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The Impact of Monetary Policy on the Consumption Level of Chinese Residents

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Abstract

The consumption level of residents is the basis of national development. The consumption level of Chinese residents has always been low, but in today's high-quality development of the country, it is very important to improve the consumption level of residents. Central banks control and regulate money supply and credit volume through monetary policy to achieve specific economic goals, which plays a very important role in improving residents' consumption level. Therefore, this paper constructs VAR model based on 2001-2020 time series data and conducts empirical research on the relationship between monetary policy and residents' consumption level. The results show that: (1) The increase in the growth rate of money supply increases both the price level and the consumer consumption level. A moderate increase in money supply will promote the improvement of consumer consumption level, but an excessive increase in the growth rate of money supply will cause serious inflation; (2) The impulse response of residents' consumption level to rising prices is positive. The rising price level makes residents reduce current consumption and choose to consume in the future instead. Therefore, the impact of rising current price level makes future residents' consumption level rise.

Keywords

Monetary Policy; Household Consumption; VAR Model.

1. Literature Review

As one of the three carriages driving economic development, consumption is the basis of national economic development, and the level of residents' consumption is an important indicator to measure regional economic development. At present, the continuous low consumption rate of Chinese residents has led to insufficient domestic consumption demand, which has become one of the important factors hindering China's economic development. The central bank controls and regulates the money supply and credit amount through monetary policy to achieve specific economic goals, which plays a very important role in improving the consumption level of residents. Therefore, this paper studies the relationship between monetary policy and consumption level of residents.

The impact of monetary policy on national economic development has always been the focus of scholars' research, and the level of residents' consumption, as the basis of national economic development, has also attracted scholars' attention. In terms of residents' consumption level, Wang Kai et al. (2019)[3] constructed a TVP-VAR model of real estate price, household consumption and money supply, and used the monthly time series data from 1998 to 2017 to conduct an empirical study on the dynamic relationship among the three. The study showed that rising housing prices had a wealth effect on household consumption, and the wealth effect was time-varying and gradually weakened with the advance of time. And the increase of money supply promotes the rise of real estate prices in our country; Yang Ming (2019) [4]studied the relationship between the uncertainty of monetary policy in the United States and the

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consumption of urban residents in China based on the channel of asset wealth effect, and found that financial assets and real estate have significant wealth effect on household consumption, and the uncertainty of monetary policy in the United States will restrain the wealth effect of financial assets and real estate, and thus have a negative impact on China's consumption. Meng Yuzhu et al. (2021)[6] analyzed the mediating and regulating effects of fiscal expenditure on household consumption through urbanization, as well as the dynamic effects between government fiscal expenditure, urbanization and household consumption. The results showed that government fiscal expenditure had a direct negative effect of "crowding out" household consumption, while urbanization played a positive mediating and regulating effect. Although government fiscal expenditure "squeezes out" household consumption in the current period, it can "squeeze in" household consumption in the dynamic effect of lagging one and five periods. Dong Jianbo et al. (2021)[7] studied the impact of residents' consumption on the upgrading of industrial structure from the perspective of public services, and the results showed that the improvement of residents' consumption level can significantly promote the upgrading of industrial structure, and the coordinated development of residents' consumption level and public services can significantly promote the upgrading of industrial structure. In terms of monetary policy, Yang Qiuyi et al. (2022)[8] investigated the effect of monetary policy on macroeconomic regulation by establishing a general equilibrium model with credit constraints and introducing the collageable asset price bubble into the inflation target. The research results showed that the fluctuations of asset bubbles would inhibit household consumption, but facilitate the accumulation of funds to the production sector and promote the production of the real economy. Monetary policy that takes asset prices into account in its inflation target can smooth out bubbles and stabilize the economy.

Through the review of the above literature, it is not difficult to find that the growth of money supply may lead to asset price bubbles and inflation, thus inhibiting residents' consumption level. In addition, the growth of money supply will lead to the rise of housing price, which is not conducive to the rise of residents' consumption level, but conducive to the accumulation of funds to the production sector and promote the production of the real economy. Therefore, this paper studies how to promote the growth of money supply to the real economy while promoting the improvement of residents' consumption level, and uses VAR model to study the relationship between the growth rate of money supply, price level and residents' consumption level.

