THE RELATIONSHIP BETWEEN FINANCIAL AGGLOMERATION AND ECONOMIC DEVELOPMENT: THE CASE OF THE FIVE PROVINCES IN NORTHWEST CHINA

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**A Thesis Submitted in Partial
Fulfillment of the Requirements for the Degree of
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ABSTRACT

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Finance is the general hub of modern market economy operation and plays a non-substitutable important position in economic progress. The fact of financial agglomeration in promoting the economy has been confirmed in the southeastern coastal areas of China, but for the inland areas of the northwest, there is still little research for this "new topic", this field of research is still waiting for people to explore. This paper firstly combs the relevant theories of financial agglomeration. On this basis, the five provinces that constitute the northwestern region of China are selected as the research areas. The total amount of financial agglomeration is set as the main explanatory variable, and the GDP growth rate is chosen to be the main explained variable, then we collected and established the panel data for 2008 to 2017. By processing and testing the data, this paper constructs a fixed-effect model for analysis. The results show that the development of financial agglomeration can promote economic development. For every percentage increase in the total financial agglomeration, the growth rate of GDP will increase by 3.19%, and the impact of financial agglomeration on economic development is lagging.

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Thank you for letting me have the confidence to complete my research.

Thank you all.

Xiao Xi

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CHAPTER 1

INTRODUCTION

1.1   The Overview of Financial Industry Agglomeration

Financial industry agglomeration refers to the phenomenon that various financial institutions concentrate in large quantities in a specific space. In the field of financial industry, starting in the seventy's, an increasing number of financial institutions are organizing transactions and production activities in a cooperative way. From the initial few banks to the rise of financial holding company, and then to the spatial agglomeration of various types of financial institutions, agglomeration has become the basic form of modern financial industrial organization. As for the causes of industrial agglomeration, many scholars around the world have explored and produced many important theories. Marshall (1890) first mentioned industrial agglomeration in his work "*the principle of economics*", and he found that the centralized vendors were more efficient than the single isolated vendors. Ellison, Glaeser, and Kerr (2010) verified Marshallian theories, who used the OLS univariate specification and OLS multivariate specification (univariate regression and multiple regression methods) to provide data support for Marshall's theory, they find the cost of moving goods can be reduced, so do the people and idea. Liang Ying and Luo Xiao (2006) argue that the phenomenon of financial agglomeration occurs mainly for two reasons: one is the spontaneous formation model, like London: economic development has generated new financial needs so that financial institutions and markets have expanded accordingly. However, the premise is that this particular region has the foundation for the financial industry to develop, which can stabilize the

financial industry here. The other is government-oriented development, with Singapore as an example. Through the artificial design planning and government policy support, the financial industry will be guided to develop in a certain area, thus driving the development of the entire financial market. Commendatore, Michetti, and Purificato (2013) give another reason. They find that the reduction of the competitiveness of the banking industry at the same level of financial development will result in an equal increase in the regional interest rate. When the development level of the financial industry in the two regions is different, the results are reinforced: the stable equilibrium before will be biased towards the enterprises in the region with high competitiveness in the banking industry. All companies are biased towards low-interest areas, resulting in financial agglomeration.

Zhang Zhiyuan and Ji Weijie (2009) pointed out that the economic environment and technological environment are the main factors affecting financial agglomeration. Wu Ming, Cao Jiahe, and Zhang Le (2014) conducted a study on the "diamond model" and pointed out that market openness is also one of the factors affecting financial agglomeration. Gong and Ban (2016) pointed out that there are regional differences in financial agglomeration through empirical analysis. Yang Chenzhu (2015) believes that financial industry agglomeration is characterized by high-frequency financial activities and efficient financial transactions, as well as the realization of high financial output. She also proposed that internet finance as a new financial role should attract our attention at the same time.

The agglomeration of the financial industry has many benefits. Kindleberger (1973) believes that there is a scale effect in the financial agglomeration centre. The financial agglomeration centre not only facilitates the intertemporal flow and settlement of local funds but affects the transfer of funds between different regions and improves the efficiency of regional resource allocation. Park (1982) pointed out that the geographical proximity of a large number of financial institutions, the

proximity of industries and the proximity of related enterprises facilitated the collaboration among financial institutions, shared infrastructure, information communication, knowledge and technology innovation, reduced financing costs, and improved market liquidity. Bernard and Jones (1996) are some of the earlier people to pay attention to the spatial dependence characteristics of regional economic development and used the spatial correlation coefficient to measure the spatial correlation of regional economic development in America. He indicated that regional economic development has both spatial correlation and spatial spillover effects. Gehrig (2000) and Zhao (2003) also share the same view, they believed that financial agglomeration also facilitates the financial industry and related industries to use the shared infrastructure and network system in the region to complete information exchange, thereby achieving economies of scale. Yang Yiwu and Fang Dachun (2013) used the panel VAR model to enter the data of 16 cities in the Yangtze River Delta region of China. Their study concluded that a long-term stable equilibrium relationship existed between financial agglomeration, industrial structure rationalization and industrial structure optimization.

In the long course of economic research, scholars have long explored the relationship between financial agglomeration and economic growth. Based on the most basic economic principles, financial agglomeration is part of the development of the financial industry. In the process of agglomeration, cooperation and development, various financial institutions must inevitably consume and invest in all aspects. These are important factors in promoting economic growth. From another perspective, the rapid development of the economy will also generate more new financial needs, and the financial industry will also be promoted, and the financial agglomeration, which can be widely adopted, can be further developed.

Worldwide, New York, London and Hong Kong have become the world's most important financial industry gathering place. These metropolises have attracted

the world's most important financial. New York is the centre of American finance, it has the fastest speed of development in the world. The latest survey shows that New York has surpassed London as the world's top financial hub. Although London's economy has been affected by Brexit, it still has the largest European dollar market, and its stock exchange market operates 24 hours a day, making it the third largest securities trading center in the world. As an international financial center, Hong Kong is characterized by the most concentrated financial institutions. There are many things in Hong Kong's legal requirements that are beneficial to the company's economic activities, which has attracted many financial companies.

Table 1.1 Rank and Rating

Centre	GFCI 24		GFCI 23	
	Rank	Rating	Rank	Rating
New York	1	788	2	793
London	2	786	1	794
Hong Kong	3	783	3	781
Singapore	4	769	4	765
Shanghai	5	766	6	741
Tokyo	6	746	5	749
Sydney	7	734	9	724
Beijing	8	733	11	721
Zurich	9	732	16	713
Frankfurt	10	730	20	708

The phenomenon of financial industry agglomeration is also rapidly developing in mainland China. DING, LI, and LI (2009) have shown that China's financial industry has shown a tendency to gather and the degree of agglomeration is gradually increasing. Many domestic and foreign financial companies are concentrated in specific areas of Shanghai and Beijing. Such as Beijing's financial street, Shanghai Lujiazui financial area, these areas have become China's mature financial industry gathering place, not just a large number of financial institution

headquarters are located here, but also attracted a large number of required human resources. Although China's financial agglomeration is still at a low level in the world(Zhao Xiaoxia, 2014), this situation is gradually changing. Wei Haili and Yuan Jiapeng (2018) analyzed the level of financial industry clusters in Tianjin Binhai new district from 1997 to 2016 by using the location entropy index. The results show that since 2006, the concentration of Tianjin Binhai new area has been continuously improved, and the growth trend is good, but its agglomeration level is still lower than the national average. For Shanghai, China's economic centre, Shanghai Pudong new district actively played a positive stimulating role for the financial industry in 2017, vigorously supported financial technology companies and well-known financial institutions, and encouraged the development of financial leasing and other enterprises. By the end of 2017, Pudong new district had settled in 2,197 professional service organizations, with a total of 6,942 various types of emerging financial institutions, including 5,085 equity investment and management companies; and 1,857 financial leasing companies. As of the end of September 2018, the Chinese version of "wall street" - Lujiazui finance and trade zone has 42,000 enterprises, and there are currently 842 licensed financial institutions, including bank of communications and other 20 commercial banks (accounting for Shanghai 80%), 32 non-bank financial institutions, 85 commercial bank branches (accounting for 58% in Shanghai), and 310 banking outlets. This area has the highest degree of internationalization of commercial banks in the country, and they have gathered 17 foreign-funded corporate banks such as HSBC, Citigroup and Chartered bank. Lujiazui also has a large number of emerging financial institutions such as asset management, private equity securities, equity investment, financial leasing, financial technology, credit rating, and financial information services, with a total of about 6,000. As the end of September 2018, the total number of employees in Lujiazui

Financial Area was more than 500,000, including nearly 300,000 financial employees, which showed high academic qualifications, specialization and internationalization.

However, due to differences in China's geography, culture, and environment, regional development is very uneven. The pearl river delta, the Yangtze river delta and the Bohai bay central economic zone, those three are the most economically developed regions, naturally, they are also placing where financial resources gather.

The inland areas such as the west and the north are limited by complex terrains such as mountains and plateaus, and the transportation is not convenient enough. Its economic level has lagged behind the eastern region. Ding Yi, Li Jingxia, and Li Lin (2010) used empirical analysis to prove that the financial agglomeration in the eastern region is higher than that in the central and western regions. Pan Hui, Shu Guanghe, Zhang Bing, and Li Jun (2013) said that the economic effects of financial agglomeration in eastern China are much larger than those in the central and western China. Ren Yinghua, Xu Ling, and You Wanhai (2010) selected the cross-sectional data of 28 inter-provincial regions in China and used spatial measurement methods to study the factors affecting financial agglomeration, they believed that there is a strong spatial dependence between financial agglomerations in the provinces. Chinese government regards regional coordinated development as a key point. From the actual situation, it hopes to promote the economy growth of the underdeveloped cities around the central city, and the development of financial agglomeration will undoubtedly contribute to the implementation of this strategy.

1.2 The Introduction of the Five Northwestern Provinces

The northwestern part of China mainly refers to the areas where the five provinces of Shaanxi, Gansu, Qinghai, Ningxia Hui Autonomous Region and Xinjiang Uygur Autonomous Region are located. There are two plateaus, three basins

and one plain in this area. It is really complicated. Closed, broken, and backward are synonymous with the northwestern region in the 1930s. With the western development strategy implement in the nearest ten years, the northwest region has further developed in the areas of roads, railways, aviation, inland water transport, ports, and pipeline transportation, forming a relatively complete modern three-dimensional transportation system. The functions of distribution and channel of logistics, people flow, capital flow and information flow in the connecting area are continuously enhanced, and the geographical advantages of the transportation hub and the whole are constantly highlighted.

Among the five provinces, Shaanxi Province has the most eastern geographical position, its economic tie is closer to the central and eastern regions. This advantage help Shaanxi's economic growth in a leading position of the northwest region. In 2017, Shaanxi's local GDP reached 2,189,881 million yuan, it has an increase of 8% over 2016 and lager than the national level 1.1 percentage points. The fixed assets investment of the whole society was 23,819,380 million yuan, it is 14.4% higher than 2016. The per capita disposable income of residents was 20,635 yuan, an increase of 1,761 yuan over 2016, an increase of 9.3%. The overall level of consumer prices rose by 1.6% over 2016. Xi'an, the provincial capital, is known as "Chang'an". It is one of the world's four ancient civilizations. It has served as the capital of ancient China for 13 dynasties, totalling 1077 years. Benefiting from the "One Belt, One Road" policy, two national-level innovation reform pilot zones and free trade pilot zones have been landed in Xi'an, and Xi'an's foreign trade growth rate has surpassed many coastal cities. Xi'an is also the fastest-growing city in the list of China's 26 provincial capital cities in 2017.

Gansu province is in the embrace of many mountains. This geographical feature has increased the difficulty of economic development, resulting in the economic indicators of Gansu Province are ranked lower in the country for a long

time. It is a province with obvious development potential and difficulties, and obvious advantages and disadvantages. As an important industrial base, Gansu provides energy and raw materials for industrial production. Since the reform and opening up, Gansu Province's GDP has increased from 64,730 million yuan in 1978 to 745,990 million yuan in 2017, with an average annual growth rate of 9.5%. The per capita GDP has increased from 348 yuan in 1978 to 28,497 yuan in 2017, an average annual increase of 8.6%. However, compared with the neighbouring Shaanxi Province, this development still has obvious gaps.

