

Housing Studies

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/chos20

The temporal change of housing inequality in urban China

Yourong Wang , Jianyu Ren , Chengdong Yi , Youqin Huang & Xiulian Ma

To cite this article: Yourong Wang , Jianyu Ren , Chengdong Yi , Youqin Huang & Xiulian Ma (2020): The temporal change of housing inequality in urban China, Housing Studies, DOI: 10.1080/02673037.2020.1788711

To link to this article: https://doi.org/10.1080/02673037.2020.1788711

Published online: 14 Jul 2020.

Submit your article to this journal

Article views: 14

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=chos20

HOUSING STUDIES
https://doi.org/10.1080/02673037.2020.1788711

Routledge
Taylor & Francis Group

Check for updates

The temporal change of housing inequality in urban China

Yourong Wang[a], Jianyu Ren[a], Chengdong Yi[a], Youqin Huang[b] and Xiulian Ma[c]

[a]Department of Urban and Real Estate Management, Central University of Finance and Economic, Beijing, China; [b]Department of Geography and Planning, State University of New York, Albany, New York, USA; [c]Chinese Academy of Governance, Beijing, China

ABSTRACT

This paper reveals temporal changes of housing inequality in housing space and access in urban China and explores the effects over time of underlying socioeconomic factors (education, occupation, industrial type, and migration status). Household-level micro data from 2000 and 2010 of the national population censuses were pooled. Our results showed that inequality in per capita space increased during the new century's first decade, both within and between social classes. Regression analysis and Oaxaca-Blinder decomposition showed that although the changes in these socioeconomic factors partially explain the enlarged inequality in per capita space, the changes in these factors' returns were the main causes. For housing access, there were no signs of prioritization in the allocations of state-subsidized housing for those in the low-ranked social strata. Further, the roles of education, occupation, and monopoly industry in accessibility to subsidized housing gradually weakened, and the allocation of subsidized housing began covering other households besides local urban residents.

ARTICLE HISTORY
Received 17 December 2018
Accepted 15 June 2020

KEYWORDS
Housing inequality; Temporal change; Oaxaca-Blinder decomposition; Multinomial logit model; Urban China

Introduction

In recent decades, there has been a well-recognized and well-studied housing market development in urban China (see Chen and Han, 2014, for a comprehensive survey of studies on the Chinese housing market). A market-oriented housing system has been established after two decades of housing reform. While many housing problems that dominated prior to the 1990s, such as shortages, crowding and poverty have been solved, new housing concerns have risen in current China, such as affordability, inequality, and the bursting of the housing bubble (Bian & Logan, 1996; Chen *et al.*, 2010; Chen & Han, 2014; Glaeser *et al.*, 2017; Huang, 2003; Sato, 2006; Yi & Huang, 2014). Among these, housing inequality has become a significant social issue (Huang & Jiang, 2009; Li &Wu, 2006; Logan *et al.*, 1999; Sato, 2006; Tan *et al.*, 2016; Yi & Huang, 2014; Yi *et al.*, 2020; Zhao & Ge, 2014). It is suggested that the wealth inequality in China was worsen by housing inequality. According to the China Social

CONTACT Chengdong Yi chdyi@cufe.edu.cn Department of Urban and Real Estate Management, Central University of Finance and Economic, Beijing 100081, China

© 2020 Informa UK Limited, trading as Taylor & Francis Group

Science Survey Report released by the China Social Sciences Research Center, Peking University, the wealth Gini coefficient in China increased from 0.45 in 1995 to 0.73 in 2012. Housing inequality is a major factor in wealth inequality. As a consistent marker of socioeconomic status, the socioeconomic, demographic, and political effects of housing go beyond the scope of housing studies (Zavisca & Gerber, 2016) and its implications for social stratification is well-recognized (Forrest & Hirayama, 2018; Liu & Hu, 2010; Song & Xie, 2014; Yi *et al.*, 2020). Therefore, social stratification reinforces itself through housing inequality, and temporal changes in housing inequality could explain the worsened social stratification problem in contemporary China.

However, studies on the temporal changes of housing inequality in urban China is insufficient due to data limitations as well as the inadequate measurement of housing status. Existing studies either focus on the development of the housing inequality index (Tan *et al.*, 2016; Yi & Huang, 2014; Yuan & Wang, 2013) or reveal housing differences across social strata (Bian & Liu, 2005; Hu, 2012; Bian & Lu, 2014; Wang *et al.*, 2016). For example, Yi and Huang (2014) found that housing inequality across education groups rose rapidly, while inequality across occupation groups seemed unchanged in Chinese cities between 2000 and 2010. Due to limitations in the summary data applied, that research failed to show or explain changes in the inequality within social strata. Although, it is believed that the housing inequality has increased with the marketization process (Huang & Jiang, 2009; Liu & Hu, 2010; Logan *et al.*, 1999; Sato, 2006), empirical findings provide contradictory evidences across different measurements of housing status (Luo, 2013; Tan *et al.*, 2016; Yi *et al.*, 2020; Yuan & Wang, 2013).

Moreover, housing access and its temporal changes has been less explored though a few studies reveal unequal patterns in the allocation of public rentals and owned housing in urban China (Logan *et al.*, 2009; Logan *et al.*, 2010; Yi & Huang, 2014; Zhao & Ge, 2014). Although a market-oriented housing system has developed in urban China, the government still plays an important role in households' housing choices through the supply of public housing. There are two types of public housing - public rental housing and subsidized ownership housing[1] - that aim to accommodate low-income households. However, resourceful work units, primarily state-owned enterprises in monopoly industries, can still provide subsidized ownership housing such as Economic and Comfortable Housing (Jingji Shiyong Fang) for employees through means such as easy access, discounted land prices, and even housing converted from former factories. The Hukou system still plays a fundamental role in public housing allocation, and migrants are more likely to be excluded from subsidized housing, especially subsidized ownership housing. Meanwhile, with the rapid urbanization process, the government has accelerated its land acquisition. The agricultural-Hukou households whose homes were taken down are settled into subsidized ownership housing (Anzhi Fang) or entitled to public rental housing. Therefore, the housing source for urban households is diversified and present unique Chinese characteristic. The housing tenure choice (own versus rent) and the accessibility to the subsidized housing are highly overlapped and the households jointly make these two decisions. Considering the recent resurgence of the public housing sector in urban China (Chen *et al.*, 2014; Chen *et al.*, 2017) and the public concern about the fairness and efficiency of the massive public housing program, it is of great importance to investigate and explain the temporal changes of housing access.

Both institutional and market factors, including household income, household head's education, employment status, work unit type, occupation rank, cadre status, and party membership are blamed for the changing housing inequality (Li & Yi, 2007; Logan, *et al.*, 1999; Yi & Huang, 2014; Zhao & Ge, 2014; Zhou & Logan, 1996). Not only the endowments of these socioeconomic characteristics changed, the effects of these changed over time(Song & Xie, 2014; Tan *et al.*, 2016). However, it is unknown the relative importance of the endowments and the returns of these factors in the changing housing inequality.

Thereafter, applying the pooled household-level micro data from two waves of China's national population census (2000 and 2010), this paper aims to reveal the temporal changes of inequality in housing space per capita and housing access, within and between social groups, and explore the time variations of the driving forces of housing inequality. Theil's T statistic (T) and coefficient of variation (CV) show that the inequality in per capita space increased during the first decade of the new century, both within and between social classes. The regression results exhibit time-varying effects of education, occupation, industry type, and migration status in housing consumption. The further Oaxaca-Blinder decomposition show that the changes in these characteristics can only explain a small part of the enlarged inequality in per capita space. Changes in the returns to these factors are the main causes. For housing access, we find that the privileged class continues to access state-subsidized housing that is intended to favor those with difficulties in finding market accommodations, but this pattern exhibits a declining trend. Households with higher education, higher occupational ranks, and who work in monopoly industries are more likely to own market housing. This trend increased over time and the roles of these characteristics in accessibility to subsidized housing gradually weakened. Meanwhile, the allocation of subsidized housing began to cover other households besides local urban residents over time. These results suggest that better housing consumption and access for households in higher social positions persist and this has led to increasing housing stratification in urban China.

