

Housing Affordability in Chinese Cities

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Abstract

Over the past decade, house prices have kept soaring in Chinese cities, making housing affordability one of the biggest social and political issues in urban China. Existing research on housing affordability in China has largely looked at megacities while medium- and small-sized cities and towns have been ignored. In order to fill this research gap, this study analyses the issue of housing affordability in a cross-tier selection of cities, ranging from 1st tier to 5th tier cities, based on both quantitative and qualitative data. Quantitative data makes use of the data collected for *the Land and Housing Survey in a Global Sample of Cities* in 32 Chinese cities in 2015 and 2016, and the qualitative data consists of 17 semi-structured expert interviews in five cities in 2019. The house-price-to-income ratio (HPIR) and rent-to-income ratio (RIR) have been adopted to measure affordability. The main finding of this research is that housing is largely unaffordable in Chinese cities, yet the severity varies among cities. Considering a HPIR of 3.0 and RIR of 25 percent to be affordable, we find ‘formal private housing’ for example, with a HPIR of 7.2 and RIR of 34 percent, to be (severely) unaffordable, yet while all sample cities’ HPIRs were above 3.0, the severity of unaffordability varies, with 1st and 2nd tier cities located in eastern China with an average HPIR higher than 10 whereas 3rd, 4th and 5th tier cities had HPIRs of around 5. Therefore, special attention should be paid to address the city variations when examining the issue of housing affordability in China. Furthermore, I assert that when facing a housing affordability crisis, it is essential to consider all housing sectors, including public housing and informal housing, the latter playing a positive role in providing relevant affordable housing to rural-urban migrant and the urban poor in Chinese cities.

Keywords: Housing affordability, formal private housing, informal housing, public housing, Chinese cities

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Housing Affordability in Chinese Cities

Introduction

Over the past 35 years the total population in China has grown from 963 million to 1.38 billion, and the share of the urban population has grown from 18 percent to 57 percent. The total land coverage of urban built-up areas increased from 7,000 square km in 1981 to 49,000 square km in 2015 (Xinhua 2016). Along with this unprecedented urban expansion, the Chinese government initiated its housing marketization reforms in 1998 (Man et al. 2011). Before the housing reform, some 80 percent of urban housing was in the public sector, which was allocated as welfare housing to employees of governments or state-owned enterprises. Most urban residents lived in such welfare housing almost for free (Chen et al. 2010), as the government and state-owned enterprises on average spent RMB 35 billion constructing new homes and maintaining old ones while receiving only RMB 1 billion from rents (Cui 1991; Wang 1997). In March 1998, housing reform was launched which encouraged urban residents to purchase their current welfare housing from the government or state-owned enterprises, or buy new commercial housing from the market, which was regarded as housing privatization in China (Wu 2018).

As of 2000s, housing prices have kept soaring in major Chinese cities, which has caused a severe reduction in the affordability of housing for middle- and low-income households. As a result, housing affordability has become one of the biggest social and political issues in urban China. Affordability varies significantly among cities, as they grow and expand at a different rate. Policymaking to address housing affordability issues requires an in-depth understanding of the patterns, trends, and contributing factors of housing affordability among cities. This research makes use of the land and housing survey data collected from a global sample of 200 cities by New York University's Urban Expansion Program, Lincoln Institute, and UN-Habitat¹. Among the 200 sampled cities, 32 are cities from mainland China, making it the country with the largest number of sampled cities. As these Chinese cities represent varied geographical, provincial and socio-economic contexts, it is worth taking China as a country case. In addition to the quantitative data from the global survey conducted in 2015 and 2016, follow-up qualitative research was carried out in five Chinese cities in 2019. Based on both quantitative and qualitative data, this research aims to explore the issue of housing affordability in Chinese cities. House-price-to-income ratio and rent-to-income ratio have been adopted to measure the affordability value. The chapters are organized as follows: a global view of housing affordability is given in Section 1. Section 2 reviews housing affordability studies in Chinese cities. Section 3 explains the research methodology. The findings are presented in Section 4 based on quantitative data analysis, and discussions are given in Section 5. The last section is the conclusion.

¹ More information about the survey can be found at https://www.lincolninst.edu/sites/default/files/pubfiles/kallergis_wp18ak1.pdf

A Global View of Housing Affordability

“Housing affordability” is defined as the extent to which dwellings can be purchased and loans to purchase these assets can be amortized, and this term involves a number of disparate issues: housing price, housing quality, the distribution of income, the ability of households to borrow, public policies affecting housing markets, conditions affecting the supply of new or refurbished housing, and the choices that people make about how much housing to consume relative to other goods (Quigley and Raphael 2004). Furthermore, the concept of “housing affordability” is not only a complicated one but also a dynamic one in a continuous process of urbanization.

Based on the literature review, there are three approaches to measuring housing affordability: normative, behavioural, and subjective approaches (Quigley et al. 2004; Li 2014; Bertaud 2016). A normative approach defines a certain threshold value for the limit or norm of housing affordability. A behavioural approach evaluates housing affordability by investigating the housing decisions of different households. A subjective approach rests on large sample surveys, summarizing the subjective evaluations of respondents’ feelings about their affordability situations. The normative approach is more widely used, and known as an income ratio approach, which was adopted in the study of *The Land and Housing Survey in a Global Sample of Cities*. In order to understand it, pieces of literature firstly sought for normative definitions.

Historically traced by Hulchanski (1995), in the 1880s, a week’s wage for a month’s rent was a widely used way of describing the “affordable” housing expenses of many tenants in the US at the level of day-to-day practice. This idea of standardizing a cost-to-income ratio for defining affordability in both government and private sector housing policies enjoyed great popularity, and more empirical evidence was introduced to support the “rule of thumb” since then (Newman and Holupka 2014); however, the housing affordability barrier ranges from 25, 30, 40 to as much as 50 percent of income in academic research as well as in federal Acts and laws (Kutty 2005). Stone (2006b) put it frankly that before the late 1960s in the United States and the late 1980s in Britain, leading housing experts accepted without question the ratio of housing costs to incomes as the appropriate affordability indicator, challenging only the notion of a single ratio as an appropriate normative standard. However, there is a growing attitude that standard ratios are only summaries of observations, and methods and theories derived from it have no basis on scientific knowledge (Harrison 1995; Harrison and Davis 2001; Glaeser and Gyourko 2003; Jacobs et al. 2004; Beer et al. 2007; Ball 2016; Rohe 2017; Warren 2018).

The use of a fixed percentage of income as a measure of housing affordability is still applied in various surveys and research. Nepal et al. (2010) compared three ratios and found only the 30/40 rule² provides a robust variant of housing stress and should be chosen to examine the impact of housing policies over time in Australia. This paper evidenced that there is little difference between the use of gross and disposable incomes, and there is a strong relevance among the housing stress, housing policies and people with different levels of income; however, it fails to give a further explanation of the causal relationship and prompts a new task for seeking suitable

² In the 30/40 rule, a household is said to be in housing stress if it spends more than 30 percent of its disposable or gross income on housing costs and the household also belongs to the bottom 40 percent of the equalised disposable income distribution.

ratio in a certain area. Since houses in the modern market are a highly differentiated products which all occupy unique locations, this makes them all different yet again (Angel 2000).

