Habitat International 35 (2011) 1–8

Contents lists available at ScienceDirect

Habitat International

journal homepage: www.elsevier.com/locate/habitatint

One decade of urban housing reform in China: Urban housing price dynamics and the role of migration and urbanization, 1995–2005

Junhua Chen [a,*], Fei Guo [a], Ying Wu [b]

[a] Department of Business, Macquarie University, Sydney NSW 2109, Australia
[b] Department of Public and Social Administration, City University of Hong Kong, Hong Kong

Keywords:
Urban housing price
China
Rural–urban migration
Urbanization
Panel model
Time-series and cross-sectional data

A B S T R A C T

This paper explores the possible effects of rural–urban migration and urbanization on China's urban housing prices through focusing on a critical decade in urban housing reform, from 1995 to 2005. Compared with other countries, China differs, to a certain extent, in migration and urbanization patterns due to its unique Household Registration System (*Hukou*) and huge population base. However, very few empirical housing studies have examined the role of rapid urbanization and massive rural–urban migration in affecting housing price dynamics in China. This paper analyses the changes over time in housing prices in each Chinese province and examines empirically the determinants of urban house price at national and regional levels using time-series and cross-sectional data. The study finds that the abolition of the policy on the provision of welfare housing in 1998 is an important milestone in Chinese urban housing reform, which resulted in the market-oriented urban housing provision system. When comparing the results from coastal and inland provincial analyses, it is found that coastal provinces encountered greater pressure and challenges in dealing with the accommodation of migrants who were mainly from inland provinces. In contrast, inland provinces have relatively less pressure from migrants. The results from this paper are also in agreement with the hypothesis that regional variations in the urbanization level would have impact on the price of sold commodity houses. The results from this microlevel analysis of housing price may inform the Chinese policy makers to re-evaluate China's urban housing reform policies from the perspective of facilitating labor migration and urbanization.

Introduction

In a remarkably short period China has experienced the process of commercialization of urban housing (Wang & Murie, 1996). Underlying this major system reform was the revolution in urban housing provision. Since the initiation of economic reforms in 1978 various new policies have been designed to privatize and reform the public-sector-dominated housing system in China. Theoretically, China's urban housing reform in the 1980s paved the way for the urban housing market based on the principle of law. In 1983, private property ownership rights (including real estate property) were written into the Constitution drafted by the State Council, although land is still controlled by the state (Wang & Xu, 1984). In 1988, the Ten Year Reform Strategy was initiated by the government to allow urban residents to buy and sell their houses, and to restructure rents in the public sector (Liu, 1989). The key transformation of urban housing commercialization was carried out in the 1990s. The official ending of the allocation of welfare housing in 1998 marked the establishment of market-oriented urban housing system in China (Wang, 2001). Instead of relying on the state or state-owned enterprises (*Danwei*) to provide welfare housing, most families in China today must turn to the urban commodity housing market to satisfy their accommodation needs. China has joined the ranks of homeowner nations in less than 30 years (Zhang, 1998).

Being a so-called open market, China's urban housing market is assumed to be subject to the law of supply and demand for urban housing. But what is the real effect of urban housing supply on urban house prices China? China's rapid urbanization process, generated by history's largest flow of rural–urban migration in the world, has led to the rapid increase in the urban population (Chan & Zhang, 1999). What role does this rise in urbanization play in China's urban housing privatization reform? Due to the special Household Registration System (*Hukou* system) in China, the migration from countryside to city is a complicated phenomenon that has at least two categories: official migration with *Hukou* transfer (or permanent migration), and unofficial migration without *Hukou* transfer (or temporary migration). Most of the unofficial rural–urban workers

* Corresponding author. Tel.: +61 2 9850 6472; fax: +61 2 9850 6065.
E-mail address: chenj@efs.mq.edu.au (J. Chen).

0197-3975/$ – see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.habitatint.2010.02.003

without a change of *Hukou* have not been included in calculation of the urban population. What effect do these unofficial rural–urban workers have on the process of commercialization of urban housing in China?

