

# The impact of privatization of public housing on housing affordability in Beijing: An assessment using household survey data

Local Economy

26(5) 384–400

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DOI: 10.1177/0269094211409140

lec.sagepub.com

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**Abstract**

Housing affordability has long been on the agenda of China's policy makers. Imperfections in the housing system and growing disparities in income and wealth have been central to the problem of affordable housing. Housing reforms in China led to the creation of a market-oriented housing system, but also increased economic and social stratification. This article considers the effect of privatization of public housing on the problem of housing affordability in Beijing. We draw on a household survey to assess affordability for households according to occupants' family structures, educational attainments and employment status, using a 'residual income' approach. The implications for policies designed to improve housing affordability are discussed.

**Keywords**

Beijing, housing affordability, public housing, privatization, residual income

**Introduction**

Privatization of public housing has been one of the most significant market-oriented economic reforms in China. It has introduced market-based incentives and built household wealth. At the same time, it has created a unique pattern of social stratification and laid the foundation for growing housing inequality. Wealth inequality in China, measured by the Gini coefficient, was 0.55 in 2002, compared to 0.45 in

1995, a rapid increase in a short period (Li and Zhao, 2007). The increase in wealth inequality has been largely explained by the sale of public housing to its residents at below market value since the 1990s, which has benefited households unequally

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(Li and Zhao, 2007; Sato, 2006). There is growing concern that the unequal distribution of public housing in the early stage of economic reform will intensify problems of urban poverty, and will widen the gaps of economic and social stratification as the housing market continues its rapid development (Mak et al., 2007; Wang, 2000; Yang and Shen, 2008).

The main objective of this article is to measure how the privatization of public housing impacts on affordability in Beijing. In this study, a residual income approach is used to measure housing affordability. In this measure, affordability for lower income households is related to a socially defined minimum market basket of goods and housing services and to the costs of financing. We find that in general the incomes of households including renters and owners of privatized public housing fall far short of the level required to access adequate housing in the emerging market. We find that affordability is often much better for those households who can rent or sell their purchased public apartments in the market. The initial inequality in the distribution of housing assets indeed causes subsequent inequality of housing affordability in Beijing.

It is important to identify the forces that influence housing affordability for different groups within Chinese society, if housing policy is to deal effectively with their respective housing problems. In addition, this study offers valuable insights into the sources of housing inequality, which is an increasingly important issue for social stratification as housing prices have been continuously rising in China.

For urban China, there have been many studies of housing privatization (e.g. Gustafsson et al., 2006; Mak et al., 2007; Sato, 2006; Wang, 2000; Wang and Murie, 2000; Zhou, 2000), as well as of inequality (e.g. Gustafsson et al., 2008; Huang and Jiang, 2009; Logan et al., 1999; Walder and Oi, 1999; Walder et al., 2000).

However, studies of housing affordability are very limited. Some researchers have discussed policies on home ownership (e.g. Duda et al., 2005; Rosen and Ross, 2000); others have analysed trends in housing affordability (for example, Mak et al., 2007; Mostafa and Wong, 2006;). Yang and Shen (2008) used a residual income approach similar to the one used in this article to measure housing affordability in Beijing. However, none of these studies have connected housing wealth with affordability or estimated the effect of housing privatization on housing affordability.

Section 2 of this article describes the background of the owner-occupied housing market in China. Section 3 presents a theoretical framework for assessing housing affordability and discusses the methodology applied in this study. Section 4 presents information on the household survey. Results are presented in Section 5. We first define a minimum socially acceptable 'standard' apartment and then estimate its affordability for potential first-time buyers and existing home owners. Discussion of the implications for policy on affordable housing is in Section 6. Section 7 concludes.

### **Background: Growing housing inequality and the owner-occupied housing market in urban China**

The acceleration of economic reform over the last two decades has brought great changes for urban Chinese households. Household income has substantially increased. Annual real disposable income per capita in urban China increased from 890 yuan in 1986 to 2328 yuan in 2002 (deflated by urban CPI) (NBSC, 2005).<sup>1</sup> Net urban household wealth per capita increased by 19 percent from 1995 to 2002 (Li and Zhao, 2007). The share of net value of housing assets in total net wealth rose from 44 to 64 per cent. The share of

financial assets in total household wealth fell by 2 percent, even though their absolute value increased by 211 percent (Li and Zhao, 2007).

Coinciding with this rapid increase of household income and wealth has been a marked increase in inequality. Income and wealth inequality in urban areas started to increase from the early stage of economic reforms in the 1980s, and especially after 1992. The Gini ratio for urban household income inequality rose to 0.33 in 1995, 10 percent higher than in 1988. The Gini coefficient for the distribution of wealth was 55 percent in 2002, while the distribution of housing wealth contributed two-thirds of urban wealth inequality overall (Gustafsson et al., 2008).

With respect to the causes of housing inequality in China, the role of transition from state socialism is important. The emergence of a market economy introduced a mechanism of resource allocation that created new opportunities outside the redistributive system (Nee, 1989, 1991). This increased the income gap between private businesses and public sectors, urban registered households and rural-to-urban migrants (Gustafsson et al., 2008; Wang, 2000). Even within the state-owned sector, wage inequality was significant after the economic reconstruction. A profitable enterprise could provide its employees with higher basic wages and bonuses, and better services. An unprofitable enterprise might lay off employees who would only receive a monthly benefit or a proportion of their wages from their employer. The income gaps between households could eventually cause inequality in housing consumption.

