Research on Regional Financial Development and Local Economic Transformation and Upgrading

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Abstract

Based on the research at home and abroad, this paper systematically sorts out the impact mechanism of financial development and local industrial transformation and upgrading, analyzes the internal relationship between financial development and local industrial structure upgrading, and makes an empirical study on this major problem by using the data of Shandong Province from 2003 to 2019. It is found that there is a long-term equilibrium relationship between financial development indicators and industrial transformation and upgrading indicators in Shandong Province. The contribution of local financial development to the tertiary industry is the largest, while the contribution to the primary industry is relatively small. Therefore, in order to further promote the transformation and upgrading of local economy in Shandong Province, we should optimize the financial structure, improve the quality of financial products and services, and improve the financial system.

Keywords

Financial development; Local economic transformation and upgrading; VAR

Introduction

In recent years, the relationship between financial development, financial structure and local economic transformation and upgrading has been widely concerned by economists. Financial development has become an important theory to guide the economic growth of developing countries. In 1969, Goldsmith published "financial structure and financial development", and founded the theory of financial development. In 1973, Mikinnon and Shaw put forward the theories of "financial repression" and "financial deepening", respectively. They believed that the market economy and capital market of developing countries were divided. In this state, Keynesian policy view of reducing interest rates would no longer hold, and thus the modern financial development theory was formally formed. Later economists studied the relationship between financial development and economic growth. Contrary to the previous conclusion, it would be more appropriate to

maintain a positive and relatively high level of real interest rate under low inflation rate, and advocated the implementation of rapid financial liberalization policies to promote economic growth. However, the practice of many developing countries has proved that this view is too radical. The financial development of developing countries should not copy the full liberalization policies of developed countries, but also need to be properly controlled. Therefore, after the 1990s, Hellmann, Murdock and Stiglitz put forward the theory of financial constraints. The economists represented by Levine have made a deeper research on the modes, ways and mechanisms of financial development promoting economic development. Since then, there have been a large number of empirical analysis on the relevant theories of financial development.

Based on the research on regional financial development and local economic growth at home and abroad, it can be found that financial development promotes economic growth by providing a variety of financial products and services. The main channels include promoting the accumulation of material capital and promoting technological progress (Levine, 1997). China's GDP has grown rapidly in recent years and has become the second largest economy in the world. However, the current economic growth rate of China is declining, and there are some problems in the process of transforming from high-speed growth to high-quality growth. There are still some problems in the process of economic development, such as high input and low output, low industrial level, weak technological innovation ability and weak sustainable development ability. After more than 30 years of extensive development, China's economy urgently needs to speed up technological innovation, realize the transformation and upgrading of local economy, and cooperate with the development of corresponding financial system, so as to better serve the real economy. Therefore, based on the existing research, this paper systematically combs the impact mechanism of regional financial development and local economic transformation and upgrading, and takes Shandong Province as an example for empirical analysis.

Literature Review

Pagano (1993) used AK model to study the impact of financial system on economic growth, and found that financial development can increase economic growth rate by increasing marginal productivity of social capital. Based on the basic Schumpeterian growth model, Aghion & Howitt (1998) pointed out that financial development improves economic growth rate by promoting technological progress. Allen (1993), Morck & Nakamura (1999) and Boot & Thakor (1997) found that market-oriented capital market is more suitable for high innovation and high-risk investment projects than bank intermediary oriented financial system, while Bank oriented financial system is more suitable for traditional low-risk investment projects. Levine (1997) thinks that the difference of financial system structure can not affect the total growth difference of the two countries, but can effectively increase the growth of different industrial sectors, thus affecting the industrial structure. Greenwood (1991) and Jovanovic (1997) found that finance and economic growth characterized by changes in industrial structure are mutually causal.

