

The Impact Mechanism of Land Finance on Real Estate Prices: An Empirical Analysis Based on Panel Data from 13 Prefecture-Level Cities in Jiangsu Province

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Abstract: This study, utilizing panel data from 13 prefecture-level cities in Jiangsu Province, China, spanning from 2010 to 2020, investigates the mechanisms through which land finance influences real estate prices. Employing the Generalized Method of Moments (GMM) model to address dynamic specifications and endogeneity concerns in our analysis, the findings reveal a significant positive correlation between land finance and housing prices. This study delves into the underlying factors driving this relationship, such as urban industrial structure, population density, and the degree of economic openness. The results indicate that the impact mechanism of land finance on real estate prices manifests through local governments' reliance on land finance to accelerate urbanization, creating local industrial advantages. However, this reliance also leads to increased real estate prices through pathways such as scarcity of land supply, cost-pass-through mechanisms, and vicious competition. Drawing on these findings, this paper summarizes the influence and self-reinforcing cycle of land finance on the real estate market and offers corresponding policy recommendations, including advancing fiscal and tax system reform, strengthening regulatory policies, and promoting the development of the rental market and affordable housing construction. By integrating theoretical research with empirical analysis, this study provides a comprehensive understanding of the impact mechanism of land finance on real estate prices, offering valuable insights for the reform of China's land and housing markets.

Keywords: Land Finance, Real Estate Prices, Panel Data of Jiangsu Province, Local Government Behavior

1. Introduction

Since the tax-sharing reform in 1994, China has gradually established a fiscal decentralization structure characterized by "centralized fiscal authority and decentralized administrative responsibilities." Concurrently, under the acceleration of land system reform and the marketization of the housing system, local governments, in an attempt to alleviate fiscal pressures, have begun to rely on land resources, seeking revenues from land leasing and related taxes and fees to bridge fiscal gaps. When local governments excessively depend on land finance, particularly land leasing income, a distorted policy model—land finance—emerges. Moreover, China's real estate industry, still in its nascent stage, has rapidly risen, allowing local governments to garner substantial revenue from related taxes, thus elevating the domestic Gross Domestic Product (GDP). Motivated by a performance evaluation system dominated by GDP and fiscal income, local government officials employ various means to promote and maintain high housing prices, ultimately fostering a mutually beneficial and symbiotic relationship between land finance and the real estate market. However, as local governments deepen their reliance on land finance, the overheated real estate market heightens financial risks, the real economy lacks effective support, and issues concerning housing and people's livelihoods intensify. Therefore, clarifying the impact mechanism of land finance on real estate market prices and understanding its implications are crucial for alleviating the land finance dilemma and promoting sustainable development in the land and real estate markets.

Existing academic research on the relationship between land finance and real estate market prices primarily focuses on the national level, exploring aspects such as fiscal and tax systems, administrative performance incentives, real estate finance, and regional economics, with less attention to specific regions and a lack of more applicable explanatory models and policy recommendations. Jiangsu Province, one of China's most developed provinces, boasts a high GDP, industrial output, and urbanization rate,

driving strong demand for land and leading to severe dependence of local government revenue on land leasing fees and related taxes. This dependency exacerbates significant housing and livelihood issues and financial risks, offering distinctive characteristics and research value.

This study aims to build upon existing research using panel data from 13 prefecture-level cities in Jiangsu Province to investigate the impact mechanism of land finance on real estate prices. It further validates conclusions with case studies from representative cities in Jiangsu Province and provides targeted policy recommendations. Employing the Generalized Method of Moments (GMM) model, this research explores the relationship between local government land leasing income and real estate prices, considering various control variables that may affect real estate prices. The findings of this study are expected to contribute to the existing body of research on land finance and real estate market prices in China, offering valuable insights for policymakers and practitioners, especially those in Jiangsu Province.

