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The Dynamic Interaction between the Financial Development and the Urbanization Process in China

--Based on the Analysis of Panel VEC Model

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Abstract: Based on the panel VEC model, this paper verifies the dynamic interaction between China's financial development and urbanization process and analyzes the short-term, medium and long term situation. The results of this research show that: the financial development can promote the urbanization process in short term, but there is not enough evidence to suggest that the urbanization process plays a significant positive or negative role in promoting China's financial development. However, in the medium and long term, there exists interaction between financial development and urbanization as both cause and effect. Based on the above, we analyze the reasons and propose the corresponding policy suggestions.

Key words: China's financial development; Urbanization; Panel VEC model

1. INTRODUCTION

Urbanization, as the process of the population transferring from rural areas to urban areas, is a kind of economic phenomenon in industrialization process. It is also an important item of measuring the modernization level of a country or a region. Not only can it alter the old way of living and production, improve the income level, and popularize the urban civilization, but also can improve the percentage of resources possession of those who stay in rural areas. At the same time, it can realize the economy of scale and intensive development. What's more, it plays a significant role in China, which is experiencing economic transformation and development.

There exists important internal relation between the financial development and urbanization. Finance is the core dynamic of modern economic system. Financial development can provide financing for the development of substantial economy, and optimize the allocation of resources. It also may benefit the intensive and gradual development of the urbanization process. Deepening of urbanization, meanwhile, also can be the capital resource and the source of customers of amounts of financial institutions, and promote the growth of the national economy and the financial market, which in turn will further active and develop the financial market.

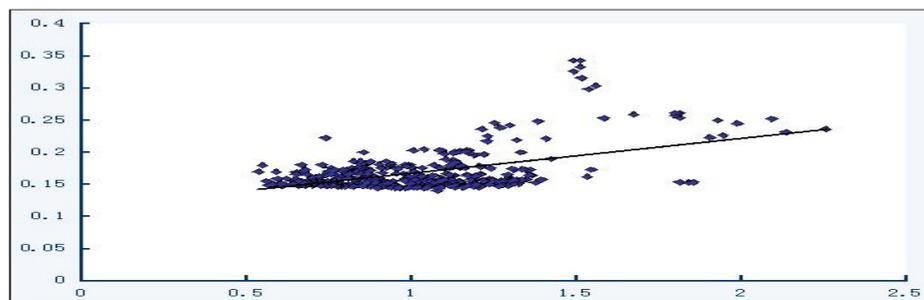


Figure 1 The scatter plot between financial development and urbanization

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Financial development internally benefits urbanization, and urbanization in turn further promotes the financial development. The relationship between financial development and urbanization process are depicted in Figure 1. It shows the change trend of the relationship between them, and it can be preliminarily concluded that it is a positive one.

In the existing theoretical literatures, there are few ones which study the direct relationship between financial development and urbanization process. Foreign similar researches are as following: Richard (1988) , using main city data of American and Britain, established the regression model that analyzed the effects of investment levels, the level of economic development and other economic factors on the United States and Britain urbanization. Results show that the capital investment is the most important factor to the Urbanization^[1]. Teranishi (1997) believed that there are a large number behavior of city infrastructure financing, city housing financing in the process of urbanization, to meet the financing demand can effectively support the growth of the scale of city^[2]. Kyung-Hwan Kim (1997) found that in the process of urbanization, the development financial played a primary role in the investment of the real estate and infrastructure construction^[3]. Cho, Wu and Boggess (2003),taking five states in the United States as an example, evaluated the extent of interaction between the level of urbanization, land use regulations and financial development by using a multi branch selective model, and made the result that the financial development had a positive effect on the investment development of land in the process of urbanization^[4].

In recent years, domestic scholars generally thought that the infrastructure construction in the process of urbanization needed much money support, but the government financial resources was hard to meet the enormous demand for funds, so the financial development and financial system innovation played an important supporting role to promote urbanization (Yang Shenggang, Zhu Hong, 2007; Wang Dingxiang ,etc.,2009; He Jing, Rong Aiping 2012^[5-7]). In the literature studying the relationship, Yan Bingzhu (2013) thought that money input was the most important problem to be solved in the construction of new urbanization, new urbanization was an important engine for the upgrade of economic structure of financial services^[8]. Zhu Jianhua (2010) thought that because of the shortage of financial support in the insufficient developed areas, our country should establish the coordination mechanism between the financial development and urban construction, that was, guided by the market the elements of economic development was agglomerated by the urbanization, and at the same time according to the urban planning, financial resources were rationally allocated, the path of financial support was innovated^[9]. On quantitative aspects the researches include: Wu Chao, Zhong Hui (2013) analyzed the current financial problems and difficulties of urbanization construction, put forward the source assumptions of the urbanization construction growth, and made clear the focal point of financial support to urbanization construction by testing through empirical method^[10]. Huang Yong and Xie Zhaohua (2008) used the VAR model for testing, and found that there was a causal relationship between China's bank lending and urbanization construction^[11].Gu Xiaojing,Wang Dingxiang (2011) ,using the provincial panel data during 1992-2008,did the national and district study on the relationship between Chinese financial development scale, the efficiency of financial development, financial development structure and urbanization process. The results showed that there existed the long-run equilibrium relationship between the financial development and the process of urbanization in China, and the financial scale had the positive effect, but the financial development had the negative effect on improving the level of urbanization ^[12].Sun Puyang and Wu Lichao (2011) analyzed the conduction mechanism of the financial development to the process of urbanization, and using panel data of 120 countries between 1995-2008, studied the impact of financial development on the process of urbanization by 2SLS.They thought that the financial development level and the promotion of freedom degree were good to accelerate the urbanization the process^[13].

