in terms of job opportunities, Amazon has really done a great job of providing the community with a lot of jobs and, in doing so, has contributed to the socioeconomic development of the community.

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At the same time, Amazon Prime has contributed significantly to the company's growth. In 2009, Amazon had 2 million Prime members, which grew to 5 million in 2011; in 2015, the number of Prime members soared to 54 million. They adopted "free delivery" in the early 2000s when they started their Super Saver Transportation program, which offered free delivery on orders over $25 [4]. In the promotion period, Amazon began the strategy that providing free delivery on the purchase of a second book, which led to a magnificent increase in sales. Clearly, Amazon recognizes the consumer's psychological tendency to label things as "free." And from this point, e-commerce transformed shipping, with U.S. trucking tonnage at about 115 tons in June 2005. The index reached an all-time high of about 130 in 2013 and 2014, with the only significant decline occurring during the recession of late 2008 to early 2009. The ATA projections that total U.S. truck ownership would increase by 26 percent in 2012; 38 percent increase for total miles traveled, and total tons would increase by 26 percent by 2023. " The freight industry is also expected to grow total revenues by nearly 66 percent, while rail tonnage and revenues are expected to fall to approximately 14.6 percent of total transport revenue. Similarly, Federal Highway Administration of the U.S. Department of Transportation projects that long-haul freight tonnage will grow by 44 percent from 2007 to 2040 [5]. Of course, trucks need people to drive them, and with the increase in truck tonnage and mileage, job opportunities are increasing. First of all, truck driving is unaffected by proliferation to global and automation; can't outsourcing services truck driving to India, for example; so a large number of transportation drivers are needed. In addition, the government has grouped truck drivers and delivery drivers into one large category, making it a very large occupation. Then, with the need for truck drivers adding, as well as the amount to be paid said by truck drivers plus the amount needed to pay for other fees such as petrol, maintenance, etc [6]. Then today, Amazon has taken over the shipping of its major products and companies like FedEx have lost much of their business as more and more online shopping shifts. As Amazon considers moving into non-Prime shipping, FedEx appears to be one of the most negatively affected. Therefore, Amazon prime increases job opportunities for society but also causes some negative impact for other shipping companies. But Amazon's growth is then bound to bring some good impact on the social economy, while companies in the same industry will face some challenges, which can also promote the development of companies in the same industry.

In additionally, Amazon's development is also inseparable from technology, and Amazon is among the technology industry, for example, Amazon and the University of California, Los Angeles established the Center for Artificial Intelligence Science. Also, as seen in Amazon's development, Amazon has developed various scientific models to help members make the most of their use. Technology has also served Amazon, or this community, well as an economic driver. And because of the increasing level of technology and labor efficiency, companies are able to increase their total production, which leads to higher profits and greater economic development. Thus, productive capacity is the crucial and long-term driver of economic growth, and creative in technology is a major factor in productive capacity development. Amazon.com has made a great contribution to social development

3. Conclusion

Amazon has had an impact on society in many ways. First, it has made many offline stores feel the pressure, so traditional stores are finding ways to follow this trend. Thanks to Amazon's efficient shipping system, many people who don't like online shopping have started to enjoy it. This is how the term "Amazon effect" started to appear. Then, Amazon provided many jobs for society and increased the demand for labor in the labor market. In addition, making Amazon.com a prime member brings huge benefits to the company and more benefits to the society's economy because it requires a lot of transportation work while the demand for trucks is growing. But there is also a blow to other transport companies. Finally, there is the technological development of Amazon. The development of con-

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temporary Internet companies must be inseparable from the development of technology, which allows the company to have greater profits, and also allows the social output rate and supply to be increased. The benefit of the online store is that people do not need inventory. More and more people find it more convenient to shop online, and now Amazon is not even just a company, it also represents the Amazon effect. So, the multi-faceted development of Amazon has brought impact to all aspects of the social economy. In such a situation, some companies will face challenges and some will follow the trend. With the development of technology the output of society will gradually increase. What other changes will be made by the real companies in the future, will they slowly go down the slippery slope under this trend of rapid rise of online business? What else can they do to change the status quo or to be on par with online business, or they must also follow this trend?

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Accounting Quality of U.S. Listed Chinese Enterprises: Disclosure Level of State-Owned and Non-State-Owned Enterprises

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Abstract: This proposal is commissioned to discuss U.S.s the differences in the disclosure level of U.S. listed Chinese state-owned enterprises (SOEs) and the U.S.-listed Chinese Non-state-owned (Non-SOEs) enterprises. Topics include introduction, objective, importance, test process and conclusion. During the past two decades, the economy of China went through rapid growth, providing Chinses enterprises a solid basement to develop. With the goal of obtaining funds for further expansion and staying competitive in the international market, more Chinese enterprises choose to go public in the U.S. The disclosure level of Chinese enterprises plays an essential role in the decision-making of foreign investors. Whether owned by the Chinese government makes investors view disclosure levels differently since Chinese SOE exists as a special type of business. From the test and analysis, no obvious differences exist between the disclosure levels of SOE and Non-SOE.

Keywords: quality of accounting information disclosure, U.S. listed Chinese enterprises, Non-SOE, SOE.

1. Introduction

As the economic developing rapidly these days, plenty of Chinese enterprises choose to go public in U.S. securities market. And according to China's special political system and policy guidelines, there is a special category of enterprises called SOE (SOEs) among all these enterprises. The Chinese government has imposed stricter regulations on these companies to avoid the risk of corruption and higher requirements for their accounting disclosure. This paper is mainly focused on the differences in accounting disclosures between U.S.-listed Chinese SOE and U.S.-listed non-SOE.

In this paper, we examine the accounting disclosure level of SOE and private enterprises through their financial reports. Firstly, we examine the management structure of enterprise, as managers are playing completely different roles in SOE and non-SOE, which could cause different impact on ac-

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counting disclosure. Secondly, we analyze the level of voluntary disclosure of SOE and other enterprises. The Chinese government has specifically established a series of required disclosures for SOE that are required to be disclosed, while for non-SOE, these are content of voluntary disclosure and they may choose not to disclose. However, as for some sensitive information, the Chinese government also has policies that require SOE to keep them confidential, while in the other hand, private enterprises may be more comfortable disclosing such information to attract investment. The special characteristic of SOE could lead to the differences of voluntary disclosure between SOE and non-SOE.

Considering that Chinese government has a very strong influence on the management structure and accounting disclosure of SOE, we predict that SOE and non-SOE will have some specific differences in management structures, and they will have significant difference in voluntary disclosures.

To analyze the accounting disclosure level of SOE and non-SOE, we construct a sample of SOE and non-SOE listed in U.S. We wanted to select a representative sample for our analysis, so we chose the typical SOE in the transportation, communication, energy and insurance industries. As for the non-state-owned enterprise, we select the e-commerce, social media, streaming media, electronic vehicle and education industries. We noticed that although most of these enterprises have a short history of development, but they all on a rapidly rising trend in the past two decades.

Using data from 20 enterprises over the period 2017 to 2021, we test the impact on disclosure level which caused by management structure of enterprises through adopting the theory and formula in "Ownership Structure and Disclosure Quality: Case of Iran" as our testing method [1]. We find that the average score of state-owned enterprise is around 5.51 and the average score of non-state-owned enterprise is around 5.28, which indicates that the difference based on the measurement of the influence of government ownership and management ownership is minor.

We test the level of voluntary disclosure of SOE and non-SOE based on the DSCORE method of Christine A Bostan [2]. After scoring and ranking of disclosure levels based on the amount of voluntary disclosure provided by companies in their annual reports, we find that the average DSCORE of SOE is around 67.87%, and the average DSCORE of other enterprises is around 63.01%. The result shows U.S. that the difference in voluntary disclosure level of SOE and non-SOE is also small.

