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Study on the Substitution Effect of Property Tax on Land Finance—Analysis based on Shanghai and Chongqing Reform Pilots

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Abstract: ***This paper aims to study the substitution effect of property tax on land finance through the pilot property tax reform implemented in Shanghai and Chongqing. Based on the theoretical foundation of analysing the impact of property tax on land finance, this paper selects the annual panel data of 35 large and medium-sized cities published by the National Bureau of Statistics (NBS) from 2006 to 2017, and analyses the impact of the pilot property tax reform on the dependence on land finance in Chongqing and Shanghai and its extent. The findings show that the pilot effect of property tax reform in Shanghai is consistent with theoretical expectations, while the opposite is true for Chongqing; under a reasonable property tax system, the substitution effect of property tax reform on land finance gradually increases over time. In the conclusion, the paper puts forward relevant suggestions.***

Keywords: Property tax, Land finance dependence, Substitution effect, Synthetic control method**.**

1. Introduction

With the acceleration of urbanisation and the development of industrialisation, the demand of local governments for infrastructure construction and public services has been increasing, and the current fiscal system can no longer meet the needs of local finance. In the current fiscal and taxation system, the dependence of local governments on land finance has become a problem that needs to be solved urgently. After the reform of the tax division system in 1994, the local fiscal revenues were greatly reduced. In 1993, local revenues accounted for 78 per cent of the national total, but in 1994, the proportion dropped to 44.3 per cent. In the years since then, the proportion has fluctuated around 50 per cent. The plummeting revenues have forced local governments to find alternative sources of finance, one of which is land transfer revenues. At the same time, economic growth has fuelled a property bubble that has pushed up land prices, giving local governments, already strapped for cash, even more reason to rely on land finance to raise revenue. For a long time in the past, land transfer revenues have had a high share of local government revenues and peaked around 2018. In the short term, land finance has provided local governments with substantial financial support and facilitated rapid socio-economic development. However, in the long term, limited land resources, climbing financial risks and the bursting of the real estate bubble have made land finance unsustainable. Especially in recent years, land finance revenues have been on the decline. Reducing the dependence of local governments on land finance and improving the local financial situation has become a top priority in the reform of China's fiscal and taxation system.

Property tax is a kind of property tax levied on property owners based on the taxable residual value or rental income of the house as the object of taxation. As an old tax widely levied by governments of Chinese and foreign countries, property tax has the feature of obtaining stable and sufficient tax revenue. At present, China's property tax is mainly levied on business houses in cities and towns, and there is still a lack of relevant laws on individual houses. On the basis of the original property tax system, China's government has focused on promoting property tax reform, aiming to regulate the real estate market by means of taxation, increase the tax revenues of the local government, and reduce the dependence on land grant revenues. On 27 January 2011, Shanghai and Chongqing issued the Interim Measures for the Pilot Project of the Shanghai Municipality to Conduct the Collection of Property Taxes on Part of the Individual Houses, and the Interim Measures of Chongqing Municipality on the Reform of the Collection of Property Taxes on Part of the Individual Houses respectively. Individual Household Property Tax Reform Pilot Measures', the pilot property tax reform officially started.2021 On 23 October 2021, the 31st Meeting of the Standing Committee of the 13th National People's Congress adopted the "Decision of the Standing Committee of the National People's Congress on Authorising the State Council to Carry Out Pilot Work on Reforming the Property Tax in Particular Areas". 2023 On 4 January 2023, the Shanghai Municipal People's Government issued a report on the extension of the Notice on the Extension of the Effective Period of the Interim Measures of Shanghai Municipality for Carrying Out the Pilot Property Tax Levy on Part of Individual Housing. 2024 On 21 January 2024, the Interim Measures of Chongqing Municipality on Carrying Out the Pilot Reform of the Property Tax Levy on Part of Individual Housing was amended by Chongqing Municipal People's Government Decree No. 367 and issued for implementation. Despite the high priority attached by the state, the effectiveness of property tax reform implementation in Chongqing and Shanghai has been controversial. Although the property tax reform has played a role over the years, there is still a gap between the desired effect and what was expected.

Local governments' long-term reliance on land-based finance is now unsustainable, and the solution to this problem is to reduce expenditure on the one hand and increase revenue on the other. Property tax, as an important means to increase local government revenue, has huge potential. Today, the pilot property tax reforms in Shanghai and Chongqing have been in place for more than a decade. Does the property tax

reform have a substitution effect on land finance in Shanghai and Chongqing? If so, what is the degree of substitution? All these questions deserve deeper investigation.

2. Literature Review

In recent years, the local land finance model that relies on land use right concession revenues has attracted extensive attention in the academic community. Regarding the main cause of the dependence on land finance, academics generally believe that the tax distribution after the 1994 tax system reform is obviously inclined to the central tax structure. For example, Luo Biliang (2010) points out that the local financial pressure triggered by the 'upward transfer of financial power' and 'retention of administrative power' of the 1994 tax system has induced the government's preference for 'land finance'. Tang Yunfeng and Ma Chunhua Tang Yunfeng and Ma Chunhua (2017) argue that local governments have incentives to increase land transfer prices in order to alleviate fiscal pressures and increase land finance revenues in order to obtain high real estate-related revenues.

