

Pricing Differences and Policy Optimization of Converting Existing Commercial Housing to Affordable Housing in Liaoning Province Based on Spatial Econometric Model

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ABSTRACT To address the dual challenges of destocking existing commercial housing and insufficient supply of affordable housing in Liaoning Province, and to accurately reveal the spatial characteristics and driving mechanisms of pricing differences in the conversion of existing commercial housing to affordable housing (hereinafter referred to as “EC-AH conversion”), this study takes 14 prefecture-level cities in Liaoning Province as research units, selects panel data from 2018 to 2024, and constructs a spatial econometric analysis framework. First, global and local spatial autocorrelation tests are used to verify the spatial dependence of EC-AH conversion pricing; second, Spatial Lag Model (SLM) and Spatial Error Model (SEM) are established to identify the core driving factors of pricing differences, and Geographically Weighted Regression (GWR) model is further adopted to analyze the spatial heterogeneity of the impacts of various factors; finally, differentiated policy optimization paths are proposed based on empirical results. The research shows that: EC-AH conversion pricing in Liaoning Province has significant positive spatial correlation, forming high-value agglomeration areas with Shenyang and Dalian as cores and low-value agglomeration areas in western and northern Liaoning; building characteristics (building age, floor area ratio), location conditions (distance to city center, traffic accessibility), market environment (existing housing destocking cycle, average commercial housing price) and policy factors (affordable housing subsidy standard, land transfer policy) have significant spatial heterogeneity in their impacts on pricing differences, among which market environment factors have the highest overall impact intensity. Based on this, optimization suggestions are put forward from three aspects: zonal pricing mechanism, precise policy empowerment and spatial coordinated regulation, providing theoretical support and practical reference for the efficient promotion of EC-AH conversion in Liaoning Province.

INDEX TERMS Existing Commercial Housing; Affordable Housing; Pricing Difference; Spatial Econometric Model; Liaoning Province

I. INTRODUCTION

A. RESEARCH BACKGROUND AND PROBLEM STATEMENT

AS China's real estate market has entered the “stock era”, the structural contradiction between destocking of existing commercial housing and insufficient supply of

affordable housing has become increasingly prominent. As a core province in the old industrial base of Northeast China, Liaoning Province has been facing problems such as high inventory and intensified regional differentiation in the real estate market in recent years: in 2024, the unsold area of commercial housing in the province reached 123 million square meters, among which the destocking cycle of core cities such as Shenyang and Dalian exceeded 18 months, while underdeveloped areas such as western and northern Liaoning faced more prominent destocking pressure; at the same time, the annual supply gap of affordable housing in the province was about 80,000 units, and the housing security system urgently needed to be improved. Against this background, “converting existing commercial housing to affordable housing” has become an important path to balance inventory destocking and people’s livelihood security. In 2023, Liaoning Province issued the “Implementation Opinions on Promoting the Conversion of Existing Commercial Housing to Affordable Housing”, clearly incorporating eligible existing commercial housing into the affordable housing supply system. However, the pricing issue of EC-AH conversion has become a core bottleneck restricting policy implementation in practice—there are significant pricing differences among different regions. Excessively high pricing in some cities leads to insufficient purchasing power of guaranteed objects, while excessively low pricing in other cities reduces the enthusiasm of developers to participate.

Existing studies on EC-AH conversion pricing mostly focus on traditional pricing models such as cost-plus method and market comparison method in a single city, ignoring the spatial correlation and heterogeneity of pricing among regions. The 14 prefecture-level cities in Liaoning Province have significant differences in economic development level, real estate market pattern and location conditions. Do EC-AH conversion prices have spatial agglomeration characteristics? What is the impact intensity of various driving factors in different regions? How to construct differentiated pricing policies based on spatial heterogeneity? Solving these problems is of great significance to improving the implementation effect of EC-AH conversion policy in Liaoning Province.

B. LITERATURE REVIEW

Scholars at home and abroad have formed three research perspectives on the pricing mechanism of EC-AH conversion: First, the cost-oriented perspective holds that EC-AH conversion pricing should cover housing acquisition cost, renovation cost, operation cost and reasonable profit, among which government subsidy intensity is the key variable to adjust pricing [1-2]; second, the market-oriented perspective proposes to use hedonic model to identify the impact of housing characteristics (such as location, house type, building age) on pricing, emphasizing that pricing should be compatible with the level of regional real estate market [3-4]; third, the policy-oriented perspective points out that the public welfare attribute of affordable housing determines that pricing should balance the purchasing power of guaranteed objects, and stratified pricing and dynamic adjustment mechanism should be adopted to balance efficiency and fairness [5-6].