Despite the controversial normative approach, the ratio itself is a good way to display trends and relative positions in a housing system of different groups of households. Malpezzi (1999) finds that a time path of the ratio of typical prices to typical incomes can indicate how well the supply side is able to respond to effective demand. Thalmann (1999) advocates rent-to-income ratios as these are related to those eligible for housing aid, and thus truly having affordability problems. Indeed, the ratio of the median house price and the median annual household income and the ratio of the median monthly rent of a dwelling unit and the median household income of renters remain key measures of both housing affordability and the overall performance of the housing market (Warren 2018; Joice 2014; Angel 2000).

Furthermore, several recent studies suggest to policy-makers that when the ratio surpasses a certain level, indicating a certain housing affordability stress, this would put households at risk of poor health and the postponement of seeking health care services (Bentley et al. 2016; Meltzer and Schwartz 2016), as well as having a certain impact on children's enrichment and cognitive achievement (Newman and Holupka 2014; Newman and Holupka 2016). Ball (2016) stresses affordability has been a growing problem, especially after the Global Financial Crisis, and along with other scholars, advocates the use of social housing supplements for protecting the security of low-income groups including sanitation workers, police officers, teachers, and tradespeople, as well as migrants. However, as Hills (2007) and Wetzstein (2017) found, not only are urban housing affordability outcomes across Western jurisdictions currently being maintained, social housing disappointingly fails to fulfil its policy aims. This so-called "outcome-gap" of housing policy stands out and could be an extensive problem.

Another approach to defining and measuring affordability, as American and European scholars like Whitehead (1993), Yip (1995), Kutty (2005) and Borrowman (2017) conclude, is to recognize the opportunity cost of housing vis-à-vis other goods and services. Furstenberg (1968) argues that smaller households with incomes at the minimum budget level could obtain and afford shelter at higher rent-to-income ratios than could larger households. Lerman and Reeder (1987) later point out that a high cost-to-income ratio can be caused by a household's preference for large or luxurious housing. Bogdon and Can (1997) and Warren (2018) find that households would gladly pay much more for housing and neighborhood characteristics that they value, such as a shorter commute to work, increased neighborhood quality, access to higher-quality schools or other neighborhood amenities, etc. For these subjective social and material experiences of individual households, Stone (1993) introduces a method computing a shelter poverty scale in the hope of transcending personal history with a deeper understanding of the social-economic structure and administrative policy. He notes that the total non-shelter costs for one-adult and two-adult households of the same size differ very little, while the maximum affordable shelter cost: (1) increases steeply with income; (2) varies substantially with household size; (3) may be below zero; (4) may be broken, as the minimum income needed to break the conventional affordability barrier; and (5) is time-dependent (Stone 2006a; Stone 2006b).

Stone's efforts in evaluating both shelter cost and non-shelter cost with socio-economic factors and separating households with different demographic characteristics have inspired many other

scholars. Kutty (2005) examined the distribution of housing-induced poverty by additionally taking the official poverty threshold into account, while Ben-Shahar and Warszawski (2016) compute a Gini coefficient and detect considerable segmentation in housing affordability for household head gender, working status, and geographical locations. Borrowman et al. (2017) focus on the sector of time and found that most households can escape housing affordability stress in one year and thus do not require assistance over longer periods. Geography and regulation have also found their way into the discussion as they constrain the housing supply and increase housing prices including a wide variety of local ordinances (Quigley and Raphael 2004), and Carmona et al. (2016) claim Spanish housing is generally affordable due to the increase in the availability of land for new homes, induced by rapid infrastructure investments (particularly transportation infrastructures) and the flexible and efficient institutions governing the housing markets.

All in all, there is a clear trend of analysts being more and more cautious when using a normative housing expenditure-to-income ratio as their fixed indicator to describe affordability. At the micro level, they are trying to combine more complicated impact factors like housing standards, demographic characteristics of households, the timing of renting and purchasing a shelter, and various non-housing burdens. In a bigger picture, non-housing cost as a general indicator of socio-economic characters and institutional factors are examined as an in-depth means of understanding affordability. Early works of Hallett (1993), and Glaeser and Gyourko (2003) picture a less discussed but enlightening criticism to zoning. The latter compare housing prices and the physical costs of construction, indicating that the price system is reasonable under certain macroeconomic environment, and both conclude that social housing may fail to ease the stress if the social resource assignment kept on centralizing. Indeed, future studies may have to go even further to examine implications of housing practices and reveal the relationship between the macro-policies and a dynamic struggling of households' affordability in the context of globalization and the distribution of educational, medical and human capital resources.

Housing Affordability Studies in Chinese Cities

Housing prices in China are affected by factors on both the supply and demand side. On the supply side, the amount of land supply and the land prices are the key factors in the Chinese context. It is a known fact that the residential land supply for formal housing development is limited in many large cities in China (Liu and Liu 2019). On the demand side, the strong demand for homeownership drives the housing prices up (Gao et al. 2019). There are many factors influencing demand: household incomes and savings, alternative means for household investments, the level of social security, the level of housing speculation, etc. As household incomes are generally more stable than housing prices, the variation in housing affordability is mainly affected by the housing prices and the share of population/households by income level. In this section, the housing sector is categorized into three types: 1) formal housing, 2) informal housing, and 3) public housing.

Formal Housing

The most common type of formal housing in Chinese cities is formal private multi-family housing, and there is formal private single-family housing coexisting with various pricing systems, which indicates various housing affordability issues. Expect migrant workers, graduate students could be the most obvious group with a strong desire of housing but limited affordability, especially the price of entry-level housing is unaffordable (Li et al. 2017). Yang and Li (2012) argue that the down payments were usually paid by the students' parents, while Shi and Yan (2015) developed a model of Housing Affordability Quadrant to evaluate housing affordability with the burden of the down payment and the monthly instalment.

Chen et al. (2010) and Luan et al. (2012) evidence that the commercial housing prices in megacities like Shanghai and Beijing are so high that even median income families are facing housing-induced poverty. This situation is especially true when the residents of these first-tier cities are trying to have access to good public services such as transportation, hospitals and, most importantly, education. Following the "by lots nearby school" policy, only those residents who live in the school district can enroll in those local high-quality schools, which has been significantly capitalized into housing wealth (Feng and Lu 2010). Samples in 10 cities show that median income households on average would under a loan period more than 30 years (Wu 2009) for which they are afraid not paying the potential non-housing costs. In analysing city-level data, Tang (2010), Liu et al. (2015) and Jiang and Zhao (2016) introduce dynamic views of the increasing income of households and the duration of housing consumption. They conclude that 40 percent of families cannot afford housing which meets their basic needs, while more households can bear the current housing burdens with their long-term consumption capacity. Indeed, a range of affordability indicators have evidenced that there can be five income groups interacting in subtle ways with the nature, extent and duration of housing policies, each having its own cohort trend as a behavioural approach of affordability (Chen et al. 2010; Lau and Li 2006; Mostafa et al. 2006)

In the existing literature, most studies take megacities as their cases. Beijing, Tianjin, Shanghai and Shenzhen are most frequently discussed (Chen 2008; Yang 2010; Chen 2013; Xu 2013; Yang 2015; Sun 2016), while data from second-tier cities like Zhongshan and Hefei can also be found in reports (Cheng and Ma 2017; Shi and Yan 2015). Duan (2011) stresses that the difference in housing affordability between second-tier and first-tier cities should not be overlooked. In general, first-tier cities in China have faster economic development and more rapid growth of population, which drives the rise of housing prices. Another major difference is the land use policy, which is more effective in holding back urban land expansion in small cities than large ones (Tan et al. 2005).

