

**Impact of Policy Promoting Tenant-Owner Right Equality on the Housing Market in
Guangzhou**

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Abstract

This research studies the impacts of a new policy promoting tenant-owner right equality on the housing market in Guangzhou through a case study of the Tianhe District. Taking datasets of monthly housing prices and rents, as well as residential complex information from 2016 to 2018 within Tianhe District, this research examines the changes in housing prices and rents that resulted from the implementation of the new policy with the use of multiple regression model and Difference-in-Difference (DID) model. The results generated from two multiple regression models show that the reputation of schools and transportation accessibility are two main influencing factors of house sales prices, while building age, transportation accessibility, and sales type are influencing factors of rents. And the results from the DID model suggest that the implementation of the new policy had increased the house sales prices, regardless of the educational reputation, despite it had little impact on the rent level. This finding is contrary to the government's expectation of stabilizing housing prices, but could be understood through the findings from 18 interviews with residents in Tianhe District.

Key words: tenant-owner right equality, school enrollment rights, housing prices, rental housing market, Difference-in-Difference model.

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Table of contents

Abstract	ii
Acknowledgments	iii
Table of contents	iv
List of Tables	v
List of Figures	vi
Chapter 1: Introduction	1
<i>Introduction</i>	1
<i>Background</i>	3
Chapter 2: Literature Review	9
Chapter 3: Research Design	14
Chapter 4: Analysis	24
<i>Results</i>	24
<i>Discussions</i>	31
Chapter 5: Recommendation and Conclusion	37
<i>Recommendation</i>	37
<i>Direction of Future Research</i>	38
<i>Conclusion</i>	39
Appendices	41
<i>Appendix A. Interview Questions</i>	41
<i>Appendix B. List of Interviewees</i>	42
Bibliography	43

List of Tables

Table 1. Policy Comparison between Major Cities.....	6
Table 2. Data and Sources	16
Table 3 Descriptive Statistics.	17
Table 4. Composition of the interviewees (Count/Percentage)	18
Table 5. Multiple Regression Results	24
Table 6 Difference-In-Difference Method Regression Results.....	26
Table 7. Interview Results	29

List of Figures

Figure 1. Key Primary School Distribution in Tianhe District	7
Figure 2. Sales Prices and Growth Rates from June 2016 to August 2018.....	27
Figure 3. Rents and Growth Rates from 2016 to 2018	28

Chapter 1: Introduction

Introduction

One of the main housing problems in China's major cities is the gap between the house purchasing price and the household income, which increases the burden for residents and becomes a repulsive force for the influx of talents in China's major cities. Due to the residency rules in urban China, school enrollment right is exclusive for the homeowners, creating owner premiums and enlarging the inequality between owners and renters (Eli, 2018). The central government believes that improving tenant-owner right equality can help to promote both the supply and the demand of the rental market, stabilize the housing price premium in the city, and attract talents to the city, while some critics worried about the rise in housing prices and the insufficient educational resources in the cities (Guan & Shi, 2018). Policies are not rigid rules or one-size-fits-all solutions. Therefore, it is necessary to theoretically discuss the impacts of a new policy that equalize the position of tenants and owners in receiving social rights and to examine the market reactions.

The policy promoting tenant-owner right equality is brought up to slow down the house purchase prices and encourage the development of rental housing market. The city of Guangzhou is among the first twelve trial cities of this new policy. In July 2017, Guangzhou issued a policy that allows children of tenants with qualified points in the point-based Hukou (household registration) system to enjoy the same right of enrollment to a nearby school during the compulsory education period as those of homeowners.

This research uses the housing prices and residential complex information in Tianhe District in Guangzhou as a case study to examine the changes in housing sales prices and rents that resulted from the implementation of the new policy through a Difference-in-Difference model. Interviews with local residents will also be collected to better understand the residents' willingness and attitude toward renting homes after the new policy was issued.

After the policy that promotes tenant-owner right equality was issued, the topic attracted many scholars to interpret, discuss, and give suggestions. However, most of the research of impacts on the housing prices still stay at qualitative and descriptive analysis, because the policy was enacted in such a short time of no longer than two years. Through in-depth study of the impacts of the new policy, this research can draw a conclusion to the question of how the housing prices and rents have responded to the changes in renter's school enrollment right and better understand residents' behavior patterns of purchasing and renting housing. This result can help urban planners to examine the degree to which the new policy is meeting the goals of city planners to stabilize the housing prices and encourage the development of rental housing market.

At the same time, this paper is going to develop an interview concerning local residents' housing search process, as well as their recognition and evaluation of this new policy. The results provided in this research could be useful for planners to understand and predict residents' housing tenure preference and their attitude towards the new policy.

Background

Owning homes has been valued above other expenditures for Chinese residents since the old days. This is significantly related to the public facilities and amenities that tied with home ownership. Due to the residency rules, homeowners instead of renters have priority to use facilities and amenities such as public schools and hospitals. These priorities could be capitalized as premiums in housing prices over those houses with insufficient public resources, and influence the local real estate market due to the scarcity of resources and residents' preference for resources with better quality. Housing prices, therefore, become a reflection of consumer's preferences and affordability of residential location.

Signs of real estate bubbles and high "sales price and rents ratio" in China's urban housing market indicate over-priced housing and excessive burden of Chinese residents, especially in areas around key primary schools due to the local governments' decision that public schools would only admit children of homeowners in each school districts (Chen, Wu, & Li, 2017). To address the aging issue in China, the previous one-child policy was replaced by a two-child policy that encourages people to have more babies in the future. The two-child policy exacerbating the demand for high-quality primary education and the housing stress for parents. Since 2016, the central government began to boost the development of rental housing in China.

Context of the Research

Guangzhou is one of the first-tier cities in the southern part of China. The abundant labor resources promote the prosperity of the city, but its soaring housing prices have caused the increasing concern about housing affordability and the risk of brain drain in this city. Tianhe District is a confluence area of urban and suburban life. It is thriving with modern city forms such as the office buildings in the Central Business District and the main shopping malls around the Tianhe Sports Center. It also preserves the aboriginal urban villages and farmland in areas close to the district boundary. In the 1990s, the Guangzhou government began to evaluate and grant the name of “key primary school”. Tianhe District is also home to primary schools with diverse reputation. 10 of the 102 provincial key primary schools in Guangzhou are located in Tianhe District, and the distribution of these schools are relatively uneven. These features make Tianhe District possible to become an ideal study location for this paper.

Policy Promoting Tenant-Owner Right Equality

Started from 2011, Guangzhou uses the point-based system for non-local residents to obtain local identity, and the primary schools started to use this point-based system to allocate the qualification for enrollment since April 2017.

The introduction of the policy that promotes tenant-owner right equality can trace its roots in June 2016 when the State Council issued a circular regarding the

plan to boost the residential rental market and improve urban residential housing conditions. The plan introduced the concept of promoting tenant-owner right equality for the first time and stressed the importance of clearly defining rental property rights. Detail suggestions included protecting tenants' right to basic public services, and promoting preferential policies for rental consumptions. It also mentioned that local governments are encouraged to transfer the management of government-invested-and-managed public rental houses to professional companies through public-private partnership or service purchase from private sectors.