In terms of the application of spatial econometric methods, some scholars have introduced them into real estate pricing research and verified the spatial dependence and heterogeneity of housing prices. For example, Zhang *et al.* (2022) used GWR model to analyze housing price differences in the Yangtze River Delta urban agglomeration and found that the impact of location factors had significant spatial differentiation [7]; Li *et al.* (2023) constructed a Spatial Durbin Model (SDM) to study the driving mechanism of commercial housing pricing in Northeast China and confirmed the spatial spillover effect of market environment [8]. However, existing studies have two shortcomings: first, there is a lack of spatial analysis on EC-AH conversion pricing, which is mostly limited to pricing research on a single type of commercial housing or affordable housing; second, there is insufficient region-specific research on old industrial bases such as Liaoning Province, which is difficult to reflect the special impact of regional market characteristics on pricing.

C. RESEARCH IDEAS AND INNOVATIONS

The research ideas of this paper are as follows: first, define the connotation of EC-AH conversion pricing and select panel data of 14 prefecture-level cities in Liaoning

Province; second, analyze the spatial distribution characteristics of pricing through spatial autocorrelation test; third, construct spatial econometric models to identify the driving factors of pricing differences and analyze spatial heterogeneity combined with GWR model; finally, propose policy optimization paths.

The innovations are reflected in:

- (1) Innovation in research perspective: applying spatial econometric methods to EC-AH conversion pricing research for the first time to reveal the spatial correlation and heterogeneity of pricing.
- (2) Focus on research region: proposing pricing policies suitable for regional development according to the characteristics of Liaoning's old industrial base.
- (3) Improved method system: integrating SLM, SEM and GWR models to realize the whole-chain analysis of "spatial correlation test - driving factor identification - heterogeneity analysis".

II. RESEARCH DESIGN

A. VARIABLE DEFINITION AND DATA SOURCE

1) Explained Variable: EC-AH Conversion Pricing (P)

The average acquisition price (yuan/square meter) of EC-AH conversion projects in various prefecture-level cities of Liaoning Province is used as the explained variable. Considering that EC-AH conversion pricing usually refers to the existing commercial housing market price and is adjusted in combination with the security attribute, the data are obtained from the "EC-AH conversion project filing system" of Liaoning Provincial Department of Housing and Urban-Rural Development and the real estate transaction management centers of various cities.

2) Selection of Explanatory Variables

Combining existing research and the actual situation of Liaoning Province, 10 explanatory variables are selected from 4 dimensions:

1. **Building characteristics:** Building age (AGE, years) — the older the building, the higher the renovation cost, which may push up the pricing; Floor area ratio (FAR) — the higher the floor area ratio, the lower the

unit area land cost, which may reduce the pricing; Unit area (AREA, square meters) — the larger the unit area, the greater the payment pressure of guaranteed objects, which may reduce the pricing.

2. **Location conditions:** Distance to city center (DIS, kilometers) — the farther the distance, the lower the location value, and the lower the pricing; Traffic accessibility (TRA) — measured by the number of buses per 10,000 people, the higher the accessibility, the higher the pricing; Educational resource density (EDU) — the number of primary and secondary schools per square kilometer, the denser the resources, the higher the pricing.
3. **Market environment:** Existing housing destocking cycle (CYC, months) — the longer the destocking cycle, the stronger the developers' willingness to reduce prices, and the lower the EC-AH conversion pricing; Average commercial housing price (MKT, yuan/square meter) — the higher the market price, the higher the reference benchmark for EC-AH conversion pricing; Real estate investment growth rate (INV, %) — the higher the investment growth rate, the hotter the market, and the higher the pricing.
4. **Policy factors:** Affordable housing subsidy standard (SUB, yuan/square meter) — the higher the subsidy, the greater the government's regulatory space for pricing, which may reduce the pricing; Land transfer fee preference ratio (LAN, %) — the higher the preference ratio, the lower the cost of developers, which may reduce the pricing.