We also noticed that both SOE and non-SOE' voluntary disclosure have the following common issues. 1)Barriers to entry are rarely discussed; 2) Average compensation per employee are almost not discussed; 3) financial forecasts are extremely rare. The existence of the common issues reflects the differences between Chinese regulation rules and U.S. regulation rules. As companies based in China, no matter SOE or other enterprises, mainly complete the financial reports by following the requirement of Chinses regulation department. When they prepare the reports as U.S. listed companies, they used to transfer the Chinese version into a U.S. version without adding information that U.S. investors are interested in.

2. Main Objective

In the background of rapid economic development in these years, a lot of Chinese enterprises are listed in the U.S. securities market to obtain a higher rate of return on capital. Although according to the requirements of the SEC of the U.S., companies listed in the United States need to disclose their information according to the corresponding disclosure standards, there are still some differences in the disclosure of companies in different industries, even among companies in the same industry. In addition to the disclosure differences between local American enterprises and American-listed Chinese enterprises that are often compared, this paper believes that there are also some differences in disclosure between two different types of Chinese enterprises, SOE and non-SOE.

China's SOE are legal persons that are funded by the state and whose capital is owned or controlled by the state. They are enterprises owned by the whole people, whose essence is that the means of production are owned by the whole people. There are some differences between state-owned and

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private enterprises in terms of property rights mechanism, competition mechanism and power mechanism, which are directly related to the daily operation and management of enterprises [3]. However, most of these differences originate from the particularity of SOE. There are three main particularities of China's SOE:

1. The business objectives of SOE are special [4]. The business purpose of general private enterprises is to make profits, but SOE are public welfare. They are usually set up to achieve the goal of national economic supervision.
2. The task of SOE is special [4]. Almost all SOE operate some businesses related to national traffic facilities or national defense security and other infrastructure constructed by the state. They can't give up these important tasks just like non-SOE in order to make profits.
3. The managers of SOE have their own characteristics [4]. The managers of SOE are essentially national staff, so people's assessment of them is different from that of general private enterprises. We should not only evaluate from the perspective of enterprise interests, but also whether the interests of the people have been safeguarded.

Generally, due to the special nature of China's SOE, they have a higher credit rating than private enterprises. Investors are more willing to believe that a company controlled by the government has a higher reputation. Therefore, SOE are also easier to carry out financing activities. In contrast, private enterprises need to disclose more accurate, effective and complete information to gain the trust of investors, and help investors consider whether to invest in these companies. On the contrary, due to the connection with the government, SOE may have stricter standards and be subject to stricter control. For example, Chinese SOE has eight relevant regulations, and they need to conduct regular economic responsibility audits. Therefore, it may also cause SOE to disclose more information. Because there are many differences between state-owned and private enterprises in China, the purpose of this paper is to explore whether these differences lead to different disclosure results and which differences lead to different disclosure contents.

3. Importance

3.1. The Importance of Studying the Quality of Corporate Accounting Information Disclosure

The quality of corporate accounting information disclosure plays a vital role in the survival of the enterprise itself, the investment market, and the investment choices of investors. From the perspective of the enterprise, the disclosure of accounting information enables the operation and development of the enterprise to operate in a more transparent environment. To maintain the economic distribution within the enterprise and improve the overall work quality and efficiency of the enterprise's employees [5]. From the perspective of the investment market, corporate accounting information disclosure, as the focus of supervision, has become a bridge for information exchange between investors and managers through the Internet, making information more symmetrical and the capital market operation more efficient and efficient standardized. From the perspectives of corporate shareholders and investors, the profit or loss brought about by corporate operations is closely related to corporate shareholders' profits. Fair and transparent disclosure of accounting information can not only help shareholders better understand the overall situation of the company to maintain their economic level, and making the right decisions can also help market investors who are still in the wait-and-see stage to reasonably make the company's future market and profit forecasts to decide whether to invest. From the perspective of project sponsors and corporate executives, high-quality accounting information disclosure can help project sponsors and corporate executives communicate efficiently and make specific and effective directional changes and detailed rectifications for projects based on actual conditions. To maximize the interests of individuals and enterprises and significantly reduce the agency costs of enterprises.

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In the meantime, under the framework of the continuous update and development of the Internet, the government and society have put forward higher requirements for the updated speed and quality of accounting information disclosure [6]. The real-time accounting information disclosure under this diversified and three-dimensional framework intuitiveness is also constantly under scrutiny because users of accounting information often need to obtain this information in the first place and make corresponding essential decisions. At the same time, with the development of accounting information networks, investors' confidence will be quickly reflected on the Internet platform. If negative emotions arise, negative information about the company can also be transmitted through the Internet platform, reducing the risk of stock market collapse.

As mentioned above, the quality of corporate accounting information disclosure is paramount. Because of it, this article will discuss the practical issues of the accounting information disclosure quality of SOEs and non-SOEs listed in the United States based on this.

3.2. Realistic Needs to Study the Quality of Accounting Information Disclosure of State-owned and Non-SOE Listed in the United States

Since Brilliance Auto was listed on the New York Stock Exchange in 1992, as of March 2021, the number of Chinese companies in the United States has far exceeded 500, but about 210 of them have been delisted. The SEC released the ninth batch of the pre-delisting list of Chinese concept stocks, and there are more than 150 Chinese concept stocks on the pre-delisting list. In the past 30 years, the first climax occurred before 2000. Large SOEs represented by China Eastern Airlines and China Mobile went public in the United States. They then fell into a trough due to the Mexican financial crisis and the Fed's interest rate hike. The second peak of Chinese companies listing in the U.S. came with the rise of the Internet economy and the new economy and fell into a trough due to the bursting of the global internet bubble. The third peak of Chinese companies listing in the U.S. followed the global economic recovery after the financial crisis. In addition, the U.S. government relaxed the threshold for listing SMEs, which accelerated the wave. However, in 2011, due to the outbreak of the crisis of confidence, the wave quickly fell to a low point again and even spread to the capital markets of Europe and Canada, and many SMEs in the United States fell to 1-2 dollars. In the following years, on the one hand, due to the differences in legal systems, accounting systems, and external supervision between China and the United States, PCAOB and SEC have increasingly stringent audit requirements for Chinese concept stocks. At the same time, Chinese-listed companies in the United States have always existed has inherent flaws. On the other hand, the domestic capital market has maintained a positive and rising trend, starkly contrasting Wall Street's overall underestimation of Chinese concept stocks. At the same time, the malicious hunting of short sellers must be considered. These factors make Chinese concept stocks face enormous risks. Market confidence is also in a volatile phase. This imposes a more significant burden on the companies themselves and puts tremendous pressure on Chinese companies to invest in the U.S. investment market, making investors more uncertain. At the same time, the Chinese concept stocks are divided into Chinese SOEs and non-SOEs. Due to the unique nature of Chinese SOEs, their decision-making will be subject to government intervention. More importantly, investors in the United States cannot go to China to investigate the company, and they do not understand the operating system of Chinese SOEs, which is likely to be a key factor affecting the consumer confidence of some investors.

As mentioned above, we will conduct quantitative research on relevant data of Chinese SOEs listed in the United States and Chinese non-SOEs listed in the United States from the perspective of the quality of corporate accounting information disclosure in this article. Calculate and compare whether there are differences in the quality of accounting information disclosure between SOEs and non-SOEs, and hope that the results can provide practical help for Chinese companies listed in the United

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States, the investment market of Chinese companies listed in the United States, and domestic and foreign investors in Chinese concept stocks.