Through the review of the relevant literatures, we find that most scholars at the local angle studied whether

the financial development promoted the urbanization construction, the significance of financial support for urbanization construction and the manner in which support the urbanization construction, etc. There are few studies about the dynamic relationship between them. At the same time, in the view of the empirical analysis method, most of the literatures adopted the time series data and general structural equation. As we know, as to the reality in China, the parameters that models set is often unstable. So the general structural equation is very difficult to accurately depict the precise meaning of Economics. Only the literature analyzing by panel data is that it studied the related relationship between many variables using econometric methods (Gu Xiaojing and Wang Dingxiang, 2011, Sun Puyang and Wu Lichao, 2011). Therefore, on the basis of existing literatures, this paper will try empirically to study in detail the internal relation and dynamic effect between financial development and urbanization process using the provincial panel data from 1997 to 2010, and the panel VEC model, in order to provide an empirical basis and digital reference for policy recommendations.

2. VARIABLE SELECTION AND DATA SOURCE

2.1 Definition and description of the variables

In order to have an accurate study of the relationship between the financial development and urbanization process, we must have a clear definition and explanation of both respectively.

“FD” is a variable representing the degree of financial development. The indicators reflecting the development level always couldn't be agreed among academia. As we know, in a mature market economy, indicators measuring financial development include the ratio of financial institutions' deposit and lending to GDP, the securities market value ratios, and the securities market liquidity ratios[14]. Since securities market in China didn't developed until the early 1990s, the relatively shorter development had a tiny impact on economic development[15]. Therefore, the role of stock market will not be discussed here. Following the general setting when discussing financial development, this paper selects the ratio of total loans to GDP as the indicator.

“URBANIZATION” is the variable representing urbanization process. Urbanization is a historical process of transformation, a kind of economic phenomenon, and also a important symbol of measuring the modernization level of a country or a region. This paper uses the general method-using the proportion of urban population to characterize the urbanization process.

2.2 The sources of statistics

To avoid the weakness of annual data analysis, we select the provincial, municipalities and autonomous regions' large sample of panel data from 1997 to 2010 as the basis of our research. Since the FD and the URBAN both show the non-stationary series (figure 1), we adopt the panel VECM method to study the internal relation between them. All the data in this paper are from "China statistical yearbook" and "China financial yearbook", "China population statistics yearbook" and "new China 60 years statistical data collection". Some data in Tibet were missing in the sample. Considering the measurement stability of the data, we use the method based on the logarithmic processing original data, and taking the Indexed Values.

3. EMPIRICAL ANALYSIS

3.1 Unit root test

To study the internal relation between financial development and urbanization, we should check their stability firstly. Table 2 lists the ADF tests values and the corresponding p values of the panel unit root test. The results demonstrate that the relationship between the FD and the URBAN is not smooth, but the first-order difference is smooth. Therefore, the two panel data sequence are the same order.

Table 1. Values of the panel unit root test.

Variables	A constant term	Contains the trend item	Contains a drift term	Results
FD	-2.728985 (0.0978)	-1.334959 (0.8297)	0.592997 (0.8310)	Unstable
DFD	-2.404130 (0.1604)	-3.213148 (0.1284)	-2.438855 (0.0198)	Stable
URBANIZATION	2.479085 (0.9932)	-0.576658 (0.8444)	-2.941959 (0.1827)	Unstable
DURBANIZATION	-4.846327 (0.0032)	-4.574201 (0.0181)	-3.003540 (0.0062)	Stable

Note: Values in brackets are p values

3.2 Co-integration relationship test

Since the FD and URBAN are the integration I of same order, we verify that the stable relationship between them. We adopt Maddala & Wu ' s results that were put forward by Fisher (1999) based on joint inspection for a single dependent variable, and set up the co-integration test method which can be used for panel data, that is Johansen Panel Co-integration Test. Table 2 is the test result by selecting the first-order lag. The result shows that there existing the co-integration regression between them, that is long stable one.

