# The Influence of Financial Industry Cluster on Economic Growth: Three Economic Zones in China

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Received: September 15, 2013 Accepted: October 9, 2013 Online Published: October 13, 2013

doi:10.5430/afr.v2n4p69 URL: http://dx.doi.org/10.5430/afr.v2n4p69

*Funds: Youth Project from Ministry of Education, "Influence of Financial Resources Aggregation on Substantial Economy: Three Economic Zones as an Example (2013YJC790207)".* Soft Science of Shandong Province, "*Influence of Financial Industry Gathering on Region Economy Growth* (2012RKB01275)*"*.

**Abstract**

In recent years, financial industry cluster has flourished, promoting economic growth in local and surrounding areas. Yangtze River Delta, Pearl River Delta and Bohai Economic Rim have facilitated economic growth in China. This paper first studies the situation of financial development and financial industry cluster in three economic zones, and finds that Beijing, Shanghai and Shenzhen centralize plenty of financial institutions and financial resources in three economic zones. Then this paper takes L-S model as theoretical basis, verifies the growth effect and radiation effect of financial industry cluster on regional economic growth, and finally puts forwards several pieces of suggestions.

**Keywords:** Financial industry cluster, Financial center, Growth effect, Radiation effect

## 1. Introduction

In these years, with the development of economic integration and financial economic globalization, financial industry cluster has developed and become a new focus of research. Financial industry cluster is defined as a competitive and cooperative industry group, which gathers plenty of monetary resources, financial institutions, financial tools, financial market and financial regulators through market connection or non-market connection in few important financial centers. In the view of whole world, New York, London and Tokyo have formed mature international financial centers, gathering a great quantity of financial resources, establishing 24 hours uninterrupted financial transaction network. In Chinese Mainland, the phenomenon of financial resources gathering and financial institutions concentrating is more and more popular. Financial Street of Beijing, Pudong financial district of Shanghai, World financial center of Shenzhen have grown into representative financial industry clusters. Financial industry cluster and regional economic growth have the relationship of mutual effect and mutual promotion. On the one hand, economic growth attracts monetary resources, financial assets and financial institutions in pursuit of a higher economic benefit; as a result, financial industry cluster and financial center emerge and develop. On the other hand, abundant financial resources, wholesome financial institutions, and comprehensive financial market can provide plenty of money and superior financial service, promoting regional economic growth. In one word, a virtuous circle of economic development – financial aggregation – economic development will appear and continue.

In China, the quick economic development is due to three economic zones, which are Yangtze River delta, Pearl River Delta, and Circum-Bohai-Sea delta. The Yangtze River delta takes Shanghai as its economic center, Nanjing and Hangzhou as its sub-center, including Yangzhou, Taizhou, Nantong, Zhenjiang, Wuxi, Suzhou, and other cities in Jiangsu province, Jiaxing, Huzhou, Shaoxing, Ningbo, Zhoushan, and other cities in Zhejiang province. It is well known that the Yangtze River delta (Shanghai, Zhejiang and Jiangsu) is the most developed, dynamic, and urbanized region in China. The Pearl River Delta takes Shenzhen and Guangzhou as its economic center, including Zhuhai, Foshan, Jiangmen, Dongguan, Zhongshan, Zhaoqing, Huizhou, and other cities in Guangdong province. We know that Pearl River Delta is the important gateway of southern coastal mainland to the world. The Circum-Bohai Sea Economic Zone is the extensive region around the Bohai Sea and yellow sea coast, which is the most active area in

northern China. The Circum-Bohai Sea Economic Zone is China's third economic growth pole, including Beijing, Tianjin, Hebei, Shandong, and Liaoning, and can be divided into three compact districts. One is Beijing-Tianjin-Tangshan region, which has the strongest financial strength in Circum-Bohai-Sea delta; the other is central-southern of Liaoning, which takes Shenyang and Dalian as its economic center, while the last one is Shandong peninsula region, which takes Jinan and Qingdao as its economic center. Compared to the other two economic circles, the development of economy and finance in Circum-Bohai Sea delta is unbalanced obviously; there is evident difference among central-southern of Liaoning, Shandong peninsula region, and Beijing-Tianjin-Tangshan region. Take the data of 2011 as an example, Circum-Bohai Sea delta accounts for 5.35 percent of total land area, 18.28 percent of total national population, 25.38 percent of total GDP, and 24.58 percent of total financial resources in China. What is more, Circum-Bohai Sea delta has not got rid of old mode of enclosed development; the phenomenon of industry isomorphism exists to some extent.

This paper analyzes the situation of financial aggregation in three economic zones, determines its financial center city, and verifies the influence of financial aggregation on regional economic growth in three economic zones. The significance of this subject includes: First, we verify the relationship between financial development and economic growth from the perspective of financial resource and industry cluster, improving the theory of financial development. Second, we explore the connotation, manifestation, and economic impact of financial industry cluster, and fill up blank of these aspects, developing the theory of financial cluster. Third, three economic zones are engine of China’s economic development, so this paper has great practical significance on our economy’s continuous and sound economic development.

## 2. Literature Review

### *2.1 Financial Industry Cluster*

In recent years, with the development of industrial economics, finance, and financial geography, the financial industry cluster has become a new research focus, domestic and overseas scholars have studied the concept, cause, measurement, and economic influence of financial industry cluster.