Informal Housing

In the context of Chinese urban housing markets, housing rents are not very closely associated with the housing prices. The housing rental markets are poorly regulated, and the rights of tenants are not well defined and protected. This situation could be especially problematic for migrants to a city, because the constraint of household registers system (*hukou* in Chinese) may even stop them from accessing any social housing program. As a result, many migrant

households choose to rent a housing unit in urban villages or live in the underground (He et al. 2010; Kim 2014; Sun 2015; Huang and Tao 2015).

Over the past decades, millions of migrant workers have flooded into cities. Most of these labourers rent accommodations in urban villages, where they have become concentrated, while some, mainly construction and industrial workers, tends to live in dormitories provided by their employers. Very few migrants own a property (Zhu 2007; Lu & Song 2006). In a case study of housing migrant workers in Shenzhen, Wang et al. (2010) indicate that 40 percent of households share a rental unit with another household, resulting in an average floor space of between 2 and 7.7 square meters per person, let alone other facilities; however, nearly 68 percent of migrants surveyed thought that their current accommodation in these urban villages was the most suitable choice.

In recent years, instead of renting, an increasing number of middle and low-income groups have shown to prefer to purchase informal housing, which is known as small property rights housing (Hereafter: SPRH). SPRH, commonly found in peri-urban areas and urban villages, is built on collectively owned rural land and sold to individuals whose *hukou* are elsewhere. While no official statistics are available, the number of small property rights units is estimated at 70 million—perhaps one-third of all housing units in urban China. Unlike formal housing, SPRH cannot be granted legal titling, therefore, such housing is considered to be extra-legal. Despite the informality, SPRH is regarded to be affordable because the housing prices of SPRH are typically 40–60 percent lower than that of formal housing in similar neighborhoods (Sun and Liu 2015; Sun and Ho 2018; Zhang and Zhao 2018; He et al 2018).

Public Housing

The once dynamic informal housing market has gradually grown into a troublesome problem for urban planners and officials, who describe these areas as the “cancer of modern cities” with poor living conditions, dirty environment and high crime rates (Wang et al. 2010). Since 2007, the Chinese Government has committed to meet the basic housing needs of low-income urban households by developing affordable housing programs, including Cheap Rent Housing (CRH), Economic and Comfortable Housing (ECH), Capped-Price Housing (CPH) and Public Rental Housing (PRH); however, the housing supply system in China is founded largely by local governments with rigorous selection mechanisms (Yang et al. 2014). In short, housing affordability in China is also an issue of the ability to access home ownership (Chen et al. 2010). Rural to urban migrants or urban to urban migrants may struggle for years to access a new residence as their demands change along with their income. While according to the empirical data provided by Dong (2015), there is a turning point in the willingness to settle down and the rent-to-income ratio, which is to say that migrant workers will be more likely to purchase a bigger house with better conditions in their hometown if their income surpasses a certain level.

In sum, the issue of housing affordability is rapidly growing into a significant economic, social, and political issue in China, and for the global housing market, it can be a complex case, which matters the wider debates on housing affordability and implications of housing policies. But, the review above indicates that few published studies look into the housing affordability in small Chinese cities (i.e. third/fourth/fifth-tier cities), which leaves a research gap for this study to fill.

This project will be a valuable addition to the current host of empirical studies of urban housing affordability in China, for the following reasons. Firstly, the project will analyse the data of a cross-section of cities ranging from mega-cities to small cities and even towns. Secondly, it will look into both the owner housing affordability and rental housing affordability. Thirdly, and perhaps most importantly, the project will explore the determinants of housing affordability from the perspectives of urban expansion, migration, land policy, and housing policy.

Research Methods

The approach of mixed methods is applied in this research, combining qualitative and quantitative methods, including documentary analysis, questionnaire survey, and semi-structured interviews.

Firstly, a thorough documentary analysis of laws, policies, and regulations at both national and municipal levels was performed, providing an understanding of the governing of land use and housing in Chinese cities.

Figure 1: The Survey Sample of Chinese Cities



Secondly, through taking a stratified sample of cities with 100,000 people or more, 32 Chinese cities were selected as survey samples (Figure 1). In 2015 and 2016, a quantitative survey on housing affordability was conducted in these 32 Chinese cities, and the valid sample is 30. For each city, one city-based researcher was identified, who then completed the survey through library-based research and interviews with local experts such as academics, officials, developer, and planners (Kallergis et al 2018). The questionnaire of housing affordability contains 117 questions which are grouped into 9 sections: 1) Housing types and their share in the overall supply of housing in the city or metropolitan area; 2) Dwelling unit in public housing offered for sale or rent; 3) Apartments in private multi-family buildings offered for sale or rent; 4) Private dwelling units in single-family homes on individual plots of land offered for sale or for monthly

rent; 5) Dwelling unit in the informal sector offered for sale or for monthly rent; 6) Plots in formal residential land subdivisions offered for sale (or long lease); 7) Plots in informal residential land subdivisions offered for sale (or long lease); 8) Plots in new squatter settlements offered for sale; 9) Access to the city center.

Thirdly, in order to have an in-depth understanding of the relationship between housing affordability and the demand for homeownership, an in-depth qualitative study was carried out in 2019. Based on the latest category of city tiers (Fengup 2017), the 30 sample cities were grouped into five types of tiers (see Table 1). One city from each tier type was selected as the sample for follow-up qualitative research. These selected cities were Beijing, Chengdu, Haikou, Anqing, and Xingping. Geographically, Beijing as 1st tier city located in eastern China, Chengdu as 2nd tier city located in inland China, Haikou as 3rd tier city located in eastern China, Anqing as 4th tier city and Xingping as 5th tier city are both located in inland China. In total, 17 expert interviews were conducted with researchers, city planners, and government officials in these five cities: 3 interviews in Beijing, 3 in Chengdu, 3 in Anqing, 4 in Xingping, and 4 in Haikou.

Table 1: Sampled Cities Categorized By Tiers and Regions

	Eastern China	Inland China
First-tier	Beijing , Shanghai, Tianjin, Shenzhen, Guangzhou	
Second-tier	Hangzhou, Jinan, Qingdao, Tangshan	Chengdu Wuhan, Zhengzhou
Third-tier	Haikou , Changzhou	
Fourth-tier	Kaiping, Yulin,	Anqing , Changzhi, Pingxiang, Yiyang, Zunyi, Leshan,
Fifth-tier and small towns	Yanggu, Xuyi, Yuhaun, Zhuji	Xingping , Bishan, Yunyang, Suining

Note: The category of city tiers is based on <http://www.fengup.com/news/60185.html>

Findings

Based on the data analysis of the quantitative survey of 32 Chinese cities, three main findings are presented in this section, 1) private multi-family housing accounts for 61 percent of the total housing sector in China compared to 38 percent on average globally, and the shares of different housing types varies among Chinese cities; 2) housing is significantly unaffordable in the formal private housing sector, especially in 1st and 2nd tier cities located in eastern China; 3) public housing and informal housing are more affordable compared to formal private housing.

