

# *A Study on the Correlation Between School District Housing Price and Birth Rate in Beijing and Kunming*

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**Abstract:** In China, under the influence of traditional thinking, people's enthusiasm for buying houses is constantly rising, and the real estate market has always been enthusiastically sought after in China. On this basis, with the development of the economy, it has slowly evolved into school district housing, central business district housing, new city housing and other room types. School district housing has become a hot topic of concern in the whole society. Some researchers believe that fluctuations in the freshman population affect school district housing prices, but there is still a lot of room for research on this view. Therefore, this paper analyzes the correlation between the new population and the housing prices of school districts in representative cities in China by collecting the data of China's new population in the past decade, as well as the highest transaction price and average annual transaction price of school districts in China. The study found no correlation between birth rates and house price levels. There is a positive correlation between the birth rate and the growth rate of house prices.

**Keywords:** school district housing, birth rate, housing price

## 1. Introduction

In a broad sense, a school district house refers to buildings such as houses near the school district. In a narrow sense, it refers to the purchase of real estate in the designated area, and the children of the homebuyers can study at the district level, municipal level, and provincial key primary and secondary schools.

With the intensification of urbanization and aging population, coupled with the attention of contemporary parents to education, the demand for high-quality education resources is gradually increasing. In order to let children win at the starting line, school district housing in big cities is heating up, and housing prices are soaring, which adds a huge economic burden to parents. In the past decade, school district housing prices have risen sharply. According to official statistics and relevant studies released by the real estate department, the housing prices of school districts in ordinary first-tier cities once reached two or three times that of school districts in the same cities, and the housing prices of school districts in megacities such as Beijing, Shanghai, Guangzhou and Shenzhen even reached four or five times [1]. The research on the education quality of primary schools in Beijing and the purchase and lease of housing in surrounding school districts has shown that the price of housing around primary schools in Beijing is correlated with the teaching quality, and the premium

is very serious [2]. Many predict that the housing market for school districts will be worse in the future due to the COVID-19 outbreak, economic slowdown, changes in public consciousness, falling birth rate, and policy adjustments.

In 2022, the number of births in Beijing even dropped significantly, almost halving compared to 2017, when the number of births peaked. Experts believe that the cliff drop in population will shake the foundation of the country. Studies have found that China has not only delayed the age of marriage, but also caused problems related to education, arguing that the extension of schooling years is the root cause of the decline in marriage rates and birth rates [3]. Entering 2021, housing prices have been soaring, but with the introduction of the “double reduction” policy, Beijing job rotation policy, and Shenzhen University District policy, school district housing prices began to fall, and the upward momentum was suppressed. In order to solve the many problems caused by the rise of school district housing, experts have put forward a series of policies such as modifying the nearby entrance law, optimizing the teaching team, and improving the teacher rotation system, so as to promote educational equity, which has become the common vision of many people [4]. These studies are necessary to solve the problem of declining birth rate and aging population.

This paper takes the housing price of a specific urban school district and the birth rate of the corresponding city as the main factors of the study, comprehensively considers the geographical location and economic development level, and chooses the super-large first-tier city Beijing and the ordinary first-tier city Kunming for comparison. The number of new students in Beijing and Kunming in recent years, as well as the highest transaction price and average annual transaction price in the concentrated districts of school districts within the city are collected to explore whether there is a correlation between population change and housing price fluctuations, and the results of this study are used as reference. Forecast the future real estate market, and provide the corresponding reference and help for the market and society.

## **2. Background Description of School District Housing in Beijing and Kunming**

### **2.1. Beijing**

First of all, as the capital of China, Beijing has rich resources and international background, attracting a lot of talent and investment. Under such a strong economic background, Beijing's real estate market has high stability and appreciation potential. Over the years, Beijing's housing prices have increased unabated, almost out of reach, and are the first choice for many people to buy a house for investment. In addition, Beijing, as the political, economic and cultural center of the country, also provides rich employment and entrepreneurial opportunities for home buyers, and can find more opportunities and obtain higher development space in Beijing. As of the first half of 2023, the total number of online signatures for second-hand housing in Beijing exceeded 84,000 sets, an increase of 18.67% over the first half of last year, reflecting the activity of Beijing's housing market.