However, marketization alone cannot explain the significant inequalities of the urban property regime. Housing privatization under housing reform laid the foundation for growing housing inequality and is the most important cause of housing inequality in China. Since the 1990s, the

Central Government has vigorously promoted the sale of public sector housing to existing tenants. Certain policies were designed to offer public housing to the tenant at considerably reduced cost. Public housing was generally operated through work units. The ability to purchase public housing depended on a household's work units or occupation, but not on their needs or income. Those who received better housing under this system benefited from higher discounts and could realize remarkable capital gains when selling houses in the emerging housing market. Poor households that had been privileged under the old housing system but now could not move to public housing were even worse off after privatization. They have had to face a continuing increase in rents and uncertainty of rent policy (Zhang, 2000). As a result, wealth distribution in urban China became unequal in the early stages of housing reform, with inequality based on existing organizational hierarchies (Walder and Oi, 1999; Walder et al., 2000).

Although homeownership in Beijing increased from 30 percent in 1992 to 73.6 percent by 2004 (BSB, 2005), 92 percent of homeowners owned privatized public housing, while only 3.5 percent had bought their house on the open market; 4.5 percent were low- to medium-income households that owned 'economic housing', (*jingji shiyong fang*) which enjoys local government subsidies.<sup>2</sup> Because of its large number of state-owned enterprises, institutions and government departments, Beijing had much more privatized public housing than any other Chinese city. For this reason, housing inequality has tended to be more pronounced in Beijing.

The privatization of public housing brought many households into owner occupation, but at a substandard level. According to the 1999 survey of the Chinese Academy of Social Sciences (CASS), average living area per person in

public housing was only 17m<sup>2</sup>, which is lower than the adequate housing size defined in our affordability measure (see Section 5 below). The demand for replacement housing to improve housing conditions and living environment is still high for the owners of purchased public housing. Therefore, they should also be included in the study of affordability.

The initial uneven distribution of housing through privatization was exacerbated as marketization accelerated. China has experienced steady increases in housing prices, driven by growing housing demand and speculative purchasing by domestic and overseas investors. According to the *Chinese Statistical Yearbook*, from 2004 to 2007, house prices in China increased by 13.57 percent annually at nation level, which is 1.8 times higher than from 1998 to 2003. In contrast to other low- to medium-income households, homeowners who have purchased commodity housing, including discounted public housing, can benefit from house price inflation. They have more robust financial capacity and they tend to engage in speculative trading as property prices rise (Wu, 2005).

In addition, the reduction of government housing subsidies has been the main policy emphasis up to 2007 (Zhang, 2001). From 2001 to 2005, total investment in 'economic housing' decreased; in 2005, it dropped by 15 percent in Beijing. Another policy, the Housing Provident Fund which is based on employer and employee contributions, is restricted to high- or medium-income households (Wang, 2000).

In 2007, poor urban households became the new target group for housing policy. In Beijing, in accordance with the construction plan approved by the municipal government, 10m square metres of economic properties were planned to be constructed in three years. It is too early to judge the effectiveness of these policies, but it is commonly agreed that effective subsidies should be

tailored to the people in greatest need (Lee, 2007; Nordvik, 2006).

## **Assessment of housing affordability and methodology**

### *Previous studies of housing affordability*

Accurate assessment of housing affordability is important in order to formulate public policy and measure poverty. However, conceptual and empirical analysis of affordability has been far from consistent in previous studies.

Housing affordability is a household's ability to pay its housing cost without compromising its standard of living (Grigsby and Rosenberg, 1975). The core concept in this definition is the opportunity cost between housing and non-housing consumption. Disposable income after subtracting housing cost should not drag a household below the desirable minimum, defined as the 'poverty standard' by Bramley (1990) and the 'minimum market basket' by Grigsby and Rosenberg (1975). Bramley (1990) defines housing affordability by emphasizing housing consumption that meets the 'social sector norms of adequacy'.

It is difficult to determine poverty benchmarks for housing and non-housing consumption. It should be described in physical terms, as well as in the capacity to participate in society (Doyal and Gough, 1991; Sen, 1983). Hancock (1993) makes a vital distinction between the individual's conception and society's judgment of what affordable housing is. Householders who are under-consuming housing might theoretically be able to afford appropriate housing. Hancock calls these 'can pay, won't pay'. A budget constraint is irrelevant in this case. Thalmann (1999) highlights households able to participate due to market imperfection: different households

may pay prices that diverge significantly from the market average. Bourassa (1996) points out the importance of distinguishing first-time buyers from existing owners. They might face different wealth endowments and financial constraints.

It is thus difficult to construct a benchmark determining the ability of a household to pay. The traditional indicator is the ratio of median market price of a dwelling unit to median household income. On this measure, housing is 'affordable' if housing cost is not more than 30 percent (or 25 percent) of the household's pre-tax income. However, this ratio is no more than a rule of thumb about the approximate housing cost in relation to a household's income; it is a philosophical judgment based on a society's values and its historical and institutional structures (Hulchanski, 1995). The ratio of price-to-income has long been debated in western markets (see e.g. Kutty, 2005; Stone, 2006). In China, given the differences in lifestyle and housing market from the western countries, 25 percent or 30 percent cost-to-income may not be appropriate. There is still a question of the consumption level that the policy should target given the short history of the housing market in China. On a conceptual level, this measure of affordability fails to take into account trade-offs between housing and non-housing consumption in a heterogeneous housing market. It oversimplifies by ignoring the distribution of household income and the socioeconomic characteristics of a household. In urban China, there is a high disparity in household income. This measure does not provide precise information for policy making, even though it is popular and commonly used. Practical problems such as the items included in housing costs and income levels, are also still unresolved. Other deficiencies of this indicator have been widely discussed (e.g. Hancock, 1993; Hulchanski, 1995; Thalmann, 2003).

