

The Impact of Public Resource Allocation on Housing Prices

– Taking Chengdu as an Example

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Abstract: This paper examines the impact of public resource allocation on housing prices and uses Chengdu as an example for analysis. By comparing education, healthcare, and transportation in each district of Chengdu, the study finds that public resource allocation and housing prices in Chengdu are positively correlated and that education and healthcare resources are more strongly correlated with property prices. Both public resources and property prices in Chengdu show a general trend of "circle + radial" diffusion, decreasing from the first to the third circle. After comparing the public resources and property prices in each district, it is clear that there is still a large gap between districts. This paper argues that the government should increase the construction of public resources and optimize talent policies in the surrounding areas in order to alleviate the disparity between districts, disperse the pressure on public resources in each district in the first circle, and promote coordinated urban development.

Keywords: house price, public resources, real estate

1. Introduction

After the commercialization of houses, people are more and more concerned about the surrounding facilities in addition to the quality of housing itself. As a necessity in people's daily lives, the price of housing has a strong relationship with the general level of the economy, and the development of housing can also drive economic development to a certain extent. As income levels rise, residents' requirements for their living environment have increased significantly, and in addition to the original quality of housing, people have begun to pay more attention to the public resources surrounding the house. This paper discusses the impact of public resources on housing prices, which will help the government to formulate reasonable policies to optimize the allocation of public resources and promote coordinated urban development.

2. The Influence of Public Resource Allocation on Housing Prices

Urban public resources are public goods that are shared by all citizens. Their allocation represents the direction of the city's internal development, which has an important impact on social welfare and in turn affects the price of houses in the area. The better the education, communication, postal and other resource facilities around a house, the higher the overall evaluation of such houses by buyers, and

naturally the higher the housing price will tend to rise [1]. In this paper, we will discuss the impact of public resource allocation on housing prices from the perspective of the development of educational resources, hospitals and health venues and commercial centers.

2.1. The Impact of Education Resources on Housing Prices

Public education resources include the consumption of human capital, material and financial resources. China's unique household registration system and limited educational resources make the choice for school vital. Quality educational resources can enhance all aspects of a child's life. Therefore, the unequal distribution of educational resources and the concentrated effect of quality resources make parents who want their children to be educated pay close attention to schools and the surrounding amenities. It is for this reason that the prices of school district houses and their near houses have undergone a wild increase in recent years. The relationship between the availability of educational resources and housing prices as shown by Wen, Haizhen et al. shows that educational facilities have a positive impact on residential prices, with home buyers and investors willing to pay additional prices for the quality and accessibility of education [2].

2.2. The Impact of Hospital Health on Housing Prices

Public health care resources include a general term for health care personnel, health care costs, health care facilities, health care information and so on. With the aging population and increased awareness of health issues, people place a high value on the protection of their health. However, the huge disparity in health care resources makes people trust hospitals, especially large kilometer hospitals, which has led to a significant impact on property prices around hospitals. People prefer to live in areas with supporting medical resources because the housing prices are relatively high.

2.3. The Impact of Urban Transport on Property Prices

Urban transport generally includes the city's investment in road construction, including all forms of transport. The planning and layout of cities are closely related to urban transport. As the population grows and technology develops, the demand for transport, especially public transport, is increasing. And easy access to transport can increase the housing price around there.

3. Current Situation of the Development of Public Resources in Chengdu

There are 23 districts, cities and counties in Chengdu, with a total of 20 in the administrative division, which can be roughly divided into three circles. The districts in the first circle are Jinjiang, Wuhou, Qingyang, Shuangliu, Chenghua, Jinniu and Longquan. The second circle has Wenjiang, Pixian, Xindu and Xinjin. In the third circle, there are Dujiangyan, Chongzhou, Dayi, Qionglai, Qingbaijiang, Pengzhou, Pujiang and Jintang. Overall, the allocation of public resources in Chengdu is generally characterized by a spread of distribution from the central city to the surrounding areas.

3.1. Education Resource Allocation by Districts in Chengdu

Chengdu is the education center of the southwest region and its education standards are among the highest in China. Overall, the budget for education expenditure in Chengdu in 2020 is \$25.2 billion. Specifically, the allocation of education resources by region in Chengdu shows the following characteristics.

Firstly, Chengdu's financial education budget decreases from the first to the third circle, and there is a relatively large gap between districts. According to the 2020 education budget of each district, the total fiscal education budget of the five central urban districts is 9.63 billion, accounting for nearly

40% of the city's 20 district-level education budgets. Among them, Wuhou District has the highest fiscal education budget in the city at 3.98 billion. Pujiang County, the outermost circle of the three circles of Chengdu, has the lowest at 390 million, which is only about 1/10 of Wuhou District's education budget.