The remainder of this article is organized as follows. Section 2 reviews the related literature. Section 3 provides an introduction of the data sets used and discusses the methodologies applied. Section 4 presents and discusses empirical results, followed by a summary and conclusion in Section 5.

Literature review

Housing inequality is a common problem worldwide (Ben-Shahar & Warszawski, 2016; DeSilva and Elmelech, 2012; Gough & Tran, 2009; Levin & Pryce, 2008; Tunstall, 2015) and its temporal changes are highly related to social stratification (Lux *et al.*, 2013; Zavisca & Gerber, 2016). Research on housing inequality in the US has a long history (Hansen *et al.*, 1994; Zavisca & Gerber, 2016). In recent decades, scholars working in Western European contexts have put housing and homeownership squarely in the spotlight when exam the issue of wealth inequality (Christophers & O'Sullivan, 2019; Fuller *et al.*, 2020). Studies from other world regions are emerging too (Gough & Tran, 2009; Lux *et al.*, 2013), specially studies in Chinese context.

Besides the common household socioeconomic and demographic characteristics, such as age, sex, education, occupation, and income, the regional studies showed huge differences in other key variables due to dissimilarities in historical and institutional backgrounds (Tan *et al.*, 2016). While race, ethnicity and migrant status are the most common variable appearing in the literature on housing inequality in the western societies (Christophers & O'Sullivan, 2019; DeSilva & Elmelech, 2012; Flippen, 2001; Krivo & Kaufman, 2004), variables related to the sociopolitical hierarchy inherited from the planned-economy era are always presented in the literature on housing inequality in transitional economies (Gough & Tran, 2009; Lux *et al.*, 2013).

The heated debates on the applicability of Nee's (1989) market transition theory in China provide overwhelming evidence of the coexistence of political power and market mechanisms in determining socioeconomic success in transitional China (Bian & Logan, 1996; Hauser & Xie, 2005; Li & Wu, 2006; Nee & Cao, 1999; Song & Xie, 2014). Those who receive the biggest gains from the housing system reform in China are still the owners of political capital in the original redistribution system (Logan *et al.*, 2010). This is inherent in the main method of housing reforms since the late 1990s in urban China which is privatization of public-owned housing. Households were encouraged to purchase the homes they rented at very low sale prices. The sale prices were usually the cost prices or even lower, based on the households' sociopolitical status. Those who were favored in the previous housing welfare system, usually with a high-ranking job position or political power, got high-quality houses at extremely low prices (Logan *et al.*, 2010; Sato, 2006). Since the initial distribution of housing assets impacts subsequent economic inequality in urban society, inequality resulted from the privatization of public housing was reinforced with the development of the private housing market. On one hand, housing prices increased rapidly in most major Chinese cities after 2003, making new purchases unaffordable for many urban residents (Glaeser *et al.*, 2017; Wu *et al.*, 2012; Yang & Chen, 2014). On the other hand, during the post-2003 housing price upsurge, some families were able to acquire more and better housing units by selling apartments previously acquired from their work units (Song & Xie, 2014). Therefore, housing inequality has been aggravated by housing reform and the development of the private housing market in urban China (Huang & Jiang, 2009; Liu & Hu, 2010; Yi & Huang, 2014).

However, studies on the temporal changes of housing inequality in urban China are generally insufficient, particularly provide unconvincing explanations. First, the empirical evidence of the temporal changes of housing inequality in urban China revealed by a few studies that focus on longitudinal comparisons is mixed. The inequality in per capita housing slightly increased, while the inequality of per capita home ownership sharply declined from 1988 to 2007 (Luo, 2013). The level housing wealth inequality among China's urban households was not only very high but also increased between 2003 and 2006. Regional differences, the status of the household register, income level, and education were the most important causes (Yuan & Wang, 2013). Another study by Tan *et al.* (2016) shows the trend of housing space inequality was steady with somewhat of an increase, while the trend of housing wealth inequality first decreased and then increased. These decomposition results suggest that the changes in household characteristics could explain little about the change of housing

inequality, while the changes of the returns from these characteristics over time played key roles in the change in housing inequality. Applying aggregated data of the 2000 census, the 2010 census, and the 2005 1% Population Survey, Yi and Huang (2014) evaluated housing consumption in Chinese cities during 2000–2010 and revealed a very complex pattern of housing inequality. Specifically, while housing inequality across education groups was rising rapidly, inequality across occupations seemed to decline or remain the same. However, they leave the within-group inequality unexplored due to the limit of aggregated census data. Pooling three waves of survey data from the 1995, 2008, and 2013 iterations of the Chinese Household Income Project, Yi *et al.* (2020) present a dynamic image of housing wealth inequality in urban China and suggest that housing wealth inequality decreased initially and increased later. The inconsistency of the results is mainly due to the differences in data applied and measurements of housing studies

Second, though various institutional and market factors have been identified as the driving forces of housing inequality in urban China, it is unknown whether and to what extent the roles of these factors change over time, since the results are inferred from studies based on data from specific years. The socioeconomic factors that most frequently studied are educational level, occupational rank, household registration status (Hukou), party membership, and type of work units (Danwei) (Huang, 2003; Huang & Clark, 2002; Huang & Yi, 2011; Li & Wu, 2006; Logan *et al.*, 1999; Logan *et al.*, 2009; Logan *et al.*, 2010; Wang, 2000; Song & Xie, 2014; Yi & Huang, 2014; Zhao & Ge, 2014). The first two are regarded as market forces that playing increasingly important roles in housing choice and consumption, and the last three are usually treated as institutional factors that persist (Logan *et al.*, 2009; Logan *et al.*, 2010; Wang *et al.*, 2005; Wang *et al.*, 2010; Yi & Huang, 2014; Zhao & Ge, 2014). However, it is hard to isolate market factors from institutional factors as education and occupation type measure household institutional status to a certain degree in China (Yi & Huang, 2014). Following the existing research,the socioeconomic factors under explored in this study are educational level, occupation rank, migration status based on the Hukou status, and type of work unit (monopoly industry or not)[2].

Third, housing inequality has been examined from various dimensions, such as living space (Huang & Yi, 2015; Luo, 2013; Sato, 2006; Song & Xie, 2014; Yang & Chen; 2014), housing quality (Sato, 2006; Yi & Huang, 2014), housing wealth (Tan *et al.*, 2016; Wang *et al.*, 2020; Yuan & Wang, 2013), housing tenure (DeSilva & Elmelech, 2012), and accessibility to public housing (Chen *et al.*, 2014; Logan *et al.*, 2009; Logan *et al.*, 2010; Zhao & Ge, 2014). For temporal changes, direct measures such as home ownership, per capita housing space and housing wealth are usually applied (DeSilva & Elmelech, 2012; Tan *et al.*, 2016; Yuan & Wang, 2013). The temporal change in housing access - including housing tenure as well as the accessibility to public housing - has been less explored; although it is well acknowledged that accessibility to public housing varies across social groups (Chen *et al.*, 2014; Logan *et al.*, 2009; Logan *et al.*, 2010; Zhao & Ge, 2014). Therefore, in this study, besides per capita housing space which has been continuously proven to be a good measure of housing consumption, we also exam the temporal changes of housing access defined by the combination of housing tenure (own *versus* rent) and the accessibility to the subsidized housing.