Existing studies trying to answer the above questions have been mainly through a review of macro-aspects of the housing system in China, such as the housing policies (Wang & Murie, 1999a, 1999b), housing consumption (Li, 2007), or an assessment of Chinese housing reform (Tong & Hays, 1996). Although the work by some scholars has contributed to demonstrate that the institutional factors are unique to affect Chinese housing consumption and residential crowding (Huang & Clark, 2002; Huang, 2004), there has been much less empirical analysis on urbanization and migration determinants of Chinese urban housing market growth at the microlevel. In particular, the regional variations of the urban housing market and the factors behind the provincial distinctions have not been adequately understood. This article attempts to fill the gap by 1) estimating the time series of housing prices in each province and 2) investigating empirically the determinants of urban housing market growth at national and regional levels with time-series and cross-sectional data.

Compared with other existing studies, this research explores the growth in China's urban housing market through focusing on a critical decade in China's urban housing reform, from 1995 to 2005. Throughout the 1980s and early 1990s state work units (*Danwei*) continued to dominate urban housing provision (Wu, 1996). It is only with the ending of the provision of welfare housing in 1998, by which housing supply turned into an open and private-sector market, has the transformation of tenure and the major reform in the system of provision of urban housing been accomplished. It is therefore important to study the growth in the urban housing market during this critical decade.

In addition, this article primarily attempts to explore the possible effects of urbanization and rural–urban labor migration on China's urban housing market. While some recent quantitative analysis on Chinese urban housing market have contributed to explore tenure consumption and residential mobility in big cities of China (Li, 2000, 2003; Lau & Li, 2006), very few studies have focused on the role of urbanization and rural–urban migration in affecting housing price dynamics in China. Compared with other countries, China differs, to a certain extent, in migration and urbanization patterns due to its unique Household Registration System (*Hukou*) and huge population base. The results may inform the Chinese policy makers to re-evaluate China's urban housing reform policies from the perspective of facilitating labor migration and urbanization. A possible contribution of this article is that its policy implications may shed light on how the Chinese government should strike a balance between an over-commercialized urban housing policy and the lack of knowledge regarding urban housing demand from low-income urban families and rural–urban migrant workers in the urbanization process. The remainder of this article is organized as follows. The next section presents a brief review of China's urban housing reform, urbanization and rural–urban migration. This is followed by a section on a theoretical framework and research hypothesis. The next section explains the methodology and variables in the time-series and cross-sectional model. The main section involves the empirical investigation. Concluding remarks are given in the last section.

A review of urban housing reform, urbanization and rural–urban migration in China

Compared with urban growth and rural to urban labor migration, Chinese urban housing reform has experienced a more complicated transformation due to the sensitive issue of land and housing tenure in the socialist political environment. Before the Reform and Opening-up Policy in 1978, there was no private urban housing market in China, and the provision of urban housing was a part of the socialist welfare system. Even after 1978 the reform of distribution of Chinese welfare housing still progressed slowly because of the continuing debate on the cession of state-owned land and work unit owned housing (Wu, 1996). Upto the mid-1990s the reform of urban housing system underwent several critical modifications. The nationwide establishment of an urban Housing Provident Fund (HPF) in 1994 was an important policy to facilitate the transition of housing from a welfare item to a commodity. After 1995, China instituted the urban commercial housing transaction market in almost every city. In 1998, the distribution of welfare housing within state-owned enterprises and government ministries was abolished through the transition of welfare housing to privation property. Before this transition, more than 80–90% of housing investment was from government or state-owned enterprises. By contrast, the percentage decreased to less than 50% after 1995. In 2001, the private rate of urban housing in most provinces had already increased to 80% and in Shanghai to almost 100% (The People's Bank of China, 2002). China's urban housing reform completed the revolutionary transition from a state-sponsored welfare housing provisioning system to an open commodity housing market in this critical decade. With this major conversion of the housing provision system, the cost of commodity residential housing in China increased quickly. Fig. 1 shows Chinese

