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Housing inequalities under market deepening: the case of Guangzhou, China

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Abstract. Escalating housing prices in China's major metropolises have brought widespread discontents. There is a general impression that housing inequality is rising, and that housing has become increasingly out of reach of ordinary households. Yet, much of the literature on urban housing in China is based on data generated in the early reform period. Very little has been written about what has happened since the 1998 housing reform when both the production and the consumption of housing became primarily market based. The present paper aims to address this deficiency with reference to surveys conducted in Guangzhou in 1996, 2001, and 2005. Quality-adjusted inequality indices including the Gini coefficient and the Theil index are computed to compare housing inequality before and after the ending of welfare allocation of housing at the turn of the century. Quite unexpectedly, the results show only a modest increase in inequality in housing consumption.

Keywords: marketization, housing allocation, inequality indices, Guangzhou

1 Introduction

The question of the 'right to the city' in China, the subject of this theme issue, is often approached from the perspective of differential citizenship resulting from the household registration or *hukou* system, which systematically discriminates against migrants from rural areas (Chan, 2010; Li et al, 2010). Yet hukou is just one of the many factors governing the 'right to the city'. In most countries finding a shelter probably is the most overriding concern for prospective urbanites. In China, access to urban housing used to be intimately tied to hukou status. With wholesale privatization of public sector housing and the emphasis on commodity housing construction since the late 1990s (Li and Yi, 2007a), the lack of local hukou is of less significance in constraining the city seeker's housing choice set. Instead, it is the difficulty of finding affordable housing that is the major concern. Indeed, this problem is not restricted to urban-bound migrants. People with the proper hukou are also confronted with escalating housing costs and the risk of being driven out of the city by redevelopment programmes.

Today, widespread discontents exist especially among people who were not able to benefit from the discounted home sales under the housing reforms of the 1990s. These people include mainly the urban poor (Wang, 2004), migrants without the proper hukou in the city (W-P Wu, 2004), and young entrants to the job market. While luxurious apartments and gated villa communities proliferate both in the central city and in the suburbs (Huang, 2005), to many newcomers finding a place to live in the city is not an easy proposition. The Chinese government is not unaware of the discontents. In recent years repeated attempts have been made to cool down the property market.

A firm grasp of the actual situation is a prerequisite to formulating appropriate policies. Published data show consistent impressive improvements in housing conditions. Per capita living space jumped from 3.8 m^2 in 1978 to 27.1 m^2 in 2006, despite the tripling of the urban population since the launching of the reform in 1978 (Chow and Niu, 2010, page 48; Li and Li, 2008, page 384). The quality of the housing stock has shown equally impressive gains;

most new housing estates are equipped with landscaped gardens and sports facilities. While homeownership was practically nonexistent in early reform times, a national household survey showed that the urban homeownership rate reached 84.3% in 2010 (Man et al, 2010, page 8). Even though the survey did not include migrant villages on former urban–rural fringes, the urban homeownership rate revealed is still high by international standards (Li and Yi, 2007b). Apparently, the widespread discontents are incongruent with objective data. Rather than signalling deterioration in housing conditions, the discontents perhaps reflect perceived or actual increase in housing inequality.

To date, much of the literature on housing consumption and housing inequalities in Chinese cities is based on data generated in the early reform period, when housing commodification was largely restricted to the supply side (Li, 2000a). At that time the main purchasers of housing built by the newly established developing companies were state work units or *danwei*, which would then allocate the commodity housing units they purchased to the workers according to established guidelines (Huang and Clark, 2002; Li, 2000a; 2000b; Logan and Bian, 1993; Logan et al, 1999). Very little has been written on what has happened since the 1998 housing reform, which pronounced the end of the welfare allocation of housing in China. Two recent works, Huang and Jiang (2009) and Logan et al (2010), make use of the 2000 Population Census microdata. But most cities did not implement the 1998 reform measures until a year or two later. It is unlikely that the 2000 Population Census would reflect the more recent situations when both the production and the consumption of housing have become primarily market based.

In comparison with the meticulous works on China's income inequality as gauged by commonly employed inequality measures such as the Gini coefficient and the Theil entropy measure (Khan and Riskin, 2001; 2005; Sylvie et al, 2006), with respect to housing inequality little attempt has been made to estimate these comprehensive measures regardless of their intuitive appeal. Most studies cited above either frame their analysis by describing variations in floor space consumed (Li, 2000a), or variations in selected housing attributes (Logan et al, 1999). Huang and Jiang (2009) employ the Theil index separately for floor space per capita and a facility index, without providing a more integrative treatment.

In this paper I try to address this deficiency by analyzing survey data collected in Guangzhou in 1996, 2001, and 2005. More specifically, I compute the above-mentioned inequality indices to gauge the variations in housing consumption and reveal the extent to which housing inequality has increased over time. The Gini coefficient is a more common measure and has the intuitive appeal of falling within the 0 (absolute equality) and 1 (absolute inequality) range; whereas the Theil index is additive–decomposable, thus enabling the assessment of the respective contributions of within-group and between-group variations to the overall inequality.