Xinjiang is a multi-ethnic area where many cultures are integrated. From 1978 to 2016, the GDP of Xinjiang increased from 3,907 million yuan to 964,970 million yuan, and the per capita GDP increased from 313 yuan to 40,427 yuan, the increased by about 246 times and 129 times respectively. The construction of "One Belt and One Road" has made Xinjiang the frontier of China's opening to the west. Many Central European trains on the western railroad track have chosen to travel through Xinjiang to Central Asia and Europe. Xinjiang is bordered by Central Asian countries, connecting Kazakhstan, Russia, Belarus, Poland, and Germany to form an international channel, becoming a domestic energy entry and exit hub. Although its current level of economic development is low, infrastructure development has a large space and sufficient energy.

Relative to several other provinces in Qinghai and Ningxia provinces, the pace of economic development is slow, but it has also maintained positive growth. Qinghai's total area is ranked fourth in the country. In 2017, the GDP value of Qinghai Province was 26,428 million yuan, it is 7.3% higher than the previous year. The per capita GDP was 44,348 yuan, it increased 6.4%. The per capita disposable income of residents was 1,9001 yuan, it is 9.8% higher than the previous year. The strong similarities between Qinghai and Central Asia and Arab countries in terms of religion and ethnicity are resources that cannot be replaced by other provinces and

regions. Therefore, human communication as an important help force for economic development has a realistic necessity. In 1958, the Ningxia Hui Autonomous Region was formally established. As a young province, its economic development potential is great and also its pressure is high. In 2017, Ningxia achieved a total production value of 345,393 million yuan, it is 7.8% higher than 2016. The per capita GDP was 50,917 yuan, increased 6.7%. The per capita disposable income of residents was 20,562 yuan, an increase of 9.2% over the previous year.
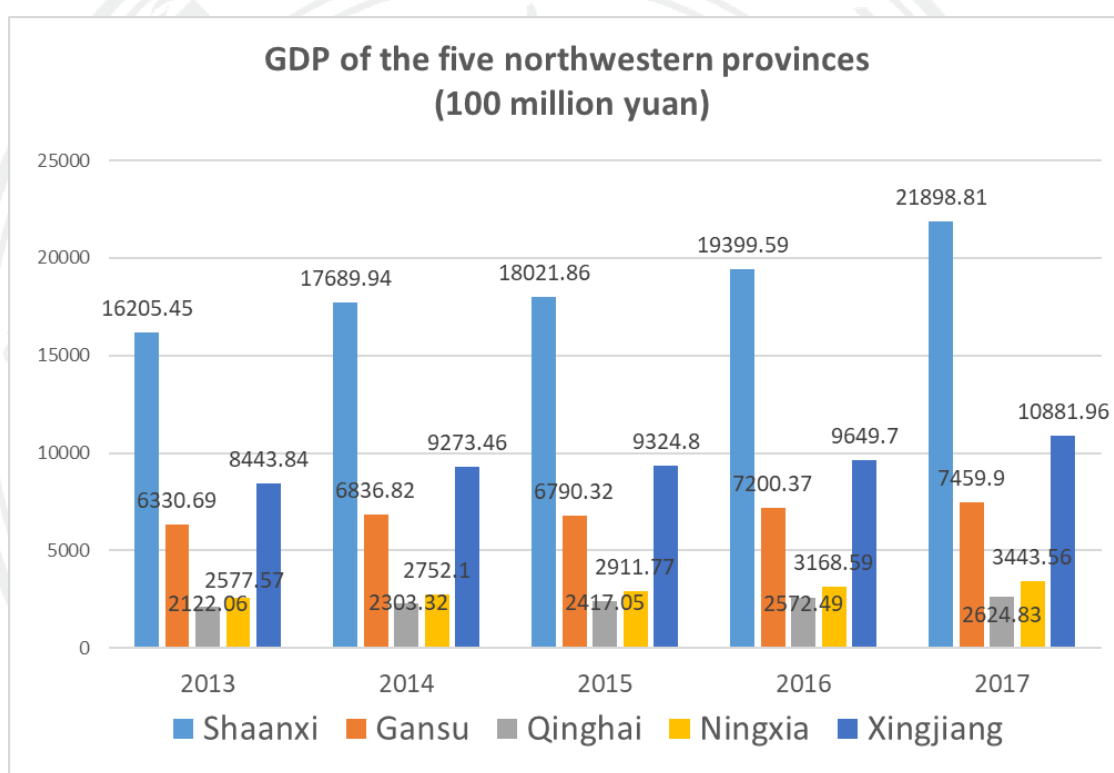
Figure 1.1 GDP of the Five Northwestern Provinces
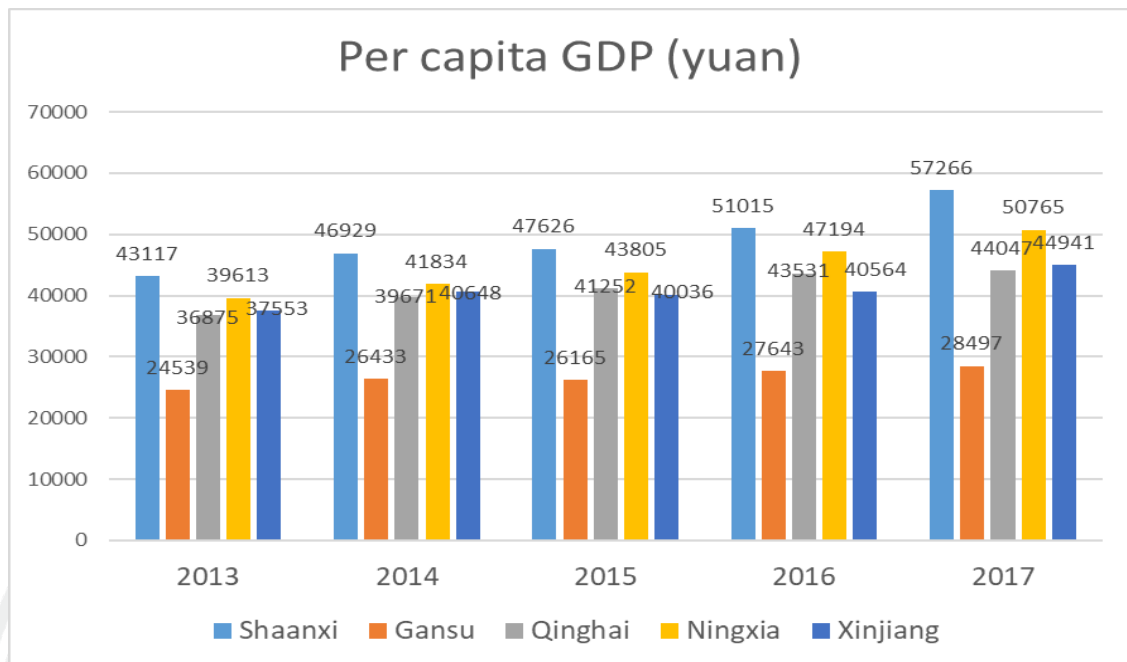
Figure 1.2 Per Capita GDP

1.3 Research Objectives

Since China's accession to the WTO, the pace of economic development has further accelerated, not only driving the economic development of the eastern coastal areas, but also improving the economic situation in the inland areas of the northwest. Compared with the industrial agglomeration of the manufacturing industry, the financial industry's agglomeration research is still relatively weak, and there are still some shortcomings and gaps. Meanwhile, combined with the actual situation of China's economic development, the economy of the eastern coastal areas is relatively developed, and there are many studies on financial agglomeration. In contrast, in the western region, whether it is the southwestern region where Sichuan and Chongqing are located, or the northwestern region where Gansu is located, due to the geographical location inland and the distribution of natural resources, economic development is lagging behind, and related research is extremely lacking. However, because of this, the region has great potential for development. Under the policy of

the "One Belt, One Road" policy, it is bound to have rapid development. This article looks at the northwestern region of China where few people are interested, and raised the following questions:

1. Is there a financial agglomeration in the five northwestern provinces? What is the situation?

2. To study the impact of financial agglomeration on economic growth in the five Northwest provinces of China.

This research intends to use quantitative analysis and use econometric knowledge for scientific assessment. It has expanded the scope of previous research to some extent, using the latest data in recent years, and more timeliness.

This article is roughly composed of five parts. We present the literature review in the next section, then is data and methodology. We will get and analyze our own result in the fourth section. A conclusion section summarizes this study at the end.

CHAPTER 2

LITERATURE REVIEW

2.1   The Theory of Industrial Agglomeration and the Theory of Financial Agglomeration

The term "agglomeration" derives from industrial-economic research. Industrial economics defines "industrial agglomeration" as a collection of interrelated, geographically concentrated companies and institutions within a particular industry (manufacturing, service, etc.). At present, there are different views on the formation and evolution of industrial agglomeration from different perspectives. Weber proposed to explore industrial agglomeration theory from the viewpoint of micro of the location of individual enterprises. The concentration of industries in a specific area will result in economies of scale and positive externalities, which will reduce the cost of the enterprise. This reduction in cost is the primary factor in attracting companies to come together. Krugman explained the industrial agglomeration with the knowledge of economic geography. He established a preliminary industrial agglomeration theory model on the basis of the increase of corporate income.

The continuous evolution of industrial agglomeration theory has spawned the theory of spatial agglomeration. The theory of spatial agglomeration believes that industrial spatial agglomeration has contributed to the emergence of cities and urban agglomerations in a certain sense. Moreover, the "knowledge linkage" and "economic linkage" effects brought about by spatial agglomeration serve as an engine for economic growth in a specific geographical space, and also a vital reason for further agglomeration. The research by Martin and Ottaviano (2001) also confirms that the

geospatial agglomeration of industry and regional economic growth have an interactive relationship. Di Giacinto and Pagnini (2011) refer to the view of new economic geography: the reason why a firm prefer to be sited in a particular region not only because it is attractive in itself, but also it has economically linked to other regions. They believe that the spatial concentration and autocorrelation indices used in existing research only direct to one sort of agglomeration process, which may be biased. They suggest that the two patterns of aggregation may be derived by different factors. The first one was defined as "local" by them; the second one is "global" or "distance-based."

The theory of financial agglomeration originates from the theory of industrial agglomeration and is influenced by the theory of spatial agglomeration. "Financial agglomeration" was first proposed by Kindle Berger of the Massachusetts Institute of Technology. He found through research that economies of scale exist in financial market organizations, which makes banks and other financial institutions often choose a specific region, so that formed a specific financial agglomeration area. Owing to the particularity of financial industry, the meaning of financial agglomeration is much broader than the meaning of industrial agglomeration. It includes both the time and space dynamic evolution of financial resources such as financial instruments, monetary capital and capital, financial institutions, and the space formed by the dynamic evolution of financial resources. Another voice believes that the study of financial agglomeration originated from financial geography, which was founded in the 1950s. The more influential monograph is "*Space Economics: Urban, Regional and International Trade*", the work is co-authored by Masahisa Fujita, Paul Krugman, Anthony J. Venables (Hu Dongwan & Songyuxiang, 2017).

Gou Xiaolan and Gao yunfeng (2014) proposed several characteristics of financial agglomeration: 1. Spatiality. Financial agglomeration process is the regional movement of the financial space of financial activities. 2. Complexity. The causes of

financial agglomeration are complex, and the process is complex. This concentration is not isolated development but needs to interact with other industries and integrate with each other. 3. Hierarchy. Financial agglomeration can be divided into three levels: macro, meso and micro, focusing on the international distribution pattern of financial resources, domestic distribution pattern and regional distribution pattern. 4. Progressive. The difference in financial resource endowment triggered the financial regional movement, thus forming a financial regional system. Then, they proposed a regional agglomeration of financial resources, which will promote the sound advancement of the financial industry in this region and promote the region's economic growth. From the perspective of financial function analysis, financial agglomeration facilitates the flow of information in financial markets and contribute to the rational distribution of resources. In the book named "The Wealth of Nations", Adam Smith mentioned that specialization is the main factor in improving productivity, and financial agglomeration can promote specialization. Yin Xingshan, He YIfen, and Xu Hongshui (2003) constructed an evaluation index system for urban financial competitiveness and firstly used statistical methods to evaluate the financial competitiveness of 15 cities in the Yangtze River Delta region. The finding reveal that the financial competitiveness of the region has a great relationship with the accumulation of financial resources. This result provides empirical support for the above theory. From the perspective of knowledge spillovers, in the area of financial agglomeration, the spillover effects of knowledge and technology generated by the intersection of different financial knowledge and technology can increase the total amount of knowledge in this region. And the rich amount of knowledge will attract new institutions to enter, forming a cyclical cumulative effect.