Secondly, Beijing's urban construction and infrastructure are highly mature and ahead of other cities, providing residents with a high-quality living environment. The transportation is convenient, the public transportation network covers a wide range, the subway runs in all directions, and modern shared bicycles, shared electric vehicles and rechargeable cars can be seen everywhere on the street, which provides convenience for citizens to travel. In addition, Beijing also has a sound medical, cultural, sports and other public service facilities to meet the various needs of residents. From medical care to recreation to sports, residents can enjoy the most advanced and high-quality services. In recent years, Beijing has also attached great importance to environmental quality and urban ecological construction, continuously improving air quality and ecological environment, and providing residents with a healthier and more livable living environment.

Beijing's rich educational resources are the fundamental reason why many people choose to buy a house in Beijing. Beijing has more high-quality schools than other cities in the country, and it is ahead in terms of learning environment, teachers, school resources and other convenience. Parents can choose better teaching resources for their children to provide better protection for their children's learning and growth. In particular, Beijing's higher education institutions, such as Tsinghua University and Peking University, have a good reputation at home and abroad, providing children with opportunities for higher education and career development. Beijing has been committed to building a core area of the capital function and an urban function expansion area with high-quality educational resources. In the future, there will be joint overseas high-quality resources, deepen and improve the reform work of group schooling, education alliance, inter-school alliance, etc., join the informatized teaching mode, and rely on the technical advantages of Internet education to improve the teaching force [5].

In particular, the research object selected in this paper is that Haidian District of Beijing is recognized as the area with the richest educational resources in Beijing. Zhongguancun in Beijing's Haidian District, like Silicon Valley in the United States and Bangalore in India, is a world-famous high-tech zone, dedicated to sending world-class top talents, as well as top universities such as Tsinghua University, Peking University, and Renmin University. The number of public primary and secondary schools in Haidian District is 172, accounting for 18.1 % of the total number of primary and secondary schools in Beijing, which is the main concentration of housing in Beijing school districts, and Haidian District has been ahead of other parts of Beijing for many years.

## 2.2. Kunming

Kunming is a famous livable city in China, also known as the Spring City, because of the four seasons like spring. Kunming is located in the middle of Yunnan-Guizhou Plateau, the city center is about 1891 meters above sea level, warm in winter and cool in summer, the average temperature is about 15 degrees. Therefore, affected by the geographical environment, the climate is more comfortable, is a paradise for tourism lovers, with tourism as an important pillar industry. At the same time, Kunming, as the capital of Yunnan Province, takes railway, road and air as the center, connecting the cities of Yunnan province with the important passageways into Yunnan, such as the Shanghai-Kunming passageway and the Beijing-Kunming Passageway, and becoming the transportation hub center of southwest China. At the same time, Kunming is also a bridgehead city in South Asia and Southeast Asia, and an important node of China's opening up to the southwest region. From Kunming, it connects Myanmar, Laos, Thailand, Vietnam, Cambodia and other South Asian countries, and connects Vientiane, Hanoi, Yangon, Phnom Penh, Ho Chi Minh, Kuala Lumpur, Singapore and other major cities.

