

Research on the Spillover Effect of Financial Development on High-quality Economic Development Based on 27 Cities in the Yangtze River Delta

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Abstract: Based on the panel data of 27 cities in the Yangtze River Delta from 2013 to 2021, this paper evaluates the high-quality development level of the Yangtze River Delta by constructing an evaluation index system of high-quality economic development. We use the spatial econometric model to analyze the spatial spillover effect of financial development in the Yangtze River Delta on high-quality economic development. The findings are as follows: (1) The high-quality development level of the Yangtze River Delta has steadily improved. (2) The high quality development of the Yangtze River Delta has a phenomenon of spatial aggregation, and the comprehensive score of the east and south is significantly higher than that of the west and north. (3) The high-quality development of the Yangtze River Delta has a spatial spillover effect. (4) Financial scale can promote high-quality economic development and has a positive spillover effect.

Keywords: Financial development; High quality development; Spatial spillover effects

1. Introduction

It is revealed that China's economic development will revolve around new contradictions. The 19th CPC National Congress pointed out that China's economic development has shifted from the traditional stage of pursuing "high-speed growth" to the new stage of "high-quality development". The Yangtze River Delta region is one of the regions with the most active economic development, the highest degree of openness and the strongest innovation ability in China. Promoting high-quality development in the Yangtze River Delta is of great significance to high-quality development in China. However, while promoting high-quality economic development, we are faced with structural imbalance between supply and demand, income gap and other practical problems. Finance is the source of high-quality economic development and the core of modern economy, which is related to development and security. Financial development can promote the rational distribution of social resources and solve the prominent problems of short board. With the continuous development of finance, the problem of unbalanced economic development among regions has been alleviated. Therefore, it is essential to study the impact of financial development on high-quality economic development and formulate targeted policies to promote high-quality development in the Yangtze River Delta.

Based on the above contents, this paper constructs an indicator system of high-quality economic development, evaluates the level of high-quality development in the Yangtze River Delta, and measures the spatial correlation of high-quality development in the Yangtze River Delta. On this basis, the paper empirically analyzes the impact of financial development on high-quality economic development, clarifies the spatial spillover effect of financial development on high-quality economic development, and puts forward suggestions for high-quality economic development.

2. Literature review and research hypothesis

Scholars at home and abroad have already started the exploration of high-quality economic development. With the in-depth exploration of common prosperity, scholars are not only concerned about economic growth, but also about distribution issues. Qian X.J., et al. (2011) evaluated economic development from four perspectives: economic growth structure, economic growth stability, economic growth welfare changes, and achievement distribution ^[1]. When the 19th National Congress of the

Communist Party of China proposed the transformation of the economy from pursuing "quantity" to "quality", domestic and foreign scholars have put forward the five concepts of "innovation, coordination, green, openness, and sharing" for the theory of high-quality economic development. Jin B. (2018) believes that high-quality development is the mode, structure and driving force of economic development to meet the growing needs of the people [2]. Fang D.C., et al. (2019), Feng Z.F., et al. (2020) comprehensively evaluated economic development with five development concepts as indicators [3-4]. Finance is the lifeblood of economic development. Clarifying the relationship between financial development and high-quality economic development is particularly important for promoting high-quality economic development. Therefore, the role of financial development in high-quality economic development has been widely concerned by the academic community, and the country has also made clear provisions on financial development. Zhu W.X. (2001) Empirical research found that the resource allocation function of the financial system can effectively promote enterprises to diversify and specialize in investment [5]. It can be seen that the resource allocation function can optimize the project selection of enterprises, promote the diversified development of enterprises, improve the efficiency of enterprise resource use, and then have a positive impact on regional economic growth. Foreign scholars Manganelli et al. (2015) have concluded through empirical research that financial development can improve economic development by promoting industrial structure optimization [6]. Sui H.G., et al. (2017) found that the ability of financial intermediaries to mobilize social funds and the ability to transform investment are positively correlated with the quality of economic growth [7]. Zhang Y.Y., et al. (2018) believed that the optimization and upgrading of industrial structure can promote high-quality economic development [8]. Chang X.F., et al. (2020) verified that the improvement of financial development and capital efficiency will promote the high-quality development of regional economy [9]. Based on the above, this paper proposes the following two assumptions.

H1: Financial development can promote the high-quality development of local economy.

H2: Financial development has a positive spillover effect, that is, it can promote the high-quality economic development of neighboring regions.

3. Research design

3.1. Data source and variable setting

The basic data used in this paper are from the Statistical Yearbook of Jiangsu Province, the Statistical Yearbook of Anhui Province, the Statistical Yearbook of Zhejiang Province and the statistical bulletins of 27 regions in the Yangtze River Delta from 2013 to 2021. Some data that cannot be directly obtained can be obtained by proportional conversion or average method in other years.