Secondly, the density and quality of education resources in Chengdu also show a gradual decline from the first circle to the third circle. Chengdu's pre-school, compulsory education and high school education campuses are mainly located in the first circle, while universities are located in the second circle. The five urban areas, centered on Tianfu Square, were the first urban centers to develop, and many quality education resources are concentrated there. The number of compulsory schools in the five urban areas accounts for roughly 30% of the city's district-level schools, which is roughly in line with the education budget. At the compulsory level, the primary school "Five Golden Flowers" and the "Chengdu Shishi High School, Chengdu No. 7 High School and Chengdu Shude High School (called "Four Seven Nine junior and senior secondary schools") are concentrated in the five urban areas. Most of the campuses at the high school level are located in Pidu District, Wenjiang District and other second-circle areas.

3.2. Health Resource Allocation by Districts in Chengdu

The budget for health expenditure in Chengdu in 2020 is approximately \$9.25 billion, with a total of 12,497 health care institutions in the city, including 692 hospitals and 11,642 primary health care institutions.

Firstly, Chengdu's health care expenditure is mainly concentrated in the first and second circles, with less in the third circle. Looking at the expenditure budgets of each district health committee, there is a wide gap in health budget spending. The health budget of Wuhou District, a suburban area, is the highest in the city, at \$870 million, while Pujiang County, the outermost of the three circles of Chengdu, is the lowest, at \$200 million, only about 23% of the health budget of Longquanyi District.



Figure 1: Distribution of Chengdu rail transit stations at all levels [3].

Secondly, the number of healthcare resources in Chengdu is concentrated in the first circle and gradually decreasing towards the third circle. In terms of the number of hospitals in each district, especially the number of tertiary hospitals, Chengdu's healthcare resources are very uneven between

the first and the third circles. The number of hospitals in the five urban areas is 253, accounting for 70% of all hospitals in the city. The highest number of hospitals is in Qingyang, with 85 hospitals, while the lowest number is in Pujiang, with only 2 hospitals. The distribution of the number of tertiary hospitals follows the same trend, with 45 hospitals in the five urban areas (excluding those already contracted or under construction), accounting for 63% of all tertiary hospitals in Chengdu. Many people from the southwest will make the trip to Chengdu for treatment, so this contributes to Huaxi Hospital's third place in the ranking of general hospitals in China in terms of surgical volume in 2021.

4. Transportation Resource Allocation in Chengdu

In the 79 years of Chengdu's history, road transport and public transport have played an important role in supporting the city's development.

Firstly, Chengdu's metro mileage ranks first in the Midwest in the shape of a ring and spreading outwards. In 2022 alone, five metro lines will be launched in Chengdu, increasing the mileage by 229 km, which makes Chengdu's metro mileage jump to the third in China and the first in Central and Western China. Chengdu's metro supports the city's development towards the southwest in a general trend of "circle + radial" diffusion [4]. According to Figure 1, Chengdu's metro mainly shows a ring pattern distributed in the main urban area and spreads outwards. In terms of the number of metro station points, the number of stations in the main urban area is 312, accounting for 65% of all metro station points. Among them, there are 103 stations in Wuhou District, accounting for 20% of the total number of stations.

Secondly, Chengdu bus lines show a trend of decreasing from the main urban area to the surrounding area. The Chengdu Bus Group in the five urban areas of Chengdu is based around the "rail + bus" model, providing a fast commuting network for the people. The first two circles account for 83% of the total number of buses, and there are many fast and direct routes as well as community routes that are convenient for residents.

5. The Current State of Development of the Housing Market in Chengdu

This section analyses the development of the housing market in Chengdu and its districts, as the city's size and prosperity has changed dramatically since its reform and opening up.