Kindle Berger (1974) indicates that through financial industry cluster, financial center can take advantage of local financial market, utilize a small amount of working capital to pay for large scale transaction. McGahey (1990) points out that the concentration of financial institutions and financial assets, globalization and integration of international capital market can intensify the competition of financial service at home or abroad. Pandilt et al (2002) analyzes the financial service industry in England, indicates that the cluster effect influences the growth of company and the amount of new entrants, and there exists correlation in different financial department in one financial center. Clark (2004) thinks that because the phenomenon of information asymmetry is popular in financial industry, the face-to-face communication is indispensable. In China, Pan Yingli (2003) discusses the aggregation effect and scale economies effect of financial center. Lian Jianhui and Sun Huanmin (2006) analyzes the financial innovation advantage, risk mitigation advantage, and operating efficiency advantage of financial cluster, which can bring rent for intra-regional financial institutions, thus promoting regional economic development. Liu Hong (2008) indicates that through financial aggregation, the core area of financial cluster can realize higher rate of growth, the neighborhood area can also speed up by means of encouraging technical progress, increasing capital accumulation, and promoting transformation from savings to investment. Li Dalei (2010) verifies that total industrial output value, financial employee, and gross domestic product can accelerate the formation of financial cluster. Ding Yi (2010) testifies the interactive relationship between financial industry cluster and regional economic growth in long term, and finds that banking industry cluster has higher elastic coefficient to economic development. Pan Hui and Ran Guanghe (2013) adopts provincial panel data to study the relationship between financial cluster and entity economy growth both in whole China and in eastern, middle, and western China, and finds that financial cluster promotes economy growth observably, while the effect is more obvious in east than in other area.

### *2.2 Financial Center*

After financial cluster, financial resources, financial institutions, financial market, and financial employees concentrate in this area and spread to its surrounding areas, as a result, financial center takes space. There is complementary and coexistent relationship between financial cluster and economy growth. On the one hand, when financial cluster develops to some extent, one certain city centralizes plenty of financial resources and institutions, and develops into regional financial center. With the further deepening of financial cluster, regional financial center can grow to nationwide financial center, or even International finance center. On the other hand, the formation and development of financial center will attract more and more financial resources, institutions, and market.

Scholars study the evolution, type, fixed position, function, advantage, and assessment indicator system of financial

center. Choietal (2002) studies the dynamic condition of international financial service and financial center, finds that the gathering attraction of financial center is determined by economic scale, total number of financial institutions, present scale of stock market, bilateral trade relations, and so on. Sagaram (2004) chooses some indexes, such as number of domestic banks in financial center and so on, analyzes the competitive situation in 37 IMF countries, and indicates enhancing competitiveness is main cause of concentrating and optimizing financial resources. In China, Wu Ninanlu, Yang Haiping (2008) points that the advantage of financial center is lower transaction cost, higher transaction efficiency, and stronger gathering ability. Wangli and Shengdi (2009) selects degree of financial development, economic sustaining force, infrastructure sustaining strength, and other measurable indicators to evaluate competitiveness of 15 financial center cities in China.

*2.3 Growth Effect and Radiation Effect*

The local spillovers model studies the pathway of financial industry cluster on regional economic growth, and can summarize the influence in two effects, one is the growth effect on core area, and the other is radiation effect on marginal area.

The long-term equilibrium includes two probabilities. One is internal equilibrium, that is, financial resources distribute in northern and southern area symmetrically. The other one is core - edge equilibrium, that is, core area realizes financial cluster, and occupies most of financial resources, while edge area only possesses few financial resources. Comparing the two equilibriums, we find that core area can achieve faster growth rate in core - edge equilibrium. In one word, financial industry cluster brings about growth effect to core area.

When financial resources and institutions assemble in core area, the household welfare can also improve by means of compensation effect and Trickle-down effect, speeding up economy development. One side, the level of economic development and residents' welfare is quite low, so after financial aggregation, it will improve evidently. In the meantime, with the diffusion of financial resources, marginal area can share funds, information, and financial talents, driving economy development in marginal area.

## 3. Area Descriptions

*3.1 Current Situation of Economy and Finance in Economic Zones*

The quick development of China is due to three economic zones, that is Yangtze river delta, Pearl River Delta, and Circum-Bohai-Sea delta.

Table 1. Comparison of economy and finance in three economic zones (2011)

| | Area(square kilometers) | Population (million) | GDP (billion RMB) | Per capita GDP(thousand RMB) | Total financial resources(billion RMB) | Per capita financial resources(thousand RMB) |
|---|---|---|---|---|---|---|
| Shanghai | 6360 | 23.47 | 1919.57 | 81.7882 | 9613.638 | 409.614 |
| Jiangsu | 102600 | 78.99 | 4911.03 | 62.1728 | 11479.2 | 145.325 |
| Zhejiang | 101800 | 54.63 | 3231.89 | 59.1595 | 11486.27 | 210.256 |
| Yangtze river delta | 210741 | 157.09 | 10062.48 | 64.0555 | 32579.11 | 207.391 |
| Guangdong | 177084 | 105.05 | 5321.03 | 50.6523 | 15142.45 | 144.145 |
| Pearl River Delta | 177084 | 105.05 | 5321.03 | 50.6523 | 15142.45 | 144.145 |
| Beijing | 16800 | 20.19 | 1625.19 | 80.4950 | 11548.33 | 571.983 |
| Tianjin | 11947 | 13.55 | 1130.73 | 83.4486 | 3372.336 | 248.881 |
| Shandong | 157100 | 96.37 | 4536.19 | 47.0705 | 8539.871 | 88.6155 |
| Hebei | 187700 | 72.41 | 2451.58 | 33.8569 | 4844.069 | 66.8978 |
| Liaoning | 146900 | 43.83 | 2222.67 | 50.7112 | 5404.036 | 123.2954 |
| Circum-Bohai Sea delta | 520447 | 246.35 | 11966.35 | 48.5746 | 33708.64 | 136.832 |

Data source: "China Statistical Yearbook(2102)", "China Financial Yearbook(2102)".