3.1.1. Explained variable

The explained variable is the comprehensive score of high-quality economic development. We constructed the evaluation index system of high-quality development level in the Yangtze River Delta, and used the entropy method to comprehensively evaluate the level of high-quality development of the Yangtze River Delta economy, and obtained the comprehensive score of high-quality development of 27 cities in the Yangtze River Delta from 2013 to 2021. For the construction of the evaluation index system of "high-quality economic development", Li J.C. (2018) analyzed the connotation of high-quality development, and combined with the main contradictions of Chinese society in the new era, built a high-quality development evaluation index system consisting of 27 indicators in five aspects: economic vitality, innovation efficiency, green development, people's life, and social harmony [10]. Huang M. (2019) and others have built a high-quality development evaluation index system with eight indicators in six dimensions of income, health, education, scientific and technological innovation, green development and people's livelihood by placing meeting the needs of the people at the core of high-quality development [11]. Referring to the appeal documents, this paper selects a total of 18 indicators from five dimensions of "economic vitality, innovation efficiency, green development level, people's livelihood sharing, and coordinated development" to build an evaluation index system of "high-quality economic development".

3.1.2. Core explanatory variables

The core explanatory variable is financial development. Finance is the core of modern economy, which is related to development and security. As the main financing method, China's credit has supported the financial development. At present, most studies measure financial development by the

ratio of total institutional deposits and loans to population. Chang X.F. (2020) represented financial development with the per capita institutional loan balance. This paper uses the total amount of institutional deposits and loans per capita to represent financial development.

3.1.3. Control variables

Considering the endogenous and stability issues, this paper selects human capital, government intervention, education investment and urbanization rate as control variables with reference to the research of Qian J.J., et al. The use of human capital is expressed by the number of college students per 100000 population; The degree of government intervention is expressed by the ratio of the general budget expenditure of local finance to the GDP of the current year; The education investment is expressed by the ratio of the education budget expenditure of the local finance to the general budget expenditure of the local finance of the current year; The urbanization rate is expressed by the ratio of urban population to permanent population in that year.

3.2. Empirical model

There is a certain degree of correlation between the indicators in the Yangtze River Delta, so this paper uses the spatial econometric model SDM for empirical analysis. The spatial panel Dubin model of financial development affecting high-quality economic development is:

$$EQ_{it} = \alpha l_n + \beta_0 FIN_{it} + \beta_1 HR_{it} + \beta_2 GOV_{it} + \beta_3 EDU_{it} + \beta_4 URB_{it} + \rho WEQ_{it} + \theta_0 WFIN_{it} + \theta_1 WHR_{it} + \theta_2 WGOV_{it} + \theta_3 WEDU_{it} + \theta_4 WURB_{it} + \gamma_t + \mu_i + \varepsilon_{it} \quad (1)$$

Where, EQ_{it} is the interpreted variable, representing the value of high-quality economic development in the i th region in the t th year. W is the spatial weight matrix with a diagonal of 0. Fin_{it} is the core explanatory variable, that is, the value of financial development in the i th region in the t th year. HR_{it} , GOV_{it} , EDU_{it} and URB_{it} respectively represent the value of human capital, government intervention, education investment and urban rate in the i th region in the t th year. θ and β represent the regression coefficients of financial development, human capital, government intervention, education investment and urban rate. ρ is the spatial autoregressive coefficient, α is a constant term, ε is the random error term, and ln is the unit matrix $nx1$ order. The empirical process is completed by software stata16.0.

4. Empirical analysis

4.1. Evaluation results of high-quality economic development level

The method used in this paper to evaluate the level of high-quality development is "entropy method". The entropy method has the characteristics of simple operation and strong practicability. Especially in determining the weight, weighting can eliminate the interference of subjective factors, and is more objective and feasible. The basic steps of entropy method are as follows: First, standardize the data; Second, determine the weight of the j th index value in index j ; Third, calculate the entropy value of each index; Fourth, calculate the weight of each index; Fifth, get the comprehensive score of each evaluation object. Through the calculation of entropy method, the comprehensive score of high-quality development level of each city in the Yangtze River Delta from 2013 to 2021 is obtained. The higher the comprehensive score is, the higher the level of high-quality development represented by 1. It should be noted that the comprehensive score is a relative score, that is, the small change of the comprehensive score value does not mean that the high quality development level does not change. From the results of the calculation, we can see that: first, the average comprehensive score of high-quality development in the Yangtze River Delta region shows an upward trend during the observation period. The lowest score in the region increased significantly, from 0.226 in 2013 to 0.318 in 2021. The absolute difference between adjacent years is the smallest of 0.01, except that the absolute difference between 2018 and 2019 is 0.39. The maximum absolute difference is 0.023, indicating that the overall high-quality development of the Yangtze River Delta has steadily improved. Second, the gap between high-quality development in the Yangtze River Delta region is obvious. There is a phenomenon that the eastern and southern regions have high scores, while the western and northern regions have low scores. High-value regions such as Shanghai, Hangzhou, Suzhou and Ningbo are concentrated in the east and south, and their scores are always higher than the average. Low-value regions such as Yancheng, Taizhou, Anqing, Chuzhou, Chizhou and Xuancheng are concentrated in the western and northern regions, and the observed values in these regions are less than the average.