2. Variable Selection and Model Introduction

2.1. Variable Selection

Monetary policy, as an important means of national macro-control, has an important impact on economic development. Consumption, as one of the troika driving economic development, is the foundation of national economic development, and residents' consumption level is an important indicator to measure regional economic development. Expansionary monetary policy can improve the total purchasing power of the whole society, that is, the cash in circulation and the deposits of individuals, enterprises and institutions in the bank, but the increase in monetary circulation may also lead to asset price bubbles and inflation, etc. In addition to stimulating economic growth, monetary policy also aims to stabilize the value of the currency. The central bank should keep the price stable within the acceptable range of residents. Therefore, the degree of inflation will also have an important impact on the formulation of monetary policy, and the price will inevitably affect the supply of money.

This paper studies the relationship between monetary policy and residents' consumption level, uses the growth rate of money supply (MN) to represent the implementation intensity of monetary policy, and selects the price level (WZ), residents' consumption level (CZ) and the

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growth rate of money supply to study the relationship between China's monetary policy and residents' consumption level.

2.2. Model Introduction

When studying the impact of monetary policy on residents' consumption, since the sample data in this paper are time series data, the vector autoregressive model is adopted to study their mutual relations. The expression of the VAR model is as follows:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + \varepsilon_t, t = 1,2 \cdots T \ldots\ldots \quad (1)$$

Expand formula (1) to get formula (2):

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ \vdots \\ y_{kt} \end{bmatrix} = A_1 \begin{bmatrix} y_{1t-1} \\ y_{2t-1} \\ \vdots \\ y_{kt-1} \end{bmatrix} + \cdots A_p \begin{bmatrix} y_{1t-p} \\ y_{2t-p} \\ \vdots \\ y_{kt-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \vdots \\ \varepsilon_{3t} \end{bmatrix}, t = 1,2, \ldots T \quad (2)$$

In formula (2), AP is:

$$A_p = \begin{pmatrix} A_{11,p} & \cdots & A_{1k,p} \\ \vdots & \ddots & \vdots \\ A_{k1,p} & \cdots & A_{kk,p} \end{pmatrix} \quad (3)$$

In the VAR model, the right side of the equation contains the lag term, and the random disturbance term is the irrelevant constant variance, so OLS can be used to estimate the asymptotic and consistency of the data.

3. Empirical Research on the Impact of Monetary Policy on Residents' Consumption

3.1. ADF Unit Root Test

Before constructing the VAR model, it is necessary to conduct ADF unit root test on the data to judge the validity of the data and prevent the occurrence of pseudo-regression. As can be seen from Table 1, the ADF test value of variable DlnWZ is -4.7413, and the p value is 0.0001, which is significant at the 1% level. The ADF test value of variable DlnMN is -3.7967, and the p value is 0.0009, which is significant at the 1% level. The ADF test value of the variable DlnCZ is -2.9146 and the p value is 0.0632, which is significant at the 10% level. All variables are of the same order and stable, which meets the construction conditions of VAR model.

Table 1. ADF unit root test

Variable	ADF test value	Prob	Significant level threshold (1%)	Significant level threshold (5%)	Significant level threshold (10%)	Conclusion
DlnWZ	-4.7413	0.0001	steady	steady	steady	steady
DlnMN	-3.7967	0.0009	steady	steady	steady	steady
DlnCZ	-2.9146	0.0632	unsteady	unsteady	steady	steady

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3.2. Determine the Optimal Lag Order

After the unit root test, the VAR model needs to determine the best lag order and select the appropriate lag period to ensure the scientificity of the model and make the variables have dynamic characteristics. In this paper, information criteria are used to judge the optimal lag order of the model, and the test results are shown in Table 2. It can be seen from Table 2 that there are the most information criteria for selecting order 2 as the optimal order of lag, indicating that order 2 is the best order of lag of the model.