Table 1 reflects economic and financial level of three economic zones in 2011. From the percentage view, three economic zones centralize 57.86 percent of total GDP and 61.45 percent of financial resources in China, economic and financial development is in the lead obviously. Circum-Bohai Sea delta possesses 25.32 percent of GDP and 24.58 percent of financial resources. Compared with Yangtze River delta and Pearl River Delta, Circum-Bohai Sea delta ranks first in gross indexes, but lags in per capita indexes. What is more, Yangtze River delta is superior to Pearl River Delta from the aspect of economic indexes.

*3.2 Financial Industry Cluster in Economic Zones*

The performance of financial industry cluster is financial resources, institutions, and market centralizing in some developed cities. So this paper chooses one city in every economic zone, and studies the degree of financial aggregation in the perspective of financial resources in three economic zones. According to 8th global financial center index (2010), the financial competitiveness of Shanghai, Shenzhen, and Beijing rank 6th, 14th, and 16th in the world, and they are financial centers in Yangtze River delta, Pearl River Delta, and Circum-Bohai-Sea delta respectively. Shanghai is the most developed city in China, possessing plenty of financial resources and institutions, perfect financial market and system. In 2011, Shanghai's output of financial industry amounts 225 billion RMB. Shenzhen owns powerful economic stake and modernized infrastructure, and its output of financial industry achieves 156 billion RMB in 2011. Beijing is the most developed city in northern China, and has formed modern financial development pattern, which is equivalent of its capital status. In 2011, Beijing's output of financial industry amounts 206 billion RMB.

Table 2. Financial aggregation in three economic zones (2011, %)

| | GDP ratio | Deposit ratio | Loan ratio | premium income ratio | financial resources ratio |
|---|---|---|---|---|---|
| Shanghai/ Yangtze river delta | 19.1 | 31.5 | 26.9 | 28.1 | 29.51 |
| Shenzhen/ Pearl River Delta | 21.6 | 27.4 | 32.8 | 29.5 | 29.52 |
| Beijing/ Circum-Bohai-Sea delta | 13.6 | 37.5 | 29.6 | 27.1 | 34.26 |

Table 2 shows ratio of Shanghai, Shenzhen, and Beijing in some economic and financial indicators. We can find that the financial cluster degree of Circum-Bohai-Sea delta is highest in three economic zones, while the financial cluster degree of Yangtze River delta and Pearl River Delta is obvious and similar. Beijing creates 13.6 percent of GDP, while it concentrates 34.26 percent of financial resources of Yangtze River delta. Shanghai centralizes 29.51 percent of financial resources of Yangtze River delta, while Shenzhen centralizes 29.51 29.52 percent of financial resources of Pearl River Delta.

**4. Methods and Results**

*4.1 model and data*

Can financial industry cluster produces growth effect in core city? Can financial industry cluster produces radiation effect in surrounding region? This paper will use the method of Granger test and impulse response function to analyze and verify the effect of financial industry cluster on economic growth, adopting data from 1990 to 2011. Considering data availability and policy continuity, this paper chooses credit ratio to reflect degree of financial concentration, which is the core city's loans divided by national loans, and can be denoted by "loan". We choose GDP growth rate to measure level and speed of economic development, which is denoted by "gdp". We use this variables to establish vector auto-regression model, and simulate the dynamic effect and economic influence of core city's financial aggregation.

All of the data gets from "China Statistical Yearbook" and "China City Statistical Yearbook", and is disposed by natural logarithm. There are three reasons, first is to alleviate heteroscedasticity and multicollinearity, second is to eliminate impact of abnormal values, third is to make regression coefficient elastic and be liable to explain.

In the aspect of empirical process, we make unit root test on time series data first, to guarantee the stationarity of variables, and then do co-integration test and Granger causality, in order to testify the causality of each variables, and finally make impulse response analysis to demonstrate the dynamic relation in study area.

*4.2 Beijing and Circum-Bohai-Sea delta*

Beijing has the obvious characteristic of financial industry cluster, while its financial radiation covers most of Circum-Bohai-Sea delta, including Beijing, Tianjin, Hebei and Shandong. So this paper takes Beijing's degree of financial cluster (denoted lloan), Beijing's economy growth (denoted by lgdp_bj), Tianjin's economy growth (denoted by lgdp_tj), Hebei's economy growth (denoted by lgdp_hb), and Shandong's economy growth (denoted by lgdp_sd) as variables, and verifies the influence of Beijing's financial cluster on its neighborhood economy growth.

4.2.1 Unit root test

We make unit root test on time series data in order to guarantee stationarity, the inspection result is as table 3.

Table 3. Result of unit root test of Beijing financial cluster

| Variable | Test type (c,t,k) | ADF statistics | Approximate P value | Conclusion |
|---|---|---|---|---|
| lgdp_hb | (c,0,0) | -3.317 | 0.0142 | stable |
| lgdp_tj | (c,0,0) | -2.975 | 0.0373 | stable |
| dl2loan | (c,0,0) | -5.200 | 0.0000 | stable |
| dlgdp_bj | (c,0,1) | -5.423 | 0.0000 | stable |
| dlgdp_sd | (c,0,0) | -3.355 | 0.0126 | stable |

Notes: 1) c, t, and k denote constant term, trend term, and lag Intervals respectively, t=0 denotes no temporal trend;

2) d before variable denotes first difference, l denotes natural logarithm, and dl2 denotes second order difference of natural logarithm.

From table 3, we can find lgdp_hb and lgdp_tj are stable series, lloan, lgdp_bj, and lgdp_sd are unstable, but after differential treatment, variables of dl2loan, dlgdp_bj, and dlgdp_sd become stable, thus achieve the precondition of co-integration test.

4.2.2 Co-integration test

Unit root test reaches the stationary conditions of variables, but these variables are differential treated, so they cannot make traditional analysis of regression, while cointegration theory solves this problem properly. This paper makes Johansen test to estimate the relation between Beijing credit ratio and GDP growth rate of surrounding provinces and cities.