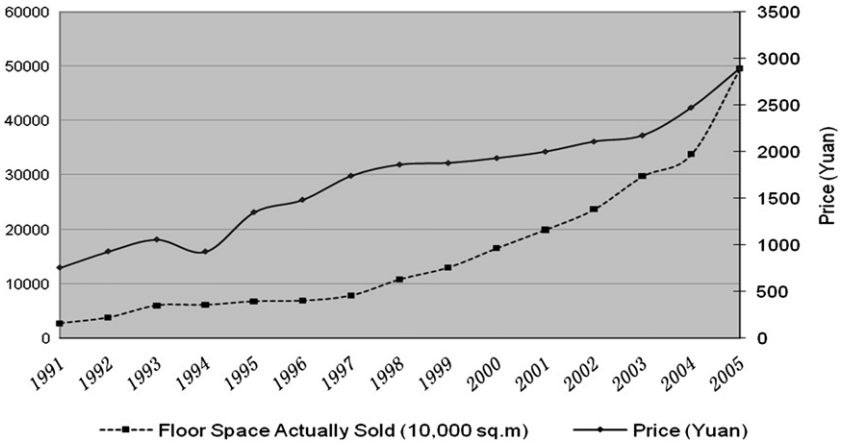

Fig. 1. Urban floor space of actually sold commercial residential housing and CPI deflator-adjusted commodity housing price in China: 1991–2005. Source: National Bureau of Statistics of China.

commodity housing trading by volume and CPI deflator-adjusted prices of commercial residential houses for the period 1995–2005.

Both transaction volume and housing price have increased rapidly from 1995 to 2005. Relative to the CPI (Customer Price Index) deflator, the adjusted price of urban residential houses in 2005 is more than six times higher than in 1991. In particular, the year 1998 should be described as a milestone in the urban housing market in China. The official ending of the provision of welfare housing in this year provided the institutional impetus for a rapid increase of not only urban commodity housing transactions but also the urban housing price. From then onwards the urban housing market became the major, sometimes even the sole, source of housing provision and the appreciation in house prices took place. Beside the urban housing market, public housing only accounts for a small part of China's urban housing system. Urban affordable housing and low-rent housing are the two main patterns of urban public housing in China. However, the limited supply of public housing and the strict application requirements force most urban households to fulfill their accommodation needs from the urban commercial housing market. The paper will discuss the Chinese public housing system again in the concluding section.

From the supply side, the annual floor space of completed commodity houses for the period 1991–2005 is included in this study to reflect urban commodity housing growth. In Fig. 2, from 1995 to 1998 the completed floor space of commodity houses in China has maintained a stable growth rate. By contrast, the line in Fig. 2 reflects the accelerated achievement of commercial housing in China from 1998 to 2005 on account of the abolition of the provision of welfare housing in 1998. It is useful to explore the effect of the rapid increase in supply of commodity housing on the urban housing market since 1998.

From the demand side, a possible explanatory factor for the rapid increase in housing prices is the great increase in housing demand from urban residents. Since housing is an essential requirement for each household, the demand for housing is usually not elastic, but inelastic, in the Chinese social environment (Shaw, 1997). This means that the expansion of the urban population would cause a high demand for housing without any substitutes. To see the situation of Chinese urbanization and urban population expansion, we separate the annual urban population growth into two parts according to China's special Household Registration System: one, the natural growth of the existing urban population; two, the net urban migration resulting from urban household registration transformation.[1] Table 1 plots the overall changes in urban population and the distribution of the natural increase in urban population, as well as the official migration to urban areas from 1991 to 2005. During this period, the natural growth in urban population remained stable and only accounts for a small part of the total increase in new urban population. By contrast, net migration forms the main part of urban population increase every year. In particular, after 1995 the gap between natural growth of urban population and net migration to urban areas has become increasingly bigger. It can be concluded from Table 1 that the net migration is the main source of urbanization in China and accounts for 90% of new urban residents.

As for migration, for a long time before the economic reforms of 1978, China followed the Russian model of economic growth and produced a form of urbanization similar to that of the FSU (the former Soviet Union) and the ECE (East and Central European) countries, which emphasized a low level of urbanization and the

[1] Migrants without the official transfer of household registration (*Hukou*) are defined as floating population and usually excluded from urban population in the official statistical survey and census in China.

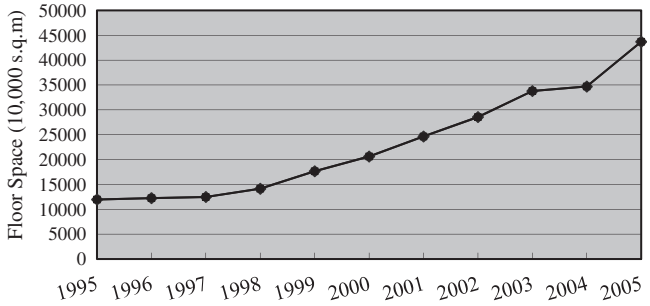

Fig. 2. Floor space of completed commodity houses in China: 1991–2005 (10,000 sq.m). Source: National Bureau of Statistics of China.

