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The Impact of the Opening Policy of the COVID-19 on Catering, Tourism and Hotel Industries

Yutong Chen [1,a,†], Zichen Qin[2,†], and Xiaoxuan Yin[3,†]

[1]*Faculty of Science, Beijing University of Technology, Beijing, 100124, China*
[2]*International Department, The Experimental High School Attached to Beijing Normal University, Beijing, 100032, China*
[3]*Mathematics and Management, Queen Mary University of London, London, E1 4NS, UK*
a. chytong@emails.bjut.edu.cn
[†]*All the authors contributed equally.*

Abstract: On December 7, 2022, China officially released management of the COVID-19, and the economic level of various industries began to gradually rebound, and people's consumption levels also gradually improved. In the consumer industry, the recovery of the catering, tourism, and hotel industries was first perceived by the market. In order to explore the impact of the COVID-19 liberalization policy on these three industries, this paper used the ARIMA model to analyze the stock closing price data of the industries before the COVID-19 liberalization, simulated the stock price trend without the implementation of the COVID-19 liberalization policy, and compared it with the actual stock price. Through the analysis, it was found that the policy of comprehensive COVID-19 control has promoted the economic development of China's catering, tourism, and hotel industry. The economic situation of all three industries has rebounded to a certain extent. Especially for the catering industry, the promotion effect is most obvious, followed by the hotel industry, and finally the tourism industry. The research in this article can help the government better respond to the current economic recovery situation, propose corresponding incentive policies, and promote the healthy development of China's catering, tourism, and hotel industries.

Keywords: COVID-19, catering industry, hotel industry, tourism industry, time Series model

1. Introduction

The COVID-19 pandemic, which started in 2019, has been steadily having an effect on the world economy, and neither a corporation nor an individual can be protected from it. Global economic prosperity and human health are both impacted by this unprecedented global problem. The sudden outbreak of New Coronary Pneumonia (NCP) has brought profound disaster to the world.The World Health Organization (WHO) estimates that as of December 20, 2021, there were more than 270 million confirmed cases of new coronary pneumonia and more than 5.35 million fatalities worldwide. The pandemic caused a serious collapse in the world economy [1]. The international monetary fund (IMF) reported that the world economy contracted significantly by 3.1% year over year in 2020 in its World Economic Outlook Report, which was published in October 2021. Emerging markets and developing economies have decreased by 2.1%, while established economies have decreased by 4.5% [2].

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The second lowest economic level of the Chinese economy appeared, related to the impact on businesses of the strict Covid-19 blockade measures in China last year. According to official data, the second-largest economy in the world saw a 3% increase in GDP in 2022. Although far lower than the government's 5.5 percent target established last year, this is better than most economists' predictions [3].

Tourism, hotels, and catering are affected by Covid-19 (From 2019 to 2023) and with the Chinese government canceling the regulation a few months ago [4], this paper can observe the number of tourists and income increase rapidly. Among the consumer sectors, the recovery in these three sectors was the first to be perceived by the market. Therefore, People can better grasp the economic situation by conducting an in-depth analysis of the effects of COVID-19 on the economy, formulate response measures, and provide guidance and experience for the future. This paper article intends to find the difference in economic impact on tourism before and after the Chinese government lifted the lockdown policy. In order to better understand its effect on China's stock markets, this research used the ARIMA model to evaluate stock price movements in China's tourist, hotels, and catering indices. The following is the order of the document. Review of the literature is described in Section 2. The data sources, unit root test, and configuration of the ARIMA model are all described in Section 3. The result is displayed in Section 4, our discussion follows in Section 5, and the conclusion is displayed in Section 6.