Table 2. Test of VAR model lag order

Lag	LogL	LR	FPE	AIC	SC
0	25.55943	NA	1.87e-05	-2.374676	-2.225555
1	82.94754	90.61281	1.17e-07	-7.468162	-6.871674
2	97.03718	17.79745*	7.48e-08*	-8.003914*	-6.960061*

3.3. Robustness Test of VAR Model

Robustness test can ensure the authenticity and validity of the VAR model. Therefore, this paper uses the unit root test method to test the robustness of the VAR model, and the test results are shown in Figure 1. As can be seen from Figure 1, the unit roots of all variables in the VAR model constructed in this paper fall in the unit circle and pass the robustness test, indicating that the VAR model constructed in this paper is robust.

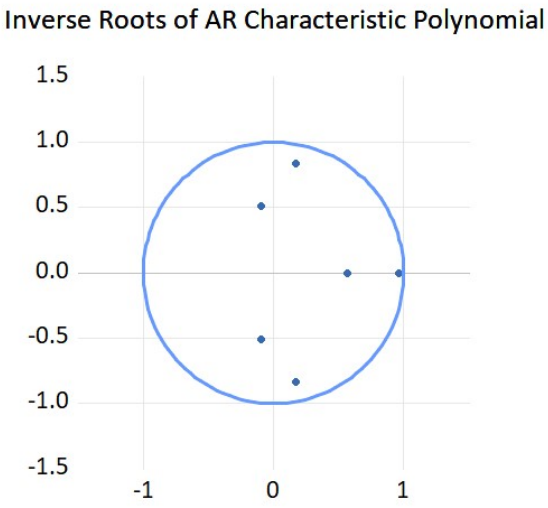

Figure 1. Robustness test results of VAR model

3.4. Granger Causality Test

lnWZ, lnMN and lnCZ were tested for Granger causality, and the test results were shown in Table 3. It can be seen from Table 3 that lnMN and lnCZ are granger causality to each other, indicating that the past growth rate of money supply will have an impact on the present consumption level of residents, and the past consumption level of residents will also have an impact on the present growth rate of money supply. lnCZ is the Granger cause of lnWZ, while lnWZ is not the Granger cause of lnCZ, which indicates that the consumption level of residents in the past will have an impact on the present price level, but the past price level will not have an impact on the present consumption level of residents.

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Table 3. Results of Granger causality test

H0	Lag	F test value	Confidence probability	Conclusion
lnWZ is not a Granger cause of lnCZ	2	1.95526	0.1783	Accept H0
lnCZ is not a Granger cause of lnWZ	2	12.6145	0.0007	Reject H0
lnMN is not a Granger cause of lnCZ	2	3.93574	0.0440	Reject H0
lnCZ is not a Granger cause of lnMN	2	3.43861	0.0610	Reject H0