2.2 The Difference between Financial Agglomeration and Financial Development

Financial agglomeration is a branch of financial development. Financial industry agglomeration refers to a country's financial regulatory departments, financial intermediaries, multinational financial enterprises, domestic financial enterprises and other institutions with headquarters functions concentrated in a specific region, and with other international (transnational) institutions, multinational companies, there is a special industrial space structure in which domestic large-scale enterprise headquarters have close contacts. Once the financial agglomeration is formed, a new financial structure will emerge. The main target of large-scale enterprises will be the financial center as the carrier, and the mutual integration of funds and capital operation mechanism will be used to perfect the distribution of resources worldwide. From a spatial perspective, the phenomenon of financial industry and financial resources gathering in space will inevitably occur during developing. The occurrence of financial agglomeration stems from the geographical concentration or centralization of financial institutions that can achieve economies of scale in business cooperation, information dissemination and mobility, labor specialization, and infrastructure sharing. This economic benefit is reflected in: reducing the spending of working capital, providing convenience both for financing and investment; improving market liquidity, decreasing market financing costs and investment risks; facilitating cooperation between financial institutions and sharing auxiliary industries (Li Biao, Song Changxu, & Wu Jia, 2016)

Financial development refers to changes in the financial structure. These changes include both short-term changes and long-term changes, both financial transaction flows in successive periods and comparative changes in financial structures at different points in time. The financial structure refers to the form, nature

and relative scale of various financial instruments and financial institutions, which means that financial development is jointly determined by financial instruments and financial institutions. Olgu (2014) wrote in the paper that financial development may be defined as the developments in the size, efficiency and stability of and access to the financial system. Kadir Y. Eryigit and Sibel Bali Eryigit (2015)Said that financial development refers to the fulfilment of the functions of the financial system in the best manner by eliminating the market distortions. Many scholars have also confirmed that financial development has a positive effect on economic growth(Gang, 1996; Jie, 1998; Ping, 1992; Qinxian & Zhiwen, 2008).

2.3 Interaction between Financial Agglomeration and Economic Growth

The theory that studies the correlation between the development of financial industry and economic growth is called financial development theory. The first one to study this aspect was the American economists John.Gurley and Edward.Shaw. In their book "*Money in A Theory of Finance*" (1950), the two scholars established a broad-based monetary theory with diversified financial institutions and sound financial policies. This move reminds people that the study of financial theory cannot be limited by monetary theory and banking theory, but should also focus on financial development theory. Gurley and Shaw believe that financial expansion is the engine and means to boost economic growth. Subsequently, Ronald I. Mckinnon and Shaw came out with the concepts of "Financial Repression" and "Financial Deepening" for the financial status of less developed countries. In the theory of financial deepening, Edward believes that the financial system and economic development are both mutually reinforcing and mutually restrictive. A sound financial system can enable the rational allocation of savings funds, thereby promoting economic development. At the same time, good economic development has created favourable conditions for

financial industry development, the national income has increased, and the demand for financial industry by the main body of economic activities has increased, thus stimulating the development of the financial industry. Mutual restraint is manifested in the fact that financial development needs the support of economic development, and economic development also includes the development of the financial system.

2.3.1 The Impact of Financial Agglomeration in Economic Growth

Thangavelu, Beng Jiunn, and James (2004) used the model of VAR to empirically explore the relationship between financial industry development in Australia and economic development. The results indicate that the impacts on economic growth created by financial intermediaries and financial markets is different. Financial agglomeration affects regional economic growth mainly through industrial restructuring (Yang Yiwu & Fang Dachun, 2013) Jedidia, Boujelbène, and Helali (2014) used Autoregressive Distributed Lag method analysis found that a positive influence on the economic growth can be seen in domestic credit for private sector. Aregbeshola (2016) using the corresponding economic indicators of Africa during 1980 to 2012 to show that in in North Africa and West Africa the impact of financial market development on economic growth is greater than in southern Africa. Also in African countries, Assefa and Mollick (2017) using the data from 1995 to 2010 on capital account and African stock markets (collected 15 African countries), and finally found that both direct financing financial markets and indirect financing financial intermediaries determinate the effect of the financial sector on the economic growth of the domestic economy. The empirical outcomes also indicate that the financial sector responds to the demand generated by economic development, that is, economic growth leads to financial development in Granger's sense.

Throughout the existing research, the correlation between the financial industry and economic development has been verified by many scholars. Lychagin (2016) verifies that an industry's spatial gatherings have spillover effects by establishing

models. He demonstrates that Companies with strong responses to spillovers in the model tend to have too many representatives in the aggregated regions. Japan (Dekle & Eaton, 1999), China (Zhong Shen & Du Lei, 2018) and other financial services industry clusters have geographical spillover effects, but the promotion effect is small, it seems to be far lower than the manufacturing industry. The financial agglomeration in Hangzhou creat a positive influence on economic expansion. Although this promotion is not as strong as capital and labour, it can still promote GDP growth (Liu Kaige, 2017). Martin and Ottaviano (2001) argue that the geospatial agglomeration of industry and regional economic growth have an interactive relationship. Feng Delian and Ge Wenjing (2004) constructed a "Falun model" when studying the factors forming the international financial centre. Model research believes that science and technology and economic developments are the main factors and internal motivation for the formation of international financial centres.

Brülhart and Mathys (2008) measured the economic agglomeration and labour productivity in various regions of Europe, concluded that the concentration of agglomeration economies in Europe has a huge effect on labour productivity. The positive influence of financial services on labour productivity is more obvious than other industries. Chen Wenfeng and Ping Ying (2008) used the methods of location entropy and Granger causality test to analyze the internal relationship between financial industry agglomeration and economic growth in Shanghai from 1990 to 2006, and found that there is a long-term equilibrium relationship between financial industry agglomeration and economic growth. Iyare and Moore (2011) found that long-term financial agglomeration can directly drive economic growth by their study. Zhao Xiaoxia (2014) believes that if a mass of financial organizations carries out multiple cooperation projects and strengthen their business contacts, they will improve their work efficiency and economic benefits in competition with each other. This is the promotion of economic agglomeration to economic development. Lu Jun

and Xu Jie (2014) conducted research on the financial agglomeration of Beijing, Tianjin, and Hebei, they have a conclusion that financial agglomeration boost economic by expanding the efficiency of resource allocation and expanding industrial development capital. Pei Donghui (2016) divided the financial industry into banking, insurance and securities industries. Through the OLS regression analysis, the banking industry and the insurance industry have promoted the economy. The promotion of the securities industry is not obvious. Li Biao et al. (2016) show that financial agglomeration has a significant role in promoting economic growth, but has a "delay effect" on R&D activities. Sun Zhihong and WANG Yaqing (2017) conducted research on China's economically underdeveloped regions, using spatial lag panel data models and spatial error panel data models to reveal the current imbalance in the development of China's financial agglomeration. The scale effect of financial agglomeration promotes economic development through network coverage, innovation, and technological advancement (Dawei, 2019).

2.3.2 The Impact of Economic Growth on Financial Agglomeration

Zhang Kewen (2018) constructed a two-way interaction relationship model between financial industry agglomeration and economic growth. He selected 10 financial centre cities in China as sample cities and conducted empirical research using co-integration test and parameter estimation. She noted that in addition to the financial agglomeration to promote economic development, economic development can also promote industrial agglomeration (four cities have produced this result). Xiong Xiaolian and Dai Fangfang (2018) explained in more detail. They proposed that in 2011, the economic development of western China gradually led to an increase in the financial agglomeration index. However, after 2014, financial agglomeration showed its contribution to economic development.

This paper examines the impact of financial agglomeration on economic growth.

2.4 Spillover Effect of Financial Agglomeration

Marshall (2007) believes that industrial agglomeration can cause internal economic and external economic effects, which in turn will drive regional economic expansion. On the one hand, with the expansion of industrial agglomeration, the scale of the enterprise continues to expand, the unit production cost is gradually reduced, and then the internal economies of scale effect; on the other hand, after the industry gathers in space, the labor market and ancillary services can be shared, which reduces the cost of the entire industry and creates an economic spillover effect(Liu Ji & Linlin, 2018) .

According to the characteristics of industrial cluster theory and financial agglomeration, Fang Shengfei, Xu Qiuyan, and Ma Linlin (2018) summarized the spillover effect mechanism of financial industry agglomeration as five points: First, financial agglomeration can strengthen the financial industry and other related industries. Exchange and resource sharing to alleviate the shortage of financial supply caused by information asymmetry; Second, financial agglomeration can improve the trust mechanism between financial institutions, financial institutions and enterprises, and reduce the spending of contract execution and supervision. At the same time, it promotes the sharing of existing information systems and infrastructure by financial institutions, reducing the cost of information search and information sharing. Third, financial agglomeration can improve cooperation efficiency and diversify liquidity risk; accelerate the specialized division of financial services, increase the efficiency of the use of financial resources, and decreasing financing spending and investment risks. Fourth, financial agglomeration can drive plenty of financial-assisted industry cluster development, such as lawyers, accounting, credit assessment, asset assessment and financial expertise Training, etc.. Fifth, financial agglomeration brings together high-quality elements such as innovative talents and high-tech, help to enhance the

industry's ability to innovate, to promote advanced technology and expertise, to promote other industries and industries through technology spillovers and knowledge spillovers, thus facilitating the entire growth of the regional economy.

Take the spatial spillover impact of financial agglomeration is concerned, Audress C and Feldman M (2006) argue that financial agglomeration will promote economic growth in neighboring regions through radiation effects while promoting the region's economic growth. Li Hong and Wang Yanxiao (2014) based on the panel data of 286 cities in China from 1995 to 2011, borrowed from the agglomeration economic externality model constructed by Ciccone & Hall (1996), and tested the relationship between financial agglomeration, its spatial overflow and urban economic growth by using the spatial Dubin model with improved weight. The results show that human capital of financial industry, financial agglomeration scale and financial output density not only significantly promote urban economic growth, but also have great spatial spillover effects in neighbouring cities. The spillover impact of financial agglomeration space can be simply embodied as service spillover and information spillover. This means that the function of financial market cannot be separated from the constraints of geospatial differences (Lian Jianhui, Sun Huanmin, & Zhong Huibo, 2005; Lin Jiangpeng & Huang Yongming, 2008). Among them, service spillovers are the spread of financial resources through financial practitioners, financial service networks. The extension creates a proliferation-type service to the surrounding real economy; the information-type spillover is reflected in the information as a financial resource from the financial center and the "information hinterland" (Zhao, 2003), to the periphery; information-type spillover is a service-type spillover Mutual influence and complementarity are closely related to the formation process of financial agglomeration.

CHAPTER 3

METHODOLOGY

3.1 Selection of Indicators and Data Sources

This paper selects the annual data of Shaanxi province, Gansu province, Qinghai province, Ningxia Hui Autonomous Region and Xinjiang Uygur Autonomous Region during 2008 to 2017, establishes panel data with a time span of ten years. Panel data combines time series and cross-sectional data, and the number of samples is usually large, providing more freedom for research.

In economics research, GDP is a very common indicator for measuring economic development. Therefore, this paper selects regional gross domestic product growth rate(GDP) to quantify economic development. Lu Jun and Xu Jie (2014) used the "financial aggregate factor" to reflect the degree of financial agglomeration in a certain region. This paper will adopt the same method. First, select relevant indicators that reflect the development of the regional financial industry: the added value of the financial industry, the number of employees in the financial industry, the fixed assets investment in the financial industry, the original insurance premium income, and the year-end balance of the RMB savings deposits of urban and rural residents, and then use the principal component analysis method to calculate Financial Agglomeration Total Factor (TFA). In addition to these two main variables, add control variables: government fiscal expenditure (GOV), infrastructure construction of transportation (ICOT), number of employees in major industries (EE), information level (IL), urbanization rate (UBR) and investment rate (INVR), using SPSS Statistics 17.0 and EViews 10 for analysis.