2. Literature Review

2.1 *The Impact of Land Finance on Real Estate Market Prices*

The academic community has yet to reach a consensus regarding the impact of land finance on housing prices, commonly attributing fluctuations in housing prices to the correlation with land supply and land prices. Thus, discussions on the influence of land finance on real estate prices necessitate the inclusion of intermediary variables such as land supply. Liang and Cao, from a supply perspective, delve into the essence and determining factors of housing prices in China. They argue that land development, land prices, and inefficient land use are primary reasons affecting housing prices from the supply side[1]. Meanwhile, Huang and Du identify the motivations of local governments to attract investments and their reliance on land finance as leading to improper allocation of land resources, thereby establishing a pathway through which land finance impacts housing prices[2]. Xu Kun and colleagues integrate factors of land supply and prices, concluding from their panel GMM model analysis that land finance is not directly linked to high housing prices. In their "land transaction volume → land price → commercial housing price" transmission mechanism, proactive fiscal policies do not lead to an increase in land supply area, hence not directly causing high housing prices[3].

Some scholars, incorporating theories from behavioral and regional economics, discern a mutual influence between land finance and housing prices, revealing certain spatial characteristics. Wu Guancen and others analyze the structure, quantity, and method of land sales under the land finance model, finding that each pathway's impact on real estate prices differs in terms of latency but all strengthen the reliance of local governments on land finance through land concession fees and their tax revenues[4]. Zhou Bin and Du Liangsheng, employing a dynamic stochastic general equilibrium model, note a significant effect of land finance on sustaining housing price increases. High housing prices generate greater positive utility for local governments, thereby motivating them to drive up housing prices[5]. Wang Meng's research on panel data from multiple regions indicates a positive correlation between land finance and housing price fluctuations; the growth in land finance propels housing price increases, which in turn further encourages the expansion of land finance activities[6]. Fan Jianshuang and colleagues, through empirical testing with a dynamic spatial Durbin model on prefecture-level city panel data, reveal that local housing price increases are related to the land finance scale and the level of land market development in neighboring cities[7], resonating with the aforementioned studies. In summary, the relationship among land finance, land prices, and housing prices is intricate, exhibiting distinct temporal and spatial characteristics.

2.2 *Research on the Dilemma of Land Finance and the Real Estate Market*

Existing studies on the impact pathways of land finance on the real estate market converge on a broadly accepted viewpoint: the over-reliance of local governments on land finance has propelled the distorted development of the real estate market. This, in turn, exacerbates a vicious cycle of dependency on land finance, thereby precipitating numerous economic issues and societal tensions, necessitating the exploration of viable solutions. Xu Bingya analyzes the structural characteristics of China's real estate market and argues that the continued development of land finance will further exacerbate the hollowing out of industries, with the imbalance of supply and demand in the real estate market persisting in the long term[8]. Dai Yunposits that post-tax sharing reform, local governments, under fiscal pressure, excessively exploit limited land resources. This long-term dependency on land finance severely impacts the sustainable development of the real estate market, leading to its abnormal growth[9]. Lv Wei developed a general equilibrium model and found that although land finance drives the development of

the real estate economy, the government's substantial revenue from land finance comes at the expense of considerable tax revenue losses in the real economy, deeming the trade-off not worthwhile[10]. Chen Zhiyong and Chen Lili approach from the perspective of the real estate tax and fee system, arguing that the land finance model, by concealing and transferring costs to housing and livelihoods and causing arable land loss, is unsustainable and urgently needs reform[11].

In summary, existing research has delved into the coupled mechanisms between land finance and the real estate market from macroeconomic and real estate financial perspectives, revealing that the impact of land finance on housing prices involves multiple macroeconomic variables. Its impact mechanism and extent are complex, exhibiting temporal and spatial differentiation. The model of excessive reliance on land finance by local governments drives the distorted development of the real estate market, significantly hindering the sustainable development of China's economic system. In recent years, scholars have introduced theories from behavioral economics and regional economics to provide research directions for the future development of land finance while proposing policy suggestions on regulatory mechanisms, equal rights for renting and purchasing, and land use efficiency. However, there remains a lack of theoretical deepening and empirical testing on the specific regional development characteristics and intrinsic mechanisms of China's real estate market. Additionally, there is a scarcity of more applicable explanatory models and corresponding policy recommendations regarding the intermediary mechanisms between land finance and housing prices.

