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The impact of Land Transfer Policies on the Real Estate Market: A Case Study of Hangzhou

Dongqi Jiang

Ulink College of Shanghai, Shanghai, 201615, China

Abstract. Land transfer policies are fundamental to China's real estate market, yet research on rural collective land remains limited due to its incomplete marketization. Existing studies primarily focus on major first-tier cities (Shanghai etc.), leaving gaps in understanding emerging cities like Hangzhou. This study examines how migration-driven land supply affects the real estate market, urbanization, and land-use diversification through policy text analysis, case studies and empirical analysis. Findings reveal that land transfer policies optimize market structures, enhance land-use efficiency, and promote social welfare while intensifying market competition. Sustainable development policies further facilitate a multi-stakeholder win-win outcome. The study concludes with policy recommendations and future research directions, considering Hangzhou's comparative advantages while acknowledging data limitations.

Keywords: Land transfer policies; Real estate market; Hangzhou.

1. Introduction

Land has been the cornerstone of Chinese civilization for millennia, shaping its social, economic, and political landscape. Due to the overarching emphasizing agriculture and suppressing business policy and political atmosphere, the importance of land has been repeatedly emphasized. The advent of socialism in modern China brought about transformative land reforms in the 20th century. In the late 1950s, the collectivization of land through the People's Commune system eliminated individual land contracts, lowering productivity and land utilization (Brian, 2019). The 1978 introduction of the Household Responsibility System allocated land use rights to households while retaining collective ownership, establishing the separation of three rights—ownership, contracting, and management—thereby laying the legal foundation for land transfer policy. Subsequently, in the end of 20th century, with the progress of industrialization and urbanization in China, the rural migration to cities results in a significant amount of underutilized rural land. In order to improve agricultural productivity and accelerate the modernization of the rural economy, the Chinese government issued the Land transfer policy, which refers to the legal framework under which rural collective economic organizations or farmers transfer their contracted land-use rights to other operators (such as individuals or enterprises) for agricultural production or other use, aimed at improving land use efficiency and promoting rural economic development (Land Administration Law, 2004).Nevertheless, Economic restructuring in the 21st century further shifted land use, with agriculture's GDP share declining to 7.7% by 2020 (China Statistical Yearbook, 2021). Land transfer increasingly supports secondary and tertiary sectors, particularly in southeastern coastal regions like Hangzhou, where trade and economic activity thrive.

Consequently, this essay selects Hangzhou which presents a unique opportunity for the focal point for case study and analyze the land transfer policies' impact on Hangzhou's real estate market. This study will further explain urban-rural integration, stabilize housing prices, and mitigate negative externalities, addressing three pivotal queries to assess and elucidate the aforementioned impacts.

(1) How an increase in land supply affects real estate prices and the dynamics of supply and demand?

(2) What is the role of land transfer in promoting urbanization and driving housing demand?

(3) What are the effects of converting rural land to non-agricultural uses on the structure of the urban real estate market.

After introducing the key questions, the remainder of this essay will be structured as follows. The paper will review previous research on land transfer policies, applying property rights theory and institutional economics to analyze changes in property rights, institutional arrangements, and stakeholder dynamics. Case studies will be used to link theoretical frameworks to these core research questions. Additionally, limitations will be addressed to strengthen logical coherence. Finally, the paper will conclude with policy recommendations and future research directions.[To avoid confusion between these two types of transfer due to language translation problems, this essay will use “state land transfer policy” to denote the transfer of state-owned land, otherwise for the transfer of collective-owned land.

2. Literature review

2.1. Recent Developments in Land Transfer Policies

Since China's reform and opening up, with the advance liberalization of land-related policies, the gradual maturity of land transfer policy has increased its impact on the real estate market. It can be known from the latest academic research in recent years that the impact of land transfer policy on the real estate market can be analyzed from the following aspects.

2.1.1. Migration and housing demand.

To begin with, the land transfer policy has significantly promoted the rural-to-urban migration, because the relaxation of land policies has reduced restrictions on rural labor mobility, facilitating the migration of rural populations to urban areas. For instance, the rural area population in China decreased from 714.96 million in 2007 to 509.92 million in 2020, indicating a decrease of 200.54 million (Xia et al, 2022), leading to an increase in the urban population scale, which directly raises the demand for housing (Zhao, 2020). In addition, this increased demand, in the context of inelastic housing supply in the short term, tends to drive up housing prices in urban area. Migration has had a particularly pronounced on urban housing prices, especially in China's major cities (Zhao et al., 2020). In the national perspective, a 1% raise in the inflow rate led to a raise in urban housing prices by 0.31% (National Bureau of Statistics, 2018). In the eastern region, a 1% increase in the population inflow led to a 1.34% increase in housing prices, which demonstrate the sensitivity of the eastern region to population migration (National Health and Family Planning Commission, 2018), which consistent with the situation of economically developed southeast coastal areas mentioned in the previous paragraph. Overall, theoretically speaking, a city with its developed economy and abundant job opportunities, which will attract a larger number of Rural-Urban migration, leading to a more sensitive housing prices in the region.

2.1.2. Urbanization and Economic Development.

Moreover, based on previous paragraph, the process of urbanization has also been greatly advanced (Wang, 2022). Pertaining to the demographic statistics derived from the 2020 Seventh National Population Census, 901.99 million people (63.89%) lived in urban areas, while 509.79 million (36.11%) resided in rural areas. Compared to 2010, the urban population increased by 236.42 million, and the rural population declined by 164.36 million, raising urbanization by 14.21 percentage points. This sustained and substantial migration has exerted a profound influence on the real estate market's development. And the diagram of data has been shown below.