4. Test Process

4.1. Sample Selection

For the sample selection, we want to select the representative U.S. listed Chinses enterprises in various industries no matter for state-owned or non-state-owned. Based on such a principle, we aim at the transportation, energy, communication, and insurance industries for SOE. The most important reason we chose those industries is that most of them are related to infrastructure in China. Those enterprises do not only aim to make profit but also are responsible for providing basic livelihoods for Chinese citizens. Thus, their financial decisions are influenced by Chinses government too. Those SOE are the typical type for disclosure level analysis. For the non-SOE, we targeted the e-commerce, social media, streaming media, electronic vehicle, and education industries. Most enterprises in these industries are founded after 2000 and have a short history of development. These industries were all on a raising trend in the past two decades. We think the economic development of China provides a basement for the success of these enterprises. In other words, their financial reports reflect the economic environment in China Also, in the U.S. stock market, investors favored these industries, which means enterprises in these industries offer financial reports that satisfy U.S. regulations. Therefore, non-SOE in these industries is valuable for us to understand our research topic.

Due to the time limitation, we choose ten SOE and ten Non-SOE to analyze. Table 1 below shows the list of SOE and Table 2 shows the list of non-SOE.

Table 1: The list of SOE.

Industry:	
Transportation:	China Eastern Airline
	GUANGSHEN Railway Co. Ltd
	China Southern Airline
Communication:	China Telecom
	China Mobile
	China Unicom
Energy:	China Petrochemical Corporation
	China National Petroleum Corporation
	Aluminum Corporation of China Limited
Insurance:	China Life Insurance

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Table 2: The list of non-SOE.

Industry:	
E-commerce:	Alibaba Group
	JD
	PDD
Social Media:	RENREN
	Baidu
	Netease
Streaming entertainment:	iQIYI
	Bilibili
Electronic vehicle:	NIO
Education:	New Oriental Education & Technology Group

4.2. Test Methods

4.2.1. First Method

To find out whether there are differences between disclosure levels between SOE and non-SOE, the first step we adopted is to discuss what elements might cause the variety. The most obvious one is the management structure of enterprises. Because managers play totally different roles in SOE and non-SOE. In non-SOE, shareholders, board of directors, and managers engage in the decision-making process of the entire business. Their goal is to maximize profit. However, even SOE build the same structure in the managerial level, the leaders who have the power to make business decisions need to follow the instruction of the government. Besides, most SOE have strong connections with the local and central government since the leaders used to be government officials. They always set business strategies according to the government's economic policies, but not for creating profits.

The direct way to test whether the management of enterprises affects the disclosure level is to measure the influence of government ownership and management ownership. As a result, we adopted the theory and formula in "Ownership Structure and Disclosure Quality: Case of Iran" as our testing method [1]. According to the article, government ownership would benefit the disclosure level because governmental shareholders are more motivated to supervise the disclosure processes of a firms. Therefore, state and national shareholders would raise firm's disclosure level. On the other hand, enterprises that have very high management ownership have lower disclosure because managers would make the financial reports represent their own expected results. Thus, they use the information that is easy to obtain to maximize their desirability and will not like to disclose the information properly and comprehensively [1]. Based on such a theory, we used the formula below to calculate the disclosure level of the sample. To use this formula, we need to reference the data which involved in pooled data regression model. (see Table 3)

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Table 3: Pooled data regression model.

Variables	Coefficient
C	95/30
Governmental ownership	2/12
Managerial ownership	-16/45
Firm size	2/15

GOWN: Government ownership will be measured by the percentage of shares owned by the government to the total number of shares issued.

MOWN: Management ownership will be measured by the percentage of shares owned by the management to the total number of shares issued.

Size: logarithm of total assets for firm i in year t.

$$VDIS = \beta 0 + \beta 1GOWN + \beta 2MOWN + \beta 3FSIZE$$

4.2.1.1.Data Collection

The first step is the collection of annual financial reports of sample enterprises in the past 5 or 4 years. The annual financial reports are found on the official websites of these enterprises and the U.S. Securities and Exchange Commission (SEC) website. After the first step, we have the data of firm sizes, which is from the Total Asset in the Balance sheet. To determine the percentages of government ownership and management ownership, we then conduct extra information collection. Our sources are mainly from Yahoo finance and Sina finance.

4.2.1.2.Result

The average score of SOE is around 5.51

The average score of non-SOE is around 5.28

The difference in disclosure level between SOE and non-SOE is small based on the measurement of the influence of government ownership and management ownership.

4.2.2.Second Method

Another important element that affects the disclosure level is voluntary disclosure. Voluntary disclosure is the provision of information by a company's management beyond requirements such as GAAP and SEC rules, where the information is believed to be relevant to the decision-making of users of the company's annual reports [7]. The major reason why we test the voluntary disclosure level is that voluntary disclosure means different for SOE and non-SOE. For SOE, financial information relates to economic policies and even confidential state data, so the Chinese government sets rules to limit voluntary disclosure. And Chinese SOE are supported by national finance departments, which means they have less concern about fund issues. They worry about the cost of capital less, so their willingness to voluntarily disclose is low. For the non-SOE, they would like to disclose more information beyond requirements as they want to lower the cost of capital to gather more funds. Since most of them are founded in a short time, and their major goal of going public in the U.S. is to gain funds for expansion and development.

The test method we use borrows from the DSCORE method of Christine A Bostan. The DSCORE method is designed to present a comprehensive ranking of disclosure levels. The score is based on the amount of voluntary disclosure of the annual reports that firms public [2]. To test the voluntary

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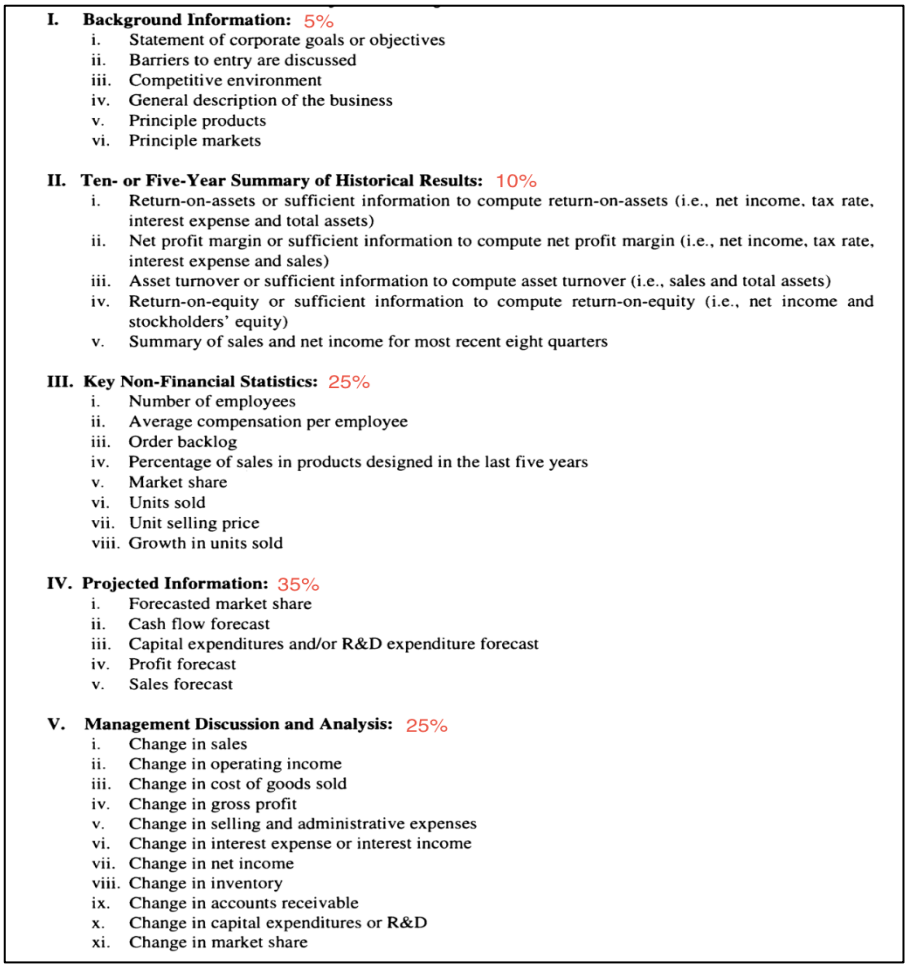
disclosure level, the information in the annual report is categorized into five segments: background information, summary of historical results, key non-financial statistics, projected information, and management discussion and analysis. We used part of elements in different sections to finish our test instead of the whole list due to the time limitation. To test how each element affects voluntary disclosure level, we use a score range of 1 to5. A higher score represents a specific element that benefits voluntary disclosure. We rate picked elements of all enterprises in the sample based on our analysis and give each enterprise a score according to the Weighting algorithms. The list of elements is shown in figure 1.



