Monetary policy, rural income and urban-rural income gap -- Empirical research based on PVAR model

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Abstract: In the process of economic development in our country, the rural residents' income has been achieved, but also formed the urban and rural dual economic structure, this article selects 2010-2017 panel data of 30 provinces in China, through the establishment of PVAR model analysis of monetary policy, rural residents' income and the income gap between urban and rural areas, the interaction between the three. The analysis results show that China's monetary policy has a long-term positive effect on farmers' income, and at the same time, it will widen the urban-rural income gap in the short term and narrow the urban-rural income gap in the medium to long term. Therefore, the formulation of a reasonable monetary policy is conducive to the long-term increase of farmers' income and the alleviation of economic structural contradictions, so as to seek policy inspiration from monetary policy, fiscal policy, credit policy and other relevant policies and measures.

1. Introduction

Since the outbreak of the financial crisis, the effects of quantitative easing monetary policy in Europe and the United States have become increasingly apparent, and the effect of monetary policy on residents' income has begun to receive widespread attention. Studies by the Federal Reserve and the ECB have shown that monetary policy can have a sustained effect on residents' income even in the context of low inflation. Ledoit et al. (2011) argue that an increase in the money supply will have a redistributive effect on the wealth of those economic agents most closely linked to financial markets, and that economic agents more deeply involved in financial transactions usually have higher incomes and consumption than other economic agents, implying that monetary expansion shocks will also bring about an increase in consumption inequality. The impact of monetary policy on the income of the population is also manifested in the heterogeneity of the population; the impact of monetary policy on the income of different classes of people, such as capitalists and workers, is significantly different (D´ıazGim´enez, Javier and Andrew Glover, 2011). A study by the Philadelphia Fed and the University of Pennsylvania in September 2012 showed that tight monetary policy has a significant positive effect on the very rich class, which represents 5% of the total population, while it is relatively detrimental to those classes that represent 5% of the total population and are at the bottom of life (Nils Gornemann eta, 2012).

In the process of economic development, China has formed a unique dualistic economic structure of urban and rural areas. The problem of income inequality then manifests itself not only in the income gap within urban residents, or within rural residents, but also in the income gap between urban and rural residents. Since the reform and opening up, the income level of urban and rural residents has increased significantly, but there is a gap between urban and rural residents in terms of both absolute and relative incomes. According to the data of the National Bureau of Statistics, by 2017, the absolute gap between urban and rural residents' income was 22,964 yuan, and the relative gap was 2.71; in the long term, the growth of urban residents' income far exceeded that of rural residents, making the absolute gap continue to expand, while the relative gap fluctuated but was at a high level for long years, and the overall trend was expanding. Particularly serious is the sharp change in the gap between

the property income of urban and rural residents; in the 1990s, the per capita property income of urban residents was still far lower than that of rural residents; in 1990, for example, the property income of urban residents was still less than half of that of rural residents, but due to the slow development of the rural economy, the increase in the property income of residents was restricted, and by 2017, the per capita property income of urban residents had long reached more than 10 times that of rural residents.

At present, the completion of a moderately prosperous society is at a decisive stage, while rural areas are the shortcomings of the completion of a moderately prosperous society, agriculture is the weakness of the simultaneous development of the four cultures, and the income gap between urban and rural areas is still hovering at a high level. Therefore, only by solving the problem of sustainable income increase for farmers and the problem of income inequality between urban and rural areas as much as possible can we solve the biggest imbalance of the current society, realize the integrated development of urban and rural areas, and help the realization of rural revitalization. As China's fight against poverty continues to deepen, the connotation, extension and functional positioning of monetary policy are constantly evolving and enriching, and the effects of monetary policy are becoming more and more obvious, and subsequently sailing into a broader world with great potential and success. Therefore, the systematic study of the interaction between monetary policy, residents' income and urban-rural income gap has certain theoretical significance and important practical significance.