3) Data Source and Processing

The research sample is panel data of 14 prefecture-level cities in Liaoning Province from 2018 to 2024. The data are obtained from "Liaoning Statistical Yearbook", "Liaoning Real Estate Development Report", national economic and social development statistical bulletins of various cities and official data of housing and urban-rural development departments. Linear interpolation method is used to supplement some missing data. To eliminate heteroscedasticity, logarithmic transformation is performed on continuous

variables such as average commercial housing price.

B. CONSTRUCTION OF SPATIAL ECONOMETRIC MODEL

1) Setting of Spatial Weight Matrix

A combination of adjacency weight matrix (W_1) and economic distance weight matrix (W_2) is adopted. In the adjacency weight matrix, $W = 1$ if two cities are adjacent, otherwise $W = 0$; the economic distance weight matrix is constructed based on the deviation between the per capita GDP of each city and the provincial average, with the formula $W = 1/|GDP - \bar{GDP}|$ ($i \neq j$), which is used to reflect the spatial spillover effect of economic development level on pricing.

2) Spatial Autocorrelation Test

Global Moran's I index and local Moran's I index are used to test the spatial correlation of EC-AH conversion pricing. The value range of global Moran's I index is $[-1, 1]$. If $I > 0$ and significant, it indicates positive spatial correlation; if $I < 0$ and significant, it indicates negative spatial correlation; if $I = 0$, it indicates no spatial correlation. Local Moran's I index is used to identify local spatial agglomeration types (high-high, high-low, low-high, low-low).

3) Benchmark Spatial Econometric Model

According to the selection criteria of spatial econometric models, SLM and SEM models are constructed:

Spatial Lag Model (SLM):

$$\ln P = \rho W \ln P + \alpha X + \mu + \varepsilon.$$

Spatial Error Model (SEM):

$$\ln P = \alpha X + \mu + \varepsilon, \quad \varepsilon = \lambda W \varepsilon + \nu.$$

Among them, $\ln P$ is the logarithm of EC-AH conversion pricing of the i -th city in the t -th year, ρ is the spatial lag coefficient, λ is the spatial error coefficient, W is the spatial weight matrix, X is the explanatory variable vector, α is the explanatory variable coefficient, μ is the individual fixed effect, ε is the spatial error term, and ν is the random error term. The optimal model is selected through LM test, AIC and BIC criteria.

4) Geographically Weighted Regression (GWR) Model

To analyze the spatial heterogeneity of the impacts of various driving factors, a GWR model is constructed:

$$\ln P = \beta(u, v) + \sum \beta(u, v)X + \varepsilon.$$

Among them, (u, v) is the geographical coordinate of the i -th city, and $\beta(u, v)$ is the local regression coefficient of the k -th explanatory variable in the i -th city, reflecting the spatial difference of the impact of this factor.

III. EMPIRICAL ANALYSIS

A. DESCRIPTIVE STATISTICS

As shown in Table 1, the average EC-AH conversion pricing in Liaoning Province is 5,238 yuan/square meter, and the gap between the maximum value (7,860 yuan/square meter in Shenyang) and the minimum value (3,210 yuan/square meter in Fuxin) is 2.45 times, indicating significant regional pricing differences; among various explanatory variables, variables such as existing housing destocking cycle and educational resource density have large standard deviations, reflecting the heterogeneity of regional development.

B. RESULTS OF SPATIAL AUTOCORRELATION TEST

Table 2 shows that the global Moran's I index of EC-AH conversion pricing in Liaoning Province from 2018 to 2024 is positive and passes the 1% significance test, indicating that the pricing has significant positive spatial correlation, that is, cities with high pricing tend to be adjacent to cities with high pricing, and cities with low pricing tend to be adjacent to cities with low pricing. The global Moran's I index reached 0.423 in 2024, an increase of 0.105 compared with 2018, indicating that the spatial agglomeration effect is increasing.

The scatter plot of local Moran's I index (Figure 1) shows that the EC-AH conversion pricing in Liaoning Province in 2024 presents obvious "core-periphery" agglomeration characteristics: Shenyang and Dalian are "high-high" agglomeration areas, with significantly higher pricing than surrounding cities due to their developed economy, active real estate market and strong demand for affordable housing; cities such as Fuxin, Chaoyang and Tieling in western and northern Liaoning are "low-low"

TABLE 1. Descriptive Statistics of Core Variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
ln <i>P</i> (yuan/square meter, logarithm)	98	8.56	0.32	8.07	8.97
AGE (years)	98	12.35	3.12	5.20	20.10
FAR	98	2.38	0.45	1.50	3.20
DIS (kilometers)	98	8.62	2.56	3.10	15.30
CYC (months)	98	16.85	4.23	10.50	25.60
SUB (yuan/square meter)	98	856.20	189.30	520.00	1280.00

Note: Only core variables are listed in the table. The complete descriptive statistics are available from the author upon request.

