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An empirical analysis of the impact of financial development on the income gap between urban and rural residents in China - based on the PVAR model

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Abstract: Although the level of China's financial industry has developed rapidly, but the domestic problem of urban-rural development imbalance is becoming more and more serious, which has formed a serious obstacle to the development and progress of social economy. In order to explore the relationship between the level of China's financial development capacity and the income gap between urban and rural residents, this paper surveys relevant data from 30 provinces, municipalities and regions in a total of 17 years from 2002 to 2018, and introduces the income gap between urban and rural residents, the scale of financial development, and efficiency. Established a PVAR model based on related variables such as financial development structure, and then conducted co-integration test, Granger causality test, GMM estimation, impulse response and variance decomposition. The empirical results show that there is a long-term equilibrium relationship between various variables, and the urban-rural income gap It is the Granger reason for the scale of financial development, but there is no reverse causality. Through dynamic analysis, it is found that the urban-rural income gap is mainly affected by its own reasons. The scale of financial development can narrow the urban-rural income gap to a certain extent, and the efficiency of financial development is to a certain extent. Will widen the income gap between urban and rural areas, and the explanatory effect of the financial development structure can be ignored.

Key words: Financial Development;Income Gap Between Urban And Rural Residents;PVAR Model;GMM Estimation

1.The Introduction

The current situation of my country's dual society is extremely serious. According to statistics, in 2019, the per capita disposable income of urban residents in my country was 42,359 yuan, and that of rural residents was 16,021 yuan. The difference between the two was 26,338 yuan. In 2015, the gap was only 19773 yuan. How to solve the problem of the excessive income gap between urban and rural areas is one of the focuses of the most attention at the social level.

By the end of 2019, the balance of RMB deposits from financial institutions to the end of 2019 was 192,878.533 billion yuan, and the balance of RMB loans from financial institutions was 153112.32 billion yuan. The financial industry has an inseparable and inseparable role in the economic development of a country and the entire world, and its impact on the income gap between urban and rural areas is getting more and more attention. Therefore, it is of great practical significance to explore the role of financial development in the urban-rural dualization and whether there is an

economic relationship with the urban-rural income gap, and how to effectively implement relevant financial policies to narrow the urban-rural income gap.

2.The literature review

In recent years, scholars have discussed the urban-rural income gap from different dimensions, among which financial development is an important part.From the point of our existing research results, academic circles on the income gap between urban and rural areas and regional financial industry development in both studies, did not form a unified view, on the one hand that financial development can significantly reduce the income gap, LIU Yu (2019), and others used the relevant data of Hubei Province and used the VAR model to demonstrate the relationship between the urban-rural income gap and the development of the financial industry. The final result indicated that once the financial industry experienced rapid growth, the urban-rural income gap in the region would also decrease. However, the growth of modern sectors and the increasing efficiency of financial development have brought about a wider gap between urban and rural incomes . Zhang Yingliang, Xu Yadong (2020) and other scholars also drew similar conclusions. Zhang Yingli (2018) who used a vector error correction model (VECM), in order to build the financial and economic development, urbanization effect on the income gap between urban and rural areas,the results can be drawn finance economic development, urbanization will intensify all And the income gap between urban and rural areas . In the relevant research conducted by Yin Xiaobo (2020), it is also proposed that there is a large difference between the development of the financial industry, the level of urbanization and the total per capita income of urban and rural households .

At the same time, due to the obvious disparity in the level of economic development among different regions in China, there will be different relations between the financial development level and the urban-rural income gap in different regions. Meng Ge (2019) adopted a static panel model to our country as well as the eastern, central and western three areas of the whole provincial panel data, respectively, to do the regression analysis, research results show that the economic and social development level is higher place will be more quick step by step into the financial development and income gap between urban and rural residents . Guigang city center of the People's Bank of China branch group (2019) based on the analysis of pratt &whitney PVAR model of financial development in our country in various areas to reduce the level of income gap between rural and urban and rural, although have a certain role in promoting, but they have regional and differentiation, the lower the level of financial development in the greater the marginal effect .