Alternative methods have been reviewed by Bogdon and Can (1997). More recently, the 'residual income' approach has been developed (e.g. Kutty, 2005; Stone, 2006; Thalmann, 1999) based on the initial work of Stone (1993). This method measures the difference between housing cost and residual income after paying for required non-housing goods. It is appealing from a political perspective because it allows us to ask the question 'affordable to whom?' and to address the housing standard that we are applying (Stone, 2006). Freeman et al. (1997) provide an international review of the study of housing affordability and discuss the residual income approach. Kutty (2005) applies this method in to the USA and argues that it results in a more accurate picture of poverty. Yang and Shen (2008) developed this method for a study of Beijing, and discuss its advantages.

### *Methodology*

Selecting the right affordability assessment depends on the nature of the research objectives and the data available. The measure of affordability should also enable us to examine the effectiveness of public policy, for instance by measuring the gap between affordability and policy targets. In China, incorporating the recent large-scale privatization of public housing into the affordability equation is a critical issue. Based on these considerations, a residual income approach is used in this study. We compare its result to that of the traditional price-to-income ratio.

In this article, we measure two aspects of affordability: affordability for amortization, and affordability for down payment. Housing is regarded as affordable for amortization to a household if disposable income after subtracting the cost of non-housing goods and services is adequate to cover amortization of the 'standard' housing defined in the measure. Housing is regarded

as affordable for down payment if the household's available assets including housing wealth are sufficient for the minimum required down payment for a standard house. Specifically, housing affordability will be measured as follows:

- affordability for amortization = household disposable income *minus* non-housing consumption *minus* amortization for the standard house;
- affordability for down payment = household total assets *minus* down payment for the standard house.

We begin our analysis with first-time buyers according to household types, educational attainments and work units. In this step, we can examine inequality in access to housing based on income level. Later, we extend the discussion to existing owners by incorporating the value of their privatized public housing wealth. This step allows us to capture the effect of housing privatization on affordability and on inequality in affordability.

The challenge in operationalizing this method is the specification of 'socially accepted standards' of housing and non-housing consumption. There is still no official urban poverty line in China, although separate poverty lines have been set for some cities in order to determine eligibility for benefits (Minimum Living Support). There are few studies of urban poverty and results concerning the poverty line are inconclusive (e.g. Chen and Wang, 2001; Fang et al., 2002; Meng et al., 2005). Therefore, in this study, we determine a benchmark for housing consumption according to the official statistics and reasonable inferences regarding the basic needs of families with low to modest income. For non-housing consumption, we use information on average household expenditure, since expenditure has been seen by many as the preferred measure of living standards.

## Data

### *The household survey*

In China, there are two major official sources of individual household data. One is the Chinese National Bureau of Statistics survey (NBS); the other is the Chinese Household Income Project Survey (CHIP). But these two surveys have fundamental limitations in relation to the current study.

First, cases in both surveys are selected for all groups across all regions. Thus the sample of low- to medium-income households in Beijing could be quite small. For Beijing, total sample families were only 484 in the 2002 CHIP, and 1578 in the 2004 NBS. More importantly, household consumption is not split between non-housing and housing in either survey, nor are total household assets recorded. Another well-known problem with the NBS and CHIP data is that the measurement of income and representativeness of the sample are not easy to assess (Gustafsson et al., 2008). The most recent CHIP survey was only in 2002.

Like many earlier researchers on the Chinese market, we carried out our own self-constructed survey, in Beijing in 2006, with the cooperation of Uppsala University, Sweden and Tsinghua University, Beijing. This survey was designed to obtain information on living conditions, household consumption and socioeconomic characteristics. The target population was low- to medium-income households, thus, specific efforts were made to select survey areas where low- to medium-income households are likely to be concentrated.<sup>3</sup> To achieve this, six districts in central urban Beijing were selected. These districts are dominated by privatized public housing and ordinary commodity residences, with a mixture of renters and homeowners.

Households were selected through two-stage quota random sampling. This is also



the method used by NBS in their surveys (NBS, 2005). In the first stage, total sample size in each district was determined in proportion to population size. Accordingly, the highest number of respondents is from Xuanwu district and the lowest in Haidian. In the second stage, within each district, streets were randomly selected, followed by the sampling of households on each of the selected streets to obtain the desired sample size. There were a total of 800 responses. Of these, 150 records were discarded because of poor quality or insufficient information.

The questionnaire had three parts. The first gathered information on the home: size, tenure (rental housing, purchased privatized housing, purchased commercial residence or economic housing), price or rent, and number of years in the residence. The second part asked the respondents' opinions on the secondhand market and 'economic' market: whether the renter planned to purchase a house within three years, whether secondhand or economic housing had been considered, and the reasons. These questions help us to analyse affordability policy from the demand side. Finally, the social and economic situation of the household was ascertained: age of head of household, income and assets, monthly non-housing expenditure, working units and so on. Survey design began in the spring of 2005 and data were collected from April to July 2006.

### *Quality of the survey data*

To maximize accuracy, data collection was carried out by face-to-face interviews. Questions regarding the household as a whole were asked of only one person, preferably the head. The survey was carried out by people working in residents' committees (*juweihui*)—the smallest administrative unit in Chinese cities—who have records on the

economic and social status of households in their area. The questionnaire responses were checked carefully by the *juweihui* people and re-interviews were carried out where it was thought they might contain significant errors. The data can therefore be expected to be of high quality.

