

The price premium for properties near shopping centers: Evidence from China

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Abstract: Commercial layout and location strategy is one of the key factors affecting the economic development of the city, and it is also an important basis for the citizens to make optimal decisions to purchase houses. Therefore, the main purpose of this paper is to investigate the relationship between house prices and commercial location in Xiamen in recent years. By inquiring the price data from one of the biggest real estate agency website, according to the satellite map and subject knowledge, the paper summarizes the data, establishes the hedonic pricing model, and carries on the related linear regression analysis on the basis of the model, obtains the results and makes the analysis. Finally, we can conclude that bus stops, seaside parks, shopping malls and other factors have a greater impact on housing prices, but school districts have little impact on housing prices. Most importantly, every increase in shopping center, the housing price will increase 57.93 thousand yuan.

1. Introduction

CBD (Central Business District), originated in 1923 in the United States, refers to the area where major business activities are carried out in a country or city. Generally speaking, CBD is located in the city center, which highly concentrates the economic, technological and cultural forces of the city. As the core of the city, CBD should have many functions, such as finance, trade, service, exhibition and consultation, with perfect transportation and communication conditions. It has the following four characteristics. Firstly, CBD is the area with the largest building capacity and the most intensive human activities in the city. Second, it has the most convenient and convenient communication facilities. Third, there are the most specific and efficient service facilities. Fourth, it is the area with the highest land price and rent in the city.

The location of commercial real estate is a long-term investment, which is directly related to the strategic decision-making of business operation. It is an important reflection of the consumer-centered view in the commercial real estate chain, a decisive factor affecting the efficiency of enterprises, and an important basis for formulating business objectives and strategies. Therefore, it is significant to investigate what will influence the location choice of shopping centre.

The case in our study is Xiamen, which belongs to Fujian Province, is not only a sub-provincial city and special economic zone in China, but also an important central city, port and scenic tourist city along the southeastern coast of China. Xiamen has a total land area of 1569.3 square kilometers, with a permanent population of 4.11 million and a per capita disposable income of 50948 yuan. Xiamen has become a new cross-strait industry and modern service industry cooperation demonstration zone, southeast international shipping center, cross-strait regional financial service center and cross-strait trade center, and has gradually become a modern international tourist city.

The remainder of this paper is revealed as follows. Section 2 reviews the existing literature focusing on the relation between the location of shopping centre and housing price. Section 3 introduces model, data and variables. Section 4 discusses empirical results. Section 5 concludes.

2. Literature review

Some scholars have directly discussed about the causes and the factors that influence the location of shopping centers or retail stores. Shi et al. (2015) analyze the connection between the shopping

center's development, evolution and Shanghai's commercial real estate development by GIS. It illustrates that Shanghai's shopping centers are still in the early stages of development. Therefore, future shopping centers may be primarily located in the stretch or peripheral zones of the city. Lin et al. (2018) analyze the connection between the location of retail stores and street centrality in traditional commercial in a multiple centrality assessment model in Guangzhou. It illustrates that street centrality in Guangzhou has a large impact on the location of retail stores and that different store types have different centrality orientations. ELSamena and Hiyasat (2017) analyze the shopping mall location selection in the area of West Amman in Jordan by following the Time-Resistance Approach and the ArcGIS's Network Analyst tool which is used to calculate the distance in terms of minutes to reach each shopping mall using Geographical Information Systems techniques. Hence, their study enables to get the necessary data to implement more advanced choice models for this research, and the research scope was limited to examining the current status of the shopping malls distribution.

It has been widely discussed that shopping centers or retail stores have significant effect on adjacent environment and residents' daily life, and further provide implications for location choice for shopping centers and retailer stores. Padilla et al. (2017) analyze the connection between out-of-town shopping centers and retail activity or employment in the towns their catchment areas in a econometric model. It illustrates that a negative impact on retail activity, around 12% in the case of the nearest and most affected town. Furthermore, negative net balance of employment in the whole of the catchment area calling into question the desirability of these centers unless they provide a complementary supply in the area. Reimers (2013) analyzes the connection between the policies aimed at deterring car-usage and retail sector by utilized a consumer household survey and a retail audit. It illustrates that any strategy designed to deter car usage should be designed to impact equally on both mall shopping and strip shopping, or risk tipping the balance even further in favor of the mall. Wadud and Chen (2018) analyze the effects of shopping and related road-side frictions and disruptions on congestion in a city by minute GPS tracking data of vehicles and a unique policy of different shopping closure days in different areas of the city. It illustrates that the differences in speed in the different zones can also be qualitatively related with the density of shopping centers in those zones. Eckert et al. (2013) analyze the connection between the transportation costs and consumer's decisions by evaluate rules of thumb and the data on the internal compositions of 90 planned regional shopping centers in the five westernmost provinces in Canada in order to examine the locational pattern of stores in shopping centers. It illustrates that Consumer transport, shopping cost and demand externalities are consistent. Anselmsson (2016) analyze the connection between the online shopping and shopping center by interviews with 96 shopping center managers in charge of malls that existed in 2008 and 2014, about their improvements during a three-year period and the effects on sales and number of visitors from one year before and one year after that period. It illustrates that significant positive relationships between shopping centers' improvements and the growth in sales as well as visit rates. The effects are, however, more significant for sales than visit growth.