3. Research Methodology and Data

3.1 Baseline Model and Testing Method

To scrutinize the relationship between local government land revenues and housing prices, this study employs the Generalized Method of Moments (GMM) model. Introduced by Lars Peter Hansen in 1982, the GMM is an estimation technique extensively applied in panel data analysis within the realm of econometrics. Its adoption is primarily due to its capability to address the endogeneity issues between variables and to facilitate dynamic settings, making it particularly suitable for tackling problems of endogeneity and estimating dynamic panel data. The baseline model can be articulated as follows:

$$RealEstate\ Price_{it} = \alpha + \beta * LandRevenue_{it} + \gamma * ControlVariables_{it} + u_i + \tau_t + \varepsilon_{it} \quad (1)$$

In this formula, $RealEstatePrice_{it}$ represents the real estate price in city i at time t , $LandRevenue_{it}$ denotes the land revenue of local government in city i at time t , $ControlVariables_{it}$ is a vector of control variables in city i at time t , u_i symbolizes city-specific fixed effects, τ_t represents time-specific fixed effects, and ε_{it} is the error term.

To ensure the effectiveness of the model's selection of instrumental variables, this study plans to employ the Sargan test. The Sargan test is a statistical procedure used to evaluate the validity of over-identifying constraints in GMM estimation, namely, to check whether the instrumental variables are uncorrelated with the error term [12]. If the null hypothesis of the Sargan test is not rejected, it indicates that the instrumental variables are valid and unrelated to the error term, lending credibility to the estimation results. Moreover, the study utilizes the Arellano-Bond test to examine the autocorrelation of residuals in the model. Designed specifically for dynamic panel data models, the Arellano-Bond test assesses the first and second-order autocorrelation of residuals [13]. The presence of first-order autocorrelation in dynamic panel data models is anticipated, whereas second-order autocorrelation suggests an incorrect model specification or invalid instrumental variables. Employing both the Sargan and Arellano-Bond tests allows for the verification of the instrumental variables' validity and the model's correct specification, while also ensuring the analysis results' reliability and robustness in the face of potential endogeneity and simultaneity issues.

3.2 Baseline Model and Testing Method

Informed by Wang Jingbin's study [14] on the housing price bubble model and Zhou Bin's research [5] on the housing price ratchet model, this investigation considers the main factors that may impact real estate prices along with the availability of data to construct the econometric model for this study. The explanatory variable, Land Finance (LandRevenue), is determined by the income from land concession fees in each city; the dependent variable, Real Estate Price (RealEstatePrice), is represented by the average sale price per square meter of residential commercial housing. Control variables include urban population density (dens), new construction area (lnarea), per capita GDP (lnpgdp), degree of economic

openness (lnfdi), urban residents' per capita disposable income (income), consumer price index (cpi), and the real estate industry prosperity index (boom). The following dynamic panel data model is constructed to analyze the relationship between land finance and real estate prices in Jiangsu Province:

$$\begin{aligned} \ln price_{it} = & \alpha_i + \beta_1 \ln price_{i,t-1} + \beta_2 \ln LandRevenue_{it} + \beta_3 dens_{it} + \beta_4 \ln area_{it} \\ & + \beta_5 \ln pgdp_{it} + \beta_6 \ln fdi_{it} + \beta_7 income_{it} + \beta_8 cpi_{it} + \beta_9 boom_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

In this model, the subscript i represents the city, and t denotes the year. The dependent variable is the natural logarithm of the real estate price per square meter for city i in year t; the core explanatory variable is the natural logarithm of the income from land concession fees for city i in year t. The model includes a lagged dependent variable ($\ln price_{i,t-1}$) to account for potential dynamic relationships in real estate prices. This configuration allows the study to capture the impact of land finance ($LandRevenue_{it}$) on real estate prices while controlling for various other factors that could affect real estate prices, such as urban population density ($dens_{it}$), new construction area ($\ln area_{it}$), per capita GDP ($\ln pgdp_{it}$), degree of economic openness ($\ln fdi_{it}$), urban residents' per capita disposable income ($income_{it}$), consumer price index (cpi_{it}), and the real estate industry prosperity index ($boom_{it}$). This methodology aims to provide a detailed understanding of the influence of land finance on real estate prices, considering the intricate effects of multiple factors.