Table 3.1 Indicator System

Variables	Indicator	Symbol
Economic Development	Regional GDP growth rate (%)	GDP
Financial Agglomeration	Financial industry added value (100 million yuan)	FVA
	Financial industry employees (10,000 people)	FIE
	Fixed assets investment in the financial industry (100 million yuan)	FAI
	Original insurance premium income (100 million yuan)	OIPI
	Savings Deposit of Urban and Rural Households, Year-end (100 million yuan)	SD
	Number of Institutions in Insurance System	INS
	Number of Institutions in Bank System	BANK
Government Spending	Government fiscal expenditure (100 million yuan)	GOV
Infrastructure construction of transportation	Railway operating mileage （10 thousand kilometer）	ICOT
	Inland waterway mileage (10 thousand kilometer)	
	Highway mileage (10 thousand kilometer)	
Number of Employees in Major Industries	Agricultural employee's number of people （10 thousand）	EE

Variables	Indicator	Symbol
Informatization Level	Total postal business (100 million yuan)	IL
	Total telecommunications business (100 million yuan)	
Urbanization level	Urbanization rate (%)	URB
Investment	Investment ratio (%)	INVR

The original premium income in the data system is an indicator on the insurance industry, and the savings deposit balance is an indicator on the banking sector. It is worth mentioning that the securities industry of China is mainly concentrated in the eastern economically developed regions. The quantity of securities institutions in the northwest region is less, the development of the securities industry lags far behind the eastern region, even behind the southwestern region. Fu Liping and Wang Chao (2016) through the research on the securities industry institutions in the northwestern minority regions, it is found that from the scale of the development of the stock market in the northwestern minority regions, the number of institutions in the northwestern minority regions has increased by less than three per year on average, the market value of GDP is relatively low, and it is also decreasing year by year. In 2008, the stock market value accounted for 36.50% of GDP, and the proportion in 2012 was only 16.30%. The decline was obvious, there was a certain gap compared with the national level. Moreover, the data related to the securities industry in the northwest region is difficult to obtain, and there are many missing data. Therefore, the corresponding indicators are not set here.

All data are from the China National Bureau of Statistics website (NBS), China Statistical Yearbook (2009-2018), Shaanxi Statistical Yearbook (2009-2018), Gansu Statistical Yearbook (2009-2017), Qinghai Statistical Yearbook (2009-2017), Ningxia Statistical Yearbook (2009-2018), Xinjiang Statistical Yearbook (2009-2018), and China Financial Yearbook (2009-2017).

3.1.1 Total Financial Agglomeration

Other than the addition to the geographical concentration of financial institutions -like the dynamic cooperation between financial institutions -financial agglomerations also include the results of this dynamic. In order to show the degree of financial agglomeration more clearly and intuitively, this paper proposes a new indicator called "total amount of financial agglomeration".

The first step, this article is about: financial industry added value (FVA), financial industry employment (FIE), financial industry total social fixed assets investment (FAI), original insurance premium income (OIPI) and savings deposit of urban and rural households (SD), the number of banking institutions (BANK) and the number of insurance institutions (INS) - these seven indicators are tested for KMO validity.

If the results show that the data structure is reasonable, that is, the research data can be extracted from the principal component and the linear correlation is satisfied, then the second step, principal component analysis is performed.

The components whose eigenvalues of the principal component are greater than 1 and which can explain more than 85% of the total data variation are extracted and named as the "financial aggregate amount" factor. According to the results displayed by the matrix of component score coefficients, the composition of this factor can be known. Its calculation formula should be:

$$f(\text{TFA}) = score_1 FVA + score_2 FIE + score_3 FAI + score_4 OIPI + score_5 SD \\ + score_6 BANK + score_7 INS \tag{1}$$

In order to facilitate the subsequent analysis, this paper plans to standardize the data obtained using the z-score standardized method. First, find the arithmetic mean (μ) and standard deviation (σ) of each variable. Then, standardization is performed:

$$z = \frac{(x - \mu)}{\sigma} \tag{2}$$

Z is the standardized variable value; x is the actual variable value.

To standardize the value of the total amount of financial agglomeration, then judge the relationship between the obtained result and 0. If the value of TFA after standardization is greater than 0, then there is indeed a financial agglomeration in the area. The higher the value, the higher the level of financial agglomeration(Yang Yiwu & Fang Dachun, 2013).

3.1.2 Control Variables

Data availability is considered as a key point. This paper selects government fiscal expenditure as a government indicator (GOV) in the specific data collection process of control variables (Ahmad, Etudaiye-Muhtar, Matemilola, & Bany-Ariffin, 2016), and uses the method of Ye, Sun, and Chen (2018) to use the total mileage of railways of each region, the total mileage of roads of each region and the total mileage of inland waterways of each region to measure the infrastructure construction of transportation (ICOT). Number of employees in major industries (EE) is measured by agricultural employee's number of people (Li Hong & Wang Yanxiao, 2014; Zhang Kewen, 2018). The level of informatization (IL) is calculated by the sum of regional postal services and total telecommunications services. The level of urbanization (urbanization rate, UBR) uses the ratio of the number of urban residents in each region to the number of permanent residents at the end of the year (Gou Xiaolan & Gao yunfeng, 2014). Finally select "investment rate" to represent the investment (INVR).

3.2 Model

3.2.1 Economic Growth Model

If the "financial agglomeration" is the Granger cause of "economic development," then we build a model for economic growth. Select regional gross domestic product

(GDP) as the explained variable, the total financial agglomeration (TFA) as the main explanatory variable, and add other variables that affect economic development, such as government fiscal expenditure (GOV), major Industries' employees (EE), infrastructure construction of transportation (ICOT), information level (IL), urbanization rate (UBR) and investment rate (INVR).

The equations constructed are as follows:

$$GDP_{it} = \alpha_0 + \alpha_1 TFA_{it} + \alpha_2 GOV_{it} + \alpha_3 EE_{it} + \alpha_4 ICOT_{it} + \alpha_5 IL_{it} + \alpha_6 UBR_{it} + \alpha_7 INVR_{it} + \mu_{it} \tag{3}$$

The symbol i represents different regions in the sample, t represents different time, α_0 is the intercept term, α_1, α_2, α_3, α_4, α_5, α_6, α_7 are the coefficients of each variable, and μ_{it} is the error term.

3.2.2 Parameter Estimation

If the variable is a non-stationary sequence, then the co-integration test is necessary to be used. This article plans to use the Pedroni test and the Kao test to co-integrate the relationship between financial industry agglomeration and economic growth (Zhang Kewen, 2018). This method can first eliminate the phenomenon of pseudo-regression. Second, we can test whether there is a long-term stable relationship between variables. If the variable passes the co-integration test, a regression analysis can be performed.

While considering panel data, the scholars usually think of these two models: Fixed Effects Regression Model and Random Effects Regression Mode.

If the result of no significant is not only between different individuals but also between different sections, then we can put the panel data together and estimate parameters by OLS method:

$$Y_{it} = \alpha + X'_{it}\beta + \varepsilon_{it}, \quad i = 1,2,\dots,N; t = 1,2,\dots,T \tag{4}$$

i is the number of individuals (number of sections), and t is the number of time points (time span). Y_{it} is the regressed variable, α is the intercept term, X_{it} is the k×1 order regression variable column vector (including k regressions), β is the k×1 order

regression coefficient column vector, and the error term is represented by $\mathcal{E}_{it}$. It should be noted that the values of α and β are the same at this time.

If no matter it is different section or time series, the intercept term is different, in this case we can introduce a dummy variables into the model to estimate the parameters, that is, constructing a fixed effect model:

$$Y_{it} = \alpha_1 D_1 + \alpha_2 D_2 + \cdots + \alpha_N D_N + X'_{it}\beta + \varepsilon_{it}, t = 1,2,\dots,T \qquad (5)$$

$$\text{Among them，} \quad D_1 = \begin{cases} 1, \ If \ it \ is \ the \ i-th \ individual, i = 1,2,\dots,N \\ 0, \ Other \end{cases}$$

The fixed effect model has three different forms, equation (5) gives the expression of the most commonly used individual fixed effect model. Y_{it} is the explained variable. α_i is a random variable, it has i different intercept terms for i individuals, and the changes are related to X_{it}. The rest of the meanings of X_{it}, β, and $\mathcal{E}_{it}$ are the same as equation (4).

Similarly, if we look at the regression coefficient of the fixed effect model with random variable, we can construct a random effect model.:

$$Y_{it} = \alpha_i + X'_{it}\beta + \varepsilon_{it}, i = 1,2,\dots,N; t = 1,2,\dots,T \qquad (6)$$

Y_{it} is the explained variable. X_{it} is the k×1 order regression variable column vector (including k regressions). α_i is a random variable, it has i different intercept terms for i individuals, but the changes are not related to X_{it}. β is the k×1 order regression coefficient column vector, it has same regression coefficient for different individuals. The error term is represented by $\mathcal{E}_{it}$.

The Hausman test method is a good partner that helps you make a decision between model (5) and model (6).

3.3   Expected Results

For the economic growth model, based on previous scholars' research, we expect that the increase in financial agglomeration can drive economic growth (Iyare & Moore, 2011; Liu Kaige, 2017; Martin & Ottaviano, 2001). Fiscal expenditures

have contributed to economic growth (Ahmad et al., 2016), infrastructure construction of transportation may improve economic growth. The number of employee in major industry increase may develop the economy. The higher the level of informatization, the more favorable it is for economic development. The higher the level of urbanization, the better the conditions that can be provided for economic growth. the faster the pace of economic development (Gou Xiaolan & Gao yunfeng, 2014). Investment as a basic term should push the economy upward (Sun Zhihong & WANG Yaqing, 2017).
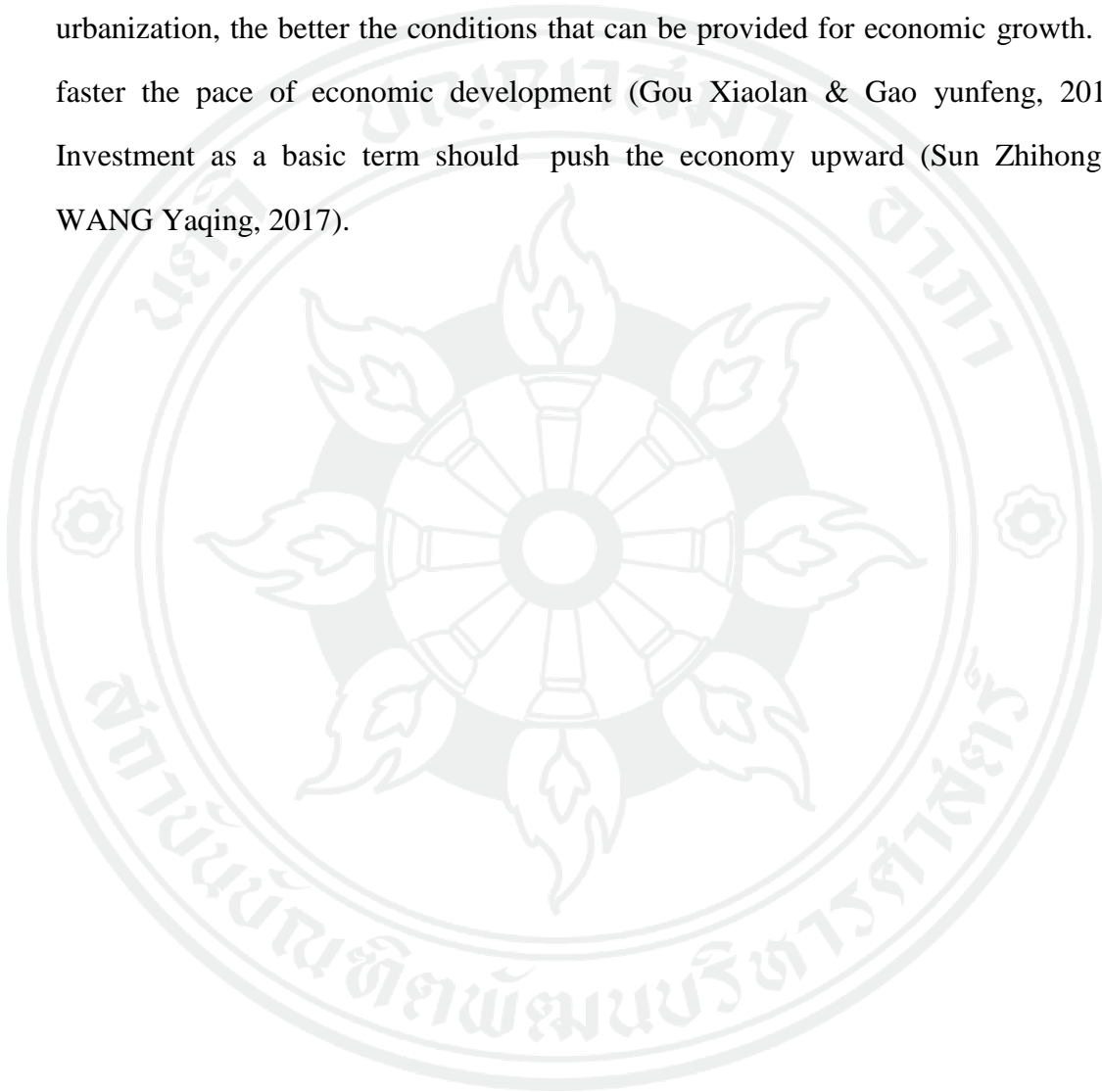
CHAPTER 4

EMPIRICAL ANALYSIS

4.1 Descriptive Statistics

In summary, in addition to the TFA that has not yet been obtained, a descriptive statistical analysis is performed on all selected indicator data. (Results are shown below):

Table 4.1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.deviation	Variance
GDP growth	45	-.006801	.271313	.11763101	.075131010	.006
GOV	50	324.61	4833.19	2045.6488	1270.21405	1613443.729
EE	50	114.79	923.88	495.5514	326.91185	106871.361
ICOT	50	.0814	.8771	.349648	.2649738	.070
IL	50	48.29	952.31	299.4378	225.22083	50724.421
UBR	50	.3356	.5792	.465944	.0586049	.003
INVR	50	0.000116	0.002873	0.001129	0.000742	.000
Valid N (listwise)	50					

In the process of descriptive statistics, we calculated the standardized values, saved them as new data and used them in subsequent studies.