Later at the end of 2016, the Central Economic Work Conference raised the issue again and stated that houses are for living in, not for speculation. With this presumption, the central government moved faster to put in place a housing system that better meets the housing needs of people.

In July 2017, Guangzhou government officially issued the "Work Plan to Boost the Residential Rental Market in Guangzhou". The new policy allows non-local tenants to have the same points calculated in the point-based Hukou system and school enrollment system as homeowners (10 points for those who rent for over 5 years and 10 points for those who own a house in Guangzhou), so that tenants and owners could enjoy the same right of enrollment to a nearby school during the compulsory education period as well as the same threshold to obtain local identity.

Table 1 lists comparison between the housing policy adopted by Guangzhou and other major cities in China to boost rental housing market. Major cities conducted different measures to boost the rental housing market. Cities such as Shenzhen, Beijing, and Shanghai combine financial innovations and incentives with

structural reform of the rental market, while Guangzhou and Wuhan focus on introducing and protecting tenants' rights as well as providing flexibility to the renting system. It is hard to judge which direction will be better, but the development trend of rental housing market in the future will obviously be the epitome of all the measures that proved to be effective.

Table 1. Policy Boosting Rental Housing Market Comparison between Major Cities

City	Time	Policy Summary	Key Features
Guangzhou	July 2017	Improve social rights for tenants; improve transparency of market rules; equalize rights for school enrollment.	Improve the structure and rules of rental housing market.
Wuhan	July 2017	Protect rental rights; offer rent stipends for talents (“Ren Cai Zu Fang Bu Tie”); adopt PPP mode into public rental housing developments; allow to pay rent with housing provident fund (“Zhu Fang Gong Ji Jin”).	Focus on providing protections for rental housing.
Beijing	August 2017	Industrial parks employees would be given priority to new rental housing; and the government encourages the development of long-term rental housing trusts (“Zu Lin Zhu Fang Xin Tuo Ji Jin”).	Increase the affordability of houses within key primary school districts, promote balanced development of different regions.
Shenzhen	August 2017	Encourage rental housing market development; boost the monetization of public rental housing (“Gong Gong Zu Lin Zhu Fang Huo Bi Hua”); allow commercial use buildings transfer to rental housing buildings.	Rental housing scale expansion.
Shanghai	September 2017	Tax reduction for rental housing; allow to pay rent with housing provident fund; rent stipends for bringing-in talents; allow commercial use buildings transfer to rental housing buildings.	Protecting the living needs for bringing-in talents.

Guangzhou Primary School Enrollment System

There are 961 primary schools in Guangzhou, 69 of them are located in Tianhe District (15 private schools and 54 public schools). From Figure 1 below we can see that, the distribution of key primary schools in Tianhe District is uneven. Key primary schools are mainly distributed along the main public transit in the southeastern part of Tianhe.

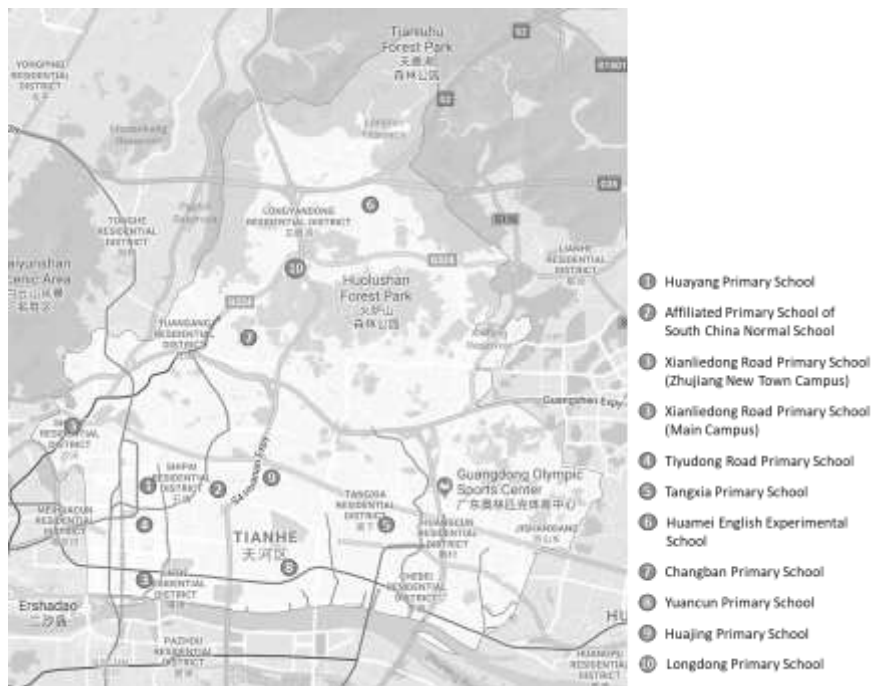


Figure 1. Key Primary School Distribution in Tianhe District

According to Tianhe District Compulsory Education School Enrollment Work Rules, location-based, point-based, and sponsorship-based are three major school enrollment principles. Sports, arts, or other students with special talents are not allowed to be given priority in school enrollment orders. At present, for residents who possess a local Hukou, the school enrollment follows the location-based principle. For non-local immigrants, the schools started to adopt the point-based

principle to allocate the qualification for enrollment since April 2017. The applicants should satisfy three required conditions (possessing a residence permit, living in the district legally, and working in the district legally), of which tenants and homeowners would receive the same full points if they live in Tianhe District for over 5 years. Non-local residents would be admitted by the primary schools according to their ranking in the point system.

2017 is the first year for Tianhe District to implement the point-based admission for immigrants. In 2018, Tianhe District met the enrollment needs of more than 50% of the total applicants. The local government plan to enlarge the portion of point-based admission in the total admission plan so that 60% of the total non-local applicants can be accepted, as well as reducing the percentage of sponsorship-based enrollment (which is a gradually prohibited way to get enrolled by sponsoring the construction and development of the primary school).

The school enrollment quota for children of immigrants in Tianhe has been specific to the school: in 2018, 665 students for public primary schools, 429 students for public junior high schools, 622 students for private primary schools, and 402 students for private junior high schools. In addition to the assigned quota, the Education Department of Tianhe District offers stipend to those households that apply for private primary schools (5,000 RMB per year) to ease the pressure of public-school enrollments and to facilitate immigrants fully realize their school enrollment rights (Department of Education, Tianhe District, 2018).

Chapter 2: Literature Review

This literature review first summarizes previous research that discovers and explains the unequal rights between homeowners and tenants. After that, research on how these unequal rights influence the housing prices are provided, helping to rationalize the intention of this research, which is to find out the indirect impacts of policy that promotes tenant-owner right equality on the housing market. Last but not least, recent research on the same topic of this research would be summarized and discussed for this research, to bring forth innovation and make further improvement in the research.

