

# Chapter 3

## Public Housing Programs and the Challenge of Household Affordability in Beijing

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### 3.1 Introduction

As China's political, economic and cultural center, Beijing is a strong magnet for both population and industry. Due to rapid industrialization and urbanization, the city's population has reached 20.2 million at the end of 2011 (according to Statistical Bureau of Beijing), and built-up urban areas have grown to 1,425.9 km<sup>2</sup> in 2011 (NBSC 2012). In addition, there have been massive urban renewals, shantytown rebuilding and new town development. The increased demand for housing has resulted in higher housing prices, and corresponding higher housing prices have grown in Beijing at a rate faster than the national average. The average price for commodity housing in Beijing increased 2.6 times from 2001 to 2009, while disposable income per capita increased only 2.4 times during the same period. This has created problems of low housing affordability and poor housing consumption, especially among low- and middle-income households. Severe housing problems are increasingly threatening economic stability in Beijing (Yang and Shen 2008; Yang and Wang 2011) and also widening social stratification between different cohorts (Yang and Wang 2011; Man 2011).

Under social and political pressures, in August 2007 the Chinese government committed to meeting basic housing needs of low-income "house-poor" urban households through developing public housing (SC[2007]No.24). This document signaled the turning point of Chinese post-reform housing history and essentially reversed the downside trend of public housing since 1998. For last few years,

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public housing program in China has been expanding at a dazzling speed. Official data suggests that China started constructing 16.3 million units of public housing and finished 11 million units during its “11th five-year plan” period (2006–2010) (MOHURD 2011). In 2010 alone, China started 5.9 million units and completed 3.3 million units of public housing. In the beginning of 2011, Chinese Prime Minister Wen Jiabao announced that the Chinese government is committed to building 36 million units of public housing during the “12th five-year plan period” (2011–2015). By this plan, public housing sector would accommodate roughly 20 % of Chinese urban households by 2015.

It is difficult to provide comprehensive evaluation on housing policy in China at its early stage. This paper, however, based on the unique dataset, put effort to test whether public housing programs in Beijing could to meet household affordability. In this study, a residual income approach is used to measure housing affordability of two programs: Economic and Comfortable Housing (ECH) and Capped Price Housing (CPH). In this measure, household affordability is related to a socially defined minimum market basket of goods and public housing costs. We find that in general the incomes of eligible households for public housing fall far short of the level required to access public housing. Although the price of ECH and PRH is lower than that of commercial housing, it is still too expensive for most medium – and low – income families. The development of public housing is challenged by its affordable for the eligible household.

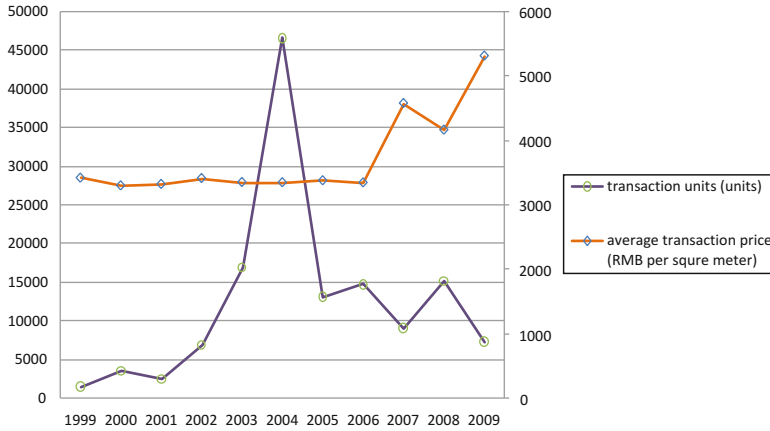
### **3.2 Public Housing Programs in Beijing: Economic and Comfortable Housing (ECH) and Capped Price Housing (CPH)**

As the capital of China, Beijing offers all available affordable housing programs, including Cheap Rent Housing (CRH), Economic and Comfortable Housing (ECH), Capped Price Housing (CPH) and Public Rental Housing (PRH). It indicates that the political objective of affordable housing program design is targeting low-and-medium-income households who cannot or have difficulties affording commodity housing in the private sector. At the subsidized rental level, CRH and PRH are restricted to eligible households and persons with low- and medium- income.

