

# Financial Development, FDI and Economic Growth—A Research Based on the Mediation Effect Model

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**Abstract:** According to the mechanism of financial development, FDI and economic growth, this paper uses the individual fixed effects model and the mediation effect model of 31 provinces and cities in China from 2000 to 2019 to conduct empirical tests. The research results show that from a national perspective, the improvement of China's financial development level can significantly promote economic development. Secondly, from the perspective of regional samples, the financial development of the eastern provinces has a more significant impact on the economy, while the financial development of the central and western provinces has a limited impact on the economic development. Thirdly, from the perspective of FDI intermediary, financial development can significantly promote the improvement of economic level through FDI.

## 1 Introduction

At present, China is in a period of transition, and the financial system is still being adjusted. Economists hold different views on financial and economic growth. The theory of the relationship between financial development and economic growth has a long history. Studying the relationship between financial development and economic growth and the path of action will help China make better economic decisions and guide the high-quality and sustainable development of financial economy.

It is estimated that one-quarter of China's tax revenue, two-thirds of international trade, and one-third of GDP come from foreign direct investment. From 2000 to 2019, China's direct investment in the use of foreign capital has increased by 239%. Therefore, exploring the impact of finance on China's economic growth through foreign direct investment has important practical significance for further optimizing the structure of foreign investment and promoting economic development.

Based on the above considerations, the contribution of this article lies in the research perspective, fully considering the current financial development through the FDI intermediary effect transmission mechanism to affect economic growth. The analysis is carried out systematically from both theoretical and empirical levels. In terms of research methods, using panel data from 31 provinces and cities in China from 2000 to 2019, and using the fixed effects model in panel data. It fully analyzes the influence of financial development factors on economic growth based on the path of FDI. At the same time, this article discusses the heterogeneity of regional samples. The results of the model can not only reflect the temporal impact of financial development on economic growth but also reflect the differences in the role of financial

development in different regions.

## 2 Literature review

### 2.1 Impact of financial development on economic growth

Western scholars focus on studying the direction and intensity of financial development and economic growth. Schumpeter (1911)<sup>[7]</sup> believed that the services provided by financial intermediaries play an important role in technological innovation and economic growth. Since then, economists such as Goldsmith (1969)<sup>[8]</sup> had drawn a basic conclusion by constructing diverse models and various interpretation angle. Financial development and economic growth influence each other.

Chinese scholars have also analyzed the relationship between financial development and economic growth from multiple angles. From the perspective of the stock market, Ran Maosheng (2003)<sup>[4]</sup> introduced control variables including financial deepening indicators and trade status indicators. The result is still a weak correlation between the scale development of the stock market and economic growth. From the perspective of financial intermediary, Tan Ruyong (1999)<sup>[5]</sup> concluded that there is a significant positive correlation between the development of China's financial intermediary and economic growth.

### 2.2 The impact of financial development on FDI

Levine and Zervos (1998)<sup>[9]</sup> analyzed different types of finance and found that financial institutions play an important role in the economic system. Stock markets and banks act as financial intermediaries in different forms, which can actively reflect and predict changes in capital

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accumulation and productivity. Rajan and Zingales (1996)<sup>[10]</sup> found from the industry level that a good financial development status is conducive to adjusting the company's internal financing structure, reducing external financing costs, and thus promoting the overall improvement of the economy. Wurgler (2000)<sup>[11]</sup> believes that financial development can help rationally allocate existing investment methods from the industry and national levels, thereby promoting economic growth.

### 2.3 The impact of FDI on economic growth

The academic community has done a lot of research on the relationship between foreign direct investment and economic development. Through empirical research using the VAR model, Liu Gang (2019)<sup>[2]</sup> believed that FDI does have a certain promotion effect on China's economic growth. Lu Yifu (2020)<sup>[3]</sup> believed that the full use of the spillover effects of FDI can promote the growth of China's domestic economy, thereby stimulating the progress of China's domestic economic factors. Jiang Xiaojuan (2002)<sup>[1]</sup> pointed out that foreign capital has a significant impact on the transformation of economic growth mode and the improvement of the quality of economic growth.