'anti urban bias of Chinese ruling ideology' (Ma, 2002). The main measurement of at that time was to carry out strict regulation of intra-country migration with the help of *Hukou* system during pre-reform period. After 1978, the official relaxation of the urban household registration system (*Hukou*), to some extent, facilitated population migration in China, mainly the increase in rural to urban migration and the development of new urban centres. The migration pattern resulting in the new urban centres was called population transfer by some scholars, which means population migration through the official exchange of administrative divisions for residence (Ma, 2002; Shen, 1996; Zhou & Ma, 2003).

Population migration in China is defined as official migration, or permanent migrants, with the transfer of household registration. These migrants with official urban household registration are included in the urban population in the official statistical survey and census. A hypothesis can be made that China's rapid urbanization and massive migration with the transfer of household registration has facilitated the urban housing growth. By contrast, migrants without the official transfer of household registration are called the floating population, or temporary migrants, and are usually excluded from urban population statistics. While rural–urban migrants without urban household registration have no eligibility to enjoy state-sponsored Urban Affordable Housing, whose price is far cheaper than the local normal market price, they may obtain commercial residential houses through the urban housing market. In addition, they have to rent or buy houses to accommodate themselves in urban areas. The floating population in theory may also lead to a thriving housing demand in urban areas.

In summary, the review has identified some possible factors related to China's rapid urbanization process, its rural to urban migration, and economic development effect on China's urban housing growth, such as: the supply of urban commercial residential houses; the changes in urban population mainly sourced from rural to urban migration; the rural to urban floating population in urban areas; and urban household income. To systematically investigate the determinants of the Chinese urban housing boom in the critical period for 1995 to 2005, we first set up an analytical framework based on the existing theories of urban housing. Then, we specify and estimate empirical models, through which evidence may be derived from time-series and cross-section data.

Driving dynamics of urban housing growth in China: a theoretical framework

Mankiw and Weil (1989) are the first authors to draw attention to the economic model of demographic influences on housing demand and real housing prices. Their model assumes that if the historical correlation persists, real house prices in the United States could fall substantially during the next three decades because of the recent demographic patterns. The theory begins with the facts about the

Table 1
The growth of urban population and relevant distribution in China: 1991–2005.

Year	Urban population (10,000 persons)	Annual growth of urban population (10,000 persons)	Annual natural growth of urban population (10,000 persons)	Percentage of natural growth of urban population (%)	Annual growth of net migrants (10,000 persons)	Percentage of net migrants (%)
1991	31203	1008	282.00	27.98	726	72.02
1992	32175	972	255.00	26.23	717	73.77
1993	33173	998	267.00	26.75	731	73.25
1994	34169	996	269.00	27.01	727	72.99
1995	35174	1005	261.00	25.97	744	74.03
1996	37304	2130	264.00	12.39	1866	87.61
1997	39449	2145	322.00	15.01	1823	84.99
1998	41608	2159	310.00	14.36	1849	85.64
1999	43748	2140	289.00	13.50	1851	86.50
2000	45906	2158	280.42	12.99	1877.575	87.01
2001	48064	2158	201.07	9.32	1956.932	90.68
2002	50212	2148	212.92	9.91	1935.076	90.09
2003	52376	2164	216.92	10.02	1947.084	89.98
2004	54283	1907	236.22	12.39	1670.784	87.61
2005	56212	1929	263.82	13.68	1665.185	86.32

Source: National Bureau of Statistics of China.

baby boom and predicts the demographic changes caused by the rise and subsequent decline in births. Using cross-sectional data from the population census for the years 1970 and 1980, Mankiw and Weil examine the link between demographic factors and housing demand. This microeconomic analysis focuses on the individual family to conclude that housing demand rises sharply between ages 20 and 30, and remains approximately flat after 30. The main variables in their model are age, income, and some other household variables. The central conclusion to their model is that changes in the number of births over time lead to large and predictable changes in the demand for housing. Accordingly, housing demand changes appear to have a substantial impact on the price of housing. To some extent, this model especially studies the impact of natural growth of urban population on housing demand and real housing prices, but ignores the impact of urban growth and the inflow of migrants to cities. The main possible reason is that migration in the United States, unlike in China, is free and personal movement occurs without any institutional barriers.

