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The Impact of Economic Downturn on People's Perception of Consumption

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Abstract: People's consumption concepts are closely related to income and socio-economic conditions. When facing an economic recession, the recession reflected by the changes in GDP will not only affect the employment rate and the wage rate, but will further affect all kinds of commodities markets. The market can react in advance and minimize their losses if consumers' perception of consumption and impacts brought through these changes can be predicted by analyzing economic indicators and trends of the economy. The Vector Auto Regression model will be used in this paper to further analyze different economic indicators that can reflect the changes and relationships of these factors that are affected by the economic downturn. These tools will be applied in this article to explore how factors can be affected by the economy and will further determine the market direction with the change of consumption concept under the trade-off and domination of consumers. Through analyzing the model, this paper concludes that the economic downturn can significantly reduce consumers' willingness to buy and instead pay attention to wealth accumulation. The accuracy of the vertical auto regression model used in this paper does not have a high accuracy in analyzing relationships between each variable, thus it may not be the optimal choice to rely on to analyze the economic trend. Further models and variables should be put into consideration.

Keywords: Economic downturn, recession, consumption behavior, vector auto regression model.

1. Introduction

Economics is a cycle that contains four factors-households, companies, governments, and foreign countries [1]. In such a cycle, goods and cash are flowing in it. Each factor is mutually affected and determines each other. Through observation and further categorization, economists have abstracted the progress as a cycle with fluidity, containing phases as recession, falling to a trough point which is the lowest period of the economy of a country, then gradually starting to expanse and recover until it reaches to the peak, and eventually falls again [2]. A recession generally lasts for more than a few months, and in some periods even for years [3]. During the recession, the unemployment rate will significantly rise. Data from Sheldon et al. showed that during a great recession, nearly 16% of the labor force will experience job loss [4]. What follows is a decrease in people's disposable income. Purchasing power decreases with the decrease in income, which will continuously lower consumers' confidence, and consumption growth and eventually lead to a decline in GDP growth [5].

Due to the periodical characteristics shown by the economy, economists are then able to predict the economic trend and later situation. However, before formulating a new and effective market

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strategy based on the forecast results, it is essential to have an extensive understanding and analysis of consumers' consumption concepts and willingness to consume, especially in the economic downturn. Consumers' consumption is driven by many factors, but the main source is income. Understanding the concept of consumption in the current situation can help economists better understand the economic process and thus make more accurate and precise predictions [6].

The changes in consumers' consumption concepts in the period of economic downturn are not solely to a single degree. A wide range from region, culture, market operation mode, and details to gender, age, and different types of expenditure, each factor may have an impact on consumers' consumption decisions [7]. Consumers during the recession are more likely to adopt a new consumption behavior to accommodate reduce in their income, leading to a greater cut to nondurable goods and a volatility decline in durable purchases [8, 9]. Through observation, the economic downturn will directly affect people's demand for quality life and diet, causing individuals' consumption of fruits, vegetables, and other ingredients to reduce significantly. Nevertheless, Vrontos et al. found out that during the economic recession, the expenditure on durable goods and necessities does not respond strongly to the stimulus of the downturn of the economy [10]. Compared to other factors such as expenditure on houses, cars family investment, that have been greatly affected during the recession period, the observed impact on durable goods is not obvious, which will only be reduced by around half of its origin [10]. This paper will focus on analyzing the reflection of the economic trends of various economic indicators and the corresponding impact on consumers' consumption habits from macro and micro aspects.

2. Methods

2.1. Data source

The data used is derived from Reed et al.'s research of the effects of consumers' spending change on commodities of different types and nature during the recession and Kaggle, which contains different financial indicators of the economy from 2003 to 2023 [9]. There are 160 groups of data that have been used in this paper. All selected data of financial indicators from 2003 to 2023 are samples from January the first of a new year, each data is separated by a whole year.

2.2. Sample selection

Due to the fluctuation and the recognition lag of the economy and the variability of the economic indicators, it is difficult to accurately grasp the changing point of the trend of the economy. This paper used 150 selected observations in Table 1 and 6 variables with their specific definition shown in the table. Through induction and summary of a large number of diverse indicators, the boom and recession changes in the economy can then be pointed out, further the effects on the consumers' willingness to consume.

