

Research on the relationship between economic growth, financial development scale and financial output in Shanxi Province

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Abstract. In today's economic society, the development of the financial industry plays an increasingly important role in promoting the economy. Throughout the world and domestic provinces, economic development must be accompanied by the development of the financial industry, and the development of the financial industry will further promote economic growth. Therefore, this paper studies the factors promoting economic development from the perspective of financial industry. Combined with the economic situation and the current situation of the financial industry in Shanxi Province, using the time series data from 2000 to 2019, this paper analyzes the relationship between the change of economic growth and the change of financial output and the scale of financial development, constructs a VAR model, and carries out Granger causality test and variance decomposition. The results show that for Shanxi Province, the scale of financial development can promote economic growth and is a two-way causality, while financial output is not the cause of economic growth, and its impact has a negative response to economic growth. Finally, according to the research results, this paper puts forward some suggestions to improve the scale of financial development to promote the economic growth of Shanxi Province.

1 Introduction

With the rapid development of the world economy, the relationship between finance and economy is getting closer and closer. On the one hand, the continuous development of the economy has provided a material basis for the rapid development of the financial industry. On the other hand, the functions of the financial system, such as transferring resources across time and space, managing risks and so on, have created more wealth for economic construction. Achieving economic growth is the goal pursued by every country and government. Our country has successfully won the battle against poverty, and the people's living standards have improved. However, there is still a contradiction between the growing needs of the people for a better life and unbalanced and inadequate development. China has a vast territory. Due to various factors, there is a phenomenon of unbalanced regional economic growth, that is, the economic growth in the eastern region is higher than that in the central and western regions. Some provinces have made use of their geographical and policy advantages to achieve rapid economic growth, such as Guangdong; While provinces like Shanxi are rich in energy, their economic status is not optimistic. In recent years, Shanxi Province has made great efforts in transformation and development[1]. Although it has made some progress, it is not satisfactory in the GDP ranking of each province.

As far as Shanxi Province is concerned, it has always relied on coal resources for development. On the whole, the real economy accounts for the main component. Today, the development of the tertiary industry has improved the economy of many cities, especially the role of the financial sector in promoting economic growth is self-evident. So whether the reform and development of the financial sector can promote the economic growth of Shanxi and provide financial support for the transformation of the resource-based economy, This is a problem worth studying. On the one hand, it is helpful to find out the problems existing in the financial industry in the process of supporting economic development, and find an effective path for financial development to promote economic growth from reality; On the other hand, it can promote economic transformation to a certain extent, break the dilemma of "resource curse" and effectively complete the objectives of the 14th five year plan[2-4].

The innovation of this paper is to add the indicator of financial output to the research. The previous literature usually only studies the relationship between economic growth and financial development. If the relationship between three variables is studied, it usually introduces the indicators of financial efficiency and financial structure, which enriches the research on financial output[5]. At the same time, some resource rich provinces in China have similar economic development status. This study can provide ideas for the economic development of other similar provinces.

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2 Theoretical analysis and research hypothesis

2.1. Financial development scale and economic growth

Financial capital is the most basic element of economic growth. When capital is scarce, financial institutions, especially banks, will only provide financial support for certain industries or specific types of enterprises, and other industries or enterprises will be hindered by the lack of financial support. Therefore, if the financial scale stays at a low level for a long time, economic growth will be limited. Only when the scale of financial development reaches a certain amount, can financial development better promote economic growth. At the same time, economic growth will make the overall economic system abundant in funds, thereby increasing the scale of financial development. Considering the reality of Shanxi Province, its financial development scale and economic development level are at a low level in all provinces of the country[6], so this paper puts forward hypothesis 1:

H1: the increase of financial development scale in Shanxi Province can promote economic growth; At the same time, economic growth will in turn promote the scale of financial development.

2.2 Financial output and economic growth

The output of the financial industry measures the development level of the financial industry to a certain extent, and can also reflect the operational efficiency of the financial system. The higher the output level of the financial industry, the greater the results of financial activities in a certain region in a certain period of time. Generally speaking, the higher the economic development level of a region, the more perfect its financial system will be, and the higher the output level of the financial industry will be. Therefore, the output of the financial industry can only be improved with a certain degree of financial support. When the financial industry develops to a certain extent, the efficiency of financial output will gradually improve, which will enhance the economic benefits of the region[7]. Considering the actual situation of Shanxi Province, its economic growth is backward and its financial output is low, the following assumption 2 is put forward:

H2: for Shanxi Province, which is backward in economic and financial development, economic growth can promote the improvement of financial output. However, due to the imperfect financial system in Shanxi Province, financial output can not effectively promote economic growth at this stage.