In sum, this paper aims to fill several gaps in the literature. First, the micro-level data enable us to decompose housing inequality into within and between social classes. Second, the temporal changes of inequality in housing access are first investigated. Third, both the roles of the underlying socioeconomic factors and their time variations are explored by the regression analyses. Forth, Oaxaca-Blinder decomposition reveals the contributions of the changes of the underlying socioeconomic factors and the changes of their returns in the changes of housing inequality.

Data and methodology

Data

Household-level micro data from two waves of the national population census (2000 and 2010) are applied in this study. The sample size and regional coverage of the census data make the representativeness self-evident. We select urban households with heads aged 18 or older, removing the outliers with housing areas of zero or greater than $500m^2$ and with a household size of zero or more than 20. Finally, valid samples for 2000 and 2010 are 118 253 and 191 366 households, respectively. The detailed information on housing and household characteristics and the time coverage make these datasets valuable for evaluating housing status in the first decade of the twenty-first century, during which profound changes took place in housing production and consumption in China. These databases were pooled and interaction terms between key variables and the year dummies (Hauser & Xie, 2005) were constructed when exploring the temporal changes of the impacts.

The variable list and their statistics are presented in Table 1. Overall, housing consumption in China improved significantly during 2000–2010. Per capita space increased by almost $10\,m^2$. For housing access, to distinguish between the sources of market and subsidized housing and to detect renting from owning, we classified housing access into four groups: rent public housing, rent market housing, own subsidized housing, own private housing.[3] With the further marketization of housing in urban China, owning private housing became the major form of housing, with 58.39 percent in this category in 2010. The percentage of renting public housing decreased dramatically, and correspondingly, renting market housing increased. The share of owning subsidized housing declined from 31.45 percent to 17.17 percent from 2000 to 2010.

Second, the four key socioeconomic factors are measured as categorical variables. We classify education into four categories, including 'Less than high school', 'High school', 'Some college' and 'College +'. The statistics in Table 1 show that the educational level improved greatly during the study period. For example, the proportion of head of households with a college or above degree almost doubled from 2000 to 2010. The occupation group is split into six categories: 'Manager/professional', 'Staff', 'Service', 'Operators', 'Agricultural and other laborers' and 'Other'. The shares of 'Manager/professional', 'Staff', 'Operators' and 'Other' remained unchanged. The share of the 'Service' group grew by 5 percent, while the share of 'Agricultural and other laborers' declined by a comparable number. The monopoly industries include energy, telecom, tobacco, railways, aviation, and entertainment media. The proportion of 'monopoly industry' decreased from 16.82 percent in 2000 to 9.26 percent in 2010. Migration status is constructed based on Hukou type and the separation of Hukou place and living place, divide into 'Local

Table 1. Variable list and statistics (mean/percentage) by year.

	2000		2010	
	Obs = 118,253		Obs = 191,366	
	Mean	S.D	Mean	S.D
Per capita housing space (m^2)	26.10	20.11	35.52	28.42
Housing access (%)				
Rent public housing	15.08	0.36	2.89	0.17
Rent market housing	6.41	0.24	21.55	0.41
Own subsidized housing	31.45	0.46	17.17	0.38
Own private housing	47.06	0.50	58.39	0.49
Education (%)				
Less than high school	63.92	0.48	60.60	0.49
High school	23.10	0.42	21.17	0.41
Some college	8.42	0.28	10.25	0.30
College+	4.57	0.21	7.98	0.27
Occupation (%)				
Manager, professional	13.63	0.34	12.18	0.33
Staff	7.26	0.26	6.90	0.25
Service	13.25	0.34	18.24	0.39
Operators	19.47	0.40	20.76	0.41
Agricultural and other laborers	17.43	0.38	12.57	0.33
Other	28.96	0.45	29.35	0.46
Monopoly industry (%)	16.82	0.37	9.26	0.29
Migration status (%)				
Local nonagricultural-Hukou residents	55.47	0.50	42.51	0.49
Urban migrants	10.23	0.30	13.55	0.34
Agricultural-Hukou residents	34.30	0.47	43.94	0.50
Household demographics and homeownership				
Homeownership rate (%)	78.51	0.41	75.56	0.43
Age of the head	45.08	14.05	46.28	14.81
Male head (%)	79.03	0.41	76.50	0.42
Number of children	1.05	0.91	0.84	0.88
Spouse's occupation (%)				
No spouse	19.93	0.40	28.66	0.45
Manager, professional	9.35	0.29	7.45	0.26
Staff	3.30	0.18	3.14	0.17
Service	10.67	0.31	12.88	0.33
Operators	9.39	0.29	8.06	0.27
Agricultural and other laborers	14.33	0.35	9.75	0.30
Other	33.04	0.47	30.06	0.46
City rank (%)				
Directly controlled municipalities, sub-provincial cities and specifically designated cities	23.84	0.43	25.55	0.44
Province capital cities	7.46	0.26	7.87	0.27
Provincial cities	68.70	0.46	66.57	0.47
Region (%)				
East	48.66	0.50	51.18	0.50
Central	29.03	0.45	26.85	0.44
West	22.31	0.42	21.97	0.41
City area (%)	65.28	0.48	63.21	0.48

nonagricultural-Hukou residents', 'Urban migrants' and 'Agricultural-Hukou residents'. Nonagricultural-Hukou households whose living place and Hukou place differed at the city level for at least six months are defined as 'Urban migrants', otherwise they are considered 'Local nonagricultural-Hukou residents'. For agricultural-Hukou households, due to data limitations, it is impossible to distinguish the rural migrants that are suffering severe housing poverty (Huang & Tao, 2015; Huang & Yi, 2015) from the agricultural-Hukou households.[4] 'Agricultural-Hukou residents' in this study are more likely those

who live in peri-urban areas and benefit from land acquisition because of the rapid urbanization process. The statistics show a growth in migration and a considerable proportion of agricultural-Hukou households in urban China.

The first group of control variables are demographic characteristics based on the head's personal information, including age, gender, and number of children. From 2000 to 2010, the average age of the head and the share of male heads were stable, and family size declined as the number of children decreased from 1.05 in 2000 to 0.84 in 2010. Spouse's occupation is defined in the same way, with occupational strata plus the additional category of single-headed households, which was only nearly 20 percent in 2000 but nearly 30 percent in 2010. City rank dummies, regional dummies, and a city area dummy are introduced to control the differences between administrative levels, across regions, and between city and town. There were only slight changes in the dummy statistics, suggesting a high representativeness of the sample.

Methodology

Two indices that are widely used to measure inequality, Theil's T statistic (T) and coefficient of variation (CV), are applied in this study. A larger T indicates larger inequality and a larger CV indicates a more dispersed distribution, thus larger inequality. While neither measure has a benchmark for acceptable level of inequality, we are more interested in changes over time and less concerned about the absolute level of inequality in each year. Moreover, Theil's T statistic is particularly effective in the analysis of grouped data, making it possible to decompose the overall inequality into within-group and between-group components.

The OLS model and multinomial logit model regress on per capita space and housing access, respectively. The two waves of data are first examined separately to verify the consistent impacts of the four key socioeconomic variables at the different points of time. Then, to reveal the temporal changes of these impacts, the two waves of data are pooled and the interaction terms between the four key socioeconomic variables and the year dummy are introduced into the models. The coefficients of the interactive terms reflect the differences in the impacts of the variables between years.