In Beijing, funding for affordable housing is mainly from the local government fiscal budget, 10 % of net proceedings from land granting, and loan from housing provident funds.<sup>1</sup> In 2011, Beijing government is given the permission to issue private debt and government bond to finance affordable housing construction.

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<sup>1</sup> Public provident funds are deposits from employers and their employees’ one – for – one match saving for the purpose of housing consumption. In 2011, in the 28 pilot cities, the reserves on housing provident funds is required to be invested in PRH development (MOHURD 2011).



**Fig. 3.1** Transaction units and average ECH transaction price in Beijing (Source: Beijing Municipal Commission of Housing and Urban – Rural Development)

### 3.2.1 Economic and Comfortable Housing (ECH) in Beijing

The Beijing municipal government’s strategy began in 1993 with the *Kangju* (healthy living) Project and continued with the national Economic Housing Project in 1998. The objective of that project is to improve living conditions for medium- and low-income groups and encourage the establishment of an economical housing supply system (Meng and Feng 2005).

ECH is encouraged by policies that including the free transfer of land and reductions or exemptions from taxes and levies. This makes the average price of ECH units lower than that of similar quality commercial housing. The ECH price is determined by the Ministry of Housing of Urban and Rural Development (MOHURD) and the National Development and Planning Committee. The general principle of ECH price determination is to cover construction costs and limit developer profits while making the housing affordable for medium-to-low-income households. As Fig. 3.1 shows, the ECH transaction price was rather stable before 2006 and started to increase after 2007 in correspondence with the growth of commercial housing prices. We can notice that 78,121 ECH units were sold from 1999 to 2004, according for 7 % of the total commodity housing in urban China during the same period. As the ECH price is one-third that of the market price on average, this implies that 30 % of housing wealth is shifted to assisted households. However, it is clear that the importance of ECH declined rapidly after 2004, and in 2010, transacted ECH units contributed less than 3 % of total new urban commodity housing. This may due to the reselling policy. Since 2004, after owning the economic housing and land-use permits for 5 years in Beijing, homeowners have been able to list their ECH in commercial markets to local housing authorities after

**Table 3.1** Eligibility conditions of applying for ECH in Beijing (2010)

Eligibility conditions		Economic and comfortable housing (ECH)
Target group		Medium-to-low-income households
Current living floor space per head		10 m <sup>2</sup>
Annual household income (RMB)	One-person	22.7 thousand
	Two-person	36.3 thousand
	Three-person	45.3 thousand
	Four-person	52.9 thousand
	More than five-person	60.0 thousand
Total household assets (RMB)	One-person	240 thousand
	Two-person	270 thousand
	Three-person	360 thousand
	Four-person	450 thousand
	More than five-person	480 thousand

Source: Beijing Municipal Commission of Housing and Urban – Rural Development

land tax, calculated as 70 % of the difference between the original and current market prices, is duly paid [SC[2007]No.24].

Eligible candidates for ECH in Beijing require local *Hukou* registration and must meet the demarcation line standards for total income and total wealth. Their current living floor space per head must be below 10 m<sup>2</sup>, including self-owned and rental housing. The eligible conditions are specified in Table 3.1.

### 3.2.2 Capped Price Housing (CPH) in Beijing

CPH was initiated in 2007 by the State Council as a new housing assistance program targeting mainly urban middle-income families. The program is also referred to as the dual-restriction commodity in which both selling price and apartment size are severely controlled. The price is set jointly by relevant local government departments, which consider the actual costs and reasonable developer profits. Generally, CPH profit is limited to 3–5 %, slightly higher than that of the comparable ECH and observably lower than the nearby ordinary commodity housing. The maximum size of a unit in CPH is limited to 90 m<sup>2</sup> per unit, and land for CPH is leased through tender auction at a lower price. The government's land lease tender states that finished units can only be sold to eligible homebuyers at fixed prices, and commercial developer bids are deemed unsuccessful if they do not abide by these requirements.