3 Empirical analysis

3.1. Current situation analysis

With the rapid growth of the national economy, the economic and financial scale of Shanxi Province has also

been developed to a certain extent, the quality of economic development has been continuously improved, and the overall financial and economic development has stepped up to a new level. Based on the actual situation of Shanxi Province, this chapter makes an in-depth analysis and Discussion on the current situation of financial development and economic growth, so as to lay a practical foundation for the further study of the following text. The data sources of the following charts are CSMAR database and the website of the National Bureau of statistics.

In recent years, China's economy is growing rapidly, the regional GDP of Shanxi Province is also expanding, and the overall strength and per capita level have been improved to a certain extent. However, compared with the national development level, the economic development level of Shanxi Province is still relatively backward. Figure 1 shows the comparison between the per capita GDP of Shanxi Province and the national per capita GDP. 10 years ago, the gap between the per capita level of Shanxi Province and the national per capita level was small, while the gap between the per capita GDP and the national per capita level in the past five years was growing, indicating that Shanxi Province urgently needs to change its economic development model.

As for the financial industry, for Shanxi Province, the development and scale of the banking industry is significantly stronger than that of the securities industry and insurance industry, and the deposit and loan ratio is relatively low, indicating that the profitability of the banking industry in Shanxi Province is poor and the liquidity of funds is not strong. The development of the securities industry and insurance industry is slow and difficult, and there is great room for progress in these two industries. At the same time, the output level of the financial industry is relatively low.

3.2. Empirical analysis

By studying the academic achievements of scholars, we can find that there is a close relationship between economic growth and financial development scale and financial output. Therefore, this paper uses the relevant knowledge of econometrics to select appropriate data and models to study the economic growth of Shanxi Province. Considering that economic growth, financial development scale and financial output may be interactive, and the time series number of relevant variables may be unstable, using the traditional econometric regression method will bring some problems[8]. Therefore, using the multi equation model to consider the action direction of variables and the dynamic relationship in the time dimension can effectively avoid these problems, vector autoregressive model (VAR model) is used for analysis.

In this paper, GDP is used to describe economic growth; The value added of financial industry is used to describe the change of financial industry output, which is expressed by AVF; Use the balance of deposits and loans of financial institutions to describe the changes in the scale of financial development, expressed in lbf. Since the economic data are usually distributed in a skew manner, the above data are in logarithmic form, i.e.

lnGDP, lnnavf and lnlnbfi. The data source is the statistical yearbook of Shanxi Province from 2000 to 2019. The vector autoregressive VAR model is constructed by using the software evIEWS10, and the Granger causality test, impulse response analysis and variance decomposition are carried out[9].

3.2.1 Unit root inspection

In order to avoid pseudo regression, and the premise of using VAR model is that the data is stable, this paper uses the unit root test to test the stability of the data. According to the test results, the original series of lnGDP, lnlnbfi and lnnavf all have unit roots and are unstable. Their first-order difference series are stable, that is, they are all first-order single integer series, in which lnGDP and lnlnbfi pass the 5% significance level. The results of the following table are obtained by using Eviews.

Table 1. ADF test.

| | ADF | Prob. | First order differential ADF | Prob. |
|---------|---------|--------|------------------------------|--------|
| lngdp | -2.6476 | 0.1014 | -4.0183 | 0.0278 |
| lnnavf | -1.9355 | 0.3096 | -2.7653 | 0.0853 |
| lnlnbfi | -1.5310 | 0.7793 | -4.2902 | 0.0042 |

3.2.2 Selection of optimal lag order

Before using VAR model analysis, it is necessary to select the optimal lag order. VaR is established for lnGDP, lnlnbfi and lnnavf. The optimal lag order selected according to AIC and SC criteria is order 2. Therefore, VAR (2) model is established.

In order to further investigate the dynamic relationship among the three, the author first tests the stability of the VAR model. The results show that all the characteristic roots of the corresponding characteristic equation are within the unit circle (as shown in Figure 1), which further shows that the VaR (2) model is stable, that is, there is a stable long-term relationship among the variables[10]. The results of the following table are obtained by using Eviews.

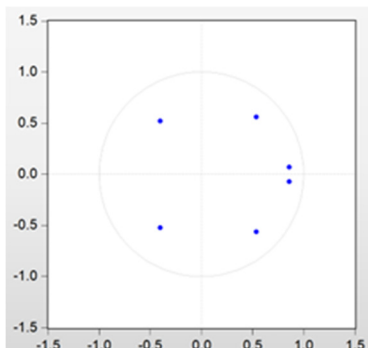


Fig. 1. Model diagnosis.