2. Literature Review

There are fewer literatures that study monetary policy, rural residents' income and urban-rural income gap under one framework, and most scholars put two of them together for correlation studies, such as studying the relationship between monetary policy, urban-rural income gap, the relationship between monetary policy, rural residents' income, or the relationship between rural residents' income and urban-rural income gap.

Not many studies have been conducted on the relationship between monetary policy and rural residents' income, mostly the relationship between monetary policy and overall residents' income level. Ding, Pan and Su-Fen Li (2014) constructed a FAVAR model of the effect of residents' income on the transmission of monetary policy, and conducted a theoretical and empirical study on the effectiveness of residents' income in the transmission mechanism of monetary policy. The findings indicate that quantitative easing policy helps to boost the income growth of urban residents but has a depressive effect on the income of rural residents. By constructing a mixed cross-sectional global autoregressive model, Ding Pan and Hu Zongyi (2018) empirically investigated the impact of monetary policy shocks on the per capita income of urban and rural residents in different provinces and regions, and the results showed that expansionary monetary policy pulled up the per capita disposable income of urban residents in the eastern region but lowered the per capita net income of rural residents in that region, while it could raise the per capita income of urban and rural residents in the central region The expansionary monetary policy has a suppressive effect on the income of urban and rural residents in the western region. At present, domestic research on the relationship between monetary policy and residents' income mainly focuses on the perspectives of financial development, financial resource allocation and residents' income gap. A more common view is that the widening income gap between urban and rural residents is caused by the unbalanced financial development, and the allocation of financial resources has an obvious tendency of urbanization (Yao Yaojun, 2005; Zhang Lijun et al., 2006). Some scholars also study from the perspective of income distribution; for example, Li Shi et al. (2005) argue that the high concentration of financial institutions and low capital prices induce enterprises (mainly large and state-owned enterprises) to choose capital-intensive technologies and substitute capital for labor, thus reducing the share of residents' income in the national income distribution. Overall, it seems that there is an intrinsic link between monetary policy and residents' income. And, existing studies mainly use models such as VAR and DSGE. In contrast, Bernanke et al. (Bernanke, 2005) point out that monetary policy makers consider thousands of

economic factors and there are many potential economic factors affecting residents' income, and the VAR and DSGE models obviously cannot respond to all the economic information. Liu, Bin (2008) also pointed out that the DSGE model is not yet a complete substitute for traditional econometric models, and there is still some difficulty in developing a model that can fit relatively well to reality.

Studies on the relationship between monetary policy and the urban-rural income gap largely agree on the existence of the urban-rural effect of monetary policy in China, but the causes and findings of the urban-rural effect of monetary policy vary. Yao, Dequan and Huang, Xuejun (2011) empirically tested the urban-rural effect of monetary policy in China using SVAR model by selecting data from 30 years of reform and opening up, and the results were consistent with previous studies that the income of Chinese urban residents was more sensitive to monetary policy shocks. And Zhang Weijin and Hu Chuntian (2014) used a dynamic stochastic general equilibrium model to simulate the impulse response path of urban and rural residents' consumption with asymmetric effects to monetary policy shocks. With the continuous development of econometrics, Ding Pan and Li Sufang (2014) used the FAVAR model to test the urban-rural income effect of monetary policy in China and found that monetary policy quantity-based instruments have significant effects, but expansionary quantity instruments widen the urban-rural income gap and the price transmission channel of monetary policy is not smooth. Fan Guiling and Li (2016) used IRF model to calculate monetary policy shocks to find that there is a significant urban-rural dual structure effect of monetary policy in China. Zhang (2017) constructs an SVAR model to study the urban-rural structural effects of monetary policy and finds that there are differences between urban and rural areas of China's unified monetary policy both in terms of the degree of impact and response time, with credit instruments having significant effects in urban areas and significant time lags in rural areas. Wu Dechang and Zhou Zhaoxiong (2018) study monetary policy and urban-rural income distribution at both theoretical and empirical levels, and they argue that monetary policy can affect urban-rural income distribution through several channels.