2. Literature Review

China's policy on this pandemic was handled in a timely manner, but at the same time, the economic damage caused to all aspects of economic development was inevitable. Because of the policy impact, people are living at home, so it is not possible to travel to other cities or other countries. Can Wang and three other researchers employed a tourist CGE model with the most recent IO database for the Chinese economy. They claim that tourism may play a significant role in the spread of a pandemic, suffers the most during one, and has a negative influence on the economy as a whole [5] . At the same time, the hotel and restaurant industry, also facing the same problems as the tourism industry, these companies rely on the flow of people and scenery to attract development of the company have been hit hard, but different companies suffer from the degree of capital hit differently. Investors penalized companies with more leverage more harshly than those with market-to-book ratios, cash reserves, and higher size, according to research by Betty Simkins, David Carter, Sharif Mazumder, and Eric Sisneros [6]. Competition among local governments will become stronger due to the increased economic concentration in all regions in the future. Now the government has introduced various incentive policies, from the state to the local have recognized that "what is more terrible than the pandemic is the break in cash flow of many enterprises caused by the pandemic, and the problem of one enterprise, causing problems in the whole industry chain". Chien-Chiang Lee, Wenmin Wu, Shan-Ju Ho and Wenwu Xing used the event study method (ESM) and found that the relationship between China's tourism stock returns and government responses was nonlinear. Additionally, government responses benefited the coronavirus-return nexus as evidenced by their favorable impact on stock returns at the high quantile of abnormal returns (ARs) [7] .

The three types of literature mentioned above each explore how the pandemic affects the tourism business independently using a different methodology, the size of the company is inversely proportional to the amount of punishment, and the stocks under the Covid-19 pandemic are affected by the government. Therefore, this is similar to other Many articles, that is, they all analyze one of the impacts of the Covid-19. In the thesis of this film, the stocks of the tourism industry, catering industry and hotel industry under the influence of the Covid-19 pandemic are analyzed and sorted out, to show these three points in a more comprehensive and detailed manner.

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3. Research Design

3.1. Data Source

The COVID-19 outbreak will have a significant effect on the tourism, hospitality, and catering sectors between 2019 and 2022. With the Chinese government lifting its regulatory plan on 2th December 2022, we can see rapid growth in tourist numbers and revenues in these three industries. As a kind of securities, stock is the stock certificate issued to the investors when the company raises capital, which represents the ownership of its holders (namely shareholders) to the company. Watching the rise and fall of a stock can be a good way to analyze the development of a company or an industry. A professional financial data analysis and investment management software is Choice, which owned by Oriental Wealth Information Co., LTD. Choice mainly caters to financial institutions, academic research institutions and professional investors, and provides them with high quality related services such as financial data [8] , We can use Choice to collect long-term data, such as equities, fixed income, funds, foreign exchange, macro industries, etc. This website also provides Excel plug-in, portfolio management and other application tools, and contains information query, statistical analysis, and other functions, is a practical tool for financial market participants.

This paper acquires the closing prices of the hotel, travel, catering market from 28th October 2022 to 24th April 2023. Data is recorded every 7 days.

3.2. Augmented Dickey–Fuller (ADF) Unit Root Test

The first step before proceeding is to test whether the data are stationary. In Table 1, based on the ADF tests which conducted in Rcode (using ***adf.test()*** code), the p-values for the stock yield of catering, tourism, hotel in the China all equal 0.01, it is taken into account statistically significant. These findings provide sufficient proof to refute the hypothesis that this variable has unit roots. This demonstrates that the data are consistent and that the model developed from them is workable [9].

Table 1: ADF-test result.

	Variables	t-statistic	p-value
Price			
	Catering	-2.3319	0.4382
	Tourism	-2.6800	0.2964
	Hotel	-1.7850	0.6659
Yield			
	Catering	-8.5313	0.01***
	Tourism	-5.0686	0.01***
	Hotel	-8.4449	0.01***

3.3. The Establishment of Arima Model

The equation (1) is showed as the general expression of the ARMA model. The Arima model is an extension of ARMA (p, d, q).

$$y_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_i \, y_{t-1} + a_i - \sum_{i=1}^{q} \emptyset_i \, a_{t-1} \quad (1)$$

$$\left(1 - \sum_{i=1}^{p} \emptyset_i \, L^i\right)(1 - L)^d X_t = \left(1 + \sum_{i=1}^{q} \theta_i L^i\right)\varepsilon_t \quad (2)$$

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The general expression of the ARIMA (p, d, q) model is shown in equation (2). The AR (p) is represented as $\emptyset_0 + \sum_{i=1}^{p} \emptyset_i y_{t-i}$, whereas the rest of it is MA (q). AR (p) uses the past stock of tourism, hotel and catering industry returns from January 2020 to 2th December 2022 to estimate the future value, while MA (q) forecasts using an error term. L is lag operator, and d means the number of differences generated by making it a stationary sequence, $d \in Z, d > 0$. We can use code ***acf*** and ***pacf*** to determine value p and q, and code *ndiffs* to determine value d.