CPH is more flexible than ECH with regard to household income and assets. Under CPH, priority is given to households with elderly or disabled people and families whose residences were demolished by urban upgrade projects. Only local

**Table 3.2** Eligibility conditions of applying for CPH in Beijing (2010)

Eligibility conditions		Capped price housing (CPH)
Target group		Medium households
Current living floor space per head		15 m <sup>2</sup>
Annual household income (RMB)	Three-person or less	88.0 thousand
	More than three-person	116.0 thousand
Total household assets (RMB)	Three-person or less	570 thousand
	More than three-person	760 thousand

registered households are allowed to buy CPH, and they have to meet certain conditions concerning income level and housing assets. Similar to ECH, after 5 years, CPH owners can sell their housing after land tax, calculated at 35 % of the difference between the original and market prices at selling time, is duly paid. Eligible conditions for CPH in Beijing are displayed in Table 3.2.

In Beijing, CPH achieved its highest rate of development in 2009, when 64,000 units covering about 6.83 million m<sup>2</sup> were built. The respective supplies of CPH units were 42,000 in 2008 and 30,000 in 2007. In 2010, 30,000 CPH units were planned for construction,<sup>2</sup> about half that of 2009 level. This was primarily due to a shift in policy focus to public rental housing in the central government.

### 3.3 Previous Studies and Measures of Housing Affordability

The accurate assessment of housing affordability is important in order to formulate public policy and measure poverty. However, conceptual and empirical analysis of affordability is far from consistent in the previous studies. This is partly because of the conceptual complexity, and partly because of the weakness of the existing measuring methods.

Housing affordability is the ability of a household 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 standards, defined as the “poverty standard” by Bramley (1990) and the “minimum market basket” by Grigsby and Rosenberg (1975). In other words, housing is not affordable if it cannot meet householder’s requirement and utility at certain minimum level. Therefore, Bramley (1990) defines housing affordability by emphasising housing consumption that meets the “social sector norms of adequacy”. This definition describes the differences in opportunity cost between

<sup>2</sup> Source: Beijing Municipal Commission of Housing and Urban – Rural Development.

housing and non-housing consumption and captures three critical dimensions of housing affordability: income, housing costs and non-housing expenditure.

From this point, residual income approach has been paid particular attention (e.g. Thalmann 1999; Kutty 2005; Stone 2006). It highlights the critical relationship among income, housing cost and expenditures on non-housing necessities. It is thus appealing from a political perspective because it allows us to ask the question “affordable to whom?” and to address the service standard of housing that we are applying (Stone 2006). Freeman et al. (2000) provide an international review on the study of housing affordability and discuss the residual income approach. Kutty (2005) applies this method in the American study and argues that this results in a more accurate picture of the nation’s poverty. Yang and Shen (2008), Yang and Wang (2011) developed this method for a study of Beijing, and discuss its advantages in their case study of China.

Using this residual income approach in the study, firstly, we assess the minimum required expenditures for non-housing consumption of the eligible households. In this study, official poverty line of household determined by the Urban Living Standard Guarantee System (*dibao*) in Beijing is used to estimate non-housing consumption. The poverty line is used for providing social assistance to poor urban households. It is based on a “cost of basic needs” covering basic cost of cloth, food, living and compulsory education and adjusted every few years by Beijing Civil Affairs Bureau according to the changes of CPI. However, it is generally thought that the poverty line is set at an unreasonably low level and updating frequency is far behind the growing economy (Chen et al. 2010). We compare the poverty line with the average non – housing consumption for the 40 % bottom households from the Beijing Statistics Bureau and find that poverty line is much lower than the statistics level of household consumption. However, our general conclusion on household affordable for ECH and PRH is not variant much by using two different measures on non – housing consumption of household.