Regarding the relationship between rural residents' income and the urban-rural income gap, Khan & Riskin (1998) found that the urban-rural income gap had the most significant impact on the overall income gap of residents by analyzing empirical data in China during 1988-1995, and that the structure of farmers' income sources, except for wage income, was not conducive to the reduction of the overall income gap of residents. Based on the income source perspective, Huang Zuhui et al. (2005) measured the GE index and the corresponding contribution of 11 prefecture-level cities in Zhejiang Province from 1998 to 2002, and the results showed that household business income as an important income source for farmers played a role in narrowing the urban-rural income gap, but with the gradual crowding out of wage income, this role is weakening year by year; transfer payment policy has not changed substantially, and farmers The transfer income of farmers is low, which widens the urban-rural income gap to a certain extent; the increase of property income plays a weaker role in narrowing the urban-rural income gap year by year. Yang Canming et al. (2007) further refined farmers' household business income and pointed out that the growth rate of net household business income, agricultural production income and household agricultural business income was much lower than that of farmers' net income per capita, which inhibited the growth of farmers' net income, while non-agricultural production income and wage income from household business income significantly increased farmers' net income. Zeng & Jingjing Hu (2008), Fan & Zhongjin Zhang (2011), Fang & Rizzo (2011), Wen & Tao (2012), and Bai Suxia & Chen Jing'an (2013) all pointed out through empirical analysis that the widening effect of wage income on the urban-rural income gap was the most significant, and the increase in household business income obviously played a role in narrowing the urban-rural income gap, while the national successive The welfare policies introduced by the state to narrow the urban-rural income gap have improved the relative status of farmers' transfer income, which in turn has narrowed the urban-rural income gap to a certain extent.

Through a review of the existing literature, we can find that there are still relatively few studies on the relationship between monetary policy and rural residents' income, the reasons for the urban-rural income effect of monetary policy and the research findings vary, and there is no literature that incorporates the three variables into one research framework for overall analysis. Therefore, based on the above realistic background and research basis, this paper analyzes the interaction among

monetary policy, rural residents' income and urban-rural income gap by establishing a PVAR model and selecting panel data of 30 provinces in China during 2010-2017.

3. Theoretical Mechanisms

3.1 Mechanism of the role of monetary policy in guiding the increase of farmers' income level

The impact of monetary policy tools on farmers' income includes two aspects: first, direct income increase, through the use of policy tools, to increase credit investment in rural areas and the development of the three rural areas, improve the availability of financial services for farmers, reduce the cost of capital, and achieve the direct income effect; second, indirect income increase, through the use of monetary policy tools to improve the financial ecological environment of rural areas and the development of the three rural areas, promote economic The second is indirect income generation, through the use of monetary policy tools to improve the financial ecological environment for the development of rural areas and the three farmers, promote economic growth, drive farmers to increase their income, improve the living conditions of rural areas, and achieve indirect income generation.

3.2 The transmission mechanism of monetary policy affecting the urban-rural income gap

The monetary policy can affect the income of residential households through various channels, and China adopts a prudent monetary policy. In order not to be redundant with both tight and loose monetary policies, the transmission mechanism in this paper mainly takes loose monetary policy as an example to analyze the path, while the influence path of tight monetary policy is the opposite. Because of the differences in the status of residential households, such as the allocation of household asset portfolios, the participation rate in financial markets, the composition of residential household income, the choice of saving and investment behavior, and the constraints in the credit market, residential households are actually heterogeneous, and then monetary policy, in the process of implementation, may have a non-equilibrium effect on the income of different households, and thus on the In the past, due to the structure of the domestic economy, there was a heterogeneity in the income distribution. In the past, due to the urban-rural dichotomy in the domestic economic structure, the heterogeneity of urban and rural households is obvious, which makes the impact of monetary policy on urban and rural households have different degrees of impact, and the income distribution between urban and rural areas has changed as a result. Monetary policy affects urban and rural income distribution mainly through the following channels, including asset price transmission channel, interest rate transmission channel and credit transmission channel.

