

An Empirical Analysis of Fiscal Decentralization's Effect on the Local Government's Land Finance: Evidence from Provinces in China

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Abstract—The purpose of this paper is to supplement the empirical evidence of the relationship between fiscal decentralization and land finance in China, and to prepare for subsequent research. In this article, data from 1999 to 2017 were collected and analyzed. Based on panel data, regression analysis, time heterogeneity analysis and regional heterogeneity analysis are conducted. In the results, a strong positive correlation is found between the two variables. In the analysis of time heterogeneity, taking 2007 as the dividing point, since when the land transfer fee has been included in the budget, the regression results are completely different in the two periods. In the previous period, the coefficient of fiscal decentralization is greater and more significant than that in the later period. In the analysis of regional heterogeneity, a strong positive correlation is shown in each region. Besides, the degree of dependence on land finance affected by fiscal decentralization is completely opposite to the level of regional economic development. In other words, in economically developed regions, land fiscal dependence is less affected by fiscal decentralization, vice versa. Based on the time heterogeneity and regional heterogeneity of fiscal decentralization's dependence on land finance as described above, it is reasonable to believe that the expansion of financial rights of local governments, comparing to the central government, is positively related to the promotion of land transfer in the local area.

Index Terms—Land finance, fiscal decentralization, empirical analysis, heterogeneity analysis, China

I. INTRODUCTION

In September 2020, Evergrande Group, a Chinese real estate developer, failed to repay its debts. After that, many real estate enterprises broke out of debt crisis, and workers on the construction site stopped construction. As a significant part of the cost of real estate development, land transferring fee is charged by governments, which is also an important part of government revenue. Thus, the research on the relationship between land finance and fiscal decentralization becomes more profound.

Land finance is a term referring to the phenomenon that China local governments used to increase their revenue and balance their budgets by the means of allocating local land to companies and corporations. Generally, in China, the revenue of local governments from land finance includes two parts: land transfer and land transaction. Land transfer means that local governments lease the right of management of land to other entities, where the lease fees are the land-transferring fees. Besides, in the transaction of land management right between leaseholders, extra land-transferring fees are charged

by the local government, the account of which is based on the original land-transferring fees.

The research on land finance plays an irreplaceable role in understanding the development of China. Firstly, as the actual monopoly seller in the land market, the overwhelming power of local governments in allocating land indicates that local governments have the power to strongly influence the local economic development and industrial structure [1, 2]. Secondly, land finance accounts for a large proportion of local government revenue, which is non-negligible when scholars try to analyze local government's behaviors. It has been estimated that land-transfer fees represent 35% to 65% of the public budget income of the local government since 2003¹. Thirdly, land finance has a statistical relationship with the promotion of local officials and corruption in land issues [3]. In general, the current researches manifest that the effect of land finance is complicated and multidimensional.

Fiscal decentralization is a term to describe the division and transmission of financial power among governments at different levels. For example, in China, from 1985 to 1993, the provincial governments, and the local government, needed to submit a certain amount of revenue to the central government. The remaining portion would be the local government's revenue, excluding transfer payments. In China, the change of fiscal decentralization in the relationship between the central government and local governments can be manifested in tax reform and government budget, like tax reform in 1994 and government budget reform in 2001 [4, 5].

A study of China's fiscal decentralization may lead to a better understanding of the peculiarities of the Chinese government's structure as well as conflicts between the central government and the local authorities. Firstly, fiscal decentralization has a significant effect on local economic development [6]. Though the traditional "voting by foot" theory has extremely strict assumptions, it implies that the local government has its own special market behaviors and profound influence in the national and regional market, distinguishing it from the central government and the other sectors. Secondly, according to Qian Yingyi and Gerard Roland [7], officials should be regarded as rational individuals, who make decisions to maximize their profits. Besides, in the precedent studies, China's fiscal decentralization has spatial heterogeneity for local economic development and urbanization process [8, 9].

This article will first review the existing research on land finance and fiscal decentralization in China in the second part,

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¹ Data sources: China Land and Resource Statistics Yearbook (Zhongguo Guotuo Ziyuan Tongji Nianjian)

and then clarify innovation. In the third part, it will introduce the dependency of provincial governments on land finance and the dependent decentralization between the central and provincial governments, and explain the data sources and statistical characteristics. In the last part, it shows the results of baseline regression, time heterogeneity analysis, and regional heterogeneity analysis. In the fifth part, the author will summarize the above materials and draw conclusions.