5.1. Overview of the Chengdu Housing Market

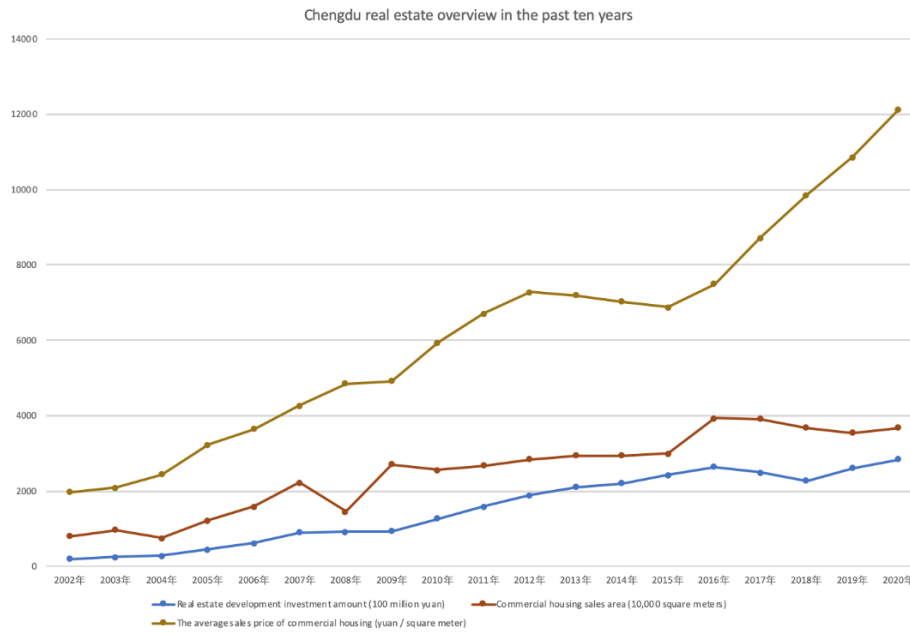


Figure 2: Changes in housing prices in Chengdu over the last ten years.

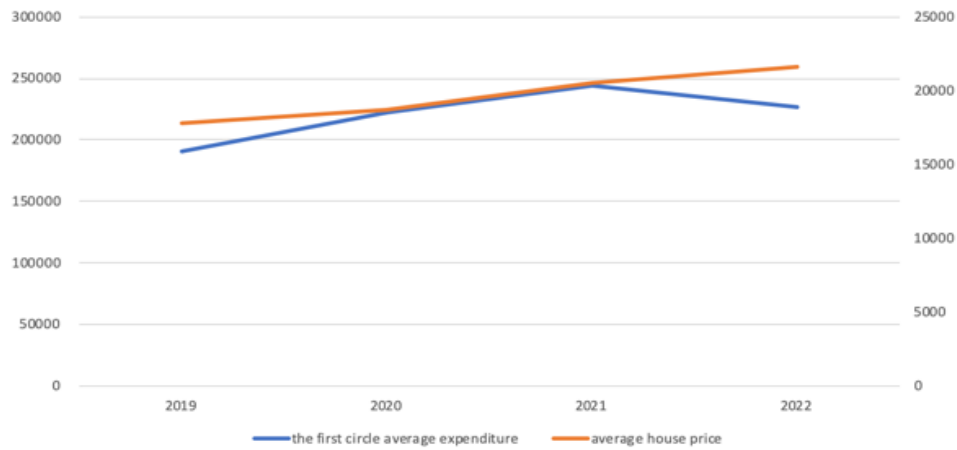
According to Figure 2, the amount of investment in real estate development, the area of commercial properties for sale, and the sales price of commercial properties have all increased substantially since 2002.

Firstly, the rapid economic development of Chengdu has driven the development of housing prices. "Chengdu's economy, in general, has maintained relatively fast growth, with comparable economic growth rates exceeding 10% in two-thirds of the years and average annual growth in gross domestic product, including 23 consecutive years of high double-digit growth from 1991-2013, with an average annual growth rate of 13.2% ...In the first half of 2019 Chengdu economic growth rate jumped to the first place in the floating cities" [5]. Housing construction, as an important foundation for urban development, is developing and expanding rapidly alongside economic development. And following the marketization of housing, the housing demand of urban residents has been released, which has brought excellent opportunities for real estate.

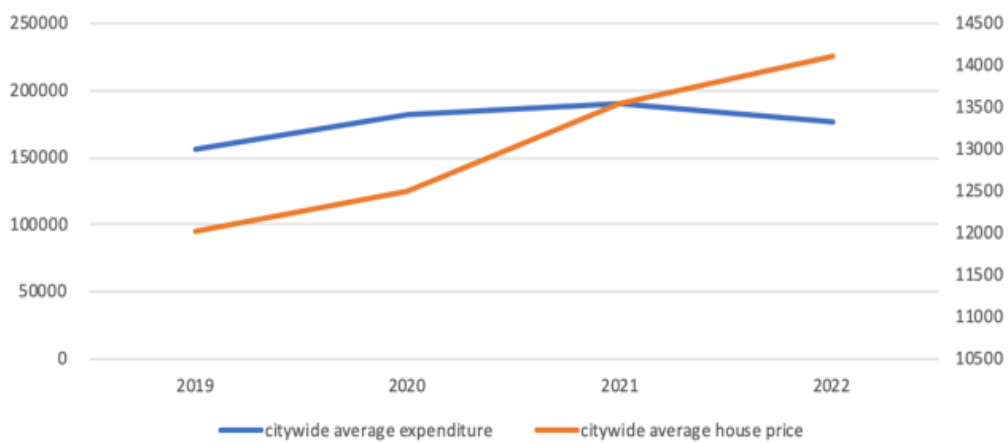
Secondly, the concentration of talent has contributed to the rapid growth of housing prices in Chengdu. The optimization of talent policies, the introduction of major projects, and the vigorous development of industrial parks have gathered a large number of young talents, further pushing up housing prices in Chengdu.