Table 1: Variable explanation

Name of Variables	Signs	Range
Gross domestic product	GDP	11170 to 26470 trillion dollars
Real interest rate	CPI	-0.25% to 2.2%
Unemployment rate	UR	3.4% to 9.8%
Personal saving rate	PSR	3.2% to 20%
Sticky Price Consumer Price	SPC	0.05 to 0.56
Consumer price index	CPI	-0.23 to 1.78

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Figure 1 shows the scatter distribution of the percentage of consumers' consumption in different types of products containing food consumption, rate of food at home and away from home, snacks' sales rate, new vehicles, consumption in durable goods, renovation of furniture, and rent.

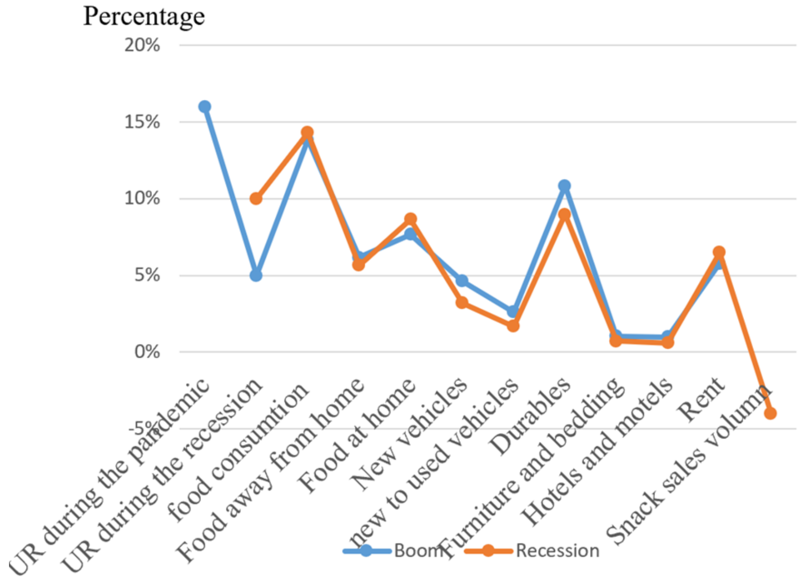

Figure 1: Comparison of consumption of products during boom with recession period

2.3. Method introduction

This article is going to use the Vector Auto Regression (VAR) model to analyze the regression of the economic data and to further conclude the relationship between the recession of the economy with changes in consumers' consumption habits [10]. The VAR model is a model that has been widely used in analyzing relationships between multiple time series variables, helping to better understand the influence between different variables over time. The model consists of endogenous variables, lags (past values of variables), coefficients, error terms, impulse response function (IRF) (measures how a shock to one variable affects all the others over time), and variance decomposition (showing how much of a variable's changes are explained by shocks to itself versus shocks to other variables).

3. Results and discussion

3.1. Vector auto regression

Through observation of the data of the economy indicators found that economic recession can be indicated from the macro and micro levels respectively. At the macro level, gross domestic product, real interest rate, inflation rate, and unemployment rate have the closest relationship with the economic situation. By combining the above variable with the analysis, a clearer economic trend can be obtained. Simultaneously, sticky price consumer prices and personal saving rates at the micro level can reflect the purchasing power and consumption level of consumers. Through the fluctuation of purchasing power, the expenditure and storage asset ratio can also reflect the economic trend from the side. By integrating data and analyzing various factors and variables, the auto regression model can then be conducted. The general mathematical model for vector auto regression (VAR) model is:

$$Y_1 = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_P Y_{t-p} + \varepsilon_t \quad (1)$$

In the formula above: A_0 is the constant term, and ε_t is the error vector.

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Table 2: Regression coefficient table