I. Background Information: 5%
- i. Statement of corporate goals or objectives
- ii. Barriers to entry are discussed
- iii. Competitive environment
- iv. General description of the business
- v. Principle products
- vi. Principle markets

II. Ten- or Five-Year Summary of Historical Results: 10%
- i. Return-on-assets or sufficient information to compute return-on-assets (i.e., net income, tax rate, interest expense and total assets)
- ii. Net profit margin or sufficient information to compute net profit margin (i.e., net income, tax rate, interest expense and sales)
- iii. Asset turnover or sufficient information to compute asset turnover (i.e., sales and total assets)
- iv. Return-on-equity or sufficient information to compute return-on-equity (i.e., net income and stockholders' equity)
- v. Summary of sales and net income for most recent eight quarters

III. Key Non-Financial Statistics: 25%
- i. Number of employees
- ii. Average compensation per employee
- iii. Order backlog
- iv. Percentage of sales in products designed in the last five years
- v. Market share
- vi. Units sold
- vii. Unit selling price
- viii. Growth in units sold

IV. Projected Information: 35%
- i. Forecasted market share
- ii. Cash flow forecast
- iii. Capital expenditures and/or R&D expenditure forecast
- iv. Profit forecast
- v. Sales forecast

V. Management Discussion and Analysis: 25%
- i. Change in sales
- ii. Change in operating income
- iii. Change in cost of goods sold
- iv. Change in gross profit
- v. Change in selling and administrative expenses
- vi. Change in interest expense or interest income
- vii. Change in net income
- viii. Change in inventory
- ix. Change in accounts receivable
- x. Change in capital expenditures or R&D
- xi. Change in market share

Figure 1: The list of elements

4.2.2.1.Data Collection

Most data we need for DSCORE calculation is from the annual financial reports of sample enterprises in the past 5 or 4 years. For extra information to rate specific element, we gather it from the official websites of enterprises and online news or reports.

4.2.2.2.Result

The average score of SOE is around 67.87%

The average score of non-SOE is around 63.01%

The difference in disclosure level between SOE and Non-SOE does not reach a significant level, based on the measurement method of DSCORE.

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5. Conclusion

In this paper, we examine the differences in accounting disclosures between U.S.-listed Chinese SOE and U.S.-listed non-SOE. As Chinese SOE are a group of companies that are particularly vulnerable to the influence of Chinese government policies, so we predict that they will have significant accounting disclosure differences from non-SOE.

Our results, however, reveal a completely different answer. Our findings are based on two methods: 1) formula from the Sahar Sepasia paper [1]; 2) DSCORE method from the Bostan paper [2], which shows that there is no significant difference between SOE and private enterprises. The government doesn't affect the disclosure level directly. And the voluntary disclosure of these two types of companies is also very similar.

From the results, we can learn that stare-owned enterprises and non-SOE have similar levels of accounting disclosure, but whether SOE' disclosure levels are really "voluntary" or are influenced by government policies requires further study. Because most of the time, the government made laws and policies to affect SOE' disclosure level, instead of using the ownership to affect certain company's disclosure level. Based on this background, we speculate that the level of actual disclosure by SOE are influenced by government policies (e.g., the eight rules made by Chinese government) that mandate SOE to disclose actual data information, and that in the absence of such policies, firms are likely to fail to disclose relevant information and to breed significant internal corruption and fraud.

We also notice that both SOE and non-SOE have the same content loss of the voluntary disclosure. We believe that this issue is because when they prepare the reports as U.S. listed companies, they used to transfer the Chinese version into a U.S. version without adding information that U.S. investors are interested in.

Due to the time constraint, this paper only preliminarily examines the differentiation of accounting disclosures between SOE and other enterprises, and we are not able to delve into the reasons behind it. Also, due to the small sample pool, the conclusions may also have a certain degree of error.

Acknowledgement

Ziyi Chen, Ruichen Ni, Zhiming Peng and Zhuolun Wang contributed equally to this work and should be considered co-first authors.

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Game Theory in Companies: A Program-approach to Find All Nash Equilibria in Games with Two Players

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Abstract: Game theory is a famous mathematical formula for economic decision-making. When two companies launch competing games within a similar time frame in the game industry, they must choose wisely between launch dates, trailer release dates, and launch platforms to seek the highest return and lower risk. This report turns the three main strategies of the release time, the preview time, and the release platform into specific values and finds the optimal strategy choice using nash equilibria. Nash equilibrium is an essential concept in finding the optimal solution. Given the complexity of finding the equilibria, computational tools are used for the task. Software like *Gambit*, *Game Theory Explorer* and python programs are used for computing all nash equilibria. This paper quantifies the three main reasons that may affect the sales result: the timing and order of the trailer, the interval between launch days, and the release platform, and turning these factors into a pay-off matrix. According to the calculation results on those pay-off matrices, this paper formulates a set of well-founded game sales methods to maximize the company's profits.

Keywords: game theory, pay-off matrix, release date, trailer, game platform, software

1. Introduction

According to Game Informer, at the end of 2021, three FPS (first-person shooter) games, *Halo: Infinite*, *Call of Duty: Vanguard*, and *Battlefield 2042*, were launched in the game market in sequence [1]. As games with equal popularity, the sales results differ in the aggregate. In this case, we tried to maximize profits when two companies released the same game product in the same period. From literature *When to release a game: Ten things to consider when choosing a video game release date, what are the best platforms for video games?* And *The 9 do's and don'ts of Game Trailers* are three factors that can affect the launch of a game: the launch date of the game, the release date of the trailer, and the platform on which the game is released [2-4]. This paper will focus on finding the best choice for a company among launch dates, trailer release dates and launch platforms. Our goal is to use computing software to find the Nash equilibrium in the pay-off matrices. The significance of this research is that based on our calculation results, game companies can use these results to make the best decision for their game sales in order to maximize their profits.

Our scenario includes two players (*A* and *B*) who know each other's game release date (*RD*). The

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goal is to attract more gamers than other companies. The release date strategy tells us that if *B* decides first, *A* will decide based on *B*'s game release date. The trailer release date (*TRD*) can attract more attention from gamers before the official game release date. Therefore, the trailer must be released before the game's release date. Releasing trailers close to the game release date will have more benefits. Game platforms (*GP*) will affect the number of gamers and how many sales each company can make. We assume there are only two platforms: *Personal computer (PC)* and *Playstation* (*P*). According to Peppiatt's article, we assume the PC has a more significant number of gamers than the *P*. From this, we know that *P* will deliver a certain sign-on bonus [5].

Maschler states that game theory is good at formulating competitive relationships between one or more people and finding well-defined strategies [6]. In a *non-cooperative game*, *A* and *B* cannot form agreements. Through a set framework of *cooperative game theory*, it is seen that our situation is as opposed to the traditional cooperative game. Other models, such as Bayesian games, provide an approach where players are unaware of their opponents' attributes. However, *non-cooperative games are* more general and sufficient in analyzing companies' behaviors. With "*two*" players and "*n*" strategies (*n* being a finite number), we will first come up with a payoff matrix in each case with Microsoft Excel Solver®, then use programs to solve them.

