Empirical Study on the Impact of Financial Scale on Regional Industrial Upgrading

Jing Wu¹ and Yaling Hu²,*

¹School of Finance, Harbin University of Commerce, Harbin, China
²School of Finance, Harbin University of Commerce, Harbin, China
E-mail: 18846041868@163.com
*Corresponding author

Keywords: Financial Size; Advanced Industry; Panel Data; Fixed Effect Model

Abstract: Based on the measurement of regional financial scale and high-level industrial development level, the provincial panel data of China from 2007 to 2016 were selected, and the fixed effect model was adopted to empirically test the impact of financial scale on high-level industrial structure of the region. The results show that financial scale can promote the upgrading of regional industrial structure. On the basis of the empirical results, the paper puts forward relevant countermeasures and Suggestions.

1. Research Background

With the advent of the new era and rapid economic growth, China's economy has now entered the "new normal". In such a social background, the traditional economic growth mode is facing severe difficulties and challenges, it is particularly important to realize regional industrial upgrading. The upgrading of industrial structure is the process of adjusting the industrial structure of a country's national economy from low-level structure to high-level structure, and the trend of transforming from labor-intensive industry to knowledge technology intensive industry, which means that the production factors such as labor, capital, knowledge and technology can be better allocated in the composition of production. Among the many factors that affect the industrial structure, many studies at home and abroad show that financial scale has a positive role in promoting economic growth, thus making a corresponding contribution to the regional industrial upgrading.

With the continuous attention and application of the industrial upgrading level, finance has a positive or negative impact on the industrial upgrading level and process to a certain extent. Due to regional differences, there is a significant gap in the level of industrial upgrading in various regions. Therefore, based on the current situation of China's economic development, this paper studies the impact of financial scale on the level of industrial upgrading in various regions, and puts forward a series of countermeasures and suggestions that can improve the level of regional industrial upgrading from the perspective of finance.

2. Literature Review

Rioja and valey (2016) empirically analyzed the cross-border panel data of 62 countries from 1980 to 2009, and found that in the underdeveloped and developing countries, the efficiency of banks in influencing the accumulation and allocation of capital factors is greater than that of the stock market, while in the developed economies, the opposite is true.

Zeng Fanqing and Ye Dezhu (2017) selected the national data from 2006 to 2015, they found that the optimization of industrial structure is a process of simultaneous evolution of rationalization and upgrading of industrial structure. The financial system has a significant impact on the industrial structure. In general, the financial system promotes the upgrading of industrial structure.
Gu Yongkun and Liu Yongtian (2017) chose to study the influence of China's financial market on the rationalization and upgrading of industrial structure, and concluded that the improvement of financial market can promote the rationalization and upgrading of industrial structure, but due to the asymmetry, the upgrading and rationalization of industrial structure are not coordinated, and the low efficiency of industrial structure has hindered the adjustment of industrial structure.


(1) Model building. On the one hand, it draws on the research idea and research method of Gan Chunhui (2011), on the other hand, because it is necessary to demonstrate the internal relationship between financial scale and industrial upgrading, as well as other factors such as control variables, etc, this paper takes the fixed effect model of provincial panel data as the core tool of empirical analysis and research, on the basis of which, according to econometrics, statistics, etc. According to the discipline theory, the multiple linear regression model is established as follows:

\[
LnINV = \beta_0 + \beta_1 FIN + \beta_2 GOV + \beta_3 LnHUM + \beta_4 FDI + \beta_5 Inv + \beta_6 STR + \epsilon
\]

(1)

Now, we explain the above multiple linear regression model: \(\beta\) stands for the regression coefficient of the parameter, \(\beta_0\) stands for the intercept term of the linear model, \(i\) stands for different regions in China, and \(t\) stands for the observed periods of the model. TS and FIN respectively represent the explained variable and the core explained variable, that is, the industrial upgrading of each region and the financial scale of each region. The following are five related control variables: GOV represents the ratio of fiscal expenditure to GDP; Ln HUM represents the logarithm of human capital level; FDI represents the degree of opening to the outside world; inv represents the scale of fixed asset investment; STR represents the construction of transportation infrastructure in each region; \(\epsilon\) represents the random disturbance item.

(2) Variable Selection. Interpreted variable TS. As the main research object of this paper is the impact of financial scale on regional industrial upgrading, the explained variable can be selected as the proportion of the annual output value of the tertiary industry and the output value of the secondary industry in each region, that is, the level of industrial upgrading in this region. The high-level industry directly represents the high-level industrial structure of a region.