4. Empirical Results and Analysis

4.1. Determine Order of ARIMA Model

To establish an ARIMA model, the values of p, q, d are needed. It's necessary to use ACF and PACF plots and *ndiffs* code to find these values, the results of which are shown below.

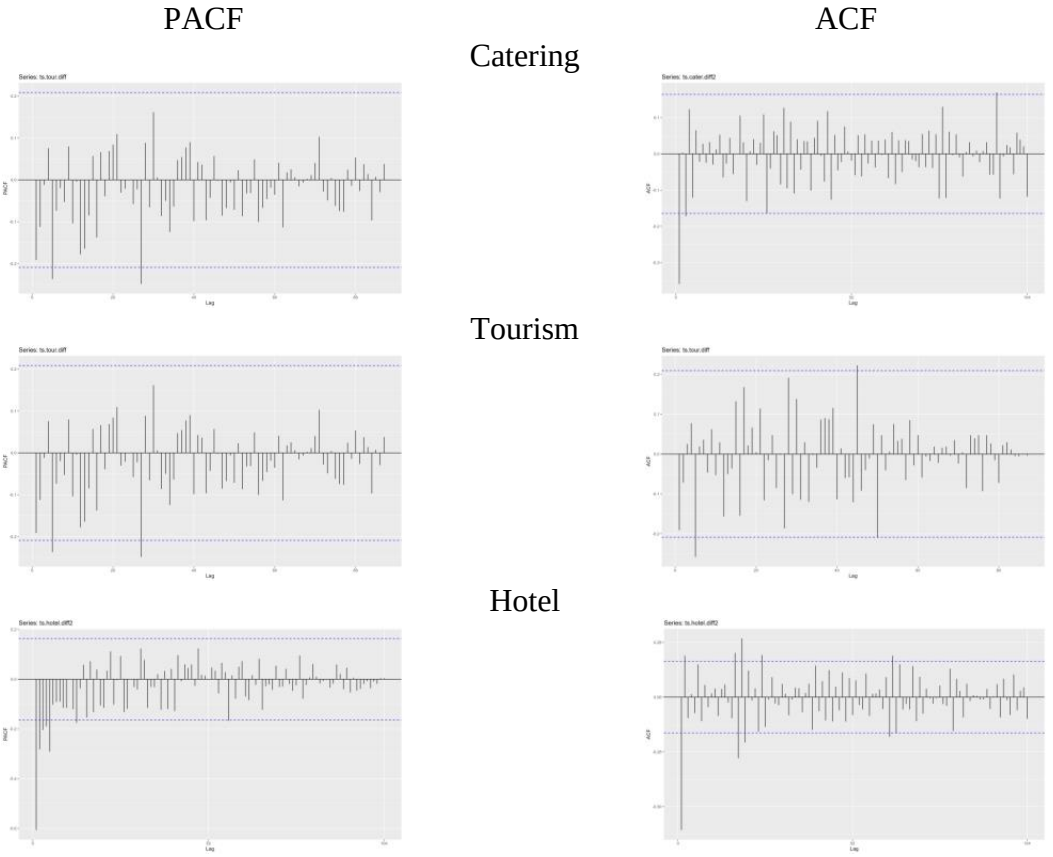

Figure 1: PACF and ACF (photo credit: original).