Monetary policy can affect the urban-rural income gap through the asset price transmission channel. Under the expansionary monetary policy, there will be an inflationary effect and an asset price increase effect, which will cause changes in household asset returns; among them, the decrease in real interest rates brought about by inflation makes rural households holding more bank savings receive less real income, while the increase in stock returns, etc. brought about by asset price increase makes urban residents holding more financial assets receive greater real income; therefore The amount of money injected into the economy, whether into the real economy causing inflation or into the virtual economy causing asset price increases, makes the increase in property income of urban residents greater than that of rural residents, which will widen the urban-rural income gap. The opposite is true for a tight monetary policy.

Monetary policy can influence the urban-rural income gap through the interest rate transmission channel. Monetary policy can influence changes in the level of interest rates and change the relative costs of factors of production. Under the expansionary monetary policy, the increase of money supply brings down the interest rate, which means the relative decrease of the cost of capital and the relative increase of the cost of labor, which then appears that enterprises replace labor with capital, causing the decline of wage income and the increase of business income. Combining the effects of interest rates on wage income and business income, monetary policy has a two-sided effect on urban and rural household income. While the decline in the labor income share can narrow the urban-rural income

gap, the corresponding rise in the capital income share will widen the urban-rural income gap, making the impact of the interest rate channel of monetary policy on the urban-rural income gap variable.

Monetary policy can influence the urban-rural income gap through the credit transmission channel. As influenced by the difference in financial market participation and financial literacy between urban and rural residents, when expansionary monetary policy causes credit expansion, urban households have easier access to credit and are more likely to have a higher return on investment on credit funds, which in turn causes changes in the income gap between urban and rural residents. The larger the scale of credit, the more credit urban residents can obtain and the more their rate of return on capital, while rural residents can obtain less credit and the relatively less their rate of return on capital. Therefore, the credit transmission channel of accommodative monetary policy may widen the urban-rural income gap, and the larger the scale of credit, the greater the impact of monetary policy on the urban-rural income gap through the credit channel.

4. Empirical study design

4.1 Model Setting

The vector autoregressive (Panel-VAR, PVAR) method for basic model panel data was first proposed and applied by Holtz-Eakinetal (1988), then gradually improved under the development of Pesaran & Smith (1995) and Arellano & Bover (1995), and matured under the extension of H.L ütkepohl (2005), Lnessa Love (2006), Lian Yujun (2007) and other extensions tend to mature, PVAR is able to overcome the endogeneity problem with estimation methods such as System generalized method of moments (SGMM).

The mathematical model expressions for the PVAR analysis in this paper are shown below:

$$Y_{i,t} = \emptyset_0 + \sum_{j=1}^{p} \emptyset_j Y_{i,t-j} + h_i + \varepsilon_{i,t} \tag{1}$$

In the above equation, Y is a vector containing all endogenous variables; i denotes the region (province) to which it belongs and t denotes the point in time (other variables or parameter subscripts have the same meaning); h is each region fixed effect/individual fixed effect (unobservable heterogeneity); Φ is a vector of coefficients of the lagged terms of each endogenous variable and j denotes the lag order; Φ_0 is the intercept term; and ε is the regression residual (disturbance term) of the model.

4.2 Variable selection and data processing

4.2.1 Variable selection and indicator definition

(1) Monetary policy: In this paper, money supply is chosen as a proxy variable to measure monetary policy. In conducting the empirical analysis, due to the lack of data on money supply in each province, the balance of deposits in financial institutions in each province (in billions of yuan) is used as a proxy variable for money supply and is recorded as M2.