The Shares of Different Housing Types Varies Among Chinese Cities

In the study of the global sample of cities, the housing sector was first divided into formal housing and informal housing; formal housing was then divided into public housing and private housing; the private housing sector was further divided into multi-family housing and single-family housing. Therefore, we compared four types of housing: multi-family housing, single-

family housing, public housing, and informal housing. As for the shares of these different types of housing (Table 2), the global sample survey results indicated that globally, multi-family housing accounts for 38 percent of the total housing stock, while 34 percent is single-family housing, and public and informal housing both account for 14 percent. When comparing the housing shares in China with the global average, it becomes clear that at 61 percent, multi-family housing represents a significantly larger share in China, while at 7 percent, the share of single-family housing shares is significantly smaller than the global average.

Table 2: Housing Shares in China and Globally

	Formal Housing			Informal Housing
	Private Housing		Public Housing	
	Multi-Family Housing	Single-Family Housing		
Globally	38%	34%	14%	14%
China	61%	7%	21%	11%

After examining 30 cities, we found that the shares of housing types vary from city to city as shown in Figure 2. For example, private multi-family housing in Shanghai accounts for 76 percent, representing the highest share of sampled cities, while Shenzhen has the lowest share at 36 percent. As for private single-family housing, Haikou in Hainan province has the biggest shares at 20 percent, while in Jinan in Shangdong province, Xining in Shaanxi province, Zunyi in Guizhou province, and Zhuji in Zhejiang province only 2 percent of housing consists of this type. As for public housing, Jinan in Shandong province and Xingping in Shaanxi province have a considerable public housing sector at 38 percent of all housing compared to Shanghai where accounts for only 9 percent of housing stock. Finally, as for informal housing, half of Shenzhen's housing stock is regarded to be informal, representing the highest share of all cities, while Shanghai, Haikou in Hainan province, Pingxiang in Jiangxi province, and Yiyang in Hunan province all have the lowest share of informal housing at 5 percent. Although the shares of housing types vary between different cities, the results indicate the differences between different tiers of cities is not significant.

Figure 2: Shares of Housing Types in 30 Chinese Cities



Formal Private Housing is Significantly Unaffordable in Chinese Cities

In this research, housing is considered affordable when the house-price-to-annual household income ratio (HPIR) is 3.0 or less and rent-to-monthly household income ratio (RIR) is 25% or less. Median Household Affordability is adopted to measure the affordability in the formal private housing sector. Median Household Affordability is the ratio of the price or rent of a Formal Private Housing unit to the reported Median Annual Household Income in the city. The formula is: Median Affordability = $[(\text{Multi-Family Housing share in Formal Private Housing} \times \text{its price}) + (\text{Single-Family Housing share in Formal Private Housing} \times \text{its price})] \div (\text{weighted average of household income of all housing occupants in the city})$.

When examining housing affordability in these 30 Chinese cities by adopting the above measure, we found that the average house-price-to-annual household income was 7.2 and the rent-to-monthly household income ratio was 34 percent, which are both (much) higher than the value of affordability (i.e., $\text{HPIR} \leq 3.0$, $\text{RIR} \leq 25$ percent). Therefore, on average formal private housing in Chinese cities is significantly unaffordable.

Figure 3: Median Household Affordability—Price-to-Income-Ratio in Formal Private Housing (city)

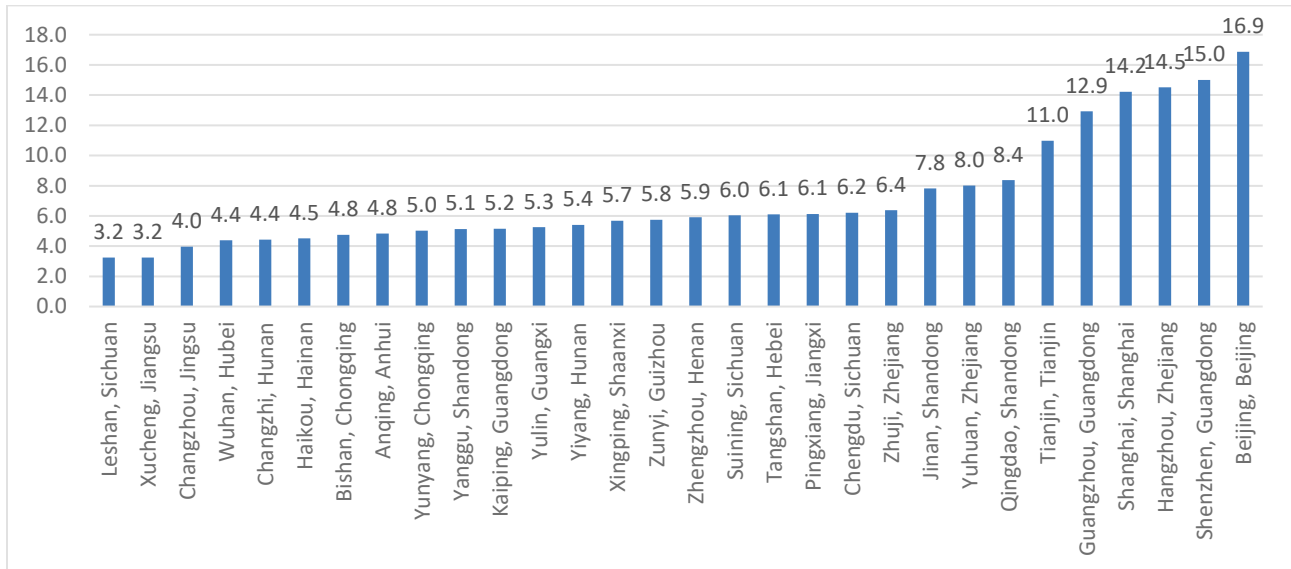
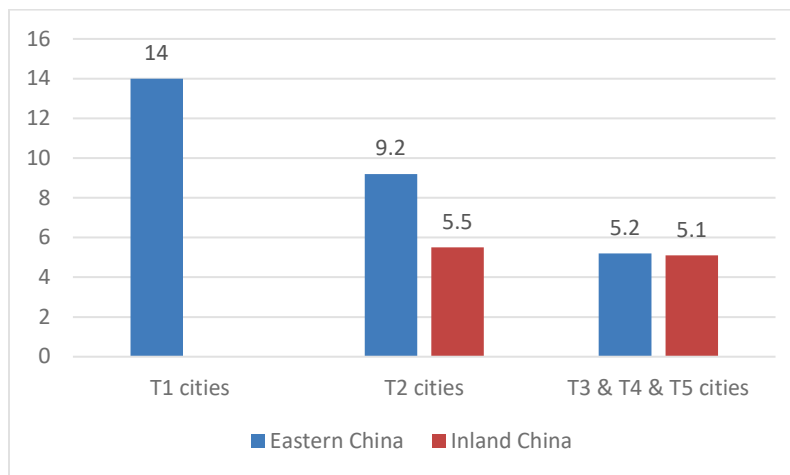


