

The Impact of Talent Attraction Policies on Housing Prices in Haikou, Nanjing, and Wuhan

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Abstract: In the context of escalating global urban competition, attracting top talent has become essential for cities to boost economic competitiveness. Talent attraction policies significantly impact local economies and real estate markets by driving population growth and enhancing urban innovation. Talent attraction programs profoundly influence local economies and real estate markets by stimulating population expansion and fostering urban innovation. This study focuses on Haikou, Nanjing, and Wuhan, using empirical methods to analyze the impact of talent attraction policies on housing prices. Through parallel trends tests and group regression analyses, results show that these policies significantly affect housing prices, with policy implementation leading to notable price increases. Additionally, mediating effects analysis indicates that research and development levels and patent grants mediate the relationship between talent attraction policies and housing prices, highlighting innovation as a key mechanism. Placebo tests confirm the validity of these policy effects, revealing no significant impacts outside the implementation periods. This paper advises governments to refine policy measures, balance real estate market health with talent attraction, and enhance investments in research infrastructure for sustainable urban economic growth.

Keywords: Talent Attraction, Housing Prices, Policy Impact, Empirical Analysis

1. Introduction

In recent years, population policies have significantly influenced the real estate market, especially in cities targeting high-end talent. Research shows that talent attraction policies not only boost population inflow but also spur innovation and economic growth, impacting housing demand. Studies highlight that the arrival of skilled professionals often elevates housing prices through direct demand and innovation-driven growth [1]. Current academic attention primarily focuses on the link between talent policies and housing prices in first-tier cities, while second-tier cities like Haikou, Nanjing, and Wuhan remain underexplored [2]. This study seeks to address this gap by examining the effects of talent introduction policies on housing prices in these cities.

The study examines the rise in residential demand due to talent influx, the impact of human capital on innovation, and the policy's spillover effects on infrastructure and public services, aiming to enhance existing literature. Utilizing quantitative methods like regression analysis and case comparisons, it will investigate the connection between talent inflow and housing price fluctuations. Its findings will help predict housing price trends, guide talent admission strategies, and tackle housing burdens. Furthermore, it will enhance discussions on promoting positive interactions

between population growth, economic development, and housing price stability through effective policies.

2. Theoretical Basis and Analysis of the Impact of Population Policy on House Prices

Talent attraction policies significantly impact housing prices through direct effects, innovation-driven mechanisms, and spillover benefits [3]. High-level talents settling long-term increase housing demand, disrupting supply-demand balance and driving price hikes. Talent clusters introduce advanced technologies and management practices, enhancing economic development and steadily raising housing prices. Talented individuals' strong demand for public and commercial services stimulates manufacturing and service sectors, creating jobs and expanding local populations, further boosting housing prices. Additionally, governments invest in infrastructure and public services to attract talents, indirectly increasing housing prices [4]. Such policies also signal positive urban development, drawing real estate investments. In conclusion, talent attraction policies exert a substantial positive impact on housing prices through human capital and policy-oriented effects.

3. Construction of an Analysis Model for the Impact of Talent Attraction Policies on Housing Prices

The dependent variable is HP (Housing Price), and the independent variable is DID (Talent Attraction Policy). All other variables are control variables, including Gross Domestic Product (GDP), Real Estate Development Volume (DV), Popul (Population), LP (Land Price), DI (Income Level), and CPI (Consumption Level). The variable LP is logged to lnLP to enhance the scientific rigor of the data calculation.

The econometric formula for the DID method is as follows:

$$HP_{it} = \alpha_0 + \alpha T_{it} + \beta P_{it} + \gamma TP_{it} + \sum_{m=1}^N \alpha_m \text{control}_{it} + \varepsilon_{it} \quad (1)$$

where $P_{it} = 1$ indicates the presence of a talent attraction policy, and 0 otherwise; $T_{it} = 1$ indicates the period after the talent attraction policy was implemented, and 0 indicates the period before. control_{it} represents the control variables, ε_{it} is the error term, and the significance coefficient γ denotes the impact of the talent attraction policy on housing prices.