Origins of unequal rights for public facilities and services between tenants and homeowners

Over the past 20 years of China's housing reform, the rental market used to be overlooked, and the tenants of rental properties have enjoyed unequal access to public services as property owners (He & Chen, 2012). At present, the difference in rights of public facilities and services between homeowners and tenants in China has not been clearly defined by the literature, due to the policy difference across regions.

From the existing study, we can conclude the following priorities that valid homeownership in the urban area provides: household registration rights, access to public facilities such as primary school and community facilities, social welfare such as healthcare insurance and the use of public housing fund. The origins of the

inequality for tenants in the urban area lay in the inadequate market-oriented economic reforms which set up local-based collection of social insurance and provision of public services that heavily rely on the urban *hukou* and local homeownership (Fang & Zhang, 2016; Gan, Zuo, Chang, Li, & Zillante, 2016; Wu & Wang, 2014).

Among all the social right differences, the school enrollment right has been a hot issue for decades. In Chinese major cities such as Beijing, Shanghai, and Guangzhou, children of local homeowners have priority over children of tenants in the enrollment of public primary school, even if they both live in the same school district (Hu, Zheng, & Wang, 2016; Zhang & Chen, 2018; Feng & Lu, 2013). This "renter discrimination policy" can trace its roots to multiple policies and rules in China. Lu and Zhang (2015) summarize that the imperfect education policy to assign "key schools" formulated in the 1950s and the "proximity-based" school enrollment principle started in the 1980s are two main reasons for the unequal rights. At the same time, the mismatch between the Hukou (Household Registration) System, the residency rules, and the school enrollment policy intensify the inequality. In most cities, the judgment of "proximity" depends on the valid local Hukou or the property certificates.

How the access to public facilities and services affects housing prices

Local public facilities and services, such as access to the public hospital, public transportation, and public schools, are not traded in the housing markets. However, their value can be indirectly reflected in the housing prices.

Tiebout (1956) originated the idea of “voting with your feet” and considered that the availability and quality of facilities and services would influence consumer-voter’s choice of a municipality (Tiebout, 1956). Oates (1969) started to study the impact of public services on housing market outcomes (Oates, 1969). Papers followed investigated the effect of amenities on the rents and purchase price of residential real estate, suggesting a different level of capitalization in different locations and conditions. These studies were conducted through the uses of cross-boundary data (Black, 1999; Haurin, 1996; Fack & Grenet, 2010), and cross-time approach (Dhar, 2012). Moreover, the hedonic price analysis (Rosen, 1974) is the conventional approach to uncover the implicit prices of local public facilities and services in the housing markets.

In China, the research on the connection between the provision of public facilities and services and housing prices is still in its initial stage. Zheng et al. estimated the implicit price of school quality and subway accessibility in Beijing’s housing market by comparing within and out-of-zone home values in adjacent buildings (Zheng, Hu, & Wang, 2014), (Hu, Zheng, & Wang, 2016); Wu et al. used spatial econometric techniques and found substantial amenity values attached to transport accessibility, higher education facilities, and green spaces in Beijing (Wu, Dong, & Zhang, 2017).

Recent research of the impact of housing policy on housing prices in China

Since the housing reform in 1998, both central and local governments have implemented housing policies to encourage the healthy and energetic development

of the land and housing market while keeping the housing price affordable. The relation between the housing policy and housing prices is a classic study object in urban planning and public economics. Some housing policies affect directly to the housing prices through the adjustment of interest rates, the reduction of the down-payment requirement, or the restrictions of purchasing behavior (Shi, Chen, & Wang, 2016; Staikos & Xue, 2017). Other housing policies indirectly influence the housing prices through the distribution of public facilities and services such as the right to public hospitals, schools, community facilities, transportations, and affordable housing (Xu, Zhang, & Zheng, 2015; Feng, Wu, Wei, & Wang, 2018). According to the current research, housing price variation within Chinese cities is largely institutionally driven.

Research to evaluate previous housing regulation policy on housing market adopt various methods. In summary, these methods include the numerical simulation method, the HCW method, the synthetic control method, the Autoregressive Distribution Lag (ADRL) model, the Hedonic Price Model (HPM), and the Difference-in-Difference (DID) model (Feng, Wu, Wei, & Wang, 2018; Wu X. , 2016). The most widely used method to estimate spatial heterogeneity in housing prices and household preferences is the hedonic price model, while the DID model can combine the “before-and-after” and “horizontal-difference” to control the impact of some non-intervention factors (Yan & Ouyang, 2018).

Recent research on the policy that promotes tenant-owner right equality in China

To date, few scholars have engaged in the research on the policy that

promotes tenant-owner right equality, as the policy was first implemented in Guangzhou in the middle of 2017. Current discussions on the impacts on housing markets put their intention in interpreting the policy from a theoretical perspective (Wang & Guo, 2018). Few researchers began exploring the policy's effect on urbanization and the development of the housing rental market (Zhou & Lan, 2017). Concerning the effect of the new policy on housing prices, the scholars mainly break two groups of opinions: one group stated that the policy had increased the housing sales price as well as the rents (Guan & Shi, 2018), while the other group indicated that the policy has reduced the housing sales prices and increased the rents (Ouyang & Deng, 2017; Zhou & Lan, 2017). Some research also mentioned that the implementation of this new policy could re-emphasize the living function of houses instead of speculating, alter residents' traditional homeownership concept (that people only own a house when they purchase it) to a more rental-friendly attitude and improve the willingness to rent (Ouyang & Deng, 2017; Feng S. , 2018).

Chapter 3: Research Design

This study is going to discover the impacts of the new policy that promotes tenant-owner right equality on housing market in Guangzhou. The assumptions are that the policy has slowed down the rise in housing prices, increased the rents, and improved people's attitude towards renting.

Based on a mixed-method research design, the first component is a bunch of quantitative analysis to verify the influencing factors of housing prices and how the new policy impacts the housing prices in areas with different education quality. To support the results from the quantitative analysis, the second component is a qualitative analysis based on interviews with residents to discover their attitude towards renting and the new policy.

Study Locations

The secondary data was collected within the range of Tianhe District in Guangzhou. To summarize, four real estate agency offices in Tianhe district were selected to take the interview. Two of the real estate offices, Xingye Real Estate at Fortune Plaza and Yufeng Real Estate at Tianhe South Second Road, were located inside the school district of two key primary schools (Huayang Primary School and Ti Yudong Lu Primary School). The other two, Centaline Property at 17 Zhongshan Middle Ave and Mantanghong Real Estate at 60 Yanxing Road, were located in the school district of non-key primary school.

Data

(1) Secondary data

This research collected secondary data that counts from June 2016 to August 2018, one year before and after the implementation of the policy in 2017, including monthly housing sales prices and rents, and other micro-level determinants of housing prices, such as the education quality (whether residential complex is located inside a key primary school district), the building ages, the number of bus and metro stations within 1km, and the green area rate for each residential complex (Dong Yuan, 2016; Cui, Gu, Shen, & Feng, 2018)). Detail uses and sources of data can be found in Table 2 below.