The mainstream view of the academic community is that property tax, an ancient tax widely levied in Western countries, has the function of increasing fiscal revenue. Chen Ping, Li Jianying and Zhuang Hailing (2018) argue that property tax can make up for the shortfall in the general budget of local finance, while generating a positive economic and social effect, creating conditions for local governments to cultivate tax sources and guarantee sustainable growth in local fiscal revenues. Jin Haiyan and Li Pei (2023) point out that the general introduction of property tax can provide local governments with stable financial revenue, help improve the supply of local basic public services and promote the equalisation of basic public services. Meanwhile, some scholars suggest that property tax itself is a kind of tax suitable for local governments to collect. For example, Guo Weizhen (2021) argues that taxes with local tax sources, typically represented by real estate, are the main local taxes that meet expectations.

Academics have put forward the idea of introducing property tax to solve the dependence on land finance. A number of scholars believe that property tax has alternative possibilities for land finance. Xu Pengjie and Wu Shusheng (2020) have empirically demonstrated that the pilot property tax reforms in Shanghai and Chongqing have led to a downward trend in local land finance dependence. Some scholars suggest that property tax has the potential to become the main tax of local governments. For example, Liu Huihong and Fan Dingxiang (2016) argue that the rational formulation of the property tax programme can make real estate tax become the main local tax and alleviate the dependence on land finance. Some scholars also believe that the introduction of property tax will adjust housing prices, thus reducing the dependence on land finance. For example, Chai Guojun and Wang Xiyan (2017) point out that the introduction of property tax has a negative impact on the average price of land and land premiums, and has a certain crowding out effect on the dependence on land finance.

In 2011, Shanghai and Chongqing began a pilot property tax collection. A number of scholars have raised some criticisms on the implementation effect of the pilot property tax. For example, Chen Xiaoan (2011) points out that the current property tax burden is too low, and unless the tax burden is increased, it is difficult for the property tax to become the main tax of local fiscal revenue. Bai Yanfeng (2012) argues that high assessment costs and tax costs have hindered the advancement of the new property tax reform. Pang Fengxi (2021) argues that the role of property tax in raising government revenue, promoting social equity and regulating economic behaviour is far from being fulfilled, and property tax reform should be accelerated.

Generally speaking, there has been a gradual increase in the number of relevant studies on property tax and land finance in recent years, but there are still some shortcomings in the existing studies: firstly, there are still fewer studies on the impact of property tax on the land finance of the local government; secondly, there are more analyses of property tax from the perspective of jurisprudence, and comparatively fewer analyses in conjunction with economics; and thirdly, very few scholars have examined the possibility of substitution of property tax for land finance. On the basis of the above literature, this paper explores the substitution effect of property tax on local government land finance and the mechanism of its influence.

3. Theoretical basis and Experimental Design of the Substitution Effect of Property Tax on Land Finance

3.1 Theoretical Basis of the Substitution Effect of Property Tax on Land Finance

3.1.1 Direct substitution of property tax on land finance

According to the principle of revenue stability, property tax has the characteristic of long-term stability. Property tax is a tax on the holding of real estate, and unlike the one-time land premium, property tax is a continuous revenue. Regardless of the fluctuations in the property market, property tax can provide a stable source of revenue for local governments. With the improvement of the property tax system and the advancement of urbanisation, the tax base of property tax will gradually expand, which means that even without adjusting the tax rate, the revenue from property tax will increase, further safeguarding the financial stability of the local government and reducing its dependence on land finance.

According to the principle of beneficence, property tax is actually a consideration charged by the government to property owners for acquiring public goods and public services. Since the tax base of property tax is the value of property, and house prices are generally higher in areas with higher levels of access to public goods and services, the government receives tax revenues that are commensurate with quality public goods and services. In turn, property tax revenues are used for local infrastructure development, public safety, education, and other public services that are closely related to property values. Improvements in public services make property holders the direct beneficiaries of these services, creating a virtuous circle. Thus, by levying property taxes, the fiscal pressure on local governments to provide public goods and services can be eased, thereby reducing the

tendency to rely on land finance to fill fiscal gaps.

3.1.2 Indirect substitution of land finance by property tax

Property tax can indirectly reduce local governments' dependence on land finance by affecting property prices. Property tax increases the cost of holding property, especially multiple properties. This increase in cost reduces the attractiveness of speculative home purchases and reduces the use of real estate for speculation. With the reduction of speculative demand, the demand structure of the property market tends to be rationalised, the phenomenon of overheating in the market is mitigated, and property prices tend to stabilise or decline. The stabilisation or decline in property prices reduces the incentives for local governments to obtain more land premiums by pushing up property prices, thus weakening their reliance on land finance. In addition, the introduction of property tax will also change market participants' expectations of house prices. Market expectations of limited room for house price increases will reduce speculative behaviour and blind investment, thus making market participants behave more rationally. Local governments will also gradually adjust their reliance on land grant revenue and seek a more stable source of fiscal revenue.