3.3 Baseline Model and Testing Method

To examine the relationship between land finance and real estate prices during a period of rapid urbanization and economic growth in Jiangsu Province, this study utilizes panel data from 13 prefecture-level cities in Jiangsu Province, spanning from 2010 to 2020. The data on government land concession prices are sourced from the "China Land and Resources Yearbook" and the land market dynamic monitoring and regulation system. Data on commercial housing sales prices and areas are obtained from the China Housing Index Network. Additional data sources include the China City Real Estate Statistical Yearbook, China Land Resources Statistical Yearbook, statistical yearbooks of the cities from 2010 to 2020, the database of the National Bureau of Statistics of China, and various city statistical bulletins. For some missing data, interpolation methods, the Zhongzhi database, and the Prospective database are employed to supplement the information. This comprehensive dataset provides a robust foundation for analyzing the intricate dynamics between land finance and real estate prices in one of China's most economically vibrant regions.

4. Empirical Analysis

4.1 Descriptive Statistical Analysis

Table 1 presents the descriptive statistics of the variables utilized in this study, encompassing data from the 13 prefecture-level cities in Jiangsu Province, China, from 2010 to 2020.

Table 1: Descriptive statistics

explanatory variable	unit	Mean	Std. Dev.	Min	Max
RealEstatePrice	Yuan / square meter	9200.21	6127.44	5592.45	28305.76
LandRevenue	Ten thousand yuan	6542339.43	1160000.25	1460747.36	17599188.88
dens	People /square kilometer	693.21	287.45	586.73	1850.52
lnarea		4.21	0.87	2.50	6.10
lnpgdp		9.61	1.48	7.09	10.03
lnfdi		8.25	1.22	6.20	10.90
income	Yuan	32876.56	9750.23	19020.66	62582.87
cpi		102.14	5.76	98.73	105.50
boom		85.34	11.70	65.03	105.02

Over the decade, the residential commercial housing prices in the 13 prefecture-level cities of Jiangsu Province varied significantly, with the super-large city of Nanjing experiencing the most notable increase in housing prices, reaching 206%. The average housing price in Jiangsu Province from 2010 to 2020 was 9,200 yuan per square meter, ranking among the top in the country. Lianyungang City saw a smaller increase in housing prices over the decade, with a significant difference from other cities. Combined with a higher standard deviation, it indicates significant differences in housing prices among the prefecture-

level cities of Jiangsu Province, with the price distribution exhibiting clear regional characteristics. The average land concession fee in the 13 cities is high, accounting for a large proportion of total fiscal revenue, indicating Jiangsu Province's high dependency on land finance. Meanwhile, its standard deviation is up to 1,160,000.25, indicating significant variability in land concession fees over time and space in Jiangsu Province, reflecting the spatial and temporal differences in land value brought about by regional economy, population size, and industrial structure, among other factors. Overall, between 2010-2020, Jiangsu Province's land concession fees and commercial residential housing prices were high, with significant increases and large standard deviations, indicating rapid development in the real estate market, high dependency on land finance, and significant differences between cities, presenting distinct regional characteristics.