3.5. Pulse Response Results

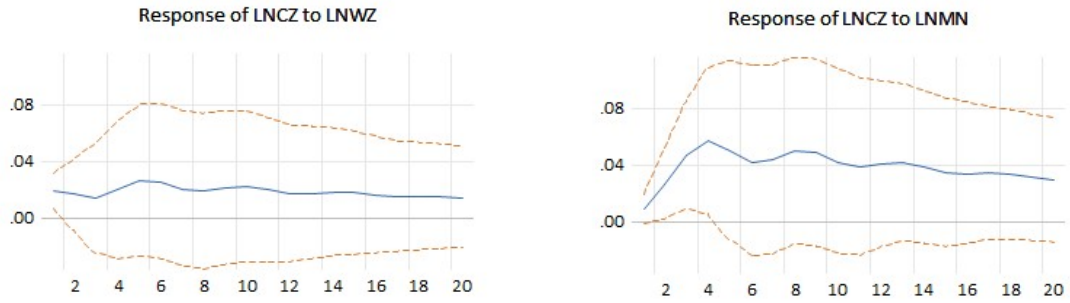

Figure 2. Impulse response results of residents' consumption level

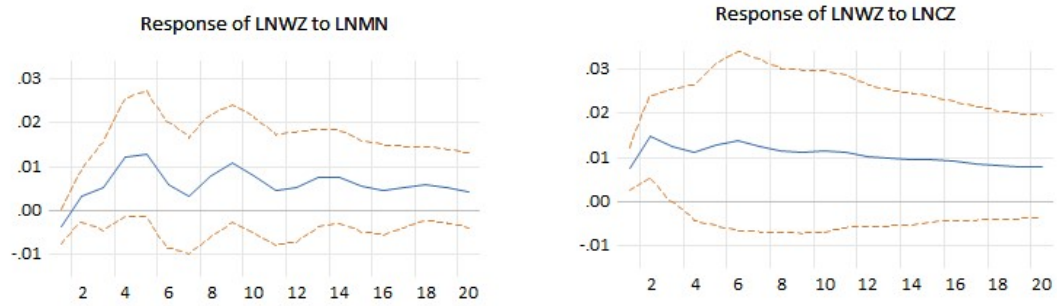

Figure 3. Impulse response results of price level

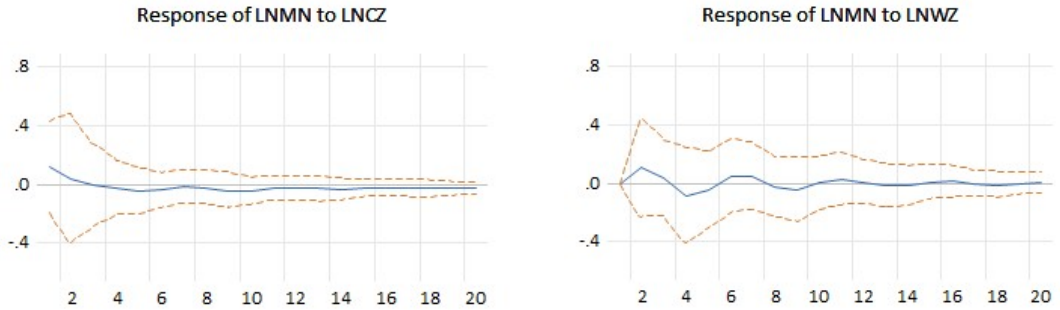

Figure 4. Impulse response of money supply growth rate

In the VAR model, impulse response mainly examines the impact of changes in one variable on another variable. This paper conducts impulse response analysis on the impact of money supply growth rate and price level on consumer consumption level and the impact of money supply growth rate and consumer consumption level on consumer price level, and the results are shown in Figure 2, Figure 3 and Figure 4.

Figure 2 shows the impulse response results of residents' consumption level, and the left figure shows the impulse response results of price level and residents' consumption level. It can be seen that the response of residents' consumption level to rising prices is positive and reaches

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the peak in the fifth period, which may be because the rising price level makes residents reduce current consumption and choose to consume in the future. Therefore, the impact of the rising price level in the current period will increase the consumption level of residents in the future. The figure on the right shows the impulse response results of the growth rate of money supply and residents' consumption level. When the growth rate of money supply increases, it will have a positive impact on residents' consumption level, and it will reach the maximum in the fourth period. This is because the increase of short-term money supply causes the increase of funds in the production sector and the increase of commodity output. Cause commodity prices to rise, thereby reducing the current consumption of residents, and turn to the future consumption level of residents to rise.

Figure 3 shows the impulse response results of the price level, and the left figure shows the impulse response results of the price level and the growth rate of money supply. The results show that the increase of the growth rate of money supply in the first phase will lead to the decline of the price level, but the rise of the price level will be caused from the beginning of the second phase, because the increase of short-term money supply will increase the funds of the production sector and increase the output of commodities. Oversupply leads to a decline in the price level, while the rise in the long-term growth rate of money supply leads to a rise in the price level because the rise in consumer consumption leads to short supply in the commodity market and a rise in the price level. However, combined with the pulse response results of consumer consumption level and the growth rate of money supply in Figure 2, The growth rate of money supply increases the price level and the consumption level at the same time, which means that the excessive growth rate of money supply will cause serious inflation. The figure on the right shows the impulse response results of the price level and residents' consumption level. The results show that the increase of residents' consumption level will lead to the increase of the price level, which conforms to the general economic law.