The rest of the paper is organized as follows. In section 2 I describe in detail the methodology and datasets employed. The main empirical findings are given in sections 3 and 4. Section 5 summarizes and concludes the study.

2 Methodology and data

2.1 Methodology

Unlike income, housing is multidimensional with varying quality: large or small, old or new, low-rise or high-rise, well or poorly fitted kitchens, number of rooms within the dwelling, standalone building or in a large estate, etc. Because of this, arriving at a comprehensive housing inequality index is not straightforward. Li (2000a) used floor space as a measure of housing consumption. But obviously this did not take into consideration variations in housing quality. Logan et al (1999) assigned weights to selected housing attributes. However, the weights were arbitrary and based largely on convenience.

Most economic studies on housing demand invoke the concepts of 'standardized housing units' and 'housing service'. The latter refers to the stream of service yielded by a dwelling over a period of time. At any given point in time and controlling for location, competitive equilibrium ensures that there exists a single price for housing service. Let p be the price per unit of service, h be the amount of housing service yielded by the dwelling, and Y be the market value of the dwelling. By definition,

$$Y = ph \ .$$

As p is constant, how much h a dwelling emits is proportional to Y; that is, its market value (Olsen, 1987).

Hedonic theory (Rosen, 1974) demonstrates that this value or price can be decomposed into the price of its constituent components, variously termed hedonic or attribute price. Also, location variation in price as given by the standard economic model of urban spatial structure is a result of market clearance, reflecting both the preference for specific locations and their relative scarcities (Olsen, 1987). The typical approach to reveal the price of individual housing attributes is to regress the observed dwelling value on such variables as location, type of housing, size and age of the dwelling, and ethnic composition and other neighbourhood attributes. Different functional forms have been tried, but the simple additive function seems to be as good as any other (Linneman, 1980).

In China, where the housing market remains highly segmented, it is difficult to envisage the presence of a unified market clearing price. In particular, for reform housing, or housing sold to sitting tenants by work units under the reform, and the remaining stock of rental housing provided by work units and the municipal government, the observed dwelling value cannot be used as a measure of housing service. However, it may be argued that in the commodity sector, housing price is determined primarily by supply and demand. Regression, based on observations only in this sector, yields estimates of the price of individual housing attributes. For dwellings in nonmarket sectors, the amount of housing service that a dwelling emits can be obtained by inserting the respective attribute values in the estimated equation.

More specifically, let Y_i be the value or price of dwelling i and $\hat{Y}_i$ be the predicted value of i based on the estimated equation, $i = 1, \ldots, n$, where n is the number of observations. The vector of housing attributes, including dwelling location, is given by $\boldsymbol{X}_i$. For simplicity, suppose that there are only two housing sectors, commodity and noncommodity.[(1)] Let n_1 be the number of observations in the commodity sector, and n_2 be the number in the noncommodity sector. Clearly, $n = n_1 + n_2$.

The procedure for computation is as follows. First, regress Y on $\boldsymbol{X}$, using the n_1 subsample. Then, compute $\hat{Y}_i$ using the estimated regression equation for all observations in the sample; that is, for $i = 1, \ldots, n$. Third, compute the given inequality index using $\hat{Y}_i$, $i = 1, \ldots, n$. The purpose of using the predicted instead of observed values also in the commodity subsample is to minimize the effect due to random fluctuations, which arise from, inter alia, the fact that the home price data are self-reported figures rather than actual transaction records.

The Theil entropy index belongs to a family of additive–decomposable indices and has been widely employed to gauge how much the overall inequality is due to variations within population groups and how much to variations between groups (Conceição and Ferreira, 2000; Shorrocks, 1980). Stratify the sample by housing types or population groups and decompose the Theil index of inequality accordingly. This allows the assessment of the relative contributions of intrasector and between-sector or group variations in housing consumption.

[(1)] Extending this to k sectors, where k is any integer, is straightforward.

2.2 Data

With the assistance of the Centre of Urban and Regional Studies at Sun Yat-sen University, I conducted a series of large-scale household surveys to unravel the housing conditions of households in Guangzhou under the reforms.

The first survey was undertaken in 1996, with a target sample of 1000 households or, equivalently, housing units. This survey covered only newly constructed commodity housing or housing put up for sale by developers at market price. In Guangzhou, supply-side commodification was well under way. Yet the main buyers of commodity housing then were individual *danwei*, which would allocate the housing units they bought to their workers according to factors such as seniority in the workplace, whether both spouses work in the same danwei, occupational rank, and membership and position in the Chinese Communist Party (Li, 2000a; Logan et al, 1999).