II. LITERATURE REVIEW/RELATED WORKS/PREVIOUS STUDIES

Some of the current relevant studies are focused on the effect of fiscal decentralization in China. Niu Meili illustrated that the revenue ratio, expenditure ratio [10], fiscal independence, and composite ratio could work in capturing decentralization in financing, delivery, and discretion. Jin Yinghua *et al.* found that there was an increase in revenue inequality at the sub-provincial level as a result of fiscal decentralization [11], resulting in an overall increase in fiscal inequality. Based on the study of eco-efficiency, Fayyaz Ahmad *et al.* proved that fiscal decentralization had a spatial difference in China [12]. Niu Yuanyuan's research on population flow indicates that fiscal decentralization could influence the local governments' expenditure effectively while migration has a slight effect on it [13]. Xue Chengkai's study on local government invisible debts shows that fiscal decentralization has a positive relationship with local government invisible debts, especially in infrastructure programs [14].

Additionally, some research has been conducted on the financing of land. Through the analysis of policy and data, Sun Linxiu and Zhou Feizhou concluded that the phenomenon of land finance was caused by the tax-sharing reform. In other words [15], land finance is caused by the lack of funds in local governments. However, Xu Nannan believes that land finance is a by-product of the state's control over the land market [16]. He Canfei *et al.*'s research on China's urbanization had got involved three sorts of factors: fiscal incentives, political incentives, and land-related variables [17]. In their article, based on the prefectural data from 2002 to 2008 in China, it was concluded that the contribution of land conveyance fees to local finance was a more contributive factor than others in the aspect of promoting urbanization. Based on the prefecture-level data from 2005 to 15 years, Liu Chaoyang and Jiang Dongxue constructed and analyzed the influencing factors of land finance, and concluded that the degree of fiscal decentralization is significantly negatively related to land finance [18]. Wang Yuan and Hui Eddie Chiman found evidence that Chinese local government officials did not maximize the revenue of land finance, suggesting that the excessive government intervention may cause market efficiency loss [19].

After analyzing the previous literature, the innovation and significance of this article are summarized as follows: (1) In the topic aspect, this article focuses on the fiscal decentralization between the provincial government and the central government, which is different from the previous fiscal decentralization focused on regional competition; (2) In the method aspect, unlike the previous discussion and analysis that fiscal decentralization will promote land finance,

this paper is based on the regression and heterogeneity analysis to prove it, so as to lay a solid foundation for future research; (3) In the data aspect, most of the raw data comes from multiple yearbooks rather than databases. And the ratio treatment applied in the paper avoids the error caused by GPD or CPI adjustment. (4) In the practice aspect, this article reveals the financial contradictions between China's central and local governments, and provides the world with China's development experience and lessons.

III. RESEARCH DESIGN

A. Explained Variables

In the paper, the explained variable is the dependence of local finance on land finance (DLF1). Based on the study of Ping Xinqiao *et al.*, there are three definitions of dependence on land finance [20]. The narrow one will be applied in this paper though there would be a little different. Narrow dependence on land finance in Ping's research is the ratio of interest obtained by local governments from land transfer to public revenue. In their paper, the interest obtained by local governments from the land transfer is considered as 62% of the transaction price of land transfer, which is a ratio of interest to transaction price in a certain year in Beijing. Although Ping admitted it's a strong assumption, it could be generally assumed that there is a linear relationship between the interest and transaction price. The linear relation assumption is broader than Ping's. Therefore, the transaction price can be treated as the proxy variable of interest of the land transaction. Then, the narrow dependence on land finance would be transaction price over local government revenue.

Besides, the income from land finance is not counted in the government budget before 2007. Therefore, land transaction prices before 2010 will be added to the government budget to fit in with the value after 2007. In addition, another similar ratio, transaction price over local government expenditure (DLF2), is designed for robust check and there is no requirement for account adjustment like DLF1. Note that the dependence here is a relative value instead of an absolute value. The greater value means that the public finance in the province is more dependent on land finance than other provinces with small values. It has no meaning in how much its public finance relies on land finance.

B. Explanatory Variables

The explanatory variable in this paper is fiscal decentralization. As aforementioned, the variable, like the expenditure ratio, works well in capturing fiscal decentralization [10]. Therefore, the expenditure ratio will be conducted in the paper. The value of expenditure ratio in each province can be obtained in the means of dividing the annual income of the local government in each province by the annual expenditure of the central government. The expenditure ratio is recorded as fiscal decentralization(fd). Note that the value here is not representing an absolute value but a relative value, by which the province with greater or less fiscal decentralization could be figured out. Generally, the value of each province would be greater if the province is more fiscally independent.

C. Data Source

In the empirical part, the paper includes data from 31 provinces, municipalities or autonomous regions in China. Taiwan Province, Macao region, and Hong Kong region are excluded due to the ‘‘One Nation, Two Systems’’ policy. And the observation period was from 1999 to 2017. The land

transaction price from 1999 to 2004 is obtained from China Land & Resources Almanac while the transaction price from 2005 to 2017 is obtained from China Land & Resources Statistics Yearbook. Revenue and expenditure of the local government in each provincial and central government are referenced from National data from the National Bureau of Statistics and SPS DATA. The results are shown in Table I.