4.2 Total Financial Agglomeration

In order to more concretely show the extent of financial agglomeration in various regions, this paper proposes a new indicator of "financial agglomeration".

The first step is to collect data from five provinces in the northwest, including: "value added by the financial industry", "number of employees in the financial industry", "investment in fixed assets of the financial industry", "original insurance premium income", "savings deposit of urban and rural households", "number of banking institutions", "number of insurance institutions", a total of seven indicators.

Second step, the KMO validity test is performed on all indicators.

In the third step, the principal component analysis is performed, and the "financial aggregate amount" factor is extracted, and the component score coefficient matrix is obtained.

In the fourth step, the total amount of financial agglomeration in each province is calculated based on the component score.

The results are shown below:

Table 4.2 Total Financial Agglomeration Factor

Year	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang
2017	4569.3	3329.5	648.1	812.6	2403.2
2016	4248.0	3155.6	612.4	703.3	2207.9
2015	3891.6	3009.8	568.2	672.9	2049.9
2014	3474.0	2721.8	522.0	639.2	1909.7
2013	3171.2	2469.2	483.0	594.5	1806.8
2012	2868.0	2125.1	422.9	543.6	1640.1
2011	2555.6	1520.0	369.9	470.2	1461.7
2010	2307.6	1376.4	320.3	414.0	1309.5
2009	2066.9	1251.6	286.8	369.8	1183.2
2008	1806.1	1080.7	256.5	335.7	1071.2

Draw a line chart using the calculated data:
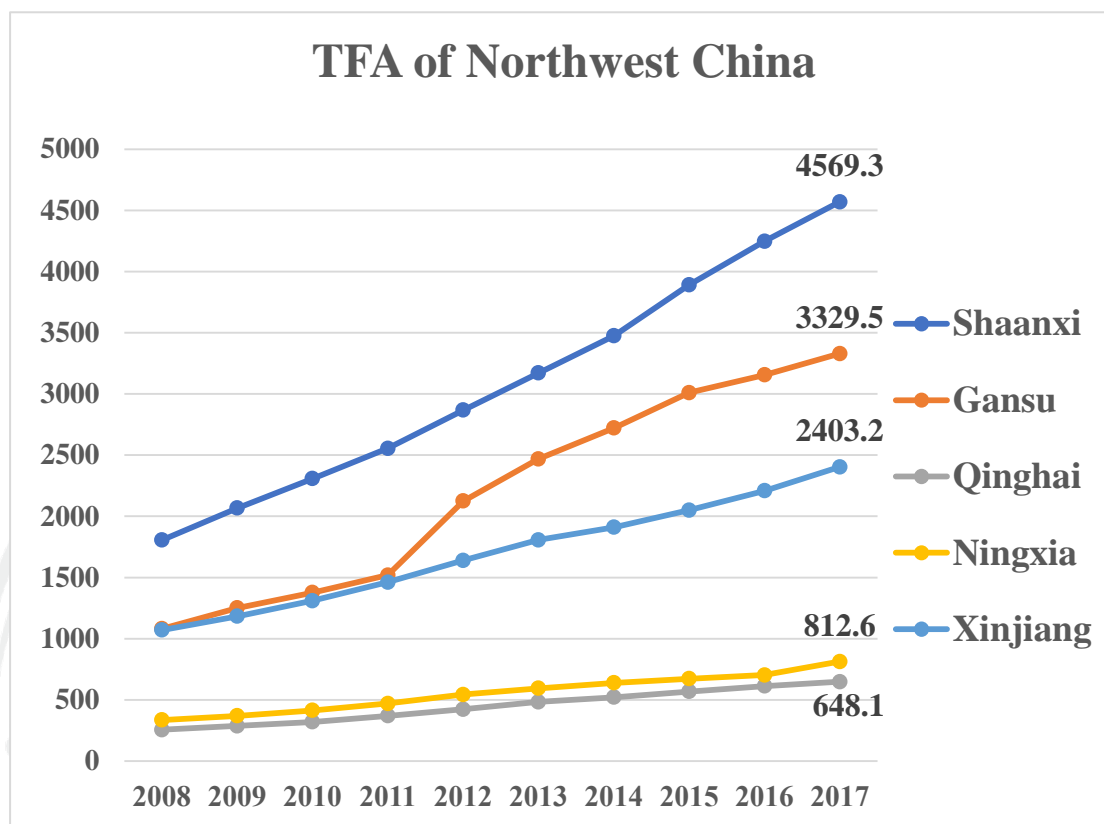
Figure 4.1 TFA of Northwest China

The highest degree of financial agglomeration in the northwestern region is in Shaanxi Province. The total financial agglomeration in 2018 reached 4569.3, which was consistently higher than other provinces in the selected time span. Gansu Province is closely followed by the TFA value of 3329.5 in 2018. An interesting thing is that before 2011, the financial agglomerations of Gansu and Xinjiang were indistinguishable. However, after 2011, the fold line in Gansu suddenly became steep. And gradually opened up the distance with Xinjiang. Although the financial agglomeration of Ningxia and Qinghai is also a growth trend during this decade, the level is still not high. The value of TFA in 2018 is only 812.6 and 648.1.

At the same time, in order to more vividly and intuitively show the development of financial agglomeration in northwestern China, this paper selects

three regions more as comparisons, namely North China, Northeast China, and East China.

Their location on the map can be seen in the figure below.
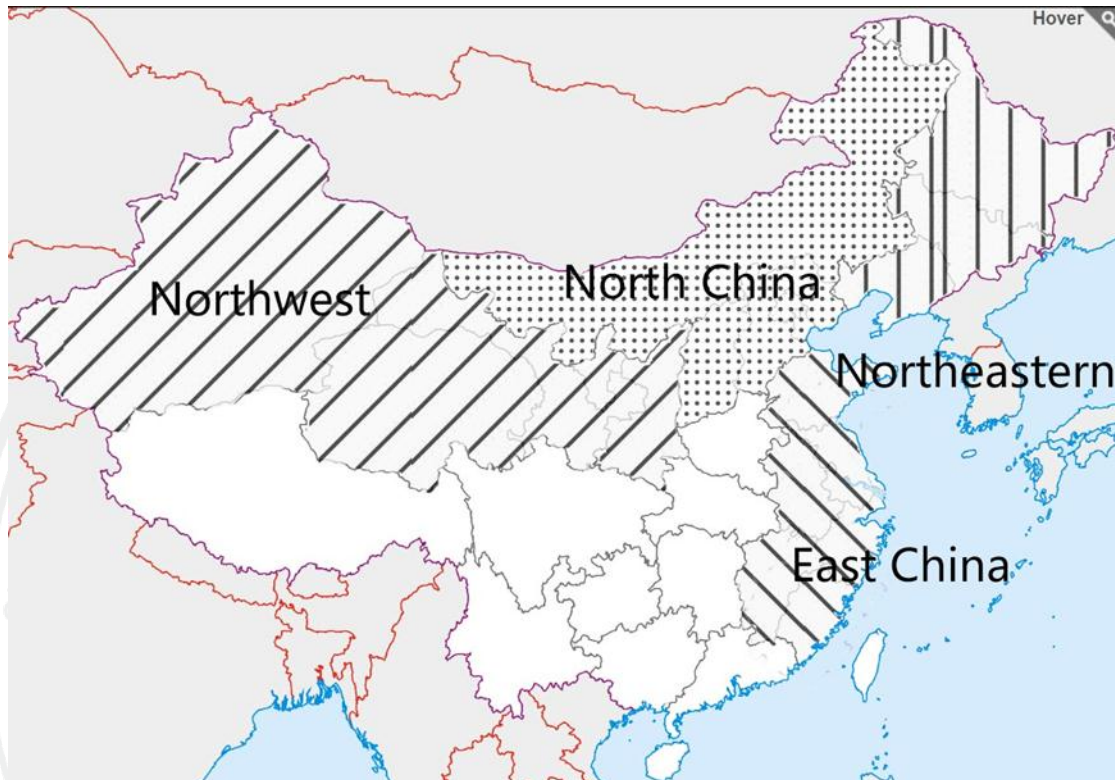
Figure 4.2 Map of Selected Area

1. "North China", located between the northwest and northeast regions, consisting of Beijing, Tianjin, Hebei, Shanxi, and Inner Mongolia.

2. "Northeast Region", including Liaoning, Jilin, Heilongjiang

3. "East China", which consists of Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong

In the northeastern part of North China, like the northwestern region, it is not affected by the "reform and opening" policy due to the influence of its inland terrain. However, compared with the northwest region, the two regions are relatively superior in location. The North China region also includes the capital of China - Beijing, and has gained more support in terms of policies, thus opening up its advantages.

East China is the region with the strongest comprehensive economic strength in China and the most developed region in China. Choosing it as a comparison can more intuitively see the imbalance in the development of China's eastern and western regions and can directly feel how big the gap is.

By using the same calculation method, this paper derives the total financial agglomeration (TFA) of each region, we put the results in tables below:

Table 4.3 TFA of North Region

Year	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia
2017	6341.4	2716.8	8367.4	5106.9	3404.3
2016	6102.2	2598.1	7809.6	4806.9	3211.4
2015	5340.9	2465.6	7111.0	4354.5	2977.1
2014	5221.4	2247.4	6418.1	3945.1	2739.2
2013	4906.2	2120.8	5935.0	3731.3	2532.3
2012	4579.3	1957.2	5404.3	3437.1	2325.7
2011	4100.0	1730.6	4793.5	3087.0	2033.8
2010	3714.8	1575.6	4379.7	2804.3	1839.9
2009	3256.2	1346.3	3983.5	2565.3	1673.8
2008	2793.1	1164.9	3592.4	2324.1	1504.4

Table 4.4 TFA of Northeast Region

Year	Liaoning	Jilin	Heilongjiang
2017	7653.6	3231.4	3903.4
2016	7162.8	3026.9	3716.9
2015	6676.4	2688.4	3470.2
2014	6000.7	2446.1	3130.7
2013	5614.8	2272.0	2947.2
2012	5133.8	2080.9	2763.6
2011	4561.9	1883.5	2512.9
2010	4212.6	1753.1	2309.1
2009	3848.1	1641.8	2121.7
2008	3459.2	1497.6	1945.5

Table 4.5 TFA of East Region

Year	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Jiangxi	Shandong
2017	6342.5	9399.9	5188.9	4478.7	4066.9	10229.1	9399.9
2016	6101.0	8901.7	4743.2	4273.2	3789.3	9678.5	8901.7
2015	5868.3	8141.1	4166.9	4004.3	3462.5	8870.6	8141.1
2014	5318.8	7453.6	3760.7	3797.2	3132.5	8060.5	7453.6
2013	5011.7	7104.4	3411.7	3576.3	2882.3	7428.4	7104.4
2012	4743.1	6577.4	3026.1	3228.6	2627.7	6707.8	6577.4
2011	4278.2	5953.6	2597.5	2893.1	2326.9	5780.2	5953.6

Year	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Jiangxi	Shandong
2010	3932.7	5285.8	2266.9	2605.0	2101.0	5171.1	5285.8
2009	3506.9	4555.2	1996.7	2333.7	1875.9	4604.8	4555.2
2008	3016.3	3865.6	1747.3	2036.8	1675.8	4009.2	3865.6

For purpose of eliminating the differences caused by the number of provinces in different regions, this paper uses the value of TFA of each province to multiply its share, thus forming the value of TFA in this region. The results are shown below:

