

A Study on the Impact of School District Housing on Real Estate Prices: Evidence from Shanghai Region

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Abstract: The paper estimates how the quality of primary school impact on the school district housing based on the repeated cross section data of 11 districts in Shanghai. Mixed OLS model, the paper draws the conclusion: on the condition of controlling the building characteristics and administrative division, city's key and district's key are higher than the ordinary buildings 23.7% and 8.9% respectively. "Because the development of the living standards, people pay more attention to their children's education. For example, a famous allusion was that Mencius mother moved three times. Nowadays, to make their children study in famous school, parents invested heavily to buy school district house. For a while, the price of school district housing goes up fast. Many developers focus on schools not only close to the advertisements of real estate, and schools provide good education by cooperating with the excellent school. The way to change this condition is to balance the supply of compulsory education resources, narrow the gap between the quality of the school. Therefore in the face of hot school district housing market, it is a very important topic.

Because the school district housing is just a hot topic in recent years, so the domestic research for the school district housing also is not very thorough and many papers still stay on the theoretical side. And traditional evaluation methods have their limitations. The article based on the OLS model to evaluate the school district housing premium, can not only make up for the inadequacy of the traditional method, but also make the result more accurate.

Keywords: School district house; Compulsory education; Educational resources

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1. Background of School District Housing

The school district housing is the house designated in a certain area. After purchasing the school district house, the children can get the right to enter the school within the area. The phenomenon of school district housing is the concept of housing formed by the uneven distribution of educational resources and the traditional idea of "looking forward to success". Now it is also used by real estate developers to form an advertising effect. Shanghai's housing price is a topic of discussion recently. The housing price of a school district in Shanghai has increased by 1 million in one year. Therefore, Meng Mu moved three times, and now school district houses are on sale.

Compared with the whole real estate market, the current school district housing price presents an unhealthy trend, but the traditional estimation method has some lim-

itations, so in order to more accurately reflect the real value of school district housing, this paper uses OLS model to get the regression equation through analysis, which is of great significance.

2. Research Method: OLS Model

This paper uses OLS model, takes the quality of school as a dependent variable, and makes the nature of school quality visible through data collection. Through the regression analysis, the effect of school district housing price on housing price is obtained. The research object of this paper mainly refers to the second-hand housing market, because the second-hand housing is more representative, and it has certain guiding significance for new housing. In this study, 1250 second-hand housing transaction information of 11 districts in Shanghai (Changning District, Putuo District, Zhabei District, Hongkou District, Pudong District, Jing'an District, Baoshan District, Yangpu District, Huangpu District, Xuhui District and Min-

hang District) were obtained from SouFun. The transaction information of the information was as of May 2015, and each data includes house price, current number of households, total number of households, total number of households Greening rate, plot ratio, property fee, opening time. According to the GIS geographic information system to get the latitude and longitude of second-hand property, and then calculate the straight distance of each property to the district government, and the straight distance to the Oriental Pearl. Shanghai is a super city, so the distance from the real estate to the district government can reflect the location of the real estate. At the same time, the distance from choosing the real estate to the Oriental Pearl is because the Oriental Pearl of Shanghai is the landmark building of Shanghai, and the center of Shanghai. All the distances can reflect the positioning of the real estate in the whole city.

The core dependent variable of this paper is the logarithm of house price per square meter, and the quality of school is the core independent variable.

$$\ln(\text{cntAvgPrice}) = \beta_0 + \beta_1 \text{'shschool_lev}_{ik} + \beta_2 \text{'Bldg}_{ik} + \beta_3 \text{'Dis}_{ik} + \mu$$

Among them, the subscript L represents real estate, and K represents eleven districts in Shanghai; Bldg represents the vector of real estate features; Disk is the virtual variable of the city. The meaning of each variable of each vector is shown in Table 1. The left side of the equation is in the form of logarithm of house price, β_1 refers to the marginal impact rate of school district housing quality on housing price. In other words, it is the ratio that the unit price of school district housing is higher than that of non school district housing.