Another big advantage of Kunming is the low cost of living and the low pressure of life. In cities with a relatively high cost of living, such as Shanghai, the housing price in the central area is generally around 50,000 to 80,000 yuan, while the housing price in Kunming is generally more than 10,000 yuan. Living in such a less stressful city, residents are more likely to experience happiness. In addition, as a new first-tier city, China has also received strong support from national policies in recent years. In 2021, the state officially approved the establishment of Kunming health Industry Demonstration Zone, which is the third largest health industry development demonstration zone in China after Hainan Boao Lecheng International Tourism Pilot Zone and Qinhuaogdao Beidaihe Life and Health Industry Innovation Demonstration Zone. In the process of development, the future will continue to vigorously support the development of tourism, while opening up the development of emerging industries such as biomedicine and health industry, focusing on the development of high-end medical, bio-manufacturing, generic drugs, biochemistry and other projects, and cooperate with clinical services, medical education, medical research and other functions, planning and building a batch of

health, health, elderly care, leisure, tourism and other functions. More people will choose to settle down in Kunming in the future.

The research object selected in this paper is Wuhua District of Kunming, located in the first ring of Kunming, with the largest commercial facilities and unparalleled location advantages. The first ring has always been a high-housing price - high-concentration area of Kunming, and the housing price is greatly affected by the surrounding environment [6], but the number of housing sales is relatively small and the price is relatively stable [7]. At present, Kunming City, a ring plate school district only Cuihu Yipin and Spring City Building No. 9. Since the opening of Cuihu Yipin, the blank unit price is about 27,000 yuan. Adjacent to Yunnan key primary School, normal University affiliated primary school, Wenlin Primary School and so on. Key junior high schools, such as the High School affiliated to Yunnan University and the High School affiliated to Yunnan Normal University, are representative districts in Kunming city.

### 3. Data Analysis

The factors selected in this paper are, the number of new births in the country from 2011 to 2022, the number of new residents in Beijing, the number of new people in Kunming, the highest transaction price per square meter in Haidian District, Beijing from 2014 to 2022, the average transaction price, and the highest transaction price and average transaction price per square meter in Xishan District, Kunming City from 2014 to 2022. The birth rate and school district housing prices were analyzed graphically, and then combined with the correlation analysis of the two, to explore whether there is a relationship between the fluctuation of school district housing prices and the decline of birth rate.

#### 3.1. Birth Rate

The data of all births in this paper are from the statistics of China economic data network [8], and the figure below is the total number of newborn people in the country from 2011 to 2022.

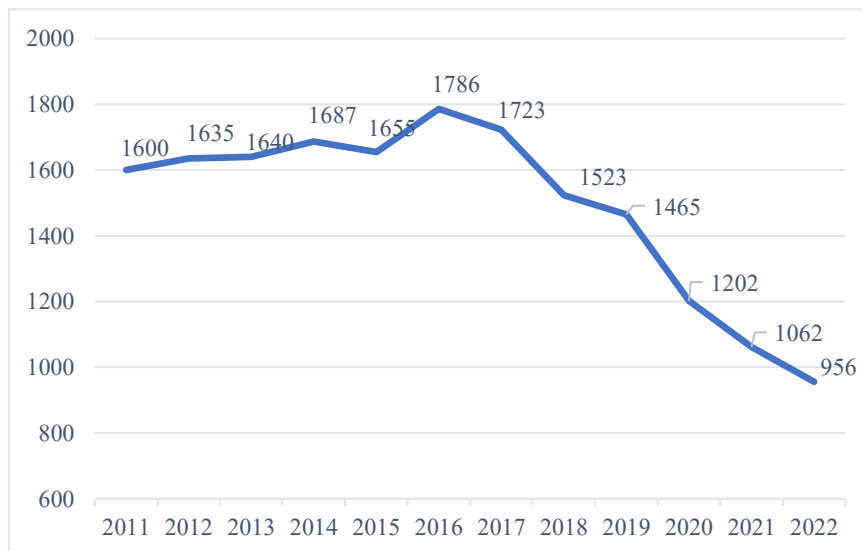


Figure 1: Total number of new entrants in China from 2011 to 2022.