For sake of the feasibility and consistency of our analytical model, each residential complex selected should have over 20 transaction records in the period of 2016 to 2018. After data screening and outlier elimination, 101 residential complexes were selected to be the study objects. 26 (25.74%) of the 101 residential complexes are located within key primary school districts, while the other 75 (74.26%) of the 101 residential complexes are located outside key primary school districts.

Moreover, several new sale residential complexes have no renting transaction records during the whole target period. When analyzing rents, 20 such new sale residential complexes were taken out and the sample size for rents therefore became 81 residential complexes.

Table 2. Data and Sources

Variable	Variable Name	Definition	Sources
Dependent Variable	Sales price, P; Rent, R	Average house sales price per month per square meter from June 2016 to August 2018 (in RMB); Average rent per year per square meter from 2016 to 2018 (in RMB).	CRIC (China Real Estate Information Corporation); Guangzhou Municipal Housing and Urban-Rural Development Bureau; National Bureau of Statistics of China; Fang.com; Lianjia.com
Education Reputation	School district group dummy variable, edu	Residential complex within key primary school district = 1, residential complex outside key primary school district = 0.	Department of Education, Guangzhou
Policy	Policy dummy variable, policy	Data collected after the implementation of the new policy = 1, data collected before the new policy = 0.	Work Plan for Accelerating Rental Housing Market in Guangzhou
Location	Transportation, trans	Number of metro and bus stations within 1km from each residential complex	Baidu Map
Environment	Green area rate, green	Green area rate for each residential complex.	Fang.com
Building Status	Building age, age	Building age for each residential complex.	Fang.com
Sale Type	Sale type dummy variable, type	New sale house = 0, Re-sale house = 1.	Fang.com; Lianjia.com

Notes: Prices and rents are adjusted by dividing CPI each month.

The samples have a mean building age of 14.06 years, a mean green area rate of 33.38%, and a mean FAR of 2.61. The public transportation in Tianhe District is well-developed, which can justify for the 7.25 public transportation stations on average within 1km distance to these residential complexes. And the mean monthly

price and rent for the samples are 22,556.17 RMB and 61.47 RMB per square meter.

Table 3 below summarizes the characteristics of descriptive statistics.

Table 3 Descriptive Statistics.

Variable	Inside key primary school districts, June 2016 to June 2017	Inside key primary school districts, August 2017 to August 2018	Outside key primary school districts, June 2016 to June 2017	Outside key primary school district, August 2017 to August 2018
Sale price: mean, standard deviation	42,264 (16196.08)	65,616 (19537.94)	36,209 (12065.36)	51,907 (22573.16)
Rent: mean, standard deviation	64.54 (20.76)	69.35 (22.79)	56.63 (16.55)	59.18 (20.32)
Transportation: mean, standard deviation	18.81 (6.57)	18.81 (7.62)	13.17 (7.62)	13.17 (6.57)
Green area rate: mean, standard deviation	33.04% (9.34)	33.04% (9.34)	33.49% (8.85)	33.49% (8.85)
Building age: mean, standard deviation	14.54 (5.09)	15.54 (5.09)	12.55 (5.75)	13.55 (5.75)
FAR: mean, standard deviation	5.27 (2.89)	5.27 (2.89)	3.77 (2.40)	3.77 (2.40)
Resale: count, percentage	18 (69.23%)	18 (69.23%)	30 (40.00%)	30 (40.00%)

Table 3 indicates that, residential complexes located within and outside key primary school districts have similar green area rate and building age, showing residential complexes of similar building characteristics are evenly distributed in Tianhe District. The variables of transportation and sale type, on the other hand, present difference between different groups. Residential complexes located within key primary school districts tend to have higher transportation accessibility and

higher resale percentage than those outside key primary school districts. This could be explained by the fact that key primary schools are mainly distributed in older part of the district where transportation network is better developed and second-hand housing market is more active.

(2) Primary data

The paper collected primary data from 18 interviews with local residents, concerning residents' housing search process, tenure preference, and opinion towards the new policy that promotes tenant-owner right equality.

Table 4 summarize the composition of the interviewees. Half of the 18 interviewees are non-local Hukou, and the other half are local, enabling the research to compare between different identifications. The age range ranges from 25 to 61 years old, with an average age of 36. More than half of the interviewees possess bachelor or higher degree.

Table 4. Composition of the interviewees (Count/Percentage)

	Description	Count	Percentage
Age	20s	6	33%
	30s	4	22%
	40s	5	28%
	50s	3	17%
Hukou	Local, urban	7	39%
	Local, rural	2	11%
	Non-local, urban	5	28%
	Non-local, rural	4	22%
Education	High School	6	33%
	Bachelor	10	56%
	Master or Higher	2	11%

In two cases, the interviews were conducted with couples and the result has been recorded as one interview. The research also consulted the opinion from two of the real estate agents. Their responses will also be analyzed and discussed in the result and final conclusion.

Methods

This paper planned to focus on housing prices comparison within one administrative district rather than inter-city comparison. Therefore, it adopted data from residential complexes in Tianhe District to develop two quantitative model, and used qualitative interview result to support the results from the quantitative methods.

The research would first use a multiple regression model to identify the influents of housing prices. Guided by the result from the first step, a Difference-in-Difference Method (a method that specifically analyzes the effects of policy interference) based on housing prices before and after the implementation of the new policy, as well as other influents of prices (education quality, community environment, and building condition), would be applied to analyze the effect of the new policy on purchasing and rental housing markets.

(1) Multiple Regression

The study first used a multiple regression to figure out the key influencing factors for housing prices and to test the impact of capitalization of education

resources on housing prices. The equations can be written as:

$$\log(P) = \alpha + \beta_1 \cdot edu + \beta_2 \cdot green + \beta_3 \cdot age + \beta_4 \cdot trans + \beta_5 \cdot type$$

$$\log(R) = \alpha + \beta_1 \cdot edu + \beta_2 \cdot green + \beta_3 \cdot age + \beta_4 \cdot trans + \beta_5 \cdot type$$

A use of log for the dependent variable helps to find the relationship between the percentage change of housing prices and five independent variables.

(2) Difference-in-Difference (DID) Method

After the multiple regression verify the main contributors to housing prices, the research would conduct a Difference-in-Difference (DID) Method to further discuss the impact of the new policy on housing prices, differentiating two groups with high and low education quality. Difference-in-Difference (DID) Method is a widely used approach among research in evaluating impacts of a policy or program when the data can be measured in multiple time periods (Ashenfelter, 1978; Card, 1990).

The new policy we study was implemented in Tianhe District in July 2017 and adjusted the point system for school enrollment to promote tenant-owner right equality. Therefore, this study would use residential complexes that located within a key primary school district as the treatment group in the analysis. Residential complexes that located outside key primary school districts were chosen as the control group as the policy has less effectiveness on these less competitive areas. To control for systematic differences between the control and treatment groups, the study collected two years of data, one year before July 2017 when the policy

changed and one year after the change. Thus, the sample was usefully broken down into four groups: the control group before the change, the control group after the change, the treatment group before the change, and the treatment group after the change (Wooldridge, 2013). The education quality is included as a binary variable (residential complexes that located within a key primary school district would be given a value of 1, the others would be given a value of 0) in the model and interacted with a binary time variable (June 2016 to June 2017 vs. August 2017 to August 2018) that represents situations before and after the change.