3.2.3 Granger causality test

Granger causality test can explain whether there is a causal relationship between variables. If the lag term of a will have a certain impact on B, it is said that a is the

Granger cause of B. if the past value of B is given, the future value of B can be predicted by using the past value of A. In this paper, Granger causality test is used to analyze whether there is a causal relationship among changes in economic growth, financial output and financial development scale[11]. See Table 2 for specific test results. The results of the following table are obtained by using Eviews.

The test results show that the change of financial development scale is the Granger cause of economic growth, while the change of financial output is not the Granger cause of economic growth; The change of financial development scale is not the Granger cause of the change of financial output, but economic growth is the Granger cause of the change of financial output; The change of financial output and economic growth are both Granger reasons for the change of financial development scale. That is, economic growth and changes in the scale of financial development are mutually causal.

Table 2. Granger causality test.

| Original hypothesis | Chi-sq | df | Prob. |
|---|---------|----|--------|
| lnnavf is not the Granger cause of lngdp | 1.3396 | 2 | 0.5118 |
| lnlnbfi is not the Granger cause of lngdp | 6.6162 | 2 | 0.0366 |
| lnnavf、lnlnbfi are not the Granger cause of lngdp | 7.5030 | 4 | 0.1116 |
| lngdp is not the Granger cause of lnnavf | 20.0036 | 2 | 0.0000 |
| lnlnbfi is not the Granger cause of lnnavf | 1.8687 | 2 | 0.3928 |
| lngdp、lnlnbfi are not the Granger cause of lnnavf | 42.1953 | 4 | 0.0000 |
| lngdp is not the Granger cause of lnlnbfi | 9.7903 | 2 | 0.0075 |
| lnnavf is not the Granger cause of lnlnbfi | 16.1881 | 2 | 0.0003 |
| lngdp、lnnavf are not the Granger cause of lnlnbfi | 22.4127 | 4 | 0.0002 |

3.2.4 Variance decomposition

In econometric research, variance decomposition technology can be used to explore the contribution rate of other factors to their own results [12]. The variance decomposition results in Table 3 are from EViews software.

The results show that, from the variance decomposition of economic growth, in addition to the impact of the scale of financial development itself, the scale of financial development has a strong impact on the forecast variance of economic growth, while the impact of financial output is weak. Therefore, stimulating economic growth from the perspective of financial development scale will have certain effects. From the perspective of variance decomposition of financial output, self-influence is weakening, and the impact of economic growth on the forecast variance of financial output is gradually increasing. In the fourth period, it exceeded the self-influence of financial output, and the scale of financial development had a certain impact, but the

impact was small. From the perspective of variance decomposition of financial development scale, the impact of financial development scale itself is weakening, and the impact of economic growth on the forecast variance of financial development scale is gradually increasing. In the

fourth stage, it has exceeded the impact of the scale of financial development itself, and financial output has a certain impact, but the impact is small. This further shows that economic growth can promote financial output and scale of financial development.

Table 3. Variance decomposition.

| | Economic Growth | | | Financial Industry Output | | | Scale of Financial Development | | |
|----|-----------------|--------|---------|---------------------------|---------|--------|--------------------------------|---------|---------|
| | lngdp | lnavf | lnlbf | lngdp | lnavf | lnlbf | lngdp | lnavf | lnlbf |
| 1 | 100.0000 | 0.0000 | 0.0000 | 19.3603 | 80.6397 | 0.0000 | 0.5103 | 18.7931 | 80.6966 |
| 2 | 88.8629 | 1.0096 | 10.1275 | 13.9020 | 82.4333 | 3.6647 | 5.9317 | 19.8726 | 74.1957 |
| 3 | 84.1676 | 3.8391 | 11.9933 | 34.2841 | 60.4100 | 5.3059 | 38.2439 | 14.2954 | 47.4607 |
| 4 | 86.1717 | 3.0281 | 10.8002 | 49.5079 | 45.6724 | 4.8197 | 50.7731 | 14.5036 | 34.7233 |
| 5 | 86.8088 | 2.6010 | 10.5902 | 55.7736 | 37.7979 | 6.4285 | 62.9818 | 12.4779 | 24.5404 |
| 6 | 87.8685 | 2.3291 | 9.8024 | 61.5097 | 30.7351 | 7.7552 | 72.3307 | 9.4677 | 18.2016 |
| 7 | 88.8223 | 2.1028 | 9.0750 | 64.6292 | 26.5390 | 8.8319 | 77.0774 | 7.4330 | 15.4896 |
| 8 | 89.2449 | 1.9723 | 8.7828 | 67.4034 | 23.8203 | 8.7764 | 79.6899 | 6.3089 | 14.0011 |
| 9 | 89.4600 | 1.9497 | 8.5903 | 69.9375 | 21.7225 | 8.3401 | 81.1381 | 5.6041 | 13.2579 |
| 10 | 89.5266 | 1.9505 | 8.5229 | 71.7849 | 20.2274 | 7.9877 | 82.1989 | 5.1013 | 12.6998 |