(2) Income level of rural residents: In terms of the income level of farmers, many researchers generally measure the overall income of farmers in China based on the level of net income per rural resident provided by the National Statistical Yearbook, which is the profit of produced products after deducting all additional costs of production, taxes paid to the state, and costly expenses of reproduction. In this paper, we adopt a roughly equivalent approach to this approach and use the net income per capita of rural residents in some important provinces to express the income of rural residents (unit: yuan). At the same time, in order to exclude the interference of inflation factors on the research results, this paper uses the real income data after deflating the consumer price index for rural residents in 2010 as the base period, and the corresponding variable is named ruincome.

(3) Urban-rural income gap: In order to simplify the research process and ensure data availability, most scholars directly measure the urban-rural income gap by the ratio of per capita income between urban and rural areas. By consulting the annual data of provinces in the China Statistical Yearbook and the website of the National Bureau of Statistics, we can obtain the per capita disposable income

of urban areas and the per capita net income of rural residents in each province in previous years, and use the ratio of their actual income data after deflating the consumer price index of rural residents in 2010 as the measure of urban-rural income gap level, and the corresponding variable is named ir.

4.2.2 Sample selection and data sources

After excluding the Tibet Autonomous Region, which has serious data missing, the panel data contains data on monetary policy, rural residents' income level and urban-rural income gap for a total of 30 provincial administrative regions in the mainland region, spanning the period of 2010-2017. Table 1 presents the results of descriptive statistics for the full set of data. Overall, the data reflect the rapid expansion of China's monetary size in the last eight years, but also reflect the worrying level of urban-rural income gap (the largest value of urban-rural income gap in the whole sample reaches 4.07).

Table 1. Descriptive statistics results of the data of endogenous variable indicators

Variables	M2	Income of rural residents	Urban-rural income gap
Number of samples	240	240	240
Average value	38337.06	37314.03	2.738457
Standard deviation	33988.01	13375.43	0.4587785
Maximum value	197602.3	91665.51	4.073476
Minimum value	2326.96	16613.2	1.873834

4.2.3 Data smoothness test

The data smoothness test was carried out using IPS and Fisher ADF; the ADF and IPS test results in Table 2 showed that the original hypothesis of unit root (not smooth) could not be rejected for all three variables, and the data smoothness requirement could not be fully satisfied. Therefore, the indicator data of the three variables were first-order differenced and then tested (variable names were adjusted to dm2, druincome, and dir), and it was found that the differenced data could all meet the smoothness requirements at the 1% significance level (see Table 2); therefore, the PVAR model estimation could be performed after introducing the differenced variables d.lnp, d.lnimg, and d.lnig.

Table 2. Results of data smoothness tests for endogenous variable indicators

Inspection method	Variable Name	M2	dm2	ruincome	druincome	ir	dir
ADF	t-statistic	-5.4772	35.2190^{***}	-5.4772	20.2369^{***}	-5.4772	-59.6641^{***}
	Concomitant probability (p-value)	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
IPS	t-statistic	1.6680	-17.2253^{***}	1.3892	-33.3097^{***}	0.1572	-17.2046^{***}
	Concomitant probability (p-value)	0.9523	0.0000	0.9176	0.0000	0.5625	0.0000

Note: The letter d plus the variable name indicates the variable after first-order differencing, and the symbols *, **, and *** represent significant at the 10%, 5%, and 1% levels, respectively.

4.2.4 Cointegration test

In order to judge whether there is a cointegration relationship between the variables of the model and whether the model setting is correct, cointegration tests are performed. The usual co-integration test methods are Pedroni, Kao, Johansan, etc. In this paper, the Kao method is used to test the panel data, and the results are shown in Table 3, respectively.

Table 3. Results of Kao residual cointegration test

	Region	t-statistic	p-value
ADF	30 provinces nationwide	-8.2067***	0.0000

Note: The original hypothesis is that none of the variables are cointegrated, based on the lagged choice of SIC; *** indicates significant at the 1% level of significance.

The results in Table 3 show that there is a long-run cointegration relationship between monetary policy, rural residents' income and urban-rural income gap.