In the sample only 25% of the housing units were purchased or rented directly in the open market. The rest was subsidized housing, including housing provided to households affected by redevelopment programmes as compensation. To a certain extent, the sample represented a snapshot of the distribution of housing units across different housing types in Guangzhou at that time. Nonetheless, caution has to be exercised in interpreting the survey findings. By definition, all households in the sample were recent movers. Moreover, they were either privileged enough to be assigned new apartments by their danwei or were able to purchase or rent in the open market. All these suggest a built-in bias towards better-to-do groups. As such, the degree of housing inequality revealed is likely to be an underestimate of the housing inequality for the population as a whole. Comparisons with subsequent years based on the 1996 survey therefore give the lower bound of the increase in housing inequality over time.

The 2001 and 2005 surveys were meant to be general surveys, with the target population being all households in Guangzhou. Because of this, additional information was sought in respect to the age of dwelling and, for owners, the year of purchase. These surveys also covered 'economic and comfortable housing'—a form of social housing supposedly built for lower-income and middle-income households—as well as 'self-built housing', which was usually built by villagers on former agricultural lands in suburban districts. The 2001 and 2005 surveys also provide information on the presence or absence of lifts in the building; the latter survey also inquired whether the housing unit was purchased by the household directly from the developer (primary market) or purchased in the secondary market. The target sample size of the 2001 survey was 1500, whereas that of the 2005 survey was 1200.

All three surveys adopted a multilevel probability proportional to size sampling strategy. For the 1996 survey, the list of presale commodity housing projects was used to construct the sampling frame. For the 2001 and 2005 samples, residents' committee (the lowest-level local authority in a city) population data provided by the Public Security Bureau were employed. In each incidence, the sample was designed so that the number of housing units surveyed in each of the original eight urban districts of Guangzhou was proportional to the total number of households or housing units in the district.[(2)] In the case of the 2005 survey, the sample also included the northern part of Panyu District, which had undergone rapid urban development since the late 1990s. Within each urban district, a number of 'streets' or subdistricts were selected on a randomized basis in accordance to the size distribution of the subdistricts. This geographically based sampling strategy ensured adequate representation of different types of residential areas and of all geographical districts of the city.

[(2)] The original eight urban districts of Guangzhou were: Liwan, Yuexiu, Dongshan, Haizhu, Tianhe, Fangcun, Baiyun, and Huangpu. In 2005, Yuexiu and Liwan were merged; so were Liwan and Fangcun. Also the former cities of Panyu and Huadu were annexed earlier in 2000 to become urban districts of the City of Guangzhou, and the southern part of Panyu has since been carved out to form the District of Nansha.

By design, migrants living in dormitories and construction sites were not interviewed. In all three samples, nonlocal hukou account for 10% of observations or less. But aside from the underrepresentation of migrants, in both the 2001 and 2005 samples the correspondence with population data is reasonably good. For instance, the age distribution of the 2001 sample is broadly in line with the one given by the 2000 Population Census. As for the 2005 sample, the percentage distribution for age groups 0–14, 15–64, and 65 years and over is: 12.8, 76.3, and 10.9; correspondingly, the one given by the 2005 Sample Census is: 13.8, 76.8, and 9.4. Because of selectivity bias, the 1996 sample comprises all new housing and relatively large units, with the mean dwelling age and floor area being 2.4 years and 73.6 m^2, respectively. The corresponding figures for the 2001 sample are 21.2 years and 55.1 m^2, and for the 2005 sample were 11.1 years and 71.8 m^2, highlighting the substantial improvements in housing consumption between the two survey years.

3 Hedonic price equations

Table 1 provides the results of hedonic price estimations. In performing the regression analysis, the dependent variable, price, is expressed in the logarithmic form. This ensures that the predicted home price is nonnegative. Floor area and number of rooms are also expressed in the logarithmic form. Thus, the corresponding regression coefficient gives the elasticity; that is, percentage change in house price resulting from 1% change in the respective predictor, holding other variables constant.[(3)] The coefficient of a given dummy variable gives the percentage difference in price between it and the reference class. The R^2 obtained, which ranges from 0.43 to 0.65, compares well with similar studies conducted elsewhere. The coefficient estimates in general show the expected signs and are of reasonable magnitudes.

With the rapid development of Tianhe as Guangzhou's new central business district in the 1990s, the completion of a large number of bridges and tunnels crossing the Pearl River, and the gradual extension of the Guangzhou Metro to suburban areas, increasingly Haizhu, Tianhe, and Fangcun are no longer outlying (Li, 2010). In 1996 home prices in these districts were 10%–20% lower than those in the old urban core of Liwan, Dongshan, and Yuexiu. In 2005 the differences were much smaller and no longer significant statistically. However, home prices in Baiyun and Panyu remained substantially lower than those in the old urban core.