2. Methodology

The payoff matrix formed by listing and arranging all the strategies can numerically quantify the advantages of each choice and calculate the optimal strategy for both companies. Based on the factor analysis, we may create the "*rules of the game*" by simulating the real situation. According to reality, each strategy choice can form a payoff matrix that shows the possible consequences, which can be formed by transforming these consequences into a reasonable number. Finally, a flow of rules is applied for each factor, and scoring results are recorded in tables.

Figure 1: Flow of the game.

2.1. Launch Dates Strategy

According to the calculation of the rules made above, the payoff matrix can be drawn, and the corresponding value of each strategy can be obtained, as shown in Table 1. In Figure 2, once the game release date is less than one month, both sides will have minus 20 points. Releasing games earlier per month will help the company earn 10 points. However, releasing games late per month will let the company to lose 10 points.

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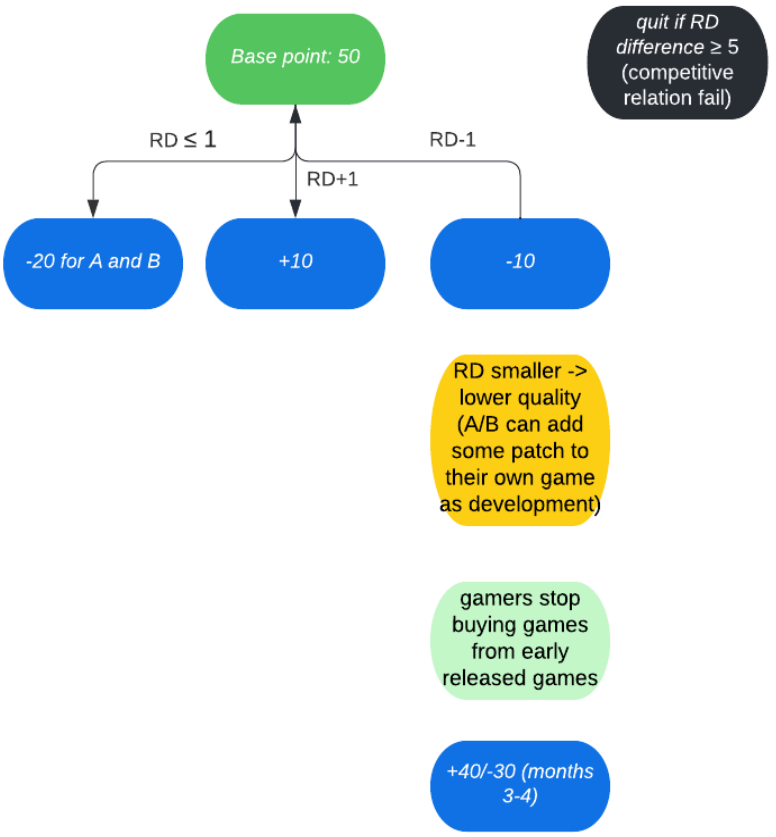

Figure 2: Rules for the release date (*RD*) in two players.

Table 1: Payoff matrix within six launch months.

		A					
		1	2	3	4	5	6
B	1	30/30	40/60	30/70	60/50	50/60	50/50
	2	60/40	30/30	40/60	30/70	60/50	50/60
	3	70/30	60/40	30/30	40/60	30/70	60/50
	4	50/60	70/30	60/40	30/30	40/60	30/70
	5	60/50	50/60	70/30	60/40	30/30	40/60
	6	50/50	60/50	50/60	70/30	60/40	30/30

2.2. Trailer Release Strategy

According to the rules above, we can get a simple 2x2 payoff matrix, as shown in Table 2. In Figure 3, if both companies choose early release, they will get 20 points. If both of them choose the late release, they will get no points. If one company chooses early release and another chooses late release, early release will bring 45 points to the company. However, the late release will only bring 15 points to the company.

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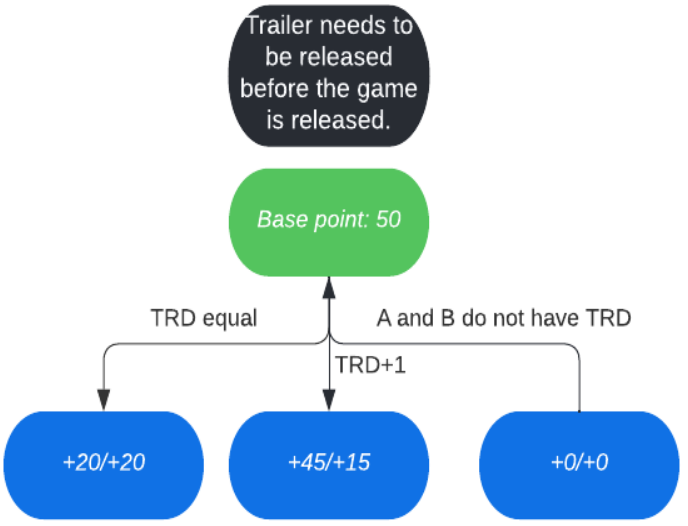

Figure 3: Rules for the trailer release date (*TRD*) in two players.

Table 2: Payoff matrix with early/late launch strategies.

Company A			
Company B		Early release	Late release
	Early release	20/20	15/45
	Late release	45/15	0/0

2.3. Game Platform Strategy

As shown in Figure 4, there are only two platforms for game companies to choose from, PC and P. Platform PC has a more significant number of gamers than P. However, if one company decides to publish on P, the P company will give the game company a certain amount of sign-on bonus. Also, game companies cannot publish their games on both platforms. If both companies choose the PC platform, both of them will get 20 points. If both of them choose the P platform, they will get t points. If one company chooses the PC platform and another chooses the P platform, the PC platform will bring 50 points to the company. However, the P platform will only bring 30 points to the company. After formulating the rules and assumptions of the three main strategies, players can combine them into a payoff matrix that contains all the strategies. Using the Excel program, they could list the numerical influence of each strategy, draw the payoff matrix quickly, and calculate the payoff value of each strategy correctly.

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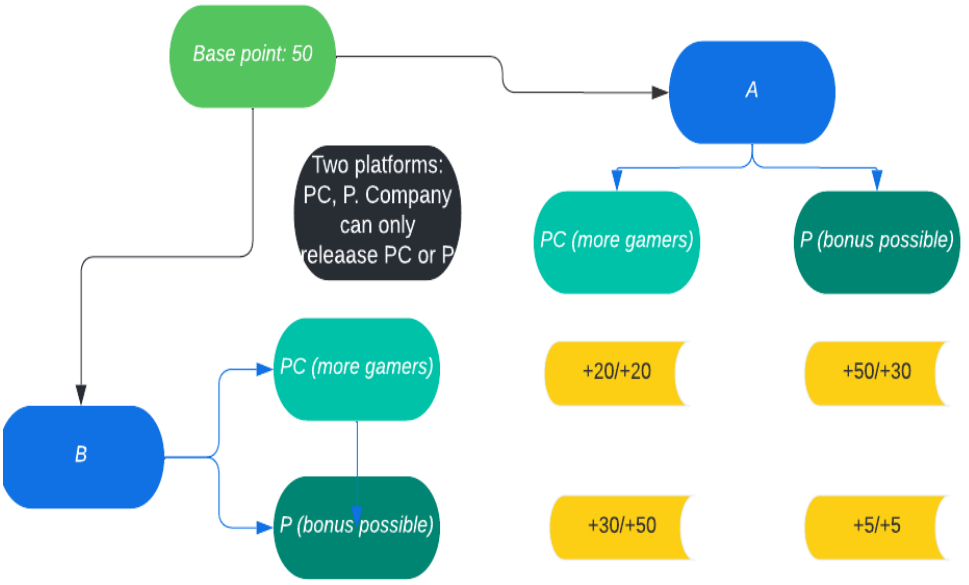

Figure 4: Rules for the game platform (*GP*) in two players.