The quality of school is the core independent variable, because the quality of school is difficult to observe, so this paper, through the ranking of primary schools in Shanghai and combining with the websites of various university districts, divides the primary schools in Shanghai into three categories, namely, the city key primary school, the district key primary school and the ordinary primary school. And then control variables: first, the real estate characteristics variables (the current number of households, the total number of households, greening rate, plot ratio, property fees, age, distance to the district government, the straight line to the Oriental Pearl). The linear distance to the district government is adopted here because Shanghai is the most super large city, so it is more convincing to choose the distance to the district government. In the references, the quadratic term of housing age is usually added in the regression, but in the

actual regression process, the variable is not significant after adding the quadratic term, so we still choose not to add the quadratic term. The second is the administrative division, taking Baoshan District as the base, constructing the virtual variables of the other ten urban areas.

3. Research Results

The average house prices in different districts of Shanghai are shown in Figure 1. It can be seen from the chart that the average house prices of Jing'an District, Xuhui District and Changning District are in the top three of the average real estate prices in Shanghai. Then Huangpu District, Hongkou District, Yangpu District, Zhabei District, Putuo District, Pudong District, Minhang District, Baoshan District.

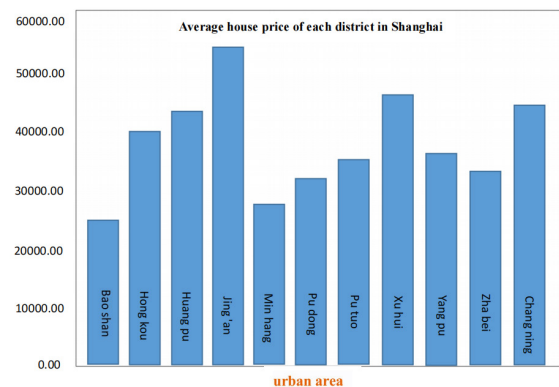


Figure 1. Average house price of each district in Shanghai

The focus of this paper is on the premium of the housing price of the key primary schools in the city and district compared with the ordinary housing price. The regression results are shown in Table 1. In the first column, there is no control variable. The results show that the average real estate price of key primary schools is 61.4% higher than that of ordinary real estate, and the result is significant in the 1% confidence interval. The average house price of key primary schools in the district is 28.73% higher than that of ordinary real estate, and the result is significant in the 1% confidence interval. From the first model, we can see that the quality of the school has a very significant impact on the real estate price. In the second column, after adding the real estate variable, we find that the degree of school quality capitalization is reduced: the average price of housing in key school districts is 33.9% higher than that of ordinary housing prices, and the result is significant in the 1% confidence interval. The average house price of key school district is 13.6% higher than that of ordinary house price, and the result is significant within 1% confidence interval. Compared with the first model, the second model after controlling

the characteristics of the real estate, the impact of school quality on the real estate price all declined. In the third column, after the location variable is added, the degree of capitalization of school quality is further reduced: the average price of housing in key school districts of the city is 24.1% higher than that of ordinary housing prices, and the average price of housing in key school districts of the district is 9.3% higher than that of ordinary housing prices, both of which are significant within the 1% confidence interval. After introducing the factor of administrative division, “current number of households”, “total number of households”, “plot ratio” and “distance from the district government” are not significant, which does not mean that these variables have no effect on house prices, but that the factor of administrative division has more significant effect on house prices. We can know that compared with the characteristics of real estate, the administrative division has the most significant impact on house prices, so the third model is more illustrative. At the same time, we observed the change of R2 from 0.26497 to 0.68534 in columns (1) to (3), and increased R2 to 0.758717 in model 3. The goodness of fit of the model is getting higher and higher, indicating that the quality of the model is relatively high.