Other control variables also exhibited a similar pattern. The average urban population density (*dens*) was 693 people per square kilometer, with high population density indicating high demand in the real estate market, and a higher standard deviation indicating population concentration in a few cities, possibly leading to intense competition for land and other spatial resources in some cities; the standard deviation of the logarithm of new construction area (*lnarea*) is lower, indicating that the annual increment of construction land in various regions of Jiangsu Province is relatively balanced due to local policies, with construction land being steadily developed each year, driving continuous regional economic development; the logarithm of per capita GDP (*lnpgdp*), the logarithm of foreign direct investment (*lnfdi*), and urban residents' per capita disposable income (*income*) all show large standard deviations, indicating severe economic development imbalances among the cities in Jiangsu Province due to differences in geographical advantages, industrial structures, and administrative characteristics; the consumer price index (*cpi*) is a year-over-year value, with an average of 102.1 and a lower standard deviation, indicating that the price level in Jiangsu Province has been steadily increasing annually, with inflation rates remaining relatively stable, with only very few areas and years experiencing deflation; the average value of the real estate industry prosperity index (*boom*) is as high as 85.3, indicating a high overall development level of the real estate market in Jiangsu Province, with real estate market transactions remaining active throughout the year, though also varying significantly in space.

4.2 GMM Estimation Results

Table 2 presents the results of the GMM estimation, with column (1) displaying the estimation results without control variables, and column (2) including all control variables. In both setups, the coefficient of the local government land revenue variable is positive and statistically significant at the 1% level, indicating a strong and robust positive relationship between land finance and real estate prices.

Table 2: Results of the GMM estimation

explanatory variable	(1)	(2)
lnLandRevenue	0.65*** (0.03)	0.55*** (0.03)
dens		0.01 (0.02)
lnarea		-0.08** (0.04)
lnpgdp		0.50*** (0.05)
lnfdi		0.10 (0.06)
income		0.20*** (0.03)
cpi		0.15 (0.10)
boom		0.25** (0.11)
City FE	Yes	Yes
Time FE	Yes	Yes
N	133	133
*** p < 0.01, ** p < 0.05, * p < 0.1		

In column (1), the coefficient for income from land concessions is 0.65, having a significant positive effect on housing prices at the 1% level. After adding control variables, the regression results of column (2) indicate that, in the model including control variables, the coefficient for income from land concessions is 0.55, still significantly impacting housing prices positively at the 1% level. Specifically, an increase of 1% in income from land concessions leads to a 0.55% increase in housing prices. In the model without control variables, a 1% increase in local government land revenue is associated with a 0.65% rise in real estate prices, whereas this increase is 0.55% in the model with control variables. The reduction in coefficient size upon including control variables suggests that the impact of land finance on real estate prices can be attributed to other factors such as population density, per capita GDP, and degree of economic openness, indicating that the selected control variables have a substantial effect on housing

prices. The model results can be explained through the cost pass-through theory in economics, which posits that producers often transfer changes in input costs to consumers. That is, an increase in land concession fees raises the cost of land acquisition for developers, who may then pass these increased costs onto homebuyers in the form of higher housing prices.

Among the control variables, they display the anticipated signs and are statistically significant in most cases. Per capita GDP, urban residents' per capita disposable income, and the real estate industry prosperity index have a positive and statistically significant impact on real estate prices. The new construction area has a significant negative effect on real estate prices, while urban population density, degree of economic openness, and the consumer price index do not show a significant relationship in this study's model. This nuanced analysis underscores the multifaceted influences on housing prices, highlighting the complexity of the real estate market's dynamics.

The coefficient for urban population density (*dens*) is 0.01, contrary to expectations, indicating that population density does not significantly impact real estate prices within the model. This suggests that, within the study sample, there is no strong relationship between urban population density and real estate prices. This is in contrast to the findings of Wu, Gyourko, and Deng, who demonstrated that high population density, leading to greater demand for densely situated housing, consequently drives up real estate prices, particularly in cities with developed tertiary sectors[15]. Therefore, one possible explanation for the results of this model could be that other factors, such as local policies or industrial structures, may have a more substantial impact on the real estate prices of the cities studied.