This paper needs to order the log returns of these three different industries and present the results in the figure above. The value of AR () and value of MA () can be determined by them. The way to find is to observe the first part beyond the x-axis, from the fixed order result of the two images in the first row in Figure 3. In the PACF series of tourism, the first part beyond the x-axis is 4, so AR(P) is of order 4. The same method can be used to determine MA(q). From these plots, the value of p, q can be found.

Then to find the difference order of ARIMA model, this paper use ndiffs() code in Rcode, which can automatically measure the value of d. The result is 2, which means we need to find the second difference of logarithmic sequence.

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4.2. Prediction and Analyze

After finish all thing above, finally the prediction result can be shown into plots. The orange lines that shown in these three plots represent fitted value, and the blue line represent actual value. All these fitted values (orange lines) are less than actual values (blue lines). The fit value represents where stocks in the sector would have gone if the policy had not been implemented. By comparing the fit line and actual line, people can judge the stock market gap of these three industries, and get the impact of the pandemic policy reform on these three industries. This paper just show the next 5 weeks after the publication of the pandemic revolution policy.

There are some similarities and differences of these lines.

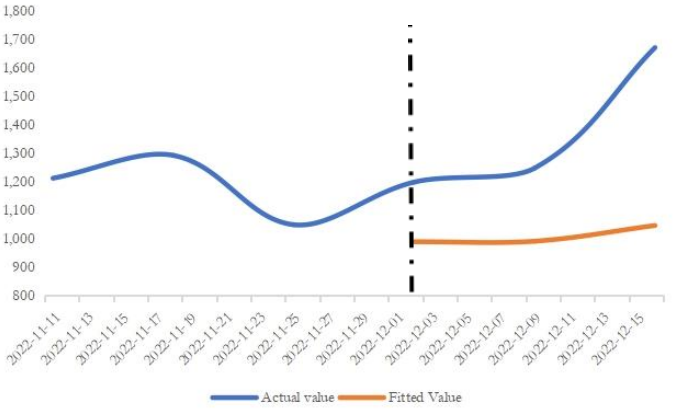

Figure 2: Catering, actual and fitted value.
Photo credit: Original

For catering, the actual value and the fitted value have a same trend. They both increase after the 2th December, and the rate of change of actual value significantly increases after 9th December. The rate of change of fitted value have some growth after 9thDecember as well, but it didn't change as much as it really did. The average difference (AD) of catering is approximately 364.05, and the average fitted value (AFV) is approximately 1008.45. The average percentage effect (APE) of catering industry is 36.09%. According to the APE, the increasing of catering stock is quite significant.

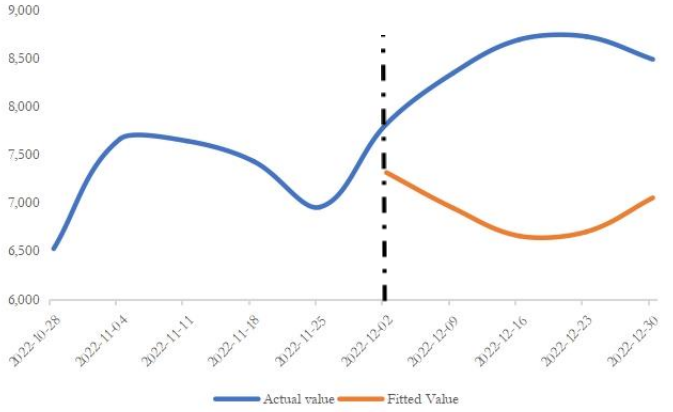

Figure 3: Tourism, actual and fitted value (photo credit: original).

For tourism, the actual value and fitted value have a remarkable difference. The fitted value decrease at first and increase later, but the actual value increase at first and decrease later. They are

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opposite. The AD of tourism is approximately 1483.48, and the AFV is approximately 6934.47. The APE is 20.14%, which is a very large growth.