Such that C represents the control group and T represents the treatment group, letting dT denotes a dummy variable for the treatment group T, and $d2$ denote a dummy variable for the post-policy change time treatment period. Plus, other influencing factors that we derived from the multiple regression would be added into the DID model for sales price and rents separately. The equations tested for sales price and rent are:

$$\log(P) = \beta_0 + \delta_0 \cdot edu + \beta_1 \cdot policy + \delta_1 edu \cdot policy + \beta_2 \cdot trans$$

and

$$\log(R) = \beta_0 + \delta_0 \cdot edu + \beta_1 \cdot policy + \delta_1 edu \cdot policy + \beta_2 \cdot age + \beta_3 \cdot trans + \beta_4 \cdot type$$

A use of log for the dependent variable helped to find the relationship between the percentage change of housing prices and the independent variables.

The intercept, β_0 , is the average housing value of a home outside those key primary school districts before July 2017. The parameter δ_0 captures changes in all

housing prices in Tianhe District from June 2016 to August 2018. And the coefficients on other factors, $\beta_2, \beta_3, \beta_4$ measure the effects that brought by transportation accessibility, FAR, and building age, helping to refine the results.

Two coefficients are the outcome variables of interest. δ_1 will be the Difference-In-Differences (DID) estimator that measures the effect of the policy. It measures the decline/increase in housing values due to the education quality, excluding value appreciation at different rates due to other reasons. The coefficient β_1 , measures the policy effect that is not due to the difference in school quality.

(3) Qualitative: Narrative Analysis

To shed light on the phenomenon of the policy that promotes tenant-owner right equality from the residents' perspective, the research conducted 18 face-to-face interviews at four real estate agency offices in Tianhe district in order to understand their perception and understanding about the new policy, their willingness to rent in the city and their attitude towards renting.

Non-probability sampling would be used to recruit the interviewees due to the size of the total population in Tianhe district (around 0.17 million) that the research studies. The research adapted purposeful sampling and ask screening questions to include interviewees of different ages (residents at their 20s, 30s, 40s, and 50s), Hukou (household registration) status (residents with urban, rural, local, and non-local Hukou), and education levels (residents with high school, bachelor and master diploma). The interview took place in 4 real estate offices in Tianhe district,

two of which will be located in the school district of key primary schools. The interpretation and analysis for the interview results would be stated in the following paragraph, looking for insights and meanings.

Chapter 4: Analysis

Results

Multiple Regression

Using RStudio 1.1.456 to conduct multiple regression for the data collected, the result is shown in the following table. The estimates are standardized coefficients, describing relative importance of each variable.

Table 5. Multiple Regression Results

	Sales Price Estimates		Rent Estimates	
	Unstandardized Coefficients	Standardized Coefficients	Unstandardized Coefficients	Standardized Coefficients
Education reputation, edu	0.1867** (0.0435)	0.2052** (0.0435)	0.1033 (0.1577)	0.1461 (0.1577)
Green area rate, green	0.0063 (0.1298)	0.1456 (0.1298)	-0.0037 (0.2815)	-0.1080 (0.2815)
Building age, age	-0.0004 (0.9523)	-0.0066 (0.9523)	-0.0150** (0.0231)	-0.2439** (0.0231)
Transportation, trans	0.0171*** (0.0044)	0.0154*** (0.0044)	0.0181*** (0.0005)	0.3909*** (0.0005)
Building type, type	-0.0678 (0.4643)	-0.0490 (0.4643)	-0.1442** (0.0481)	-0.2212** (0.0481)
constant	10.3712*** ($<2e-16$)	10.3712*** ($<2e-16$)	4.1918*** ($< 2e-16$)	4.1918*** ($< 2e-16$)

Notes: *, significant at the 10% level; **, significant at the 5% level; ***, significant at the 1% level.

For house sales prices, education quality turns out to have significant positive relation to prices (95% CI). Residential complexes that located within key primary school districts would have 20.02% higher prices that those outside key primary

school districts. One standard deviation increase in education reputation also has the strongest impact on housing prices as the standardized coefficient of it has the highest value among all the variables. Transportation also has significant influence on prices (95% CI): accessibility to one more transportation stop would increase 1.54% of the sales price. This is intuitionistic as areas with more transportation stops imply its closer distance to city center and higher level of commute convenience.

For rents, education quality is no longer a strong influencing factor to prices. Instead, variables denote building age, transportation accessibility and sale type have significant relationship to rents. The standardized coefficients of building age, transportation accessibility and sale type are also the highest among the variables, indicating stronger impact with every standard deviation of these variables' changes. Newer residential complex that is new sale and has higher public transportation accessibility tend to have higher rents. Tenants would prefer better characteristics of building location and condition than education quality when choosing houses, which differ with owners.

Difference-in-Difference Method

Given that the residential complex group that located within key primary school districts were more likely to have higher sales prices, the research wanted to further examine different reaction to the new policy that promotes tenant-owner right equality between these two groups. Adjusting for the inflation in the year of 2017 and 2018 with Consumer Price Index (CPI) (National Bureau of Statistics of China, 2019), Table 6 below reports the results of DID method.

Table 6 Difference-In-Difference Method Regression Results

	Sale Price Estimates		Rent Estimates	
	Unstandardized Coefficients	Standardized Coefficients	Unstandardized Coefficients	Standardized Coefficients
Education reputation, edu	0.1593* (0.0731)	0.1648* (0.0731)	0.0664 (0.3137)	0.0969 (0.3137)
Policy, policy	0.3239*** (3.52e-07)	0.3831*** (3.52e-07)	0.0403 (0.4126)	0.0645 (0.4126)
Building age, age	-	-	-0.0133*** (0.0020)	-0.2234*** (0.0020)
Transportation, trans	0.0047 (0.2229)	0.0815 (0.2229)	0.0200*** (5.37e-09)	0.4438*** (5.37e-09)
Building type, type	-	-	-0.1861*** (0.0001)	-0.2946*** (0.0001)
edu·policy	0.0788 (0.5160)	0.0815 (0.5160)	0.0382 (0.6725)	0.0558 (0.6725)
constant	10.3539*** (<2e-16)	10.3539*** (<2e-16)	3.9991*** (< 2e-16)	3.9991*** (< 2e-16)

Notes: *, significant at the 10% level; **, significant at the 5% level; ***, significant at the 1% level.