To sum up, many literatures have concluded that there is a certain relationship between financial development and the gap in per capita income of urban and rural residents in my country. However, most scholars and experts analyze and research from the perspective of comprehensive indicators of financial development. The innovations of this article are as well as The contribution is based on the three perspective variables of the scale, efficiency, and structure of my country's financial development. At the same time, in order to accurately distinguish the differences between different regions, the panel data of 30 provinces in my country from 2002 to 2018 are selected, based on the statistics of Stata and Eviews. Software to analyze the impact of the development level of my country's financial industry on the income gap between urban and rural residents.

3.Theoretical mechanism analysis and research hypothesis

First, as the center position of China's financial system is based on bank, credit constraints policy easing conditions directly affect the financing main body would have more financial resources, in the continuous development of the financial, financial institutions can understand finance main body more accurate and effective credit information, enrich the type of mortgage loan, so as to relax the credit constraints, such as rural land management rights, such as mortgage loans, which makes the traditional rural credit guarantee ability is insufficient financing subject to the conditions for more financial resources, financial development will provide more financial tools for individual products,Diversified financial investment instruments, such as funds, trusts and financial products, have lowered the participation threshold

of all social strata, thus reducing the income gap between urban and rural residents. Therefore, the first hypothesis is proposed:

（1）The scale of financial development is negatively correlated with the income of urban and rural residents.

Secondly, the early stage of the founding of the people with heavy industry as the core strategy development, make the financial system is rural agricultural sector transfer of financial resources to the city's industrial departments tools, farmers can not access to the resources from the financial system, which means the development of the financial industry of the advantages is nothing compared to the farmers, instead, is the foundation of further enrich the urban development, makes the gap widened again.However, after the reform and opening up, China gradually adjusted its financial development strategy, so that rural areas could get more support from the financial system, and rural residents had more opportunities to participate in the financial system, which improved the urban-rural dual financial structure and reduced the urban-rural income gap (Feng Tao (2020)). Therefore, the second hypothesis was proposed:

(2) The financial development structure is negatively correlated with the income gap between urban and rural residents.

Deng Chuang (2019) mentioned in the article, follow the principle of efficiency first, the financial development in cities and towns has relatively strong ability to attract capital, thus improving the financial development of the savings and the formation of the capital did not benefit the country, all kinds of financial institutions in rural deposit-taking ability strong, but most of these savings will move to the city to invest, to some extent can increase the income gap between urban and rural areas , so this paper proposed a third hypothesis:

(3) The efficiency of financial development is positively correlated with the income gap between urban and rural residents.

4.Research design

4.1 Panel Vector Autoregressive Model (PVAR)

Scholars Holtz - Eakin claimed was first published PVAR model research scholar, he in the VAR model for the first time into the panel vector data, and clear its able to efficiently avoid the endogeneity problem, but also broke through the VAR model requirements needed for the time series of the limitation of big span, that is to say, may require a single space that contains both the individual effect and time effect.This model structure is used to observe all the variables in the system from the perspective of completing the system, and then use the orthogonalization pulse to influence them, and accurately judge the influence degree of different factors on the income gap between urban and rural residents in China through variance decomposition.Based on this, this paper adopts the PVAR model with four variables, which is set as follows:

$$Y_{i,t} = \alpha_i + \beta_t + \sum_{n=1}^{n} \eta_n Y_{i,t-n} + \varepsilon_{i,t}$$

Among them: is an endogenous variable of 4X1 dimension based on the panel data of provincial regions, respectively referring to the annual income GAP between urban and rural residents (GAP), financial development scale (DS), financial development efficiency (DE) and financial development structure (DC) of each province; The relevant regions in China are represented by I;The year is denoted by t;The lag period of the equation is represented by n; η_n is the parameter matrix with a lag period of n;The individual effect vector is represented by α_i;The time effect vector is denoted by β_t, $\varepsilon_{i,t}$ is a random disturbance term assuming normal distribution.