Table 4.6 TFA Comparison Table by Region

Year	Northwest	North	Northeast	East
2008	1264.99	2612.589	2606.937	2732.5
2009	1445.733	2936.88	2890.96	3166.177
2010	1607.642	3263.423	3160.337	3617.153
2011	1777.53	3585.201	3423.99	4016.474
2012	2092.916	4023.465	3840.679	4461.99
2013	2346.661	4375.828	4188.111	4854.922
2014	2568.864	4694.586	4473.578	5162.195
2015	2863.02	5078.629	4974.213	5614.026
2016	3088.434	5642.327	5341.559	6045.889
2017	3300.236	5986.752	5697.413	6376.625

Use these data to draw a line chart. The line chart can intuitively show the changes in the total financial agglomeration of the target area in 2008-2017.
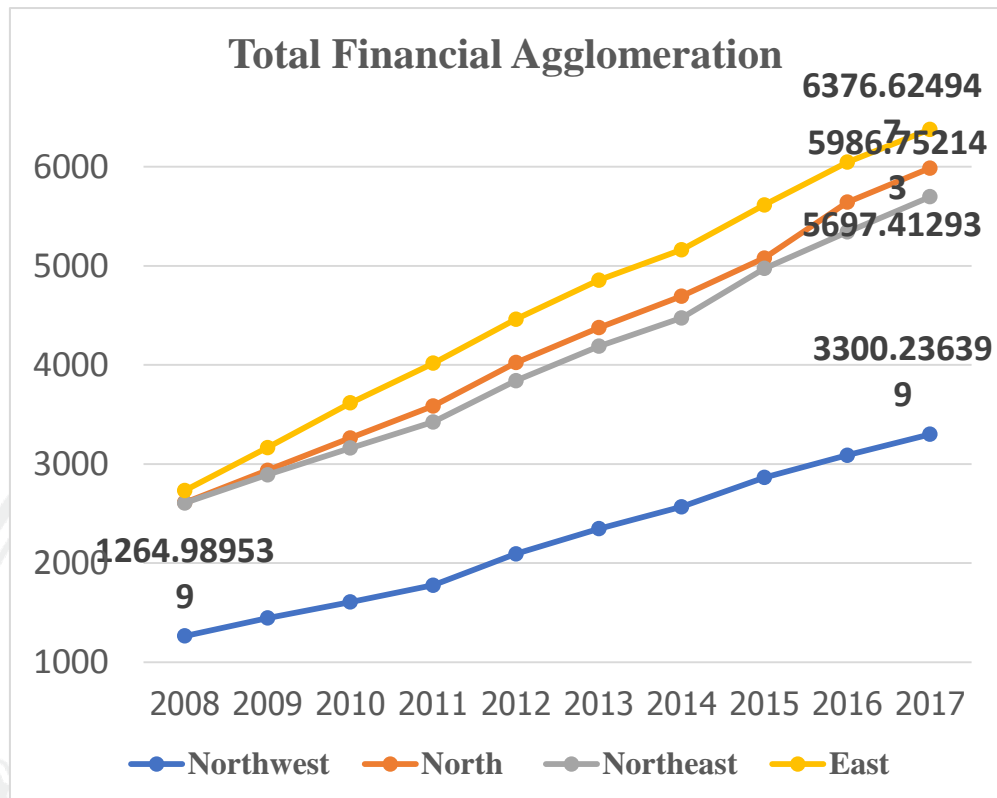
Figure 4.3 TFA Comparison Figure by Region

From the figure, during the time span of the study, the financial agglomeration of the selected target regions showed an upward trend, but the financial agglomeration in the northwest region was far behind the other three regions. East China has the highest level of financial agglomeration, and its value in 2018 reached 6376.625, and has been in a leading position within the scope of this study. The difference between North China and Northeast China is relatively small, but North China is always higher than Northeast.

The same as what we do in the last part, we standardize the value of TFA to provide the convenience for subsequent regression analysis. Meanwhile, a figure is drawn on the standardized values:

Figure 4.4 Standardized TFA of northwestern region

This figure can be clearly seen that before 2013, the value of TFA in the northwest region was less than 0, indicating that there was no financial agglomeration in the northwest region during the period of 2008-2012. However, after 2013, the value of TFA became a positive number, which proved that the financial agglomeration occurred in the northwest region since 2013 and the next few years. The value is getting bigger and bigger, indicating that the degree of financial agglomeration is getting higher and higher.

4.3 Unit Root Test

The unit root test method selected in this paper is ADF. After performing the unit root test on all the data in turn, we found that some of the original data of the variables could not pass the stationarity test, so we performed the first-order difference on these data at one time. The first-order difference variable rejects the null hypothesis ($P<0.05$), and the sequence shows a steady trend.

Table 4.7 Unit Root Test

Variable	Statistic	Prob.	Stationarity
GDPgrowth	32.0600	0.0004***	I(0)
TFA	18.4891	0.0473**	I(1)

Variable	Statistic	Prob.	Stationarity
GOV	43.4195	0.0000***	I(0)
HR	18.6921	0.0444**	I(1)
ICOT	59.0133	0.0000***	I(0)
IL	18.5093	0.0470**	I(0)
UBR	25.7181	0.0041***	I(1)
INVR	35.9629	0.0001***	I(0)

Because the three variables TFA, HR, and UBR are first-order differential stationary, we use dTFA, dHR and dUBR when building the model. dTFA represents the total growth rate of financial agglomeration, and dEE represents the growth rate of employees in major industries. dUBR represents the growth rate of urbanization level.

4.4 Regression

4.4.1 Multicollinearity Test

In order to ensure the accuracy of the model, first of all, this paper performs a collinear test on all explanatory variables.

Table 4.8 Results of Multicollinearity Test

	dTFA	GOV	dEE	ICOT	IL	INVR	dUBR
dTFA	1.00000	-0.50009	-0.30749	-0.49896	-0.59280	-0.29314	-0.13050
GOV	-0.50009	1.00000	0.12142	0.37959	0.66288	0.14426	-0.05260
dEE	-0.30749	0.12142	1.00000	0.45133	0.27727	0.19303	-0.10035
ICOT	-0.49896	0.37959	0.45133	1.00000	0.57634	0.02077	0.25437
IL	-0.59281	0.66288	0.27727	0.57634	1.00000	0.05238	0.17678
INVR	-0.29314	0.14426	0.19303	0.02077	0.05238	1.00000	0.17285
dUBR	-0.13050	-0.05260	-0.10035	0.25437	0.17678	0.17285	1.00000

As shown in the above table, the variables are compared two by two, all valid detection values are less than 0.8, which means that all variables have passed the multicollinearity test.

4.4.2   Hausman Test

Before performing regression analysis, determine which model to choose by Hausman test.

Table 4.9 Result of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	30.479530	7	0.0001

The P value is 0.0001, which is less than 0.05, indicating that the null hypothesis should be rejected at the 95% confidence level, ie, "the coefficient of random effect estimation is the most effective estimate, which is significant than the fixed effect", that is to say, we should use fixed effect model in this study.

4.4.3   Fixed Effect Model Regression

Establish a fixed effect model and perform regression :

Table 4.10 Individual Fixed Effect Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.082775	0.479966	-2.255944	0.0308
dTFA	0.488773	2.121005	0.230444	0.8192
GOV	-0.483789	0.283841	-1.704434	0.0977
dEE	3.064250	4.220501	0.726039	0.4729
ICOT	-1.573710	1.034915	-1.520618	0.1379
IL	-0.519746	0.278433	-1.866681	0.0709
INVR	-0.194834	0.153285	-1.271061	0.2126
dUBR	5.237013	1.582388	3.309563	0.0023

Based on the regression results, we can write the specific form of this model (to simplify the equation, all coefficients retain four decimal places):

$$GDPgrowth_{it} = -1.0828 + 0.4888dTFA_{it} - 0.4838GOV_{it} + 3.0643dEE_{it}$$
$$-1.5737ICOT_{it} - 0.5197IL_{it} + 5.2370dUBR_{it} - 0.1948INVR_{it} \tag{7}$$

Table 4.11 Effects Specification of Table 4.10

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.505676	Mean dependent var	2.22E-07
Adjusted R-squared	0.340902	S.D. dependent var	1.000000
S.E. of regression	0.811849	Akaike info criterion	2.644173
Sum squared resid	21.75024	Schwarz criterion	3.125949
Log likelihood	-47.49388	Hannan-Quinn criter.	2.823774
F-statistic	3.068896	Durbin-Watson stat	1.637447
Prob(F-statistic)	0.006177		

The significance of the main explanatory variable dTFA does not meet our expectations. The study of Sun Zhihong and WANG Yaqing (2017) shows that the impact of financial agglomeration on economic growth is lagging, so try adding lag to the main explanatory variable and performing regression again:

Table 4.12 Model Regression Results with Lag Added

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.370127	0.426443	0.867941	0.3928
dTFA (-1)	4.287238	1.620551	2.645544	0.0132
GOV	-1.062791	0.264620	-4.016290	0.0004
dEE	3.568035	3.583134	0.995786	0.3279
ICOT	-2.334130	0.926590	-2.519053	0.0178
IL	-0.103071	0.246610	-0.417950	0.6792
dUBR	2.647297	1.546259	1.712065	0.0979
INVR	0.046492	0.155683	0.298632	0.7674

After taking the first-order lag of the main explanatory variable dTFA, its P value is 0.0132, less than 0.05, and the result is significant, in line with expectations. The model form at this time is :

$$GDP\text{growth}_{it} = 0.3701 + 4.2872 dTFA_{i(t-1)} - 1.0628 GOV_{it} + 3.5680 dEE_{it}$$
$$-2.3341 ICOT_{it} - 0.1030 IL_{it} + 2.6473 UBR_{it} + 0.0465 INVR_{it}$$

(8)

Table 4.13 Effects Specification of Table 4.12

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.748640	Mean dependent var	0.064390
Adjusted R-squared	0.649891	S.D. dependent var	1.028518
S.E. of regression	0.608574	Akaike info criterion	2.087929
Sum squared resid	10.37015	Schwarz criterion	2.594593
Log likelihood	-29.75858	Hannan-Quinn criter.	2.271123
F-statistic	7.581263	Durbin-Watson stat	1.353452
Prob(F-statistic)	0.000007		

The corrected model R-square is 0.7486, the goodness of fit is good. It is worth mentioning here that the DW value of this model is 1.353. According to the table lookup, 5 per cent significance points of dL and dU are 0.946 and 1.724, respectively, dL<DW=1.353<dU=1.724, we cannot determine if there is an autocorrelation problem in the model. Here this article considers this situation to be an autocorrelation problem.

4.4.4 Autocorrelation Correction

If there is an autocorrelation problem in the model, its reliability and prediction accuracy will be reduced. Through the generalized difference method, we directly join ar(1) for regression, and eliminate the regression parameter failure caused by the autocorrelation existing in the original model. In fact, ar(1) is not a new variable, nor does it need to introduce an equation. Its role is to make the regression effect more accurate.

Show new regression results below:

Table 4.14 Model Regression Results with AR (1) Added

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.278085	1.919184	-0.665952	0.5124
dTFA(-1)	3.192867	1.380097	2.313510	0.0304
GOV	1.226427	1.251853	0.979690	0.3379
dEE	-0.279848	3.357384	-0.083353	0.9343
ICOT	-1.601794	3.886612	-0.412131	0.6842
IL	-0.343159	0.234344	-1.464336	0.1572
dUBR	0.641112	1.330695	0.481787	0.6347

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INVR	0.077274	0.114966	0.672143	0.5085
AR(1)	0.692452	0.125746	5.506729	0.0000

Table 4.15 Effects Specification of Table 4.14

Effects Specification		
Cross-section fixed (dummy variables)		
R-squared	0.754471	Mean dependent var	-0.168346
Adjusted R-squared	0.620547	S.D. dependent var	0.871297
S.E. of regression	0.536717	Akaike info criterion	1.871859
Sum squared resid	6.337430	Schwarz criterion	2.449560
Log likelihood	-19.75754	Hannan-Quinn criter.	2.071282
F-statistic	5.633547	Durbin-Watson stat	2.091180
Prob(F-statistic)	0.000240		

From the table, the DW value after this regression is 2.091. By looking up the Durbin-Watson statistic table (one per cent significance points of dL and dU), we get dU=1.757<DW=2.091<4-dU=2.243, indicating that there is no autocorrelation problem at this time.

4.5   Result

At this time, the R-square is 0.754471, this shows that the equation can be used to continue our research. So, in the end we get the equation is (the result retains four decimal places):

$$GDP\text{growth}_{it} = -1.2781 + 3.1929 dTFA_{i(t-1)} + 1.2264 GOV_{it} - 0.2798 dEE_{it} \\ - 1.6018 ICOT_{it} - 0.3432 IL_{it} + 0.6411 UBR_{it} + 0.0773 INVR_{it} \tag{9}$$

From Table 4.14 we can see that only the variable TFA representing the degree of financial agglomeration is significant at 95% confidence level, and their P values was 0.0304.