TP = Basic points + Platform Points + Trailer Points + Δ month points + early/late profits						
x		1 month	2 month	3 month	4 month	
Basic points	50					
						+
both PC platform	20					
both Sony platform	5					
sony platform only	50					
PC platform only	30					
						+
Trailer both early release	20					
Trailer both late release	0					
trailer late release	45					
trailer early release	15					
						+
same month discount	-20					
						+
early profits/month		10	20	30	40	
late release lose/month		-10	-20	-30	-40	
						+
better quality profits (months 3-4)					40	
lower quality lose (months 3-4)					-30	

Figure 5: Rules formulated in microsoft excel.

Figure 5 shows that we listed all the policies and their corresponding values in excel files. In this way, the final value of each strategy can be obtained by adding together the corresponding values for each strategy during calculation. For example, in Microsoft Excel, the numerical calculation method can be AA5+AA7+AA12+AA17&"/"&AA5+AA7+AA12+AA17. This sample equation shows that both companies chose the PC platform and RD early in the first month. By adding the cells containing the corresponding values shown in Figure 5, we obtained the final number of the corresponding strategy. We can quickly calculate all the values of the overall payoff matrix, and the results are shown in Figure 6.

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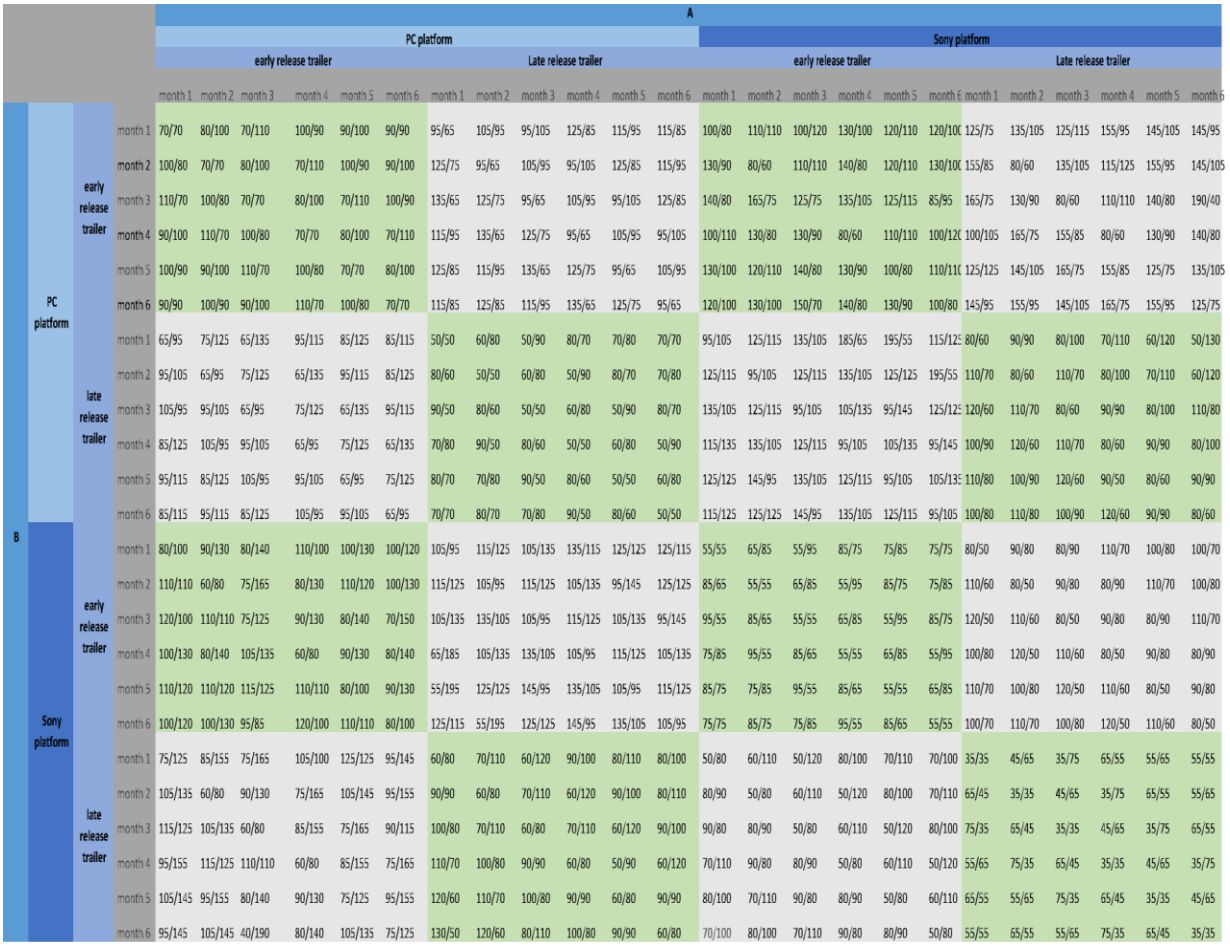