In China's research, Tan Ruyong (1999) and Han tingchun (2001) conducted empirical studies on China's financial development and economic growth, and found that the development of financial development has a significant positive effect on economic growth. Referring to Goldsmith's ideas, fan Fangzhi and Zhang Lijun (2003) divided China into three regions: the Eastern Region, the Central region and the Western Region. They

recognized the financial development from the perspective of financial structure transformation, selected the financial related ratio as the explanatory variable, and the output value of the secondary and tertiary industries divided by the actual GDP of each year as the explanatory variable The conclusion further affects the economic development. Chen Zhimei and Yang Deyong (2007) made a systematic analysis on the mechanism of financial impact on industrial structure adjustment, and made time series analysis and Empirical Study on the impact of financial structure on industrial structure. They found that financial structure, economic growth and industrial structure are highly correlated, and they weaken with the increase of economic monetization. Yang Lin and Li Jianwei (2002) conducted theoretical and empirical research on the correlation mechanism between China's financial structure upgrading and real economic structure upgrading. Fu Jin and Wu Xiaoping (2005) discussed the mechanism of financial influence on industrial structure adjustment from the perspective of capital formation mechanism, capital guidance mechanism and credit catalytic mechanism. Taking the central region as an example, Liu Ganzhou (2005) concluded that the upgrading of industrial structure in the central region needs the unconventional development of regional finance and the innovation of financial service means. Ye Yaoming and Ji Cuiling (2004) took the Yangtze River Delta Urban Agglomeration as the research object, and concluded that the financial development of the Yangtze River Delta urban agglomeration can effectively promote the upgrading of the regional industrial structure. Hui Xiaofeng and Shen Jing (2006) studied the relationship between financial development and industrial structure upgrading in Northeast China by using multiple regression analysis. Zhang Lila (2000) analyzed the important role of financial innovation and financial development from the overall goal of Guangdong industrial structure adjustment and upgrading. Zhang Wenyun and Xu Runping (2004) analyzed the effects of economic development, industrial structure upgrading and financial support in the Pearl River Delta, and concluded that the financial support system played a key role in effectively gathering and allocating financial resources in the process of adjusting the industrial structure of the Pearl River Delta.

Although scholars at home and abroad have done extensive research on the correlation mechanism and empirical research of financial development and economic growth, there are few studies on financial development and local economic transformation and upgrading, and the existing research is relatively sufficient in the theoretical basis and research methods for developed countries, and the understanding of the actual national conditions and financial development of developing countries is not deep. This paper uses time series analysis and multiple regression method, using the data of Shandong Province in China, to empirically analyze the correlation mechanism between regional financial development and local economic transformation and upgrading.

The Influence Mechanism of Regional Financial Development on the Transformation and Upgrading of Local Economy

Finance affects the flow structure of capital, the distribution structure of production factors and the structure of capital stock by affecting savings and investment, and finally affects the industrial structure, thus promoting the transformation and upgrading of local economy. The development of regional finance can adjust the stock structure and incremental structure, so as to permeate the whole process of industrial development. Through financing, resource allocation and credit catalytic function, it becomes an important realization mechanism of industrial structure upgrading and guides the transformation and upgrading of local economy.

First of all, the formation of capital affects the formation of industrial structure. The financial system overcomes the information asymmetry of individual depositors gathering loan enterprises. Relying on the financial system institutional arrangement, it plays a guiding role in social funds and changes the level and allocation pattern of funds. For the industrial groups in the start-up stage of industrialization, small production scale and backward technology, they are eager to expand the business scale and develop new products and new technologies. There must be a large number of long-term capital support. For the decline, exit and Industrial Differentiation and reorganization of traditional industries, there must also be an efficient industrial capital transformation mechanism.

Secondly, capital orientation promotes the adjustment of industrial structure. The competitiveness of the financial system allocates the savings funds among the investments with different yields and risks, so that the funds can flow efficiently among the industrial sectors according to the economic principles, adjust the allocation of funds, and improve the average rate of return of social funds. Capital flows to sectors with high yield, and industries with high added value and high profit rate win capital resources, thus adjusting the industrial structure. On the other hand, it creates macro preconditions for industrial structure adjustment through policy finance, that is, general monetary policy tools. Different interest rate policies should be adopted to encourage or restrict different industries, industries and enterprises, so as to guide capital investment. The government can also make investment and loans to other financial institutions that are unwilling or unable to provide funds, as well as key and emerging industries with insufficient investment, so as to realize the correction and supplement of commercial finance.

Thirdly, credit catalytic mechanism promotes industrial development. The essence of financial credit catalytic mechanism is to accelerate the formation of capital and the effective use of resources by expanding the amount of money, that is, credit creation, so as to realize the potential resources and promote the upgrading of industrial structure. Financial development promotes the development of enterprise group and internationalization, provides financial resources for enterprise merger and reorganization, and provides necessary conditions for industrial growth, thus accelerating the adjustment of industrial structure. The economic development of developed countries shows that the degree of industrial development and the adjustment and optimization of industrial structure are increasingly inseparable from the participation and penetration of financial factors.