Table 4. Result of Co-integration test of Beijing's financial cluster

| Variable Date Sets | Null hypothesis | Statistics | Trace test statistic | Maximum eigenvalue statistics |
|---|---|---|---|---|
| dl2loan, dlgdp_bj | $r = 0$ | $r > 0$ | 27.2515* | 17.2289* |
| dl2loan, dlgdp_sd | $r = 0$ | $r > 0$ | 20.8979* | 16.0029* |
| dl2loan, lgdp_hb | $r = 0$ | $r > 0$ | 18.2576* | 13.1661* |
| dl2loan, lgdp_tj | $r = 0$ | $r > 0$ | 18.8861* | 14.3923* |

Note: * denotes refuse null hypothesis and accept alternative hypothesis.

From table 4, We find that there exists some common trend and long-term stable relation among Beijing's financial cluster, Beijing's economy growth, Tianjin's economy growth, Shandong's economy growth, and Hebei's economy growth, though the relation may deviate temporarily.

4.2.3 Granger causality test

This paper adopt Granger causality test to determine the causal relationship among variables.

Table 5. Result of Granger causality test of Beijing's financial cluster

| Null hypothesis | Chi-squared statistic | P value |
|---|---|---|
| dl2loan is not Granger cause of dlgdp_bj | 0.77101 | 0.680 |
| dl2loan is not Granger cause of dlgdp_sd | 0.6222 | 0.733 |
| dl2loan is not Granger cause of lgdp_hb | 1.4203 | 0.492 |
| dl2loan is not Granger cause of lgdp_tj | 3.1787 | 0.204 |
| dlgdp_bj is not Granger cause of dl2loan | 0.47625 | 0.788 |
| dlgdp_sd is not Granger cause ofdl2loan | 5.0621 | 0.080 |
| lgdp_hb is not Granger cause of dl2loan | 1.1611 | 0.560 |
| lgdp_tj is not Granger cause of dl2loan | 0.52583 | 0.769 |

From table 5, dlgdp_sd is Granger causality of dl2loan under significance level of 10%, that is, Shandong's economy growth granger cause Beijing's financial cluster. While there does not exist Granger causality among other variables. In other words, financial industry cluster of Beijing does not have growth effect on local economy and radiation effect on regional economy.

4.2.4 Impulse response analysis

Though the granger causality among variables does not exist, but we can use impulse response analysis to analyze the mutual relationship between financial industry cluster of Beijing and economic growth of Bohai Economic Rim dynamically.

The growth effect of financial cluster on local economy growth can be mirrored by a standard deviation of financial cluster degree on economic growing future value. While radiation effect of financial cluster on surrounding regional economic growth can be transmitted by dynamic structure of model. The impulse response analysis of variables can be reflected by figure 1, figure 2, figure 3, and figure 4. In these figures, horizontal axis shows response periods of impact, vertical axis shows verifying percentage of variables, full line denotes impulse response function, and shaded area means confidence interval. We judge the statistical significance of variables 'influence is through 95% confidence interval, while the distance between impulse line and line y=0 reflects power of impact.