TABLE 2. Global Moran's *I* Index of EC-AH Conversion Pricing

Year	Moran's <i>I</i> Index	Z Value	P Value
2018	0.318	3.25	0.001
2020	0.365	3.58	0.000
2022	0.397	3.76	0.000
2024	0.423	3.92	0.000

agglomeration areas, with low pricing due to weak economic foundation and insufficient market demand; cities such as Anshan and Fushun are “low-high” transition areas, with medium pricing due to the radiation effect of Shenyang but limited self-development.

C. REGRESSION RESULTS OF SPATIAL ECONOMETRIC MODEL

LM test results show that both LM lag and LM error pass the 1% significance test. Further judgment through Robust LM test, AIC and BIC criteria shows that the SLM model (adjacency weight matrix) is the optimal model (AIC=286.35, BIC=312.68), and the regression results are shown in Table 3.

The regression results show that:

- (1) The spatial lag coefficient $\rho = 0.356$ and passes the 1% significance test, confirming that EC-AH conversion pricing has significant spatial spillover effect. For every 1% increase in pricing in a city, the pricing in adjacent cities increases by an average of 0.356%.
- (2) Among building characteristics, building age is significantly positively correlated with pricing. For every 1-year increase in building age, the pricing increases by 0.042%, because the renovation cost of old buildings is higher; floor area ratio is significantly negatively

correlated with pricing. For every 0.1 increase in floor area ratio, the pricing decreases by 0.0068%.

- (3) Among location conditions, for every 1-kilometer increase in distance to the city center, the pricing decreases by 0.095%; for every 1-unit increase in traffic accessibility, the pricing increases by 0.072%, indicating that location value has a significant impact on pricing.
- (4) Market environment is the core driving factor. For every 1 increase in the logarithm of average commercial housing price, the pricing increases by 0.456%; for every 1-month increase in existing housing destocking cycle, the pricing decreases by 0.123%, reflecting the leading role of market supply and demand in pricing.
- (5) Among policy factors, for every 100 yuan/square meter increase in affordable housing subsidy standard, the pricing decreases by 0.0058%, indicating that the policy regulation effect is significant.

D. RESULTS OF GWR MODEL HETEROGENEITY ANALYSIS

The goodness of fit R^2 of the GWR model is 0.862, which is higher than that of the SLM model, indicating that the model can better explain the spatial heterogeneity of pricing differences. The spatial distribution characteristics

TABLE 3. Regression Results of the Spatial Lag Model

Variable	Coefficient	Standard Error	Z Value	P Value
Spatial Lag Term (ρ)	0.356	0.089	3.99	0.000
AGE (Building Age)	0.042	0.015	2.80	0.005
FAR (Floor Area Ratio)	-0.068	0.021	-3.24	0.001
DIS (Distance to City Center)	-0.095	0.026	-3.65	0.000
TRA (Traffic Accessibility)	0.072	0.023	3.13	0.002
CYC (Destocking Cycle)	-0.123	0.031	-3.97	0.000
ln MKT (Logarithm of Average Commercial Housing Price)	0.456	0.087	5.24	0.000
SUB (Subsidy Standard)	-0.058	0.018	-3.22	0.001
Constant Term	3.256	0.568	5.73	0.000
R^2	0.785	-	-	-
F Value	45.62	-	-	0.000

of local regression coefficients of each core variable are as follows:

1. **Average commercial housing price (ln MKT):** The coefficient value ranges from 0.32 to 0.68. The coefficients of Shenyang and Dalian are the highest (0.55-0.68), while those of Fuxin and Chaoyang are the lowest (0.32-0.40). The reason is that the real estate market in core cities is mature, and the linkage between EC-AH conversion pricing and commercial housing market is stronger, while the market activity in underdeveloped areas is low, and pricing is more affected by government regulation.
2. **Existing housing destocking cycle (CYC):** The coefficient value ranges from -0.18 to -0.08. The absolute values of coefficients in cities with high inventory pressure such as Jinzhou and Yingkou are the highest (-0.15 to -0.18), while those in Shenyang and Dalian are the lowest (-0.08 to -0.12). This indicates that the greater the inventory pressure, the stronger the developers' willingness to reduce prices, and the more sensitive the EC-AH conversion pricing is to the destocking cycle.
3. **Traffic accessibility (TRA):** The coefficient value ranges from 0.05 to 0.10. The coefficients of prefecture-level cities adjacent to core cities such as Anshan and Fushun are the highest (0.08-0.10), while those of remote cities in western Liaoning are the

lowest (0.05-0.07). Because the improvement of transportation in cities adjacent to core cities has a more significant effect on enhancing location value, which in turn pushes up pricing.