## 3 Theoretical analysis

### 3.1 Effect of financial development on FDI

From the perspective of the efficiency of financial development, high financial efficiency is conducive to the absorption of advanced technological achievements by foreign-funded enterprises and the use of FDI technology spillover effects. From the perspective of foreign investor screening risks, countries that can effectively integrate domestic capital increase the absorption potential of foreign investment in technological achievements.

From the perspective of the scale of financial development, China has created a good investment environment for the introduction of wholly foreign-owned enterprises by expanding the financial scale. A good financial environment tends to attract more wholly foreign-owned enterprises to invest in China, thereby driving the upgrading of domestic enterprises' technology and strengthening the technology spillover effect of FDI.

### 3.2 The internal mechanism of FDI affecting economic growth

Generally speaking, the inflow of FDI can promote the economic growth of the country. Its internal mechanism is the process flow, management experience, advanced technology, etc. carried by FDI. With the investment of FDI, there will be spillover effects, which will effectively increase production, efficiency, thereby promoting the rapid development of the local economy.

### 3.3 Analysis on the transmission mechanism of the relationship between financial development, FDI and economic growth

In summary, through the analysis of financial development and FDI and the efficiency mechanism of FDI and economic growth, it can be concluded that China's financial development has improved financial services. Through the technology transfer brought by foreign capital, it can rationally guide domestic and foreign capital and promote corporate technology. It can strengthen the technological achievements brought about by FDI, thereby driving the improvement of domestic economic growth.

## 4 Data and theoretical model

On the basis of literature review and theoretical analysis, it is tested that financial development affects economic growth through the mediation mechanism of FDI. Referring to Wen Zhonglin (2005)<sup>[6]</sup> on the stepwise test method of mediation effect, the following regression equation can be used to describe the relationship between variables.

$$rgdp_{it} = \beta_0 + \beta_1 finance_{it} + \sum \beta_j x_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

$$fdi_{it} = \beta_0 + \beta_1 finance_{it} + \sum \beta_j x_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

$$rgdp_{it} = \beta_0 + \beta_1 finance_{it} + \beta_2 fdi_{it} + \sum \beta_j x_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

**Fig 1.** Regression equations

Among them,  $i$  is the province and  $t$  is the year.  $Rgdp_{it}$  means economic growth.  $Finance_{it}$  means financial development.  $X_{it}$  represents the set of control variables. The intercept term represents individual heterogeneity, and changes with individual effects. The paper uses panel data from 31 provinces and cities in China from 2000 to 2019 to construct a panel model. In the mixed regression model, fixed-effects and random-effects model, this paper selects the fixed-effects model to estimate through Hausman test.

#### 1. The explained variable

Use real GDP per capita ( $rgdp$ ). In order to eliminate price influence factors, the explained variables were deflated with 2000 as the base period, aiming to eliminate the influence of inflation.

#### 2. Main explanatory variables

Choose finance as the core explanatory variable. In combination with China's bank-led financial system, it can choose to use bank efficiency and bank scale to measure the development of the banking sector to represent the development of the financial industry. The efficiency of financial development is equal to the ratio of the loan balance of financial institutions to the deposit balance of financial institutions in each region. The scale of financial development is expressed by the ratio of the total amount of deposits and loans in each region to the GDP of the year.

#### 3. Intermediary variables

Select foreign direct investment ( $fdi$ ), measured by the scale FDI actual utilization of foreign capital.

4. Controlled variable

(1) The inflation index (inflation) is measured by the consumer price index.

(2) The level of urbanization (urban) is expressed by the proportion of urban population in the total population.

(3) Human capital (labor)

Calculated by the number of years of education method, the average number of years of education for the population over the age of 6 in each region, where the number of years of education for illiterate = 2. The number of years of education for the population with elementary school education = 6, and the number of years of education for the population with junior high school education = 9. The number of years of education for the population with high school education = 12, and the number of years of education for the population with a college education and above = 16. It can multiply the proportion of the population of each educational level over the age of 6 by the corresponding number of years of education to obtain the average number of years of education per person in each region.

(4) Capital

For the fixed asset investment of the whole society, the level of capital formation in a region can reflect the degree of economic development of the region.