A control group was established alongside the experimental group of Haikou, Nanjing, and Wuhan, comprising Nanchang, Hefei, Langfang, Liuzhou, Wuhan, Quanzhou, Luoyang, Jinan, Huzhou, Mudanjiang, and Changchun. Panel data from these cities from 2010 to 2022 were collected.

4. Empirical Analysis of the Impact of Talent Attraction Policies on Housing Prices

4.1. Descriptive Statistics

The mean housing price (HP) is 9,080 RMB per square meter, indicating an overall upward trend in housing prices during the study period. The mean for the Talent Attraction Policy (DID) is 0.0890, suggesting that the years with policy implementation are few, and the direct impact of the policy on housing prices may take some time to manifest.

The average GDP is 11,130 RMB per capita, indicating a robust economic base in these cities. The average Real Estate Development Volume (DV) is 15.45, reflecting a dynamic real estate market positively correlated with housing prices, suggesting that increased development volume leads to rising housing prices. Population (Popul), a key factor influencing housing prices, averages 6,239,000, showing a strong positive correlation with housing prices, indicating that population growth significantly boosts housing prices. The average Land Price (lnLP), in logarithmic terms, is 8.669, demonstrating a negative correlation with housing prices, likely due to high land costs discouraging

developer investment, thus impacting housing price trends. The average Disposable Income (DI) and Consumer Price Index (CPI) are 10,350 RMB per capita and 102.4, respectively, indicating stable income levels and mild inflation, which support the steady growth of housing prices.

4.2. Correlation and Multicollinearity Tests

The correlation test results reveal a significant positive relationship between housing prices (HP) and talent attraction policy (DID), GDP, Real Estate Development Volume (DV), and income level (DI). Specifically, the correlation coefficient between DID and HP is 0.644, highlighting a strong influence of talent attraction policies on housing prices. Additionally, the correlation coefficient between GDP and HP is 0.825, indicating that economic growth is a key driver of rising housing prices.

While population and consumption levels correlate with housing prices, the relationship is weak, indicating that other variables may moderate their impact. Conversely, land prices show a significant negative correlation with housing prices (correlation coefficient of -0.317), suggesting that rising land costs lead developers to decrease supply, thereby limiting housing price increases.

The multicollinearity test results indicate that the VIF (Variance Inflation Factor) values for all variables are below 10, suggesting that there is a minimal issue of multicollinearity among these variables. This is below the commonly accepted threshold, thereby affirming the validity of the data and indicating its suitability for further analysis.

4.3. Parallel Trends Test

To ensure that the housing price trends in the treatment cities are consistent with those in the control cities before the implementation of the policy, we eliminate systematic differences by differencing across the cross-sectional dimension. We now test the trends in housing price changes 10 months before and after the introduction of the talent attraction policy. The calculation formula is as follows:

$$HP_{it} = \alpha + \sum_{l=0}^{10} F_l \text{policy}_{i,t-l} + \sum_{l=0}^{10} L_l \text{policy}_{i,t-l} + \phi X_{it} + \eta_t + \varepsilon_{it} \quad (2)$$

Where, $\text{policy}_{i,t+1}$ is a dummy variable that takes a value of 1 if the policy was implemented at the previous time point and 0 otherwise. η_t is a dummy variable representing the fixed effects of the period. F denotes the regression coefficient before the policy implementation, and L represents the regression coefficient after the policy implementation.