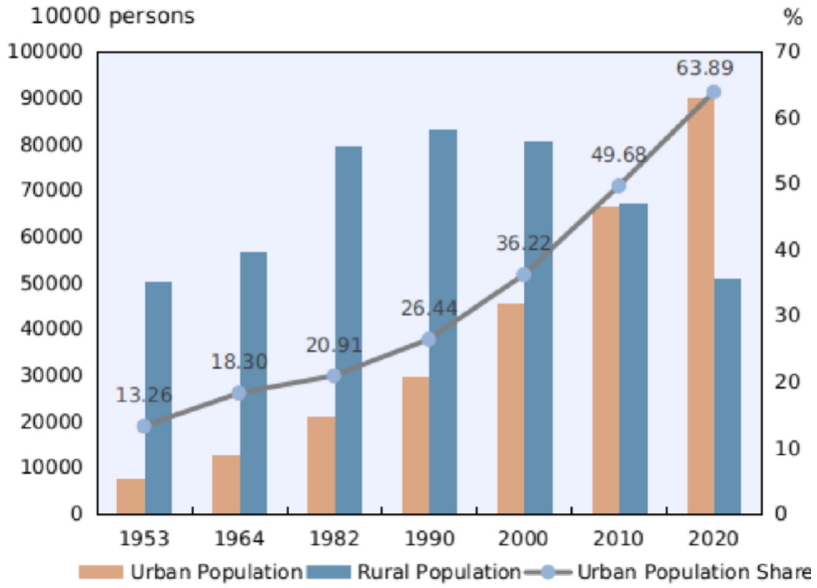

Figure 1. Urban and Rural population In China

(Source: National Bureau of Statistics, 2020)

Furthermore, Urbanization accelerates productivity, fosters a dynamic labor market, and drives economic growth, increasing purchasing power and housing demand (Chen et al., 2017). Higher wages from better urban job opportunities boost consumption. And Labour concentration promotes service sector expansion, infrastructure growth, and innovation, enhancing entrepreneurship (Chen et al., 2017; Chatterji et al., 2014).

Therefore, Economic growth forms a positive feedback loop: higher consumer confidence spurs housing investment, while real estate firms increase supply to meet demand, reflecting market dynamics. This synergy benefits both the economy and the real estate market, creating a win-win outcome.

2.1.3. Utilization and diversity.

As the urbanization process mentioned above, this outcome will further influence land use efficiency and the diversity of land utilization. Firstly, the land transfer policy enhances land use efficiency by converting underutilized rural land into effective urban uses. This policy streamlines land acquisition processes and promotes market-oriented reforms, enabling local governments and developers to more easily access land, thus accelerating the urbanization process (Pei, 2023). Moreover, local governments and stakeholders can optimize land use by concentrating urban development, reducing land fragmentation, increasing resource utilization efficiency, and lowering infrastructure planning costs (Qiao, 2024; David, 2022). Concentrated urban development not only saves resources but also improves service quality (David, 2022), while enhancing regional accessibility, allowing residents to more easily access urban resources, which further stimulates economic activities (Liu et al., 2023). The land transfer policy also promotes the diversification of land use beyond traditional agricultural purposes, providing space for industrial, commercial, and residential development. And this transformation meets the growing urban population's needs and stimulate economic development (Lu et al., 2022). As a result, the real estate market will be impacted, with housing demand potentially surging, and housing prices fluctuating in response to changes in supply and demand.

2.2. Policy evolution analysis

This section outlines the evolution of China's land transfer policies in three stages. The first phase (1978–1987) laid the foundation through initial policy reforms. The second phase (1988–2003) marked the legalization of land circulation, notably with the 1988 Land Administration Law. The third phase (2003–present) saw further legislative refinement, including the Rural Land Contracting

Law and Property Law, promoting marketization and standardization. This progression reflects China's transition from state-controlled land allocation to a regulated market system, ensuring greater efficiency in land use and rural development, and the detail has been shown in the Table 1 below. (Xin, 2009 & Ye, 2013 & Han, 2021).

Table 1. Policy evolution (1978 — present)

Stage	Time	Policy/Event	Key Content (Including Specific Cases)	Impact
Exploratory Phase	**1978**	**Reform and Opening-up**	Introduced economic reforms, but the concept of land transfer remained undefined.	Laid the foundation for future land marketization.
	1982	**Constitution (Chapter 1, Article 10)**	Established **state/collective land ownership** and introduced the concept of **separating land use rights from ownership**, but without specific implementation details.	**Did not provide legal feasibility for land transfers**; transactions remained strictly controlled.
	1986	**Land Administration Law Passed & Establishment of the National Land Administration**	Clarified land management regulations, strengthening state supervision and providing a legal framework for land transfer.	**Laid the legal foundation**, but land was still not fully marketized.
	1987	**State Council's Approval for Shenzhen Pilot on Paid Land Use Rights**	**Shenzhen auctioned 8,588 square meters of land (50-year use rights)**, marking the first **paid transfer of land use rights**.	**Initiated land marketization reform**, providing a model for nationwide implementation.
Formative Phase	**1988**	**Amendment to the Land Administration Law (Added Article 2, Clause 4)**	Allowed the **legal transfer of state-owned and collectively owned land use rights**, but specific implementation measures were yet to be issued.	Established a legal framework, providing a basis for land marketization.
	1993	**Third Plenary Session of the 14th CPC Central Committee**	Stipulated that **land use rights could be transferred according to law**, but compensation mechanisms were not specified.	More open policy direction, but implementation obstacles remained.
	1998	**Third Plenary Session of the 15th CPC Central Committee**	Explicitly stated that farmers **could voluntarily and for compensation transfer contracted land use rights**, legitimizing transfer income.	**Further formalized the land market**, ensuring farmers' land rights.
Mature Phase	**2003**	**Rural Land Contracting Law Passed**	Allowed **contracted land use rights to be transferred through subleasing, leasing, and other methods**; by 2011, **17.8% of contracted land had been transferred**.	**Promoted land marketization**, accelerating rural land transfers.
	2007	**Property Law Passed**	Defined **contracted land as usufructuary rights**, granting farmers **the legal right to possess, use, transfer, and profit from the land**.	**Strengthened farmers' land rights**, reducing government intervention in land transactions.
	2009	**Rural Land Contracting Dispute Mediation and Arbitration Law Passed**	Established **a dispute resolution mechanism for land transfer conflicts** to protect farmers' legal rights.	**Enhanced policy stability**, reducing legal disputes arising from land transfers.
	2013	**"Separation of Three Rights" Reform**	Introduced the **separation of ownership rights, contract rights, and management rights**, allowing **land management rights to be transferred independently**.	**Improved land use efficiency**, promoted large-scale agricultural operations, and reduced land idleness.
	2016	**Opinions on Improving the Separation of Land Ownership, Contract Rights, and Management Rights**	Further detailed the **"separation of three rights"** policy, emphasizing **collective ownership, stabilizing contract rights, and liberalizing management rights**.	**Optimized land resource allocation**, promoted agricultural modernization, and increased land transfer efficiency.
	2017	**Expansion of National Land Transfers**	**Over 70 million rural households completed land transfers, covering 5.12 million hectares (37% of contracted farmland).**	**Matured the land market**, increased land use flexibility, and boosted rural economic development.