From an urbanization perspective, early urban economists, including Alonso (1964), Kain (1962) and Muth (1969), suggested models involving urban growth and housing supply, which were keenly focused on the interplay between housing markets and urban expansion. In the place-to-place migration model, household moves are believed to depend upon the relative housing and labor market opportunities in the originating and destination regions, local amenities, population characteristics, and relocation costs. Glaeser, Gyourko, and Saks (2006) further developed these models. Like Mankiw and Weil, they put some demographic variables into their empirical model. However, they are mainly interested in how certain urban forms impact the nature of housing supply. The characteristics of households are basic analysis units in their model. The empirical results demonstrate that the fundamental connection between urban change and the housing stock is clearly evident in the strong correlation between population levels and housing units. Besides households, they also consider two patterns in the supply of urban housing (inelastic supply and elastic supply) to illustrate the key issues. They argue that if a city's housing supply is relatively elastic, the increase in household results in a relatively modest upward shift in housing demand and a corresponding modest increase in housing prices. By contrast, if housing supply is inelastic, housing prices must rise significantly.

In addition, the literature on Chinese urban housing growth suggests that some institutional factors as well have unique effect on urban housing demand and real housing prices in China. In the model of housing consumption and crowding suggested by Youqin Huang (2003), the room stress data is examined against three kinds of factors: changes in demographics; institutional factors; socioeconomic variables. In another multilevel model using the same housing data, Youqin Huang and Clark (2002) suggests that both market mechanisms and institutional forces affect households' tenure choice in urban China. However, the research by Youqin Huang is limited to quantify the so-called institutional factors. In the above two models, Youqin Huang only apply those socioeconomic variables, such as *Hukou* status, job rank, work-unit rank, Work-unit type, to reflect the changes in Chinese social institution. It is necessary to mention that these indirect variables are less enough to quantify the institutional changes.

For the purpose of this article, we also put some indirect institutional variables (*Hukou* status and urbanization level) into the final analysis model. Nevertheless, it is almost true that these institutional factors are much more difficult to quantify in the quantitative model. This study makes some exclusions and mainly focus on those relevant to China's experience of urban housing transition. For example, the rise in household numbers in China may drive both urban housing demand and the increase in housing prices in the cities. The urban household income is another important variable included in the model of this study. The increase in household income may also drive the consumption of housing. Moreover, changes in supply of urban housing are a possible explanation for the growth of the urban housing market in China. Due to the radical transition in China's urban housing provision system, urban housing supply has experienced significant changes during the critical period of urban housing reform in China. In particular, institutional factors are considered in this study. Different from other countries with free movement of people, internal migration in China can be divided into two categories according to the pattern of changes in household registrations. This study sets two migration variables to explain these two different migration patterns: the net migration with official transfer of household registration, and the floating movement without household registration transfer. Having regard to the main purpose of this article, this study has to ignore some institutional factors, such as: changes in housing policies, municipal land policies and the complicated relationship between government and land development corporations (LDC).

Empirical analysis of determinants of urban housing market growth in China

Variables and time-series data

In this section we conduct multivariate statistical analyses to explore the growth in the urban housing market in China. How high

is the urban housing price as an outcome of the interplay between a range of demand and supply factors (DiPasquale & Wheaton, 1994; Tsatsaronis, 2004). To obtain a general description of the growth in Chinese urban housing and possible relevant determinants, we first provide a profile of all variables. Here the province is identified as the unit for statistics. The urban commodity housing price is the dependent variable in all models in this article, and also is the critical variable to reflect the changes in the urban housing market.

Except for the urban commodity housing price, we use the following explanatory variables in accordance with previous research work and China's experience. Demand factors include, inter alia, urbanization levels and the number of persons in floating population (or temporary migrants) in urban areas. These two variables reflect a host of demographic and urban institutional factors. As mentioned in the review section, urbanization levels are dependent, not only on the institutional administration of urban centres, but also on the urban household registration system. The number of migrant rural workers in urban enterprises is a special variable reflecting the situation of a particular social group in China, the floating population without urban household registration. In the Chinese context, *Hukou* determines a person's access to housing opportunities in urban areas. This point will be discussed again in the concluding remarks section. In contrast, urban household income and the floor space of completed urban houses belong to the supply factors, which depend on economic conditions and real estate capital investment. Urban household income is an important factor in the plan for family housing, as pointed out in earlier. The newly completed urban houses reflect the new housing investment and determine the subsequent housing supply in the urban housing market, which may have a possible effect on urban housing prices (Poterba, Weil, & Robert, 1991).