The findings also suggest that households in Guangzhou are attaching greater importance to dwelling design over time. First, the number of rooms in the dwelling, which was insignificant in the 1996 and 2001 equations, became highly significant in the 2005 equation. Holding floor area constant, in the latter period an extra room would increase the value of a dwelling by 17.9%, suggesting that privacy provided by a room of one's own assumed increasing importance. Second, higher floors are associated with better lighting, ventilation, and privacy. Indicative of change in taste, it is only in the 2005 equation that higher floors command a price premium over lower floors (in the order of 8%). The availability of lifts further enhances the premium. Third, related to the above, the 2005 equation shows that provision of recreation facilities in the housing estate raises home price by an average of 4.7%.

Confirming the general impression, home price in the primary market commands a premium over price in the secondary market. The 2005 equation shows that the former is, on average, 18% higher than the latter, everything else being constant. New buildings too command higher prices. But, reflecting the general inflation of home prices, the greatest difference lies in the year of purchase. According to the 2005 equation, those who bought

[(3)] Suppose there is one housing attribute, which is continuous, in the equation $\mathrm{d}(\log Y)/\mathrm{d}(\log X) = \mathrm{d}Y/Y \div \mathrm{d}X/X$, or percent change in Y as a result of 1% change in X. For equations with more than one housing attribute, the corresponding partial derivatives apply.

Table 1. Hedonic price equations: Guangzhou commodity housing units 1996, 2001, and 2005 (dependent variable: ln price).

Variable	2005		2001		1996	
	B	*t*	*B*	*t*	*B*	*t*
(Constant)	−0.409	−2.393*	−0.520	−1.699	−0.240	−0.958
District[a]						
Haizhu	−0.042	−1.303	0.065	1.309	−0.098	−2.671**
Tianhe	−0.020	−0.658	0.089	1.638	−0.193	5.046***
Fangcun	0.097	1.155	−0.168	−2.227*	−0.198	4.602***
Baiyun and Huangpu	0.135	3.537***	−0.028	−0.549	−0.325	6.993***
Panyu	−0.092	−2.959**				
Ln floor area	0.588	5.891***	0.688	3.728***	1.055	7.058***
Ln *N* rooms	0.179	2.160*	−0.108	−0.734	−0.133	−0.853
Recreation facility (1 = yes)	0.047	2.238*				
Flat floor						
5–9	0.020	1.059	0.067	1.904	-0.035	-0.657
10+	0.082	2.066*	0.061	0.862	0.009	0.150
Lift (1 = present)	0.052	2.450*				
First-hand purchase (1 = yes)	0.182	8.929***				
Year of Construction						
built 1990s	0.111	3.982***	0.213	2.846**		
built 2000s	0.078	2.364*	0.306	3.714***		
Year of Purchase						
bought 1990s	0.351	8.392***	0.221	4.390***		
bought 2000s	0.424	9.731***				
Management fee						
50–99	0.000	-0.021	−0.024	-0.561	0.086	2.223*
100+	0.104	3.909***	0.229	2.698**	0.112	2.463**
R^2	0.650		0.435		0.491	
N	517		196		258	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
[a] Reference: the old urban core of Liwan, Yuexiu, and Dongshan

in the early 2000s had to pay some 42.4% higher in price than those who bought in the 1980s or before, other variables being constant. But the price difference between residences bought in the 1990s and early 2000s was minimal.

Apparently, households in Guangzhou are quite receptive to paying an estate management fee, provided that higher management fee means better service. This variable had positive and significant effects on home price in all three years.

4 Housing inequality indices

4.1 Overall inequality level

The relatively high explanatory powers of the regression equations and the reasonableness of the coefficient estimates give confidence in employing the equations to estimate the amount of housing service yielded by individual housing units and then construct the housing inequality indices. The result of the computation is provided in table 2. For reference, the Gini coefficients based only on floor area are also given.

Table 2. Guangzhou: housing inequality indices.

Index	1996	2001	2005
Gini coefficient (floor area)	0.198	0.226	0.210
Gini coefficient (controlled for housing quality)	0.277	0.321	0.332
Theil index	0.125	0.164	0.177

The Gini coefficients based on floor area did not exhibit any increasing trend. It was 0.198 in 1996, 0.226 in 2001, and 0.210 in 2005. Judging from the fact that the 1996 sample was targeted only at newly constructed commodity housing and hence was relatively homogeneous, the relative lack of increase in the inequality index in the latter years was all the more surprising. The Gini coefficients based on the hedonic regression estimations were more in line with the general impression of rising housing inequality. It rose from 0.277 in 1996 to 0.321 in 2001, and then modestly to 0.332 in 2005. The Theil entropy index showed a similar trend: from 0.125 in 1996, to 0.164 in 2001, and then to 0.177 in 2005.