				A																			
				PC platform						Sony platform													
				early release trailer						Late release trailer						early release trailer						Late release trailer					
				month 1	month 2	month 3	month 4	month 5	month 6	month 1	month 2	month 3	month 4	month 5	month 6	month 1	month 2	month 3	month 4	month 5	month 6	month 1	month 2	month 3	month 4	month 5	month 6
B	PC platform	early release trailer	month 1	70/70	80/100	70/110	100/90	90/100	90/90	95/65	105/95	95/105	125/85	115/95	115/85	100/80	110/110	100/120	130/100	120/110	120/10	125/75	135/105	125/115	155/95	145/105	145/95
			month 2	100/80	70/70	80/100	70/110	100/90	90/100	125/75	95/65	105/95	95/105	125/85	115/95	130/90	80/60	110/110	140/80	120/110	130/10	155/85	80/60	135/105	115/125	155/95	145/105
			month 3	110/70	100/80	70/70	80/100	70/110	100/90	135/65	125/75	95/65	105/95	95/105	125/85	140/80	165/75	125/75	135/105	125/115	85/95	165/75	130/90	80/60	110/110	140/80	190/40
			month 4	90/100	110/70	100/80	70/70	80/100	70/110	115/95	135/65	125/75	95/65	105/95	95/105	100/110	130/80	130/90	80/60	110/110	100/12	100/105	165/75	155/85	80/60	130/90	140/80
			month 5	100/90	90/100	110/70	100/80	70/70	80/100	125/85	115/95	135/65	125/75	95/65	105/95	130/100	120/110	140/80	130/90	100/80	110/11	125/125	145/105	165/75	155/85	125/75	135/105
			month 6	90/90	100/90	90/100	110/70	100/80	70/70	115/85	125/85	115/95	135/65	125/75	95/65	120/100	130/100	150/70	140/80	130/90	100/80	145/95	155/95	145/105	165/75	155/95	125/75
		late release trailer	month 1	65/95	75/125	65/135	95/115	85/125	85/115	50/50	60/80	50/90	80/70	70/80	70/70	95/105	125/115	135/105	185/65	195/55	115/12	80/60	90/90	80/100	70/110	60/120	50/130
			month 2	95/105	65/95	75/125	65/135	95/115	85/125	80/60	50/50	60/80	50/90	80/70	70/80	125/115	95/105	125/115	135/105	125/125	195/55	110/70	80/60	110/70	80/100	70/110	60/120
			month 3	105/95	95/105	65/95	75/125	65/135	95/115	90/50	80/60	50/50	60/80	50/90	80/70	135/105	125/115	95/105	105/135	95/145	125/12	120/60	110/70	80/60	90/90	80/100	110/80
			month 4	85/125	105/95	95/105	65/95	75/125	65/135	70/80	90/50	80/60	50/50	60/80	50/90	115/135	135/105	125/115	95/105	105/135	95/145	100/90	120/60	110/70	80/60	90/90	80/100
			month 5	95/115	85/125	105/95	95/105	65/95	75/125	80/70	70/80	90/50	80/60	50/50	60/80	125/125	145/95	135/105	125/115	95/105	105/13	110/80	100/90	120/60	90/50	80/60	90/90
			month 6	85/115	95/115	85/125	105/95	95/105	65/95	70/70	80/70	70/80	90/50	80/60	50/50	115/125	125/125	145/95	135/105	125/115	95/105	100/80	110/80	100/90	120/60	90/90	80/60
	Sony platform	early release trailer	month 1	80/100	90/130	80/140	110/100	100/130	100/120	105/95	115/125	105/135	135/115	125/125	125/115	55/55	65/85	55/95	85/75	75/85	75/75	80/50	90/80	80/90	110/70	100/80	100/70
			month 2	110/110	60/80	75/165	80/130	110/120	100/130	115/125	105/95	115/125	105/135	95/145	125/125	85/65	55/55	65/85	55/95	85/75	75/85	110/60	80/50	90/80	80/90	110/70	100/80
			month 3	120/100	110/110	75/125	90/130	80/140	70/150	105/135	135/105	105/95	115/125	105/135	95/145	95/55	85/65	55/55	65/85	55/95	85/75	120/50	110/60	80/50	90/80	80/90	110/70
			month 4	100/130	80/140	105/135	60/80	90/130	80/140	65/185	105/135	135/105	105/95	115/125	105/135	75/85	95/55	85/65	55/55	65/85	55/95	100/80	120/50	110/60	80/50	90/80	80/90
			month 5	110/120	110/120	115/125	110/110	80/100	90/130	55/195	125/125	145/95	135/105	105/95	115/125	85/75	75/85	95/55	85/65	55/55	65/85	110/70	100/80	120/50	110/60	80/50	90/80
			month 6	100/120	100/130	95/85	120/100	110/110	80/100	125/115	55/195	125/125	145/95	135/105	105/95	75/75	85/75	75/85	95/55	85/65	55/55	100/70	110/70	100/80	120/50	110/60	80/50
		late release trailer	month 1	75/125	85/155	75/165	105/100	125/125	95/145	60/80	70/110	60/120	90/100	80/110	80/100	50/80	60/110	50/120	80/100	70/110	70/100	35/35	45/65	35/75	65/55	55/65	55/55
			month 2	105/135	60/80	90/130	75/165	105/145	95/155	90/90	60/80	70/110	60/120	90/100	80/110	80/90	50/80	60/110	50/120	80/100	70/110	65/45	35/35	45/65	35/75	65/55	55/65
			month 3	115/125	105/135	60/80	85/155	75/165	90/115	100/80	70/110	60/80	70/110	60/120	90/100	90/80	80/90	50/80	60/110	50/120	80/100	75/35	65/45	35/35	45/65	35/75	65/55
			month 4	95/155	115/125	110/110	60/80	85/155	75/165	110/70	100/80	90/90	60/80	50/90	60/120	70/110	90/80	80/90	50/80	60/110	50/120	55/65	75/35	65/45	35/35	45/65	35/75
			month 5	105/145	95/155	80/140	90/130	75/125	95/155	120/60	110/70	100/80	90/90	60/80	90/90	80/100	70/110	90/80	80/90	50/80	60/110	65/55	55/65	75/35	65/45	35/35	45/65
			month 6	95/145	105/145	40/190	80/140	105/135	75/125	130/50	120/60	80/110	100/80	90/90	60/80	70/100	80/100	70/110	90/80	80/90	50/80	55/55	65/55	55/65	75/35	65/45	35/35

Figure 6: Payoff matrix with 24 strategies.

2.4. Python Program for Pure Strategy

There is a simplified version of the matrix with four strategies for simplicity. Now we will code a python program to find its nash equilibria.

			Company A			
			PC		P	
			month 1	month 2	month 1	month 2
Company B	PC	month 1	**50/50**	**60/80**	**80/60**	**90/90**
		month 2	**80/60**	**50/50**	**110/70**	**80/60**
	P	month 1	**60/80**	**70/110**	**35/35**	**45/65**
		month 2	**90/90**	**60/80**	**65/45**	**35/35**

Figure 7: Payoff matrix with four strategies.

2.5. Algorithm for Exhaustively Finding All Pure Nash Equilibria in a Two-Player Game

In this section, we describe an algorithm to solve a Two-Player game. Pseudo-code for the algorithm is given below:
Begin