3. Case Study Analysis

Based on the data and relevant policies provided in Chapter 3, this chapter employs a triple interaction analysis framework, enriched with case studies. As shown in the Figure 9 below, the effects of land transfer policy are reflected through three interconnected levels, forming a logical feedback loop.

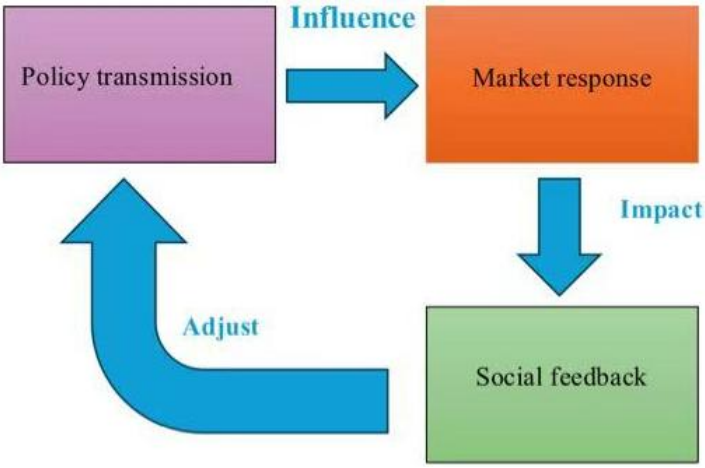

Figure 2. Triple interaction Framework

3.1. Policy transmission level

The policy transmission level refers to the impact of changes in central land policies as they are implemented by local governments, influencing the real estate market during the process of policy dissemination. This level primarily affects the real estate market through mechanisms such as direct price effects, supply structure effects, and regional restructuring effects. By mediating the relationship between social feedback and market response, the policy transmission plays a pivotal role in shaping the dynamics of the real estate sector.

3.1.1. Direct price effect.

Land transfer policies directly influence local land prices by affecting land supply, which subsequently impacts housing prices. As discussed in Chapter Three, the refinement of land transfer policies has allowed an increasing number of fragmented village collective lands to access the land market through land transfer. With the third amendment to the Regulation for the Land Administration Law in 2021, which lowered entry barriers for collective rural land into the market and optimize land resource allocation. Based on the rural collective asset platform, Yuhang District in Hangzhou has recorded a total land transfer area of 55,800 mu, with transaction amounts reaching 9.5137 million yuan in 2023, marking a historic high since the administrative division adjustments in 2021. Concurrently, the average land transfer price of Yuhang district decreased, and this price decline significantly alleviated the cost burden on developers, leading to a reduction in construction costs for residential properties. As a result, the average housing price in the district fell from 25251 yuan per square meter in December 2023 to 23985 yuan per square meter in December 2024, reflecting an overall reduction of 5.01% (CNBS,2023). However, the transmission of price effect may not simply lead to a liner relationship between land transfer policy and housing price, because as the land price is regulated to a low position through land policy, the competition for winning the ownership of the land may ascending in an opposite direction.

The above cases highlight the complexity of how land transfer policies influence the real estate market through price mechanisms. Beyond directly affecting average housing prices via cost transmission, these policies also drive price dynamics through competition and feedback among market participants, leading to a reform in supply structure of real estate market.

3.1.2. Supply structure effect.

As land transfers progress, rural collective agricultural land is gradually transitioned into urban areas and converted into construction land. This transformation in land use reflects the diversification of land functions and further enhances land-use efficiency, as discussed in Section 2.1.3. Taking Hangzhou as an example, the shift in the purpose of agricultural and other collective land inevitably contributes to the decline of the primary industry, while simultaneously driving the rapid growth of the secondary and tertiary industries. As illustrated in Figure 7, the primary industry in Hangzhou accounts for only 1.7% of its GDP contribution, significantly lower than the other two sectors. This observation substantiates this transformation and highlights the substantial advancements in productivity. Since 2017, Shuangpu Town in Hangzhou has transformed its agricultural land (mainly paddy fields) into construction land, planning to add approximately 220 mu of new construction land and create a modern landscape. The town is divided into three areas: the west focuses on ecological development and tourism, forming a rural cultural zone; the center emphasizes urban development and the expansion of a modern agricultural park, integrating city and countryside; the east follows the government's strategy to develop a financial hub, positioning it as a long-term development zone. This case clearly demonstrates the impact of land transfer policies in optimizing land functions and improving land use efficiency, accelerating urbanization, generating positive externalities through the restruction of regional value. (Hangzhou Planning and Natural Resources Bureau, 2017).

3.1.3. Regional restructuring effects.

With the advancement of integrated urban-rural development, the previously distinct dualistic structure has gradually transitioned into a unified and integrated composite structure. Many village collectives have opted for mergers and integration, reconstructing the value of their regions. In 2021, five village collectives in Hangzhou's Qiantang District collaborated with a local state-owned enterprise to develop and transfer 36.8 mu of reserved land under the "Four Unified" principle, emphasizing unified planning and design, construction acceptance, service facilitation, and leaseback operations. This approach ensured systematic and efficient land use. While land ownership remained with the village committees, the state-owned enterprise handled initial construction and subsequent unified operations under a 20-year lease agreement. The planned high-end complex, featuring commercial, office, and hotel facilities, benefits from its prime location near one of Hangzhou's largest resettlement housing projects. Upon completion, the project was expected to generate an additional annual income of over 4 million yuan for the village collectives. In addition, the project will further enhance the urban image along its route, fostering connections with the nearby semiconductor industry. This will drive high-quality industrial-urban integration in the area and contribute to the overall value enhancement of the region. For example, the project may provide offices for semiconductor industry which create the foundation of hi-tech park. (Hangzhou Municipal People's Government, 2021).

3.2. Market response level

According to the analysis of policy transmission level, we should also engage in an in-depth discussion regarding market responses. Land transfer policies influence stakeholders in the market through policy transmission mechanisms, eliciting varied responses from different market stakeholders. Driven by the objective of utility maximization, stakeholders are likely to adjust their strategies and preferences accordingly. Consequently, the overall market structure may undergo transformation, accompanied by the establishment of a price mechanism.