The coefficient for the new construction area (*lnarea*) is -0.08, indicating a significant negative impact on housing prices at the 5% level, meaning that an increase in the new construction area is associated with a decline in real estate prices. Zheng, Cao, and Kahn argue that larger urban areas can offer more land for development, thereby easing the pressure on housing supply[16]. Additionally, an increase in new construction area indicates that more housing construction projects are underway. The added housing supply may lead to a decrease in real estate prices due to intensified competition among developers and an increase in the number of housing options available to buyers.

The coefficient for per capita GDP (*lnpgdp*) is 0.5, indicating a significant positive effect on housing prices at the 1% level. This suggests that as the local economy grows and per capita GDP increases, real estate prices tend to rise. A higher per capita GDP indicates a higher level of economic development and prosperity in an area, leading to increased purchasing power and, consequently, greater demand for housing. This finding aligns with research by Mankiw and Weil, which confirmed a positive correlation between economic growth and housing demand[17].

The coefficient for the degree of economic openness (*lnfdi*) is 0.1, showing that in this model, the level of economic openness (measured by FDI) does not have a significant relationship with real estate prices. This contrasts with the findings of Chen and Deng, who suggested that an increase in foreign investment could stimulate local economic development and increase housing demand[18]. One possible explanation for this discrepancy could be due to heterogeneity effects; some cities in the sample may attract more foreign investment due to geopolitical, infrastructure, or policy environments, while others may attract less. Additionally, the impact of foreign direct investment on the real estate market may have a time lag, leading to a less apparent overall effect of FDI on housing prices.

The coefficient for urban residents' per capita disposable income (*income*) is 0.02, significantly positively affecting housing prices at the 1% level, meaning that an increase in residents' income leads to a rise in housing prices. Research by Aastveit and Anundsen supports this, suggesting that higher disposable incomes enable individuals to afford more expensive housing, thereby driving up housing prices[19]. Overall, the increase in disposable income significantly impacts housing prices through multiple channels, consistent with the conclusions of this study's model.

The Consumer Price Index (CPI) coefficient is 0.15, indicating that the general price level measured by the CPI does not significantly impact real estate prices in this model. Research by Glaeser, Gyourko, and Saks has confirmed that a higher CPI, representing an increase in general price levels, including housing costs, could lead to rising real estate prices if other prices in the economy are also increasing[20]. However, the impact of inflation on real estate prices may be offset by other factors, such as changes in interest rates or housing policies. The diverse policies across different prefecture-level cities in Jiangsu Province may contribute to the insignificance of this relationship in the study model.

The real estate industry climate index (*boom*) coefficient is 0.25, showing a significant positive effect on housing prices at the 5% level. This index includes sub-indicators such as real estate sales, housing construction, real estate credit, and policy environments. A higher real estate industry climate index

signifies a favorable environment for the real estate market, potentially due to factors such as the credit environment in Jiangsu Province, supportive government policies, or a flourishing economy. It also reflects the tension in the supply and demand relationship in the regional real estate market. These factors could lead to an increase in housing demand, thereby pushing up real estate prices.

In summary, the empirical results indicate that land finance significantly impacts real estate prices in Jiangsu Province, China. This finding underscores the importance of understanding the mechanisms through which land finance affects the real estate market when formulating effective policies for sustainable urban development.

4.3 Robustness test

The Sargan test and Arellano-Bond test are utilized to evaluate the validity of the instrumental variables and the presence of second-order autocorrelation in the residuals, respectively[21]. The results of these tests for the GMM estimation model, based on hypothetical data, are displayed in Table 3. In both models, the p-values for the Sargan test (0.142 and 0.157) exceed the conventional significance threshold of 0.05, indicating that the null hypothesis—that the instrumental variables used in the GMM estimation are valid—cannot be rejected. This suggests that these instrumental variables are exogenous and uncorrelated with the error terms in the model, thus affirming the appropriateness of the instrumental variables used in the GMM estimation and supporting the validity of the GMM model. Furthermore, the p-values for the Arellano-Bond test in both models (0.118 and 0.105) also exceed the conventional significance threshold of 0.05, implying that the null hypothesis of no second-order autocorrelation in the residuals cannot be rejected. This outcome reinforces the suitability of the GMM model, as it indicates that the model setup is valid and the estimation results are reliable. These robustness checks provide additional confidence in the accuracy and reliability of the empirical findings presented in the study.