The results indicate that the implementation of the new policy had a significant effect on the sales prices in Tianhe District, which increased 32.39% of the housing prices. Reputation of education resources is still an influencing factor of housing prices: a residential complex located in key primary school district would have 15.93% higher housing prices on average. The standardized coefficient of education is nearly half of the standardized coefficient of policy, indicating the implementation of the new policy has 2 times the relative impact on housing prices than the reputation of education resources. However, the DID estimator (estimate of the edu·policy interaction) was not significant in the result, which means that residential complexes within and outside key primary school district did not react differently towards the new policy.

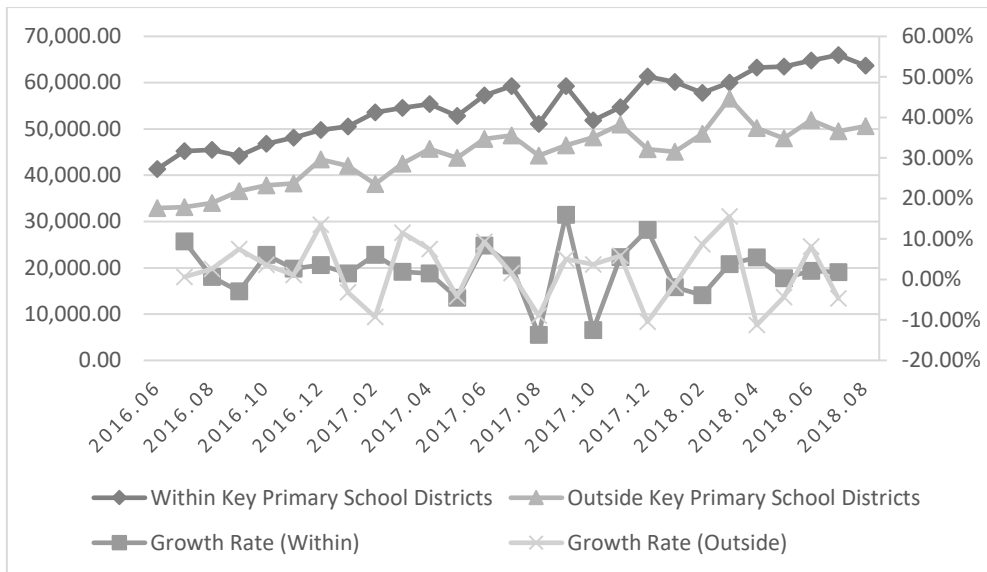


Figure 2. Sales Prices and Growth Rates from June 2016 to August 2018

Calculating the average sales prices for our 101 samples, we can depict the price changes from June 2016 to August 2018. Despite the significant and positive policy estimates resulted from the DID model, from Figure 1 we could read a sudden drop of sales prices growth rates for both groups of residential complexes. Therefore, we can imply that the implementation of the new policy had impacts on short term sales prices and reduced the price growth rates. However, the long-term patterns of the sales prices remain climbing.

For the rent part, the DID results match the multiple regression results and our common sense that building age, transportation, and sale type are three estimates that had significant impacts on rents. Among them, higher transportation accessibility would have the strongest impact on the changes of rents. With one standard deviation increase in the number of public transportation stations within 1km from the residential complex, rents would increase 44.38%. First-sale residential complexes that have shorter age and higher transportation accessibility will have

higher rents. Average rents for our samples in each year are calculated and displayed in Figure 3 below, from which we can infer the rent changes and growth rates during the period.

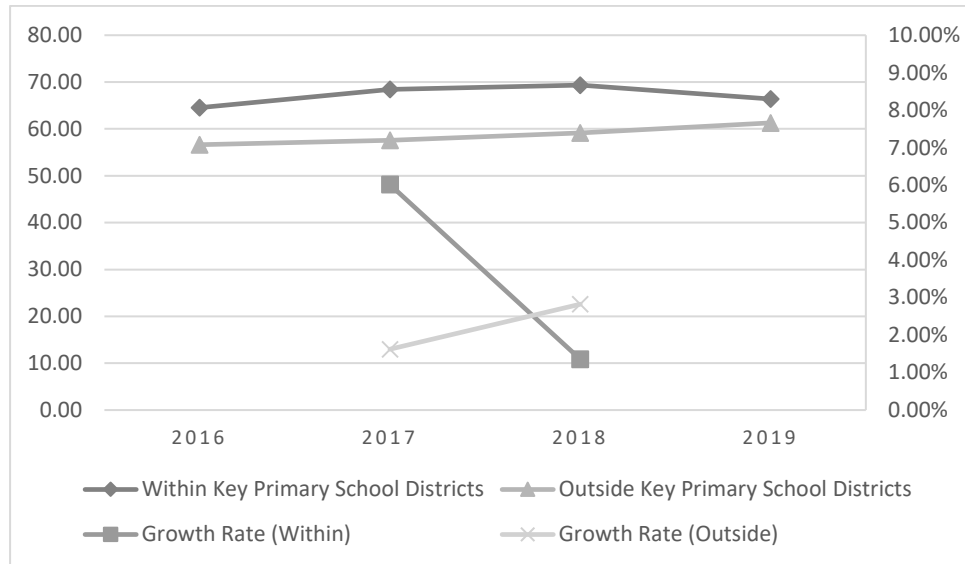


Figure 3. Rents and Growth Rates from 2016 to 2018

There are no signs of significant relationship between rent and education quality, policy implementation, and their interaction from the results. Education quality here turns out to be a subordinate influence factor for tenants, as the tenants may choose to rent for other reasons than to seek for a key primary school for their children. However, if we look at Figure 3 where the average rents and their growth rates are displayed, we will find that growth rates for rents of residential complexes located with key primary school districts were slowing down after the implementation of the new policy, while the growth momentum of residential complexes located outside key primary school districts was speeding up.

Interview

18 interviews were done with local residents, asking about their housing search process, tenure preference, and opinion towards the new policy that promotes tenant-owner right equality. All the informants were asked to talk about the top three factors that they would have considered before moving to or deciding to rent or purchase a house as well as their tenure preference. Regarding the policy that promotes tenant-owner right equality, the interviewees were asked to first describe their familiarity towards the new policy, then to elaborate the detail impact of the new policy on their housing decisions. At the end of the interview, the interviewees were asked to share their opinions and suggestions. The component of the interviewees can be found in Appendix A.