3.2.1. Developers' Behavior Response.

As discussed in Section 4.1.1, the increased supply in the land market attracts more real estate developers to participate in land auctions, potentially driving land prices higher rather than lowering them. For instance, on December 31, 2024, Hangzhou's final land auction of the year saw seven parcels of land collectively sold for 14.56 billion yuan, with an average premium rate of 30.1%. Among these, the Xixing parcel in Bin Jiang District, characterized by its prime location and

significant locational advantages, achieved a final premium rate of 59.78% (BCIA, 2024). Therefore, the financial pressure for developers may be high, thus the developers may change their land acquisition strategy. Additionally, some well-funded large-scale developers, facing capped land prices in prime locations, where multiple bidders reach the maximum price, making it difficult to secure the land. As a result, some developers opt to intervene early by assisting the government with land remising or entering into pre-sale agreements to acquire land more conveniently. According to Hangzhou Planning and Natural Resources Bureau (2024), the flow chart (Figure 10) below illustrates this situation.

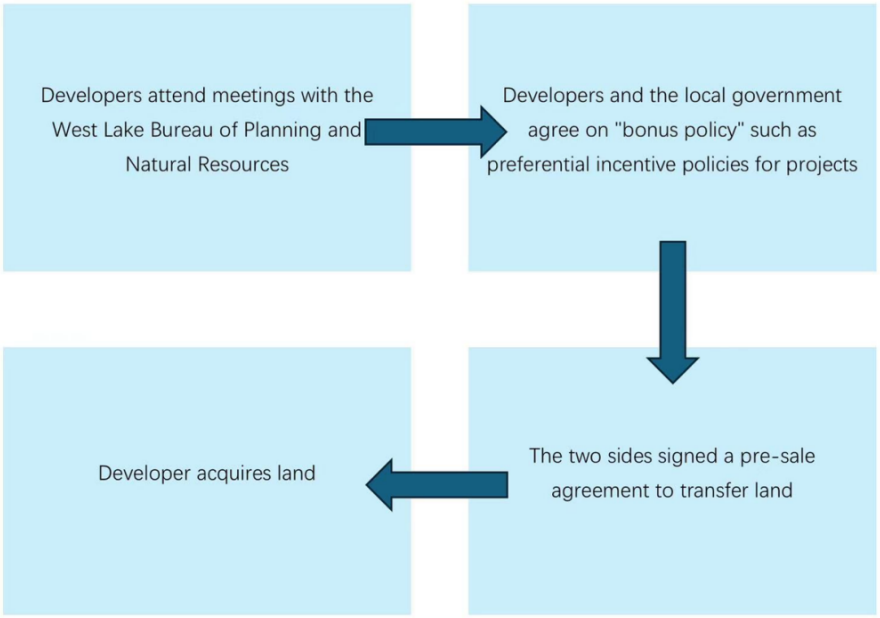

Figure 3. Hangzhou XH0910-29 Land Parcel Project

(Source: Hangzhou Planning and Natural Resources Bureau, 2024)

The above case reflects developers' responses to land policies and the land acquisition strategies driven by profit motives. Additionally, the high land premium rates and the resulting increase in average housing prices have compelled developers to adopt innovative product positioning strategies to attract homebuyers, leveraging higher-quality housing to remain competitive in the real estate market.

3.2.2. Homebuyers' demand change.

With developers' product innovations and changes in reginal value, homebuyers' demand structure and preferences have also evolved. In Hangzhou, developers' marketing strategies in 2024 have shifted from focusing on price to prioritizing quality, emphasizing premium finishes, smart home systems, and comprehensive community amenities. For instance, VIP appointment systems have been introduced, allowing potential buyers to preview and select properties in advance. Therefore, Demand for improved housing has become dominant, with many buyers relocating from suburban to urban areas and upgrading from smaller to larger units. Notably, sales of large flats over 200 square meters and garden-style duplexes have increased significantly, reflecting the ongoing upgrade in Hangzhou's housing demand (BCIA, 2024). The following graph from Beijing China index Academy illustrates this trend of "improved housing" demand.

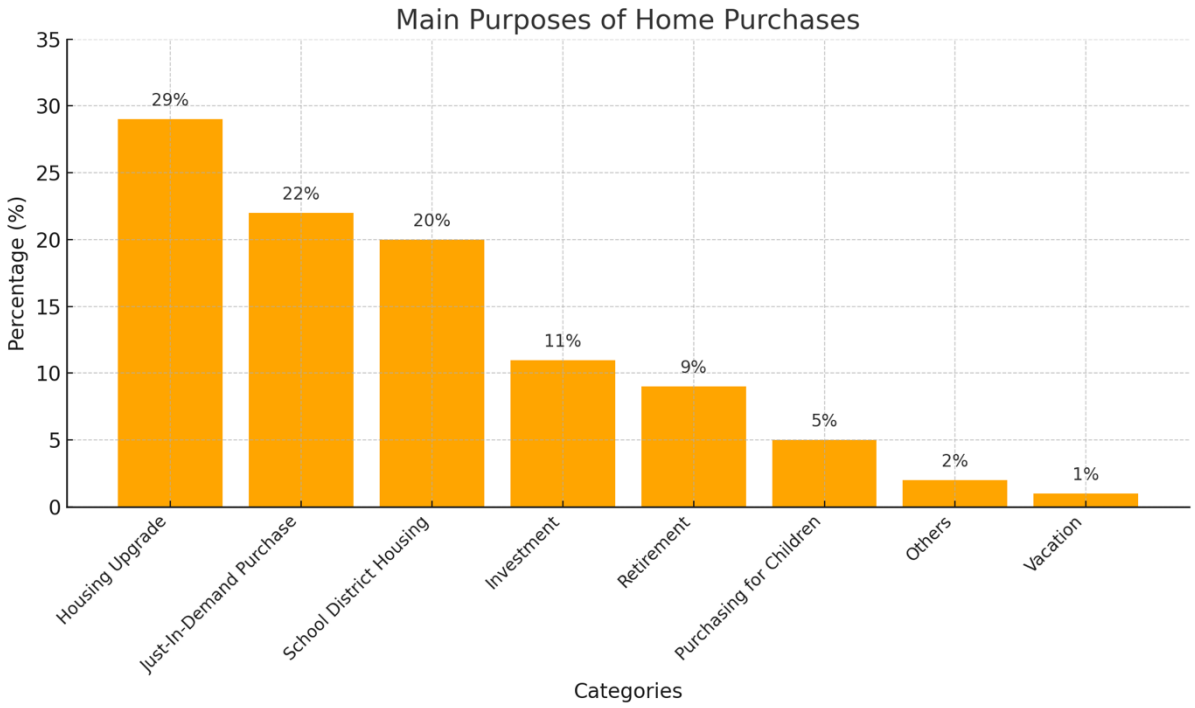

Figure 4. Main Purposes of Home Purchase

(Source: BCIA, 2024)