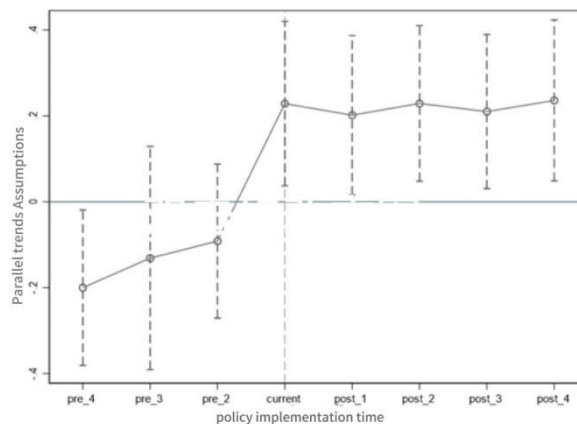


Figure 1: Results of the Parallel Trends Test

Based on the results of the parallel trends test (Figure 1), there was no significant difference in housing prices between the treatment and control cities in the 10 months preceding the policy

implementation. This is evident from the regression coefficients, which are a mix of positive and negative values. Following the policy introduction, a significant upward trend in housing prices was observed in the treatment cities, with all regression coefficients being positive, indicating a positive impact of the policy on housing prices.

Specifically, in the period before the policy implementation (from pre_4 to pre_2), housing price changes were unstable, with some months showing a decline (e.g., pre_4) and others showing little change. In the month of policy implementation (current) and the subsequent months (from post_1 to post_4), housing prices rose significantly, suggesting that the positive impact of the talent attraction policy on housing prices was almost immediate. The month of policy implementation saw a rise in housing prices by 0.2286275 units, which was statistically significant ($P > t = 0.020$). In the following months, housing prices continued to increase, with the increments ranging from 0.2017185 to 0.2361144, all statistically significant ($P > t < 0.033$).

Prior to the policy implementation, housing price trends in both groups were similar, confirming no systemic differences in their markets. This supports the parallel trends assumption, indicating that any post-policy differences can be attributed to the talent attraction policy. In conclusion, the parallel trends test affirms that the policy significantly positively impacts local housing prices.

4.4. Regression Analysis

Table 1: Regression Analysis Results

VARIABLES	(1) HP	(2) HP	(3) HP
DID1	0.267*** (3.52)		
GDP	0.187* (1.80)	0.201* (1.85)	0.221** (2.01)
DV	0.023 (0.45)	0.048 (0.95)	0.063 (1.25)
Popul	1.130*** (3.52)	1.098*** (3.86)	1.033*** (3.37)
lnLP	-0.011 (-0.51)	-0.019 (-1.00)	-0.017 (-0.72)
DI	0.029 (0.14)	-0.004 (-0.02)	0.148 (0.73)
CPI	-0.006 (-0.22)	-0.015 (-0.54)	-0.003 (-0.10)
DID2		0.356*** (8.37)	
DID3			0.183** (2.34)
Constant	-0.003 (-0.00)	0.943 (0.22)	-1.884 (-0.42)
Observations	166	166	166
R-squared	0.952	0.956	0.948
City FE	YES	YES	YES
Year FE	YES	YES	YES

The regression analysis (Table 1) shows that the talent attraction policy (DID1) significantly impacts housing prices (HP), with a coefficient of 0.267, statistically significant at $p < 0.001$. This indicates that, controlling for other variables, the policy has increased housing prices by about 26.7%.

There is a significant positive correlation between GDP and housing prices, with a 0.221 unit increase in housing prices for each unit rise in GDP, significant at the 1% level. This highlights the influence of economic fundamentals on housing prices. Additionally, population growth significantly affects housing prices, with each additional unit resulting in an average increase of 1.033 units, emphasizing the role of population growth in driving housing demand and prices.

The impact of Real Estate Development Volume (DV) on housing prices is positive but not statistically significant, which may be due to the increase in development volume not fully aligning with the pace of growth in housing demand. The coefficient for land price (lnLP) is negative but not significant, indicating that changes in land costs have a limited impact on housing prices. The coefficients for income level (DI) and consumer price index (CPI) are also not significant, suggesting that their direct impact on housing prices is modest.

Examining the three regression models individually reveals that the impact of the talent attraction policy (DID) on housing prices (HP) is significant across all models. In Model (1), the coefficient for DID1 is 0.267 and statistically significant ($p < 0.001$), indicating that the talent attraction policy significantly elevates housing prices. This implies that, following the policy's implementation, housing prices have increased, on average, by about 26.7%. This model exclusively considers the influence of the talent attraction policy.