An Empirical Study on Financial Development and Local Economic Transformation and Upgrading in Shandong Province

Shandong Province is a province with large economy and population in China. Figure 1 shows the change trend of the proportion of the output value of the primary industry, the output value of the secondary industry and the output value of the tertiary industry in Shandong Province. It can be seen from Figure 1 that the proportion of the output value of the primary industry shows a downward trend, from 34.70% in 1985 to 7.20% in 2019, while the proportion of the output value of the secondary industry and the tertiary industry gradually increases, and the proportion of the output value of the secondary industry is gradually increasing After nearly 50 years of dominant share, there has been a downward trend since 2006. The development of the tertiary industry is relatively slow. Compared with other provinces in China, the proportion of tertiary industry

output value in Shandong Province is relatively low, and there is still room for improvement. Overall, in recent years, Shandong Province has made some achievements in the transformation and upgrading of local economy and the transformation of new kinetic energy. This paper will focus on the financial factors in the driving force of economic transformation and upgrading.

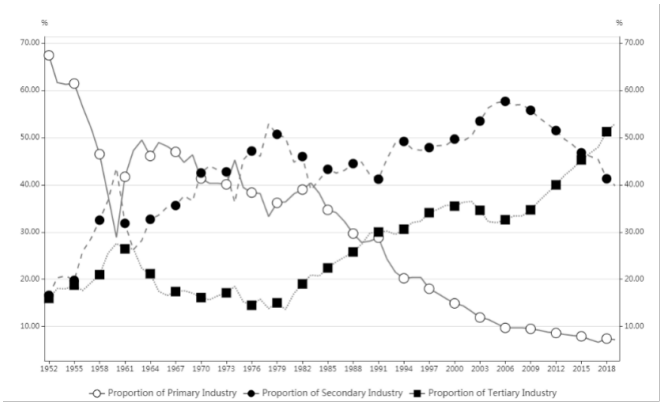

Figure 1. 1952-2019 changes of industrial structure in Shandong Province

Based on the selection of economic variables and unit root test, this paper studies whether there is a long-term stable relationship between regional financial development and local economic transformation and upgrading in Shandong Province through co integration analysis and Granger causality test, so as to ensure the scientificity and reliability of the research.

Variable selection and data source

This paper studies the correlation mechanism and empirical test between regional financial development and local economic transformation and upgrading. The variables involved mainly include indicators reflecting the changes of industrial structure and indicators reflecting financial development. This paper selects the industrial structure optimization rate to reflect the economic transformation and upgrading, which is equal to the proportion of the total output value of the secondary and tertiary industries in GDP. In addition, considering that for China, financial institutions play an important role in the allocation of funds, among which deposit money banks are the main body of financial institutions, so this paper selects the quantitative indicators of Financial Deepening -- financial correlation ratio and efficiency index of financial development -- deposit loan ratio to measure the financial development level of Shandong Province. The financial correlation ratio is equal to the ratio of total deposits and loans of financial institutions divided by GDP, indicating the expansion of financial scale. The deposit loan ratio is equal to the ratio of total loans to total deposits of financial institutions, which indicates the efficiency of financial intermediaries in converting savings into loans. This paper selects the data of GDP and output value of three industries in Shandong Province from 2003 to 2019, as well as the deposit and loan data of financial institutions in Shandong Province, and calculates the optimization rate of industrial structure, financial related ratio and efficiency indicators of financial development. The data are from the National Bureau of Statistics and the people's Bank of China.

Unit root test

In order to ensure the stationarity of each sequence, ADF test method is used to test the stationarity. The results are shown in Table 1.

Table 1. Results of Unit Root Test

Tested variables	ADF test value	1% critical value	5% critical value	10% critical value	Conclusion
SRI	-4.171849**	-4.728363	-3.759743	-3.324976	Stable
FIR	-9.520646***	-4.667883	-3.733200	-3.310349	Stable
SLR	-3.119234**	-3.920350	-3.065585	-2.573459	Stable

*Note: ** and *** respectively indicate the MacKinnon critical value of the ADF test value less than 5% and 1%, and reject the original hypothesis of unit root, that is, the test sequence is stable.*

According to the ADF test results, the ADF test value of SRI is -4.171849, less than the MacKinnon critical value -3.759743 of the 5% level. Therefore, the original hypothesis of unit root is rejected at the significant level of 5%, and the variable of SRI is stable. Similarly, FIR and SLR are also stable at the significant level of 1% and 5%, respectively. Therefore, the above variable have passed the stationary test.