5. Empirical analysis based on PVAR

5.1 Lag order selection and parameter estimation

In order to determine the optimal order of PVAR analysis, firstly, the AIC, BIC and HQIC information criteria should be calculated for the model at each order and compared respectively. After performing the above calculations, Table 4 can be seen. If the minimum calculated value of each information criterion is used as the criterion, the optimal lag order of PVAR model should be order 1 against the results in the table.

Table 4. Lag orders of the model

lag	AIC	BIC	HQIC
1	-6.90107	-8.91405*	-7.32077*
2	-6.86568	-4.35693	-5.84686
3	-10.1761	-6.92633	-6.86559
4	-12.0434*	-7.64527	-6.323

5.2 GMM estimation results

In this paper, the GMM estimated coefficients were obtained mainly with the help of the econometric software as stata15.0, used. The estimation results are given in Table.5. Where h_, h2_, h3_, and h4_ represent lags one, two, three, and four, respectively.

Table 5. GMM estimation results of PVAR model

	h_dlnm2	h_druincome	h_dir
h_dlnm2	-0.01655	-0.03944**	-0.12725**
h_druincome	0.47149	0.12085**	0.30433
h_dir	-0.51488**	0.00894	0.17336
h2_dlnm2	-0.07377	0.00008	0.02582**
h2_druincome	0.09069*	0.03140	0.14085
h2_dir	0.09689	-0.01133*	-0.01634
h3_dlnm2	0.36737	-0.00761	-0.00976
h3_druincome	0.367394**	0.02734**	0.01751
h3_dir	0.02041	0.00838**	-0.00495
h4_dlnm2	-0.04265**	0.00166	0.00495
h4_druincome	0.47646*	-0.05084	-0.13076
h4_dir	0.01284*	-0.00859***	-0.02300**

Note: *, **, *** refer to statistical values significant at the 10%, 5% and 1% levels, respectively

The test value at 5% significant level indicates that the relationship is relatively significant. The table shows that monetary policy with lag 1 has a significant negative effect on rural residents' income and urban-rural income gap with coefficients of -0.12 and 0.304, respectively. monetary policy with lag 2 and lag 4 has a significant effect on urban-rural income gap with sizes of 0.026, -0.023, respectively. The above results indicate that monetary policy is an important cause of rural residents' income and urban-rural income gap.