Figure 4: Median Household Affordability—Price-to-Income-Ratio in Formal Private Housing (city tier)

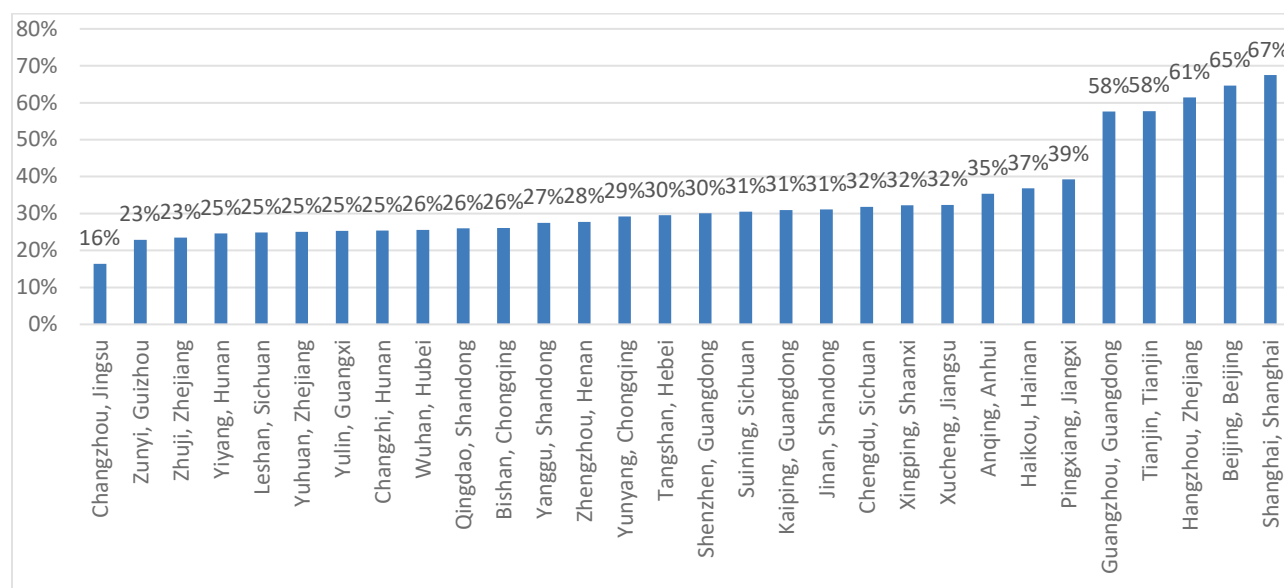


As shown in Figure 3, all cities' HPIRs are above 3.0, in other words, the formal private housing in all sampled Chinese cities are unaffordable, though in some cities only slightly so. Six cities' HPIRs are higher than 10, these are Beijing (16.9), Shenzhen (15), Hangzhou (14.5), Shanghai (14.2), Guangzhou (12.9), and Tianjin (11). Two cities' HPIR is 3.2, putting Leshan and Xucheng only slightly above the maximum 3.0 HPIR ratio. When grouping these cities into tier types, it is clear to find that 1st tier cities, with an average HPIR of 14, are the most unaffordable, followed by 2nd tier cities of 7.9 (Figure 4). When further analysing 2nd tier cities' location, eastern cities' average HPIR (9.2) is significantly higher than that of inland cities (5.5). However, it is surprising to find that the HPIRs of tier 3, tier 4 and tier 5 cities are very similar,

which are slightly higher than 5, and the difference between eastern cities and inland cities are not significant.

As for RIR (figure 5), 22 out of 30 cities' RIRs are above 25 percent, 5 cities' RIRs are 25 percent, and 3 cities' RIRs are below 25 percent (Changzhou at 16 percent, Zunyi at 23 percent, and Zhuji at 23 percent). Five cities' RIRs are significantly higher than the maximum 25 percent for affordable housing at 50 percent of above. These are Shanghai (67 percent), Beijing (65 percent), Hangzhou (61 percent), Tianjin (58 percent), and Guangzhou (58 percent).

Figure 5: Median Household Affordability—Rent-to-Income-Ratio in Formal Private Housing Sector (city)



Public Housing and Informal Housing Are Slightly Unaffordable for Urban Poor

The occupants of private formal housing could be any income group in the city. Unlike private formal housing, the occupants of public housing and informal housing are largely low-income groups or the urban poor. Therefore, when examining the affordability of public housing and informal housing, the measure of Occupant Household Affordability is adopted, which is the weighted average of the housing price of each type, and the income is the income of the actual occupants of the particular housing type. The formulas as follows: Occupant Affordability of public housing = Public Housing share x its price / household income of its occupants ; Occupant Affordability of informal housing = Informal Housing share x its price / household income of its occupants.

The average HPIRs and RIR of public housing are 5.6 and 21 percent respectively, which are more affordable than formal private housing (7.2 and 34 percent respectively). However, the HPIR is still above the maximum value of affordability (3.0) and therefore unaffordable. As shown in Figure 6, except for Wuhan (2.7) and Anqing (2.9), all the cities' HPIRs are above 3.0. Some are above 9.0, making ownership of public housing in Shanghai (11.6), Haikou (9.7) and Tangshan (9.2) particularly unaffordable. As for renting (Figure 7), 20 out of 30 cities' RIR in

public housing is 25 percent or below, which is considered to be affordable. However, it varies considerably. For example, the RIR of Kaiping is as low as 5 percent, making it highly affordable, while that of Chengdu is 44 percent, making it very unaffordable. The results indicate that the difference in the affordability of public housing between different tiers of cities is not significant.

Figure 6: Occupant Household Affordability—Price-to-Income-Ratio in Public Housing