In Figure 1 above, in the decade from 2011 to 2022, with 2017 as the cut, the number of new students fluctuated little and remained relatively stable before 2017. In 2016, the number of new births reached 17.86 million, the highest number of new births in the past 10 years. After 2016, the population began to decline year by year, especially in 2018 and 2020, the number of newborns

decreased by 2 million compared to the previous year. By 2022, the number of new entrants will be only 9.56 million, almost half of its peak.

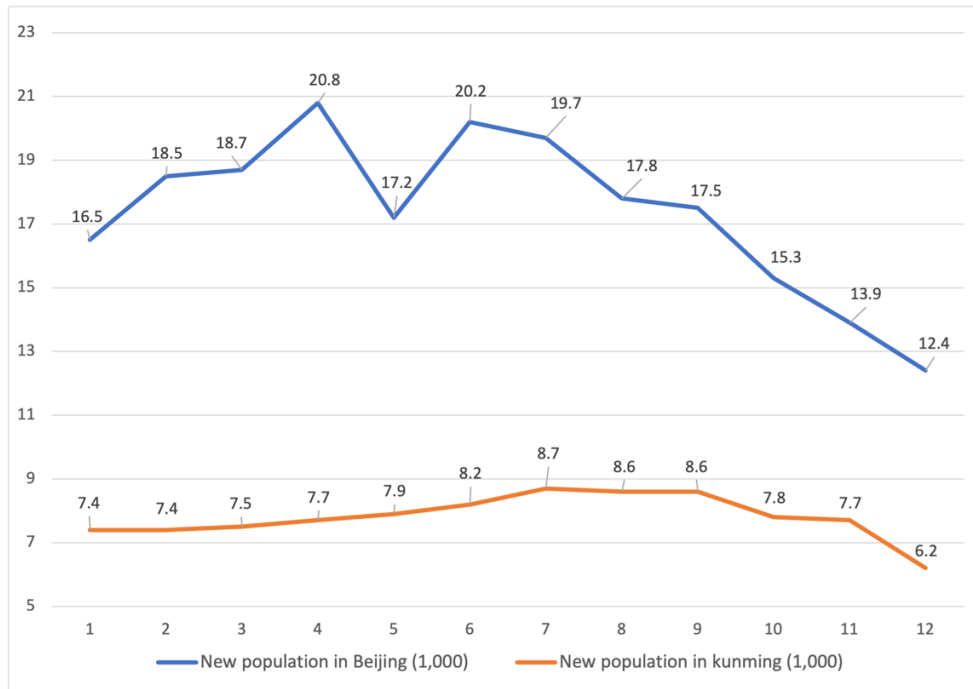


Figure 2: Total number of new entrants in Beijing and Kunming, 2011-2022.

Figure 2 above shows the number of new births in Beijing and Kunming from 2011 to 2022. It can be seen that the number of births in both places fluctuates to a certain extent. In 2015, the number of births in Beijing was 172,000, down 36,000 from the previous year, and the birth rate was 7.96%, down 18,000 points from the previous year, the lowest level during the “Twelfth Five-Year Plan” period and the lowest point in the same period. In the following two years, with the encouragement of the government and the implementation of the two-child policy, the number of new students finally reached a record high of 202,000 in 2016. After 2020, due to the impact of the epidemic, the number of newborns began to decline significantly, and in 2022, there were only 124,000 newborns. Meanwhile, Kunming is in a similar situation to Beijing, with 87,000 new students in 2017. Since then, it has been decreasing for many years, and from 2021 to 2022, the decrease of 15,000 people is particularly pronounced.

Combined with Figure 1 again, it can be found that the number of new births in the country is positively correlated with the number of local new births, and the peak period is also from 2016 to 2017, and after this as a turning point, it began to decline year by year.