TABLE I: DESCRIPTIVE STATISTICS

Variable	Unit	Obs	Mean	Std. Dev.	Min	Max
Land Transaction Price	10k Yuan	589	6,022,584	9,513,005	504.16	72,903,270
Local Government Income	100m Yuan	589	1,237.36	1,574.55	4.57	11,320.35
Local Government Expenditure	100m Yuan	589	2,201.31	2,246.7	49.53	15,037.48
Central Government Income	100m Yuan	589	36,261.5	25,218.5	5,849.21	81,123.4
Central Government Expenditure	100m Yuan	589	14,392.1	7,927.15	4,152.33	29,857.2
DLF1		589	0.345	0.244	0.004	1.395
DLF2		589	0.207	0.191	0.001	1.305
fd		589	0.128	0.085	0.011	0.504

D. Model Setting

The basic regression model of this paper is a unitary linear regression, individual fixed effect model, which is

$$y = \beta_0 + \beta_1 x + \mu_i + \varepsilon \tag{1}$$

In model (1), y is the explained variable, which could be DLF1 or DLF2, the dependence of the local government on land finance based on individual statistics means. Besides, x is the explanatory variable, which is fd , the fiscal decentralization in terms of governments’ expenditure. Moreover, μ_i is the estimator of regional fixed effect. At the end, ε is the random error term.

IV. RESULTS AND DISCUSSIONS

A. Correlation Analysis

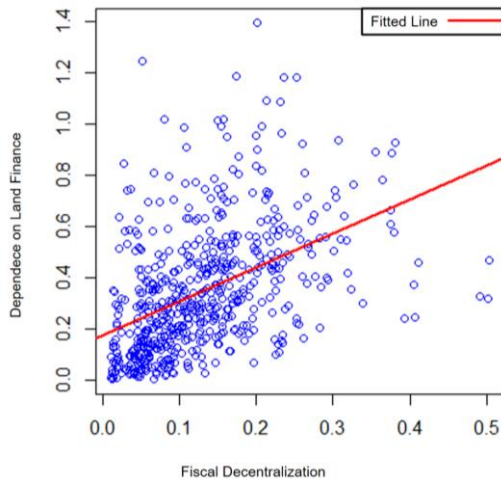


Fig. 1. Correlation between the development on land finance and fiscal decentralization.

Fig. 1 in the following depicts the relationship between the dependence of the local government on land finance and fiscal decentralization between the provincial government and central government. In the graph, DLF is the dependent of local government on land finance and fd means the fiscal decentralization between each provincial government and central government. As shown in the following, there is an increasing trend in the graph, which illustrates that as fiscal

decentralization between the provincial government and central government increases, the dependence on the provincial government will also increase. In the means of regression analysis, the relationship between dependence on land finance and fiscal decentralization can be further confirmed in the paper.

B. Baseline Regression

As shown in Table II., Model (1) illustrates the basic regression result of fiscal decentralization between central government and provincial government, counted in the means of expenditure ratio, affecting the dependence of provincial government on land finance. In particular, the estimated coefficient of explanatory variable of model (1) is 2.232, which is significantly positive at the significance level of 1%. The results of baseline regressions illustrate that the fiscal decentralization between the central government and provincial government promotes a positive impact on the dependence of provincial governments on land finance. These results strongly support the assumption that fiscal decentralization can promote land finance. Model (2) with the replacement of DLF1 to DLF2 are robust check for Model (1), and there is no significant change in the outcome.

TABLE II: REGRESSION RESULTS OF BASELINE

	DLF1	DLF2
	(1)	(2)
fd	2.254***	0.857***
(Std.Error)	(0.128)	(0.089)
Observations	589	589
R2	0.357	0.142

Note: ***, **, and * indicate that the statistical value is significant at the significance level of 1%, 5%, and 10%, and the standard error is in parentheses. The same below.

The transmission mechanism between fiscal decentralization and dependence on land finance can be explained by the motivation of local governments to increase income. After a series of taxing sharing reformations at the end of the last century and at the beginning of this century, China government got into the dilemma that financial power and administrative power haven’t matched each other, which represented that more superior governments had more money while more inferior governments had less money thought they dealt with public benefits more directly [21]. After the

central government has strengthened its financial power, the provincial government will increase its income through investment attraction and land transactions in order to exercise its management power normally. As a key component of industrial development, land transactions will play a significant role in attracting investment. Therefore, the dependence of local governments on land finance will increase due to the motivation to increase their income.