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```
        Step (1):
set best payouts = {}
set row number = length of payout grid
set column number = length of payout grid [0]
        Step (2)
                For j = 0 to column num
                        max payout = max([payout grid] for r in range(row num))
                        For j = 0 to row num:
                                if payout grid[row][col][p1] == max payout:
                                best payouts[(row, col)] = (row_labels[r], col_labels[c])
                best payouts labels = []
                For n = 0 to row num:
max payout = max([payout grid] for r in range(col num))
                        For m = 0 to row num:
                                if payout grid[row][col][p2] == max payout:
                                        if (row, col) in best payouts:
                                           bestpayoutlabels.append(best_payouts[(row,col)])
        return best payouts labels
```

2.6. Available Software for Mixed Strategy

There are numerous algorithms for finding nash equilibria, but they are time demanding for finding nash equilibria with multiple strategies. In this way, using software is efficient in applying the developed algorithm.

$$u_i(s) = \sum_{a \in A} u_i(a) Pr(a|s) \quad (1)$$

$$Pr(a|s) = \prod_{j \in N} s_j(a_j) \quad (2)$$

2.6.1. Gambit

Gambit (http://www.gambit-project.org/) is an open-source software whose purpose is to find Nash equilibria. Python is used for applications. The application can do various kinds of games, including non-cooperative games. As shown in Figure, this software efficiently solves games with a larger number of strategies. After entering our scores table, the software asks for a method to return the results. We choose "compute as many nash equilibria as possible" and "use Gambit's recommended method".

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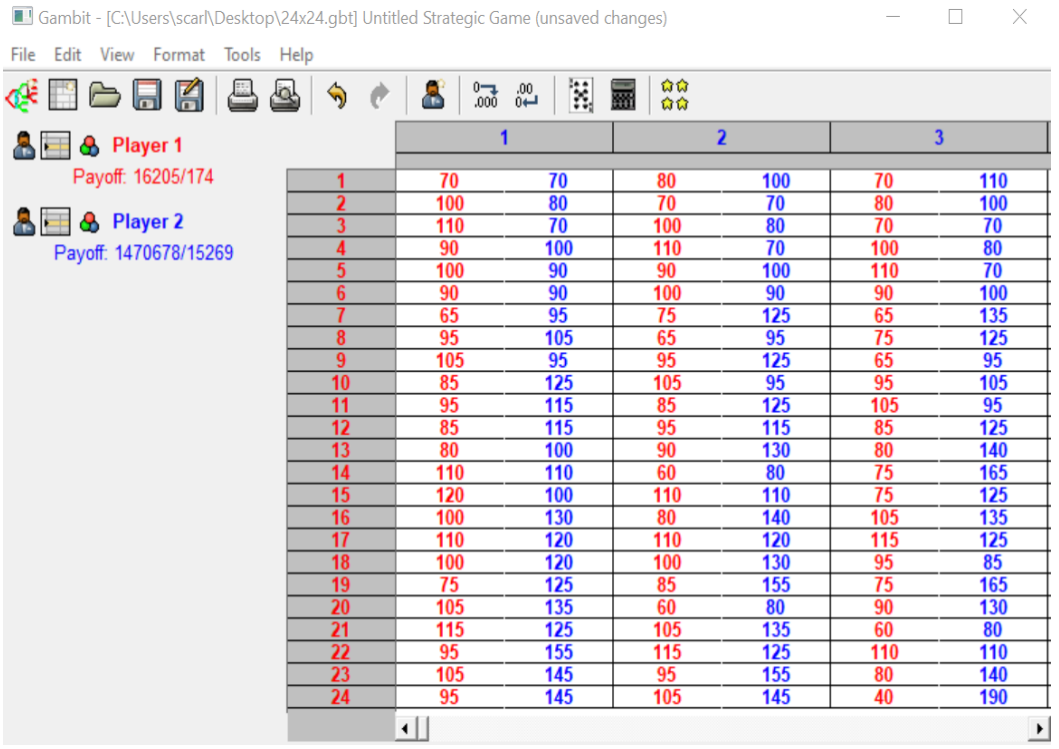

	1		2		3	
1	70	70	80	100	70	110
2	100	80	70	70	80	100
3	110	70	100	80	70	70
4	90	100	110	70	100	80
5	100	90	90	100	110	70
6	90	90	100	90	90	100
7	65	95	75	125	65	135
8	95	105	65	95	75	125
9	105	95	95	125	65	95
10	85	125	105	95	95	105
11	95	115	85	125	105	95
12	85	115	95	115	85	125
13	80	100	90	130	80	140
14	110	110	60	80	75	165
15	120	100	110	110	75	125
16	100	130	80	140	105	135
17	110	120	110	120	115	125
18	100	120	100	130	95	85
19	75	125	85	155	75	165
20	105	135	60	80	90	130
21	115	125	105	135	60	80
22	95	155	115	125	110	110
23	105	145	95	155	80	140
24	95	145	105	145	40	190

Figure 8: Gambit's screen with a game mode for two players and two strategies and the results found by the software.

2.6.2. Game Theory Explorer

Game Theory Explorer, GTE (http://www.gametheoryexplorer.org) was developed with the objective of analyzing games as models of strategic interaction.

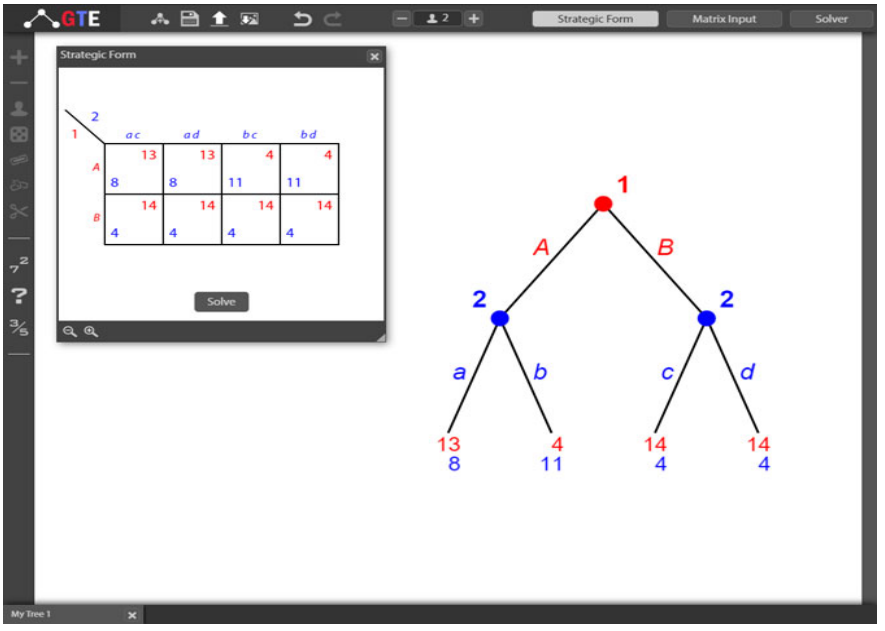

Figure 9: GTE's screen with a game mode for two players and two strategies and the results found by the software.

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Other Approaches

3. Results and Conclusion

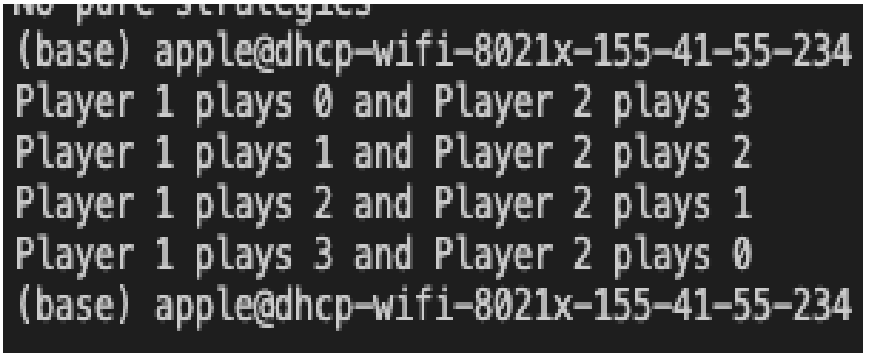

Figure 10: Terminal results for payoff matrix with four strategies.

3.1. Pure Strategy

Among four best choices in the table, which can be divided into two cases. In the first case, one company releases on *PC* in the first month, whereas the other company releases on *P* in the second month. The payoff for both sides is relatively maximized and equal to 90 in this case. In the second case, one company chooses *PC* and releases the game in the second month, while the other company chooses *P* and releases the game in the first month. The company that releases *P* gets the most benefit, while the other gets a poorer but good benefit.

Among the four best plans, there is no duplication in the choice of strategy between the two companies. When one company launched on *PC*, another company launched on *P*; When one company releases a game in the first month, another company releases a game in the second. It is concluded that when two game companies release competing products, it is best to stagger the release platform and release time with each other to maximize profits or minimize losses. Also, if you can make sure the platform is *P* and you can ship it in the first month, then you can maximize the revenues in this case.

Based on Nash Equilibria's calculation with a 4 x 4 matrix, when two game companies release competing products, *postponing the release platform and release time from each other is the best choice to maximize profits or minimize losses*. *If B chooses to release a game on the P, the best strategy for A is to maximize profit is to releasing the game one month after on PC*. If you can ensure that the release platform is *P* and released in the first month, the revenue can be maximized. A literature review made it possible to identify available programs to find Nash equilibria.

3.2. Mixed Strategy

No pure strategy was found for the 24 x 24 payoff matrix; thus, a mixed strategy must exist. To calculate it, we may change the criteria of the original 4 x 4 matrix. In mixed strategy games, we found the probability distribution of nash equilibria through tools like *Gambit* and *GTE*. Our heatmap shows that strategy 1-6 is maximized for *A*, and strategy 1-8 is maximized for *B*.
Given the limitations of modeling and how it differs from reality, we will update the model and develop a better algorithm in the future.

3.3. Conclusion

In this report, we try to figure out when two companies in the gaming industry are about to launch

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new games of similar types and how they can resort to a mathematical formula to make profitable decisions. Game theory, particularly Nash equilibria, helps companies make wise choices among three factors: time to release and preview and platform to release. Companies could turn these elements into a pay-off matrix and formulate and execute sales strategies accordingly to achieve optimal company profits. To make the research process more intuitive for target audiences, we created two players, A, and B, in the virtual scenario and focused on exploring how it worked under the cooperative other than the traditional uncooperative mode. We actively resorted to tools, including Gambit, Game Theory Explorer, and Python, for the calculations.

Additionally, we applied the listing, arranging, and calculating method in the Microsoft Excel Solver to make the analysis developed based on more accurate and intuitive data. We then produced and presented corresponding figures and algorithms accordingly. Finally, we draw the results by deploying the pure strategy and mixed strategy simultaneously. From the Nash Equilibria calculation with a 4 x 4 matrix, one of the two companies is suggested to delay its release time when the other one releases similar products earlier. By doing so, both can achieve their maximized profits as anticipated.

Acknowledgment

Sijia Li, Zhexiang Li and Zhuang Liu contributed equally to this work and should be considered co-first authors.

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