### 3.2. School District Housing Price

In this article, two sets of data are selected for school district housing prices. They are the highest annual transaction price and the annual average transaction price. These two sets of data were selected based on the anchor price effect and the theory of price fairness perception, which means that people are influenced by some specific information when making decisions, and use this information as a reference point or “anchor” to evaluate other relevant information. The anchoring effect is mainly divided into two forms: adjustment and substitution. The adjustment form refers to the fact that people use the anchor as a benchmark, make appropriate adjustments around it, and finally come up with a decision-making result. The alternative form is that people directly use the anchor point as the basis

for decision-making without excessive adjustment [9]. When making purchases, consumers will judge whether goods or services are worth buying based on their income level and economic situation. In the case of large price fluctuations, consumers will pay attention to both the upper price limit and the lower price limit as their acceptable price range, which is the anchor in the buyer's mind. Price fairness perception refers to consumers' subjective feelings about prices, that is, whether consumers believe that the price paid is fair and reasonable [10]. Further, assuming that buyers pay attention to last year's average transaction price and the highest home price, they can calculate the approximate transaction range of house prices in this area, and buyers will set a price range for themselves in their minds. First of all, if the price proposed by the seller is relatively acceptable to the buyer within this range, the transaction can be completed relatively quickly and smoothly.

However, in the process, if the price offered by the seller at the beginning is close to the upper limit of the price in the buyer's mind, the buyer will bargain, starting from the lowest price, even if the final transaction price is not the lowest price in the buyer's mind, it is within the buyer's acceptable range. This explains why house prices continue to rise, as long as they do not exceed a certain maximum price, that is, the anchor price, in this range everyone's acceptable range is different, but there are always people with a high acceptable range, pulling up the average price, which will make new buyers re-evaluate the price, think that a certain commodity should have a higher new value, and the acceptability of the house price in their minds will also become higher.

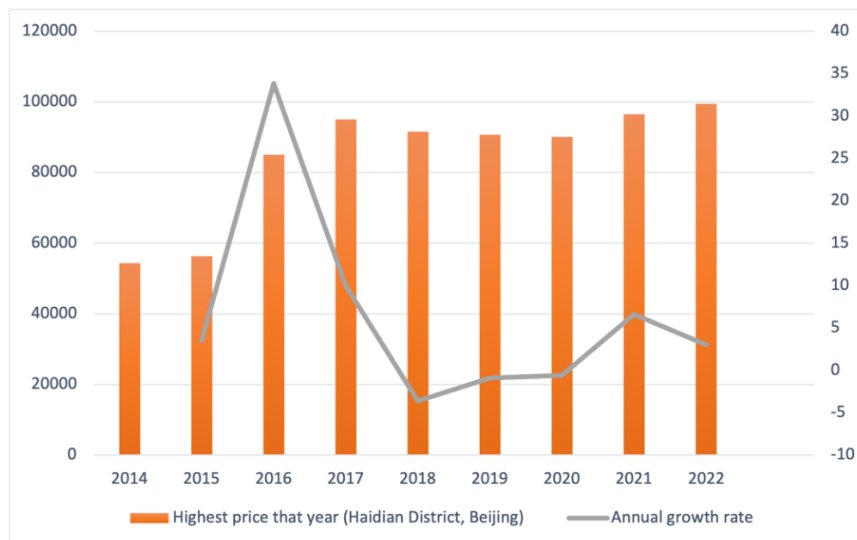


Figure 3: The highest transaction price (m<sup>2</sup>) and annual growth rate in Haidian District from 2014 to 2022.

In Figures 3 above and 4 below, the highest transaction prices in Haidian District and Xishan District from 2014 to 2022 are shown [11]. The highest transaction price in Haidian District reached a new high of 99,447 yuan per square meter in 2022, and although the highest transaction price from 2017 to 2022 fluctuated, the overall price was stable at around 90,000 per square meter. It is worth noting that from 2015 to 2016, house prices rose fiercely, with the highest transaction price increasing by 33.8%. There was also a 10% growth rate by 2017, but in the next three years from 2018 to 2020, the growth rate has been a negative growth trend, and the highest transaction price has continued to decline, falling to 90,042 yuan per square meter by 2020. Since 2018, the price of housing in the school district has not risen as much as before, and the growth rate from 2021 to 2022 is only about 5%. Before 2020, Kunming, as a second-tier city, housing prices were more stable, except for 2018, the growth rate reached 20%, and maintained a low growth rate of 10% every year. In 2022 there was a slight negative growth, a decline of 6%, but overall house prices did not fluctuate much.