Table 1. robust regression results of School District Housing premium model

| School quality: | Model 4 |
|------------------------------|--------------|
| City key = 1 | 0.237221*** |
| District focus = 1 | 0.089166*** |
| Greening rate | 0.495797*** |
| Property fee | 0.011987*** |
| age | -0.010276*** |
| Distance from Oriental Pearl | -3.50E-05*** |
| Changning=1 | 0.378830*** |
| Hongkou=1 | 0.166827*** |
| Huangpu=1 | 0.204803*** |
| Jingan=1 | 0.358229*** |
| Putuo=1 | 0.154378*** |
| Pudong=1 | 0.177347*** |
| XUhui=1 | 0.387716*** |
| Yangpu=1 | 0.210976*** |
| Zhabei=1 | 0.085067*** |
| Minhang=1 | 0.248118*** |
| Constant term | 10.44893*** |
| F | 237.78*** |
| R-squared | 0.7561 |
| Adj R-squared | 0.7530 |

Note: in the table, *** means that P is less than 0.01, the test is significant.

However, when diagnosing multicollinearity for model 3, the Vif of total households and current households in the first column is more than 10, and the average Vif of model 3 is 3.76, so model 3 has serious multi-

collinearity. The results are shown in the table below. We remove the insignificant variables in model 3 and establish model 4, sacrificing some explanatory variables and a very small part of goodness of fit, but solving the problem of multicollinearity. Therefore, this paper adds model 4, which eliminates the three variables of the number of households, the total number of households and the plot ratio, and constructs a new equation. The regression results are shown in Table 1. From the results, we can draw a conclusion: the average price of housing in key school districts of the city is 23.7% higher than that of ordinary housing prices, and the average price of housing in key school districts of the city is 8.9% higher than that of ordinary housing prices, both of which are significant in the 1% confidence interval. After excluding the non significant variables and carrying out the new regression analysis, the results of greening rate, property fee, age and distance from the Oriental Pearl are all remarkable.

(1) The impact of greening rate on house price is very significant, the greening rate increases by one percentage point, and the house price increases by 0.495 percentage point; Greening rate refers to the ratio of vertical input area of greening to community land. Generally speaking, as long as there is lawn, it can be regarded as greening. If the greening rate of the community is low, the noise and dust in the community will be relatively large, the air quality will be poor, the temperature regulation ability will be low, and the overall living quality will decline. Therefore, in the purchase of buildings, consumers will be more willing to pay higher prices to buy green rate is higher.

(2) The property fee also has a very significant impact on the price of the house. For each percentage point of the property fee increase, the house price will increase by 0.0117 percentage points; Therefore, the higher the level of the community, the higher and better the service of the property. The health, safety, disputes and other issues of the community will be improved in time, so of course, higher property fees will be charged.

(3) Housing age also has a significant impact on housing prices, which is negatively correlated with housing prices. Based on the data of second-hand housing in Shanghai, Hao Qianjin and others found that the average construction depreciation rate of housing is 3% - 5% per year, but it shows obvious nonlinear characteristics. At the same time, it is found that the depreciation speed of houses with different price characteristics is different. The depreciation speed of low price and high price yuan is relatively slow, while the depreciation speed of medium price yuan is the fastest (Hao Qianjin, 2012).

(4) Considering that the average price of Baoshan district is the lowest among the eleven districts, the model takes Baoshan District as the base. The results show that the average price of houses in Xuhui District is the highest, which is 38.31% higher than that in Baoshan District; Jing'an District and Changning District followed closely, and the average price of houses was 36.78% and 36.50% higher than that of Baoshan District, respectively; The average price of houses in Minhang District is 23.80% higher than that in Baoshan District; The average house prices in Huangpu District and Yangpu District were 21.29% and 20.54% higher than those in Baoshan District, respectively; The average house prices in Pudong and Hongkou were 18.01% and 16.57% higher than those in Baoshan District, respectively; The average prices of houses in Putuo and Zhabei District were 15.18% and 8.40% higher than those in Baoshan District, respectively.