Secondly, average total purchase prices of ECH and PRH are used to estimate the housing costs of eligible households. Given the total cost of ECH and PRH, we can estimate the down payment and annual debt service payment respectively based on the Chinese standard repayment loan. We can thus derive a minimum required budget that is the sum of expenditures for non-housing goods and the costs of ECH and PRH after taking financing costs into account. By comparing the eligible household’s actual income (obtained from the Beijing Housing Indemnity Office (BHIO) in Beijing Municipal Commission of Housing and Urban – Rural Development) with minimum required budget estimated above, we are able to measure if ECH and PRH is affordable for the eligible households.

We can also measure affordable for renting housing such as CRH or PRH, by comparing eligible household’s actual income and minimum required budget including expenditures of non – housing goods and rents for LRH or PRH.

### 3.4 Data

The data on eligible household is obtained from Beijing Housing Indemnity Office (BHIO) in Beijing Municipal Commission of Housing and Urban-Rural Development.

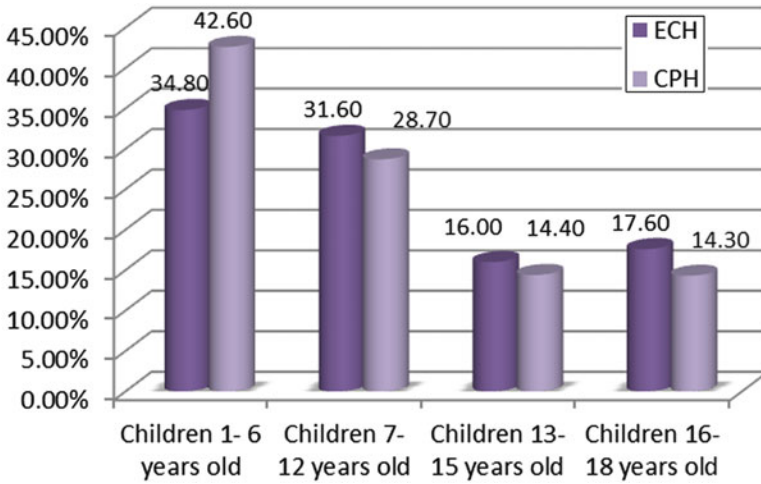
More than 40,000 families were approved as eligible for ECH and 70,000 families for CPH from 2007 to the first quarter of 2010. Table 3.3 summarizes the major characteristics of the eligible households in the database for the two programs.

In the table, annual income refers to total family income including salary, subsidies, income from financial assets and unregulated income. It shows that on average the incomes and asset values of eligible households in the ECH program are lower than those in the CPH program. For example, more than half of ECH households have annual income between RMB20,000 and RMB50,000, while more than half of CPH household annual incomes are between RMB50,000 and RMB100,000. These differences reflect policy discrepancies between the ECH and CPH projects described above. With regard to family structure, child ages are similar in both groups, as shown in Figs. 3.2 and 3.3. In general, more than half of the eligible households have children old enough to attend school, and more than 80 % of families are working class.

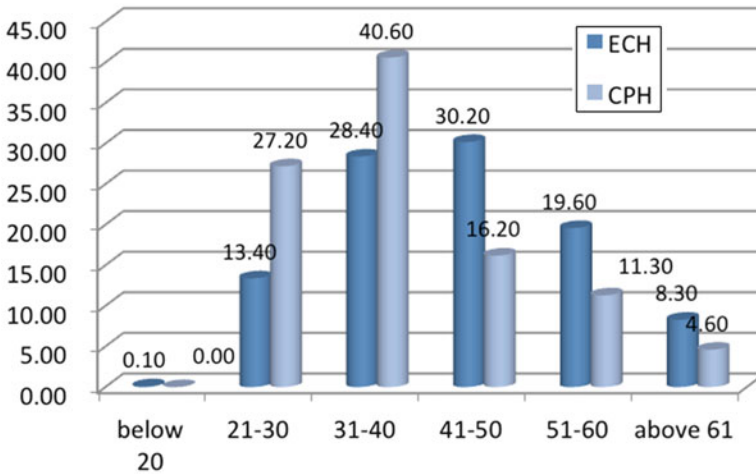
**Table 3.3** Major characteristics of eligible households for ECH and CPH in Beijing