Explain the variable FIN. It can be seen from the literature at home and abroad that there are many ways to measure the financial scale of various regions at home and abroad. Based on a series of ways, this paper finally decides to choose the location entropy method to measure the regional financial scale. There are many kinds of indicators to measure the scale of regional economic development, but this paper chooses the location entropy method because it not only represents the level of financial development in a specific region, but also has been unanimously recognized by many scholars at home and abroad, which can be represented by fin. Its specific expression is as follows:

\[
FIN = \frac{Loan}{{GDP}}
\]

(2)

It can be seen from the above formula that loan represents the year-end loan balance of RMB of financial institutions in various regions, and GDP represents GDP. The ratio of loan to GDP fin represents the scale of financial development in various regions of China. According to the data collected and collated, it can be seen that the value takes 1 as the critical value, and the calculation results show that the larger the value is, the better the degree of financial development is, and the larger the scale of financial development is.

Selection of control variables. First, the degree of government intervention has an irreplaceable impact on the development of financial scale. In this paper, the ratio of fiscal expenditure to GDP in a certain region is used to express, that is, GOV.
Second, the level of human capital is also one of the reasons that affect the financial scale. It is expressed by the pairs of the number of people with junior college education in every 10000 people, that is, \( \text{Ln HUM} \).

Third, the fixed asset investment scale of each region will also have different degrees of impact on the financial scale, and the regional differences are large. Therefore, this paper also chooses the ratio of fixed asset investment scale to GDP as another control variable, \( \text{INV} \).

Fourth, the total mileage of transportation is another control variable. In this paper, the ratio of the total area of transportation to the land area is taken as the traffic facilities of the region, namely \( \text{STR} \).

Fifthly, the ratio of FDI to GDP will also have a certain impact on the financial scale of each region, which indicates the degree of opening up of each region, expressed as \( \text{FDI} \).

(3) Data Sources. First of all, most of the data used in this paper are from the China Statistical Yearbook, which is relatively complete and easy to query. Second, the data of the year-end loan balance of RMB of financial institutions and the relevant data of various regions are from the China Urban Statistical Yearbook, which includes all provinces of China The relevant data of the city is also relatively complete. In addition, the author analyzes and sorts out these data, and some data need to be calculated to reflect the reality. Because of the lack of data in Tibet, Hong Kong, Macao and Taiwan, and the focus of empirical research on the availability and consistency of data, this paper selects the inter provincial panel data of 31 provinces, autonomous regions and municipalities from 2007 to 2016 in addition to Hong Kong, Macao and Taiwan.

4. Empirical Process and Results Analysis

In order to prevent the occurrence of heteroscedasticity, the following step-by-step variable adding method is adopted to test the multiple equation model for further regression. From the empirical research results in table 1 below, we can know that the negative correlation between financial scale (\( \text{FIN} \)) and industrial upgrading (\( \text{TS} \)) still exists, but it is significant at the level of 1%.

As the result of single factor model test, there are three same control variables that have a positive impact on financial scale, namely, \( \text{gov} \), \( \text{FDI} \), \( \text{inv} \), and they are all significant at the level of 1%.

On the one hand, through the test of single factor model, on the other hand, through the analysis of multiple equation, through a series of empirical research results, it is concluded that the coefficient of financial scale is positive, which shows that the continuous expansion of financial model will improve the level of industrial upgrading to different degrees. From table 1, there is a coefficient of 0.0299 in the table, which shows that the regional industrial upgrading level will increase by 0.0299% for each 1% increase in financial scale.

Among the five control variables, first of all, the degree of government intervention refers to the ratio of financial expenditure to GDP. Using \( \text{GOV} \), if the degree of government intervention in a certain region is strong, it means that there are more government financial expenditures in this region, so as to promote the upgrading of industrial structure. From the results, the impact of government financial expenditure on all regions has been positive, and government intervention has played a positive role.

Secondly, the level of human capital refers to the cost of human resources, that is, the logarithm of the number of people with a college degree in every 10000 people. The higher the cost of human resources means that the more investment enterprises make in the adjustment and optimization of industrial structure, the more the investment, the less the output.

Moreover, investment in fixed assets \( \text{inv} \) refers to the investment in fixed assets such as plant and equipment. The increase of these investment reflects that the hardware infrastructure of an enterprise will be more and more perfect, so it lays a certain foundation for the adjustment of industrial structure. On this basis, it is conducive to the upgrading and optimization of industrial structure, and is conducive to the improvement of the level of industrial upgrading.
The degree of opening to the outside world is expressed by FDI, that is, the proportion of foreign direct investment to GDP, which indicates that the increase of the proportion of foreign direct investment in a region will make the industrial structure of the region continuously upgrade and adjust, and finally promote the rapid economic development of the region. In the empirical analysis of provincial panel data, we can know that FDI will promote the internal upgrading of various industries, which is conducive to the upgrading of industrial structure.