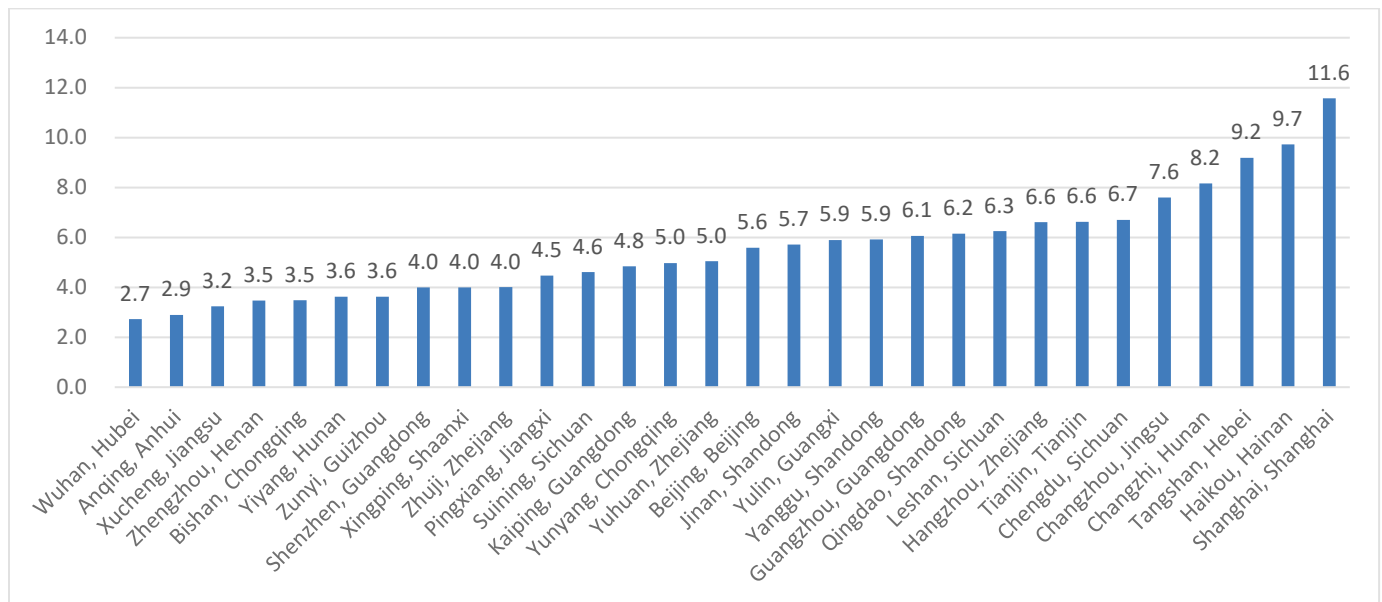
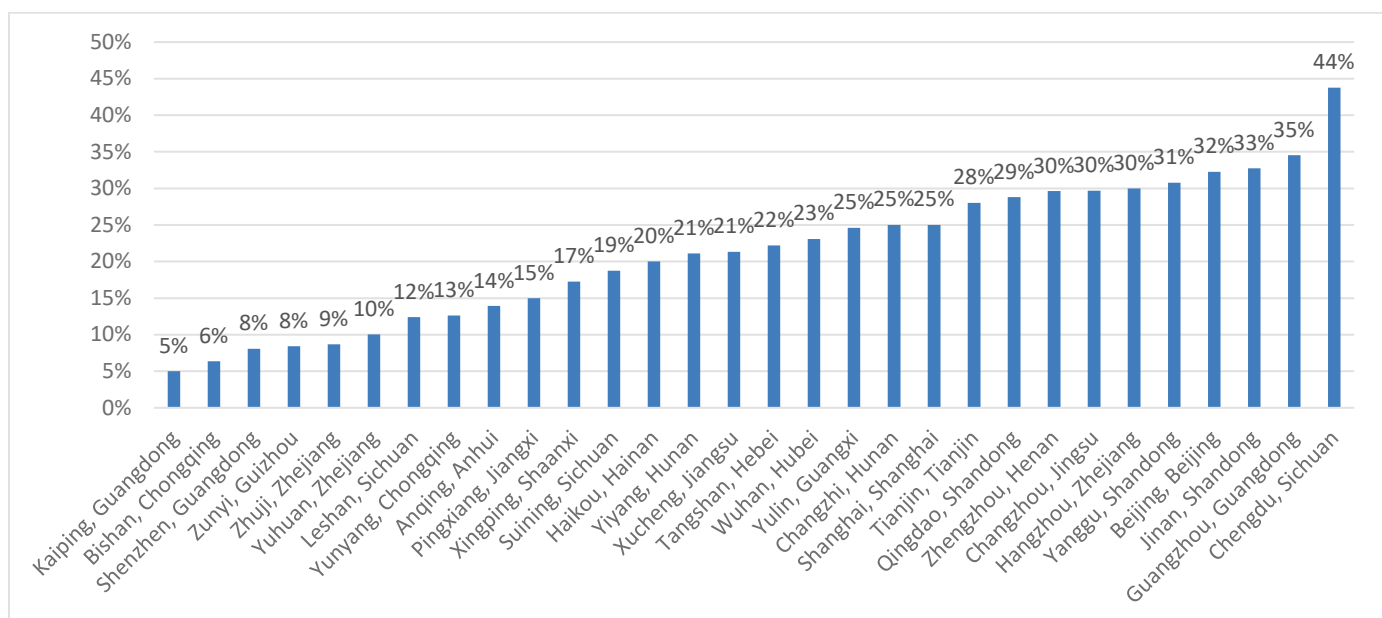


Figure 7: Occupant Household Affordability—Rent-to-Income-Ratio in Public Housing



As for informal housing, the average HPIRs and RIR are 4.7 and 27 percent respectively, which are more affordable than formal private housing (7.2 and 34 percent respectively), but still unaffordable as the values are above the affordability standard ($HPIR \leq 3.0$ and $RIR \leq 25$ percent). As for the HPIR (Figure 8), 27 out of 30 cities' values are above 3.0, with only three cities where informal housing can be considered to be affordable: Shenzhen (1.8), Wuhan (2.3), Suining (2.5). It is worth noting that Shenzhen is known for its large scale of small property rights housing with a low sale price, which is around only half of the formal housing price (Lai, et al. 2017). The buyers of such SPRH are not only rural-urban migrants or urban poor but include a significant number of local middle-income group. Yuhuan, as a fifth tier city, is an outlier with a HPIR of 9.9, which can be attributed to the popularity of informal holiday housing on its coastal sites. As for RIR (Figure 9), 16 out of 30 cities' values are 25 percent or below, making them affordable. For example, the RIR of Shenzhen is 16 percent. Some cities' RIRs are only slightly above 25 percent, however, two cities' RIRs are higher than 50 percent: Haikou (60 percent) and Chengdu (52 percent). The reason for Haikou's high value is its informal renting market for tourists. The results indicate the difference in the affordability of informal housing among different tiers of cities is not significant.

Figure 8: Occupant Household Affordability—Price-to-Income-Ratio in Informal Housing