Property tax can indirectly reduce the local government's reliance on land finance by influencing corporate investment. Due to the overheating of real estate, a large amount of capital has been attracted to the real estate market, resulting in the lack of necessary capital support for other industries such as manufacturing and high-tech services, and the development potential has been greatly restricted. Property tax can reduce the enthusiasm for real estate investment by increasing the cost of real estate holding. This change in the investment environment prompts enterprises to invest more capital in other industries such as manufacturing, high-end services and high-tech industries. At the same time, property tax revenue can be used to improve local infrastructure and public services, and quality infrastructure and public services will attract more quality enterprises to invest in the region. Diversified investments optimise the local economic structure, drive economic development, and bring more sustainable and stable fiscal revenues, thus reducing the local government's reliance on land grant revenues.

Property tax can indirectly reduce the local government's dependence on land finance by influencing the allocation of land resources. Land concessions bring in instant and large amounts of fiscal revenue, which leads local governments to favour large amounts of land concessions for real estate development in order to obtain funds. This inefficient use of land wastes valuable land resources and brings about problems of irrational urban layout and a rapid increase in the burden of infrastructure and public services. Property tax can raise the cost of holding property and encourage market players to use land resources more prudently. Property tax can avoid the inefficient use of land resources, improve the efficiency of land resources, and reduce the mismatch of resources such as the dependence on land finance.

3.2 Research Design of the Substitution Effect of Property Tax on Land Finance

3.2.1 Method selection

The mainstream methods currently used to assess the policy effect are double difference method and synthetic control method, which assess the effect of policy implementation by comparing the differences between multiple treatment and control groups before and after the policy. However, the double-difference method usually assumes that there are multiple treatment and control groups, whereas in this paper, there are fewer treatment groups (only Shanghai and Chongqing are the pilot cities for property tax reform) and more control groups. Therefore, this paper needs to adopt a model that can accurately assess the causal effects of policy interventions while dealing with a small number of treatment groups and multiple control groups. In this regard, this paper proposes an empirical study using the synthetic control method proposed by Abadie et al. (2003). Synthetic control methods are widely used to assess the impact of policy interventions on large individuals, such as cities, regions or countries, by weighting the control group and fitting a 'counterfactual' reference group, the 'synthetic control group', to the treatment group in the absence of the policy intervention. Assessing the effect of an intervention (e.g., policy change, treatment, or event) on an outcome variable.

Synthetic control methods provide a more accurate measure of policy effects than traditional double-difference methods by constructing a 'synthetic control group' with similar characteristics to the treatment group before the policy was implemented. At the same time, the double-difference method may not be able to effectively control for economic and demographic heterogeneity across Chinese cities. The synthetic control method can better control the heterogeneity among cities by selecting appropriate control units from multiple control groups that have not been subjected to policy interventions and assigning appropriate weights to each control unit to construct a synthetic control group, so that their weighted combinations can well replicate the characteristics of the treatment group. In addition, the synthetic control method can also graphically demonstrate the differences before and after the policy, thus showing more intuitively the impact of the property tax reform on the land finance situation in Shanghai and Chongqing.

In the context of the pilot property tax reform in Shanghai and Chongqing, it is assumed that (J+1) districts can be collected. Where J=1 (pilot cities, i.e. Shanghai and Chongqing) in for the policy implementation of the treatment group, the remaining J cities (for the pilot cities) as the control group.T_0 for the start of the property tax reform pilot.Y_{it}^S is the land finance dependence of pilot cities that have not implemented property tax reform.Y_{it} refers to the land finance dependence of the pilot cities implementing property tax (i.e. Shanghai and Chongqing). α_{it} ($\alpha_{it} = Y_{it} - Y_{it}^S$) is the policy effect, indicating the impact of the pilot property tax reform on land finance dependence. Since the degree of land finance dependence in Shanghai and Chongqing without the pilot property tax reform is not observable, a synthetic control method is used to construct the 'synthetic control' variable Y_{it}^S:

$$Y_{it}^S=\delta_t+\theta_t Z_i+ \lambda_t\mu_i+\varepsilon_{it} \quad (1)$$

δ_t is a time fixed effect;θ_t is a (1×F)-dimensional unknown parameter, Z_i is a (F×1)−dimensional observable control

variable for cities unaffected by property tax reform, is a (1×N)−dimensional unobservable common factor, is a (N×1)-dimensional vector of coefficients, and is an unobservable error term.