5.3 Impulse response function and variance decomposition

5.3.1 Impulse response function

In order to further examine the dynamic effects of monetary policy shocks on rural residents' income and urban-rural income gap in the model, the generalized impulse response function is chosen for analysis in this paper, and the results are shown in Fig. The horizontal axis in the figure indicates the number of lags of the shock effect, the vertical axis indicates the impulse response function value, the red line indicates the path of the impulse response function value over time, and the blue and green lines indicate the positive and negative two times standard deviation deviation bands. Since this paper focuses on the relationship between monetary policy, rural residents' income and income disparity. Therefore, impulse response plots for other control variables in the system are not reported in detail here.
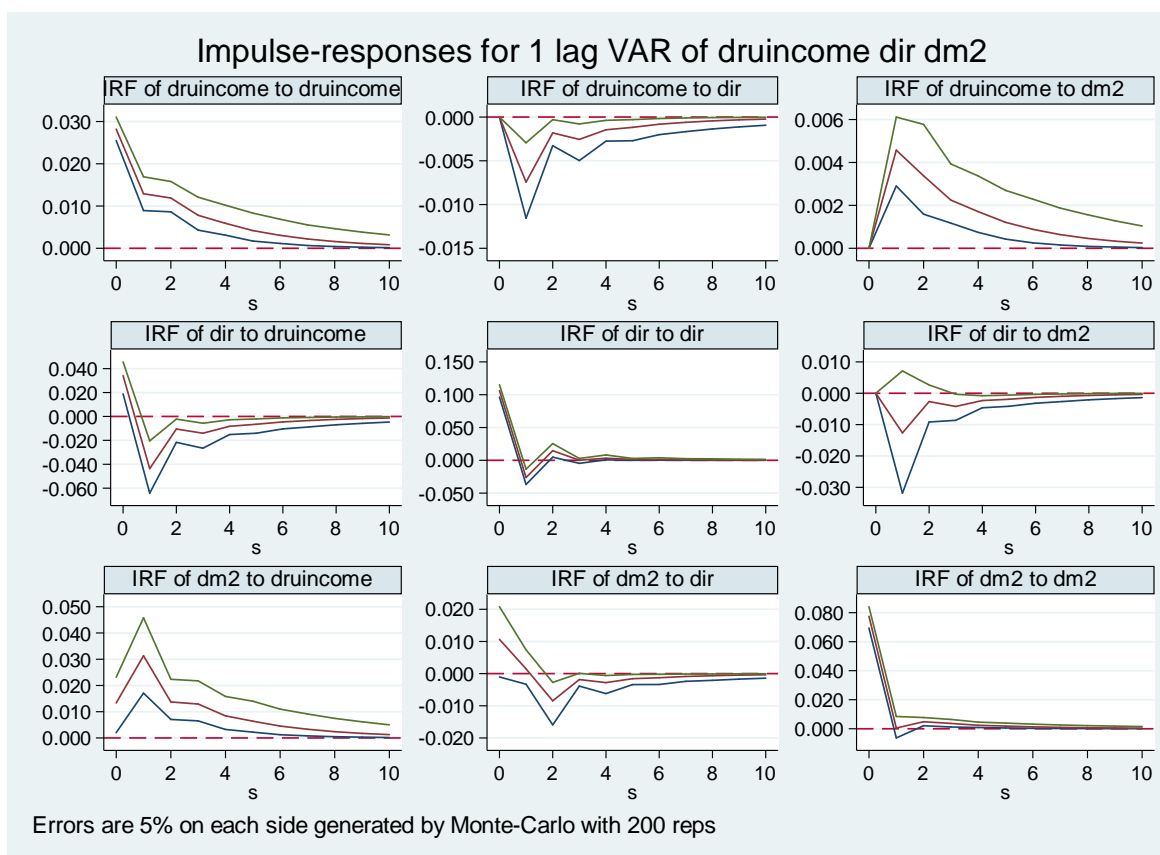

Figure.1. Impulse response diagram of the variables

Figure 1 presents the dynamic influence process of monetary policy, rural residents' income, and urban-rural income gap on each other. the responses of the 3 variables to orthogonalized shocks of one standard deviation size of themselves should gradually converge. The main concern of this paper is the trend of the first two plots in the third column, where the first plot is the response of rural residents' income to orthogonal shocks of monetary policy. It can be seen that monetary policy presents a positive shock to rural residents' income in general, peaking at lag 1, then slowly declining, and finally gradually converging to a value of 0. This indicates that China's monetary policy will show a positive response to rural residents' income in a longer period of time. The maximum response of rural residents' income to monetary policy shocks occurs in the first period, with a response value of 0.030.

The second figure depicts the effect of one standard deviation of orthogonal shocks to China's monetary policy on the urban-rural income gap. Very obviously, the urban-rural income gap has a positive response to monetary policy in the current period and converges rapidly to 0 in the lagged period, followed by a negative response in the urban-rural income gap, which peaks in the lagged

period 2 and gradually converges to 0 in period 3. The effect of monetary policy on the urban-rural income gap is not continuous, with positive effects in the short run and negative effects in the medium and long run.

5.3.2 variance decomposition

The variance decomposition enables further understanding of the contribution of a variable to the changes in other variables to reflect the relative roles of various factors. Therefore, we also performed variance decomposition on the basis of impulse response function. From the impulse responses of the variables of interest in Figure 1, it can be found that the variance decomposition tends to stabilize among the variables after five lags, so only the results of the variance decomposition with five lags are reported in this paper, and the results are shown in Table 6.