The variable TFA has a positive regression coefficient, indicating that the rise in the level of financial agglomeration and the increase in the total amount of financial agglomeration have the same direction with economic growth. Compared with

consumption and purchase of stocks and bonds, Chinese residents rely more on banks, so the regions with less developed economies will have a higher proportion of bank deposits. The Northwest is a typical example. Residents here are accustomed to depositing income other than daily expenses into banks, which provides banks with ample loan reserves and reduces investment costs for enterprises, thus promoting economic development. Moreover, the financial industry as a tertiary industry, its vigorous development has also promoted economic development. For every percentage increase in the total financial agglomeration, the GDP growth rate will increase 3.19%.
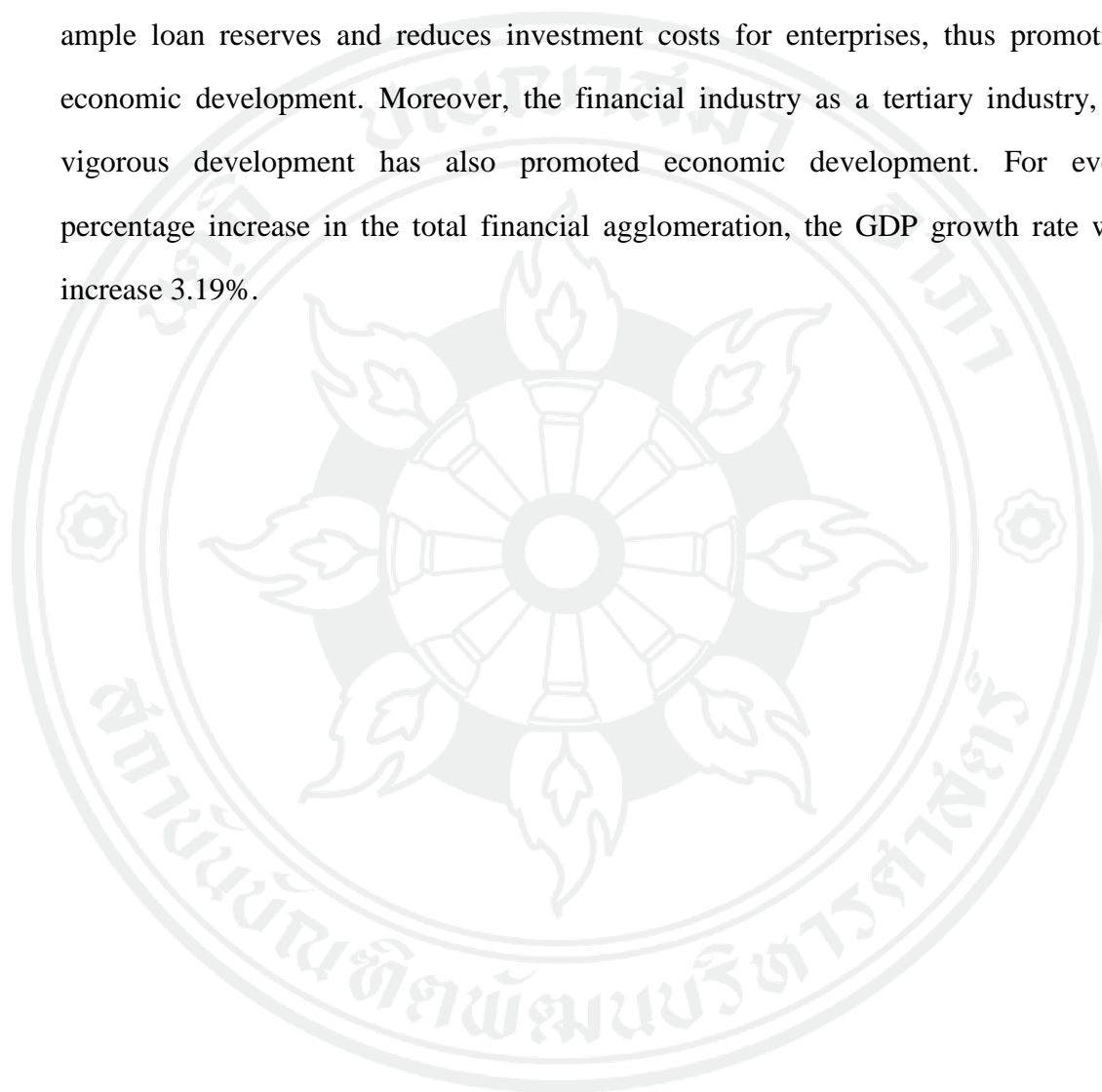
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the relevant theories of financial agglomeration and industrial agglomeration, this paper draws on the papers of seniors about financial agglomeration and economic growth, and combines the specific conditions of Northwest China to construct an index system for measuring financial agglomeration, and then uses principal component analysis to calculate the degree of financial agglomeration in the Northwest, North, Northeast, and East regions of China from 2008 to 2017. In this way, we can comprehensively compare the development status of the Northwest region. Then using the panel data of the northwest region, through the unit root test, multicollinearity test, autocorrelation test & correction, and the establishment of individual fixed effect model to do quantitative research on financial agglomeration to boost economic development, the following conclusions are drawn:

First, northwestern region's financial agglomeration factor, TFA, is positive after 2013. It also maintained a growth trend in the following years. It is certain that there is a financial agglomeration in the northwestern region.

Second, from the perspective of the provinces, there are also differences between the provinces in the northwest. The highest level of financial agglomeration is in Shaanxi province. In 2017, the financial agglomeration factor reached 4569.3, far ahead of other provinces, especially Ningxia and Xinjiang. Gansu Province ranks second in financial agglomeration, and has a very rapid development after 2011. It is also the rapid development of this period, which has opened the gap with Qinghai Province, the third place. The financial agglomeration in Qinghai Province has maintained a steady and continuous development trend, and it is steadily rising without rushing. Ningxia and Xinjiang, which are in the fourth and fifth places

respectively, although the pace of development is slightly slow, they still see an upward trend.

Third, from 1264.99 in 2008 to 3300.21 ten years later, the development of financial agglomeration in the Northwest is worthy of our affirmation. However, its agglomeration is far less than that of North China, it is in the initial stage. According to data 2017, the degree of financial agglomeration development in the northwest region is still not in the same position as other regions, it is the last one ranking among the selected comparison objects and the gap is large. According to the data alone, the total amount of financial agglomeration in the Northwest is almost half of that in East China. East China is a veritable financial agglomeration. However, the expansion of financial agglomeration in the northwest region has great potential.

Fourth, when the confidence level is 95%, all data pass the stationarity test. A long-term stable correlation between the variables.

Fifth, by constructing a fixed effect model, it illustrates that financial agglomeration has the same changes in direction with economic growth, and the development of financial agglomeration can promote economic development. For every percentage increase in the total financial agglomeration, the GDP growth rate will increase by 3.19%, and the effect of financial agglomeration on economic development is lagging.

This paper uses empirical analysis to evaluate and explore the degree of financial agglomeration in northwestern China. This move fills the gap in financial agglomeration for the study of the Northwest Inland. The empirical results show that financial agglomeration can indeed promote economic growth, which provides new ideas for the government to promote economic growth, and also confirms the importance of promoting the concentration of financial institutions. In the study, we found that the development of financial institutions in the northwest region is unbalanced at this stage, which may also be a factor contributing to the low level of financial agglomeration in the region. In terms of the extent to which financial agglomeration promotes economic growth, compared with 14.64% in Shenzhen (Zhang Kewen, 2018), 18.26% in Hangzhou (Liu Kaige, 2017), 7.22% in Chongqing (Pei Donghui, 2016), the Northwest China with the rate 3.19% shows that there is still much room for further development.

5.2 Recommendations

5.2.1 Limitation of Study

Of course, there are still many limitations in this article:

1. By reason of the difficulty of data collection, this paper's sample size is small, which may affect the results. In the future research, the sample capacity should be expanded as much as possible. At the same time, the measurement units used by the individual data are different between provinces, and the accuracy of the data is also affected during the conversion.

2. For the insurance industry and the securities industry, this article only uses one indicator of the number of institutions, which is too one-sided. Indicators should be measured from multiple perspectives in future research.

3. This research only studies the development of financial agglomeration in Northwest China during 2008-2017. Due to the hysteresis of financial agglomeration, the implementation influence of the new policy is also lagging. Therefore, in the future, when the effect of the "Belt and Road" policy on the progress of the financial industry and economic development in the northwest region is revealed, the degree of financial agglomeration in the northwest region will be a new look, which will be a very interesting research direction.

5.2.2 Policy Implications

The outcomes of this study reveal that financial agglomeration does exist in the Northwest. The agglomeration plays a positive role on economic growth. Therefore, for purpose of a rapid progress of the financial industry in the northwest region, it is necessary to enhance the level of agglomeration in the financial industry. From the current point of view, there is still many things can do for promote the development of financial industry in the northwest region. Therefore, based on the research conclusions of this paper and the actual situation in the northwest region, the following suggestions are proposed:

First, in order to make better use of the effect on financial agglomeration in promoting economic increase, the government should strengthen the construction of financial streets, financial centers and other gathering places, accelerate the formation

of regional financial centers, and jointly stimulate the growth of China's regional economy.

Second, through the study of the total amount of financial agglomeration, this paper finds that the degree of financial agglomeration in the western region is far behind the eastern and central regions. Therefore, this paper believes that the government should increase support for the financial industry in the western region to fill the shortcomings of financial supply in the western region.

Third, the speed of financial industry development in the northwest region cannot catch up with other regions, another reason is that financial talent cannot be retained. The financial industry talents who have received higher education are not well treated in the northwest, have fewer job opportunities, and have no higher salary levels in the eastern region. Therefore, a large number of talents have flocked to areas with developed financial industries, such as Beijing, Shanghai, and Shenzhen. Therefore, the government should set up more talent recruitment programs based on the better working conditions and living security of financial professionals.

Fourth, the role of financial agglomeration in promoting economic growth is lagging behind. This suggests that the government should give the market sufficient reaction time when formulating economic policies. It should be long-term and should not be eager for success.

On July 20, 2019, the Office of the Financial Stability Development Committee of the State Council of China launched 11 measures for opening up the financial industry, including: 1.The government would encourage overseas financial institutions to participate in the establishment and investment of commercial banking financial subsidiaries; 2. Overseas financial institutions are allowed to invest Establish or participate in a pension management company; 3. Support foreign investment to establish or participate in a currency brokerage company; relax the entry conditions of foreign insurance companies, cancel the 30-year business life requirement; 4. Allow foreign institutions to obtain the A-type license lead underwriting in the inter-bank bond market; 5. Further facilitate the investment of foreign institutional investors in the inter-bank bond market. These measures can strengthen financial agglomeration in the Northwest China.

BIBLIOGRAPHY

Ahmad, R., Etudaiye-Muhtar, O. F., Matemilola, B. T., & Bany-Ariffin, A. N. (2016). Financial market development, global financial crisis and economic growth: evidence from developing nations. *Portuguese Economic Journal, 15*(3), 199-214.

Aregbeshola, R. A. (2016). The role of local financial market on economic growth: A sample of three African economic groupings. *African Journal of Economic Management Studies, 7*(2), 225-240.

Assefa, T. A., & Mollick, A. V. (2017). Financial development and economic growth in Africa. *Journal of African Business, 18*(3), 320-339.

Audress C, & Feldman M. (2006). Spillovers and the Geography of Innovation and Production. *American Economic Review, 86*(3).

Bernard, A. B., & Jones, C. I. (1996). Productivity and convergence across US states and industries. *Empirical economics, 21*(1), 113-135.

Brülhart, M., & Mathys, N. A. (2008). Sectoral agglomeration economies in a panel of European regions. *Regional Science Urban Economics, 38*(4), 348-362.

Chen Wenfeng, & Ping Ying. (2008). The relationship between financial industry agglomeration and economic growth in Shanghai. *Statistics and Decision Making, 20*, 93-95.

Commendatore, P., Michetti, E., & Purificato, F. (2013). Financial development and agglomeration.

Dawei, S. (2019). Progress and Prospects of Financial Agglomeration Research. *Finance, 02*, 33-34.

Dekle, R., & Eaton, J. (1999). Agglomeration and land rents: evidence from the prefectures. *Journal of Urban Economics, 46*(2), 200-214.