4.2 Variable description

4.2.1 The income GAP between urban and rural residents

There are many indicators that can reflect the income gap between urban and rural residents, such as Theil coefficient, Gini coefficient, coefficient of variation and so on.This paper refers to the index used in the research of

domestic scholar Lin Baomei (2021), that is, the ratio of per capita disposable income between urban and rural areas as a measure.

GAP= urban residents per capita disposable income/rural residents per capita net income

4.2.2 Financial Development Scale (DS)

In the late 1960s, Goldsmith published the calculation model of financial growth and development scale of relevant countries or regions through financial correlation ratio, that is to say, in a certain period of time, the ratio of the current total assets of a country or region to the national wealth of a country or region . This paper refers to the research practices of Zhang Qi (2020) and other scholars, who believe that the scale of banking institutions occupies the majority of the financial system. Here, the ratio between the loan balance of financial institutions and China's GNP is taken as the current situation of financial development in a country or region . The higher the ratio is, the larger the scale of financial development is.

DS= outstanding loans of financial institutions /GDP

4.2.3 Financial Development Efficiency (DE)

By referring to the relevant mechanism in the article of Zhang Min (2018), this paper calculates the capital conversion capacity of the market in relevant regions by selecting the ratio of the total loan balance and balance in the financial industry . The higher the ratio, the higher the efficiency of the development of financial institutions.

DE= loan balance of financial institutions/deposit balance of financial institutions

4.2.4 Financial Development Structure (DC)

Scholar Goldsmith(1969) published the concept of financial structure in the late 1960s and defined it as the comparison between the relative size of a financial instrument and the relative size of a financial institution.Its structure change is the industry development change itself.At the same time, according to the research conclusions of Li Zhifeng (2020) and other scholars, the ratio of the loan balance of financial institutions to GDP is used to represent the financial development structure .

DC= outstanding loans of financial institutions /GDP

4.3 Data source

Due to the lack of some data, this survey does not include the information of Tibet in China.The survey included 510 short panel data of annual observations from 2002 to 2018 in 30 provinces.The survey data are reliable and accurate, mainly from the statistical database of China Economic Network, Wind database and statistical yearbooks of various provinces and regions from 2013 to 2019. The missing data are made up by regression method.

Table 1: Descriptive statistics

The variable name	The number of data	The mean	The minimum value	The maximum	The standard deviation
GAP	510	2.897	1.701	4.759	0.575
DS	510	2.797	0.684	6.918	1.009
DE	510	1.374	0.622	2.461	0.254
DC	510	1.180	0.325	2.524	0.406

5.Empirical analysis

5.1 Research procedures

Firstly, the stationarity test of the observed values of each variable should be carried out by Eviews software. Then, Johanse-Juselius(JJ) co-integration test and Granger causality test should be adopted on the basis of maintaining the stationarity of the data. Then, impulse response and variance decomposition should be used to test the dynamic effect of the observation model.

5.2 Unit root test

In order to prevent the occurrence of false regression results, it is necessary to judge the stationarity of the sequence of observed values, that is, to check whether the sequence has unit roots.This paper USES the LLC, ADF, PP test, and through the Eviews9 software to realize the above inspection method, inspection results are shown in table 2, the table can be clearly seen under 5% significance level, the variable are off in the form of zero order single whole stationarity sequence, after the first order difference of data processing, according to the corresponding P values can be seen that the sequence under the significance level of 5% is smooth, can satisfy the prerequisite to build the model.

Table 2: Unit root test results

Variable	LLC test	ADF test	PP test	conclusion
GAP	1.0000	0.9999	1.0000	Unstable
dGAP	0.0000***	0.0000***	0.0000***	stable
DS	0.4469	1.0000	1.0000	Unstable
dDS	0.0000***	0.0000***	0.0000***	stable
DE	0.2013	0.4164	0.7287	Unstable
dDE	0.0000***	0.0000***	0.0000***	stable
DC	0.9742	1.0000	1.0000	Unstable
dDC	0.0000***	0.0000***	0.0000***	stable

Note: *** in the table indicates that P value is significant at the 1% significance level

5.3 Co-integration test

Table 3 shows that the variables are first-order integral and the original sequences are all non-stationary sequences. At present, it is necessary to carry out panel co-integration test to judge the long-term equilibrium relationship among its variables.If the co-integration test is successfully completed, it can indicate that the residual of the equation tends to be stable, so we can carry out the regression of the original equation on this basis.At present, there are three main co-integration test modes: Kao, Pedroni and Johansen. In this thesis, the Johansen test mode is used to complete the test process of the four variables. The final results are shown in the table below.At the significance level of 5%, there is a long-term stable correlation between GAP, DS, DE and DC.