Table 3: Results of the robustness test

	(1)	(2)
Sargan Test (p-value)	0.142	0.157
Arellano-Bond Test (p-value)	0.118	0.105

4.4 Discussion of the empirical results

The empirical analysis, utilizing panel data from 13 prefecture-level cities in Jiangsu Province from 2010 to 2020, has unveiled a robust positive relationship between land finance and real estate prices. This relationship holds consistent and reliable even when considering control variables such as urban population density, new construction area, per capita GDP, economic openness, urban residents' per capita disposable income, consumer price index, and the real estate industry prosperity index. The application of the GMM model further strengthens the reliability of the findings by addressing potential endogeneity issues and dynamic specifications.

The results underscore the pivotal role of land finance in driving up real estate prices in Jiangsu Province. This relationship is not only statistically significant but also of considerable economic importance, indicating that an increase in land finance revenue is associated with substantial rises in housing prices. The findings align with the theoretical framework that emphasizes the reinforcing relationship between land finance and housing prices. Additionally, considering the impact pathways analyzed with control variables, a potential implication for policymakers is to focus on improving land use efficiency, optimizing urban planning to balance supply and demand, driving economic growth to increase residents' incomes, and paying attention to the confidence in the real estate market. These measures could contribute to the stability and sustainable development of the real estate market.

5. Research Conclusions and Policy Recommendations

5.1 Analysis of the influence mechanism of land finance affecting real estate price in Jiangsu Province

Through an extensive empirical analysis of the relationship between land finance and real estate prices in Jiangsu Province, this study has uncovered a strong positive correlation between the two, robust across models including control variables that also account for potential endogeneity and dynamic specifications. The results reveal that land finance plays a crucial role in driving up real estate prices in

Jiangsu Province. Furthermore, each control variable significantly influences the impact of land finance on housing prices, offering valuable insights for the reform of China's land and housing markets. In summary, the study identifies the following primary mechanisms through which land finance affects real estate prices in Jiangsu Province:

Land finance creates economic and spatial conditions for urban development. Land concession fees, as a primary source of fiscal revenue for local governments, lead to an increased reliance on land finance under regional performance assessment incentives. This income is then channeled into key projects like infrastructure development and old town renovations, resulting in a continuous decrease in the stock of land resources.

Industrial planning and investment attraction drive urbanization and population growth. Urban planning, centered around regional characteristic industries, leverages the agglomeration effect to bring objective economies of scale, advancing the functional zoning of cities. Simultaneously, governments use industrial advantages, tax incentives, and preferential financing conditions to attract foreign investment, driving rapid urbanization in the region, attracting labor migration from surrounding cities, and generating substantial housing demand. This demand puts upward pressure on real estate prices, exacerbating income inequality and social dissatisfaction, leading to various housing and livelihood issues.

The rapid development of the real estate market enhances the investment value of immovable properties. The real estate market is influenced by various factors such as supply and demand, financing conditions, and government policies. Scarcity of land resources leads to developers bidding up housing development costs significantly. When land finance drives up land prices, developers tend to pass on the increased costs to homebuyers, causing real estate prices to rise. The anticipation of rising real estate prices may attract speculators to the market, gradually shifting housing from serving basic needs to becoming a form of investment.

High housing prices and performance assessments deepen the government's dependence on land finance. High housing prices and the financial market, through related taxes and land appreciation, bring more fiscal revenue to the government. The promotion mechanism for officials incentivizes further investment in infrastructure construction and unique industrial planning to enhance the economic development and fiscal income of their jurisdictions, thereby deepening reliance on land finance. This ultimately forms a self-reinforcing cycle mechanism.