The actual degree of housing inequality could be higher than what the computed indices suggest, as they do not take into consideration the residuals of the hedonic regressions. The problem of 'throwing away the residuals' by using predicted rather than observed home price for commodity housing units would be more severe in more recent years under market deepening.[(4)] To explore this possibility, I regress the residuals separately against education and household income—the main socioeconomic factors underlying housing inequality. The result is inconclusive. For education, the coefficient is significant but carries a negative sign for the 2001 equation, and is insignificant for the 2005 equation. For household income, the coefficient is insignificant for the 2001 equation, and is positive and significant for the 2005 equation. As for the 1996 equation, both variables are insignificant. While throwing away the residuals could result in underestimation of housing inequality, the analysis of residuals suggest that the effects are unlikely to be large.

4.2 Variations between housing sectors

The decomposition of the Theil index by housing sectors reveals interesting findings. While in all three years within-sector inequalities accounted for the bulk of the overall housing inequality, the share of within-sector inequalities declined from 82.5% in 1996 to 73.1% in 2001; and further to 68.7% in 2005. In part, this could be attributed to the relative homogeneity of the 1996 sample. However, this could also reflect actual increase in the difference in inequality between housing sectors.

This is confirmed by computing the mean predicted home price, the result of which is also given in table 3. Most of the predicted home values for the 1996 sample are higher than those of the 2001 and 2005 samples. The major reason of course has to do with the built-in bias of the 1996 sample, which comprises only new commodity housing units, although the great majority of these dwellings have been turned into work-unit housing after the initial purchase. The other two samples, on the other hand, consist of housing of varying quality and age. For a commodity dwelling with the following characteristics: 70 m^2 floor space, less than five years old, located in Tianhe, on a high floor, and with lifts, the predicted home values for 1996, 2001, and 2005 are, respectively, RMB 393 000, RMB 452 000, and RMB 477 000. Above, it was pointed out that the major difference in price with respect to date of purchase is between the 1980s and later years, and the difference in price between homes purchased in the 1990s and 2000s is relatively small. The steady increase in home price revealed by the computation is consistent with the above observation.

[(4)] I am indebted to an anonymous referee who pointed out this possibility.

Between housing sectors, in all three years the mean predicted price of owned-commodity housing was either the highest (for the 2001 and 2005 samples) or second highest (for the 1996 sample) among all housing sectors. Moreover, the difference between owned-commodity housing and other sectors was the largest in 2005. In other words, those who were able to buy commodity housing enjoyed better housing than people living in all other types of housing, and the relative supremacy of owned-commodity housing strengthened over time.

However, inequality within the commodity-owned sector remained comparatively low and quite stable over time: it was 0.094 in 1996, 0.113 in 2001; and 0.119 in 2005 (table 3). The slightly lower value for 1996 could be attributed to the fact that the 1996 survey covered only new commodity housing. Reflecting the growing prevalence of commodity-owned housing in more recent years (14.9% of the sample housing units in 2001; 44.8% in 2005), in 2001 variations within this sector contributed 14.2% to the overall inequality; in 2005 they contributed 39.8%. To a significant extent, then, inequality in housing consumption today largely reflects inequality in the owned-commodity housing sector.

Housing provided by the municipal housing bureau was of relatively poor quality in all three years. With the mass disposal of work-unit housing in the late 1990s, the remaining stock of work-unit rental housing was of equally poor quality in more recent times. It may be concluded that those who were left behind in the public rental sector experienced relative or even absolute declines in their housing lots under the housing reform. Because of the decreasing share of work-unit-rented housing, the sector's contribution to the overall housing inequality decreased from 40.4% in 1996 to 5.9% in 2001, and further to 1.7% in 2005.

In comparison, reform housing or housing which was sold to sitting tenants at heavy discounts was of relatively decent quality in all three years. Moreover, the degree of housing inequality within the reform housing sector was consistently low: the Theil index was 0.052 in 1996, 0.096 in 2001, and 0.069 in 2005. But with the conferment of full property rights to reform housing purchasers, reform housing, too, has become trivialized. As a result, the sector's contribution to the overall inequality decreased from 21.6% in 2001 to 4.9% in 2005.

Economic and comfortable housing was proposed to be the main form of social housing under the 1994 and 1998 housing reforms (Li and Yi, 2007b). A few observers point out that many such projects are in fact commodity-housing constructions in disguise (Zhang et al, 2010). Confirming this observation, in both 2001 and 2005 samples the mean predicted home value of economic and comfortable housing was only slightly lower than that of the owned-commodity sector. Variations within the sector were smaller in 2005 (Theil index = 0.073) than in 2001 (Theil index = 0.116), suggesting growing homogeneity within the sector.