To obtain Y_{it}^{S}, a (J+1)−dimensional weight vector $W^{*}=(w_1\ldots, w_{j+1})$ needs to be derived to weight the control group cities to simulate the characteristics of the treatment group. This vector W satisfies $w_m \geq 0$, m=2, …, J+1, and $w_2+\ldots+w_{J+1}=1$. The outcome variable for the synthetic control is denoted as:

$$\sum_{m=2}^{J+1} w_m Y_{mt} = \delta_t + \theta_t \sum_{m=2}^{J+1} w_m Z_m + \lambda_t \sum_{m=2}^{J+1} w_m \mu_m + \sum_{m=2}^{J+1} w_m \varepsilon_{mt} \quad (2)$$

Assume that there exists a vector $(w_2^{*}\ldots, w_{J+1}^{*})$:

$$\sum_{m=2}^{J+1} w_m^{*} Y_{m1} = Y_{11}, \ \sum_{m=2}^{J+1} w_m^{*} Y_{m2} = Y_{12}, \ldots, \sum_{m=2}^{J+1} w_m^{*} Y_{mT_0} = Y_{1T_0}, \sum_{m=2}^{J+1} w_m^{*} Z_m = Z_1 \quad (3)$$

Assuming that is a non-singular matrix, the following equation holds:

$$Y_{1t}^{S} - \sum_{m=2}^{J+1} w_m^{*} Y_{mt} = \sum_{m=2}^{J+1} w_m^{*} \sum_{s=1}^{T_0} \lambda_t \left(\sum_{i=0}^{T_0} \lambda_i \lambda_i^{'} \right)^{-1} \lambda_s^{'} (\varepsilon_{ms} - \varepsilon_{1s}) - \sum_{m=1}^{J+1} w_m^{*} (\varepsilon_{mt} - \varepsilon_{1t}) \quad (4)$$

According to the proof of Abadie et al. (2010), equation (4) tends to zero if the pre-policy time period is long relative to the time horizon of the pilot. Thus, $\sum_{m=2}^{J+1} w_m^{*} Y_{mt}$ can be used as an unbiased estimate of to obtain an estimate of the policy effect:

$$\hat{\alpha} = Y_{1t} - \sum_{m=2}^{J+1} w_m^{*} Y_{mt} \quad (5)$$

3.2.2 Data sources and variable selection

This paper selects annual panel data of 35 large and medium-sized cities published by the National Bureau of Statistics (NBS) from 2006-2017 to analyse the impact of the pilot property tax reform on land finance dependence in Chongqing and Shanghai. The data come from China Land and Resources Statistical Yearbook, China Urban Statistical Yearbook, and CEIC data. As the Ministry of Land and Resources (MLR), the agency responsible for statistics on land finance revenue data, underwent a departmental reorganisation in 2018, and its statistical yearbook China Land and Resources Statistical Yearbook ceased to be changed, there is a possibility that the coherence of the subsequent statistics on land finance revenue will be impaired due to changes in statistical calibre and methodology. At the same time, the pilot property tax reform has been implemented for many years until 2017, and to a certain extent, it has been able to reflect the impact of the property tax reform on the land finance of Shanghai and Chongqing. Therefore, this paper selects the data of six years before and after the property tax reform pilot, takes Shanghai and Chongqing as the treatment group, and the rest of the cities as the reference group, and conducts the synthetic control method analysis.

The purpose of this paper is to analyse the substitution effect of property tax collection on land finance dependence with the help of the pilot property tax reform implemented in Shanghai and Chongqing. Therefore, this paper selects land finance dependence (LFD) as the outcome variable. Meanwhile, this paper draws on the existing literature on land finance dependence and selects urbanisation level (UL), fiscal decentralisation (FD), per capita land area (PCLA), and level of economic development (GDP) as the important factor variables affecting land finance dependence as the predictor variables, and excludes the influence of price factors on the variables. Specific descriptions about the variables are as follows:

Land Fiscal Dependence (LFD): drawing on the study of Mou Yan et al. (2018), this paper adopts the ratio of the land premium to the local government's general budget revenue to express.

Urbanisation level (UL): expressed as the ratio of year-end population to total population of each city. As urbanisation accelerates, the demand for land increases, and the fiscal revenues received by local governments through land concessions also increase.

Fiscal Decentralisation (FD): expressed as the ratio of general budget revenue to general budget expenditure of each city government. In areas with a lower degree of fiscal decentralisation, local governments may rely more on land grant revenues to cover their fiscal gap.

Per capita land area (PCLA): expressed as the ratio of land area to population in each city municipal district. The larger the per capita land area, the more land resources the local government has available for concession.

Economic Development Level (GDP): expressed using the per capita GDP of each city. Economically developed areas usually have higher land value and demand, and local governments can obtain more fiscal revenue through land concessions.