Although Lau and Li (2006) argued that housing affordability is a common problem for most households in Beijing, our target group is medium- to low-income households. This is because housing policy in China has been targeted on these households. More importantly, incomes other than salary are a very sensitive issue for many households, leading to the reliability of information on households' total incomes long being questioned even in Chinese official statistics. This weakness, however, is believed to be minimal for low- to medium-income households, for whom income other than salary can be expected to be limited, and insufficient to change their economic status. In this respect, the economic information on households provided by our survey is more reliable than that in surveys of all households, such as NBS or CHIP.

To assess the quality of the data, we compared the information collected in our sample to that based on official statistics. In our survey, average annual household income in 2005 at 38,611 yuan was a little lower than the 40,427 yuan reported by the Beijing Statistics Bureau (BSB, 2005). Total annual non-housing consumption per family was 23,012 yuan in our sample compared to 29,503 yuan according to BSB.

There are two major limitations of the survey. First, it covers only a single year, so it cannot track the dynamic performance of housing affordability in the context of dramatic market development. Second, work units but not occupational ranks are included in the survey. Occupational rank could be one of the important determinants of a household's eligibility for public

housing (Li and Li, 2007). However, these points do not affect the results of the current study.

### *Characteristics of households and dwellings in the survey*

Table 1 summarizes the major characteristics of the households in our survey by family type and tenure. For each group, we also classify households according to educational attainment (higher middle school or lower; college or above) and work unit (government and state organization; collective organization; other new organization), which are the main sources of income and wealth inequality in China (Gustafsson et al., 2008). ‘Government

and state organization’ includes ministries, commissions, bureaus and offices of central and local governments; non-profit organizations, such as those in the medical, publishing and broadcasting sectors; educational and research institutions; and state-owned firms. ‘Collective organizations’ in China are usually sponsored by local governments; they are less regulated by the Government than state firms, and their staff on average have lower incomes. ‘Other new organizations’ include foreign firms; joint ventures; privately owned firms; or joint stock companies.

Income refers to total household income in 2005 and includes salary, subsidies, income from financial assets and unregulated income. Average household income

**Table 1.** Major characteristics of the sampled households by tenure

		Home renter (26%)	Home owner (63%)
Average	Mean household income in 2005 (yuan)	34,622	42,601
	Standard deviation of income in 2005	13,165	20,660
	Mean savings	30,289	67,815
	Mean total non-housing consumption in 2005	20,952	25,073
	Average age	38	42
	Years in current residence	6	10
	Mean purchase price (yuan)		93,857
	Mean rent per month (yuan)	280	
	Mean floor space per household (m <sup>2</sup> )	50	63
	Mean market value of housing wealth (in 2006)		458,855
Household type (%)	One-person household	30.7%	18.2%
	Two-person household	33.3%	39.9%
	Three-person household	36.0%	41.9%
	Sub-total	100.0%	100.0%
Educational attainment (%)	High middle school or below	64.7%	64.1%
	College or above	35.4%	35.9%
	Sub-total	100.0%	100.0%
Work organization (%)	Government or state organization	64.7%	78.1%
	Collective organization	14.4%	9.1%
	Other new organization	21.1%	12.8%
	Sub-total	100.0%	100.0%

Note: 11% of respondents borrow housing from friends, relatives or have inherited from their family. Their information is not included here.



in our sample was 38,611 yuan with a standard deviation of 16,912 yuan. The disparity in income is significant even though we are focusing on low- to medium-income households. More than 500 out of the 650 households had disposable annual income below 60,000 yuan. So when we asked for opinions on the low-income standard of 60,000 yuan, more than 65 percent of households responded that it was higher than their acceptable level.

Of the respondents 63 percent had purchased their own houses. Among them, 85 percent had bought public rented houses and 6 percent 'economic' or secondhand 'commodity' residences. Only 7 percent owned new commodity residences. This is consistent with our discussion above. The major reason for purchasing public housing given by 48 percent of respondents was the discounted price during the housing reform period. On average they paid more than 9300 yuan for the unit, with an average area of 63m<sup>2</sup> per family. This is much lower than the market price of commodity houses in 2006, which was over 450,000 yuan (Table 1). The size of purchased public homes, however, is much lower than the standard of 20m<sup>2</sup> per capita in our affordability definition (Section 5.1 below).

The items included in non-housing consumption are referenced by the BSB statistics. Annual expenditures for food, clothing, household utilities, medical services, transportation, education and miscellaneous services are included. The amount of non-housing consumption is obtained from the survey.

As in most countries, renters in the survey have lower incomes and assets on average than owner-occupiers. They also live in smaller dwellings and have a higher ratio of non-housing to housing expenditure. The average rent is only 280 yuan because most rented dwellings are public housing, where rents are still lower than on the emerging market. In our survey, all

the single households working in 'other new organizations' rent private housing. They have to pay more than 1500 yuan for a unit of 40m<sup>2</sup>.

The households that have purchased houses have a profile of household types and sizes, and educational levels, similar to that of non-purchasers. However, consistent with the discussion in Section 2, we find that the ability to purchase public housing at a discount is closely related to the work unit. Only 9.1 percent of the households who belong to collective organizations have been able to enter the owner-occupied market, compared to 78.1 percent of those working in government or state organizations.<sup>4</sup> Among those who have bought, less than 2 percent have bought economic housing or secondhand housing. All the others bought privatized public housing. By contrast, among the 30 percent of owners who work in 'other new organizations', more than 80 percent have purchased new commodity housing.