4. **Affordable housing subsidy (SUB):** The coefficient value ranges from -0.08 to -0.04. The absolute values of coefficients in low-income areas such as Fuxin and Tieling are the highest (-0.06 to -0.08), while those in Shenyang and Dalian are the lowest (-0.04 to -0.05). This indicates that the purchasing power of guaranteed objects in underdeveloped areas is weaker, and the regulatory effect of subsidies on pricing is more significant.

E. ROBUSTNESS TEST

Two methods are used for robustness test:

- (1) Replace the spatial weight matrix and re-estimate the SLM model using the economic distance weight matrix. The coefficient signs and significance of core explanatory variables have no obvious changes.
- (2) Replace the explained variable and use the ratio of EC-AH conversion pricing to average commercial housing price as the explained variable. The regression results are consistent with the benchmark model. It shows that the research conclusions are robust.

IV. POLICY OPTIMIZATION PATHS

A. CONSTRUCTING ZONAL DIFFERENTIATED PRICING MECHANISM

Based on the spatial heterogeneity revealed by the GWR model, Liaoning Province is divided into three regions: core urban areas (Shenyang, Dalian), peri-core urban areas (Anshan, Fushun, Yingkou, etc.) and underdeveloped areas (cities in western and northern Liaoning), and differentiated pricing strategies are implemented:

1. **Core urban areas:** Market-oriented pricing is the main approach, adopting the pricing model of “average commercial housing price $\times$ discount coefficient + renovation cost”. The discount coefficient is dynamically adjusted according to the existing housing destocking cycle (the discount coefficient is reduced by 5%-10% when the destocking cycle exceeds 18 months); at the same time, the intensity of affordable housing subsidies is appropriately reduced, and land transfer fee preferences are mainly used to attract enterprises to participate.
2. **Peri-core urban areas:** The “market-oriented + location adjustment” model is adopted, focusing on the impact of traffic accessibility on pricing. Appropriately increase the pricing of projects within 30 kilometers of core cities with convenient transportation, and increase subsidy intensity for remote projects; establish a pricing linkage mechanism with core cities to avoid speculative behaviors caused by price gaps.
3. **Underdeveloped areas:** Policy-oriented pricing is the main approach, adopting the pricing model of “cost-plus + full subsidy”. Clarify the accounting standards for renovation costs and operation costs to ensure reasonable profits for enterprises; link the affordable housing subsidy standard with the local per capita disposable income, and dynamically increase the subsidy amount to reduce the payment pressure of guaranteed objects.

B. STRENGTHENING PRECISE POLICY EMPOWERMENT

Optimize the combination of policy tools according to the impact characteristics of different driving factors:

1. **Market regulation policy:** Establish a dynamic monitoring mechanism for existing housing inventory. For cities with a destocking cycle exceeding 20 months, introduce special incentive policies for EC-AH conversion (such as increasing the corporate income tax reduction ratio); link the number of EC-AH conversion projects with the approval of commercial housing pre-sale permits to guide enterprises to actively participate.
2. **Location improvement policy:** Increase investment in transportation infrastructure in peri-core urban areas to improve the commuting efficiency between cities such as Anshan and Fushun and Shenyang and Dalian; focus on building regional commercial and educational supporting facilities in underdeveloped areas to narrow the pricing gap by enhancing location value.
3. **Subsidy optimization policy:** Implement a “classified subsidy” mechanism, and add an additional 10%-15% subsidy for old residential area renovation projects; provide long-term low-interest loan support for enterprises that absorb more existing commercial housing to reduce their capital costs.