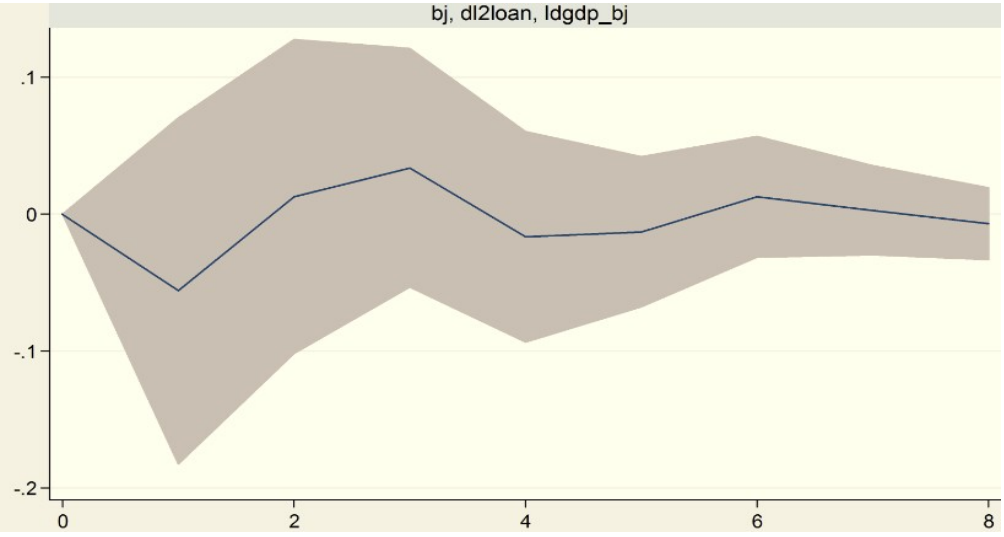


Figure 1. Impulse effect of lloan on lgdp_bj

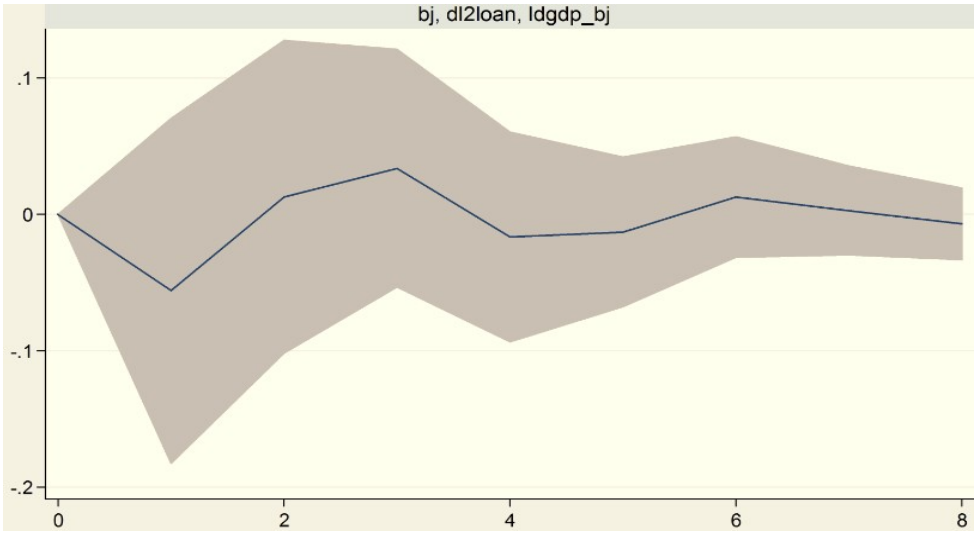


Figure 2. Impulse effect of lloan on lgdp_sd

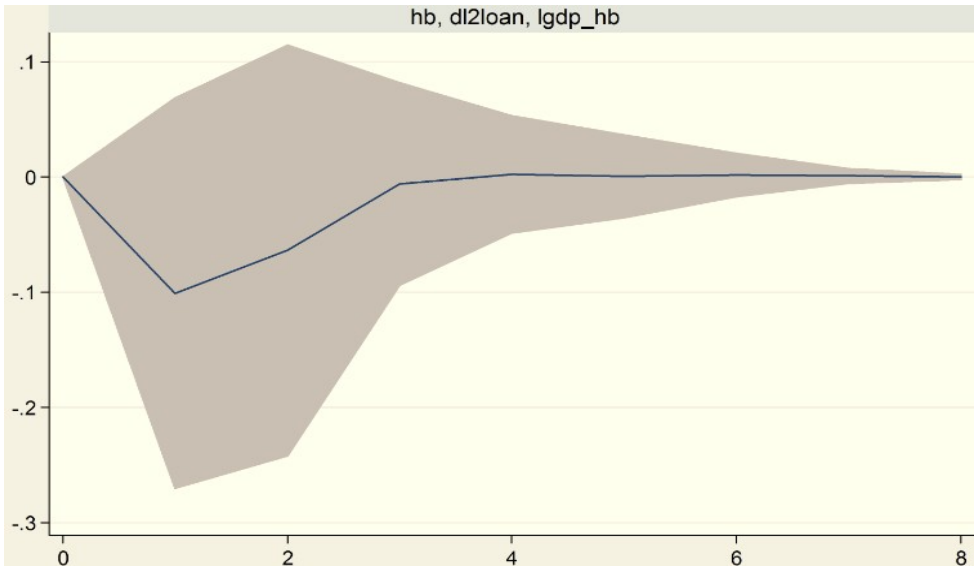


Figure 3. Impulse effect of lloan on lgdp_hb

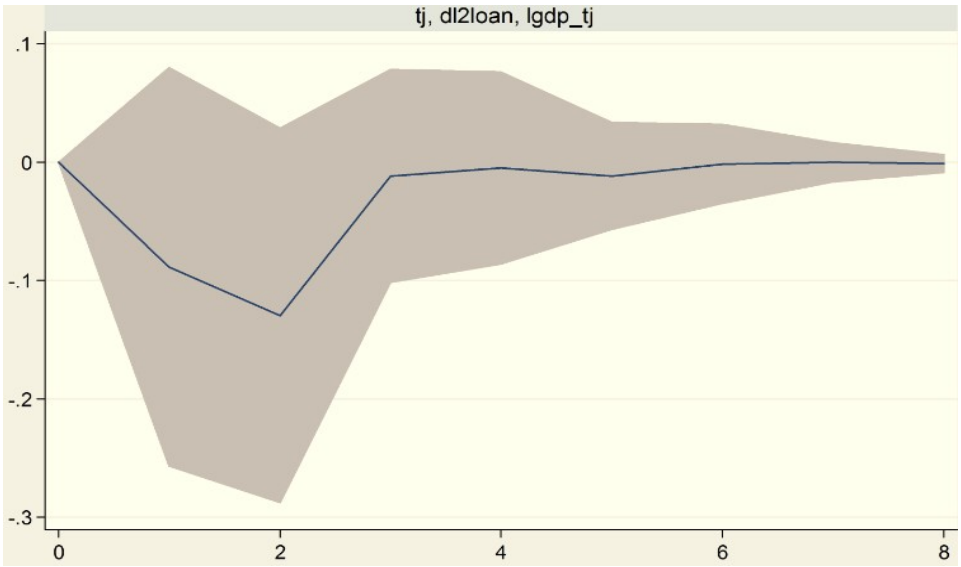


Figure 4. Impulse effect of lloan on lgdp_tj

Figure 1 to figure 4 are all made in 95% certification level. From figure 1, we can find that the impact of Beijing's financial cluster on Beijing's economy growth is unstable. At first, the effect is negative, reaching the minimum in the first year. Then the effect begins to rise, reaching the maximum in the third year. After that time, the influence of financial cluster on economic growth declines gradually and becomes stable. Figure 2 shows that the influence of Beijing's financial cluster on Shandong's economy growth is negative at first, reaching the minimum in the first year, and the rises. After the second year, the negative effect disappears and becomes stable gradually. Figure 3 indicates that the negative influence of Beijing's financial cluster on Hebei's economy growth continues until 4 years later, and then the effect becomes stable. Figure 4 manifests that the negative influence of Beijing's financial cluster on Tianjin's economy growth continues until 6 years later. In one word, at first, Beijing's financial cluster has negative impact on local economy and neighborhood economy growth. But in the later stage, Beijing's financial cluster has positive impact, though the effect is unconspicuous.