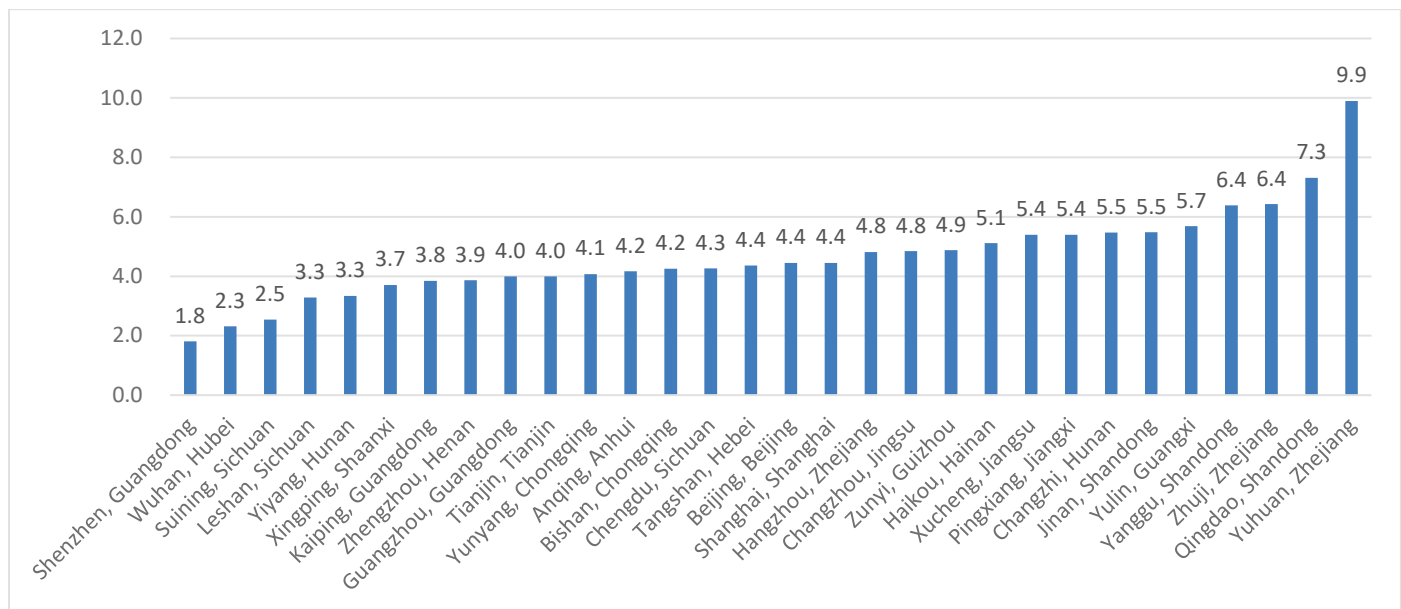
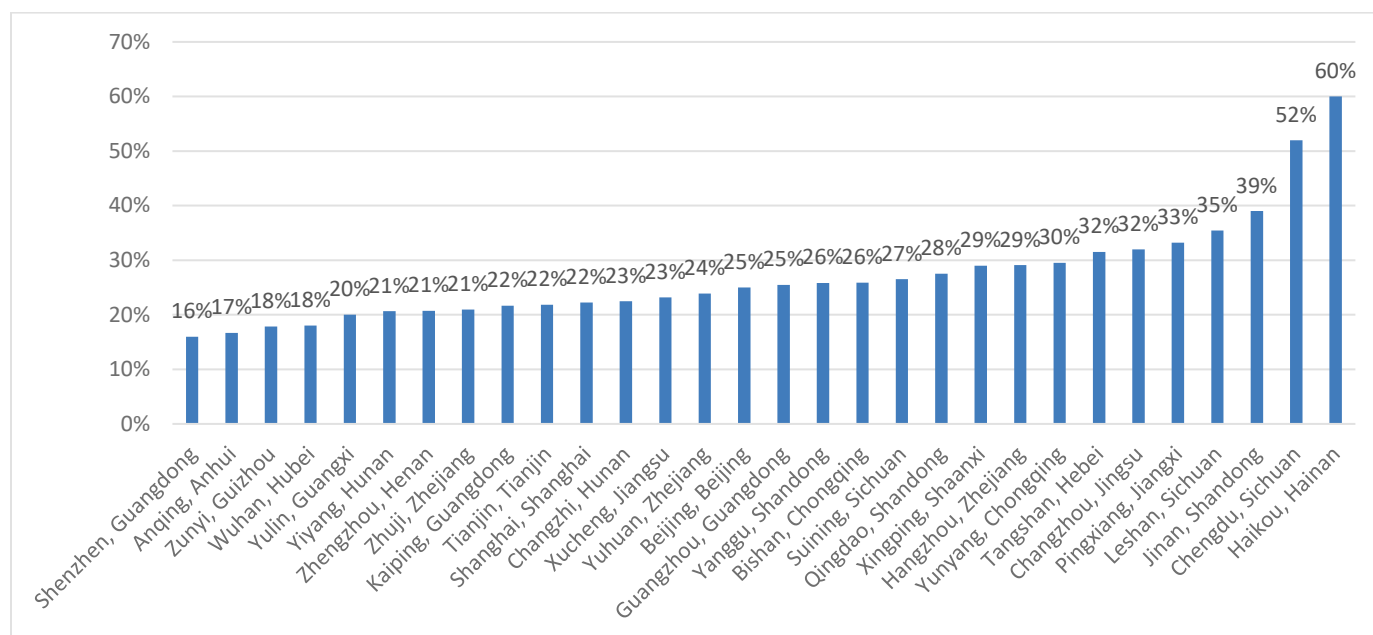


Figure 9: Occupant Household Affordability—Rent-to-Income-Ratio in Informal Housing



Discussions

High Homeownership Despite the Unaffordable Housing Price

Existing research points out the government's monopolization on land supply largely attributes to the high housing price in Chinese cities (Shen et al. 2018). Unlike in western countries, land supply in China is controlled by the government as the Land Administration Law regulates the urban land is state-owned, and the rural land is collectively owned. The government sets a residential land quota for urban housing construction. Such interventions in the land market drive the land price extraordinarily high, especially in first and second-tier cities, which affects the housing price accordingly. Despite the unaffordable housing price, the homeownership rate was 92.8 percent in 2017 according to the China Household Finance Survey (Zhou 2018).

Furthermore, the homeownership rate for millennials in China was 70 percent, compared to 35 percent in the US and 31 percent in the UK (HSBC 2017). Existing studies show a large number of young people can't afford to buy homes in European countries (Helderman and Mulder 2007), Australia (Yates and Bradbury 2010), and Japan (Forrest and Hirayama. 2009). Without access to homeownership or social housing, they have to rent (private) housing for an extensive period of time, possibly for life, and this cohort has been termed "generation rent" (McKee 2012; Hoolachan 2017). Against this backdrop, it is vital to discuss why homeownership is so high in China and how young people here are able to access homeownership which has proven elusive elsewhere. Based on in-depth interviews, we found that Chinese citizens' housing purchasing behaviours are largely determined by sociocultural and economic factors.

Firstly, homeownership is rooted in traditional Chinese value. Laozi, the pioneering philosopher of Daoism in the 6th-century BC, proposed "Anjuleye" (i.e., owning housing and enjoying your

work) as the foundation of a contented life. All interviewees expressed a strong influence of such traditional thoughts on current Chinese citizens' housing purchasing behaviour. For example, One local official in Haikou noted, *"influenced by traditional culture, only owning housing is perceived to having a home. Renting (in other words: being without homeownership) is not socially accepted on the ground. Thus, everyone is eager to buy a property instead of renting"*.

Secondly, buying an apartment is a prerequisite for marriage in China nowadays (Wei and Zhang 2011). According to the National Bureau of Statistics, men outnumbered women by 32.66 million in China (People's Daily 2018). Women are in an advantageous position to choose men and normally they won't consider a man who doesn't own any property. Several interviewees address such housing demand as "social necessity", and one urban planner in Beijing mentioned, *"it is a common practice for the groom's family to purchase an apartment before marriage, in most cases, the groom's parents would contribute the down payment because young men have little in terms of savings"*. Intergenerational housing support is one of the main factors that allows Chinese millennials to buy a property instead of renting despite the high housing price in major cities (Li and Shin 2013; Clark et al 2019).

Thirdly, homeownership matters to children's education. Normally, public schools only accept children whose families have the ownership of the housing in the designated neighborhood (Zhang et al 2019). One researcher in Beijing highlighted that *"If you don't own the housing in Beijing, your child can't be admitted to public schools. Families have to buy the apartment instead of renting it. Of course, rich people can afford nicer neighbourhoods with better schools"*.