Table 3: Co-integration test results

Number of cointegrating vectors	Fisher joint trace statistic (p-value)	Fisher joint characteristic root statistics (p-value)
None	731.4(0.0000)	545.7(0.0000)
At most 1	287.5(0.0000)	242.6(0.0000)
At most 2	109.1(0.0001)	94.3(0.0031)
At most 3	96.93(0.0018)	96.93(0.0018)

5.4 Granger causality test

The first step is to select the optimal lag order, and then start the Granger causality test.The proposition will be judged by AIC, BIC and HQIC.As can be seen from Table 4, a lag order of 1 is relatively good.

Table 4: Optimal lag order

Lag	AIC	BIC	HQIC
1	-8.96172	-7.65345*	-8.44464*
2	-8.89394	-7.34816	-8.28119
3	-9.06848	-7.25497	-8.34739
4	-9.28881	-7.17053	-8.44386
5	-9.34832	-6.87913	-8.36015

After confirming the optimal lag order, Granger causality test can be carried out. The final results are shown in Table 5: at the significance level of 5%, GAP is mutually causal with DE and DC, and GAP is the Granger cause of DS, while DS is not the Granger cause of GAP.

Table 5: Granger causality test

Null hypothesis (the Granger reason why the previous sequence is not the latter)	F statistics	P-value
DS-GAP	15.3929	0.0001***
GAP-DS	2.02443	0.1555
DE-GAP	23.0887	0.000002***
GAP-DE	10.0418	0.0016***
DC-GAP	29.2302	0.0000001***
GAP-DC	8.33686	0.0041***

Note: *, ** and *** represent the rejection of the null hypothesis at the significance levels of 10%, 5% and 1%, respectively

5.5 Panel moment estimation (GMM)

The optimal lag order of the PVaR model is 1. In order to prevent endogenicity of the system, the forward mean difference method is used to remove the individual fixed effect of the panel model species, that is, the first-order difference variables are selected as the instrumental variables to estimate the parameters.The estimated results of GMM are shown in Table 6 below, where B_GMM is the coefficient value, SE_GMM is the standard deviation, and T_GMM is the T statistic.In general, if the absolute value of t is not less than 2.58, it indicates that there is a significant relationship between the two variables at the significance level of 1%.If the absolute value of t is less than 2.58 but greater than or equal to 1.96, it indicates that there is a significant relationship between the two variables at the significance level of 5%.If the absolute value of t is greater than or equal to 1.64 and less than 1.96, it indicates that at the significance level of 10%, the two variables have significant relationship.If the absolute value of t is less than 1.64, it indicates that there is no significant relationship between the two variables.It can be clearly seen that, at the significance level of 5%, DS is negatively correlated with GAP, while DE and DC are positively correlated with income GAP.

Table 6: GMM estimation results

h_dGAP	b_GMM	se_GMM	t_GMM
L.h_dDS	0.07026991	0.06200458	1.1333018
L.h_dDS	-0.21956312	0.08002331	-2.7437394
L.h_dDE	0.41609302	0.11411681	3.6462028
L.h_dDC	0.39723445	0.20882887	1.9022008