To further reveal the contributions of these variables in the changes of housing inequality, we apply the Oaxaca-Blinder decomposition method (Blinder, 1973; Oaxaca, 1973) to analyze the contribution of each factor in the difference regressions by yeear as follows[5]:

$$Y_i = X_i\hat{\beta},$$

where Y is a continuous variable (per capita housing space), X is a vector of explanatory variables and $\hat{\beta}$ is a vector of their coefficients. i = 2000′ or 2010. The difference in per capita housing space is decomposed as follows:

$$\begin{aligned} E\ (Y_{2010}) - E\ (Y_{2000}) = {} & E\ (X_{2010})'(\hat{\beta}_{2010} - \hat{\beta}_{2000}) + \\ & \left[E\ (X_{2010})' - E\ (X_{2000})'\right]\hat{\beta}_{2000} \end{aligned}$$

The left hand side of this expression denotes the difference in the group means of Y. The first term on the right hand side is the coefficient effect (the effect from changes in the returns to the characteristics of the households); the second term is the endowment effect (the effect from changes in the characteristics of the households). Then the proportions of the difference in per capita housing that are attributed to each explanatory variable is calculated. The decomposition exercise provides an intuitive illustration of the relative importance of the sources to the change in per capita housing space over time by distinguishing between changes in the characteristics of the households and changes in the returns to these characteristics (Tan *et al.*, 2016).

Empirical results and discussions

Temporal changes of inequality in per capita housing space

Per capita housing space increased dramatically during 2000-2010 in urban China for all social strata defined by the four key socioeconomic variables, as shown in Table 2. However, the increase rate varied across the social strata. Both per capita space and the rate of growth increased with educational level. The managers and professionals had the largest per capita space for both years and the group of other occupations enjoyed the highest increase rate. The households with heads working in the monopoly industries consumed more space and also increased faster than those in non-monopolistic industries. While the per capita space of local nonagricultural-Hukou households was the lowest in 2000, it grew faster than the others and surpassed the agricultural-Hukou residents in 2010.

The results of Theil's T statistics and CV are reported in Table 3. The increase in inequality was as striking as the improvement in housing space. First, both Theil's T statistic and CV show a clear rising trend in the housing inequality. T was 0.221 in 2000 and 0.246 in 2010, and CV was 0.77 in 2000 and 0.80 in 2010. Second, the decomposition of the Theil's T statistic suggests that both within-group and between-group inequality increased in almost all dimensions. Specifically, the within-group T-statistic by education increased from 0.220 in 2000 to 0.245 in 2010, by occupation increased from 0.218 in 2000 to 0.241 in 2010, by industry from 0.220 in 2000 to 0.245 in 2010, and by migration status from 0.220 in 2000 to 0.245 in 2010. The temporal changes of the between-group inequalities revealed by both T-statistics and CV presented similar trends, although they were less significant.

The results of the separate regressions on the data from the two years are reported in Table A1 and those of the pooled data are shown in Table 4. The key explanatory variables under exploration result in consistent impacts across the models, as shown in Table A1 and Table 4. Per capital housing space increased with the education of the head. For occupation, managers, professionals, staff, and service workers enjoyed larger per capita area than operators and agricultural and other laborers were less likely to have larger per capita area. As expected, employees in monopoly industries consumed larger per capita housing areas than those in non-monopoly industries. These results show how housing consumption differ across different social strata. Out of our expectation, both urban migrants and agricultural-Hukou residents had advantages in per capita housing space compared to nonagricultural-Hukou residents. This

abnormal result might relate to the composition of each group and deserves further study in future. The results of the control variables are not reported in these tables to save space, nevertheless, they are all consistent with our expectations[6].

Table 2. Per capita housing space by social strata (m^2).

	2000	2010	Change (%)
Education			
Less than high school	25.58	34.33	34.21
High school	25.82	34.99	35.52
Some college	28.80	39.20	36.11
College+	29.82	41.20	38.16
Occupation			
Manager, professional	29.15	39.77	36.43
Staff	27.79	38.76	39.47
Service	24.31	32.91	35.38
Operators	22.95	29.63	29.11
Agricultural and other laborers	26.89	37.44	39.23
Other	26.72	37.95	42.03
Monopoly industry			
Monopoly	28.12	40.58	44.31
Non-monopoly	25.70	35.00	36.19
Migration status			
Local nonagricultural-Hukou residents	25.01	36.43	45.66
Urban migrants	27.52	38.50	39.90
Agricultural-Hukou residents	27.45	33.71	22.81

Table 3. Inequality in per capita housing space by social strata.

	2000		2010	
	Theil	CV	Theil	CV
Whole sample	0.221	0.77	0.246	0.80
Education groups				
Less than high school	0.242	0.81	0.272	0.85
High school	0.202	0.73	0.225	0.77
Some college	0.157	0.64	0.185	0.68
College +	0.148	0.61	0.187	0.67
Within-group inequality	0.220		0.245	
Between-group inequality	0.001	0.07	0.002	0.08
Occupation groups				
Manager, professional	0.172	0.66	0.183	0.69
Staff	0.185	0.71	0.200	0.72
Service	0.248	0.82	0.265	0.88
Operators	0.219	0.76	0.288	0.83
Agricultural and other laborers	0.213	0.74	0.231	0.77
Other	0.240	0.83	0.241	0.79
Within-group inequality	0.218		0.241	
Between-group inequality	0.003	0.09	0.006	0.11
Monopoly industry				
Monopoly	0.165	0.65	0.175	0.67
Non-monopoly	0.233	0.80	0.254	0.81
Within-group inequality	0.220		0.245	
Between-group inequality	0.001	0.04	0.001	0.07
Migration status				
Local nonagricultural-Hukou residents	0.197	0.73	0.191	0.71
Urban migrants	0.209	0.74	0.209	0.72
Agricultural-Hukou residents	0.257	0.82	0.315	0.92
Within-group inequality	0.220		0.245	
Between-group inequality	0.001	0.04	0.001	0.05

Table 4. OLS model estimates of per capita housing space with interactions.

	Coef.	S.E
Education (Less than high school = reference)		
High school	1.64***	0.17
Some college	2.83***	0.28
College+	3.85***	0.36
Occupation (Operators = reference)		
Manager, professional	2.50***	0.27
Staff	1.87***	0.31
Service	1.12***	0.24
Agricultural and other laborers	−3.04***	0.25
Other	−1.72***	0.21
Monopoly industry	−0.22	0.23
Migration status (Local nonagricultural-Hukou residents = reference)		
Urban migrants	4.24***	0.22
Agricultural-Hukou residents	5.63***	0.18
Year (2000 = reference)	3.83***	0.23
Interactions		
2010*Education (Less than high school = reference)		
High school	−0.47*	0.22
Some college	0.74*	0.34
College+	1.87***	0.42
2010*Occupation (Operators = reference)		
Manager, professional	1.96***	0.34
Staff	1.49***	0.40
Service	1.53***	0.29
Agricultural and other laborers	3.46***	0.30
Other	2.99***	0.25
2010*Monopoly industry	2.17***	0.31
2010*Migration status (Local nonagricultural-Hukou residents = reference)		
Urban migrants	0.79**	0.28
Agricultural-Hukou residents	−0.17	0.22
Constant	−0.28	0.46
Household demographics and Homeownership	controlled	
Spouse's occupation	controlled	
City rank	controlled	
Region	controlled	
Place	controlled	
No. of observations	309619	
R2	0.25	

Most importantly, significant time variations emerged in these impacts, as shown by the significant coefficients of the interactive terms in Table 4. Taking education as an example, compared with 2000, while high school education no longer had an advantage in 2010, the advantages of college education were significantly improved suggested by the significant positive coefficients of the interactions between the 2010-year dummy with the 'Some college' and 'College +'. In other words, compared with 2000, the positive roles of college education in housing consumption became stronger in 2010. This suggests the returns to the education increased over time. The results of the interactions of occupational and industrial variables show the similar conclusion. The positive impacts of higher occupational status and monopoly industry were enhanced during the study period. While the priority in housing space of urban migrants was reinforced over time, that of agricultural-Hukou showed no significant change. These findings imply the changes in allocation mechanism with the transformation of housing system in urban China.