Finally, Chengdu's unique geographical location has made it a heavenly land of abundance. As a "livable city of happiness" and a resource center in southwest China, Chengdu has more room for future development and therefore higher demand for investment. Over the past decades, "the proportion of foreigners purchasing homes in Chengdu has increased, driving up the housing prices" [6].

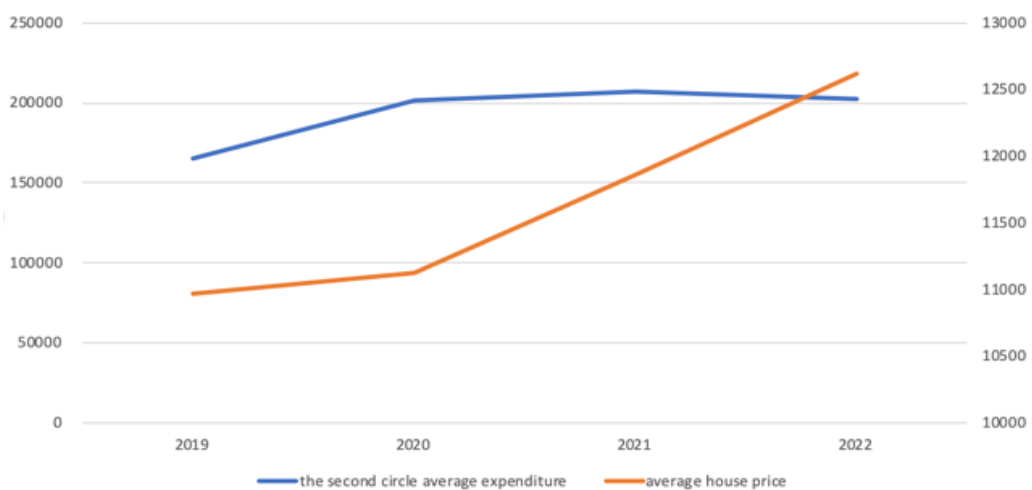
The relationship between the average annual expenditure and the average house price of the first circle



The relationship between the city's average annual expenditure and the average house price



The relationship between the average annual expenditure and the average house price of the second circle



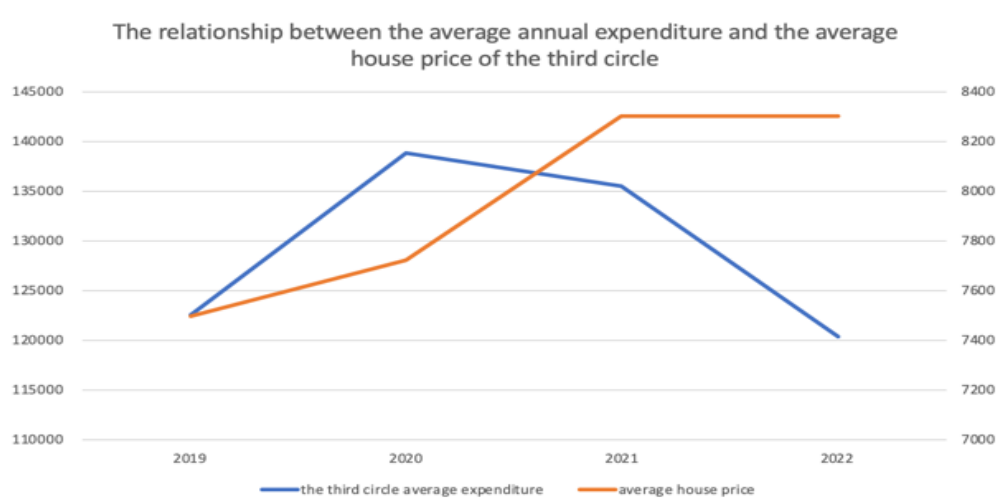


Figure 3: Relationship between average annual expenditure and average housing price for the city as a whole and by circles.

5.2. Housing Market Overview by Districts in Chengdu

Further, Figure 3 illustrates the relationship between annual average expenditure and housing prices for the city as a whole and for each of the circles, with the following main features.