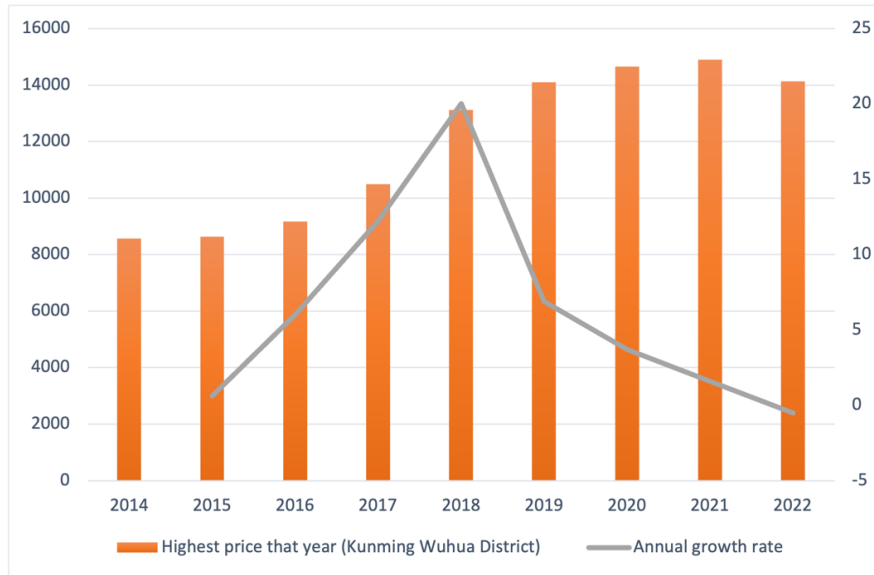


Figure 4: The highest transaction price (m2) and annual growth rate in Xishan District from 2014 to 2022.

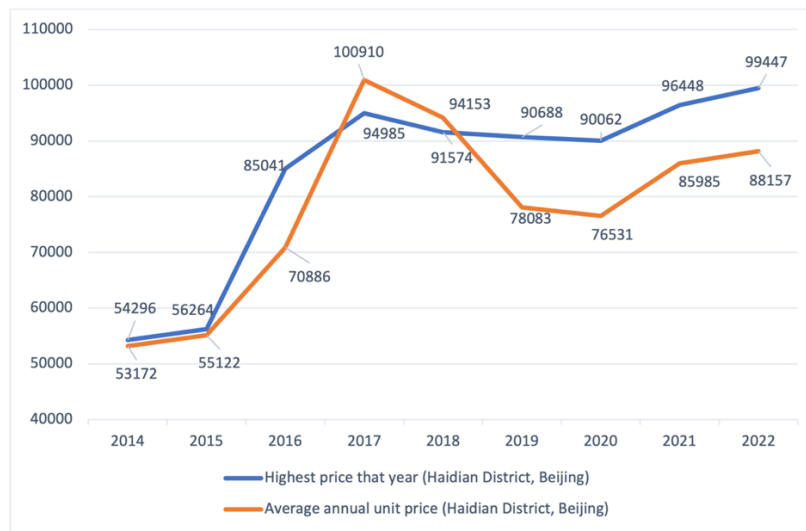


Figure 5: Comparison of the highest and average transaction prices from 2014 to 2022 in Haidian District.