Selecting of lag order for VAR model

When constructing the VAR model, this paper tries to determine the optimal lag order by selecting different lag orders and weighing the criteria. The result is shown in Table 2.

Table 2. Determination of optimal lag order

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.353520	NA	0.281357	1.558920	1.680147	1.514037
1	-2.526652	5.102490	0.178419	1.087775	1.249411	1.027932
2	-1.338400	1.386295	0.177727	1.056400	1.258444	0.981596
3	5.512331	6.850731	0.070089	0.081278	0.323731	-0.008487
4	11.22763	4.762751*	0.034247*	-0.704606*	-0.421743*	-0.809331*
5	11.95976	0.488086	0.039886	-0.659960	-0.336689	-0.779647

Note: indicates lag order selected by the criterion*

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 2 shows that according to all the criterions which are LR criterion, FPE criterion, AIC criterion, SC criterion and HQ criterion, the optimal lag order is 4. The larger the lag order is, the smaller the degree of freedom. Then, the optimal lag order is obviously 4.

Cointegration test

For the analysis of time series data, the stationarity test and cointegration test are essential. Only when the stationarity and co integration exist among variables can the requirements of data analysis be satisfied. Therefore, this paper carries out cointegration test on variables. For multiple variables, Johansen multiple test method is used in this paper. The test results are shown in Table 3.

Table 3. Results of Cointegration Test

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.925039	75.71258	42.91525	0.0000
At most 1 *	0.773171	36.85075	25.87211	0.0015
At most 2 *	0.622113	14.59738	12.51798	0.0221

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

The results in Table 3 show that, at the 95% confidence level, when the original hypothesis is "no cointegration relationship", the tracestatistic is 75.71258 > 42.91525, and the adjoint probability is less than 5%. Therefore, the original hypothesis is rejected. When the original hypothesis is "at most one" and "at most two", tracestatistic is greater than the critical value, and the adjoint probability is less than 5%. Therefore, the original hypothesis is rejected, so Si R. There are three cointegration relationships between fir and SLR, which indicates that there is a long-term stable equilibrium relationship between them. In the long run, there is a long-term equilibrium relationship between financial development and local economic transformation and upgrading.

Grainger causality test

At present, this paper only knows that there is a long-term cointegration relationship among the optimization rate of industrial structure, financial correlation ratio and deposit loan ratio, but whether the cointegration relationship constitutes a causal relationship still needs to be further verified. In this paper, Granger causality test method is used to test the causality among variables. The test results are shown in Table 4.

Table 4. Results of Grainger Causality Test

Null Hypothesis	F-Statistic	Prob.	Conclusion
FIR does not Granger Cause SRI	11.4619	0.0183	Refuse
SRI does not Granger Cause FIR	12.6879	0.0152	Refuse
SLR does not Granger Cause SRI	10.3366	0.0068	Refuse
SRI does not Granger Cause SLR	4.95221	0.0752	Accept
SLR does not Granger Cause FIR	0.74851	0.6071	Accept
FIR does not Granger Cause SLR	0.72842	0.6169	Accept

From table 4, we can see that FIR is the Grainger reason for SRI, and SRI is also the Grainger reason for FIR.

SLR is the Grainger reason for SRI, but SRI is not the Grainger reason for SLR. FIR and SLR are not the Grainger reason for each other. The result of table 5 indicates that the financial correlation ratio is the Granger of the industrial structure optimization rate, and the industrial structure optimization rate is also the cause of the financial related ratio; the deposit loan ratio is the Granger of the industrial structure optimization rate, otherwise it does not hold; there is no causal relationship between the financial related ratio and the deposit loan ratio. This shows that the growth of financial scale and the improvement of financial efficiency are conducive to promoting the transformation and upgrading of local economy and the optimization of industrial structure, and the transformation and upgrading of local economy will also promote the growth of financial scale, but the optimization of industrial structure has little effect on the improvement of financial efficiency, and there is no interaction between the growth of financial scale and financial efficiency.