Table 7. Interview Results

Questions	Answers
Top Considerations	<p>Prices/affordability is the top-rank consideration for choosing places to live among the interviewees (100% of the interviewees mention this in their top three considerations). According to the interviewees, savings in the bank account and income level limit their choices of housing.</p> <p>Education reputation (33%) particularly affects those family households with children or family households that plan to have children. Two interviewees that aged over 50 have the experience of purchasing house inside key primary school districts to have their children enrolled in key primary schools.</p> <p>Among all the interviewees, 56% think that it is unnecessary to send their children to key primary schools, because the threshold of enrollment is high for them, and they believe primary education is less important than secondary education.</p>
Tenure Preference	<p>Generally speaking, the preference for homeownership (78%) is higher than renting (22%). Most of the interviewees believe that they follow the traditional Chinese homeownership concept of linking up homeownership and house ownership.</p>

	<p>However, another 22% of the interviewees choose to rent under the pressure of housing price. Some young interviewees at their 20s and 30s see the strength of renting in its mobility and flexibility. 6% (1 interviewee) of the interviewees would like to purchase a house for retirement.</p>
Policy Familiarity	<p>Familiarity of the new policy that promotes tenant-owner right equality among residents in Tianhe District is very low. Only 11% of the total interviewees (2 out of the 18 interviewees) have full understanding of the policy, both of them are with higher education background. However, only one of them believe this policy would have an impact on his life (he would consider to rent in Tianhe District).</p> <p>78% of the total interviewees (14 out of the 18 interviewees) have little or no knowledge of the policy. These interviewees usually read news via internet instead of newspaper and television. They have few tunnels to receive housing policy changes and information.</p>
Impacts	<p>89% of the 9 local interviewees express that the new policy has no impact on their housing choice, because they already possessed house in the city while this policy only benefits residents without self-owned house.</p> <p>67% of the 9 non-local interviewees agree that the new policy will affect their housing search decision. These 6 interviewees will consider to rent and send their children to nearby primary schools, and they are indifferent to the school quality. The other 33% of the non-local interviewees would not stay in this area in the long term and would like to have their children studied in their hometown.</p>
Suggestions	<p>Interviewees give comments on the new policy and provide suggestions for better improving the equal rights as the followings:</p> <ol style="list-style-type: none"> (1) Rent control should be established to restrict unreasonable rent increase. (2) Tenants should be protected from illegal displacing. (3) Tenants should enjoy wider social rights. (4) The government should set up an information sharing platform for housing (for example, an official house subleasing platform).

Discussions

Education quality as an influencing factor of sales prices and rents

Residents interviewed expressed many influencing factors for their home choosing decision: the price or affordability of the house, the location of the property, the accessibility to public transportation, the education reputation, and the building conditions. Price or affordability is the primary consideration when choosing houses, following by the location and transportation factors. Their answers suggest that, while education quality is one of the determinants for choosing houses, it particularly affects those family households with children or family households that plan to have children.

Among all the interviewees, 56% think that it is unnecessary to send their children to key primary schools and they are indifferent to key primary schools and normal primary school. For these residents, the education quality factor cannot outweigh the price/affordability. Another important reason for the indifferences of school quality is that, the school enrollment threshold is high (tenants have to show evidence of residence for 10 years and tax payments) while the school enrollment quota is limited (the quota can only satisfy 50% of the total point-based application). An immigrant needs to get high points in other sections in the point system, such as education level, to be in the front of the row and get enrolled.

The interview supported what we have found in the multiple regression model, as estimates of transportation accessibility had significant and positive relationship to both sales prices and rents while education quality only became a strong influence factor in the sales prices model. The fact that education quality

turned out to be a subordinate influence factor for tenants, could be explained by the complexity and imperfection of tenant protection policy and school enrollment rules in Guangzhou.

The impact of the new policy that promotes tenant-owner right equality

The answers to questioning housing tenure preference from the interview results show variability of choices that, interviewees would have different preferences under different condition. The majority of the interviewees admitted they prefer to own a house, although less than half of the interviewees do own a house in the city. Rental preference increases with interviewees at their 20s and those with non-local Hukou due to the concerns of affordability and living mobility. Moreover, 5 interviewees who are more than 40 years old, rent or plan to rent in Tianhe District for closer distance to workplace, activity places and other downtown resources. Nearly 80% of the non-local interviewees prefer to rent when they work in Guangzhou due to the high housing purchase price, but change the preference to purchase house given the assumption that they eventually return back to their hometown cities with lower prices. These results showed that although the housing consumption concept is changing in this area, the majority of residents prefer to own their own house and only regard renting as the interim transition. The new policy that promotes tenant-owner right equality still has a long way to go before the rental market is fully activated.

Given the result of the DID model, the research found that the housing sales prices had increased after the implementation of the new policy that promotes

tenant-owner right equality, extracting the inflation, transportation, and location factors. This could be partly explained by the speculation phenomenon caused by the implementation of the new policy. As two interviewees had expressed in their interview, they would like to invest in houses located within key primary school and to seek immigrant tenants in the future. However, this paper believed that the results were influenced by other market factors that were not included in the model. The real influencing power of the new policy would be much smaller than what we have found in the results. Also, from the sudden fall of growth rates after June 2017 shown in Figure 1, we could summarize that the new policy helped to slow down the growth of housing prices and control soaring housing prices in the short term. These short-term price fluctuations are usually caused by changing market expectation and housing policy shocks. Therefore, we could infer that, the introduction of the tenant-owner right equality concept delivered the information of rental housing market's future growing potential, but the development of the rental market turned out to be time-consuming so that sales price again returned to its original level.

For the results of DID model for rents, our interpretation is that the implementation of the policy that promotes tenant-owner right equality had neither negatively nor positively affected the affordability of rental housing, despite a slightly accelerating growth rate of rents for residential complexes outside key primary school districts shown in Figure 2. As education quality here is not a significant influencing factor to rents, one possible explanation is that the education quality difference is narrowing down between key primary schools and none key primary schools. The implementation of the new policy to some extent increased

immigrants' willingness to rent in area with normal educational resources as the rents are cheaper and the quota for immigrants is larger.

Meanwhile, the research found no significant difference between the reactions of the two study groups (one with better education quality and one with lower education quality), indicating that the new policy had similar impact throughout Tianhe district and the price difference between these two groups are not raised by the new policy. On the one hand, it is good to see the price gap between key primary school districts and none key primary school districts was shrinking. On the other hand, the result might imply the little overall impact of this policy on sales prices and rents as the market reaction was very weak.

It's worth noting that, 14 out of 18 interviewees had little or no knowledge about the new housing policy that promotes tenant-owner right equality, showing general incomprehension of the new policy and the lack of promotion. People with higher education level tend to have better knowledge about the policy; they also have more advantages in the point system that related to the school enrollment rights, leaving non-local immigrants with lower education level at a vulnerable position in an unfavorable position in the rental market in Guangzhou. This unfamiliarity partly explained the little impact of the new policy on housing prices and the weak difference between the reaction of two study groups.

Rental Housing Development in Tianhe District

Besides the 18 residents that interviewed, I also had a thorough discuss with the real estate agents in the four real estate agency offices, who have the first-hand rental market information. According to the real estate agents, the demand for rental housing in Tianhe District is rigid, deciding by the fact that this district is home to a huge amount of offices, industrial parks and colleges. The absorption rates for rental housing have been very stable in the past 20 years. As we can see from Table 1, key primary schools in Tianhe District are mainly distributed in better-developed southeastern area in Tianhe District, along primary public transit routes. This characteristic leads to a high occupancy rate for rental apartments and reduces effect of the studied policy that promotes tenant-owner right equality.

Education reputation has been a main attraction for buyers and tenants all the time. As the enrollment quota for each school is limited, the number of children waiting in line is often larger than the amount that one school could accept. Therefore, for residential complexes inside key primary school, the demand for housing usually exceeds the supply. Even if the housing price rises, houses inside key primary school districts could still be sought easily. This scarcity of housing inside key primary school explain why housing prices remain high.