5.6 impulse response and variance decomposition

Figure 1, the solid middle line in the impulse response diagram represents the variable response curve, while the dashed upper and lower lines represent the upper and lower bounds below the 95% confidence interval.The horizontal axis is the number of lag periods, and the vertical axis is the response size.It can be seen from the results, when the financial development scale (DS) began to impact the urban and rural residents' income GAP (GAP) can cause negative pulse response immediately, and in the first period for the minimum value, then began to gradually convergence, impact effect is abate, but are less than zero, the no.4 begin tends to zero, this means that in the long-term development, financial development scale of urban and rural residents income GAP remain negative effect, the size of the financial institutions to improve is conducive to narrow the income GAP between urban and rural areas;When the financial development efficiency (DE) starts to have an impact, the income GAP between urban and rural residents (GAP) will immediately have a positive impulse response. Its maximum value appears in the first phase, and it decays to 0 at the fifth phase.This means that in the long-term development, financial development efficiency has a positive effect on the income gap between urban and rural residents, and improving financial development efficiency will widen the income gap between urban and rural residents.When the financial development structure (DC) has an impact, the urban-rural income GAP (GAP) will immediately have a positive impulse response, but after the first period, it presents a negative response, and after that all are less than 0, which means that the optimization of the financial development structure in

the short term will promote the increase of the urban-rural GAP.