4.2.5 Empirical results and reason analysis

From empirical test, we can find that the financial industry cluster does not have growth effect on local economy growth and does not have radiation effect on neighborhood economy growth. The reasons may be as follows.

First, Beijing's economy growth benefits by political advantage mainly, not its financial cluster. Beijing is capital and political center of China, but is behind Shanghai and Shenzhen in terms of economic development. Beijing is the headquarters location of financial industry regulatory authority, which is people's bank of china, china securities regulatory commission, china insurance regulatory commission, and china banking regulatory commission. Beijing is also location of the head office of four nationalized banks, and concentrates some headquarters of stock-holding banks, such as China citic bank, China everbright bank, and so on. Beijing owns large numbers of state-owned enterprises, thus has abundant stock turnover. In one word, Beijing's unparalleled political advantage decides gathering of financial institutions and financial resources, and thus decides economy growth in local area.

Second, the regional economic growth shows unbalancedness in circum-Bohai-Sea delta. Circum-Bohai-Sea delta is big in area, and is uneven in economic and financial development; as a result, the financial industry cluster of Beijing is difficult to generate financial radiation effect on areas lag behind relatively in economic circle. Take data of 2011 for example, per capita GDP in Beijing is 80.5 thousand RMB, while per capita GDP in Beijing is 33.9 thousand RMB in Hebei. There is huge gap of economic development in circum-Bohai-Sea delta, while the level of economy development is similar in Yangtze River Delta and Pearl River Delta.

Finally, the existence of crowding-out effect makes it is difficult to exert financial radiation effect on economic growth in surrounding areas. Financial resources is numerous and superior in Beijing, while financial resources is deficient and inferior in surrounding area, as a result, the resources can not support economic development in surrounding area.

*4.3 Shanghai and Yangtze river delta*

Shanghai is financial center of Yangtze River delta economic area. So in this part, we takes Shanghai's financial cluster (lloan), Shanghai's economy growth (lgdp_sh), Jiangsu's economy growth (lgdp_js), and Zhejiang's economy growth (lgdp_zj) as variables, and do Granger causality test.

Table 6. Result of Granger causality test of Shanghai's financial cluster

| Null hypothesis | Chi-squared statistic | P value |
|---|---|---|
| lloan is not Granger cause of dlgdp_sh | 4.8886 | 0.087 |
| lloan is not Granger cause of lgdp_js | 1.8255 | 0.401 |
| lloan is not Granger cause of dl2gdp_zj | 0.13292 | 0.936 |
| dlgdp_sh is not Granger cause of lloan | 5.269 | 0.072 |
| lgdp_js is not Granger cause of lloan | 2.3935 | 0.302 |
| dl2gdp_zj is not Granger cause of lloan | 4.9764 | 0.083 |

The result of empirical test is shown in table 6. We can find that there exists stable and long-term equilibrium relationship between financial industry cluster of Shanghai and economy growth of Yangtze River delta. More specifically, there is bilateral causal relationship between Shanghai's financial cluster and Shanghai's economy growth. Zhejiang's economy growth promotes formation and development of Shanghai's financial cluster, while Shanghai's financial cluster is not Granger cause of economy growth in Jiangsu and Zhejiang.

We use impulse response function to analyze the mutual relationship between financial industry cluster in Shanghai and economic growth in Yangtze River delta dynamically, in order to verify the growth effect and radiation effect.