The data and cases above demonstrate that the demand structure of homebuyers tends to shift in response to developers' marketing strategies and changes in housing features. Additionally, homebuyers' preferences may also be influenced by government policies. In the chart above, the proportion of "school district housing" is significantly lower than that of "housing upgrade," which is likely due to Hangzhou's government policies promoting educational equity since 2021, like the "double reduction" policy. These policies have gradually diminished the advantages of school district housing for education, leading to changes in homebuyers' preferences (State Council, 2021).

3.2.3. Real estate market reform.

From a market-wide perspective, the implementation of land transfer policies has further reshaped the demand-supply structure. As discussed in Section 4.1, the transfer of rural agricultural land into the urban real estate market has, in theory, the potential to lower land prices due to the rightward shift of the supply curve. However, as indicated in Sections 4.1.1 and 4.2.1, the expansion of the land market has attracted more developers, intensified market competition and ultimately leading to high land premium rates. This heightened competition is not only evident in the land market but also permeates the real estate market. As outlined in Section 4.2.2, given the inability to reduce land acquisition costs amid harsh competition, developers are compelled to pass these costs onto homebuyers through price transmission effects. Consequently, the average housing prices exhibit a gradual upward trend, as shown in Figure 8. To remain competitive, developers must appeal to homebuyers through non-price factors, such as product differentiation and innovation. This shift drives the real estate market closer to a model of perfect competition. From the perspective of homebuyers, this stakeholder group increasingly demands higher standards for housing, influenced by greater transparency of market information and evolving marketing strategies. Preferences are shifting towards improved housing option that prioritize comfort and quality according to Section 4.2.2.

In summary, the market structure is gradually transitioning towards a model of perfect competition, thereby leading to the formation of price mechanisms and fostering a more optimized market environment.

3.3. Social feedback level

At the macro level, the responses of stakeholders and the transformation of the real estate market collectively impact the feedback mechanisms of the entire city, such as the effects of accelerated urbanization, industrial upgrading, and welfare redistribution. These factors together constitute the social feedback level, adjusting the further refinement and implementation of government policies.

3.3.1. Accelerating urbanization effect.

With the implementation of the aforementioned land transfer policies, a significant amount of rural land has been converted into urban construction land, further accelerating the process of urbanization. Based on the data and analysis in Section 2.1.2, as well as the chart in Figure 1, the acceleration of urbanization in China is evident. The line graph below illustrates the process of urbanization in Hangzhou from 2017 to 2023 (Hangzhou Gov, 2023).

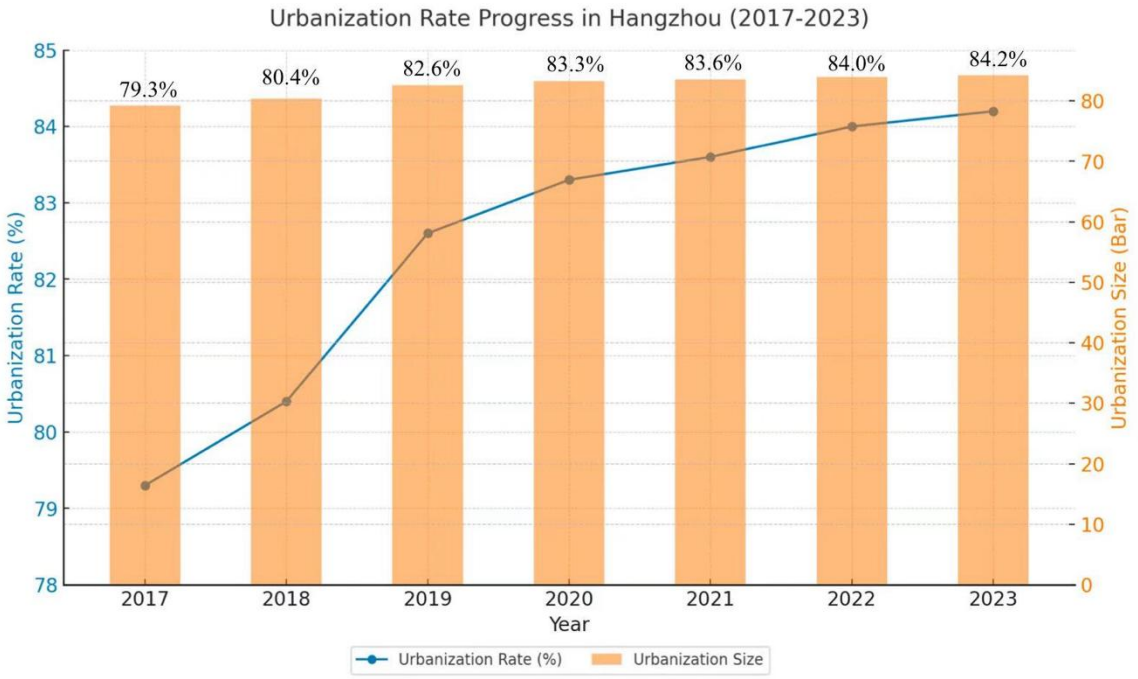

Figure 5. Urbanization Rate Progress in Hangzhou (2017-2023)

(Source: Hangzhou Municipal People's Government, 2023)

Therefore, the process of urbanization has further promoted spatial restructuring, especially in more developed regions where well-established and comprehensive urban structures have formed, for example, the urbanization rate of Bin Jiang district in Hangzhou has reached 100% in 2023 (Hangzhou Gov, 2023). As a result, some population-related issues, such as traffic congestion or urban heat island effect can be reduced. In Hangzhou, government reports indicated that in 2022, the average one-way commute time in Hangzhou was 35 minutes, the shortest among China's 14 megacities. Compared to 2021, Hangzhou's commute time has decreased by 6.52%, reflecting notable improvements in urban transportation efficiency (Hangzhou Gov, 2023). The above information demonstrates the effect of accelerating urbanization, fully emphasized the benefit of spatial restruction and the reform of population structure issues. Furthermore, as noted in Section 2.1.1, the rural-to-urban migration accompanying urbanization has not only facilitated the influx of talent into cities but also driven the upgrading and transformation of industrial structures.