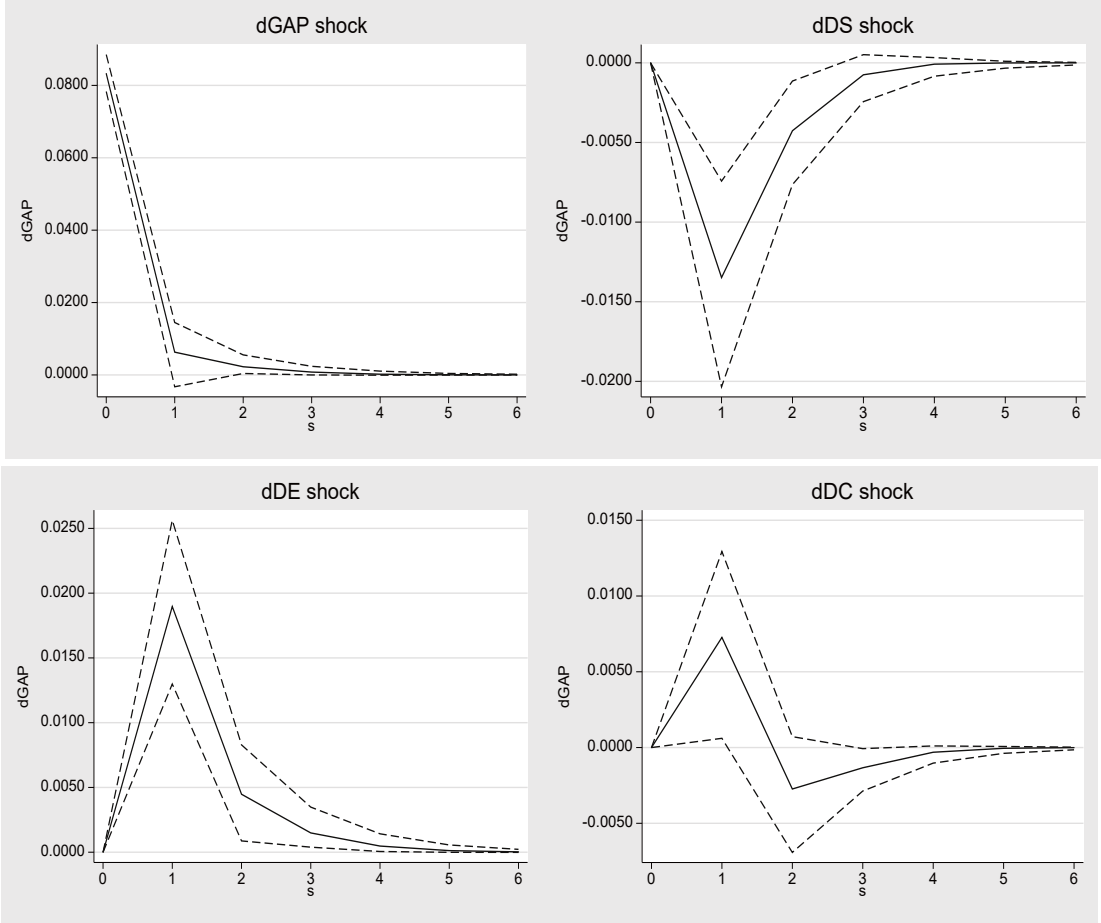

Figure 1: Impulse response diagram

What variance decomposition can show is that variances of variables have different impact decomposition forms at different time points.Explain the relevant content and use the process to determine the value each shock provides in the process of variable fluctuation. Table 7 can clear the income gap between urban and rural areas through the wave curve is the key to its own reason, its contribution is about 91.5%, followed by financial development scale, financial development efficiency in the three periods of contribution were similar, were 2.6% and 5%, respectively, and the structure of the financial development contribution to the lowest, at 0.8%, show that in the financial development of China's economic and social, the role of financial development scale and financial efficiency is significant, and the role of financial development structure can be almost completely ignored.

Table 7: Variance decomposition

	s	dGAP	dDS	dDE	dDC
dGAP	10	0.915381	0.2630283	0.05015822	0.00815795
dDS	10	0.01218748	0.91446056	0.00642893	0.06692303
dDE	10	0.00380449	0.00246581	0.99365665	0.00007304
dGAP	20	0.915381	0.02630283	0.05015822	0.00815795
dDS	20	0.01218748	0.91446056	0.00642893	0.06692303
dDE	20	0.00380449	0.00246581	0.99365665	0.00007304
dDC	20	0.01136128	0.67841421	0.21152276	0.09870175
dGAP	30	0.915381	0.02630283	0.05015822	0.00815795
dDS	30	0.01218748	0.91446056	0.00642893	0.06692303
dDE	30	0.00380449	0.00246581	0.99365665	0.00007304
dDC	30	0.01136128	0.67841421	0.21152276	0.09870175

6.Conclusions and Suggestions

The unbalanced state of urban and rural economic development has affected the great goal of my country's overall social and economic development, and finance, as an important link that directly promotes the development of modern society and economy, has an important role in the urban-rural income gap. This paper selects relevant data from 30 provinces, municipalities and regions in 17 years from 2002 to 2018, introduces related variables such as the income gap between urban and rural residents, the scale of financial development, efficiency and financial development structure, constructs a PVAR model, and then conducts a co-integration test. , Granger causality test, GMM estimation and impulse response and variance decomposition. The empirical results show that there is a long-term equilibrium relationship between various variables. The urban-rural income gap is the Granger reason for the scale of financial development, but there is no reverse causality. The analysis found that the urban-rural income gap is mainly affected by its own reasons. The scale of financial development can narrow the urban-rural income gap to a certain extent. The efficiency of financial development will expand the urban-rural income gap to a certain extent, and the explanatory effect of the financial development structure can be ignored.

Based on the above empirical analysis, in view of the problems existing in the current urban and rural residents income gap of our country, put forward the following Suggestions: first, rapid implementation of financial system reform process, implement the practice of the pilot work, the behavior of financial idling must put an end to, to make the root of the financial return to support the healthy development of the real economy, realize the whole society's common ascension;Second, a more perfect rural financial system should be formed, diversified financial service institutions should be established, and the rural status quo and financial industry should be organically integrated. Through the construction of multiple outlets, the overall development of rural finance should be realized.The government guided the development of private financial model, planned the construction of various types of financial guarantee institutions, and constantly develop the structure of rural financial industry;Third, gradually reduce the cost of farmers' loans, plan targeted interest rate management mechanism according to the actual situation in rural areas, and provide a series of preferential support policies for rural loan services, so as to reduce the cost of farmers' loans and rapidly promote the development of rural economy in China.The government should introduce a series of targeted policies to benefit farmers, introduce preferential forms closely related to rural life and production, and strengthen efforts to eliminate the urban-rural gap;Fourth, constantly adjust and strengthen the financial supervision mechanism, under the strong guidance of the government, quickly realize the road of rural financial development.In terms of regulatory norms, differentiated supervision should be carried out for some rural financial institutions, rather than "one size fits all".The government can support the economic development of rural entrepreneurs through various favorable policies, such as cash subsidies, free guarantee services, tax reduction and other behaviors, and give support to the development of rural financial industry, so that rural finance can bear rich fruits in the rural land of China.

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