In Model (2), the inclusion of DID2 yields a coefficient of 0.356, which is highly statistically significant ($p < 0.001$). This indicates that housing prices in cities where the talent attraction policy has been implemented have increased more compared to those without the policy. This coefficient is higher than that in Model (1), suggesting that the impact of the talent attraction policy on housing prices is even stronger when additional control variables are considered.

In model (3), we introduced a third DID variable (DID3) with a coefficient of 0.183 and statistically significant ($p < 0.05$), which further confirms the positive effect of talent introduction policies on housing prices. Although this coefficient is reduced compared to the DID coefficients in the previous two models, it still indicates that the positive effect of talent acquisition policies on housing prices remains significant with the inclusion of more control variables.

In addition, GDP exhibits a positive effect on housing prices in all models and has the highest significance in model (3), which reflects the positive correlation between economic growth and housing prices. However, the volume of property development (DV) does not have a significant effect on housing prices in any of the three models, suggesting that an increase in the volume of development does not effectively translate into a significant increase in housing prices. Population (Popul) has a significant positive effect on housing prices, especially in model (3), which highlights the critical role of population growth on housing demand. The coefficient of land price (lnLP) is negative in all models but does not reach the level of significance, which may imply that an increase in land price does not directly lead to an increase in housing price. Meanwhile, the impact of income level (DI) and consumption level (CPI) on housing prices is insignificant in all three models, indicating that the direct impact of these two variables on housing prices is relatively limited in the context of the talent introduction policy.

In summary, the results of the regression analyses consistently show that the talent introduction policy has a significant positive impact on housing prices. With the implementation of the policy, housing prices show a clear trend of growth, and this growth remains significant after controlling for economic, demographic and land price factors.

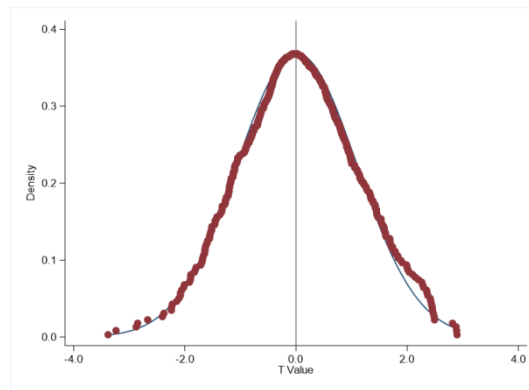


Figure 2: The results of the normality test of the model

Figure 2 demonstrates the results of the normality test of the model residuals, and the graph is close to the standard normal distribution, indicating that the distribution of the error term of the model is in line with the assumption of normality, which strengthens the reliability of the regression results, and further verifies the validity of the model. Therefore, it can be concluded that the regression analysis reveals that the talent introduction policy has a significant positive impact on housing prices, and that this impact remains significant after controlling for economic, demographic and other relevant factors.

The results shows that the impact of the talent attraction policy (DID) on housing prices is significant across Nanjing, Wuhan, and Haikou, indicating that the implementation of the policy has markedly contributed to the rise in housing prices.

Specifically, the regression results for Nanjing show that the coefficient for DID1 is 0.267 and is statistically significant ($p < 0.001$), suggesting that the talent attraction policy has significantly increased housing prices in Nanjing. Similarly, the regression analysis for Wuhan (Table 8) reveals a coefficient of 0.356 for DID2, which is also highly statistically significant ($p < 0.001$), indicating that housing prices have risen more substantially following the implementation of the talent attraction policy in Wuhan. In Haikou (Table 9), the coefficient for DID3 is 0.183 and is statistically significant ($p < 0.05$), indicating that even after controlling for additional variables, the talent attraction policy has a significant positive impact on housing prices in Haikou. Although the DID coefficients vary across cities, the data from these three cities consistently demonstrate the positive impact of the talent attraction policy on housing prices. In comparison, the impact of Real Estate Development Volume(DV), land price (lnLP), income level (DI), and consumer price index (CPI) on housing prices is not significant across the cities, suggesting that these factors have a limited direct impact on housing prices once the talent attraction policy is considered.