Di Giacinto, V., & Pagnini, M. (2011). Local and global agglomeration patterns: Two econometrics-based indicators. *Regional Science Urban Economics, 41*(3), 266-280.

DING, Y., LI, S.-c., & LI, L. (2009). Analysis on Financial Aggregation Degree Evaluation of China [J]. *Soft Science, 6*.

Ding Yi, Li Jingxia, & Li Lin. (2010). Financial Agglomeration and Regional Economic Growth: An Empirical Analysis Based on Inter-provincial Data. *Insurance Research, 2*, 20-30.

Ellison, G., Glaeser, E. L., & Kerr, W. R. (2010). What causes industry agglomeration? Evidence from coagglomeration patterns. *American Economic Review, 100*(3), 1195-1213.

Eryigit, K. Y., & Eryigit, S. B. (2015). Foreign Direct Investment, Financial Development and Economic Growth: The Case of Turkey. doi:10.4018/978-1-4666-7288-8.ch021

Fang Shengfei, Xu Qiuyan, & Ma Linlin. (2018). The Spillover Effect and Spatial Heterogeneity of Financial Agglomeration——Based on the Empirical Study of Provincial Administrative Regions in China. *Southern Finance,, 01*, 23-31.

Feng Delian, & Ge Wenjing. (2004). New Theory of Growth Mechanism of International Financial Centers: Wheeled Model. *Finance and Trade Research, 1*.

Fu Liping, & Wang Chao. (2016). Research on the Environment, Problems and Countermeasures of the Development of the Securities Industry in Northwestern Ethnic Regions. *Modern Economic Information*(6), 444-445.

Gang, Y. (1996). Analysis of China's financial assets structure and policy implications. *Economic Research, 12*, 26-33.

Gehrig, T. (2000). Cities and the geography of financial centers. *Economics of cities: theoretical perspectives*.

Gong, C., & Ban, H. (2016). Research on the regional differences of financial agglomeration and economic growth based on data mining. *RISTI*(E6), 343-354.

Gou Xiaolan, & Gao yunfeng. (2014). A Study of the Regional Differences between China's Financial Agglomeration and Economic Growth—Based on the Year-wide National Panel Data Analysis. *Southwest University*.

Hu Dongwan, & Songyuxiang. (2017). Research on the spillover effect of financial agglomeration on regional economic growth. . *Journal of Zhongnan University of Economics and Law*(4), 30-35.

Iyare, S., & Moore, W. (2011). Financial sector development and growth in small open economies. *Applied Economics, 43*(10), 1289-1297.

Jedidia, K. B., Boujelbène, T., & Helali, K. (2014). Financial development and economic growth: New evidence from Tunisia. *Journal of Policy Modeling, 36*(5), 883-898.

Jie, Z. (1998). What kind of financial system arrangement is more conducive to savings volatility and financial support in the transition. *Financial Research, 12*, 14-21.

Kindleberger, C. P. (1973). The formation of financial centers: a study in comparative economic history.

Li Biao, Song Changxu, & Wu Jia. (2016). Innovation-driven financial agglomeration and regional economic growth. *Finance and Economics*(1), 88-99.

Li Hong, & Wang Yanxiao. (2014). Financial Agglomeration, Spatial Spillover and Urban Economic Growth: An Empirical Study Based on China's 286 Urban Spatial Panel Dubin Models. *International Financial Research, 2*, 89-96.

Lian Jianhui, Sun Huanmin, & Zhong Huibo, F. E. C. E. N., Efficiency Boundaries and Competitive Advantages. Financial Research, (6), 72-82. (2005). Financial Enterprise Clusters: Economic Nature, Efficiency Boundaries and Competitive Advantages. . *Financial Research*(6), 72-82.

Liang Ying, & Luo Xiao. (2006). Study of Financial Agglomeration Forming Mode: Global Views and Local Choice. *Journal of Nanjing University of Finance and Economics, 2006*(5), 16-20.

Lin Jiangpeng, & Huang Yongming. (2008). Financial Industry Agglomeration and Regional Economic Development. *Financial Theory and Practice*(6).

Liu Ji, & Linlin, M. (2018). Economic Spillover Effect of Financial Agglomeration and Time-Space Differentiation——Spatial Econometric Analysis Based on Inter-provincial Data. *Financial development research, 2*, 17-25.

Liu Kaige. (2017). *Research on financial industry agglomeration and its economic growth effect.*

Lu Jun, & Xu Jie. (2014). Empirical Analysis of Financial Agglomeration and Regional Economic Growth: Taking the Beijing-Tianjin-Hebei Region as an Example. *Academic Exchange 2*, 107-113.

Lychagin, S. (2016). Spillovers, absorptive capacity and agglomeration. *Journal of*

Urban Economics, 96, 17-35.

Martin, P., & Ottaviano, G. I. (2001). Growth and agglomeration. *International Economic Review, 42*(4), 947-968.

Olgu, Ö. E. (2014). Handbook of research on strategic developments and regulatory practice in global finance. *IGI Global.*

Pan Hui, Shu Guanghe, Zhang Bing, & Li Jun. (2013). Regional Differences in the Relationship between Financial Agglomeration and Real Economic Growth. *Exploration of Economic Issues, 5*, 102-107.

Park, Y. S. (1982). The economics of offshore financial centers. *Columbia Journal of World Business, 17*(4), 31-35.

Pei Donghui. (2016). Research on the impact of Chongqing's financial industry agglomeration on regional economic growth *China Business Trade, 18*, 86-87.

Ping, X. (1992). Analysis of China's Financial Asset Structure. *Economic Research, 11*(1), 30-37.

Qinxian, B., & Zhiwen, Z. (2008). Financial Development and Economic Growth: China's Empirical Research. *Southern economy, 9*, 17-32.

Ren Yinghua, Xu Ling, & You Wanhai. (2010). Spatial Econometric Model of Influencing Factors of Financial Agglomeration and Its Application. *Quantitative Economics and Economics Research*(5), 104-115.

Sun Zhihong, & WANG Yaqing. (2017). Research on the Spatial Spillover Effect of Financial Agglomeration on Regional Economic Growth——Based on the Data of Five Northwest Provinces. *Audit and Economic Research, 32*(2), 108-118.

Thangavelu, S. M., Beng Jiunn, A., & James. (2004). Financial development and economic growth in Australia: An empirical analysis. *Empirical Economics, 29*(2), 247-260. doi:10.1007/s00181-003-0163-7

Wei Haili, & Yuan Jiapeng. (2018). Research on the Development of Financial Industry Clusters-Taking Tianjin Binhai New Area as an Example. *North China Finance*(8), 53-59,75.

Wu Ming, Cao Jiahe, & Zhang Le. (2014). Empirical research on the factors affecting regional financial industry agglomeration based on provincial panel data. *Special Zone Economy*(4), 272-274.

Xiong Xiaolian, & Dai Fangfang. (2018). The Coupling Mechanism of Financial Agglomeration and Economic Development in Western China: Empirical Analysis Based on the Coordination Model. *Journal of Guizhou Normal University (Social Science Edition)*(2018-04), 94-103.

Yang Chenzhu. (2015). A Survey of Internet Finance Research. *Economic research guide;*(1), 112-113.

Yang Yiwu, & Fang Dachun. (2013). Financial Agglomeration and Industrial Structure Change: Empirical Study from 16 Cities in the Yangtze River Delta. *Financial Economics Research*(06).

Ye, C., Sun, C., & Chen, L. (2018). New evidence for the impact of financial agglomeration on urbanization from a spatial econometrics analysis. *Journal of Cleaner Production, 200*, 65-73.

Yin Xingshan, He YIfen, & Xu Hongshui. (2003). Analysis of the financial agglomeration situation and promotion competitiveness of the Yangtze River Delta. *Shanghai Finance, 8*.

Zhang Kewen. (2018). An Empirical Analysis of the Relationship between Financial

Industry Agglomeration and Economic Growth in China. *Statistics and Decision Making, 34*(18), 136-139.

Zhang Zhiyuan, & Ji Weijie. (2009). Influencing Factors of China's Provincial Financial Industry Clusters with Spatial Econometric Analysis. *Journal of Guangdong University of Finance*(01), 107-117.

Zhao, S. X. (2003). Spatial restructuring of financial centers in mainland China and Hong Kong: a geography of finance perspective. *Urban affairs review, 38*(4), 535-571.

Zhao Xiaoxia. (2014). Exploring the economic growth mode of China's big cities from the perspective of financial agglomeration. *Management World, 5*, 174-175.

Zhong Shen, & Du Lei. (2018). Research on the Impact of Financial Agglomeration on Regional Economic Growth——Econometric Analysis Based on Spatial Panel Data. *Industrial Technology Economy, 37*(4), 62-69.
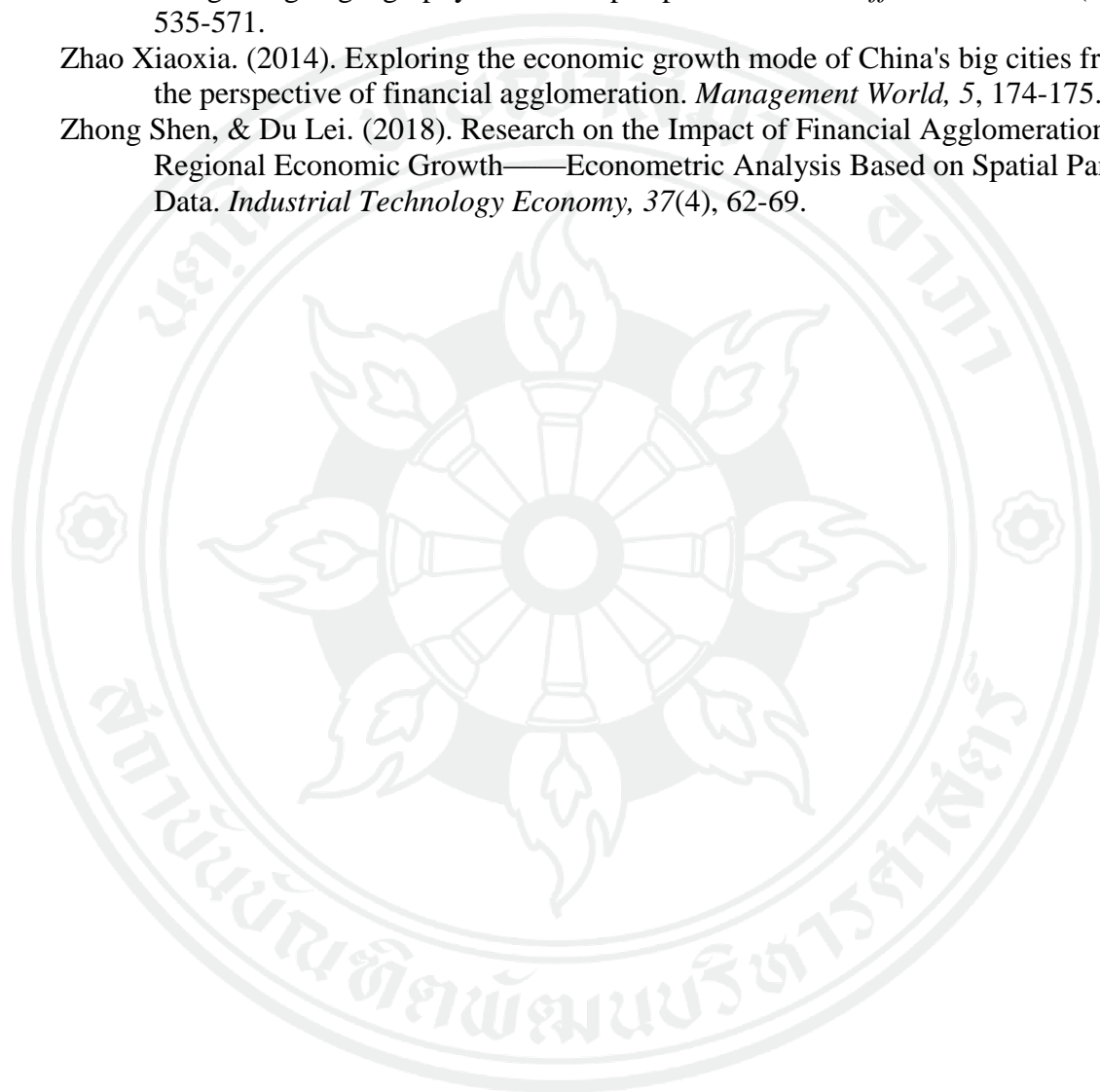
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