Individuals who were forced to relocate because of urban redevelopment are often seen as underprivileged (F-L Wu, 2004). Li and Song (2009), however, found that relocated households in Shanghai are quite satisfied with their current housing. Echoing this finding, in all three Guangzhou samples the mean predicted price of owned-relocated housing was only slightly lower than that of reform housing. In other words, like reform housing, owned-relocated housing was of quite decent quality, far better than the remaining stock of work-unit and housing-bureau rental housing. But for those relocated households who could not afford to buy and had to live in rental housing provided by the developers, their housing conditions were not much better than those who continued to rent work-unit and housing-bureau housing. This was especially the case in the most recent year (ie 2005). Thus, the owner–renter divide in housing consumption was also apparent for compensation housing. An examination of the Theil indices shows that inequality within the compensation housing sector experienced consistent increases. For rented-compensation housing, the Theil index was 0.087 in 1996, 0.076 in 2001, and 0.302 in 2005. For owned-compensation housing, the respective values were: 0.063, 0.112, and 0.184. Perhaps this relatively high degree of inequality within the

Table 3. Theil index decomposed by housing sectors and predicted mean market home values.

Housing sector	1996			2001			2005		
	entropy index	contribution (%)	predicted mean home value[a]	entropy index	contribution (%)	predicted mean home value[a]	entropy index	contribution (%)	predicted mean home value[a]
Rent work unit	0.120	40.42	39.78	0.205	5.90	7.50	0.153	1.66	9.82
Rent housing bureau	0.079	1.43	21.16	0.193	7.50	5.41	0.246	3.90	9.91
Rent market	0.146	3.97	54.22	0.133	9.02	11.19	0.138	6.28	16.36
Rent free	0.173	2.17	35.30	0.132	4.51	9.88	0.125	1.07	18.89
Rent compensated	0.087	6.27	28.72	0.076	1.25	10.83	0.302	0.48	9.19
Owned commodity	0.094	24.09	46.88	0.113	14.19	14.68	0.119	39.84	28.80
Owned reform	0.052	1.86	32.95	0.096	21.56	12.41	0.069	4.87	17.73
Owned compensated	0.063	2.21	26.48	0.112	4.91	10.12	0.184	3.13	15.68
Economic and comfortable housing				0.116	1.42	11.44	0.073	2.07	25.17
Self-built housing				0.149	2.82	5.55	0.177	5.41	15.03
Within group		82.45			73.09			68.70	
Between group		17.05			26.91			31.30	

[a] The unit is 10 000 RMB.

Note: current exchange rate is 1.00 USD $\simeq$ 6.68 RMB at 1 December 2010.

Table 4. Theil indices decomposed by sociodemographic attributes and predicted mean home value.

Sociodemographic attribute	1996			2001			2005		
	entropy index	contribution (%)	predicted mean home value[a]	entropy index	contribution (%)	predicted mean home value[a]	entropy index	contribution (%)	predicted mean home value[a]
By occupational group									
Professional	0.109	9.19	37.70	0.092	4.16	14.84	0.113	6.60	29.67
Managerial	0.111	35.52	42.71	0.119	25.92	13.09	0.126	24.80	26.15
Skilled	0.133	16.26	32.23	0.153	28.59	10.05	0.157	19.06	18.43
Unskilled	0.128	5.30	29.87	0.177	17.41	8.11	0.173	13.62	15.28
Others	0.123	28.43	39.73	0.188	11.66	8.90	0.206	22.74	22.96
Within group		94.70			87.74			86.83	
Between group		5.30			12.26			13.17	
By age group									
Young	0.114	32.27	36.14	0.148	40.53	11.47	0.153	40.40	23.17
Middle	0.127	50.20	39.55	0.167	51.94	10.13	0.189	55.44	20.76
Old	0.135	16.47	41.57	0.220	05.99	8.99	0.332	02.88	16.06
Within group		98.93			98.46			98.72	
Between group		1.07			1.54			1.28	
By hukou status									
Local	0.113	79.79	36.93	0.163	91.92	10.49	0.178	92.22	22.17
Nonlocal	0.137	13.08	57.03	0.157	07.41	12.57	0.144	6.58	17.60
Within group		92.88			99.32			98.80	
Between group		7.12			0.68			1.20	

[a] The unit is 10 000 RMB.
Note: current exchange rate is 1.00 USD $\simeq$ 6.68 RMB at 1 December 2010.

compensation housing sector in recent years is reflective of the varying degree of success of the displaced households in their negotiation with the developer or municipal government (Zhang, 2010, page 143). Those who failed to secure decent housing because of being misinformed or the lack of appropriate legal and financial means, for instance, would likely express deep contempt towards the developer and local government.

Under China's land tenure system, land in rural areas is the property of rural collectives, essentially village committees. In actuality rural land is controlled by individual peasant households. Every peasant household is entitled to build housing as its residence on a plot of land designated by the village committee. In table 3, self-built housing is mainly the housing built by peasants on (former) urban–rural fringes. With urban expansion many former rural villages are now encircled by urban development. Such villages are termed urban villages (W-P Wu, 2004). Much of the housing in urban villages is of dubious quality and legal status. It was constructed to generate rental income. The bulk of this housing is rented to migrant workers. In the 2001 sample, the average predicted home value for self-built housing was RMB 55 500, about the same as that of work-unit rental housing. In the 2005 sample, the stock of self-built housing was of much better quality, with the mean equivalent market value standing at RMB 150 300, as compared with RMB 99 100 for work-unit rental housing. Theil index computation shows that housing inequality in this sector was close to the overall inequality level of the city in both 2001 and 2005.