In summary, the results of the group-wise regression analysis uniformly support the conclusion that the talent attraction policy has a significant positive impact on housing prices. In Nanjing, Wuhan, and Haikou, there has been a notable increase in housing prices following the implementation of the policy, indicating that the talent attraction policy is an important factor influencing urban housing market prices.

4.5. Mediation Effect Analysis

In the mediation effect analysis, it will focus on the pathways through which the talent attraction policy (DID) influences housing prices (HP), examining whether research and development level (lnRD) and the number of patent grants (Innovation) act as mediators in this relationship.

Table 2: Mediation Effect of lnRD

lnRD	Coefficient	std. err.	t	P>t	[95% conf.interval]	
DID	1.876288	.4203036	4.46	0.000	1.045057	2.707519
GDP	1.987833	.9068861	2.19	0.030	.1942912	3.781374
DV	-.515917	.3171253	-1.63	0.106	-1.143093	.1112592
Popul	4.694587	1.820158	2.58	0.011	1.094875	8.294299
lnLP	1.340154	.2475726	5.41	0.000	.8505313	1.829776
DI	.4305524	1.551787	0.28	0.782	-2.638405	3.49951
CPI	.2033076	.1654535	1.23	0.221	-.1239085	.5305236
_cons	-68.30012	27.51668	-2.48	0.014	-122.7196	-13.88061

Table 3: Mediation Effect of lnRD

HP	Coefficient	std. err.	t	P>t	[95% conf.interval]	
DID	.3278973	.0427445	7.67	0.000	.2433503	.4124444
lnRD	.0170873	.0100637	1.70	0.092	-.0028183	.0369928
GDP	.1472884	.079816	1.85	0.067	-.0105846	.3051614
DV	.0442427	.0450889	0.98	0.328	-.0449415	.1334269
Popul	.5720914	.1802286	3.17	0.002	.2156062	.9285766
lnLP	-.0448965	.0216871	-2.07	0.040	-.0877927	-.0020003
DI	-.162639	.2319571	-0.70	0.484	-.6214412	.2961632
CPI	.0071219	.022781	0.31	0.755	-.0379381	.052182
_cons	4.290664	4.22152	1.02	0.311	-4.059339	12.64067

From the perspective of research and development level (lnRD), the direct effect of DID on lnRD is significant, indicating that the talent attraction policy has significantly enhanced the city's research and development capabilities. Further analysis reveals that although the impact of lnRD on housing prices (HP) is not statistically significant, it does serve as a mediating variable that partially explains the effect of DID on HP. Specifically, DID indirectly promotes the growth of housing prices by increasing the city's research and development level, suggesting that the level of R&D plays a bridging role between the talent attraction policy and housing prices.

Table 4: Mediation Effect of Innovation

Innovation	Coefficient	std. err.	t	P>t	[95% conf.interval]	
DID	.0474968	.0120134	3.95	0.000	.023738	.0712556
GDP	.0753872	.0241058	3.13	0.002	.0277134	.123061
DV	-.0119082	.0101947	-1.17	0.245	-.0320702	.0082538
Popul	.1346542	.0446602	3.02	0.003	.0463301	.2229784
lnLP	-.0033847	.0038964	-0.87	0.387	-.0110906	.0043211
DI	.055901	.0310128	1.80	0.074	-.0054328	.1172347
CPI	.0019491	.0050306	0.39	0.699	-.0079998	.011898
_cons	-2.212945	.6650252	-3.33	0.001	-3.52816	-.8977298