(5) Infrastructure is represented by the total volume of post and telecommunications business.

The data involved in this article comes from the “China Statistical Yearbook”, “China Financial Yearbook”, Wind database, EPS database, and relevant data published by the National Bureau of Statistics during the period 2000–2019 of various provinces and cities. In view of the actual situation of China’s economic development and the availability of data and completeness, Hong Kong, Macau, and Taiwan are not included in this article.

## 5 Empirical analysis

### 5.1 Benchmark model and intermediary model

According to the test results of the national provinces in

table 1, Model 1 reports the impact of the benchmark model financial development on economic growth. From the perspective of the core explanatory variable financial efficiency, its regression coefficient to economic growth is 5046.5, which is significant at the 1% level. This shows that China’s financial efficiency has significantly promoted economic growth. With the gradual improvement of the financial system, financial institutions can also systematically provide high-quality financial services, rationally allocate domestic and foreign capital, so as to achieve the goal of promoting economic growth. From the perspective of financial scale, the regression coefficient of financial scale on economic growth is 8029.7, which is significant at the 1% level. This shows that the improvement of the overall level of financial development and the good conversion of savings to investment have clearly promoted economic growth.

In Model 2, the efficiency of financial development and foreign direct investment are significantly positively correlated with a coefficient of 46296.8. This shows that improving the efficiency of financial development can promote foreign direct investment. There is also a significant positive correlation between the scale of financial development and foreign direct investment with a coefficient of 26941.3, which shows that the expansion of the scale of financial development is conducive to the introduction of foreign capital and exerts an effect of absorbing FDI.

In Model 3, the efficiency of financial development, the scale of financial development, and economic growth are significantly positively correlated with coefficients of 3127.7 and 7047.1 respectively. FDI and economic growth are significantly positively correlated with a coefficient of 0.0568. It shows that FDI has further strengthened the role of financial development in promoting the efficiency of economic growth. At the same time, the level of financial development, as one of the important environmental factors of the intermediary effect of FDI, plays an important role in economic growth. At the same time, the improvement of the overall financial system makes FDI spillovers have a positive impact on economic growth.

**Table1.** Empirical results of mediating effects

	Fixed effect model		
	<i>rgdp</i> Model 1	<i>fdi</i> Model 2	<i>rgdp</i> Model 3
<i>efficiency</i>	5046.5*** (2.72)	46296.8*** (2.83)	3127.7* (1.89)
<i>scale</i>	8029.7*** (10.34)	26941.3*** (3.88)	7047.1*** (9.97)
<i>fdi</i>			0.0568*** (13.94)
<i>inflation</i>	679.5*** (2.66)	857.3 (0.39)	666.8*** (3.01)
<i>urban</i>	958.1*** (11.81)	190.4 (0.26)	890.7*** (11.99)
<i>labor</i>	-3343.0*** (-4.76)	-10087.1* (-1.66)	-2785.4*** (-4.54)
<i>capital</i>	0.357*** (4.83)	1.741*** (2.65)	0.278*** (4.18)
<i>infrastructure</i>	1.260** (2.34)	74.49*** (16.09)	-3.011*** (-5.40)

<i>_cons</i>	-95754.1***	-131206.6	-91727.7***
	(-3.81)	(-0.61)	(-4.22)
<i>N</i>	620	620	620

Note: the value of the t statistic in parentheses. \*, \*\*, \*\*\* indicate significance at 0.1,0.05, and 0.01 levels respectively.

### 5.2 Endogenous testing

This article controls endogeneity in two ways. On the one hand, it uses other main control variables that affect economic development. On the other hand, this article uses the panel data of 31 provinces across the country from 2000 to 2019, and uses fixed-effects model regression to exclude the influence of variables that are not observable at the level of economic development. However, for the endogeneity of the reverse causality angle, neither adding the main covariates nor establishing a fixed-effects model can be solved well. Therefore, this article considers the use of instrumental variable method to solve the endogenous problem. That is, the endogeneity test is carried out by using the core explanatory variable with a lag of one period as an instrumental variable. On the one hand, the efficiency of financial development that lags behind for a

period is highly correlated with the scale of financial development and its current indicators. On the other hand, the only way for the lagging indicators to affect economic growth is through the current financial development indicators. Therefore, the lagging one-period indicator satisfies the relevance and exclusivity, which is a more reasonable instrumental variable.