The situation of urban housing prices and available housing accommodation are presented in Figs. 1 and 2. Fig. 3 describes the changes in the other three explanatory variables in this study. Urban household income experienced a stable increase from 1995 to 2005. In the same period, the increasingly prosperous urban centres attracted a wave of migrants from rural to urban areas (Zhang & Song, 2003). This internal migration of population had an active effect on the urbanization process because, after the 1990s, the population's natural growth rate in most urban areas has stayed at the replacement level. The rural to urban migration with official transfer of household registration has become the major driving force of Chinese urbanization process. Although only a fraction of the total number of migrants can become converted to urban residents, the level of state urban population increased rapidly for the period of 1995–2005, generally through the reclassification of urban administrative boundaries and through the sale of urban household registrations in migration process as a revenue generating scheme for local governments.

The unit for the above profile including all explanatory variables in the analysis is province (or Autonomous Regions). Nonetheless, changes in these explanatory variables, to some extent, may mask the regional variation in the urban housing market and its relevant determinants. Table 2 presents main characteristics of urban housing market in China's coastal developed provinces and inland less-developed provinces. In this article, coastal provinces (12 provinces in total) include Liaoning, Hebei, Tianjin, Beijing, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Guangxi, and Hainan; inland provinces (17 provinces in total) are Heilongjiang, Jinlin, Inner Mongolia, Shanxi, Henan, Anhui, Hubei, Hunan, Jiangxi, Shaaxi, Gansu, Ningxia, Qinghai, Xinjiang, Sichuan, Yunnan, and Guizhou. A similar classification can be found in existing studies focusing on the regional variation in China (Lin, Wang, & Zhao, 2004). The major contribution to the rapid urbanization process in China emerges from the rapid increase in urbanization levels in inland provinces, whereas, in marked contrast, most coastal provinces have already achieved a relatively high level of urbanization and the further increase in recent years would be relatively slow. Moreover, the regional gap in urban household annual income between coastal and inland provinces is also considerable, being more than 2500 Yuan on average. The noticeable variation in the floating population in urban areas and the supply of urban commodity houses between coastal and inland provinces reflect the distinct economic levels and urban housing situation in China. The major issues in the analysis that follows, therefore, concern the effect of possible factors influencing urban commodity housing prices based on the time-series and cross-section data.

Analysis with time-series and cross-sectional data

The national descriptive analysis presented in previous section is limited in understanding the changes in the urban housing market at provincial levels. To explore the information about the time-series provincial urban housing market in China, the research extends the time-series analysis to the panel model at provincial level (time-series and cross-sectional data), which emphasizes the role of urban household income, provincial urbanization levels, the

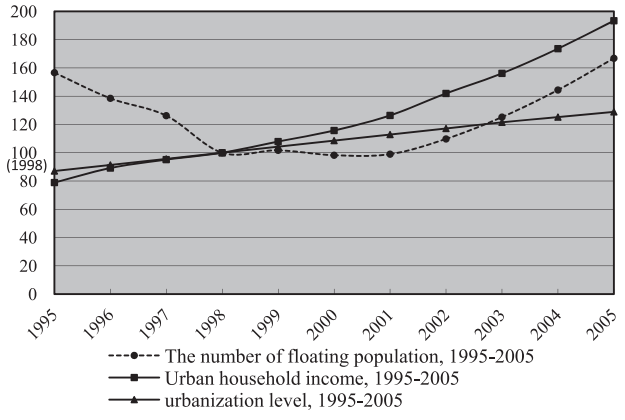

Fig. 3. The index of three explanatory variables. Note: Three explanatory variables are the urban household income, the floating population in urban areas, urbanization level. All data in Fig. 3 are the index of three variables based on the level in 1998. Source: National Bureau of Statistics of China.

Table 2
The regional variation and main characteristics of Chinese urban housing market, 1995–2005.