Annual income (Thousand RMB)		Distribution (%)	
<b>ECH</b>	0–5	7.93	
	5.001–10	6.00	
	10.001–20	26.58	
	20.001–30	26.74	
	30.001–40	23.15	
	40.001–50	9.00	
	50.001–60	0.61	
<b>CPH</b>	0–10	2.94	
	10.001–30	13.93	
	30.001–60	43.30	
	60.001–70	15.21	
	70.001–100	23.59	
	Above 100	1.03	
Family assets (Thousand RMB)		ECH	CPH
0–50		45.94	27.54
50.001–100		21.25	19.44
100.001–500		32.81	49.80
500.01–600		0.00	2.74
Above 600		0.00	0.47

Sources: Beijing Housing Indemnity Office (BHIO) work reports by the BHIO



**Fig. 3.2** Child age distribution in families eligible for ECH and CPH (%) (Sources: Beijing Housing Indemnity Office (BHIO) and work reports by the BHIO)



**Fig. 3.3** Age distribution of households eligible for ECH and CPH (%) (Sources: Beijing Housing Indemnity Office (BHIO) and work reports by the BHIO)

### 3.5 Affordability of Housing Costs for Low-Income Households

In this section, we calculate the affordability of approval eligibility for ECH and CPH households from 2007 to 2009 using the residual income approach.

The average sale prices of ECH and CPH housing obtained from the BHIO are used. Average construction areas of 70 and 80 m<sup>2</sup> are used to calculate the total



**Table 3.4** Household affordability for ECH and CPH (RMB)

Year	2007	2008	2009	
	ECH	ECH	ECH	CPH
Total price	249,603	331,731	362,529	582,465
Down payment (20 %)	49,921	66,346	72,506	116,493
Amortization (yearly)	17,454	19,156	20,731	33,309
Non-housing expenditure (yearly)	10,788	11,484	13,572	13,572
Required minimum income (yearly)	28,242	30,640	34,303	46,881

Notes:

1. Average sizes of 30 m<sup>2</sup> per capita (construction area) are used to calculate total ECH and CPH costs
2. Loan maturity at 30 years is assumed in the estimation. This is currently the longest term for a bank mortgage loan for affordable housing
3. The mortgage rate used in the calculation is 7.83 % at the 2007 level, 5.94 % at the 2008 level and 6.94 % at the 2009 level
4. Non-housing expenditure is calculated using the poverty line which is yearly published by Beijing Civil Affairs Bureau
5. RMB refers to Renminbi, the Chinese currency  
US\$1 = RMB6.154, EUR1 = RMB 8.071 up to 2013 -5 -4

costs of ECH and CPH, respectively. These are referenced by the BHIO. Given the total costs of ECH and CPH, we can estimate the down payment and annual debt service payment, respectively. A standard repayment loan, which has been the dominant credit contract for affordable house purchase in China, is one in which the down payment is less than 20 % of the total value and the loan maturity is a maximum of 30 years. Applying the annual interest rate for each year, we can estimate the annual amortization for purchasing ECH and CPH, respectively, and the annual minimum income of a family required to purchase ECH and CPH in 2007, 2008 and 2009, respectively. Because CPH began in Beijing in 2008 with very few projects, we calculate CPH affordability only for 2009. The estimated results are shown in Table 3.4. By simply measuring the gap between these minimum required budgets and the actual income of a family (shown in Table 3.3), we can obtain the affordability of ECH and CPH debt payments. Further, we can give a general overview of down payment affordability by comparing total household asset value with required ECH and CPH down payments.