TABLE III: ANALYSIS OF TIME HETEROGENEITY

	DLF1		DLF2	
	(1)	(2)	(3)	(4)
fd	4.053***	0.310	4.391***	0.082
(Std.Error)	(0.462)	(0.264)	(0.569)	(0.153)
Observations	248	341	248	341
R2	0.263	0.004	0.216	0.001

C. Time Heterogeneity Analysis

This paper will take 2007 as the time node, which divide the sample period into two periods to conduct the time heterogeneity analysis. Because after 2007, land transaction fees are required to be conducted in government budgets by the central government [22]. Model (1) in Table III shows the regression results of fiscal decentralization impacting on the dependence on land finance before 2007. The estimated coefficient of the explanatory variable is 4.053, which is significantly positive at the significance level of 1%. Model (2) in Table III reports the regression results of fiscal decentralization affecting the dependence on land finance after 2007(2007 included). The estimated coefficient of the

explanatory variable is 0.310, which is insignificant. The results that the decline of coefficients and their significance show that the policy that land transaction fees should be included in the budget has restrained the promoting effect of fiscal decentralization on the dependence on land finance. Model (3) and Model (4) are models with the replacement of DLF2 with DLF1 and there is no significant change in the conclusion.

D. Regional Heterogeneity Analysis

According to the 2011 classification method of the National Bureau of Statistics, all provinces in China are divided into four regions: eastern, northeastern, central, and western region². The regional heterogeneity analysis will be conducted based on the classification method. There was a significant difference in the dependence on land finance for the eastern, northeastern, central, and western regions when fiscal decentralization was examined in models (1), (2), (3), and (4) in Table IV. The estimated coefficients of each region are respectively 1.884, 3.678, 2.752, and 2.173, all of which are significantly positive at the significance level of 1%. The difference in coefficients could be explained by the diversity of local economic development levels. A good economy means adequate taxation, and the enthusiasm of local governments for land finance will also decline. The Theil index of economic development calculated based on regional differences and intra-regional differences is as follows: eastern region, western region, northeast region and central region [23]. The order of coefficient value also basically conforms to this order.

TABLE IV: ANALYSIS OF REGIONAL HETEROGENEITY

	DLF1			
	(1)	(2)	(3)	(4)
fd	1.884***	3.678***	2.752***	2.173***
(Std.Error)	(0.219)	(0.510)	(0.221)	(0.233)
Observations	190	57	114	228
R2	0.292	0.495	0.591	0.289

V. CONCLUSIONS

Based on the above empirical results, the paper confirms that the fiscal decentralization between central government and provincial governments in China has a positive relationship with the dependence of the provincial government on land finance. The central government According to the time heterogeneity analysis, since land transaction fees taking into the budget in 2006, the impact of fiscal decentralization between central and provincial governments obviously has declined. According to the regional heterogeneity analysis, the impact of fiscal decentralization on the dependence on land finance matched with the regional economic development level. In particular, in well-developed regions, fiscal decentralization has less impact on the dependence on land finance and vice versa. Based on the time heterogeneity and regional heterogeneity of fiscal decentralization's dependence on land finance as

described above, it is reasonable to believe that the expansion of financial rights of local governments, comparing to the central government, is positively related to the promotion of land transfer in the local area.

The shortcomings of this paper are as follows. First, although the research hypothesis is broader than Ping Xinqiao's model, the linear relationship between the land transaction price and the government's income from the land transaction still needs to be proved when selecting the explanatory variables. Second, fiscal decentralization between the central government and provincial government can represent the relative financial pressure between different cities while its financial pressure cannot be well measured for a single city. Therefore, insufficient persuasiveness is evident in the explanation of why income should increase.

² Note: The eastern region consists of 10 provinces, including Beijing, Hebei, Tianjin, Shandong, Shanghai, Jiangsu, Zhejiang, Guangdong, Hainan and Fujian. The northeast region consists of 3 provinces, including Heilongjiang, Jilin and Liaoning. The central region consists of 7 provinces, including Inner Mongolia Autonomous Region, Shanxi, Henan, Anhui, Jiangxi, Hubei and Hunan provinces. The western region consists of 11

provinces, including Xinjiang Uygur Autonomous Region, Tibet Autonomous Region, Gansu Province, Qinghai Province, Sichuan Province, Yunnan Province, Guangxi Zhuang Autonomous Region, Ningxia Hui Autonomous Region, Guizhou Province, Chongqing Municipality and Shaanxi Province.

CONFLICT OF INTEREST

The author declares no conflict of interest.

AUTHOR CONTRIBUTIONS

Chuanzhi Huo collected the data, coded the program and wrote the paper.

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