Figure 4 shows the impulse response results of the growth rate of money supply, and the left figure shows the impulse response results of the growth rate of money supply and residents' consumption level. The results show that the increase of residents' consumption level will increase the growth rate of money supply in the next period, because the increase of residents' consumption level will increase the demand for money, but the increase of money supply will lead to inflation after two periods. So after the third period, the growth rate of money supply is negative, but close to zero. The figure on the right shows the impulse response of the price level and the growth rate of the money supply. The result shows that the response of the growth rate of the money supply fluctuates up and down. When the price level rises, the monetary policy adopts expansion and tightening alternately to stabilize the price level and eventually to stabilize it.

3.6. Variance Decomposition Results

In addition to impulse response, another important result of VAR model is variance decomposition. Figure 5 shows the variance decomposition results of residents' consumption level, price level and money supply growth rate.

On the left is the variance decomposition result of residents' consumption level. From the figure, it can be seen that the growth rate of money supply has the strongest explanation for residents' consumption level, reaching 7.24% in the second phase and reaching the peak in the fourth phase, explaining 28.90% of residents' consumption level, and then stabilizing at about 28%. The price level has the strongest explanation in the second phase, which explains 3.09% of the household consumption level, and then the influence gradually weakens. It can be seen that the growth rate of money supply has a great impact on residents' consumption level, and the impact lasts for a long time, while the impact of price level on residents' consumption level is concentrated in the short term and weak in the long term.

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Table 4. Variance decomposition results of consumer consumption level, money supply growth rate and price level

	LNCZ			LNMN			LNWZ		
	LNCZ	LNMN	LNWZ	LNCZ	LNMN	LNWZ	LNCZ	LNMN	LNWZ
1	100.00	0.00	0.00	3.32	96.68	0.00	40.51	9.09	50.40
2	89.67	7.24	3.09	3.59	94.01	2.39	74.27	6.38	19.34
3	75.98	21.30	2.72	3.06	94.64	2.30	72.97	8.90	18.13
4	69.45	28.90	1.65	3.07	93.55	3.38	64.18	22.98	12.84
5	70.03	28.75	1.22	3.34	93.05	3.61	59.96	30.35	9.69
6	72.08	26.90	1.01	3.49	92.51	4.00	63.73	27.97	8.30
7	72.44	26.57	0.99	3.49	92.15	4.36	66.78	25.61	7.60
8	71.38	27.29	0.89	3.50	92.18	4.33	66.64	26.29	7.07
9	70.81	28.41	0.78	3.74	91.71	4.56	64.92	28.83	6.24
10	71.15	28.17	0.71	3.97	91.50	4.53	65.13	29.12	5.75
11	71.52	27.81	0.67	4.06	91.27	4.67	66.36	28.25	5.39
12	71.44	27.91	0.65	4.10	91.24	4.66	67.01	27.82	5.18
13	71.17	28.21	0.62	4.20	91.12	4.68	66.75	28.33	4.92
14	71.13	28.28	0.58	4.35	90.95	4.70	66.52	28.82	4.66
15	71.27	28.17	0.56	4.46	90.83	4.71	66.85	28.68	4.47

In the middle is the variance decomposition result of the growth rate of money supply. It can be seen from the figure that in the short term, residents' consumption level has a stronger explanatory power to the growth rate of money supply, but in the long run, the price level has a stronger explanatory power to the growth rate of money supply. Besides the goal of driving economic growth, monetary policy also has the goal of stabilizing the value of money. The central bank should keep the price stable within the acceptable range of residents and avoid the irrational rise of prices from impacting the normal life of residents. Therefore, the degree of inflation will also have an important impact on the formulation of monetary policy.