4.2. Measurement of spatial relevance

4.2.1. Global Moran Index

Using the Moran index model, we have obtained the global Moran index of high-quality development in the Yangtze River Delta from 2013 to 2021. It can be seen from calculation results that the global Moran index I of high-quality development in the Yangtze River Delta is greater than 0, that is, the spatial correlation coefficient is greater than 0, and all pass the test under the condition of 1% confidence. It can be seen from the observation values that I is basically greater than 0.25 during the observation period, indicating that the high-quality development of the cities in the Yangtze River Delta has the aggregation phenomenon of high value and high value, low value and low value.

4.2.2. Local Moran index

In order to investigate the spatial correlation degree of each region and its adjacent regions in the Yangtze River Delta, this paper uses the local Moran coefficient. Through calculation, we can get the local Moran scatter map of the cities in the Yangtze River Delta from 2013 to 2021. During the observation period, Shanghai, Yangzhou, Suzhou, Yancheng, Ningbo and other places have significant positive correlation with the high-quality development of the surrounding areas; Changzhou, Zhenjiang, Taizhou, Taizhou, Wuhu, Huzhou and other places have a significant positive correlation with the high-quality development of the surrounding areas in most years. Combined with Lisa distribution map, the observed values are presented more clearly. First, the observed values of the local Moran index in some areas of the Yangtze River Delta are small and not significant. There are few regions with large and significant Moran index, which shows that the problem of unbalanced high-quality development in the Yangtze River Delta is obvious. From 2018 to 2021, the local Moran index in most regions was significantly higher than that from 2013 to 2017, and the significance was also significantly enhanced. It shows that with the integration of high-quality development in the Yangtze River Delta, the development imbalance in the Yangtze River Delta has improved. Secondly, the local Moran index points are basically distributed in the H-H region and the L-L region, indicating that there is an obvious spatial aggregation effect in the Yangtze River Delta. High-value regions are basically concentrated in the eastern and southern regions of Nanjing and Suzhou, Jiaxing, Shaoxing, Taizhou, etc. Low-value areas are concentrated in the western and northern areas of Maanshan, Wuhu, Tongling, Yangzhou, etc.

4.3. Empirical analysis

The above has proved that there is significant spatial correlation between high-quality economic development in 27 regions of the Yangtze River Delta. In order to explore the spatial spillover effect of financial development on high-quality economic development, the spatial panel SDM model is introduced. By testing the significance of statistics LM-lag and LM-err and robust LM-lag and LM-err, it is found that LM-lag and LM-err are significant at 1% confidence level, so the rationality of SDM model is preliminarily determined. In the selection of random effect and fixed effect, the Hausman test value is 11.52, which passes the significance test, so the random effect is rejected and the fixed effect model is selected. In order to further test the rationality of spatial spillover effect estimated by spatial Dubin model, LR test and Wald test are carried out. The test results all passed the significance test, indicating that the selection of SDM model is reasonable. Through the test of city, time fixed effect and double fixed effect, we can choose the test form of time fixed effect on the basis of maximizing the overall fit. Therefore, this paper chooses the spatial econometric model in the form of time fixed effect for analysis.

4.3.1. Function analysis of variables

The results of SDM model test are shown in Table 1. From the results of SDM model test, we can see: (1) From the perspective of the explained variables, the level of high-quality economic development has a positive spatial spillover effect. The regression results show that the spatial regression coefficient of the explained variable is 0.326, which is significant at the confidence level of 1%, indicating that there is a positive spillover effect of high-quality economic development. (2) From the perspective of core explanatory variables, financial development can promote high-quality development. The regression results show that the regression coefficient of financial development is 0.0002, and through the significance test, it shows that financial development has a positive impact on high-quality economic development, that is, for every unit of improvement in financial development, local high-quality economic development can increase by 0.0002 units. Therefore, hypothesis 1 (H1) is verified. (3) From the perspective of control variables, the degree of government intervention, human