Table 2. The co-integration regression analysis result for the panel data

Test method	Assumption test	Statistic name	Statistic value(P value)
	Original assumption	Trace Statistic(P value)	λ -max Statistic (p value)
Johansen test	0 cointegration vector	21.96207 (0.0046)**	20.63598 (0.0043)***
	1 cointegration vector at least	1.326088 (0.2495)	1.326088 (0.2495)

Note: ‘*’ means the significant level when hypothesis selection is refused. ***1%, **5%, *10%

3.3 Causality test

The integration I of same order between the FD and URBAN leads to the causality test of them failing to pass the Vector AR model. So we need to use the Vector Error Correction Model(VECM) as following model 1:

$$\begin{bmatrix} DFD_{i,t} \\ DURBAN_{i,t} \end{bmatrix} = \begin{bmatrix} \gamma_1 \\ \gamma_2 \end{bmatrix} e_{i,t-1} + \sum_{j=1}^l \begin{pmatrix} A_{11,j} & A_{12,j} \\ A_{21,j} & A_{22,j} \end{pmatrix} \begin{bmatrix} DFD_{i,t-j} \\ DURBAN_{i,t-j} \end{bmatrix} + \begin{bmatrix} \mathcal{E}_{1,i} \\ \mathcal{E}_{2,i} \end{bmatrix} \quad (1)$$

Where l is the lag order number. We test the two null hypotheses based the regression result of model 1. The null hypothesis 1 (H10) suggests that FD is not the Granger cause of Urbanization. If it is true, the coefficient of all the Urbanization delays will zero and γ_1 will be 0 in the DFD AR model. Similarly, the null hypothesis 2 suggests that FD is not the Granger cause of Urbanization. If it is true, the coefficient of all the DFD delays will zero and γ_1 will be 0 in the regression model of Urbanization. When the delay time is from 1 to 4. the F value and P value can be shown by following table, table 3:

Table 3. The Granger causality test for the panel data

Delay time	H10: FD is not the cause of urbanization		H20: urbanization is not the cause of FD	
	F value	P value	F value	P value
1	3.54390**	0.03281	4.62791**	0.0415
2	4.2340**	0.01772	5.33418**	0.0014
3	4.15536**	0.01581	4.36715**	0.0137
4	3.34182**	0.00149	3.36761**	0.0247

Note: ‘*’ means the significant level when hypothesis selection is refused. ***1%, **5%, *10%

According to the results of table 3, when the delay time is from 1 to 4, under the significant level of 5%, there exists causality between the financial development and the urbanization process. And the result is stable during the delay time from 1 to 4. So, the Granger causality test means that they interact. That is to say, the financial development is good at the urbanization process and meantime the urbanization can promote financial development conversely.

3.4 The analysis of impulse response function

According to the selection standard of delay order number, we choose the delay order number is 2. Based on the evaluation of model 1, the impulse response function can be computed as following figure 2. the shock to one standard deviation of FD rapidly influences the current and delayed urbanization, last a long time. Urbanization makes responses to the shock currently. The response degree is the highest after the tenth period, and over time the change is stable as time goes on. Ten years later, the current response of urbanization to the shock is still significant. It shows that the direct responses of FD to urbanization is permanent. In the meantime, urbanization has direct responses to FD. Although the direct response is none in the beginning, it will increase as time goes on, get the highest level in tenth period, and then keep stable. The result tells us that in the middle and long run, the financial development and the urbanization process will lead each other. The financial development promotes the urbanization process and the urbanization process will also enhance the financial development. But we must notice that the financial development can promote the urbanization process immediately, and the effect of the urbanization to the financial development is delayed to some extent.