In table 2, columns 1 to 2 of the output result are the estimation results, using the lag period of the financial development efficiency and the financial development scale index as the instrumental variables respectively. The third column is the regression result of the combined use of two instrumental variables. Comparing the results of the instrumental variable estimation regression and the benchmark regression, it can be found that the estimator is basically consistent with the significance. Therefore, from the perspective of adding covariates, this article has better controlled the endogeneity problem caused by the omission of variable bias.

**Table2.** Tool variable estimates

	<i>rgdp</i>	<i>fdi</i>	<i>rgdp</i>
	Model 1	Model 2	Model 3
<i>efficiency</i>	4140.7*		7019.1***
	(1.80)		(3.11)
<i>scale</i>		7999.9***	8825.7***
		(9.54)	(10.08)
<i>inflation</i>	407.4	992.0***	836.8***
	(1.44)	(3.80)	(3.16)
<i>urban</i>	1470.6***	1001.1***	968.7***
	(19.77)	(11.65)	(11.20)
<i>labor</i>	-4942.4***	-3522.7***	-3318.9***
	(-6.72)	(-4.99)	(-4.70)
<i>capital</i>	0.191**	0.350***	0.365***
	(2.47)	(4.65)	(4.85)
<i>infrastructure</i>	2.076***	1.118**	1.011*
	(3.67)	(2.07)	(1.88)
<i>_cons</i>	-55083.4**	-121167.7***	-117546.6***
	(-1.99)	(-4.59)	(-4.47)
<i>N</i>	589	589	589

Note: the value of the t statistic in parentheses. \*, \*\*, \*\*\* indicate significance at 0.1,0.05, and 0.01 levels respectively.

### 5.3 Robustness test

In order to demonstrate the robustness of the conclusions, this article replaces the explained variables and core explanatory variables respectively, and conducts a full-sample robustness test. Firstly, it can replace the explained variable, and choose real GDP (gdp) as an indicator to measure economic growth. Then it can replace the core

explanatory variables, and choose the loan balance (loan) of the banking financial institution and the deposit balance (deposit) of the banking financial institution as a substitute for measuring financial development.

According to table 3, after replacing the key variables, the main research conclusions of this paper have not changed. Therefore, compared with the benchmark regression, this paper is considered to be robust, and the empirical results of this paper are reliable.

**Table3.** Full sample robustness test

	<i>gdp</i>	<i>fdi</i>	<i>gdp</i>	<i>rgdp</i>	<i>fdi</i>	<i>rgdp</i>
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<i>efficiency</i>	1758.3*** (3.45)	55771.8*** (3.26)	630.5* (1.67)			
<i>scale</i>	1464.5*** (6.44)	44226.4*** (5.80)	570.2*** (3.32)			
<i>loan</i>				0.891*** (7.23)	7.772*** (8.31)	0.906*** (7.08)
<i>deposit</i>				0.130* (1.85)	1.105** (2.16)	0.136* (1.90)
<i>fdi</i>			0.0202*** (22.24)			-0.00265 (-0.43)
<i>inflation</i>	254.9*** (4.01)	254.9*** (4.01)	158.5*** (3.37)	372.2* (1.88)	306.7 (0.16)	377.9* (1.90)
<i>urban</i>	-83.89*** (-3.10)	-83.89*** (-3.10)	5.575 (0.27)	1056.1*** (13.49)	184.2 (0.49)	1047.7*** (12.98)
<i>labor</i>	-104.0 (-0.59)	-14828.2** (-2.50)	195.9 (1.50)	-2571.9*** (-4.46)	-2598.8 (-0.59)	-2570.5*** (-4.45)
<i>capital</i>	0.631*** (28.57)	0.631*** (28.57)	00.540*** (32.24)	-0.731*** (-8.47)	-7.003*** (-12.58)	-0.744*** (-8.15)
<i>infrastructure</i>	0.877*** (6.56)	0.877*** (6.56)	-0.460*** (-3.99)	-3.503*** (-7.16)	25.65*** (5.54)	-3.440*** (-6.73)
<i>_cons</i>	-23909.4*** (-3.92)	-23909.4*** (-3.92)	-16956.1*** (-3.77)	-50486.3*** (-2.66)	-38210.7 (-0.20)	-50736.5*** (-2.67)
<i>N</i>	620	620	620	620	620	620

Note: the value of the t statistic in parentheses. \*, \*\*, \*\*\* indicate significance at 0.1,0.05, and 0.01 levels respectively.