4.3 Decomposition by sociodemographic attributes

To analyze how housing inequality varies over sociodemographic groups, more specifically with respect to age, occupational status, and hukou status of the head of household, I compute both the mean predicted home values of the respective groups and the associated Theil indices (table 4). The former computation supports the general impression that housing inequality between occupational groups has increased alongside market deepening. In particular, while the differences in the mean home values were quite small among occupational groups in the 1996 sample, professional and managerial workers, on average, enjoyed much better housing than other workers in both the 2001 and 2005 samples. This increase in housing inequality between population groups over time is confirmed by the Theil indices. Whereas between-group variations contributed only 5.3% to the overall inequality in 1996, in 2001 and 2005, 12.3% and 13.2% of the overall inequality were attributed to variations between occupational groups, respectively.

Despite the general impression of widespread discontents among young entrants to the job market, the Theil index computation indicates that variations between age groups contributed no more than 1.5% to the overall level of housing inequality. More surprisingly, it was only in 1996 that the mean home value for young households was somewhat lower than other age groups. In both 2001 and 2005 samples, young households on average lived in homes with the highest predicted values. It was the older people that were relatively less well off.

It is not too difficult to come up with explanations for this observation. First, the younger generation in urban China today is much better educated and was brought up in a much more congenial environment than were their parents; the latter had to endure the Cultural Revolution as well as the Rustication Programme of the 1960s and early 1970s. A much larger proportion of the young generation today is employed as professional and managerial workers. Moreover, in Chinese society parents are prepared to take care of grownup and married children. In a study on home financing using the same datasets, Li and Yi (2007b) found a general tendency to avoid mortgage finance. Instead, young households would seek assistance from their parents. Parental contribution either solely or in combination with personal savings accounted for some 30% of all commodity housing purchases over the period 1998–2005, which was even higher than the percentage employing mortgage loans (26%).

Migrants, including those highly educated young professionals, are unlikely to be as fortunate. But in comparison with the retirees and old lay-off workers who are either trapped in the remaining stock of dilapidated public rental housing or who were forced to relocate to substandard apartments in distant suburbs resulting from wholesale redevelopment of urban neighbourhoods, the housing conditions of young professional migrant workers may not be much worse.

Further insights are provided by decomposing the Theil index according to hukou status. Because of the sampling design, the 1996 respondents with nonlocal hukou were primarily those who were able to buy commodity housing in the open market with the view to obtaining the Guangzhou hukou status. As such it was not surprising they consumed somewhat better housing than local hukou holders. The 2001 and 2005 samples were meant to represent the population at the time of survey. The mean predicted home value for nonlocal hukou holders in the 2001 sample continued to be higher than that for local hukou holders. The 2005 survey yielded results more in line with expectation: the mean predicted value for local hukou holders was some RMB 44 570 or 25.3% higher than that for nonlocal hukou holders. However, probably because of the small percentage of nonlocal hukou households in the samples, the observed housing inequality was almost entirely attributed to variations or inequality within given hukou groups.

5 Summary and conclusions

Most authors approach the 'right to the city' in China by focusing on the hukou institution. However, like urban seekers elsewhere, the pressing concern of prospective urban seekers in China today is finding a place to live and a job. The discriminatory treatments by municipal government and the strict eligibility criteria governing local hukou application, although important, are of more distant concerns. In fact, finding a place to live is also important even for established urban dwellers with the proper hukou. With the market reigning supreme, their right to the city could too be at risk if they cannot afford the escalating housing costs. Uprooting due to redevelopment further jeopardizes the chance of a continuing claim to the city for large segments of urban poor.

By employing hedonic price regressions and using survey data collected in 1996, 2001, and 2005, the present paper provided quality-controlled estimates of housing inequality in Guangzhou before and after the ending of the welfare allocation of housing under the 1998 urban housing reform. The quality-controlled indices show a slight increase in housing inequality in the later survey years, as compared with 1996. While the result is not totally in agreement with the general impression of substantially heightened housing inequality, a national household survey conducted in 2007 reveals rather low levels of variations in housing floor space consumption across income classes (Man et al, 2010).