The number of provinces	Coastal provinces	Inland provinces
	12	17
The average urban housing price (yuan/sqm)	2113.89	1144.29
The average income of urban families (yuan p.a.)	8220.4	5672.79
Urbanization level (% of urban population)	47.34	32.05
The annual floor space of completed house (10,000 sq.m)	1477.61	626.59
The number of floating population (10,000 persons)	59.85	24.42

Source: Author's calculation from national data of NBSC. Because the newly established municipal city of Chongqing was a part of Sichuan province before 1996, to be consistent, the city of Chongqing is still treated as part of Sichuan province. Moreover, due to too many missing values, Tibet province has been dropped from the sample of empirical analyses.

size of the floating population in the urban area and the supply of completed urban commodity residential houses in determining the growth in the urban housing market in the different provinces of China. Two panel models are designed: one for the changes in the urban housing market in each province, and another for the regional situation in both coastal and inland provinces.

The general analysis model is given as:

$$Ptj = \alpha 0 + \alpha 1 Itj + \alpha 2 Utj + \alpha 3 Ftj + \alpha 4 Htj + \varepsilon t$$

where

Ptj

The urban commodity housing price in province *j* at *t* year within 11 years (1995–2005). Due to unavailability of urban commodity housing prices before 2000, the data of this variable is calculated from the proportion of the total sales value of commodity houses in that year by the floor space of actually sold commodity residential houses. All data in the above calculation process are from NBSC. The results are illustrated in Fig. 1. The urban commodity housing prices is an important index to measure the urban housing growth in China, because the commodity houses are becoming the major housing tenure in urban China since the official abolishment of welfare housing allocation in 1998.

Itj

The urban household income in *j* province at *t* year, which reflects the urban family's economic capability.

Utj

The urbanization level in province *j* at *t* year, obtained from the adjustment evaluation of the UN method based on the data of agricultural and non-agricultural population in each province of China. We introduce the provincial urbanization level as an explanatory variable to examine the hypothesis that the larger urban populations and urban concentrations in a province tend to produce a larger demand of urban residential houses. To some extent, this variable also reflects the situation of migration to urban areas with official transfer of Household Registration as the major dynamic of the Chinese urbanization process.

Ftj

The extent of the floating workers in province *j* at *t* year; Due to the missing exact number of floating population in each province of China, here the floating workers working in urban China is used to reflect the changes in the floating population in urban areas without official transfer of Household Registration. The hypothesis behind this variable is that most migrant people without urban resident identity find it difficult to enter the local urban housing market because of their poor economic conditions, and usually 3D occupations (Dangerous, Dirty and Difficult).

Htj

The floor space of completed commodity houses in province *j* at *t* year, which reflects the supply of urban houses.

The data on all independent variables, except *Utj*, are from China Statistical Yearbook (1995–2005). The provincial urbanization levels (*Utj*) are estimated using the UN urbanization method, as well as non-agricultural and agricultural population data. The detailed method of estimating urbanization levels is presented in the note.[2] Because the newly established municipal city of Chongqing was a part of Sichuan province before 1996, to be consistent, the city of Chongqing is still treated as part of Sichuan province. Moreover, due to too many missing values, Tibet Autonomous Region has been dropped from the model of analyses.

Table 3
Determinants of urban housing prices in all provinces of China, 1991–2005.

Dependent variable: the price of sold commodity houses (yuan per sqm)		
Independent variables	Coefficients	*Z* statistic
Constant (c)	468.41**	3.72
Urban household annual income (yuan)	0.132**	9.49
Provincial urbanization levels (% of urban population)	6.57*	1.80
The annual floor space of completed houses (sq. m)	0.0155	0.39
The number of floating population	−1.98	−2.18
R^2	0.6126	

Number of provinces: 29; Number of observations: 319.
*Level of significance: 5%; **Level of significance: 1%.

The results of the first provincial model for 1995 to 2005 are reported in Table 3 from which the following main points emerge.

First, the overall result of estimates in regressions is satisfactory. The value of R^2 is around 61%, suggesting a reasonable explanatory power of the model. The significance of annual urban household income (*Itj*) is constant with our hypothesis mentioned in the theoretical framework section.

Second, as is expected in Table 3, the growth in urban household income in the provinces of China is significantly positive with respect to the prices of sold commodity houses. This finding is consistent with the theoretical predictions in the last section. In this regression, both the supply of urban houses (*Htj*) and the floating population (*Ptj*) are insignificant to the price of urban houses. The former result may be due to the fact that the supply of urban residential houses does not satisfy the actual demand of the urban housing market. While the urban housing market in China is private and open, the Chinese market in land is controlled by local governments. The supply of urban houses and the final housing prices are determined by the real estate development companies. In a word, the supply of urban houses in China is not the traditional factor of a normal open housing market. The insignificance of the number of migrant rural workers may be due to the fact that these floating people without official urban household registration find it difficult to participate in the local urban housing market because of poor economic conditions and institutional barriers.