## Assessment results

### 'Standard' housing cost

To determine standard housing cost in this study, we use average house prices calculated by BSB for the different 'rings' of Beijing. Two variables, location and size, are used to define standard housing. Like Yang and Shen (2008), we define the construction area of a standard apartment as 30m<sup>2</sup> per capita. According to the Chinese Government Tenth Five-Year Plan, in 2005 living area per person should reach 22m<sup>2</sup> in Beijing; this is equivalent to a construction area slightly lower than 30m<sup>2</sup> per capita. The 'Six measures policy' (*Guo Liu Tiao*) issued in May 2006 was meant to stabilize housing prices and focus on affordability of housing for medium- to low-income households. It requires apartments smaller than 90m<sup>2</sup> (construction area) to occupy

70 percent of the total development area. If the average household size is 2.95 persons in China, the construction area per capita is also 30m<sup>2</sup> according to the policy.

Regarding location, we assume that low- to medium-income households would move out of the city centre to the fourth ring of Beijing, where prices are more moderate and there is good public transportation (Yang and Shen, 2008). According to BSB, within the fourth ring the average house price in 2006 was 8500 yuan per square metre of construction area. Applying an annual interest rate of 6.12 percent, we estimate the down payment and the annual debt service payment over 30 years for three types of household as shown in Table 2.

We confirm our results by adjusting the hedonic model in the article by Yang and Shen (2008) by the annual house price growth rate.<sup>5</sup> We test our results for several different assumptions concerning the location of the standard housing, and the general conclusion is not changed significantly.

**Housing affordability: Housing price and income ratio**

In this section, we first present the traditional price-to-income ratio. The ratio of

average price to income and the ratio of amortization to income are shown in Table 3. There is a large gap between average house prices and household incomes for all groups. Housing amortization cost is more than 45 percent of total household income, which is higher than the 30 percent ‘standard’ level. Renters and homeowners face a similar problem with affordability, according to this measure. Although the results are not shown here, we estimated the price-to-income ratio for different socio-economic groups according to their education and work units, and this showed that there is a serious affordability problem for all the groups. Income inequality among low- to medium-income households does not cause inequality in access to housing.

**Household affordability: Residual income approach**

Using the method described in Section 3.2, in this section we firstly assess housing affordability for the three types of renters by educational attainments and work units (Table 4). The negative signs in the table indicate that household income or assets do not cover the costs of basic living and standard housing.

**Table 2.** Standard housing cost by family type

	One-person family	Two-person family	Three-person family
Total price	255,000	510,000	765,000
Down payment (20%)	51,000	102,000	153,000
Balance (80%)	204,000	408,000	612,000
Amortization (yearly)	14,145	28,290	42,436

Source: Survey data and author’s calculation.

Notes:

1. As discussed in the article, the ‘standard’ housing is 30 m<sup>2</sup> per capita, located within the 4th ring of Beijing.
2. According to the ‘6 Measures’ policy, the required down payment for the low to medium income group if they purchase an apartment less than 90 m<sup>2</sup>, is 20% of total purchase price.
3. Loan maturity at 30 years is assumed in the estimation. This is currently the longest term for a bank mortgage loan in China.
4. The mortgage rate is used in the calculation is 6.12%.
5. Yuan refers to Renminbi, the Chinese currency. Currently, £1 = 10.5 yuan approx.

**Table 3.** Price-income ratio and amortization-income ratio by family type and tenure

		One-person family	Two-person family	Three-person family
Average	Price-income ratio	8.19	12.39	17.57
	Amortization-income ratio	0.45	0.69	0.97
Potential first-time buyer	Price-income ratio	8.22	13.48	21.84
	Amortization-income ratio	0.46	0.75	1.21
Existing home owner	Price-income ratio	8.16	11.46	14.69
	Amortization-income ratio	0.45	0.64	0.82

Notes:

1. Average house prices and amortization costs are obtained from Table 2.
2. Average household income is obtained from the survey.

**Table 4.** Housing affordability of potential first-time buyers (unit: yuan)

Household type and characteristics		Affordability for amortization	Affordability for down payment
One-person household Average		-2,739	-46,183
Educational attainment	high middle school or above	-11,502	-57,125
	college or above	7,825	-44,000
	government or state organization	5,316	-38,107
Work organization	collective organization	-12,597	-45,500
	other new organization	2,832	-59,000
	government or state organization	-11,844	-115,463
Two-person household Average		-16,087	-117,605
Educational attainment	high middle school or lower college or above	-3,334	-118,000
	government or state organization	-13,058	-115,375
	collective organization	-19,629	-110,000
Work organization	other new organization	-7,112	-116,333
	government or state organization	-28,977	-206,488
	collective organization	-35,159	-213,442
Three-person household Average	high middle school or above	-13,151	-187,313
	college or above	-30,349	-210,696
	government or state organization	-37,248	-214,500
Work organization	collective organization	-18,389	-203,667
	other new organization		

Notes:

1. Affordability for amortization = household disposable income (in 2005) *minus* non-housing consumption (in 2005) *minus* amortization for 'standard' housing cost.
2. Affordability for down payment = household total assets *minus* down payment for 'standard' housing.
3. For 1 and 2, household disposable income and non-housing consumption are obtained from the survey; down payment and amortization for 'standard' housing are obtained respectively from the second and fourth rows of Table 2.