In Figures 5 above and 6 below, the highest annual transaction price and the average annual transaction price of the two districts from 2014 to 2022 are compared, and the average and maximum transaction prices of Beijing and Kunming are similar and fluctuate consistently. In 2017, Haidian District was the peak period of housing prices, and the highest transaction price and average were higher than other levels in the same period. There was an overall decline from 2018 to 2022, but it remained at a stable level. The overall housing price level in Xishan District showed a steady and low-growth climbing trend.



Figure 6: Comparison of the highest and average transaction prices from 2014 to 2022 in Xishan District.

In Figures 7 and 8 below, the two scatter plots show the relationship between the urban born population and the annual growth rate of housing prices, and a positive correlation can be seen. It means that as the number of births continues to decline, the growth rate of house prices is also expected to decline, and the growth rate of school district housing is constantly slowing down.

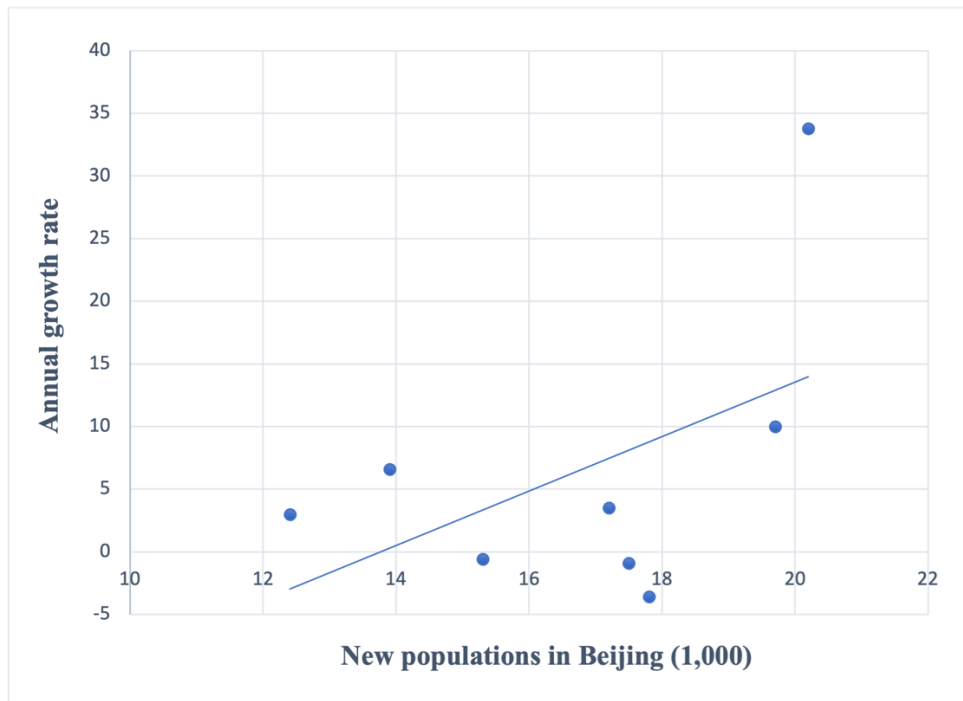


Figure 7: Haidian District new population and annual growth rate of housing price scatter chart.