Table 2. robust regression results of School District Housing premium model

| | |
|------------------------------|--------------|
| School quality: | Model 4 |
| City key = 1 | 0.237221*** |
| District focus = 1 | 0.089166*** |
| Greening rate | 0.495797*** |
| Property fee | 0.011987*** |
| age | -0.010276*** |
| Distance from Oriental Pearl | -3.50E-05*** |
| Changning=1 | 0.378830*** |
| Hongkou=1 | 0.166827*** |
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| R-squared | 0.7561 |
| | 0.7530 |

Note: in the table, *** means that P is less than 0.01, the test is significant.

4. Conclusions

On the basis of controlling the characteristics of real estate and location, this paper comes to the conclusion that the housing prices of second-hand school districts are significantly higher than those of non school districts. The selling prices of the key housing in the city and the key housing in the district are 23.9% and 9.1% higher than those in the non School District, respectively. However, there are also missing variables in the text research, which leads to errors in the results. The reason is that the population characteristics are not controlled, and the

measurement of location characteristics is too rough. The results show that the policy of “enrollment nearby” only transfers the sponsorship fee to the price of housing, which can not promote the balanced development of compulsory education. At the same time, compared with the traditional way of choosing schools, “choosing schools based on housing” will lead to “residential cluster effect”, thus widening the distance between social groups, which is not conducive to the flow of social strata, In the end, it will hinder the development and progress of society.

References

- [1] Wang Songtao, Zheng Siqi, Feng Jie. 2007. The Impact of Public Service Facilities Accessibility on the Price of New Housing: A Case Study of Beijing Central City [J]. *Progress in Geography* (2007)6:78-85.
- [2] Wang Xi, Ge Yousong, Zhang Han.2010. Study on Housing Price Mechanism in Nanjing Old Town School District [J]. *Cooperative Economics and Science & Technology*,2010(12):10-13.
- [3] Chen Youhua, Fang Changchun.2007. Social Stratification and Education Diversion -- An Empirical Study on the Equity of the Institutional Arrangement of “Nearby Enrollment” in Compulsory Education Stage [J]. *Nanjing: Jiangsu Social Sciences*, 2007(1).
- [4] Liang Ruobing, Tang Yun.2008. Tiebout Model of Local Public Goods Supply: An Empirical Study Based on Urban Housing Price in China [J]. *World Economy*, 2008(10):71-83.
- [5] Liang Xuefeng, Qiao Tianwen.2006. On the Level of Urban Compulsory Education -- Empirical Data from a City [J]. *Managing the World*, 2010 (12).
- [6] Bayer P, Ferreira F, McMillan R. 2007.A Unified Framework for Measuring Preferences for Schools and Neighborhoods[J]. *Journal of Political Economy*, 115(4):588-638.
- [7] Black S E. 1999. Do better schools matter? Parental valuation of elementary [8] education[J]. *The Quarterly Journal of Economics*, 114(2):577-599.
- [8] Brookhart MA, Wang PS, Solomon DH, Schneeweiss S. 2006. Evaluating short-term drug effects using a physician-specific prescribing preference as an instrumental variable[J]. *Epidemiology*, 17(3): 268-75.
- [9] Clark D E, Herrin W E.2000 The impact of public school attributes on home sale prices in California[J]. *Growth and Change*, 31(3):385 - 406.
- [10] David Brasington and Donald R.haurin. 2003.educational outcomes and house values:a test of the value added approach[J], *journal of regional science*.
- [11] Fack G, Grenet J. When do better schools raise housing prices? Evidence from Paris public and private schools[J]. *Journal of Public Economics*, 94(1-2):59-77.
- [12] Feng H, Lu M. 2013.School quality and housing prices: Empirical evidence from a natural experiment in Shanghai, China[J]. *Journal of Housing Economics*, 22(4):291-307.