According to the aforementioned studies, it can clearly show that the location choice and the effect of shopping centers on city development and residents' daily life has been well studied. However, the gap within these studies is that most of these studies have not considered the impact of shopping centers on property prices, which could actually provide implications for determining the location of shopping centers. Therefore, this study will conduct an study to investigate the relation between shopping centers and property prices.

3. Model

Hedonic pricing model

The Hedonic Price Model, which is based on the relationship between the housing characters and housing price characters, sets up the regressive model of housing price. In addition, implicit and shadow values of the attributes of a property can be singled out and estimated from a regression equation by using the OLS method. Hedonic price model has several function forms, including

linear function, logarithmic function and semi-logarithmic function in the application. And logarithmic function is applied in this study. The hedonic pricing model returns real estate price (Y) to a set of observable real estate properties (Xs) because it assumes that the properties of heterogeneous properties are valued. Its mathematical expression is,

$$Y=X\beta+\varepsilon,$$

where β is a vector of parameters with explanatory variables and random error terms, reflecting unobserved changes in real estate prices.

4. Data and Variables

Table1 lists the variable definitions and descriptive statistics. We took a residential area in Xiamen city as the center and carried out statistical research on the surrounding stations, airports, shopping centers and seaside squares. Also, we control for building age, building height, population density and job density. Additionally, considering the effect of shopping center on residents is effective within a certain distance, we limit the sample that shopping centers are within 3 km where residents live, and choose 11365 data in our analysis.

Table 1 Variable definitions and descriptive statistics (N=11,365).

Variable	Description	Mean	Std. Dev
<i>Dependent variable</i>			
Price	- (10 ⁴ yuan)	822.32	559.52
<i>Control variables</i>			
Size	Gross floor area (m ²)	136.99	74.62
Age	-	10.67	5.58
Building height	Number of stories	19.12	10.81
Population density	Neighborhood fixed-effects variable (10 ³ /km ²)	17.72	9.74
Job density	Neighborhood fixed-effects variable (10 ³ /km ²)	16.36	15.73
Distance to the city center	Distance to the central point of Zhongshan Road (km)	7.08	3.22
Distance to the sea	Distance to the sea (km)	2.71	1.48
Distance to Wuyuan Bay	Distance to Wuyuan Bay (km)	4.26	2.80
Distance to the airport	Distance to Xiamen International Airport (km)	5.75	1.95
School district	Indicator variable, 1 for a property within the attendance zone of a high-quality school, 0 otherwise	0.14	0.35
Number of bus stops	Number of bus stops within 0.5 km	5.91	3.59
<i>Explanatory variables</i>			
Number of shopping center	Number of shopping center within 3 km	1.47	2.78

5. Results

According to the results in table2, almost all the attributes are significant at the 1% level, such as building age, building height, bus stops, seaside parks, shopping centers. One exception is the variable school district, the reason why school districts have little impact on housing prices is that in recent years, housing prices in Xiamen school districts have risen too high, so many residents gradually give up buying houses in school districts. This situation began to become normal. These residents pay the money they had planned to buy to send their children to private aristocratic schools, which was more economical and affordable.

The explanatory power of this OLS model is reasonably high, which can help explain 87.1% of the property prices in our sample and is also in line with our expectations. Moreover, the coefficient

of number of shopping center is 5.793, which interprets that every increase in shopping center, the housing price will increase 57.93 thousand yuan. A precise valuation of shopping center on housing prices will aid the government and the developers to make better decisions. On the other hand, it will also help home-purchasers to compare potential targets more efficient.

Table 2 Results of OLS model

Variable	OLS model	
	Coefficient	t-statistic
Size	5.895	199.98*
Age	-17.240	-31.55*
Building height	-0.663	-2.718*
Distance to the city center	-37.984	-16.59*
Distance to the sea	-53.692	-26.10*
Distance to Wuyuan Bay	-41.235	-13.27*
Distance to the airport	18.657	9.03*
Population density	-2.161	-5.70*
Job density	2.841	16.384*
School district	7.860	1.14
Number of bus stops	-7.170	-6.96*
Number of shopping center	5.793	5.369*
Constant	680.178	21.69*
R-squared	0.871	
Adjusted R-squared	0.871	

Note: * Parameters are significant at the 1% level.

6. Conclusion

This paper uses the hedonic pricing model to explore the correlation between commercial center and housing price in Xiamen, and studies the correlation between housing price and commercial center. Based on Hedonic pricing model, this paper uses regression analysis method to make qualitative and quantitative analysis of different relevant factors. The results show that bus stops, seaside parks, shopping malls and other factors have a greater impact on housing prices, while school districts have a smaller impact on housing prices. Among them, shopping center and urban center have significant effects on the rise of housing prices. Every increase in shopping center, the housing price will increase 57.93 thousand yuan.

From the above conclusions, we can conclude that Xiamen's future urban development planning should pay attention to the rational allocation of high-quality educational resources and core commercial resources, improve the imbalance of urban development around the two parts of education and commerce, so as to alleviate the pressure of housing purchasing in some areas, effectively control house prices, achieve the balance of population distribution and economic development in Xiamen.

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