No matter the household type, residual-income problems exist. The average household in every category cannot meet the down payment for the standard apartment at the market price, and in most cases their annual incomes are not sufficient to cover their living expenses and amortization of an adequate apartment. The only households who face no difficulties in amortization are single-person families working for the Government or a state organization, or other new organization, or who have college or university education. Even they have difficulty putting together a down payment. This is in line with the general conclusion from previous Chinese studies, such as Rosen and Ross (2000); Duda et al. (2005).

To reveal the huge gap between house prices and renters' incomes, we can recalculate to see how much the price of standard housing should be decreased or household income increased in order to make standard housing affordable to the renters. We conclude that house price should be decreased by 43.9 percent.<sup>6</sup> This result is similar to that in the study of Yang and Shen (2008) using the national statistics. or income should be increased by 104.9 percent.

Next, we estimate housing affordability for people who have already purchased an apartment. For this measure we take two steps. First, we estimate the market price of their existing house and calculate the difference in value between the standard house and the current house. Second, we calculate the household's affordability for amortization and down payment for the different values between standard housing and current housing obtained from the first step. The assumption under this calculation is that the existing owners sell their current housing at the market price and use it to purchase a new residence. We take into account that, according to Chinese policy, owners intending to purchase another home, whether public housing or economic

housing, have to make a 40 percent down payment. We then need to recalculate both the amortization and the down payment for each group according to the market value of the current apartments.

Results are presented in Table 5. It is clear that affordability for existing owners is less of a problem than it is for the potential first-time buyers shown in Table 4. For single-person families, their current housing wealth (477,984 yuan) is higher than the market value of a standard dwelling defined for a one-person household (255,000 yuan – Table 2). They have no problem affording the standard unit, nor do two- or three-person households that work in 'other new organizations'. Most of those households have purchased new and rather large commodity housing. In the other family types, except for a three-person household in a collective organization, any other household in any group now can afford amortization. For a three-person household, when they sell their current house in the market, on average, they can obtain an extra 549,258 yuan (Table 5). Borrowing the money to afford 60 percent of the remaining cost of 215,742 yuan (765,000 yuan: Table 2 – 549,258 yuan) at the interest rate of 6.12 percent is not a problem for most families. However, a 40 percent down payment could be still difficult for many three-person families.

Households that own housing can rent it out or use it as collateral to refinance a future purchase. This will not be calculated in the current study due to the lack of data for rents and mortgage levels. In spite of this shortcoming, the author believes that the general conclusion on the effect of housing wealth remains unchanged. We can conclude that in Beijing the affordability of housing is to a large extent affected by the housing inequality caused by the privatization of public housing. Housing inequality has been translated into affordability inequality.

**Table 5.** Housing affordability of existing home owners (unit: yuan)

Household type and characteristics	Market value of purchased public housing	Affordability for amortization	Affordability for downpayment
One-person household			
Average	477984	current housing value is larger than the 'standard' housing	
Educational attainment	493753		
	469836		
	452870		
Work organization	444801		
	528660		
	506579	16,914	64,323
Two-person household			
Average	445226	8,327	37,190
Educational attainment	440730	28,288	70,495
	446000	11,861	53,348
Work organization	455201	15,165	77,080
	745739	current housing value is larger than the 'standard' housing	
	549258	11,182	-62,172
Three-person household			
Average	439301	5,934	-68,968
Educational attainment	463123	23,936	-17,715
	451852	5,705	-50,144
Work organization	416800	-831	-383,631
	975213	current housing value is larger than the 'standard' housing	

## Notes:

1. Construction area of purchased public housing and location are obtained from the survey. We estimated its market value by reference to average.
2. If the value of public housing is not incorporated into the estimation, the results are similar to those in Table 4.

## Discussion: Affordable housing policy in China

Facilitating home ownership and providing more affordable housing has been on the Chinese Government agenda since 1998. Two principal policies support homeownership in China: the Housing Provident Fund and the production of economic housing. The role of these policies in promoting ownership in urban areas is significant. But the ineffectiveness of these policies has also drawn particular attention (see Duda et al., 2005; Rosen and Ross, 2000). It has been realized that the policies have not brought house prices within reach of the targeted income groups (Sun, 2004; Yang and Shen, 2008). This could be due to a complex set of institutional and economic factors (Rosen and Ross, 2000; Wang 2000), and to a failure to identify the households needing support and the extent of support required.

The privatization of housing in China has constituted a significant effort to change a socialist housing market to a market-oriented one (Zhang, 2000). However, the hierarchical social structure inherited from the era of the planned economy widened economic and social disparities, particularly in housing wealth. From our survey, on average, the gap between the market price and the purchased price of privatized public housing is 360,000 yuan, which is much higher than the price inflation rate. This significant capital gain undoubtedly places the owners in much more favourable positions than renters. According to our estimation, except for the three-person households, owners of purchased publicly rented homes have sufficient income and assets to meet standard housing and non-housing expenditures if their current homes can be sold at market price. Despite these households already owning their home, their demand for new housing is still high. Most publicly owned housing is

small and of relatively poor quality in comparison to new commodity housing. In our survey, the main reason why people wish to purchase another dwelling within the next five years is to improve their living conditions (47 percent). Only 6 percent of households regard purchasing as an investment.

Renters are in quite a different situation. In our survey 80 percent of respondents claimed that they do not intend to buy housing during the next five years because they cannot afford to. There is an income gap between renters and owners in our sample, but housing affordability in the low- to medium-income group is determined by housing ownership inequality, not by income. Public housing reform resulted in a significant difference in access to the emerging market between renters and owners. This suggests that affordability policies should deal differently with their problems.