The results of the Oaxaca-Blinder decomposition are reported in Table 5. It shows that the changes in the returns of the socioeconomic factors are the main reasons for

Table 5. Oaxaca-Blinder type decomposition of per capita housing space between 2010 and 2000.

	Total	Endowment effect	%	Coefficient effect	%
Education (Less than high school = reference)					
High school	−1.93	−2.57	132.88	0.64	−32.88
Some college	17.97	4.54	25.26	13.43	74.74
College+	35.42	10.84	30.61	24.58	69.39
Occupation (Operators = reference)					
Manager, professional	7.23	−4.58	−63.35	11.81	163.35
Staff	3.17	−0.90	−28.24	4.07	128.24
Service	37.26	4.79	12.86	32.47	87.14
Agricultural and other laborers	3.32	4.96	149.17	−1.63	−49.17
Other	4.13	0.02	0.57	4.11	99.43
Monopoly industry	6.35	−3.10	−48.85	9.45	148.85
Migration status (Local nonagricultural-Hukou residents = reference)					
Urban migrants	49.96	10.13	20.27	39.84	79.73
Agricultural-Hukou residents	129.86	49.45	38.08	80.41	61.92
Total	292.75	73.59	25.14	219.16	74.86

the differences in housing space between 2000 and 2010. For example, among positive overall effect of 'Some college' on the difference in per capita housing area between 2000 and 2010, 25.26 percent attributed to the increase in 'Some college' between 2000 and 2010 and 74.74 percent attributed to the increase in the return to 'Some college' between these two years. In general, for education and migration variables, changes in these characteristics contributed less than one third of the changes in the inequality of per capita housing space. Although the contributions of changes in the occupation and industry variables even became negative, the overall effects were positive because of the big coefficient effects.

In sum, the results from Tables 2 and 3 reveal an increasing trend of inequality in per capita housing space. The results from Tables 4 and 5 provide the explanation. The educational and occupational ranks, industrial type, and migration status all affect the difference in housing consumption and these effects exhibit significant time-varying patterns. These results suggests that the market conditions and allocation mechanism changed a lot during the transitional period in urban China.

Temporal changes of inequality in housing access

Housing access shows an unequal pattern across social classes and a changing pattern over time, as demonstrated by Table A2 and Table 6 that report the housing access in 2000 and 2010 by social strata and the changes of it, respectively. People with higher education were more likely to rent public housing and own subsidized housing in 2000. 63.08 percent of households with college education or above owned subsidized housing in 2000, while the highest ratio of owning private housing were those with less than high school education (56.25 percent). This suggested a privilege of advantaged social groups in accessibility to public housing at the beginning of housing reform. In 2010, while the highest proportion of owning subsidized housing was those with some college education (23.87 percent), the supply of subsidized housing started to tilt toward the low-level education groups. The groups of 'Some college' and 'College +' witnessed the largest percentages decline in the proportions of owning subsidized housing (-30.40 percent% and −40.01 percent, respectively) and the

Table 6. Changes of housing access by social strata.

	Change (%)			
	Rent public housing	Rent market housing	Own subsidized housing	Own private housing
Education (%)				
Less than high school	−10.50	15.24	−9.18	4.44
High school	−15.59	15.92	−18.92	18.58
Some college	−14.62	14.12	−30.40	30.90
College+	−13.6	16.35	−40.01	37.27
Occupation (%)				
Manager, professional	−14.26	13.86	−27.87	28.27
Staff	−14.54	13.10	−27.46	28.89
Service	−13.53	19.32	−12.73	6.96
Operators	−13.41	23.43	−17.94	7.93
Agricultural and other laborers	−1.70	5.61	−1.68	−2.22
Other	−16.02	9.07	−11.31	18.25
Monopoly industry (%)				
Monopoly	−15.03	9.13	−26.99	32.89
Non-monopoly	−11.74	15.37	−10.99	7.37
Migration status (%)				
Local nonagricultural-Hukou residents	−16.21	26.84	−32.57	21.95
Urban migrants	−18.45	21.73	−34.22	30.93
Agricultural-Hukou residents	−2.73	9.26	13.88	−20.41

largest percentages increase in the owning private housing (30.90% and 37.27 percent, respectively). In other words, with the marketization of housing, the superior position of high education groups in the housing market had significantly improved.

The temporal changes of housing access by other three socioeconomic characteristics show similar patterns. The groups of 'Manager, professional' and 'Staff' witnessed the largest percentages decline in the proportions of owning subsidized housing (-27.87 percent and −27.46 percent, respectively) and the largest percentages increase in owning private housing (28.27 percent and 28.89 percent, respectively); from 2000 to 2010, households of 'service' and 'operators' had experienced a certain degree decrease in both rental public housing and owning subsidized housing, but the largest increase in renting market housing. This result reflects the worsening positions of the two groups in housing access; the changes for 'Agricultural and other laborers' and 'Other' were less evident than others and this was because the composition of these two groups were complex. In 2000, heads of households who were working in monopoly industries were more likely to own subsidized housing, while in 2010 they were more likely to own private housing. Households working in Non-monopoly industries experienced the biggest increase in renting market housing. Households of the local nonagricultural-Hukou residents were more likely to own subsidized housing but also witnessed substantial decline in owning subsidized housing. Households with agricultural-Hukou in urban areas were more likely to own private housing in both 2000 and 2010 and also witnessed largest increase in owning subsidized housing. The increased likelihood of access to

public housing for agricultural households may be due to rapid urban expansion, and they were more likely to be resettled.

The results of the multi-nomial logit (MNL) models on the data of the two separate years and on the pooled data are reported in Table A3 and Table 7, respectively. In general, the results reveal evident inequalities in housing access and significant temporal changes in the effects of the underlying driving forces, with some major points of interest. First, highly educated households were more likely to rent public housing and own subsidized housing, but less likely to rent market housing. Second, compared with all of the other occupations, operators were least likely to own private housing; managers and professionals were least likely to rent public housing, staff were least likely to rent market housing, and agricultural and other laborers were least likely to own subsidized housing. Third, those working in monopoly industries were more likely to rent public housing and own subsidized housing, but are less likely to rent market housing. Last but not the least, urban migrants and agricultural-Hukou residents were less likely to rent public housing and own subsidized housing but more likely to rent market housing.

Similar to the results of the time-varying roles of the household characteristics in housing area, the time variations of the roles of these factors in housing access are notable too, as shown by the significant coefficients of the interactive terms. Specifically, the higher the educational level of the head, the higher probability of renting public housing and owning subsidized housing; however, this pattern weakened significantly from 2000 to 2010. The higher the educational level, the lower the probability of renting market housing; this pattern enhanced during the same period. Besides operators, all other occupations were less likely to rent public housing, rent market housing, or own subsidized housing, and this trend reinforced over time. In other words, compared to operators, the likelihood of all other occupations to own private housing has increased from 2000 to 2010. Households whose head worked in monopoly industries were more likely to rent public housing and own subsidized housing, and these patterns weakened over time. Again, these findings shows the supply of subsidized housing started to tilt toward the disadvantaged groups; however the privilege of advantaged social groups in accessibility to public housing persisted.

The accessibility of public rental housing increased for urban migrants as well as agricultural-Hukou residents. At the same time, accessibility to subsidized ownership housing decreased for urban migrants but increased for agricultural-Hukou residents. This is understandable considering the agricultural-Hukou residents in this study mainly refer to farmers in the suburbs, who are more likely to benefit from urban expansion. These results suggest that the allocation of public housing started to cover other households besides local urban residents, although the local Hukou was still a crucial barrier to owning subsidized housing.