Infrastructure construction mainly refers to the total mileage of transportation. The ratio of the total mileage of transportation to the land area of each region is the situation of transportation infrastructure. When the transportation infrastructure is relatively perfect, the improvement process of financial market and financial mechanism will be further accelerated.

The above empirical research results show that the impact of financial scale on industrial structure is significantly positive, that is, the development of financial scale promotes the development of industrial structure. The expansion of financial scale can promote the transformation of industrial structure from the traditional industry to the emerging industry, promote the technological upgrading of regional industry, and make the industrial structure to the advanced development. In general, although the development of financial scale is affected by a series of factors, which have a certain effect on the industrial upgrading to some extent, it will eventually promote the further development of industrial upgrading.

Table 1 List of tests for multivariate equations

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN</td>
<td>0.128***</td>
<td>0.115***</td>
<td>0.118***</td>
<td>0.0580**</td>
<td>0.0585**</td>
<td>0.0535**</td>
</tr>
<tr>
<td></td>
<td>(0.0299)</td>
<td>(0.0293)</td>
<td>(0.0293)</td>
<td>(0.0253)</td>
<td>(0.0252)</td>
<td>(0.0241)</td>
</tr>
<tr>
<td>GOV</td>
<td>0.920***</td>
<td>1.045***</td>
<td>-0.158</td>
<td>-0.127</td>
<td>0.242***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.236)</td>
<td>(0.247)</td>
<td>(0.236)</td>
<td>(0.236)</td>
<td>(0.226)</td>
<td></td>
</tr>
<tr>
<td>InHUM</td>
<td>-0.0266*</td>
<td>-0.0295**</td>
<td>-0.0339**</td>
<td>-0.0439***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0158)</td>
<td>(0.0133)</td>
<td>(0.0134)</td>
<td>(0.0129)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INV</td>
<td>0.700***</td>
<td>0.692***</td>
<td>0.711***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0656)</td>
<td>(0.0654)</td>
<td>(0.0625)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STR</td>
<td>-0.0160**</td>
<td>0.00865**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00803)</td>
<td>(0.00780)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI</td>
<td>0.468***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0893)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.878***</td>
<td>0.656***</td>
<td>0.409***</td>
<td>0.245*</td>
<td>0.223</td>
<td>0.300**</td>
</tr>
<tr>
<td></td>
<td>(0.0297)</td>
<td>(0.0640)</td>
<td>(0.160)</td>
<td>(0.135)</td>
<td>(0.135)</td>
<td>(0.130)</td>
</tr>
<tr>
<td>Obs</td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>31</td>
</tr>
<tr>
<td>R²</td>
<td>0.062</td>
<td>0.111</td>
<td>0.120</td>
<td>0.377</td>
<td>0.386</td>
<td>0.442</td>
</tr>
</tbody>
</table>

Note: ***, **, * are significant at the significance level of 1%, 5% and 10%, respectively.

5. Policy Suggestion

A long time ago, China's industry made a series of achievements, but there are also many problems and contradictions. Through a series of index analysis and empirical research, this paper finds that the financial development in different regions of China is unbalanced, so that the level of industrial upgrading in different regions is different. With the rapid development of economy, the mode of economic growth is unsustainable, so it is our main task to adjust and optimize the industrial structure and change the industrial development mode. It can be seen that financial scale plays an irreplaceable role in promoting regional industrial upgrading and has a positive impact. Therefore, the relevant financial industry and government should start from the perspective of reducing regional differences, adjusting and optimizing industrial structure and improving the speed of economic development, improve the level of industrial upgrading in highland areas and narrow the gap between the rich and the poor.
There are different ways of economic activities in China, some economic activities are
dominated by the financial industry with the progress of society. On the basis of continuous
adjustment of industrial structure, a series of measures of financial industry will play an
irreplaceable role in the process of industrial upgrading. In the process of industrial structure
adjustment, it needs the guidance of the government's industrial policies. In order to improve the
level of regional industrial upgrading, the government should issue a series of policies to promote
the expansion of financial scale. In some cases, the profit-seeking nature of the financial market will
make the real enterprises not get financial support, which requires the government to issue a series
of policies to support and guide the development of enterprises.

References


Patent 6,231,666. (2001)


[5] Rioja F, Valev N. Stock markets, banks and the sources of economic growth in low and high

upgrading and economic growth: panel var analysis based on provincial data [J]. Finance and trade
research, 2017,10 (7): 19-25.