4. Empirical Test of the Substitution Effect of Property Tax on Land Finance

4.1 Synthetic Control Method Analysis

In order to explore in depth the impact of the property tax pilot on land finance dependence in Chongqing and Shanghai, this paper establishes corresponding synthetic control cities for Shanghai and Chongqing, and adopts the variables of GDP per capita, urbanisation level, fiscal decentralisation, land area per capita, and the observed values of land finance dependence from 2006 to 2017 as the predictor variables to fit the synthetic control cities. The higher the fitted weights for the control group cities, the more similar the characteristics of the city are to those of the pilot cities, and the opposite means that the characteristics of the city are more different from those of the pilot cities. The cities with higher synthetic weights for Shanghai are Beijing (0.282), Shenzhen (0.196), Xining (0.193), Nanjing (0.164) and Guangzhou (0.164); and the cities with higher synthetic weights for Chongqing are Nanning (0.369), Xi'an (0.329), Harbin (0.196) and Hohhot (0.105).

Figure 1 portrays the land finance dependence of Shanghai and its corresponding synthetic control city, synthetic

Shanghai, from 2006 to 2017. At the left end of the vertical dashed line, actual Shanghai and synthetic Shanghai are more overlapping and the fit is high. This suggests that the difference in land finance dependence between actual Shanghai and synthetic Shanghai before the property tax pilot began is similarly small. At the right end of the vertical dashed line, actual Shanghai and synthetic Shanghai begin to deviate, and the degree of deviation is getting higher and higher. The value of actual Shanghai is lower than that of synthetic Shanghai, and the difference between the two illustrates the policy effect of the property tax reform. This means that the post-2011 property tax reform policy has a reducing effect on Shanghai's land finance dependence, and this effect becomes more and more significant over time.

The land finance dependence of Chongqing and the corresponding synthetic control city, synthetic Chongqing, between 2006 and 2017 is shown in Figure 2, where the vertical dotted line represents the year 2011 when the property tax pilot reform was implemented. On the left side of the dotted line, the actual Chongqing is closer to the synthetic Chongqing, with a smaller degree of difference, which indicates that the synthetic control method is a better fit for the synthetic Chongqing. On the right side of the dotted line, actual Chongqing begins to deviate from synthetic Chongqing, with actual Chongqing being more land-finance dependent than synthetic Chongqing except for 2016. The difference between actual Chongqing and synthetic Chongqing reflects the policy effect of the property tax reform pilot. This suggests that the implementation of property tax reform does not reduce Chongqing's dependence on land finance, but rather promotes it, compared to the hypothetical Chongqing without the pilot property tax reform.

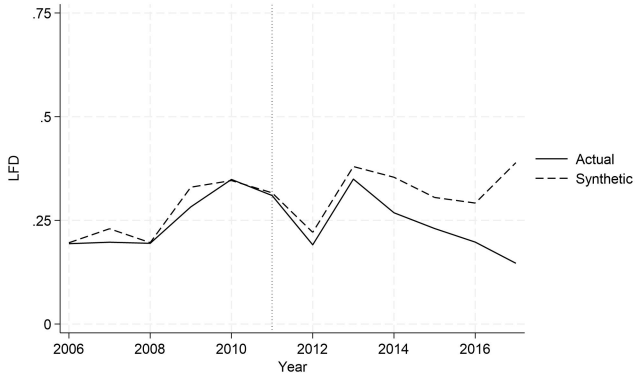

Figure 1: Land finance dependence of actual Shanghai and synthetic Shanghai

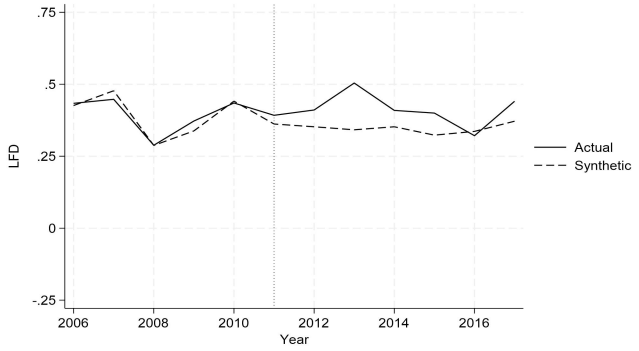

Figure 2: Land Fiscal Dependence in Actual Chongqing and Synthetic Chongqing

4.2 Robustness Tests

In order to rule out the possibility of differences in the results of the empirical analyses due to differences in the control group, this paper uses the LOO (Leave One Out) method to conduct a robustness test to examine whether the effect of property tax reform on land finance dependence is affected by the weights of the synthetic control group. The method iteratively removes control areas with positive synthetic weights and tests whether the policy effects analysed by the synthetic control method after removing one city would be different due to the absence of one city, i.e., the predictions of the synthetic control method are not driven by the data of a particular city. The results of the robustness test are shown in Figures 3 and 4. After removing a control area with positive weights, the prediction results still fluctuate around the actual results, which indicates that the results of the empirical analysis are very robust.