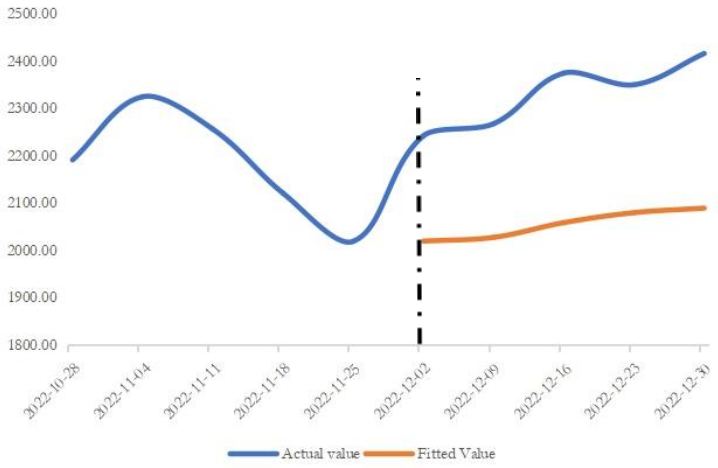

Figure 4: Hotel, actual and fitted value (photo credit: original).

For hotel, the orange line and the blue line have a same trend. The actual line has more fluctuation, the fitted line is much smoother by comparison. The AD of catering is approximately 275.0, and the AFV is approximately 2054.2. The APE of catering industry is 13.38%.

In conclusion, all plot show that the stock price of these three industries have increased after the publication of the pandemic revolution policy.

5. Discussion

Different from other studies, this paper focuses on the economic development direction of China's catering, tourism and hotel industry, which are three highly correlated industries in the post pandemic era. Existing articles mainly study the impact of the outbreak of the COVID-19 pandemic on the economic development of various industries in China. Although some articles have studied the performance of the stock market after the COVID-19, their research is mostly limited to a single industry sector, such as the catering, hotel, and tourism industry, or other industry sectors. In terms of research methods, some authors, like us, use the ARIMA model to analyze stock price trends, while others use the LSTM model, VAR model, or other models for analyzing stock market trends.

Through this article, government policy makers can formulate some subsidy policies for the tourism industry to improve people's consumption levels in the tourism industry and its closely related hotel and catering industries, thereby gradually restoring the industry's development to its original level. At the same time, the existence of the pandemic cannot be completely ignored to avoid a resurgence of the pandemic. For practitioners in these industries, various promotional work can be done well at this stage to increase brand exposure and attract more consumers. For investors, the closing prices of stocks in the catering and hotel industries have shown a steady upward trend, while the closing prices of stocks in the tourism industry are still unstable, but in the long run, they will also show an upward trend.

6. Conclusion

The purpose of this article is to explore the impact on the stock market prices of China's catering, tourism, and hotel industries in the context of China's announcement of the COVID-19 policy, and to predict the future development direction of these three industries. At the same time, suggestions are

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provided for the government, industry practitioners, and investors. This article uses the ARIMA model to fit and predict the closing price data of stocks in the catering, tourism, and hotel industry. It simulates the possible trends of stock prices in the three industries without the release of the pandemic control policy, and compares them with the actual closing prices. Finally, it is concluded that the policy of comprehensive pandemic control has promoted the economic development of China's catering, tourism, and hotel industry, The economic situation of all three industries has rebounded to a certain extent. Especially for the catering industry, the promotion effect is most obvious, followed by the hotel industry, and finally the tourism industry.

Finally, this article indicates that if China does not loosen its control over the pandemic, the economic development of the catering, tourism, and hotel industries will continue to show a downward trend. The promulgation of the policy of fully liberalizing the pandemic has played a strong promoting role in the economic recovery of these three industries, and can promote the healthy development of the industry in the long term. For the catering and hotel industries, stock prices have shown a gradual upward trend, but for the tourism industry, it can be observed that prices have shown a downward trend after a period. This implies that the economic status of the tourism business cannot be quickly improved in a short period of time, even if pandemic control is entirely eased. The comprehensive opening up of the pandemic does not mean the end of the pandemic. People still have concerns about the potential impact of the pandemic when traveling, and in the three years since the outbreak, the impact on the tourism was the greatest. Many tourism companies have closed down, and tourism industry practitioners have switched careers. Therefore, it will take some time to restore the tourism industry to its original level.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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