<p align="center">Table 6. Results of variance decomposition</p>

Decomposed variables	Number of periods	Decomposition variables		
		dm2	druincome	dir
dm2	1	0.954	0.028	0,018
druincome	1	0.000	1.000	0.000
dir	1	0.000	0,094	0.906
dm2	2	0．825	0.159	0.016
druincome	2	0.020	0.927	0.053
dir	2	0.011	0.202	0.787
dm2	3	0.797	0.178	0.025
druincome	3	0.027	0.924	0.049
dir	3	0.011	0.205	0.784
dm2	4	0.780	0.195	0.025
druincome	4	0.029	0.919	0.051
dir	4	0.012	0.215	0.774
dm2	5	0.772	0.202	0.025
druincome	5	0.031	0.917	0.052
dir	5	0.012	0.770	0.218

From the variance decomposition results in Table 6, it can be seen that the variance contribution of monetary policy is mainly from itself, which is 95.4% in period 1 and still occupies 77.2% in period 5, which means that the past monetary policy can explain the monetary policy making in the current period to a greater extent. Focusing on the impact of monetary policy on the income of rural residents and the urban-rural income gap, we find that, in general, the impact of monetary policy shocks on the income of rural residents is greater than the impact of monetary policy shocks on the urban-rural income gap. And the impact of monetary policy shocks on both has lags and persistence. However, the contribution of monetary policy to the urban-rural income gap is not far as the contribution of rural residents' income to the urban-rural income gap, and the impact of rural residents' income on the urban-rural income gap is as high as 77% at a lag of 5 periods, indicating that the income level is the main cause of the income gap, and monetary policy can only affect rural residents' income and the urban-rural income gap to a limited extent.

6. Conclusions and Policy Recommendations

This paper constructs a long-term equilibrium equation between monetary policy, rural residents' income and urban-rural income gap by establishing a PVAR model, and further analyzes the dynamic response process between these two using impulse response and variance decomposition. The following conclusions and corresponding policy recommendations are drawn.

First, monetary policy will continue to raise farmers' income level in a longer period of time and has an important positive effect on farmers' poverty reduction. Therefore, it is important to pay

attention to the important role of monetary policy in poor areas and build a new situation of "government-led financial institutions singing on the stage" to deepen the effect of poverty reduction in poor areas. The central bank should make full use of monetary policy tools, guide low-cost funds into poverty alleviation and development, mobilize financial institutions to participate in poverty alleviation, explore the use of monetary policy tools, and strengthen monetary policy publicity.

Second, monetary policy will lead to the widening of the urban-rural income gap in the short term, indicating that in the short term, China's monetary policy has significant effects in urban areas and will exacerbate the urban-rural economic disparity in China. The reasons for this are the unbalanced development strategy between urban and rural areas, the dualistic financial structure, and the difference in the level of financial development, which can explain this phenomenon. However, in the medium and long term, monetary policy can reduce the urban-rural income gap. The current study of the urban-rural disparity effect of monetary policy based on economic structural transformation and upgrading has positive practical significance for improving the effectiveness of China's monetary policy, correcting the urban-rural imbalance, and alleviating economic structural contradictions. Based on the above analysis, the author puts forward the following suggestions. First, considering the specific formulation and implementation of monetary policy in conjunction with the urban-rural differential effect of monetary policy can greatly improve the accuracy and effectiveness of monetary policy, and can also foresee the implementation effect of monetary policy more accurately. Secondly, when implementing monetary policy, it is necessary to base on the current economic structural transformation and upgrading background of the times, combine the differential interest rate, differential reserve ratio and other monetary policy differentiation operation tools based on the urban and rural difference effect of monetary policy, so that the structural adjustment utility of monetary policy can be effectively played. Thirdly, when implementing multiple policies, we should seek the cooperation between monetary policy, fiscal policy, credit policy and other related policies and measures to break the disadvantages of rural areas in terms of policy inclination and financial environment one by one, actively explore the space for monetary policy to play a role in structural adjustment, promote China's modernization process, realize the positive interaction between urban and rural areas, and complete the transformation of urban-rural dualistic economic structure to modern economic structure.

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