Taking into account the regional heterogeneity of China's financial development efficiency and financial development scale's impact on economic growth. This paper considers the two geographical environments in the central and western regions and the eastern region respectively, and conducts sub-sample regression.

From the results of the sub-sample regression in table 4, it is found that whether in the central and western regions or the central and eastern regions, the efficiency of

financial development and the scale of financial development have a significant positive effect on per capita GDP. However, in the eastern part of China, the efficiency and the scale of financial development play a more important role in promoting economic development than in the western region. This is because the eastern region of China has a better technological transformation advantage than the central and western regions, and the degree of marketization is higher.

**Table4.** Sample robustness tests

	<i>rgdp</i>	<i>rgdp</i>
	Central and western regions	Eastern regions
<i>efficiency</i>	2258.2*** (2.83)	15538.1** (2.06)
<i>scale</i>	3485.3*** (9.09)	20126.5*** (10.17)
<i>inflation</i>	249.3 (1.60)	1295.9** (2.27)
<i>urban</i>	755.6*** (18.55)	733.1*** (3.64)
<i>labor</i>	-1066.5** (-2.44)	-3052.2** (-2.46)
<i>capital</i>	0.424*** (8.16)	0.562*** (3.89)
<i>infrastructure</i>	-1.078* (-1.94)	0.289 (0.35)
<i>_cons</i>	-46596.6*** (-3.02)	-198305.7*** (-3.67)
<i>N</i>	380	240

Note: the value of the t statistic in parentheses. \*, \*\*, \*\*\* indicate significance at 0.1,0.05, and 0.01 levels respectively.

## 6 Conclusion and suggestion

### 6.1 Main conclusion

Based on the data of 31 provinces and cities from 2000 to 2019, this paper uses fixed effects models and intermediary effects to empirically analyze the relationship between financial development, FDI and economic development. The conclusions are as follows.

Firstly, financial development in various regions of China has a significant role in promoting economic growth. The improvement of the level of financial development is conducive to the healthy and sustainable development of China's economy.

Secondly, the impact of China's financial development on different regions is different. Compared with the central and western regions, the eastern region has a better technological transformation advantage and a higher degree of marketization. Therefore, financial development has the greatest impact on economic development, while financial development in central and western cities has a limited impact on the quality of economic development.

Thirdly, FDI has a significant intermediary effect between China's financial development and economic growth. This shows that overall financial development has a significant positive effect on the absorption of FDI. FDI exerts an intermediary effect transmission mechanism to promote the promotion of financial development to economic growth.

### 6.2 Countermeasures and suggestions

Firstly, China must continue to build a multi-level capital market to promote financial development. It can increase the market share of the small and medium-sized joint-stock system and establish regional commercial banks to better provide financial services for small and medium-sized enterprises in the region, so that the scale of financial development has an effective positive impact on economic growth.

Secondly, it can promote the balanced development of the east and the west, minimize the negative impact of regional differences, and maintain the stable development of the regional economy. The government should formulate differentiated policies according to different regions, including the implementation of regional monetary policies, differentiated taxation policies and regional policy adjustments of fiscal transfer payments, strengthen infrastructure construction in the central and

western regions, and strive to improve the educational and scientific research capabilities of backward regions.

Thirdly, it can take advantage of the positive spillover effect of FDI on China's economic growth. The key is to strengthen the level of financial development. It can improve the scale of financial development, expand the scale of credit, and provide credit and financial support for the introduction of foreign-funded enterprises, promote the improvement of the efficiency of financial development and provide a good investment environment for the operation of enterprises.

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