In sum, better education and privileged positions in certain industry types make households more likely to own subsidized housing. This trend weakened between 2000 and 2010. Having a high occupation rank reduced the possibility of renting public housing and owning subsidized housing. This trend was reinforced during the study period. Local nonagricultural-Hukou residents were more likely to access both types of public housing, and the likelihood of renting public housing increased for

Table 7. Multinomial logit model estimates of housing access with interactions (Own private housing = reference).

	Rent public housing		Rent market housing		Own subsidized housing	
	Coef.	S.E	Coef.	S.E	Coef.	S.E
Education (Less than high school = reference)						
High school	0.04	0.02	−0.23***	0.04	0.46***	0.02
Some college	−0.03	0.04	−0.28***	0.07	0.70***	0.03
College+	0.13*	0.06	−0.36***	0.11	1.02***	0.04
Occupation (Operators = reference)						
Manager, professional	−0.26***	0.04	−0.25***	0.06	−0.37***	0.03
Staff	−0.24***	0.04	−0.59***	0.08	−0.23***	0.04
Service	−0.10**	0.03	0.38***	0.04	−0.34***	0.03
Agricultural and other laborers	−1.18***	0.05	−1.38***	0.05	−0.97***	0.04
Other	−0.07*	0.03	−0.36***	0.04	−0.26***	0.03
Monopoly industry	0.10**	0.03	−0.33***	0.06	0.36***	0.03
Migration status (Local nonagricultural-Hukou residents = reference)						
Urban migrants	−0.20***	0.03	1.38***	0.05	−0.49***	0.03
Agricultural-Hukou residents	−1.68***	0.03	1.16***	0.04	−2.72***	0.03
Year (2000 = reference)	−2.72***	0.05	0.83***	0.05	−0.24***	0.03
Interactions						
2010*Education (Less than high school = reference)						
High school	−0.26***	0.04	−0.14**	0.04	−0.29***	0.03
Some college	−0.59***	0.07	−0.53***	0.08	−0.60***	0.04
College+	−0.65***	0.08	−0.48***	0.11	−0.97***	0.05
2010*Occupation (Operators = reference)						
Manager, professional	−0.23***	0.07	−0.04	0.07	−0.06	0.04
Staff	−0.19*	0.08	0.25**	0.09	−0.09	0.05
Service	−0.17***	0.05	−0.38***	0.04	−0.17***	0.04
Agricultural and other laborers	−0.06	0.08	0.23***	0.06	0.22***	0.06
Other	−0.54***	0.05	0.02	0.05	0.19***	0.03

(*continued*)

Table 7. Continued.

	Rent public housing		Rent market housing		Own subsidized housing	
	Coef.	S.E	Coef.	S.E	Coef.	S.E
2010*Monopoly industry	−0.51***	0.07	0.01	0.07	−0.24***	0.04
2010*Migration status (Local nonagricultural-Hukou residents = reference)						
Urban migrants	0.64***	0.05	−0.42***	0.05	−0.27***	0.03
Agricultural-Hukou residents	2.62***	0.05	0.32***	0.04	0.47***	0.04
Constant	2.75	0.08	1.53	0.07	−1.81	0.07
Household demographics and Homeownership			controlled			
Spouse's occupation			controlled			
City rank			controlled			
Region			controlled			
Place			controlled			
No. of observations			309619			
R2			0.30			
Log pseudo-likelihood			−251835.76			

urban migrants and agricultural-Hukou residents. The trend of owing subsidized housing increased for agricultural-Hukou residents. The findings discussed above provide supporting evidence for a reform of public housing in urban China with more stringent allocation mechanism making the state-subsidized housing to accommodate households that have difficulties in buying or renting market-channeled housing.

Conclusion

This research aimed to reveal the temporal changes of housing inequality in per capita housing space and housing access in China, both within and between social groups, and to investigate the temporal changes in the underlying forces of housing inequality. By decomposing housing inequality, it is found that inequality both within and between social classes increased during the first decade of the new century. Education, occupation, migration status, and monopoly industry all contributed to increased housing inequality and there were significant temporal changes in the roles of these factors. Both changes in the household socioeconomic characteristics and changes in the returns of these characteristics contribute to the differences between 2000 and 2010, and the latter is the primary reason.

This study contributes to the existing literature in several ways. First, we provide multi-dimensional examinations about temporal changes of housing inequality, per capita housing space, and housing access, within and between social groups. Second, for the underlying socioeconomic factors, besides educational, occupational and migrating differences, a fourth factor of monopoly industry is explored to expand the empirical evidence about the importance of work unit type. Third, the regressive analyses and Oaxaca-Blinder decomposition not only reveal the impact of underlying socioeconomic factors over time, but also reveal the relative power of the changes in market conditions and the changes in the allocation mechanism in housing inequality between 2000 and 2010; both have changed dramatically during the transitional period in urban China.

Empirically, findings about the temporal changes in housing inequality are of great importance to understanding social stratification in urban China. The findings of this study imply that households at the higher social positions had greater housing consumption and better access to housing during the first decade of the twenty-first century, although the trend weakened for some. This led to the increasing housing stratification that worsening the problem of social stratification since housing is the superior indicator, even more than income, in representing socioeconomic attainment in China (Song & Xie, 2014; Walder & He, 2014). Second, the underlying factors of housing inequality and the temporal changes of their roles revealed in this study shed lights on the potential policies to reduce housing inequality. For example, the results suggest that with the development of the private housing market, weak position in education and occupation is the increasingly significant cause of housing difficulties. Public housing aims to solve the housing problems of vulnerable groups, and this is particularly true for the recent aggressive public housing plan in China (Chen *et al.*, 2017). Therefore, in addition to the income and Hukou status, the criteria of the allocation of the public housing could be enriched to incorporate the education and occupation.

Notes

1. See Chen *et al.* (2014) for a detailed introduction of the category and allocation rules of Chinese public housing.
2. First, the party membership is excluded because the census data have no information about it. Second, the type of work unit is defined as whether the work unit belongs to the monopoly industry in China other than whether public sector. This is because there is simply no information about the household's head work on private or public sector in the census data. However, the three-digit industry code provided enable us to identify whether the work unit belongs to the monopoly industry which mostly are state-owned enterprises (SOE) and closely connected to the public sector.
3. Housing access was defined from the question about housing sources. However, the answer menu of housing sources was inconsistent in the two waves of censuses. To make the definition consistent across different census years, the various housing sources were grouped into four categories by housing tenure (own versus rent) and whether received subsidize from the state.
4. There are two main reasons for the difficulty to define rural migrants in this study. First, the sample of urban households in this study are selected base on whether the living place is the 'urban' region in where the land is state owned. The households in urban villages, the gathering place of rural migrants, are excluded from the sample. Second, there are the differences in the questionnaires about migration behavior between the two waves of the census. The criterion to define 'urban migrants' which is households whose living place and Hukou place differed at the city level for at least six months is not applicable for rural migrants.
5. The Oaxaca-Blinder decomposition method was originally designed to decompose a linear regression with a continuous dependent variable and was extended to apply to the logit and probit models by Fairlie (2005). Currently this method still does not apply to the multinomial logit model.
6. The full results are available by approaching any of the authors.

Funding

This work was supported by the National Social Science Foundation of China under Grant number 16BRK023; and the Fundamental Research Funds for the Central Universities under Grant number GL18012.

Note on contributors

Yourong Wang is an Associate Professor in the Department of Urban and Real Estate Management at the School of Management Science and Engineering, Central University of Finance and Economics. Her research currently focuses on real estate finance and investment, urban development, housing economics, social housing and policy.

Jianyu Ren is a PhD Candidate in the Department of Urban and Real Estate Management at the School of Management Science and Engineering, Central University of Finance and Economics. Her research currently focuses on housing market and policy, population aging and housing

Chengdong Yi is a Professor in the Department of Urban and Real Estate Management at the School of Management Science and Engineering, Central University of Finance and Economics. His research currently focuses on real estate market and policy, real estate finance and asset securitization, urbanization and urban-rural development in China.