3.3.2. Industrial upgrading effect.

As previously mentioned, the upgrading of urban industrial structures is also propelled by the process of urbanization. Specifically, with the addition of significant amounts of land designated for construction and the population inflow, the original industrial systems of cities may undergo upgrading due to the urbanization. In Hangzhou, such changes are commonly observed in the shift

from secondary to tertiary industries or from high-pollution industries to environmentally friendly industries. The Table 15 use the Industrial Transformation in the Kang Qiao Subdistrict, Gong Shu District, Hangzhou to show this change.

Table 2. Industrial Transformation in the Kang Qiao Subdistrict

Aspect	Before Land Reform (Pre-2014)	After Land Reform (Post-2014)
Dominant Industries	Heavy industries: Hangzhou Refinery, Hangzhou Coal Gas Plant	Life sciences: Kangqiao Health Industry Park (biopharmaceutical research and high-end medical rehabilitation); green energy: Wujia Dun Industrial Park (new energy vehicle and photovoltaic projects)
Land Use	Industrial use dominated by heavy manufacturing facilities	Reallocated 500+ mu for urban redevelopment and high-value industries
Urban Villages	Nine urban villages with limited modern infrastructure	Complete demolition and integration into modern urban planning
Economic Focus	Traditional manufacturing, high pollution	Innovation-driven industries: biopharmaceuticals, medical rehabilitation, and renewable energy

The above case precisely illustrates the industrial upgrading driven by land transfer, transitioning from low-productivity, high-pollution industries to high-productivity service sectors or renewable energy industries. This transformation not only reduces negative externalities but also enhances land-use efficiency and creates additional local employment opportunities, reflecting the positive social feedback of this innovative industrial model.

3.3.3. Welfare redistribution effect.

Land transfer policies significantly contribute to social welfare redistribution. Farmers and original landowners gain direct benefits through transferring the right of land management, while local residents see increased employment opportunities from industrial upgrades. Improved land-use efficiency and rising land values further expand income channels, enhancing local income structures. For example, in the case outlined in 4.1.3, the project is expected to increase collective income by over 4 million yuan, representing a 57.5% boost compared to the village's total annual income of 6.961 million yuan in 2020. Similarly, in the case presented in 4.3.2, Gong Shu District generated 19.7 million yuan in property rental income through the transfer of reserved land in 2023 (Hangzhou Gov, 2023). Additionally, urban public services can be optimized as local industrial upgrades and integrated urban-rural development drive improvements in infrastructure. The following graph illustrates the public infrastructure investment in several areas.

Table 3. Public infrastructure investment

Sector	Number of Projects	Annual Investment	Progress of Construction
Overall	841	280 billion CNY	Total investment of 1.87 trillion CNY; planned investment of 212.9 billion CNY
Education	74	16.1 billion CNY	54 schools under construction (e.g., Tianyuan Academy Hemu Campus, Hangzhou Polytechnic Jiande Campus); 23 schools (e.g., Phase III of Westlake University) expected to be completed in 2025
Healthcare	20	4.5 billion CNY	5 hospitals completed and operational (adding 3,000 beds); other projects under construction
Municipal and Water Infrastructure	96	10.71 billion CNY	15 projects completed (e.g., Phase I of Wenyi West Road Extension, Xiangfu Water Plant Expansion); 81 projects under construction (e.g., Lifan Reservoir Expansion, Wen'er West Road Tunnel)
Transportation	7	52.4 billion CNY	7 projects under construction (e.g., Hangzhou-Quzhou Railway [Jian-Qu section], Changlong Aviation Apron), expected to be operational by 2025

(Source: Hangzhou daily news, 2024)

The cases above illustrate that the land transfer policies enhance social welfare by boosting landowners' income, creating jobs, and improving infrastructure through industrial transformation and urban-rural integration.

Overall, The policy transmission level reveals pathways for price effects, supply structure shifts, and spatial reconfiguration. The market response level illustrates stakeholder dynamics and structural adjustments. The social feedback layer captures the combined impacts of urbanization, industrial upgrading, and welfare redistribution.

4. Empirical analysis

4.1. Research Design

This Study selects to construct An Ordinary Least Squares (OLS) Regression Analysis Model for empirical analysis to analyze the impact of Land Transfer Policies on the Real Estate Market (A Case Study of Hangzhou). The general expression of the model is as follows:

$$ln\ (HousePrice_t) = \beta_0 + \beta_1 ln\ (LandRevenue_t) + \beta_2 ln\ (Income_t) + \beta_3 ln\ (People)_t + \beta_4 Urbanization\_rate_t + \varepsilon_t$$

Among them, the explained variable $ln\ (HousePrice_t)$ represents the real estate market indicator, the explained variable $ln\ (LandRevenue_t)$ represents the land transfer policy, ε_t represents the error term, and the subscript represents the year.

4.2. Variable Selection and Explanation

This study employs a linear regression model to analyze the impact of Hangzhou's land transfer policies on its real estate market. The variables include independent, dependent, and control variables,

covering policy transmission, market demand changes, and social structural transformations. This approach explores the connections between land supply, urbanization, and housing price fluctuations, ensuring the model captures the dynamics of the research questions.

Land revenue, the key independent variable, is defined as the annual income (in ten thousand yuan) generated from the transfer of both state-owned and collective land in Hangzhou. This variable is logarithmically transformed to eliminate dimensional differences and directly quantifies the intensity of land policy implementation and the scale of land supply. Theoretically, land transfer revenue affects housing prices through two pathways: (1) an increase in land supply may reduce developers' land acquisition costs, thereby alleviating upward pressure on housing prices; and (2) intensified competition in the land market may lead to higher premium rates, increasing development costs and potentially driving up housing prices. The data for this variable is sourced from the Hangzhou Planning and Natural Resources Bureau and the Yuhang District Rural Collective Land Trading Platform for the period 2017–2023. To ensure the accuracy of the time-series characteristics of policy effects, the data is adjusted using the Consumer Price Index (CPI).