Impulse Response Analysis

AR root test

After determining the optimal lag order of 4, it is necessary to test the stability of the VAR model, thus the AR root of the characteristic equation of the model should be both within the unit circle or the eigenvalue is less than 1. If the model is not stable and the standard error of the impulse response function may not be effective, the AR root test of the VAR model is performed before the impulse response function analysis. The result is shown in Figure 2, we can see that the AR roots of the VAR model are in the unit circle, so the model is stable, and the impulse response function analysis is reliable.

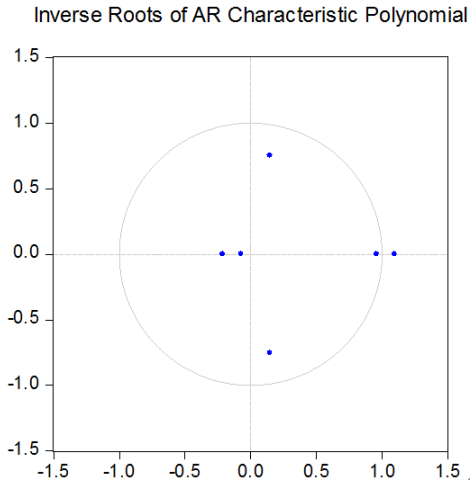

Figure 2. Results of AR root test

Impulse response function analysis

The impulse response analysis based on VAR model can be used to estimate the impact of the impact of a variable on other variables in different periods, then, to describe the dynamic impact path between variables. This paper makes an impulse response function analysis of the macroeconomic variables selected, so as to reveal the impact of a standard deviation of the FIR and the SLR. The dynamic impact paths of SIR in the first to tenth phases after shocks from FIR and SLR are respectively analyzed.

Figure 3 is the response of the SIR to the impact of a standard deviation of the FIR. From Figure 3, we can see that when the impact of a standard deviation of the FIR is impacted, the change of SIR is very rapid and fluctuating. The first phase rises, then reaches its peak in the second period, then decreases rapidly, reaches the trough in the third period, and rises smoothly after the fourth period.

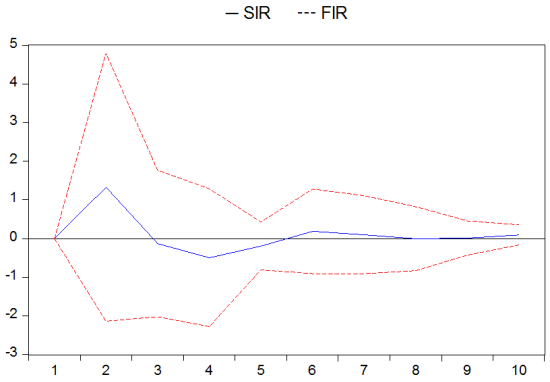

Figure 3. Impulse response analysis of FIR to SIR

Figure 4 shows that when SIR is affected by a standard deviation of SLR. It can be seen from Figure 4 that the impact of SIR on SLR is in a longer period. After the eighth phase, the impact rises smoothly.

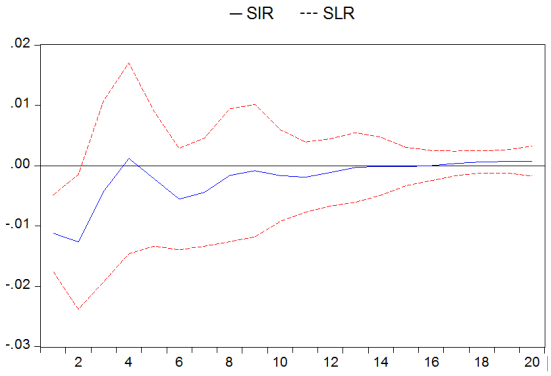

Figure 4. Impulse response analysis of SLR to SIR

Multiple Regression Analysis on the Impact of Financial Development on Local Economic Transformation and Upgrading

In order to further verify the impact of financial development on the transformation and upgrading of local economy in Shandong Province, and prove the role of regional financial development in promoting the upgrading of industrial structure, this paper also establishes a multiple regression model for empirical analysis. The ratio of loan balance of financial institutions in Shandong Province to GDP is used to reflect the ability of financial institutions to convert savings into investment, and the proportion of deposit balance of financial institutions to GDP is used to express the role of financial system in improving savings. The logarithm of output value of three industries is analyzed by regression analysis and regression equation is established.

$$\ln y_i = \beta_{i0} + \beta_{i1} \ln x_1 + \beta_{i2} \ln x_2 + e_i$$

Where Yi is the output value of the I industry in each year, X1 is the proportion of deposit balance of financial institutions in GDP, X2 is the proportion of loan balance of financial institutions in GDP, and E is the residual item. All the data are from Shandong statistical yearbook over the years, and are still studied in time series from 2003 to 2019. The results of regression analysis on the selected data are as follows.