Youqin Huang is a Professor in the Department of Geography and Planning and a research fellow at the Center for Social and Demographic Analysis, and a Research Professor at

Confucius Institute for China's Culture and Economy, State University of New York at Albany, USA. Her research currently focuses on low-income housing, housing inequality, housing policy, population migration, urbanization and institutional transformation in China.

Xiulian Ma is an associate Professor in Chinese Academy of Governance. Her research currently focuses on urban development and governance, housing policy, affordable housing, social governance and social organization.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Ben-Shahar, D. & Warszawski, J. (2016) Inequality in housing affordability: Measurement and estimation, *Urban Studies*, 53, pp. 1178–1202.

Bian, Y. & Liu, Y. (2005) Social stratification, home ownership, and quality of living: Evidence from China's fifth census, *Sociological Studies*, 3, pp. 86–98. (In Chinese).

Bian, Y. & Logan, J. R. (1996) Market transition and the persistence of power: The changing stratification system in urban China, *American Sociological Review*, 61, pp. 739–758.

Bian, Y. & Lu, C. (2014) *Urban-Rural Housing Inequality in Transitional China. Analysing China's Population* (Netherlands: Springer Press).

Blinder, A. S. (1973) Wage discrimination: Reduced form and structural estimates, *The Journal of Human Resources*, 8, pp. 436–455.

Chen, J. & Han, X. (2014) The evolution of the housing market and its socioeconomic impacts in the post-reform People's Republic of China: A survey of the literature, *Journal of Economic Surveys*, 28, pp. 652–670.

Chen, J., Hao, Q. & Stephens, M. (2010) Assessing housing affordability in post reform China: A case study of Shanghai, *Housing Studies*, 25, pp. 877–901.

Chen, J., Yang, Z. & Wang, Y. (2014) The new Chinese model of public housing: A step forward or backward?, *Housing Studies*, 29, pp. 534–550.

Chen, J., Yao, L. & Wang, H. (2017) Development of public housing in post-reform China, *China & World Economy*, 25, pp. 60–77.

Christophers, B. & O'Sullivan, D. (2019) Intersections of inequality in homeownership in Sweden, *Housing Studies*, 34, pp. 897–924.

DeSilva, S. & Elmelech, Y. (2012) Housing inequality in the United States: Explaining the white-minority disparities in homeownership, *Housing Studies*, 27, pp. 1–26.

Flippen, C. A. (2001) Racial and ethnic inequality in homeownership and housing equity, *The Sociological Quarterly*, 42, pp. 121–149.

Forrest, R. & Hirayama, Y. (2018) Late home ownership and social re-stratification, *Economy and Society*, 47, pp. 257–279.

Fuller, G. W., Johnston, A. & Regan, A. (2020) Housing prices and wealth inequality in Western Europe, *West European Politics*, 43, pp. 297–320.

Glaeser, E., Huang, W., Ma, Y. & Shleifer, A. (2017) A real estate boom with Chinese characteristics, *Journal of Economic Perspectives*, 31, pp. 93–116.

Gough, K. V. & Tran, H. A. (2009) Changing housing policy in Vietnam: Emerging inequalities in a residential area of Hanoi, *Cities*, 26, pp. 175–186.

Hansen, J., Formby, J. P. & Smith, W. J. (1994) The measurement and trend of housing inequality in the United State, 1978-85, *Applied Economics*, 26, pp. 1021–1028.

Hauser, S. M. & Xie, Y. (2005) Temporal and regional variation in earnings inequality: Urban China in transition between 1988 and 1995, *Social Science Research*, 34, pp. 44–79.

Hu, R. (2012) Housing inequality during the market transition: Evidence from the data of CGSS2006, *Society*, 32, pp. 126–151. (In Chinese).
Huang, Y. (2003) A room of one's own: Housing consumption and residential crowding in transitional urban China, *Environment and Planning A: Economy and Space*, 35, pp. 591–614.
Huang, Y. & Clark, W. A. V. (2002) Housing tenure choice in transitional urban China: A multilevel analysis, *Urban Studies*, 39, pp. 7–32.
Huang, Y. & Jiang, L. (2009) Housing inequality in transitional Beijing, *International Journal of Urban and Regional Research*, 33, pp. 936–956.
Huang, Y. & Tao, R. (2015) Housing migrants in Chinese cities: Current status and policy design, *Environment and Planning C: Government and Policy*, 33, pp. 640–660.
Huang, Y. & Yi, C. (2011) Second home ownership in transitional urban China, *Housing Studies*, 26, pp. 423–425.
Huang, Y. & Yi, C. (2015) Invisible migrant enclaves in Chinese cities: Underground living in Beijing, China. *Urban Studies*, 52, pp. 2948–2973.
Krivo, L. J. & Kaufman, R. L. (2004) Housing and wealth inequality: Racial-ethnic differences in home equity in the United States, *Demography*, 41, pp. 585–605.
Levin, E. & Pryce, G. (2008) *Measuring Housing Wealth Inequality* (London: Department of Communities and Local Government). (forthcoming).
Liu, Z. & Hu, R. (2010) Urban housing stratification: An analysis based on CGSS2006 data, *Society*, 30, pp. 164–192. (In Chinese).
Li, Z. & Wu, F. (2006) Socio-spatial differentiation and residential inequalities in Shanghai: A case study of three neighbourhoods, *Housing Studies*, 21, pp. 695–717.
Li, S. & Yi, Z. (2007) The road to homeownership under market transition Beijing, 1980-2001, *Urban Affairs Review*, 42, pp. 342–368.
Logan, J., Bian, Y. & Bian, F. (1999) Housing inequality in urban China in the 1990s, *International Journal of Urban and Regional Research*, 23, pp. 7–25.
Logan, J. R., Fang, Y. & Zhang, Z. (2009) Access to housing in urban China, *International Journal of Urban and Regional Research*, 33, pp. 914–935.
Logan, J. R., Fang, Y. & Zhang, Z. (2010) The winners in China's urban housing reform, *Housing Studies*, 25, pp. 101–117.
Luo, C. (2013) Changes of housing inequality of urban residents, *Journal of Population Science*, 33, pp. 14–25. (In Chinese).
Lux, M., Sunega, P. & Katrnak, T. (2013) Classes and castles: impact of social stratification on housing inequality in post-socialist states, *European Sociological Review*, 29, pp. 274–288.
Nee, V. (1989) A theory of market transition: From redistribution to markets in state socialism, *American Sociological Review*, 54, pp. 663–681.
Nee, V. & Cao, Y. (1999) Path dependent societal transformation: Stratification in hybrid mixed economies, *Theory & Society*, 28, pp. 799–834.
Oaxaca, R. L. (1973) Male-female wage differentials in urban labour markets, *International Economic Review*, 14, pp. 693–709.
Sato, H. (2006) Housing inequality and housing poverty in urban China in the late 1990s, *China Economic Review*, 17, pp. 37–50.
Song, X. & Xie, Y. (2014) Market transition theory revisited: Changing regimes of housing inequality in China, 1988-2002, *Sociological Science*, 1, pp. 277–291.
Tan, S., Wang, S. & Cheng, C. (2016) Change of housing inequality in urban China and its decomposition: 1989–2011, *Social Indicators Research*, 129, pp. 29–17.
Tunstall, B. (2015) Relative housing space inequality in England and Wales, and its recent rapid resurgence, *International Journal of Housing Policy*, 15, pp. 105–126.
Walder, A. G. & He, X. (2014) Public housing into private assets: Wealth creation in urban China, *Social Science Research*, 46, pp. 85–99.
Wang, Y. (2000) Housing reform and its impacts on the urban poor in China, *Housing Studies*, 15, pp. 845–864.