Housing prices, the core dependent variable, are measured by the logarithm of the annual average transaction price (in yuan per square meter) of residential properties in Hangzhou. This metric reflects the balance of supply and demand in the real estate market and the effectiveness of policy interventions. Logarithmic transformation is applied to address the right-skewed distribution of price data and to enable the interpretation of regression coefficients as price elasticities, facilitating the quantification of marginal effects between variables. The data for housing prices is compiled from Hangzhou Municipal Bureau of Statistics' annual transaction reports for the period 2020–2023 and regional housing price indices published by the National Bureau of Statistics. This data covers key stages of policy adjustments and reveals the transmission mechanism of changes in land supply on housing prices.

To control for potential confounding factors, three key variables are included:

The logarithm of urban per capita disposable income (in yuan per year), reflecting residents' housing purchasing power and demand-side pressures. Income growth drives housing consumption upgrades.

The logarithm of permanent population (in ten thousand people), quantifying the expansion of rigid housing demand during urbanization.

Urbanization rate (%), measuring the depth of urban-rural structural transformation and indirectly linking land-use conversion (such as the conversion of agricultural land) and industrial upgrading to long-term impacts on the real estate market.

All data for these control variables are sourced from Hangzhou Statistical Yearbooks and the Seventh National Population Census Report. To ensure the robustness and explanatory power of the model estimation, the data is adjusted by the Consumer Price Index (CPI) and missing values are addressed through linear interpolation.

4.3. Statistical descriptive analysis

This section provides statistical descriptions of the variables involved in the empirical analysis to reveal the basic characteristics of the data. Table 4 presents the mean, standard deviation (SD), minimum (Min), and maximum (Max) values of the observed variables (N=7) for Hangzhou from 2017 to 2023. All variables were logarithmically transformed (except urbanization rate) to eliminate dimensional differences and satisfy the linear assumptions of the model.

The housing price (HP) has a mean of 10.29 and a standard deviation of 0.085, indicating minor fluctuations in log-transformed housing prices during the observation period, with an overall stable trend. The minimum value of 10.20 (2020) and maximum value of 10.43 (2023) reflect an average annual growth rate of approximately 2.2%. Land revenue (LR) exhibits a mean of 17.02 and a standard deviation of 0.189, suggesting moderate volatility in land transaction scales, though remaining at a consistently high level (16.79–17.30). The urban per capita disposable income (Ic)

shows a mean of 11.14 and a standard deviation of 0.129, with values ranging from 10.94 to 11.30, demonstrating steady income growth aligned with urbanization progress. The permanent population (P) has a mean of 7.019 and a standard deviation of 0.120, spanning 6.853–7.133, reflecting continuous population expansion in Hangzhou. The urbanization rate averages 81.4% with a standard deviation of 3.8%, ranging from 76.8% (2017) to 86.5% (2023), highlighting accelerated urbanization driven by policy interventions and relatively balanced regional development.

In summary, the standard deviations of all variables are below 0.2, indicating low data dispersion and alignment with the stationarity characteristics of time-series data. Furthermore, the dataset was adjusted using the Consumer Price Index (CPI) to address missing values through linear interpolation, ensuring model robustness. These statistical outcomes establish a reliable foundation for subsequent regression analysis.

Table 4. Statistical descriptive analysis

Variable	N	Mean	SD	Min	Max
HP	7	10.29	0.0850	10.20	10.43
LR	7	17.02	0.189	16.79	17.30
Ic	7	11.14	0.129	10.94	11.30
P	7	7.019	0.120	6.853	7.133
Urbanizati~e	7	0.814	0.0380	0.768	0.865

4.4. Correlation Analysis

The correlation matrix in Table 5 reveals the relationships between housing prices (HP) and key variables. First, land revenue (LR) exhibits a weak negative correlation with housing prices ($r = -0.249$), suggesting that increased land supply may exert downward pressure on housing prices by reducing land acquisition costs for developers. However, this relationship is not statistically significant, implying that other factors may mediate this effect.

Housing prices show a moderate positive correlation with urban per capita disposable income (Ic) ($r = 0.652$), indicating that higher income levels enhance residents' purchasing power and drive housing demand. Similarly, permanent population (P) and urbanization rate are positively correlated with housing prices ($r = 0.588$ and $r = 0.581$, respectively), underscoring the role of population growth and urbanization in stimulating housing demand. Notably, urbanization rate demonstrates a strong positive correlation with permanent population ($r = 0.978$) and income ($r = 0.945$), reflecting the intertwined nature of demographic shifts, economic development, and urban expansion.

These results align with theoretical expectations: income growth and population influx amplify housing demand, while urbanization fosters structural transformations that reshape real estate dynamics. However, the insignificant correlation between land revenue and housing prices highlights the complexity of policy transmission mechanisms, where competitive land auctions and developer behavior may counteract the price-suppressing effects of land supply expansion. The findings emphasize the need to contextualize policy impacts within broader market and socioeconomic frameworks.

Table 5. Correlation Analysis

HP	LR	Ic	P	Urbanization_rate	
HP	1				
LR	-0.249	1			
Ic	0.652	0.0470	1		
P	0.588	0.0970	0.951***	1	
Urbanizati~e	0.581	-0.0620	0.945***	0.978***	1

Note: *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

4.5. Benchmark Regression Analysis

The benchmark regression results in Table 6 provide insights into the relationships between land transfer policies, control variables, and housing prices in Hangzhou. Four models were estimated to assess the robustness of these relationships by incrementally adding control variables.

In Model (1), land revenue (LR) exhibits a negative coefficient (-0.113), suggesting that increased land supply may reduce housing prices by alleviating developers' land acquisition costs. However, the effect is statistically insignificant (t = -0.57), implying that other factors may mediate this relationship. The constant term (12.204) is significant at the 5% level, reflecting baseline housing price levels in Hangzhou.