On the right is the variance decomposition result of the price level. It can be seen that the consumption level of residents in the first phase explained 40.51% of the price level. In the second phase, the explanation of the consumption level of residents reached its peak, explaining 74.27% of the price level. Monetary policy also explains a lot of the price level, explaining 30.35% of the price level in the fifth period. It can be seen that when the price level is more affected by the monetary policy, the change of supply and demand is the most important factor of the price level, and the change of the quantity of money circulating in the market brought about by the change of the growth rate of the money supply will also affect the price level. But not as strong as supply and demand.

4. Conclusion and Recommendations

Based on the time series data from 2001 to 2020, this paper reviews the existing research results in the academic field, and selects the growth rate of money supply, price level and residents' consumption level as research variables to build a VAR model, and studies the relationship between monetary policy and residents' consumption level. Through the empirical analysis of the VAR model, this paper draws the following conclusions: (1) The impulse response analysis found that the impact of the growth rate of money supply on residents' consumption level showed an obvious upward trend from the first to the third period, reached the peak in the fourth period, and showed an obvious downward trend after the fourth period.

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A moderate growth rate of money supply would promote the improvement of residents' consumption level, but an excessive increase in the growth rate of money supply would devalue the currency; (2) The increase of people's consumption level will increase the growth rate of money supply in the next period, because the increase of people's consumption level will increase the demand for money, but the rise of money supply will lead to inflation after two periods, so the growth rate of money supply is negative but close to zero after the third period. (3) Impulse response finds that the impact of price level on residents' consumption level presents a relatively stable positive impact, indicating that the past increase in price level will have a lasting and stable impact on the future increase in residents' consumption, but the impact is small; (4) The variance decomposition results of residents' consumption level show that the growth rate of money supply has a great influence on residents' consumption level, and the influence lasts for a long time. The influence of price level on residents' consumption level is concentrated in the short term, and the influence is weak in the long term. (5) The variance decomposition results of the money supply growth rate show that in the short term, the consumer consumption level has a stronger explanatory power to the money supply growth rate, but in the long run, the price level has a stronger explanatory power to the money supply growth rate; (6) The variance decomposition results of the price level show that the consumption level of residents is more affected by the price level, and the change of supply and demand is the most important factor of the price level. The change of the money supply growth rate brings about the change of the amount of money circulating in the market will also affect the price level, but the impact is not as strong as that of supply and demand.

Based on the above analysis, this paper puts forward some suggestions to improve the consumption level of Chinese residents:

First, we will adjust our monetary policy according to the actual economic situation. It can be seen from the research results of the VAR model that expansionary monetary policy is conducive to the improvement of residents' consumption level, but it will also increase the price level. Therefore, monetary policy should be adjusted according to the actual economic situation to balance the price level and economic growth. At the same time, in different stages of economic development, the impact of monetary policy on residents' consumption level is different. In economic prosperity, in order to prevent economic overheating, monetary quantity should be reduced and tight monetary policy should be implemented. When the economy is in recession, in order to stimulate economic development, the monetary quantity is increased and expansionary monetary policy is adopted.

Second, the additional issuance of money should be kept within a reasonable range. According to the results of the VAR model, the rise of the price level will make the future residents' consumption level rise. Therefore, although the additional issuance of money may cause the rise of the price level and then trigger inflation, the appropriate inflation will be conducive to the improvement of the residents' consumption level and promote the economic development of our country. Therefore, the currency increase should be controlled at a reasonable level. However, due to the imbalance of regional development in China's economic development, the monetary policies adopted in different regions should also be different.

Third, stabilizing price levels is the top priority. The price level will have an important impact on the consumer level, and the rise of the price level will lead to the decline of the consumer level in the current period, but the empirical results of the VAR model show that the rise of the price level will lead to the rise of the consumer level in the future, and the consumer level is the most important influencing factor of the price level. Price is a key factor affecting the national economy and people's livelihood, and has a very important impact on social stability and harmony. The important purpose of monetary policy implementation is to stabilize economic development and promote the improvement of national income level and consumption level.

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The implementation of monetary policy should proceed from the basic purpose and promote the phased improvement of residents' consumption level on the basis of stable price level.

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