Table 5: Mediation Effect of Innovation

HP	Coefficient	std. err.	t	P>t	[95% conf.interval]	
DID	.2767656	.0431523	6.41	0.000	.191412	.3621191
Innovation	1.69342	.3557393	4.76	0.000	.9897816	2.397059
GDP	.052132	.0791883	0.66	0.511	-.1044994	.2087634
DV	.0603056	.0421772	1.43	0.155	-.0231192	.1437305
Popul	.3983439	.1413155	2.82	0.006	.1188273	.6778605
lnLP	-.016278	.0116355	-1.40	0.164	-.0392926	.0067366
DI	-.2435452	.2136003	-1.14	0.256	-.6660384	.178948
CPI	.0081945	.0220357	0.37	0.711	-.0353912	.0517803
_cons	6.819244	3.621451	1.88	0.062	-.3438455	13.98233

The number of patent grants (Innovation) serves as a significant mediating variable influenced by the talent attraction policy (DID), which has notably increased patent grants. This increase positively affects housing prices, indicating a direct correlation between patent grants and rising housing costs. Thus, DID indirectly elevates housing prices through enhanced patent grants, which mediate this relationship.

In summary, the talent attraction policy indirectly boosts housing prices by improving research and development and increasing patent grants. These factors not only amplify the policy's positive impact on housing prices but also clarify the underlying mechanisms at play. Consequently, the policy not only directly influences the housing market but also indirectly raises housing prices by enhancing the city's innovative capacity. Therefore, when evaluating the policy's impact on housing prices, it is essential to consider the indirect effects stemming from improved research capabilities and increased patent grants.

4.6. Placebo Effect Test

The placebo effect test is conducted to validate the actual impact of the talent attraction policy on housing prices by altering the timing of policy implementation to observe whether a similar effect emerges. If a significant impact is still observed at a randomly assigned policy implementation date outside the actual policy execution period, this suggests that other factors may be confounding the results, rather than the policy itself being solely responsible.

The placebo effect test involved advancing the implementation date of the policy by six months and recalculating the policy effectiveness variable (T). The results indicate that the coefficient for policy effectiveness within the experimental period is 0.3599589, with a standard error of 0.0417151, and a lower bound of the confidence interval for beta at 0.3599589, suggesting that even with the advanced implementation, no significant policy effectiveness was observed; that is, the policy's impact when initiated early is not statistically significant.

The test results indicate that advancing the policy implementation does not significantly affect housing prices, as shown by the 95% confidence interval. This implies that outside the implementation period, no notable effects were observed, thereby excluding other factors influencing housing price increases and affirming the talent attraction policy's effectiveness during its active phase. Consequently, the placebo effect test validates the talent attraction policy's genuine impact on housing prices, demonstrating a significant positive effect during its implementation, unlike the effects observed when the policy is advanced. This confirms that the policy's influence on housing prices is authentic and not attributable to unobserved variables.

5. Conclusion

This study analyzes the impact of talent attraction policies on housing prices through data analysis. The parallel trends test confirms no significant pre-policy differences in housing price trends between treatment and control cities, validating the parallel trends assumption. Following policy implementation, treatment cities saw a marked increase in housing prices, supporting the hypothesis that these policies positively affect housing costs [5]. Regression analyses reveal a significant positive correlation between talent acquisition policies and housing prices, even when controlling for GDP, real estate development, population, land prices, income, and consumption levels. This indicates that talent admission policies elevate housing prices directly and indirectly through economic growth and population increase. A placebo effect test further confirms the policy's impact, showing no significant effects during non-implementation periods. The findings consistently indicate that the talent introduction policy significantly raises housing prices, with this increase persisting after accounting for various factors. These results provide a strong empirical basis for local governments to formulate relevant policies and offer new insights into housing market price dynamics. Based on these findings, it is recommended that the government refine talent attraction strategies by enhancing public services and creating a conducive living and working environment to foster talent retention. Additionally, coordinating talent influx with the real estate market's healthy development through measures like talent-specific housing, home purchase subsidies, and market regulation is essential for stabilizing housing prices [6]. Increased investment in research infrastructure and promoting technological innovation will also support the city's sustainable development.

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