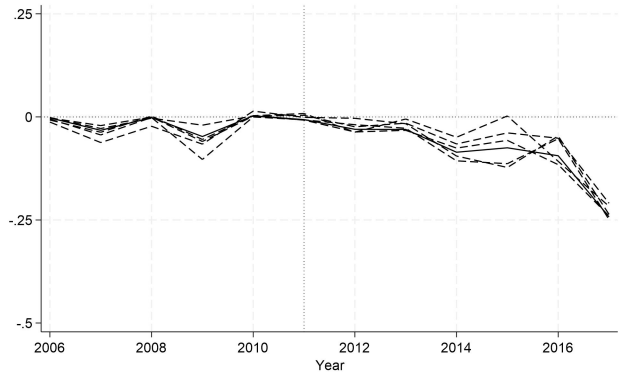

Figure 3: Robustness test of Shanghai synthetic control method

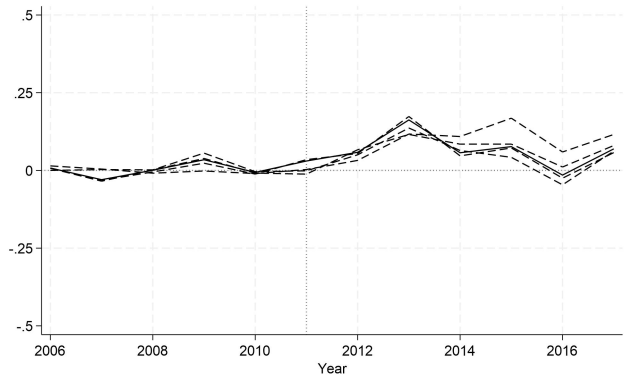

Figure 4: Robustness test of synthetic control method in Chongqing city

4.3 Placebo Test

As shown by the empirical results, there is a significant difference between the actual land finance dependence and the synthetic land finance dependence in Shanghai and Chongqing. In order to exclude the possibility that such a difference is caused by chance events other than the property tax reform pilot policy, this paper adopts the placebo test to verify the validity of the policy effect. Assuming that the property tax reform pilot was carried out in 2009 before the implementation of the policy, the year 2009 is selected as the virtual point in time. If the model shows a significant effect at the virtual point in time, this indicates that there may be problems with the synthetic control model, and that the effects of other factors, such as time trends and external shocks, on

the results cannot be ruled out. Conversely, if there is no significant effect, this indicates that the model is robust to causal inference. Accordingly, this paper obtains the actual and synthetic land finance dependence curves of Shanghai and Chongqing by synthetic control method. According to Figure 5, the synthetic path of land finance dependence in Shanghai is first slightly lower than the actual path, and then slightly increases. According to Figure 6, the synthetic path of land finance dependence in Chongqing is first slightly higher than the actual path and then slightly decreases. Both in Shanghai and Chongqing, the synthetic and actual curves tend to overlap, with smaller policy effects. This shows that the model does not show a significant effect at the virtual treatment time point. This suggests that the original causal inference may not have been misled by time trends or other external factors, and that the policy effects obtained in the previous section are not occasional factors.