Decomposing the Theil index shows that differences between housing sectors as gauged by their percentage contributions to the overall inequality were larger in the more recent samples. Naturally, those in the owned-commodity sector enjoyed better housing than others. Within this sector the level of inequality remained low in all three survey years, however. Buyers of economic and comfortable housing enjoy only slightly less decent housing as compared with owners of commodity housing. Policy restrictions suggest a high degree of homogeneity for economic and comfortable housing. The sector-specific Theil indices confirm this. This was especially true both in 2001 and in 2005. Owners of reform housing also enjoyed relatively good housing. Inequality within this sector was low for all three samples. People who were trapped in the remaining stock of work-unit and housing-bureau rental housing had to endure the worst housing conditions. There have been frequent stories of immense sufferings of residents uprooted by redevelopment programmes. The findings of the present study depict a rather mixed picture, though. The compensation that the affected

households receive depends, inter alia, on the negotiation strategies adopted and on whether they were owners of the properties to be demolished (Zhang, 2010, page 159). Those who were offered and able to purchase compensated housing enjoyed relatively good housing. However, the housing conditions for those who had to rent were as poor as the remaining work-unit rental housing residents.

Decomposing the Theil index by sociodemographic groups also yields unexpected results. In particular, in almost every instance, within-group variations contribute to 85% or more of the overall housing inequality. Probably because of the relative lack of nonlocal hukou households in the sample, in the decomposition by hukou status, within-group contributions amounted to almost 100%. Similarly, in the decomposition by age groups, within-group variations contributed 98.5% or more to the overall inequality for all three samples. The findings simply do not support the view that younger households are the losers of the market-based 1998 housing reform. Surely their aspiration for homeownership would be curtailed by the increase in home price in more recent years. But in terms of the actual level of housing consumed, the plight of retirees, lay-off workers, and households uprooted by redevelopment programmes without adequate compensation is likely to be much worse.

The lack of total agreement between the above findings and the common perception of rapidly rising housing inequality deserves further scrutiny. Maybe Guangzhou is quite unique among Chinese cities in that the market already played a significant role in 1996 because of the influence of Hong Kong. Other cities might show larger changes between 1996 and 2005. Maybe 2005 was only a few years down the road since the 1998 housing reform was fully implemented, and the socialist system of housing allocation remained an influential factor. Given the pace of change in China, especially the accelerated increase in home prices in more recent years, the 2005 survey could be dated by now. More works need to be carried out to ascertain whether the same conclusions hold for other major cities and for changes that have taken place since the mid-2000s. Nonetheless, the Guangzhou findings clearly demonstrate that we need carefully constructed measures to gauge housing inequality more accurately.

But suppose that housing inequality indeed has not significantly worsened and that most people today generally enjoy much better housing than previously, then why are there widespread discontents, especially among young households? Here I can only make a few speculative remarks. First, subjective perception may not reflect objective reality. For sure, housing inequality in a market-based housing provision system largely mirrors inequality in the distribution of wealth and income, which has shown substantial increases in recent times (Khan and Riskin, 2005). But even in prereform and early-reform times when egalitarianism was supposed to prevail, there existed substantial housing equalities between who held redistributive powers and those who did not. In fact, it has been argued that in state socialism economic inequality manifested mainly in variations in housing consumption (Szelenyi, 1983). Previous works have demonstrated that such inequalities persisted in the early phases of the reform, and the bulk of the windfall gains associated with the wholesale disposal of work-unit housing to sitting tenants went to those who benefited from the old system. Yet, the equation between egalitarianism and state socialism appears to be a deeply ingrained belief.

Second, discontent may arise because of the discrepancy between aspiration and realizable attainment. For more than two decades the Chinese state has advocated housing privatization and homeownership. Major efforts, including the nationwide adoption of the Housing Provident Fund and the extension of mortgage loans to ordinary households, have been made to promote home purchase (Li and Yi, 2007b). The 1998 housing reform, launched amidst the Asian Financial Crisis of 1997–98, in particular stressed the importance of real estate development and hence home buying in fostering economic growth. While households in the early 1990s who used to pay nominal rent for their work-unit dwellings were reluctant to buy

even with heavy discounts, young households today who were brought up in an era of rising homeownership see home purchase as almost sacrosanct. Developers' aggressive advertising campaigns to promote luxurious villas and condominiums as dream homes further strengthen the aspiration for owning a dream home. Failing to do this could be equated with personal failure. Indeed for young couples, homeownership is often considered to be a precondition to marriage (Zhang, 2010, page 165)

Yet, rapidly increasing home prices would render this dream increasingly unrealizable, especially for those without the support of parents. The story of the popular TV series Woju, which describes the plight of a young migrant woman in her struggle to attain homeownership in Shanghai, and the recent popularity of the term 'ant tribe' to describe young migrants with high levels of education attainment living in cubicles, are indicative of the unhappiness of these people. Perhaps it is about time to reconsider homeownership promotion as a policy priority. Recently the Chinese central government has shown renewed interests in social housing. But provision of social housing rests upon the municipal governments, whose support of the central government's initiative is suspicious given their continuing reliance on land leasing as the major source of finance. Complicating the matter, of course, is the hukou system, which deprives migrants from accessing the low-cost social housing provided by municipal governments. The relatively level playing field under a market-based system could once again be overturned with the expansion of social housing programmes. What this would imply for the nature of housing inequality and for the pattern of social and spatial segregation remains to be seen.

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