If we compare the actual family income shown in Table 3.3 with the required income calculated in Table 3.4, we find that more than 67.25 % of eligible ECH households have difficulties in purchasing ECH at the price level in year 2009, indicating that the ECH supply has not successfully made home ownership affordable. The affordability of CPH is better, with nearly 61.48 % of households showing higher incomes than the minimum required income level. For most households, down payment affordability is not a severe problem given the asset value shown in Table 3.2. More than 50 % of eligible households are affordable to downs payments of ECH and CPH.

To further understand household affordability for ECH, we specify the affordability for different household sizes (shown in Table 3.5). We find that one-person

**Table 3.5** Household affordability for ECH by households size (RMB)

Year	2007	2008	2009
<b>Household size</b>	<b>One-person household</b>		
Total price	86,070	114,390	125,010
Down payment (20 %)	17,214	22,878	25,002
Amortization (yearly)	6,018.47	6,605.62	7,148.57
Non-housing expenditure (yearly)	3,720.00	3,960.00	4,680.00
Required minimum income (yearly)	9,738.47	10,565.62	11,828.57
<b>Household size</b>	<b>Two-person household</b>		
Total price	172,140	228,780	250,020
Down payment (20 %)	34,428	45,756	50,004
Amortization (yearly)	12,036.93	13,211.25	14,297.14
Non-housing expenditure (yearly)	7,440.00	7,920.00	9,360.00
Required minimum income (yearly)	19,476.93	21,131.25	23,657.14
<b>Household size</b>	<b>Three-person household</b>		
Total price	258,210	343,170	375,030
Down payment (20 %)	51,642	68,634	75,006
Amortization (yearly)	18,055.40	19,816.87	21,445.71
Non-housing expenditure (yearly)	11,160.00	11,880.00	14,040.00
Required minimum income (yearly)	29,215.40	31,696.87	35,485.71

households have the most difficulty in housing affordability, while two-person families are relatively better. In 2009, more than 80 % of one-person households and more than 50 % of three-person households are not affordable for ECH. This level was around 40 % for the two-person households.

### 3.6 Concluding Remarks

China's affordable housing supply is increasingly viewed as a political issue because skyrocketing prices have raised concerns of widening inequality among households as well as unsustainable economic development. In Beijing, housing prices are challenged by rapid urbanization as well as increasing improvements to living conditions. A greater supply of affordable housing is also regarded as a measure to stabilize housing prices. About 100,000 affordable housing units were planned for construction in Beijing in 2011.

Despite the benefits it would ostensibly create, this study will show that a successful housing program is not only estimated by the number of affordable dwellings supplied, but also challenged by the extent to which the programs meet household needs concerning both affordability and accessibility. Based on the study of two affordable programs in Beijing, namely Economic and Comfortable Housing and Capped Price Housing, we find that low- and medium-income families fall far short of the level required for the subsidized housing to be affordable.

Affordable housing development in China is supported by government through preferential land supply and tax policy. The price of affordable housing is determined to ensure limited low profit for developers, nominally 3 %. It leaves little room for price decreases from the supply perspective, which suggests that demand-side subsidies, integrated with other income subsidy policies, should be complementally used in housing policy. This would provide households with more options to locate in areas that meet their affordability and accessibility demands. In addition, shared equity between low-income families and the government could be an effective policy that would decrease the financial burden of disadvantaged households and share the risk that arises from future housing values.

The responsibility of affordable housing provision in China rests almost entirely on local government. It is the role of central government to ensure that vulnerable families receive the highest quality housing and services in their time of greatest need. It is important for them to integrate affordable housing allocation into a wider coordinated context of urban planning, and to ensure that affordable housing communities are designed with good access to public services. However, this does not necessarily mean that government is the sole agent in affordable housing provision. That affordability programs in China have not successfully brought housing prices and accessibility within reach of the targeted income groups may imply that expansion of public/private partnerships could provide an effective model for the type of affordable housing that has been awarded worldwide (UNECE 2004).

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