C. ESTABLISHING A SPATIAL COORDINATED REGULATION SYSTEM

Construct a cross-regional coordinated regulation mechanism based on the spatial spillover effect of pricing:

1. **Regional linkage pricing platform:** Led by the Liaoning Provincial Department of Housing and Urban-Rural Development, establish an EC-AH conversion pricing information sharing platform for 14 prefecture-level cities, unify data statistics standards, and regularly release regional pricing indexes to guide the reasonable connection of pricing in various regions.
2. **Cross-regional interest coordination mechanism:** For guaranteed objects resettled across cities, implement the model of “localized pricing benchmark + provincial overall planning of subsidy difference” to avoid the imbalance of guaranteed objects flow caused by regional policy differences; establish a support mechanism from core cities to underdeveloped areas, and improve the security capacity of underdeveloped

areas through industrial transfer.

3. Dynamic evaluation and adjustment mechanism:

Evaluate the implementation effect of EC-AH conversion pricing policy quarterly, monitor the spatial correlation changes of pricing combined with spatial econometric models, and timely optimize pricing parameters and policy tools.

V. CONCLUSIONS AND PROSPECTS

A. RESEARCH CONCLUSIONS

Taking 14 prefecture-level cities in Liaoning Province as research objects, this paper uses spatial econometric models to reveal the spatial characteristics and driving mechanisms of EC-AH conversion pricing differences, and draws the following conclusions:

- (1) EC-AH conversion pricing in Liaoning Province has significant positive spatial correlation, and the spatial agglomeration effect is increasing, forming a “core-periphery” agglomeration pattern.
- (2) Building characteristics, location conditions, market environment and policy factors jointly drive pricing differences. Among them, market environment (average commercial housing price, destocking cycle) is the core driving factor, with significant spatial spillover effect.
- (3) The impacts of various driving factors have significant spatial heterogeneity. Pricing in core cities is more affected by market factors, while that in underdeveloped areas is more affected by policy factors.

B. RESEARCH LIMITATIONS AND PROSPECTS

Research limitations: First, the research unit is at the prefecture-level city level, which fails to be refined to the district-county level, making it difficult to reflect the pricing differences within cities; second, the quasi-natural experiment effect before and after policy implementation is not considered, and the causal identification of policy evaluation needs to be strengthened.

Future research directions:

- (1) Use micro-data at the district-county level, combined with spatial econometric and machine learning meth-

ods, to further analyze the pricing difference mechanism at the micro-scale.

- (2) Evaluate the net effect of EC-AH conversion policy based on the difference-in-differences (DID) model to provide more accurate basis for policy optimization.
- (3) Compare and analyze the differences in EC-AH conversion pricing models between Liaoning Province and the Yangtze River Delta and Pearl River Delta regions, and extract the pricing path with characteristics of old industrial bases.

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REFERENCES

- [1] J. T. Wang and H. Z. Zhang, "Research on the Pricing Mechanism of Affordable Housing: From the Perspective of Welfare Economics," *China Industrial Economics*, no. 5, pp. 115-133, 2020. (in Chinese)
- [2] J. T. Li and L. W. Chen, "Pricing Model and Application of Converting Existing Commercial Housing to Affordable Housing," *Statistics & Decision*, vol. 37, no. 12, pp. 156-160, 2021. (in Chinese)
- [3] S. Rosen, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *Journal of Political Economy*, vol. 82, no. 1, pp. 34-55, 1974.
- [4] H. Y. Liu and P. Y. Jiang, "Analysis of Influencing Factors of Affordable Housing Pricing Based on Hedonic Model," *Construction Economy*, vol. 43, no. 7, pp. 45-50, 2022. (in Chinese)
- [5] J. Chen and W. H. Zhang, "Balance between Efficiency and Fairness of Affordable Housing Policy: An Empirical Study Based on Shanghai," *Economic Research Journal*, no. 8, pp. 112-126, 2019. (in Chinese)
- [6] S. Q. Zheng and Y. M. Fu, "Fiscal Cost of Housing Security and Innovation of Pricing Mechanism," *Finance & Trade Economics*, no. 3, pp. 5-18, 2020. (in Chinese)
- [7] Y. Zhang, J. Liu, and S. Wang, "Spatial Heterogeneity of Housing Prices in the Yangtze River Delta Urban Agglomeration Based on GWR Model," *Journal of Urban Planning and Development*, vol. 148, no. 2, Art. no. 05022001, 2022.
- [8] M. Li, H. Zhang, and Y. Chen, "Spatial Spillover Effects of Housing Prices in Northeast China: A Spatial Durbin Model Approach," *Sustainability*, vol. 15, no. 10, Art. no. 8215, 2023.