Table 5. Results of multiple regression analysis

	(1)	(2)	(3)
	primary industry	secondary industry	tertiary industry
Deposits	5.389***	6.731***	8.756**
	(1.775)	(1.875)	(3.535)
Loans	-5.691**	-7.113**	-9.128*
	(2.345)	(2.478)	(4.671)
Control variables	controled	controled	controled
_cons	7.117***	8.617***	7.870***
	(0.253)	(0.267)	(0.504)
adj. R2	0.664	0.737	0.581

Standard errors in parentheses

** p < 0.1, ** p < 0.05, *** p < 0.01*

From the regression results, from 2003 to 2019, the proportion of the deposit balance of financial institutions in GDP in Shandong Province is significantly positively correlated with the output value of the three industries, and the contribution of the financial system to the output value of the tertiary industry is greater than that of the secondary industry, and the contribution of the financial system to the secondary industry is greater than that of the primary industry. This result is consistent with the research on other provinces in China. The proportion of the loan balance of financial institutions to GDP in Shandong Province is significantly negatively correlated with the output value of the three industries, which is consistent with the empirical research results of most scholars on the impact of China's financial development and economic growth. The reason can be explained as: during this period, the monetary authorities used monetary policy tools to regulate economic operation, and carried out counter cyclical operation through monetary policy to smooth the economic wave Move. That is, when the economy is overheated, the monetary authorities tighten the money supply and bank loans, while when the economy is in recession, the monetary authorities expand the money supply and bank credit.

Conclusion and Policy Recommendations

Based on the data of Shandong Province from 2003 to 2019, this paper uses time series analysis method to establish VAR model and multiple regression model to empirically analyze the correlation mechanism between regional financial development and local economic transformation and upgrading. The results of time series analysis show that the indicators of financial correlation rate and deposit loan ratio represent the Granger of the industrial structure optimization rate of local economic transformation and upgrading, and the

industrial structure optimization rate is the Granger of financial correlation rate, but not the Granger causality of deposit loan ratio Department. From the multiple regression results, we can see that the degree of regional financial development in Shandong Province will significantly affect the change of local industrial structure, thus affecting the transformation and upgrading of local economy, and play an important role in the growth of regional industries. This paper provides a theoretical basis and empirical conclusion for regional financial development to promote the transformation and upgrading of local economy.

First of all, it should be paid close attention to the gap between regional economic growth and financial development, and deeply analyze the influencing factors behind it, and formulate corresponding policies to accelerate the economic growth of underdeveloped areas to narrow the gap.

Secondly, improve the financial system. Establish a reasonable financial structure and improve the efficiency of financial operation. In order to further promote the transformation and upgrading of local economy, we should improve the financial organization system with the help of financial system reform, and form an all-round, multi-level and three-dimensional financial service system to improve the efficiency of the transformation from savings to investment, provide effective support for industrial development and promote the upgrading of industrial structure. We should actively develop the capital market, develop industrial investment finance and regional venture capital funds, establish a venture capital mechanism, give financial support to high-tech industries, and support industrial restructuring by means of intensive financial allocation. Establish regional private banks, standardize the private financing mechanism, and bring a large amount of private capital into the banking system.

Thirdly, we should guide the flow of financial intermediary funds to industries with high added value and high technology, and support technological progress and industrial innovation, especially those non-state-owned small and medium-sized enterprises with high-tech content and urgent innovation needs to give policy and financial support and help.

Finally, encourage financial innovation, encourage inter-bank competition, realize financial deepening, improve the level of financial services, so that banks and other financial intermediary institutions can actively penetrate into the industrial development and actively participate in the adjustment of industrial structure, so as to meet the needs of different industrial development and promote the upgrading of industrial structure.

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