Model (2) introduces urban per capita disposable income (Ic), which shows a positive coefficient (0.439) with marginal significance (t = 1.88). This aligns with theoretical expectations: higher income levels enhance residents' purchasing power, driving housing demand and prices. The inclusion of Ic improves the model's explanatory power, as indicated by the rise in R^2 from 0.062 to 0.503.

Model (3) incorporates permanent population (P), which yields a negative but insignificant coefficient (-0.127). This contradicts the hypothesized positive relationship between population growth and housing demand, potentially due to multicollinearity between P and Ic (r = 0.951). The insignificant result underscores the complexity of disentangling population effects in a small sample.

Model (4) adds urbanization rate, which shows a large negative coefficient (-6.217) but remains statistically insignificant (t = -0.88). This counterintuitive result may reflect omitted variables or the limited time span (2017–2023), as urbanization's long-term structural impacts may not be fully captured. The adjusted R^2 increases to 0.643, indicating improved model fit, though the small sample size (N = 7) limits generalizability.

Across all models, land revenue (LR) consistently displays weak negative associations with housing prices, but statistical insignificance suggests that competitive land auctions and developer strategies (e.g., bidding premiums) may counteract the price-suppressing effects of expanded land supply. Income (Ic) emerges as the most influential variable, though its significance diminishes with additional controls.

These findings highlight the nuanced transmission mechanisms of land transfer policies, where market competition and stakeholder behaviors complicate direct policy effects. Future research should expand the dataset and employ advanced econometric techniques to address small-sample limitations and better isolate causal relationships.

Table 6. Benchmark Regression Analysis

	(1)	(2)	(3)	(4)
	HP	HP	HP	HP
LR	-0.113	-0.127	-0.123	-0.316
	(-0.57)	(-0.79)	(-0.66)	(-1.08)
Ic		0.439	0.550	0.710
		(1.88)	(0.63)	(0.77)
P			-0.127	1.672
			(-0.13)	(0.74)
Urbanization_rate				-6.217
				(-0.88)
_cons	12.204**	7.562	7.141	1.091
	(3.66)	(2.06)	(1.36)	(0.12)
N	7.000	7.000	7.000	7.000
r2	0.062	0.503	0.506	0.643

Note: t statistics in parentheses; *, **, and *** represent significance levels of 10%, 5%, and 1% respectively.

5. Conclusion and prospect

5.1. Key findings

This study systematically examines the impact of land transfer policies on Hangzhou's real estate market through theoretical analysis, case studies, and empirical modeling. The key findings are summarized as follows:

5.1.1. Land Supply Dynamics and Housing Prices.

The empirical analysis reveals a weak negative relationship between land revenue (LR) and housing prices, aligning with the theoretical expectation that increased land supply may reduce developers' acquisition costs. However, this effect is statistically insignificant, suggesting that market competition and developer strategies—such as aggressive bidding for prime locations—counteract the price-suppressing potential of expanded land supply. For instance, Yuhang District's land transfers (55,800 mu) in 2023 led to a 5.01% temporary price decline, but subsequent auctions saw premiums exceeding 30%, ultimately stabilizing prices. This underscores the dual role of land transfer policies: while increasing supply, they also intensify competition, creating complex price dynamics.

5.1.2. Urbanization and Housing Demand.

Land transfer policies significantly accelerate urbanization by converting rural land into urban construction land. Hangzhou's urbanization rate surged from 76.8% (2017) to 86.5% (2023), driven by rural-to-urban migration and industrial upgrading. Urbanization amplifies rigid housing demand, as evidenced by the positive correlation between permanent population (P) and housing prices ($r = 0.588$). However, the regression models highlight multicollinearity between population growth and income ($r = 0.951$), complicating the isolation of pure demographic effects. Case studies, such as Shuangpu Town's transformation into a mixed-use zone, demonstrate how land diversification meets urban population needs while fostering economic growth.

5.1.3. Structural Transformation of the Real Estate Market.

The conversion of rural land to non-agricultural uses optimizes land functions and stimulates industrial upgrades. For example, Qiantang District's collaboration with state-owned enterprises to develop high-end complexes catalyzed industrial-urban integration, generating annual collective income growth of 57.5%. This structural shift drives market competition toward non-price factors (e.g., housing quality, smart amenities), as seen in the rising demand for upgraded housing (e.g., 200+ m^2 units). Concurrently, policies like educational equity reforms diminish the premium for school district housing, reshaping buyer preferences toward comfort and functionality.

5.1.4. Social Welfare and Policy Trade-offs.

Land transfer policies enhance social welfare through income redistribution, job creation, and infrastructure improvements. Projects like Gong Shu District's retained land development generated ¥19.7 million in rental income (2023), benefiting both collectives and residents. However, rapid urbanization introduces challenges, such as balancing industrial growth with environmental sustainability and managing urban sprawl. The insignificant coefficient for urbanization rate (-6.217) in Model (4) hints at unresolved trade-offs, necessitating long-term policy calibration.

5.2. Policy proposal

Based on the empirical findings and case study insights, this study proposes targeted policy recommendations to optimize land transfer mechanisms, enhance market efficiency, and ensure equitable urban-rural development in Hangzhou and similar rapidly urbanizing regions:

5.2.1. Dynamically Adjust Land Supply to Stabilize Housing Prices.

Establish a flexible land supply system that responds to real-time market demand. For instance, increase land auctions in periods of housing price surges (e.g., prime locations like Binjiang District)

and prioritize industrial/commercial land in areas with oversupplied residential markets; Implement tiered land premium caps to curb excessive bidding competition. For high-demand parcels, mandate a portion of affordable housing (e.g., 20–30% of projects) to balance profit motives with social welfare.

5.2.2. Promote Fair Competition and Market Diversification.

ntroduce preferential policies (e.g., tax incentives, simplified approval processes) to encourage small and medium-sized developers to participate in land auctions, reducing monopolization by large firms; Digitize land transaction platforms to ensure open bidding processes and prevent collusion. Publish detailed auction data (e.g., premium rates, developer profiles) to improve market accountability.

5.2.3. Strengthen Urban-Rural Integration with Quality Urbanization.

Allocate land transfer revenues to upgrade public services (e.g., schools, hospitals) and transportation networks in newly urbanized areas, as seen in Qiantang District's high-end complex project; Reserve land for strategic industries (e.g., tech parks, green manufacturing) to create local jobs and reduce reliance on speculative real estate development.

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