3.3. Conclusions

Using the data of Shanxi Province, this paper makes an empirical analysis on the relationship between economic growth, financial output and the scale of financial development. It is found that, first, the growth of the scale of financial development will promote economic growth, and there is a two-way Granger causality between the two variables, and the impact of the scale of financial development will bring a positive response to economic growth, At the same time, in the variance decomposition of economic growth, the scale of financial development has a greater impact on it. Therefore, to improve the economic growth of Shanxi Province, we can improve the scale of financial development, that is, hypothesis 1 is true; Second, financial output is not the Granger cause of economic growth, but there is a one-way causal relationship between them. At the same time, the impact of financial output will bring negative response to economic growth, and the impact of financial development scale on economic growth is very small in the variance decomposition of economic growth, that is, hypothesis 2 is true. To sum up, for the development status of Shanxi Province, economic growth can only be achieved by promoting the scale of financial development but not too much use of funds to promote the output of the financial industry.

4 Policy recommendations

Using the time series data of Shanxi Province for 20 years, this paper makes an empirical test on the relationship between the scale of financial development and economic growth, financial output. The results show that the scale of financial development in Shanxi Province has a positive response to the impact of economic growth, and presents a two-way Granger effect relationship; The impact of financial output and economic growth is a negative response, and it is not the Granger cause of

economic growth, which shows that the financial support to the economy only stays in the quantitative expansion, but does not achieve the improvement of output. Therefore, in order to give full play to the supporting role of the financial industry in economic growth and promote sustainable economic development, the following suggestions are put forward.

4.1. Deepening banking reform

The characteristic of Shanxi Province is that the five major state-owned banks are in the dominant position, and the development of small and medium-sized commercial banks is relatively slow. This situation makes the banks have a strong ability to absorb deposits, but makes the loan business lack of liquidity. Therefore, the deposit business system is relatively perfect. The preferred investment method of most ordinary people is bank deposits, and the loan business still has a lot of room for development. First, we should appropriately lower the loan standards, solve the problem of financing difficulties for small and medium-sized enterprises, and support the development of private enterprises; Second, reduce the loan interest rate, encourage enterprises and individuals to invest in loans, and enhance the liquidity of the overall capital; Third, change the direction of loan investment. At present, a large amount of funds are used for resource-based enterprises. We should support the development of small and medium-sized enterprises while properly supporting resource-based enterprises, and support the development of high-quality innovative enterprises.

4.2. Expand the direct financing market

From the analysis of the current situation in Shanxi Province, the main way of financing is indirect financing. With the continuous growth of the capital market in recent years, although the direct financing market is also growing, the overall development is still insufficient, and indirect financing is still the most important way of

financing. Therefore, we should continue to strengthen supervision, establish a capital market under the formal financial system, deepen the financing structure, constantly adjust the role of the capital market as an engine of economic growth, expand the direct financing market, and constantly optimize the development role of financial support in adjusting economic strategies. Make full use of the long-term and stable characteristics of insurance funds to raise funds for regional transportation, new energy construction and other projects, constantly explore the advantages of trust mechanism, fund mechanism and asset securitization in asset management and capital allocation, and open up a new channel to play the role of multi-level financial capital.

4.3. Guiding finance to promote real economy

In view of the actual situation of Shanxi Province, we should further improve the ability of the financial system to serve the real economy through reform. On the one hand, we should respect the development law of the financial system itself, actively learn from international good practices and experience, and improve the efficiency of the financial system and the scale of financial development; On the other hand, accelerate the process of factor marketization, especially to promote the reform of capital factor marketization, provide capital strength for the development of the real economy, constantly promote the financial marketization, improve the efficiency of capital factor allocation through market mechanism, and promote the transformation of savings into investment to act on the real economy.

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