An indispensable barrier of the development of rental housing market would be the lacking of tenant protection. One of the interviewees has been priced out from his rental apartment by a steep rise in rent. Another interviewee who pays close attention to housing policy changes suggested that Guangzhou should learn from Germany's experience of rent control and protect tenants from illegal

displacing. Therefore, the healthy development of rental housing in Tianhe District cannot reach without advance housing policy to fully protect tenant's living rights and maintain the rents at a stable level.

Chapter 5: Recommendation and Conclusion

Recommendation

The policy that promotes tenant-owner right equality has not successfully realized the government's expectation to reduce the housing prices due to multiple factors. From the results of interview, we could know that the beneficiary group of this policy is limited to non-local immigrants that have less affordability to own houses. One suggestion is to expand the influencing power of this policy is to build additional public rental housing or rent-control housing so that more immigrants could benefit from this policy. We also notice a very low popularity of the new policy among the residents, indicating more populist publicity and promotion approaches are crucial for the successful implementation of similar policies.

The results from interview also inspired some advanced recommendation formed in this research. To better encourage the development of rental housing market in this area, more measures needed to protect the legal rights of tenants, such as rent control rules, and tenant protection (from displacing) regulations. There is a loud voice to set up an official information platform for rental housing, integrating all the leasing and subleasing information as well as the latest rental preferential policies.

The policy had served as a symbol of the future reform that may give tenant a wider right to enjoy the same public service right as the homeowners. Future policies are expected to provide wider social rights and better-defined property rental rights such as the rights of transferring or disposing of the property, and applying loan with rental contracts.

Direction of Future Research

First of all, future research could expand the scale of study to inter-city analysis. The paper sets the study area in Tianhe District in Guangzhou, and uses micro-level influencing factors of housing prices to build the quantitative models. To further discover the impact of the policy that promotes tenant-owner right equality, future research could build a DID model with inter-city macro-level influencing factors. Adding comparison with cities that have not adopted similar policy could help to reduce the interference factors from the cities' own characteristics.

Moreover, the data collected for this paper is constrained by the availability of official transaction data. In July 2018, Guangzhou Municipal Housing and Urban-Rural Development Bureau ceased to update new sale houses transaction records. Therefore, the new sale data in July and August 2018 is collected by private housing information websites that are less authentic than the official dataset.

Last but not least, future research needs to summary all the other housing or social policies that might affect housing prices and include them into the discussion. For example, in March 2017, Guangzhou published house-sale and home-loan restrictions to control the fast-growing housing prices. Such housing policies also affected the overall housing prices as sales prices growth was low and even negative in March and April 2017 in Figure 1. Factors such as land price changes, interest rate fluctuation, and the housing inventory would also contribute to the changes in housing prices. Future research is expected to take these contributors into consideration and to have more in-depth discussions.

Conclusion

This study analyses the impacts of a new policy that promotes tenant-owner right equality on housing prices in Tianhe District in Guangzhou by using a combination of research methods. The results from the multiple regression models showed that education quality has been an influencing factor to housing sales price rather than rents; the results from the DID models showed a positive relationship between the implementation of this new policy and the housing sales prices, although this increment in price could be explained by other factors that were not included in this research's model. Meanwhile, the reactions of different regions in Tianhe District had no significant difference regardless of its location in key primary school districts or not. Combining with the findings from 18 interviews with local and non-local residents, we could draw the conclusion that the new policy has little impacts on the housing prices in Tianhe District. Although the beneficiary group of this policy is small, calling for equal social rights and protecting tenant rights the same importance and meaning as other housing policies.

The introduction of the policy that promotes tenant-owner right equality has changed the original property right structure in China since its creation. Before the policy was implemented, homeowners enjoy the right of pledge, alternation, disposal, as well as the right to receive public service. However, the property rights for tenants were vague and lacking in legal basis, normally written arbitrarily in the rental contract between the tenant and the landlord. Unclear property rights prevent the free development of the rental housing market, with several side effects including corruption, rent-seeking, and private transactions. Although this paper

found a strong positive relationship between the implementation of the new policy and the housing sales prices, we believed it would slow down the speed of price increment in the future, if the government continue to adopt ancillary housing policies.

Another significance for the implementation of the new policy lies in altering the homeownership concept among the Chinese population. The true essence of the worship for owning a house is the strong value of family among the Chinese population. Therefore, ambiguity in rental contracts and rental rights directly leads to a preference for purchasing houses. If rental rights can be clearly defined and tenants' legal rights could be better protected, the gap between tenants and homeowners would shrink to an ideal situation that people are willing to own a property in a rental way.

Appendices

Appendix A. Interview Questions

This is a research that studies the impact of the policy promoting tenant-owner right equality on housing market in Guangzhou. After explaining the purpose of this research and receiving the verbal consent of interviewees, the following questions will be asked.

Screening questions:

1. What is your age range (20s, 30s, 40s, or 50s)?
2. What is your Hukou condition (local/non-local, urban/rural)?
3. What is your education level?

Interview questions:

1. What is your home search process?
2. What are the determinants for choosing house (for example, prices and rents, accessibility to public transportation, reputation of school, neighborhood environment)?
3. What's your tenure preference (purchasing or renting a house)?
4. What's the impact of the implementation of the new policy that promotes tenant-owner right equality on you? Has it changed your willingness to rent?
5. What do you think of the policy that promotes tenant-owner right equality?
Do you have any suggestions and comments on the new policy?

Appendix B. List of Interviewees

No.	Gender	Local/ Non-local	Urban/ Rural	Range of Age	Education	Interview Location Inside/Outside Key Primary School District	Total Interview Time
1	Male	Non-local	Urban	20s	Master	Inside	30min
2	Female	Local	Urban	40s	Bachelor	Inside	20min
3	Female	Local	Urban	50s	Bachelor	Inside	10min
4	Male	Local	Rural	30s	Bachelor	Inside	15min
5	Female	Non-local	Urban	20s	Bachelor	Inside	20min
6	Male	Local	Urban	20s	Master	Inside	25min
7	Male	Local	Urban	40s	Bachelor	Inside	10min
8	Male	Non-local	Rural	50s	High School	Inside	10min
9	Male	Local	Urban	40s	Bachelor	Inside	15min
10	Female	Non-local	Urban	40s	High School	Outside	15min
11	Male	Non-local	Urban	20s	Bachelor	Outside	20min
12	Female	Non-local	Rural	40s	High School	Outside	20min
13	Female	Local	Urban	50s	High School	Outside	30min
14	Male	Local	Urban	30s	Bachelor	Outside	10min
15	Male	Non-local	Urban	30s	Bachelor	Outside	10min
16	Male	Local	Rural	20s	Bachelor	Outside	20min
17	Female	Non-local	Rural	30s	Bachelor	Outside	10min
18	Female	Non-local	Rural	20s	High School	Outside	15min

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