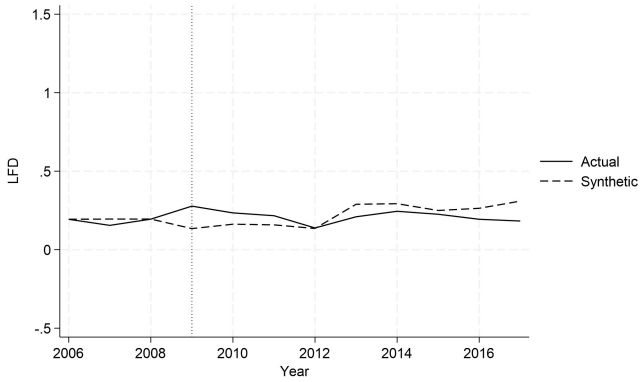

Figure 5: Placebo test for the Shanghai synthetic control method

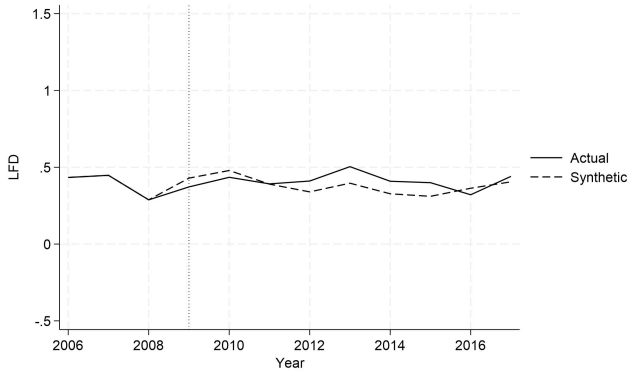

Figure 6: Synthetic control method placebo test in Chongqing

4.4 Analysis of Empirical Test Results

The empirical results show that the property tax reform has different impacts on land finance dependence in Shanghai and Chongqing. Figure 1 illustrates the land fiscal dependence of Shanghai and the synthetic control city (synthetic Shanghai) from 2006 to 2017. Before the property tax pilot in 2011, the fit between actual Shanghai and synthetic Shanghai is better and the difference is small, suggesting that the trend of fiscal dependence is similar in both cases. After the implementation of the property tax pilot, actual Shanghai and synthetic Shanghai begin to show significant deviation, and the degree of deviation gradually increases, and the land fiscal dependence of actual Shanghai is lower than that of synthetic Shanghai, which suggests that the property tax reform reduces Shanghai's land fiscal dependence, and this effect becomes more and more significant over time. Figure 2 shows the fiscal dependence of Chongqing and synthetic Chongqing in the same time period. Before the property tax pilot, the fit is high and the difference is small, proving that the synthetic control method is a good match for Chongqing. However, after the implementation of the property tax, the dependence of actual Chongqing and synthetic Chongqing started to deviate, and except for 2016, the dependence of actual Chongqing has been higher than that of synthetic Chongqing. This suggests that the property tax reform did not reduce Chongqing's dependence on land finance, but rather served to increase it to some extent.

Why has Chongqing's dependence on land finance diverged from the original policy intent compared to Shanghai? The main reason may be the specific policy differences between Shanghai and Chongqing regarding property tax. Shanghai mainly levies tax on newly purchased housing units of two or more units, and its tax targets are the second or more housing units purchased by the city's resident households after the implementation of the pilot policy, as well as newly purchased housing units in Shanghai by non-city resident households. For non-residents, regardless of whether they are buying their first home or multiple homes, they are all within the scope of the property tax. At the same time, Shanghai offers a property tax exemption for new homes with a per capita area of less than 60 square metres for families of city residents, and for new purchases of the only home needed for children's marriages. The scope of Shanghai's property tax is new housing rather than stock, and this policy design shows that the purpose of Shanghai's property tax is to comprehensively reduce the demand for investment property within the whole society. In contrast, Chongqing's property tax is mainly targeted at high-grade housing and single-family residential property, including single-family residential property, residential property priced at more than two times the price of new residential property in the main urban area, and the second or more ordinary residential property purchased by non-family residents who are not investing in Chongqing or working in the city. This policy is designed to be more targeted at high-income groups, with the nature of a 'punitive' tax, and is aimed at regulating the structure of the real estate market and curbing the overdevelopment of the high-end housing market. This difference has led high-income people in Chongqing to divert the funds they would have used to buy high-end housing for their own use to invest in ordinary housing that is not covered by the property tax, which in turn has pushed up the demand for investment property, increased the degree of resource mismatch, and raised the government's expectation of relying on land to generate revenues.

5. Conclusions and Recommendations

5.1 Main Findings

The purpose of this paper is to study the impact of property tax on land finance dependence, in order to do so, this paper carries out a theoretical analysis of the impact of property tax on land finance dependence, and takes the property tax reform pilot in Shanghai and Chongqing starting from 2011 as a quasi-natural experiment, and adopts the synthetic control method to study the substitution effect of the property tax reform pilot on land finance dependence. Based on the above

theoretical analyses and empirical tests, this paper obtains the following conclusions:

Property tax has a substitution effect on land finance to a certain extent, and the empirical analyses of Shanghai better verify this theory. Meanwhile, the empirical analysis finds that the degree of substitution of land finance by the pilot property tax reform in Shanghai gradually increases with time. In the long run, through the property tax reform, property tax is expected to gradually replace land finance and become an important source of revenue for local governments.

However, during the concrete implementation of the property tax policy, the effect of the policy has been biased. There are differences in the substitution effect under different conditions of property tax implementation rules, and an inappropriate property tax system does not have a substitution effect on land finance. The implementation of the pilot property tax reform in Chongqing confirms this view, according to the empirical analysis, the property tax reform has increased the degree of dependence on land finance in Chongqing, and failed to replace the land finance in Chongqing.

The reason for the difference between the pilot property tax reforms in Shanghai and Chongqing may be the difference between the property tax reform policies in Shanghai and Chongqing. Shanghai's property tax reform policy focuses on controlling the investment property market as a whole to reduce speculation, while Chongqing's property tax policy focuses on changing the structure of the property market to control the consumption of high-end properties. The Chongqing model does not effectively target the investment property market, resulting in the flow of funds that would otherwise be used to purchase high-end properties to the speculative property market, increasing the degree of resource mismatch and the government's reliance on land finance.

5.2 Policy Recommendations

5.2.1 Policy design for property speculation

In Chongqing Municipality, for example, property tax reform has failed to effectively curb speculative property investment due to the lack of targeting of speculative property investment, and a large amount of money has poured into the property speculation market. In this regard, the property tax reform should strengthen the precision of the fight against speculative property purchases. Property tax can start from the optimisation of the tax rate, the taxpayers who hold more than one set of housing to implement progressive tax rates, the more property held the higher the tax burden. By targeting real estate speculation, property tax increases the holding costs of speculators, suppresses overheated real estate investment enthusiasm, promotes the rational allocation of resources, facilitates the healthy development of the economy, and reduces the tendency of local governments to rely on land finance.