Lastly, from an economic perspective, wealthy Chinese citizens purchase housing as a means of investment due to the limited (safe) investment options in China. For example, the Chinese stock market is not well regulated and lacks transparency, as a result of which Chinese investors don't trust it (Liu and Liu 2019). Furthermore, buyers expect the housing price will keep increasing, which boosts their believe that buying housing is a good investment. This phenomenon worries the Chinese government, and therefore President Xi explicitly addressed that "houses are built to be inhabited, not for speculation" at the 19th Party Congress in 2017.

Challenges for Public Housing and Informal Housing

As indicated in Section 4, public housing and informal housing are less unaffordable compared to formal private housing. However, interviewees address various challenges public housing and informal housing face in China.

As for public housing, during the 12th five-year plan (2010-2015), the Chinese government announced the provision of 36 million units of public housing. According to the National Bureau of Statistics, the actual provision was 28 million units by the end of 2015, which accommodated 12.3 percent of urban households (Liu and Liu 2019). Despite such achievements, social exclusion of public housing, long waiting lists, and its inconvenient geographical location are the main constrains of public housing development in China. According to relevant policies and regulations, the applicants for public housing must hold the local urban household registration (*hukou*) or have been formally employed and contributed to social insurance in the

corresponding city. These requirements largely exclude non-local urban residents or informal labourers. The largest group excluded by public housing are the 281 million rural to urban migrants, even though they comprise a low-income group in receiving cities. Migrants are not eligible to apply for public housing because of their rural *hukou* and informal employment in factories without social insurance contribution (Sun 2019). Additionally, all interviewees in the selected five cities mentioned the long waiting time for public housing. One interviewee in Chengdu noted *“The waiting time is long and the competition is high, for example, in August 2018, 7785 units of public rental housing were newly built in Chengdu but there were 19000 qualified applicants, which means around 11000 applicants are in the waiting list for future public rental housing and no one knows how long they will wait”*. Lastly, public housing is built far away from the city centre, often located in the suburbs which lack convenient access to public transport. Under this circumstance, public housing residents have to spend a lot of time commuting to the workplace in the downtown.

Due to their exclusion from public housing and the high price of formal private housing, a large number of rural-urban migrants as well as other urban poor choose to live in informal housing due to its affordability. Informal rental housing is largely located in urban villages (*chengzhongcun*). The main concerns for such informal rental housing are the unregulated rental market and the sub-standard housing construction. For example, one interviewee in Haikou said *“the tenants and landlords normally don’t sign a rental contract and it is based on an oral agreement. The rent is paid in cash and the landlords may increase the rent abruptly. The termination of the tenancy could be on very short notice. Anyway, the tenants (i.e., migrants) are in a disadvantaged position in the rental market”*. In recent years, an increasing number of people are interested in purchasing informal housing either in urban villages or high-rise compounds, which is termed Small Property Rights Housing (hereafter: SPRH) (Sun and Ho 2018). Most interviewees highlight its affordability despite the illegality. One interviewee in Beijing addressed *“the popularity of such informal housing is largely due to its cheap price. But if more public housing is available for migrants or the urban poor, the demand for informal housing would reduce. Therefore, I advocate the need for more public housing in Beijing”*. It is worth noting the case of Shenzhen city where the SPRH accounts for half of the housing stock as shown in Figure 2. The quality of SPRH is much higher than that of typical informal housing in developing countries. Most of such SPRH with decent quality could be upgraded to the standard of formal commercial housing or public housing with relatively additional low cost, as Shenzhen City Government is working on under the pressure of public housing supply.

Conclusions

The main finding of this research is that housing is largely unaffordable in Chinese cities and when facing housing an affordability crisis, it is essential to consider all housing sectors, especially the role of public housing and informal housing. In this research, housing is categorized into four types, which are multi-family housing, single-family housing, public housing, and informal housing. The first two types are regarded as formal private housing. Survey data shows the most common housing type in Chinese cities is private multi-family housing which accounts for 61 percent of the total housing sector, compared to 38 percent on average globally. Besides private multi-family housing, the share of single-family housing,

public housing, and informal housing in Chinese cities are 7 percent, 21 percent, and 11 percent respectively.

Based on qualitative and quantitative data, it is found that the formal private housing is significantly unaffordable in Chinese cities with a house-price-to-annual household income ratio (HPIR) of 7.2 and rent-to-monthly household income ratio (RIR) of 34 percent, both of which are considerably higher than the value of affordability ($HPIR \leq 3.0$, $RIR \leq 25$ percent). First-tier cities has an average HPIR of 14, with Beijing (16.9), Shenzhen (15), Shanghai (14.2), Guangzhou (12.5), and Tianjin (11) all being multitudes higher than 3.0. The average HPIR of 2nd tier cities was 7.9, and upon further analysis it was found that their geographical location is an important variable, with eastern cities' average HPIR (9.2) being significantly higher than that of inland cities (5.5). The HPIRs of tier 3, tier 4 and tier 5 cities are very similar, and slightly higher than 5. Therefore, it is reasonable to argue that although all 30 cities' HPIRs are above 3.0, the affordability crisis is centred in the very extremely unaffordable 1st tier cities and 2nd tier cities located in eastern China such as Hangzhou (14.5).

Additionally, the data shows public housing and informal housing are slightly unaffordable for urban low-income groups. The average HPIRs and RIR of public housing are 5.6 and 21 percent, and 4.7 and 27 percent respectively for informal housing which is clearly more affordable than formal private housing (7.2 and 34 percent). The results further indicate the difference in the affordability values of public housing and informal housing among different tiers of cities is not significant. Thus, China should stabilize the prices of commodity housing in the 1st and some major 2nd tier cities. Meanwhile, China should continue to provide affordable public rental housing, and protect the informal housing market, to alleviate the declining housing affordability problem.

Despite the unaffordable housing price, homeownership rate in China was as high as 92.8 percent in 2017. Homeownership doesn't only offer security and asset accumulation, but is also regarded as a requisite to having a successful lifestyle (Hirayama 2012; Rowlands and Gurney 2000; Ronald 2008). In China, having a car, an apartment and a family are all symbols of reaching the Chinese dream by citizens in cities (Mars and Hornsby 2008). Chinese citizens' housing purchasing behaviours on the demand side is driven by sociocultural and economic factors: 1) Homeownership is rooted in the traditional Chinese value that only owning housing is perceived as having a home. 2) Buying an apartment is a prerequisite for marriage in China and intergenerational housing support is one of the main factors that allows Chinese young people to buy a property for marriage. 3) Homeownership determines residents' social welfare, especially their children's schooling, as public schools only accept children whose families have ownership of housing in the district. 4) Wealthy Chinese purchase housing as a means of investment due to the limited investment options in China.

Finally, this paper seeks to argue that public housing and informal housing shouldn't be ignored when examining the issue of housing affordability, as informal housing is shown to play a positive role in providing relevant affordable housing to the urban poor in Chinese cities (Sun and Ho 2018). Nevertheless, public housing and informal housing in China face several challenges. Firstly, the social exclusion from public housing of non-local urban applicants (i.e. migrant workers with a rural household registration), long waiting lists, and its inconvenient

geographical location are the main constraints of public housing development in China. Secondly, the unregulated rental market and the sub-standard housing construction of informal housing are issues that are yet to be addressed.

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