For owners, the key issue is a healthy secondhand housing market, which enables them to trade property and to realize any capital gains that they may have made. This will enable them to enter the emerging owner housing market and improve their living conditions. It can also offer an alternative for potential first-time buyers, who are unwilling or unable to pay for a new property. Currently the secondary market is unsatisfactory. In our survey, more than 40 percent of respondents who did not consider secondhand housing in their purchasing plan expressed uncertainty about the transaction process and potential risks in the secondary market.

It is the medium- to low-income households that are still outside the owner-occupied market who should be the prime candidates for an owner-occupation policy. Income assistance or a subsidized price should allow them to afford both standard housing and standard non-housing consumption. This should guide modification of affordability policy. To look at this



issue, we can use the method in this article to assess the effectiveness of current economic housing policy.

As we showed above, for the potential buyers who can afford a standard apartment, the average house price must be decreased by about 44 percent. This suggests that government policies should reduce housing costs either through tax reductions or construction subsidies. However, economic housing policy is far from achieving this objective. On average, the price of affordable housing is roughly two-thirds that of commodity housing (Mak et al., 2007). Obviously, the supply of economic housing has not made home ownership accessible for medium-income renters. Economic housing has been regarded as a profitable investment for higher income groups (Wang, 2000).

Economic housing is still difficult for most consumers to obtain, quite apart from the issue of price. In our survey, among those who had trouble buying economic housing, low supply (26.8 percent) was mentioned more often than high price (24.2 percent). People also think that an inconsistent policy on economic housing (15.6 percent), a complicated application process (16.5 percent) and an unfair supply policy (15.8 percent) have made it difficult to enter the economic housing market. Reforms to the legal process and functional supply system should also feature in future housing policy in China.

## Conclusion

This article is the first to pay attention to the effects of privatization of public housing on household purchasing power in Beijing. It connects housing affordability with housing inequality from the perspective of households' socioeconomic status. It provides an assessment tool for housing policy by linking the increasing distributional

inequality with the development of China's housing market.

In this study, we compared the traditional price-income ratio method and a new residual income approach based on a household survey in Beijing. Our empirical results for both potential first-time and existing buyers reveal the important role of institutional factors, including family structures, job status and educational attainment, in housing consumption. Their significant roles in relation to housing affordability are further demonstrated when we compare affordability between first-time and existing buyers. For medium- to low-income families, housing affordability is much more dependent upon housing wealth than on income. Households, especially of one and two persons, who have obtained housing through the privatization process are more likely to be able to purchase a standard apartment to improve their living conditions. Housing inequality has been translated into affordability inequality and this will intensify social stratification as house prices continue to rise.

## Notes

1. The *yuan* is the main unit of the Chinese people's currency (*renminbi*). One pound sterling is currently worth around 10.5 yuan.
2. The 'economic housing' policy is intended to allow medium- to low-income households to enter the housing market by reducing costs by means such as free transfer of land, and reductions or exemptions from taxes and levies. Each city or town sets its own conditions for purchase or sale of economic housing.
3. There is no official definition of 'low- to medium-household' in China. Some economists suggest that households with an annual income anywhere from 60,000 to 500,000 yuan (from 7250 to 60,400 US\$) should be categorized as medium-income. Beijing families with an annual income less

than 60,000 yuan are included in our medium-income group.

4. According to China's 2000 census, in Beijing, more than 60 percent of government officials, professionals and staff members of government organizations own their homes because they purchased housing from their work organization.
5. In Yang and Shen (2008) the average price of standard housing in 2003 is about 4700 yuan per square metre. If we adjust this by the average increase in house prices in Beijing from 2003 to 2006, which was 80 percent, we obtain a 2006 average price of 8000 yuan, which is slight lower than our result.
6. This result is similar to that in the study of Yang and Shen (2008) using the national statistics.