5.2.2 Tailoring property tax policies to local conditions

The level of economic development and real estate market conditions vary greatly from city to city in China, and a reasonable property tax policy should be formulated in accordance with the characteristics of each city and according to local conditions. For first-tier cities such as Beijing and Shanghai, where the property market is overheated, a higher tax rate should be designed to combat property speculation; for second- and third-tier cities where the property market is not hot, the property tax rate should not be too high, and a lower tax rate can be adopted to avoid an excessive impact on the local property market while obtaining tax revenue. By designing property tax according to local conditions, the policy can be better adapted to the actual situation of different cities, enhance the fairness and acceptability of the policy, and promote the sustainable development of the real estate market and local finance.

5.2.3 Expanding the scope of taxation

The current property tax reform has the problem of insufficient taxing scope, and the taxing scope of property tax should be expanded in a gradual and orderly manner. For example, Chongqing's property tax policy should not only be limited to newly purchased high-class residential units and single-family houses, but also gradually levied on newly purchased multi-unit ordinary houses and even the stock of multi-unit houses. By expanding the scope of property tax, local governments can obtain sufficient and stable tax revenues through property tax and improve the local financial situation while reducing the dependence on land finance.

5.2.4. Enrichment of tax incentives

The current property tax is mainly targeted at the middle- and high-income groups, but after expanding the scope of property tax to the stock of houses, the tax burden of the middle- and low-income groups will become a problem. The design of property tax should take into account the interests of the middle-income group, and differentiated tax incentives should be applied to families with different income levels and different types of properties. For the only housing of low- and middle-income families, the property tax should give clear tax incentives to ensure that the property tax does not increase the burden of their residence, so as to maintain social equity.

5.2.5 Optimising Collection Management

At present, China's real estate registration system is still not sound enough, which makes it difficult to accurately count the tax base of property tax. At the same time, there is a shortage of resources for local tax authorities to collect property tax, which is a huge local tax. All these phenomena may lead to the loss of tax money. In this regard, the government should speed up the establishment and improvement of a unified national real estate registration system to ensure the full transparency of property information and provide reliable basic data for the accurate collection of property tax. An information-sharing platform should be established to ensure that all departments can collaborate effectively to reduce tax loss. At the same time, the tax authorities should strengthen the capacity of property tax collection and management by introducing modern collection and management technology on the one hand, and setting up special property tax collection and management departments and providing professional training for tax collectors on the other.

References

[1] Luo Biliang. Tax System, Fiscal Pressure and Government's Preference for Land Finance[J]. Academic Research, 2010, (10): 27-35.

[2] Tang Yunfeng, Ma Chunhua. Fiscal pressure, land finance and 'house price ratchet effect'[J]. Finance and Trade Economics, 2017, 38(11): 39-54+161.

[3] Chen P, Li JY, Zhuang HL. Forecasting the Impact of Real Estate Tax Reform on Local Fiscal Revenues - Simulation Measurement Based on Guangzhou City Data[J]. Tax Research, 2018, (09): 52-56.

[4] JIN Haiyan, LI Pei. Research on the Impact of Property Tax on Basic Public Services-Empirical Evidence from Shanghai and Chongqing[J]. Financial Studies, 2023, 49(09): 64-78.

[5] GUO Weizhen, SHANG Yihui. The Establishment of Local Main Tax: Reflection and Path[J]. Taxation Research, 2021(10): 26-30.

[6] Xu Pengjie, Wu Shusheng. Can property tax alleviate land finance dependence? --An empirical analysis based on synthetic control method[J]. Economic Jingwei, 2020, 37(02): 169-176.

[7] Liu Huihong, Fan Dingxiang. Land finance dependence, property tax substitution and model selection[J]. Economic Jingwei, 2016, 33(06): 131-136.

[8] CHAI Guojun, WANG Xiyan. Can property tax reduce house prices and replace land finance? [J]. Journal of Hebei University of Economics and Trade, 2017, 38(06): 55-62.

[9] Chen Xiao-an. The Function, Role and Institutional Design Framework of Property Tax [J]. Tax Research, 2011, (04): 30-35.

[10] Bai Yanfeng. Can property tax become a reliable source of local revenue in China[J]. Economic Theory and Economic Management, 2012, (05): 57-64.

[11] Pang Fengxi, Wang Yihuan. Measurement of Modernity of Modern Tax System and Analysis of Path of Promotion[J]. Taxation Research, 2021(06): 31-38.

[12] Abadie, A.; Diamond, A.; Hainmueller, A.J.. Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program[J]. Journal of the American Statistical Association, 2010, Vol. 105(490): 493-505.

[13] Mou Yan, Qian Zhonghao. Does local government land finance dependence necessarily push up the level of city-level land marketisation? --A test based on Chinese provincial panel data from 2003-2015[J]. China Land Science, 2018, 32(10): 8-13+35.