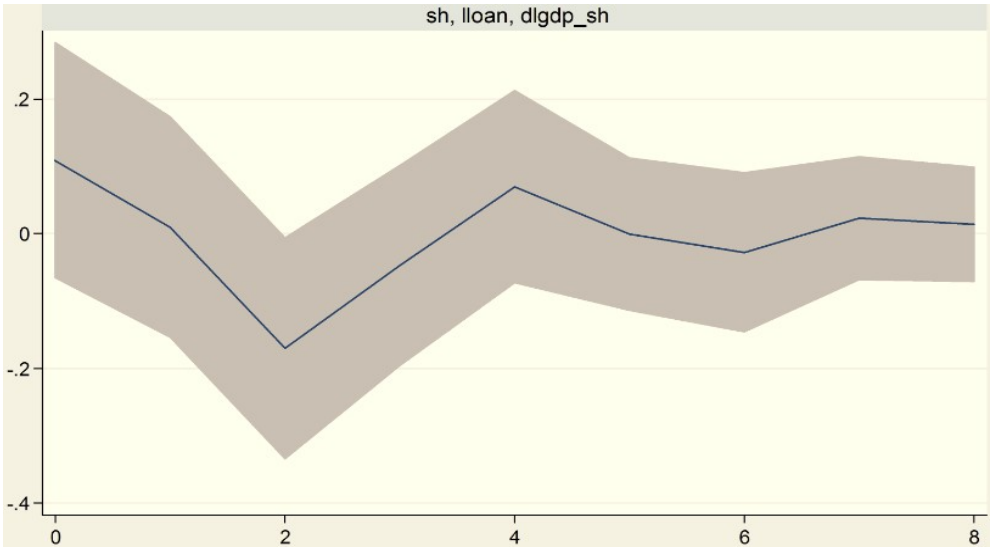


Figure 5. Impulse effect of lloan on gdp_sh

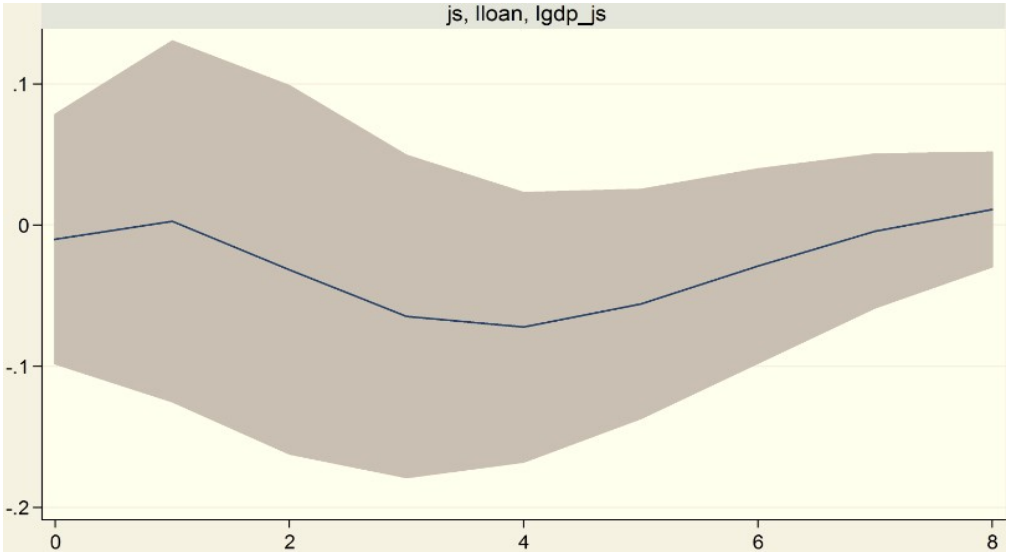


Figure 6. Impulse effect of lloan on lgdp_js

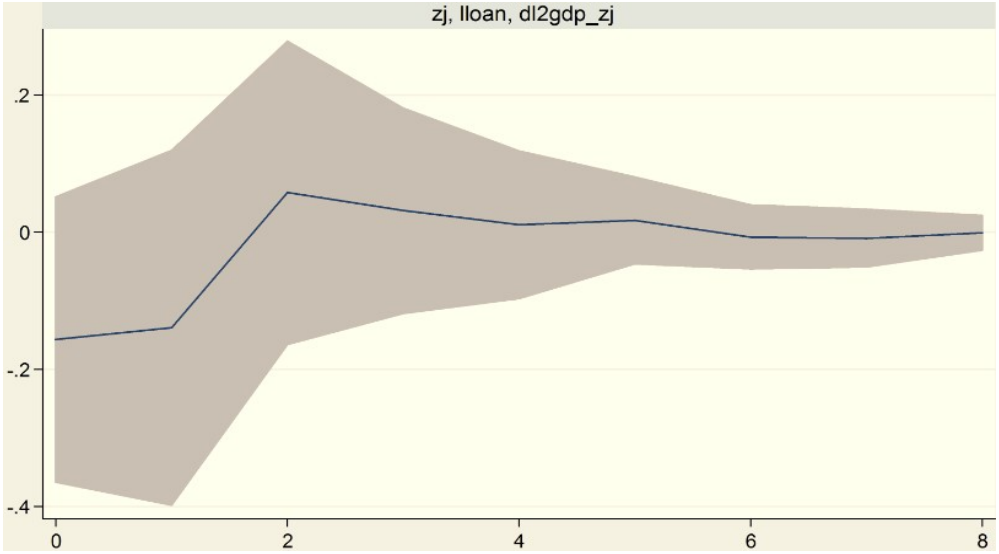


Figure 7. Impulse effect of lloan on lgdp_zj

Figure 5 to figure 7 are all made in 95% certification level. The impulse response analysis of variables is shown in figure 5, figure 6, and figure 7. The impact of Shanghai's financial cluster on Shanghai's economy is positive at first, then declines, and reaches the minimum in the second year, then rises and becomes stable gradually. Shanghai's financial cluster accelerates Jiangsu's economy growth from the beginning, then impedes since the second year, until 7 years later, the positive effect reappears. The impact of Shanghai's financial cluster on Zhejiang's economy growth shows hysteretic nature, it shows positive since the second year, and disappear little by little until 6 years later. In all, the impact trend and power of Shanghai's financial cluster on Yangtze River delta is limit.

*4.4 Shenzhen and Pearl River Delta*

Shenzhen is financial center of Pearl River Delta. This part we take Shenzhen's financial cluster(lloan), Shenzhen's economy growth (lgdp_sh), Guangdong's economy growth (lgdp_js) as variables, and verifies effect of Shenzhen's financial cluster on economy growth in Pearl River Delta.

Table 7. Result of Granger causality test of Shenzhen's financial cluster

| Null hypothesis | Chi-squared statistic | P value |
|---|---|---|
| lloan is not Granger cause of dlgdp_sz | 10.277 | 0.006 |
| lloan is not Granger cause of dl2gdp_gd | 14.76 | 0.001 |
| dlgdp_sz is not Granger cause of lloan | 5.3448 | 0.069 |
| dl2gdp_gd is not Granger cause of lloan | 6.7338 | 0.034 |

The result of Granger causality test is shown by table 7, there is bilateral causal relationship among Shenzhen's financial cluster, Shenzhen's economic growth, and Guangdong's economy growth.

We adopt impulse response function to analyze the interrelation between financial aggregation and economic growth in Pearl River Delta.