Wang, Y., Li, Y., Huang, Y., Yi, C. & Ren, J. (2020) Housing wealth inequality in China: An urban-rural comparison, *Cities*, 96, pp. 102428.
Wang, Y., Wang, Y. & Bramley, G. (2005) Chinese housing reform in state-owned enterprises and its impacts on different social groups, *Urban Studies*, 42, pp. 1859–1878.
Wang, Y., Wang, Y. & Wu, J. (2010) Housing for migrant workers in China: A study of the Chinese model in Shenzhen, *Housing Studies*, 25, pp. 83–100.
Wang, L., Yuan, P. F. & Wang, K. (2016) What influence China urban households' house property?-Revealing the difference among different wealth classes, *Statistical Research*, 33, pp. 44–57. (In Chinese).
Wu, J., Joseph, G. & Deng, Y. (2012) Evaluating conditions in major Chinese housing markets, *Regional Science and Urban Economics*, 42, pp. 531–543.
Yang, Z. & Chen, J. (2014) *Housing Affordability and Housing Policy in Urban China* (Berlin: Springer Press).
Yi, C. & Huang, Y. (2014) Housing consumption and housing inequality in Chinese cities during the first decade of the twenty-first century, *Housing Studies*, 29, pp. 291–311.
Yi, C., Li, Y., Wang, Y. & Wan, H. (2020) Social class and housing wealth inequality in transitional urban China, *International Journal of Urban Science*, doi: 10.1080/12265934.2020.1713860
Yuan, P. & Wang, L. (2013) Decomposition analysis on distribution of housing wealth inequality among China's urban households and contribution rate, *Statistical Research*, 30, pp. 69–76. (In Chinese).
Zavisca, J. R. & Gerber, T. P. (2016) The socioeconomic, demographic, and political effects of housing in comparative perspective, *Annual Review of Sociology*, 42, pp. 347–367.
Zhao, W. & Ge, J. (2014) Dual institutional structure and housing inequality in transitional urban China, *Research in Social Stratification and Mobility*, 37, pp. 23–41.
Zhou, M. & Logan, J. R. (1996) Market transition and the commodification of housing in urban China, *International Journal of Urban and Regional Research*, 20, pp. 400–421.

Appendix

Table A1. OLS model estimates of per capita housing space by year.

	2000		2010	
	Coef.	S.E	Coef.	S.E
Education (Less than high school = reference)				
High school	1.33***	0.14	1.36***	0.15
Some college	2.48***	0.23	3.79***	0.22
College+	3.18***	0.29	6.26***	0.26
Occupation (Operators = reference)				
Manager, professional	3.16***	0.22	4.13***	0.24
Staff	2.49***	0.25	3.08***	0.28
Service	0.96***	0.19	2.74***	0.19
Agricultural and other laborers	−1.02***	0.21	−1.15***	0.25
Other	0.06	0.19	0.20	0.21
Monopoly industry	0.41*	0.41	1.43***	0.23
Migration status (Local nonagricultural-Hukou residents = reference)				
Urban migrants	3.05***	0.18	5.99***	0.18
Agricultural-Hukou residents	5.13***	0.15	6.96***	0.16
Constant	10.52***	0.59	−1.87**	0.61
Household demographics and Homeownership	Controlled			
Spouse's occupation	Controlled			
City rank	Controlled			
Region	Controlled			
Place	Controlled			
No. of observations	118253		191366	
R2	0.23		0.24	

Table A2. Housing access by social strata.

	2000				2010			
	Rent public housing	Rent market housing	Own subsidized housing	Own private housing	Rent public housing	Rent market housing	Own subsidized housing	Own private housing
Education (%)								
Less than high school	13.59	7.51	22.65	56.25	3.09	22.75	13.47	60.69
High school	18.39	5.33	41.21	35.08	2.80	21.25	22.29	53.66
Some college	16.77	3.23	54.27	25.74	2.15	17.35	23.87	56.64
College+	16.18	2.31	63.08	18.42	2.58	18.66	23.07	55.69
Occupation (%)								
Manager, professional	16.6	3.55	46.86	32.99	2.34	17.41	18.99	61.26
Staff	16.78	2.6	50.08	30.55	2.24	15.70	22.62	59.44
Service	17.33	17.07	22.5	43.09	3.8	36.39	9.77	50.05
Operators	17.85	10.02	30.79	41.34	4.44	33.45	12.85	49.27
Agricultural and other laborers	3.05	2.82	4.65	89.47	1.35	8.43	2.97	87.25
Other	18.29	3.56	40.18	37.97	2.27	12.63	28.87	56.22
Monopoly industry (%)								
Monopoly	16.66	2.49	51.29	29.56	1.63	11.62	24.3	62.45
Non-monopoly	14.76	7.2	27.43	50.6	3.02	22.57	16.44	57.97
Migration status (%)								
Local nonagricultural-Hukou residents	19.58	1.76	47.99	30.67	3.37	28.60	15.42	52.62
Urban migrants	22.39	11.89	36.15	29.58	3.94	33.62	1.93	60.51
Agricultural-Hukou residents	5.62	12.29	3.29	78.80	2.89	21.55	17.17	58.39

Table A3. Multinomial logit model estimates of housing access by year (Own private housing = reference).

	2000						2010					
	Rent public housing		Rent market housing		Own subsidized housing		Rent public housing		Rent market housing		Own subsidized housing	
	Coef.	S.E	Coef.	S.E	Coef.	S.E	Coef.	S.E	Coef.	S.E	Coef.	S.E
Education (Less than high school = reference)												
High school	0.08**	0.02	−0.24***	0.04	0.42***	0.02	−0.39***	0.04	−0.37***	0.02	0.21***	0.02
Some college	0.02	0.04	−0.26***	0.07	0.66***	0.03	−0.92***	0.06	−0.84***	0.03	0.16***	0.02
College+	0.16**	0.06	−0.26*	0.11	0.97***	0.04	−0.87***	0.07	−0.89***	0.03	0.13***	0.03
Occupation (Operators = reference)												
Manager, professional	−0.31***	0.04	−0.23***	0.06	−0.38***	0.03	−0.30***	0.06	−0.28***	0.03	−0.43***	0.03
Staff	−0.29***	0.04	−0.53***	0.08	−0.23***	0.04	−0.25***	0.07	−0.34***	0.04	−0.34***	0.03
Service	−0.13***	0.03	0.35***	0.04	−0.35***	0.03	−0.21***	0.04	0.02	0.02	−0.51***	0.03
Agricultural and other laborers	−1.20***	0.05	−1.31***	0.05	−0.95***	0.04	−1.11***	0.07	−1.16***	0.03	−0.79***	0.05
Other	−0.15***	0.03	−0.24***	0.05	−0.11***	0.03	−0.22***	0.05	−0.35***	0.03	−0.20***	0.03
Monopoly industry	0.10**	0.03	−0.39***	0.06	0.36***	0.03	−0.37***	0.07	−0.30***	0.03	0.13***	0.02
Migration status (Local nonagricultural-Hukou residents = reference)												
Urban migrants	−0.17***	0.03	1.44***	0.05	−0.50***	0.03	0.40***	0.05	0.95***	0.02	−0.76***	0.02
Agricultural-Hukou residents	−1.63***	0.03	1.21***	0.04	−2.71***	0.03	0.77***	0.04	1.49***	0.02	−2.26***	0.03
Constant	1.80***	0.10	0.99***	0.15	−2.25***	0.10	1.05***	0.14	2.55***	0.08	−3.01***	0.09
Household demographics and Homeownership	controlled											
Spouse's occupation	controlled											
City rank	controlled											
Region	controlled											
Place	controlled											
No. of observations	118253						191366					
R2	0.26						0.27					
Log pseudo-likelihood	−103745.20						−146919.99					