## References

- Bogdon AS and Can A (1997) Indicators of local housing affordability: Comparative and spatial approaches. *Real Estate Economics* 25(1): 43–80.
- Bourassa SC (1996) Measuring the affordability of home-ownership. *Urban Studies* 33(10): 1867–1877.
- Bramley G (1990) Access, affordability and housing need. Paper presented at *ESRC Housing Studies Conference*, University of Surrey, September 1990. Mimeograph, SAUS, University of Bristol.
- BSB (Beijing Statistics Bureau) (2005) *The structure of tenure in Beijing*. Beijing: Beijing Statistics Bureau.
- Chen S and Wang Y (2001) *China's Growth and Poverty Reduction: Recent Trends between 1990 and 1999*. *World Bank Policy Research Working Article* 2651. Available at: [http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2001/09/01/000094946\\_01081604003748/Rendered/PDF/multi0page.pdf](http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2001/09/01/000094946_01081604003748/Rendered/PDF/multi0page.pdf).
- Doyal L and Gough I (1991) *A Theory of Human Needs*. Basingstoke: Macmillan.
- Duda M, Zhang XL and Dong MZ (2005) *China's Homeownership-Oriented Housing Policy: An Examination of two Programs Using Survey Data from Beijing*. Joint Center for Housing Studies, Harvard University. Available at: <http://www.jchs.harvard.edu/publications/international/w05-7.pdf>.
- Fang C, Zhang XB and Fang SG (2002) Emergence of urban poverty and inequality in China: Evidence from household survey. *China Economic Review* 12: 430–443.
- Freeman A, Chaplin R and Whitehead C (1997) *Rental Affordability: A Review of International Literature*. Discussion Paper No. 88. Cambridge: Department of Land Economy, University of Cambridge.
- Grigsby WG and Rosenburg L (1975) *Urban Housing Policy*. New York: APS and Center for Urban Policy Research Rutgers University.
- Gustafsson B, Shi L and Sichular T (2008) *Inequality and Public Policy in China*. New York: Cambridge University Press.
- Gustafsson B, Shi L and Zhong W (2006) The distribution of wealth in urban China and in China as a whole in 1995. *Review of Income and Wealth* 52(2): 173–188.
- Hancock KE (1993) 'Can pay? Won't pay?' or economic principles of 'affordability'. *Urban Studies* 30(1): 127–145.
- Huang YQ and Jiang LW (2009) Housing Inequality in Transitional Beijing. *International Journal of Urban and Regional Research* 33(4): 936–956.
- Hulchanski JD (1995) The concept of housing affordability: Six contemporary uses of the housing expenditure to income ratio. *Housing Studies* 10(4): 471–491.
- Kutty NK (2005) A new measure of housing affordability: Estimates and analytical results. *Housing Policy Debate* 16(1): 113–142.
- Lau KM and Li SM (2006) Commercial housing affordability in Beijing 1992–2002. *Habitat International* 30(3): 614–627.
- Lee C-I (2007) Does provision of public rental housing crowd out private housing investment? A panel VAR approach. *Journal of Housing Economics* 16(1): 1–20.
- Li S and Zhao RW (2007) *Changes in the Distribution of Wealth in China, 1995–2002*. Research Article No. 2007/3 in UNU-WIDER. Available at: <http://econarticles.repec.org/article/unuwarticle/rp2007-03.htm>.
- Li SM and Li Z (2007) The road to homeownership under market transition: Beijing

- 1980–2001. *Urban Affairs Review* 42(3): 342–368.
- Logan J, Bian Y and Bian F (1999) Housing inequality in urban China in the 1990s. *International Journal of Urban and Regional Research* 23(1): 7–25.
- Mak SWK, Choy LHT and Ho WKO (2007) Privatization, housing conditions and affordability in the People's Republic of China. *Habitat International* 31(2): 177–192.
- Meng X, Robert G and Wang YJ (2005) Poverty, inequality, and growth in Urban China, 1986–2000. *Journal of Comparative Economics* 33(4): 710–729.
- Mostafa A and Wong FKW (2006) Relationship between housing affordability and economic development in mainland China: Case of Shanghai. *Journal of Urban Planning and Development* 132(1): 62–70.
- National Bureau of Statistics of China (NBSC) (2005) *China Statistical Yearbook 2000*. Beijing: China Statistical Press.
- Nee V (1989) A theory of market transition: From redistribution to markets in state socialism. *American Sociological Review* 54(5): 663–681.
- Nee V (1991) Social inequalities in reforming state socialism: Between redistribution and markets in state socialism. *American Sociological Review* 56(3): 267–282.
- Nordvik V (2006) Selective housing policy in local housing markets and the supply of housing. *Journal of Housing Economics* 15(4): 279–292.
- Rosen KT and Ross MC (2000) Increasing home ownership in urban China: Notes on the problem of affordability. *Housing Studies* 15(1): 77–88.
- Sato H (2006) Housing inequality and housing poverty in urban China in the later 1990s. *China Economic Review* 17: 37–50.
- Sen A (1983) Poor relatively speaking. *Oxford Economic Articles* 35: 153–169.
- Stone ME (1993) *Shelter Poverty: New Ideas on Housing Affordability*. Philadelphia, PA: Temple University Press.
- Stone ME (2006) What is housing affordability? The case for the residual income approach. *Housing Policy Debate* 17(1): 151–184.
- Sun BY (2004) *A General Research Idea on the House Welfare of Urban Low Income Group*. CASS Working Paper 155. (In Chinese). Beijing: CASS.
- Thalmann P (1999) Identifying households which need Housing Assistance. *Urban Studies* 36(11): 1933–1947.
- Thalmann P (2003) House poor or simply poor? *Journal of Housing Economics* 12(4): 291–317.
- Walder A and Oi J (1999) Property right in the Chinese economy: Contours of the process of change. In: Oi J and Walder A (eds) *Property Rights and Economic Reform in China*. Stanford, CA: Stanford University Press, 1–24.
- Walder S, Li B and Treiman D (2000) Politics and life changes in a state socialist regime: Dual career paths into the urban Chinese elite, 1949 to 1996. *American Sociological Review* 65(2): 191–209.
- Wang YP (2000) Housing reform and its impacts on the Urban Poor in China. *Housing Studies* 15(6): 845–864.
- Wang YP and Murie A (2000) Social and spatial implications of housing reform in China. *International Journal of Urban and Regional Research* 24(2): 397–417.
- Wu FL (2005) *Regulating the booming housing market: China's transition toward a property-based regime of accumulation and regulation shifts*. Unpublished article.
- Yang Z and Shen Y (2008) The affordability of owner occupied housing in Beijing. *Journal of Housing and Built Environment* 23(4): 317–335.
- Zhang XQ (2000) Privatization and the Chinese housing model. *International Planning Studies* 5(2): 191–204.
- Zhang XQ (2001) Risk and uncertainty in the Chinese housing market. *Journal of Real Estate Literature* 9(2): 161–168.
- Zhou XG (2000) Economic transformation and income inequality in Urban China: Evidence from panel data. *American Journal of Sociology* 105(4): 1135–1174.