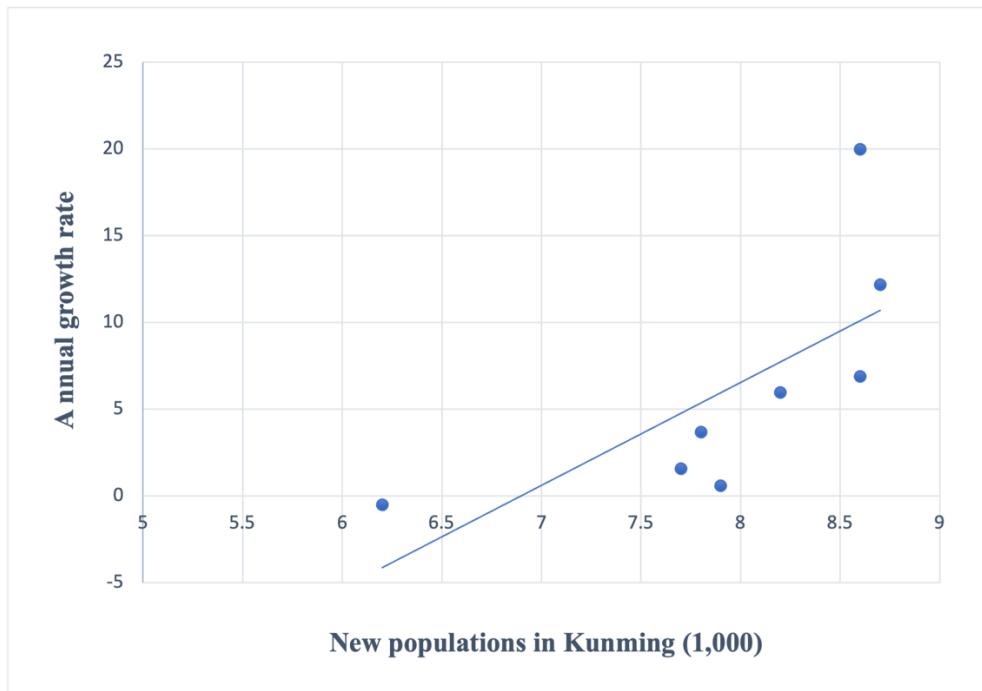


Figure 8: Xishan District new population and annual growth rate of housing price scatter chart.

The data show that the correlation coefficient between the highest annual transaction price and the average annual transaction price and the neonatal population in Haidian District of Beijing is -0.3, and the correlation coefficient between the highest annual transaction price and the average annual transaction price and the neonatal population in Xishan District of Kunming City is -0.5. As a result, it can be assumed that the correlation between house price levels and the number of new students is low ( $r < 0.3$ ). From the data, it can also be seen that although the new population is declining, the housing price level of school district housing is still growing. However, calculating the annual growth rate of house prices and the number of new populations, it can be found that the correlation coefficient between the annual house price growth rate and the new population in Haidian District is 0.6975, and the correlation coefficient between the annual house price growth rate and the new population in Xishan District is 0.8011, at this time, there is a strong correlation between the house price growth rate and the number of new population ( $r > 0.8$ ).

#### 4. Conclusion

In recent years, China's birth rate has been declining, and the low birth rate is often accompanied by social problems such as a sharp decrease in the working population and an aging population, which is not conducive to the long-term sustainable development of a country. Real estate is the weather vane of the national economy, so the problem of school district housing is also hotly debated by the society. In the future, as the number of new students continues to decrease, whether the school district housing prices will fall, whether China's real estate market and even the national economy will be affected. Therefore, this paper takes two cities of different magnitude as reference samples to collect the number of new students in recent years and the housing price level of the school district, and analyzes the correlation. The research finds that there is no correlation between the current housing price level and the number of new students in China, but there is a correlation between the growth rate of housing price and the new population. With the decrease of the new population, the growth rate of housing price slows down.

In order to promote educational equity, the state has also introduced a series of related policies in recent years. Some cities have canceled nearby and regional enrollment, and adopted exams or lottery for enrollment. At the same time, efforts are made to improve the quality of the teaching team, and the teacher rotation system is implemented, so that high-quality teacher resources cover every school. However, the correlation analysis only shows that there is an association between the two, and does not show that there is a causal relationship between the two. There are many reasons for the fluctuation of house prices, and the declining birth rate is only one of them. The reference objects of this paper are only two cities and the sample size is small, so there are still large gaps in the results of this study. Some have suggested that 2023 is the school district's last swan song, after the 2017 population peak, the 2023 batch of newborns just entered elementary school. After 2023, as the new population continues to decline, school district housing prices are likely to continue to decline, and whether this statement is accurate in the future remains to be verified.

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