	GDP	CPI	IR	UR	SPC	PSR
Constant	1341.003	5.107*	-4.149	-6.685	0.198	-5.172
	-0.697	-2.407	(-0.501)	(-0.877)	-0.571	(-0.293)
L1 GDP	0.952**	-0.000	-0.000	0.000	-0.000	0.001
	-16.025	(-1.771)	(-0.019)	-0.677	(-0.404)	-0.971
L1 CPI	-52.657	0.2	1.846	0.971	0.028	-0.33
	(-0.177)	-0.608	-1.439	-0.823	-0.516	(-0.121)
L1 IR	87.581	-0.14	-0.187	-0.564	0.048*	0.171
	-0.847	(-1.227)	(-0.420)	(-1.375)	-2.548	-0.18
L1 UR	-70.232	-0.172	0.188	1.256**	-0.014	-0.155
	(-0.726)	(-1.616)	-0.451	-3.278	(-0.787)	(-0.175)
L1 SPC	-1457.72	-1.534	6.871	15.774	-0.309	0.656
	(-0.637)	(-0.608)	-0.697	-1.74	(-0.749)	-0.031
L1 PSR	109.612	-0.132	0.352	-0.125	0.018	0.71
	-1.28	(-1.401)	-0.955	(-0.369)	-1.155	-0.904
n	18					
LLF	-139.322					
AIC	20.147					
SC	22.224					
HQIC	20.433					

Table 2 shows the regression coefficients of the multiple linear regression equation model. The table shows that the four variables GDP, CPI, UR, and SPC have the most accurate information. The error does not exceed 0.05, showing that these four variables can provide more accuracy. The lag order of the model is at the first level. Generally, the smaller the lag order, and the higher the sample information is available, the more precise the model is.

3.2. Power of different variables

Based on the data in Table 3, the variance decomposition PSR can further be concluded. As one of the main factors that will affect consumers' willingness to consume, data in Table 3 shows that at short horizons (1-2 lags), the variance is mainly affected by UR (34.13%), CPI (31.342), and IR (14.29%). At short horizons, GDP has a small power in shocking PSR. At medium horizons (3-6), PSR's power in shocking itself still remains at a low rate. What's more, CPI and IR are still at a dominant place in affecting PSR and its rate keeps increasing. At these horizons, though the affection brought by UR is not negligible, its influence has begun to decline gradually compared to the first horizons (34.13%-22.46%). Data from long horizons (lag 7-10) demonstrate that PSR is still being dominated by CPI, which consistently explains at rates around 29%-30%, and IR, which sticks around 19%-29%. Variables such as GDP (8.9%) and SPC (14.8%-16.4%)'s power in affecting the rate of SPR continuously increase in these horizons. Above all, the data indicates that PSR is mostly driven by external economic shocks. It is strongly affected by CPI and IR in all time horizons. UR plays an important role in the short term, while GDP and SPC gradually show their importance in the long term.

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Table 3: Variance decomposition-PSR

Order	Variance Decomposition	GDP (%)	CPI (%)	IR (%)	UR (%)	SPC (%)	PSR (%)
1	2.904	0.817	31.342	14.290	34.132	12.436	6.983
2	3.574	0.783	33.274	15.885	31.019	12.102	6.937
3	4.178	1.924	33.135	17.583	28.484	12.152	6.721
4	4.707	3.355	32.242	18.327	26.732	12.640	6.705
5	5.258	5.229	31.393	18.848	24.610	13.348	6.573
6	5.882	7.130	30.686	19.163	22.464	14.135	6.422
7	6.642	8.914	30.162	19.420	20.379	14.881	6.244
8	7.579	10.413	29.787	19.629	18.562	15.525	6.085
9	8.737	11.604	29.523	19.810	17.073	16.039	5.950
10	10.151	12.511	29.331	19.957	15.920	16.433	5.847

4. Conclusion

In conclusion, although 160 samples are used in this paper, and the error of a portion of data is comparatively small, the other samples with higher errors and are not accurate enough showing that variables selected in this paper and the Vector Auto Regression model used may still not accurately enough to indicate economic changes due to the various influencing factors and the lag in recognizing changes in the economy. However, the existing model and results can show that variables such as the unemployment rate, personal savings, short run, and long-run investment will still be affected by changes in the level of GDP, lowering consumers' purchasing power and willingness to consume. Personally speaking, in order to better analyze changes in the economy and the further effects brought to consumers, a more accurate and useful model should be applied. Other models can be put into consideration, such as multiple linear regression (MLR), panel model, autoregressive distributed lag (ARDL) model, or simply logistic regression. Through comparing the accuracy of outcomes these models, thus derive the model with a higher accuracy of data processing and analyzing. This paper only used 160 groups of samples as a reference, causing a smaller sample size, although the research uses macro data, which may lead to a bias. Therefore. In order to improve the accuracy of the relative research, more datasets, a wilder sample size, and more diversified variables can be considered to improve the accuracy of models to process data, and further improve the accuracy of the relative analysis.

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