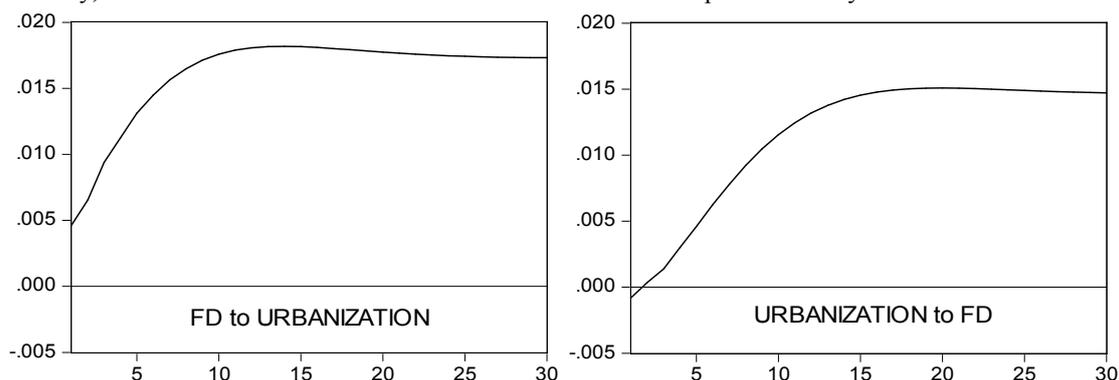


Figure 2. The impulse response function of the panel data

3.5 The further comparison of leading-delayed relationship

The paper gets the evaluation results of the financial development leading the urbanization process based on the estimate of model 1. In the view of table 4, the FD delayed one term is positive to current urbanization, but the urban delayed 1 term does not have significant effect on current FD under the significant level of 5%. In the short run, financial development promotes the urbanization process, but there are not enough evidence to show that urbanization has positive or negative effect on financial development.

Table 4. The leading-delayed relationship test

variable specification	Variable signal	L.FD	L.URBANIZATION
The financial development level delayed one term	FD(-1)	0.803167*** (5.55816)	0.407631** (2.79156)
The urbanization level delayed one term	URBANIZATION(-1)	0.298110 (0.86930)	0.876685*** (9.20857)
Constant term	C	1.424420** (2.35001)	0.018894 (0.02011)
Goodness of fit	R-squared	0.764946	0.928767
Adjusted goodness of fit	Adj. R-squared	0.717935	0.914521
F statistic	F-statistic	16.27167	65.19241
Akaike's information criterion	AIC	-0.906546	-7.718166
Schwartz criterion	SC	-0.776173	-7.587793

Note: '**' means the significant level when hypothesis selection is refused. ***1%, **5%, *10%

4. RESULTS AND SUGGESTION

The paper studies the inner relationship between the financial development and urbanization process in the background of gradually putting on the agenda of urbanization. By a series of serious tests and the analyses in the short and long run, we can the results as following:

4.1 In the view of short run, the financial development promotes the urbanization process, but there are not enough evidence to show that urbanization has positive or negative effect on financial development.

As the most important system arrangement in the economic transition in China, the urbanization is very important doubtlessly to China who has the dual tasks of economic development and transition. The financial development is adapted to economic development and social development. As the depth of financial reform and the strengthen of commercial banks marketing, the government can get more funds support from the bank system. So the government may promote the urbanization process in the short run. But urbanization is a very long process relatively, and it owes to a country's economic development level and social development objects. In the meantime, as the system fact, urbanization exists delayed effect when it leads the economic development. So in the short run, the urbanization does not have significant effect on financial development.

4.2 In the middle and long run, there exists the relationship of interaction, reciprocal causation and leading each other between the financial development and urbanization process.

The financial development is internally good at the urbanization process, inversely the urbanization process promotes the financial development. In the view of middle and short run, the financial development can promote the accumulation of social capital, enhance the efficiency of capital allocation and the labor factor moving to cities. So it promotes the urbanization process. At the same time, the financial development can promote the regional financial equilibrium, and inversely strengthen the regional economic development. The economic development promotes urbanization. So in the view of long run, the financial development is good at urbanization process. In the meantime, during the urbanization process, it speed up the better allocation of resource and the decentralization of banks monopoly action. So it makes the financial market more marketing. The financial development is embedded in the formation and changeable process of regional economic state. So the urbanization provides the development term and space for financial development, and can promote it further.

The paper has the following suggestions:

At first, we can solve the problem of the term matching of urbanization input and output and the risk management of cost and benefit by the market system. Grasping the opportunity of urbanization funding system

building, we explore flexible invest and fund styles and promote the improvement of financing structure, such as the spreading of the country municipal debt financing adapted to China's situation, asset securitization, equity investment fund, etc. and encourage more social fund investing urbanization building.

Secondly, our country should give full play to the financial industry financing function and advantage by the innovation of financial system, promote the finance to support the urbanization building and development by using the theory of incentive compatibility, enhance the efficiency of resource allocation, improve the urbanization process. The financial industry can also use urbanization bonus financing to lead to benign cycle between urbanization dividend release and the availability of finance.

Thirdly, there is contradiction between the benefit objects of financial institutions and the social effects of urbanization building. In the background of relatively rare financial resource, we must decide the focus of urbanization finance by the property of urbanization, enhance urbanization by the multiplier effect in the economic system and related effect. Currently, the financial focus of urbanization may choice the needs of little county, agricultural modernization development, the urban infrastructure and public service, etc.

At last, in the view of financial area, the marketing of finance is good at the building of urbanization, but appropriate financial system is better at the development of urbanization. We should better further related financial system for urbanization such as credit approval authority decentralization of large-owed commercial bank, moderate opening market of private finance market, promoting the reform of market-oriented interest rate, establishing a property rights trading market and encouraging the development of credit enhancing the financing tool.

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