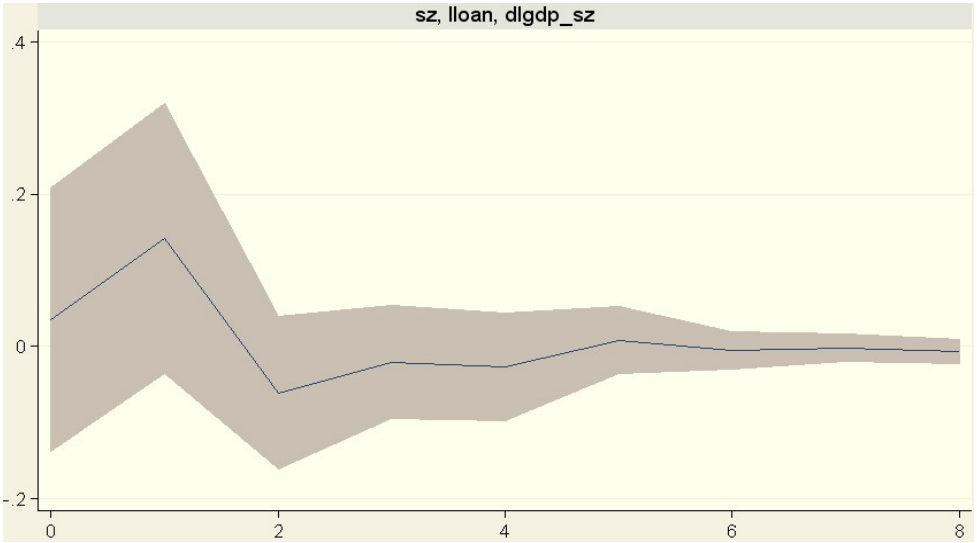


Figure 8. Impulse effect of lloan on gdp_sz

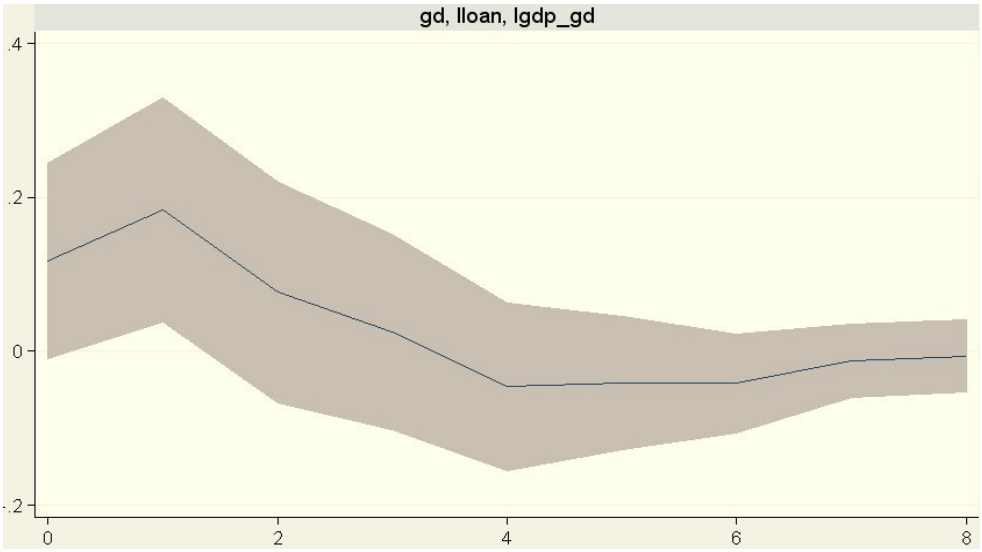


Figure 9. Impulse effect of lloan on lgdp_gd

Figure 8 and figure 9 are all made in 95% certification level. From figure 8 and figure 9, we find that there is positive effect of Shenzhen's financial cluster on Shenzhen's economy growth in the first 2 years, then negative effect, and fades away until 6 years later. The effect of Shenzhen's financial cluster on Guangdong's economy growth is positive from the beginning, then turns into negative since the third year, and becomes stable gradually.

**5. Conclusion**

This paper takes LS model as theoretical basis, analyzes the financial development and aggregation in three economic zones, and verifies the growth effect of financial cluster on local area and radiation effect of financial cluster on economic circle, using the Granger causality test.

1) The main performance of financial industry cluster is high centralization of financial resources in some developed cities. The effect of financial industry cluster on economy growth is divided into growth effect in core area and radiation effect in marginal zone.

2) With the development of economic integration and financial globalization, the trend of financial aggregation arises and develops quickly. In the worldwide, New York, London, and Tokyo are three biggest cities of financial industry cluster. In China, financial street of Beijing and Pudong financial district of Shanghai attract plenty of financial institutions and financial resources, and become national financial centers.

3) Three economic zones have their distinct characteristic of financial industry cluster. Beijing, Shanghai, and Shenzhen are financial centers of circum-Bohai-Sea delta, the Yangtze River delta, and Pearl River Delta respectively. Through analysis, we find that the degree of financial aggregation is highest; the difference of financial resources is biggest in Circum-Bohai Sea Region, while the agglomeration degree and differentiation is slight and similar in Yangtze River delta and Pearl River Delta.

4) Through empirical test, Beijing's financial cluster does not have the growth effect on local economy growth and radiation effect on economy growth in circus-Bahia-Sea. The reason may be as follows. First, the economy growth of Beijing profits from political advantage and not financial aggregation. Second, Circum-Bohai-Sea delta is vast in area, and uneven in economic and financial development, so financial industry cluster is difficult to exert radiation effect on economy growth in Circum-Bohai-Sea.

5) Shanghai's financial cluster realizes growth effect in local economy growth, but fails to attain radiation effect in surrounding areas, that is Yangtze River delta. Shanghai is most developed city in China, and its agglomeration degree is highest, so we should keep on developing financial industry cluster in order to realize the radiation effect on economic growth in Pearl River Delta.

6) Shenzhen's financial cluster realizes growth effect in local economy and radiation effect in surrounding area, which is Pearl River Delta, and forms a two-way causal relationship between financial aggregation and economy growth. Cities in Pearl River Delta are similar in economic development and concentrated in financial resources, so the growth effect and radiation effect are quite evident.

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