Firstly, public resource expenditure and housing prices in Chengdu are both broadly on an upward trend. Comparing annual expenditure on education, healthcare and transport with average housing prices over the four years, we can see that the annual growth in education, healthcare and transport expenditure is positively correlated with the increase in average housing prices across the city, with the highest positive correlation in the first circle and the lowest correlation in the third circle.

Secondly, housing prices in all districts in Chengdu are on roughly the same upward trend as the overall average housing prices in Chengdu, with the first circle experiencing a more moderate increase. As the earliest area to develop, it has always been the economic, cultural, and tourist hub of Chengdu, so prices have been steadily increasing. However, with the saturation of the main city and the government's demand for building a new economic and modern international area, many industries and companies have been attracted to the newly developed areas outside the main city, and many companies have even started to move out to the second and third circles. As a result, with the increase in companies and people, there has been some significant increase in housing prices in the second and third circles.

Finally, housing prices vary widely between districts and the rate of increase varies greatly. The average housing price in the five urban districts will be around 21,600 per square meter in 2022, while the average housing price in the three circles will be 0.83 million per square meter. The difference between the highest average housing price of 27,000/sqm in Jinjiang District and the lowest of 0.62 million/sqm in Jintang County is more than 20,000 per sqm. Among the larger increases are Shuangliu District and Wuhou District, Wuhou District contains the high-tech zone as a high-tech development zone to attract a large number of people to come here, high population density, high-paying enterprises plus the original high land prices make Wuhou District housing prices rise rapidly. The rapid rise in housing prices in Shuangliu District also stems from Shuangliu District's strategy to improve the high quality of building China's aviation economic capital that practices the new development concept based on the urban park city [7]. Shuangliu is part of the mid-merit and southern expansion area and is connected to Gaoxin District and Tianfu New Area, enjoying double dividends while accommodating people who cannot buy houses in Gaoxin District and Tianfu New Area. However, Jintang, which has the lowest prices, has seen its prices fall rather than rise. The main

reason for this is that Jintang has suffered from floods year after year due to its location at the convergence of many rivers. This has resulted in a net outflow of people from Jintang in recent years and a slump in the housing market.

In general, education, healthcare and transport expenditure in Chengdu show a varying positive correlation with housing prices in each circle, with education expenditure showing the highest positive correlation with housing prices, with the demand for quality education resources contributing significantly to housing price growth. There is also a positive relationship between the development of public transport and medical resources and housing prices, so housing prices and education resource allocation in Chengdu show roughly the same trend, from the highest in the five central cities to the decreasing in the three circles [8]. However, the growth rate of some areas in the second and third circles is greater than that of the first circle.

6. Conclusion

In this paper, we have analyzed the impact of the distribution of public resources on housing prices in Chengdu by looking at the current situation of education, health care, and transportation construction in Chengdu. After collecting and analyzing the data, it was found that the distribution of public resources such as education, health care, and transportation expenditure and housing prices in Chengdu showed a positive correlation, with education expenditure showing the highest positive correlation with housing prices. After dividing each district into the first, second, and third circles according to geographical location, a comparison of the annual changes in education, health care, transport expenditure, and housing prices in Chengdu shows that the annual growth in education, health care, and transport expenditure is positively correlated with the increase in average housing prices, with the highest positive correlation in the first circle and the lowest correlation in the third circle. A detailed analysis of the allocation of resources by district shows that public resources in Chengdu are unevenly distributed, with large differences between regions and weak resources in the third-circle districts. However, in recent years, as the government has invested in the second and third circles, the growth rate of several of them has even surpassed that of some of the first circle.

Based on the findings of this paper, this paper proposes the following suggestions. First, the government should strengthen the equalization of public resources and gradually promote the equalization of public services in suburban areas based on population density [9]. By devoting more public resource spending to the second and third circles, the government can not only spread the pressure on public resources in the first circle, but also promote the growth of housing prices in the second and third circles. Policies can also strengthen the introduction of people and companies in the second and third circles, which will lead to a rapid increase of population, public resources and the housing prices. Secondly, the government can formulate corresponding industrial policies to coordinate the balanced development, taking into account the characteristics of the areas. With the rapid development of the second and third spheres, the government should follow the law of urban development to reasonably divide the functional areas in the core first circle according to local conditions. Specifically, in order to prevent the old urban areas' decline, the government should determine the appropriate scale of development and optimize the functional layout according to the cultural development characteristics of old urban areas, promote industrial clusters and improve the optimization of public facilities. The overall function of old urban areas can be improved in order to balance the relationship between the present and the future [10].

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