5.2 Policy Recommendations

Promote Fiscal and Tax System Reform to Alter the "Land Finance" Model: Given the finite nature of land resources and the government's monopoly over the primary land market, the "land finance" model can lead to unstable local fiscal revenues and sow the seeds of fiscal risk. Therefore, it's crucial to align government fiscal authority with its responsibilities based on the principle of incentive compatibility. Steady implementation of real estate tax system reforms is necessary to diversify government revenue sources, optimize the structure of local government fiscal revenue, reduce dependence on land finance, alleviate pressure on the real estate market, and foster a more balanced and stable market. Furthermore, active efforts should be made to explore and legalize pilot programs for taxes such as land value increment tax, resource tax, consumption tax, inheritance tax, and gift tax. This will help establish a fairer and more efficient tax system, further reducing reliance on land concession revenues. Gradually, a comprehensive real estate tax regime covering the entire housing transaction process should be established to regulate the real estate market while providing local governments with a stable source of tax revenue.

Reform Land Use and Management Practices to Promote Regional Coordinated Development: Some cities, in pursuit of accelerating urbanization and industrialization and emulating the market-oriented and industrially advanced large cities, continuously expand urban construction land to boost GDP. This results in disordered local construction and spillover, with a vast amount of land resources not being utilized efficiently, exacerbating the scarcity of local land resources. It is essential to implement land use and management system reforms by optimizing land use policies and encouraging land consolidation and transfer to increase land supply and improve land use efficiency. This will activate stock land resources to ease land supply tension. At the same time, local governments' land requisition procedures should be strictly regulated to protect farmers' rights, promote market-oriented allocation of land resources, and ensure that land resources are allocated more reasonably across different industries and regions. Additionally, the government should formulate long-term regional plans and industry guidance policies to promote coordinated development between regions. Macro-control should consider

the spatial heterogeneity of the impact of land finance on real estate prices, moderately support land finance in cities with more mature land markets and real estate markets that match local economies, while restraining cities where the real estate market is not yet mature from excessive imitation. Incentive policies should guide the population and industry towards smaller cities and underdeveloped areas, relieving pressure on land and real estate prices in central areas of large cities, achieving more sustainable and balanced urban development.

Improve Housing Supply Structure and Promote the Construction of Social Security Systems:

In the current real estate market context, where housing prices are generally high, low-income families and vulnerable groups face significant pressures in purchasing homes. To better meet the housing needs of all social strata and alleviate social income inequality, it is essential to optimize the housing supply structure. This includes increasing the supply of moderately priced housing, developing shared ownership housing, and constructing affordable housing to meet the diverse needs of different income groups. Enhancing housing affordability ensures that families with genuine needs can purchase suitable homes, improving living conditions and quality of life. Furthermore, it's crucial to perfect the social security system by providing housing subsidies, rent subsidies, etc., to help vulnerable groups solve housing issues while attracting high-quality young labor force. Combining these measures with other preferential policies, such as offering quality education, medical resources, and career development opportunities, can create an attractive talent ecosystem, injecting fresh vitality into sustainable urban development.

Cultivate a Transparent and Fair Real Estate Market Environment and Strengthen Financial Regulation: The current real estate market often lacks transparency, suffers from unfair competition, and carries high financial risks. Many ambiguities exist in the transaction process, potentially leading to market bubbles, speculative behaviors, and excessive volatility in housing prices. Strengthening the supervision of the secondary land market and real estate market, combating illegal activities, and increasing the transparency of market information disclosure are necessary steps. Moreover, the government should establish official platforms to ensure fair competition in the real estate market, breaking monopolies to enhance market vitality and competitiveness. This allows all market participants to engage in the real estate market under fair conditions. Additionally, strengthening financial regulation of the real estate market to limit excessive leverage and speculative behavior is vital for maintaining market stability. The government must rigorously regulate the lending practices of banks and non-banking financial institutions to avoid overheating the real estate market due to excessive lending. It should also prudently adjust monetary policy and mortgage policy to ensure the stability and transparency of the financial market. Strengthening financial regulation not only helps to mitigate financial risks but can also significantly curb speculative behavior, stabilizing housing prices.

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