capital, urbanization rate, and human capital are positively correlated with high-quality economic development, and the government intervention and urbanization rate are significant at 1% confidence level, while the investment in education is negatively correlated with high-quality economic development, but not significantly. From this point of view, the increase of government intervention may stimulate social investment, enhance the confidence and motivation of industry development, and be beneficial to enterprise development, thus promoting high-quality economic development. The ability of human capital to promote high-quality economic development is very small, but the improvement of human capital can solve the problem of labor shortage in a small number of enterprises to a certain extent, and may also improve the level of labor force, thus slightly affecting high-quality economic development. The improvement of urbanization rate can solve the problem of unbalanced development between urban and rural areas, increase the income of rural residents, narrow the income gap between urban and rural areas, and promote coordinated development, thus promoting high-quality economic development. The impact of education investment on the high-quality development of regional economy can be ignored, but there may be problems such as waste of education resources and unbalanced distribution of education resources in some regions, which will also have a negative impact on the high-quality development of economy.

Table 1: Test results of spatial Dubin model

Vriable	Main	Wx
<i>FIN</i>	0.0002* (0.96)	0.0011 (0.38)
<i>GOV</i>	0.389*** (0.00)	0.3540* (0.05)
<i>HR</i>	0.0000 (0.33)	-0.0000*** (0.00)
<i>EDU</i>	-0.0001 (0.78)	0.0004 (0.57)
<i>URB</i>	0.0045*** (0.00)	0.0028*** (0.00)
<i>rho</i>	0.326***	
Observations	243	243
R-squared	0.735	0.735
Number of id	27	27

4.3.2. Spatial effect decomposition of variables

The spatial direct effect, spatial indirect effect and spatial total effect of variables on high-quality development are obtained through partial differential method. The spatial direct effect is the impact of the explanatory variable on the local area, while the spatial indirect effect (i.e. spillover effect) is the impact of the explanatory variable on the neighboring area. According to the decomposition results of spatial effects, both the direct and indirect effects (i.e. spillover effects) of financial scale on high-quality development are positive, indicating that the improvement of financial scale will promote the high-quality development level of neighboring regions. Hypothesis 2 is correct. The reason may be that on the one hand, the improvement of regional financial development is to promote the allocation of resources and improve the effect of capital on high-quality economic development through the improvement of the level of financial development. Especially, capital can support innovation and green development, and provide conditions for coordinated development, which is of great significance to improve high-quality economic development; On the other hand, the development of the Yangtze River Delta region is highly correlated, and the improvement of the level of financial development can drive the development of neighboring regions, especially in the dimension of economic vitality and green development level. In terms of control variables, the direct effect of government intervention on high-quality development is positive and significant at 1% confidence level, that is, the improvement of government intervention will have a positive impact on high-quality development. The direct effect of human capital on high-quality development is positive, but the indirect effect is negative, and both are not significant, indicating that the financial scale may have a negative impact on high-quality development in neighboring areas. The direct effect of education investment on high-quality development is negative, but the indirect effect is positive, and both are not significant, indicating that the improvement of education investment may promote high-quality development in neighboring areas. The direct and indirect effects of urbanization rate on high-quality development are both positive, and both are significant at the 1% confidence level, indicating that the improvement of urbanization rate can promote high-quality development in neighboring areas.

4.4. Robustness test

In order to test the stability of the conclusion, this paper refers to the existing research and tests the impact of financial scale on the high-quality development of the Yangtze River Delta economy under

two different spatial weight matrices. It can be found from the results that the effect of variables on the high-quality development of the Yangtze River Delta is similar to the previous results. The main observation variables have little change except the coefficient value, but the coefficient sign and significance have little change, indicating that the previous research conclusion is robust.

5. Suggestions

Based on the above research, we put forward the following suggestions: (1) Continuously promote the "integration of high-quality economic development in the Yangtze River Delta". Affected by the epidemic, many regions lack the impetus for economic development. In the process of gradually lifting the restrictions, developed regions should play their own radiation effect to drive the overall development of the Yangtze River Delta. Relatively backward regions should seize the opportunity of the integrated development of the Yangtze River Delta, adjust measures to local conditions, and use their own advantages to develop. (2) The government should continue to support finance, develop finance in a reasonable way, and play the role of financial development in promoting high-quality economic development. The policy formulation of financial development in different regions should be based on local actual conditions and adapt to local conditions so that financial services can serve local economic development. Drive high-quality economic development through financial development. (3) Give full play to the intermediary role of finance and make rational use of the spillover effect of financial development. The government should guide the inflow of capital to scientific and technological innovation, green development, and people's livelihood coordination. The core of high-quality economic development is still to solve the main contradictions. At present, technology, environment and people's livelihood are the focus of improvement to avoid affecting the development efficiency due to insufficient funds. (4) Strengthen financial supervision. While giving full play to the impact of financial development on high-quality economic development, we should pay attention to the occurrence of financial risks, prevent financial risks, and provide guarantee for high-quality economic development.

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