Third, while the coefficients for provincial urbanization levels (*Utj*) are statistically significant and positive in Table 3, we doubt its real effect on urban housing prices. The geographic distribution of urbanization levels suggests that the major contribution for the growth of Chinese urbanization levels is from those less-developed provinces with relatively low original urbanization levels. The results of the following regional panel models (coastal and inland provinces) demonstrate our uncertainty. We will discuss this issue again in the next part of the empirical analysis.

The aim of second model is to explore the regional variation of urban housing growth in China. All provinces are divided into two categories according to the geographic location and economic level: coastal provinces and inland provinces. The coefficients can be

[2] The United Nations Method is the most popular methodology to calculate urbanization level, designed by United Nations Population Division. The main advantage of UN method is to use incomplete data to estimate the urban–rural population rate, namely, the level of urbanization. China has no annual urban and rural population data, but agricultural and non-agricultural population emerged from China's Household Registration System (*Hukou* System). In this article, the urbanization levels calculated with United Nations Method were adjusted by official agricultural and non-agricultural population data.

Table 4
Determinants of urban housing prices in both coastal and inland provinces of China, 1991–2005.

Dependent variable: the price of sold commodity houses (yuan per sqm)				
Independent variables	Coastal provinces		Inland provinces	
	Coefficients	*t* statistic	Coefficients	*t* statistic
Constant (c)	1544.40**	6.48	108.93	0.81
Urban household annual income (yuan p.a.)	0.22**	8.03	0.049**	3.63
Provincial Urbanization levels	−20.47**	−2.96	26.74**	4.69
The annual floor space of completed houses	−0.048	−0.61	0.019	0.68
The number of floating population	−2.63	−1.97	−3.98**	−2.99
R^2	0.66	0.75		
Number of provinces	12	17		
Number of observations	142	247		

*Level of significance: 5%; **Level of significance: 1%.

compared to show the regional difference between developed and developing provinces in China. Table 4 reports parameter estimates of the models. The values of R^2 in Table 3 suggest that a regional classification of all provinces is improved in explaining the provincial differences in growth of the urban housing market. The overall estimates for inland provinces ($R^2 = 0.75$) is better than the regressions for coastal provinces ($R^2 = 0.66$).

As for annual urban household income, this factor is significant in both coastal and inland provinces. By contrast, the annual floor space of completed houses is insignificant in both of them. These two constant results in both types of provinces are consistent with the outcomes of the provincial model in previous section.

The regression result of rural to urban migrant workers in coastal provinces suggests the change in numbers of migrant rural workers have no significant impact on the growth of urban housing prices. This result supports our hypothesis that most migrants are not able to participate in the local urban commodity housing market due to relatively poor economic and employment status. Moreover, the floating population in coastal provinces accounts for the majority of migrant workers who are mainly from inland provinces where residents have a large income and economic gap compared with residents of coastal provinces. The regression estimate for inland provinces reveals an apparent puzzle in that the migrant workers in inland provinces have a significant effect on changes in urban housing prices. This may be due to the relatively low threshold of the urban housing market in inland provinces. Moreover, there is migration of small merchants to inland provinces from coastal provinces (Zhang, Zhang, Rozelle, & Boucher, 2006). These migrating small merchants might be more readily able to obtain houses in the local housing market as temporary accommodation and warehouses.

The most important finding in Table 4 is that the coefficients for provincial urbanization levels are statistically significant in explaining the changes in urban housing price and they are positive in inland provinces model and negative in the coastal provinces model, while in Table 3 it is less significant. This result accept the hypothesis mentioned in the previous section that regional variations in the urbanization levels have certain impact on the price of sold commodity houses. The negative coefficient may imply that many coastal provinces already have high urbanization levels at the beginning of the analysis period. It would be difficult for ordinary rural–urban migrants to obtain local urban household registration status. Some coastal provinces, such as Beijing and Shanghai, set high threshold for the much sought-after local urban *Hukou* (Wang, 2004). The negative coefficient of urbanization levels and insignificant coefficient of the number of floating population in coastal provinces model may also suggest that, even though there are large numbers of migrants moving to those coastal provinces, most of them would be highly unlikely to participate in the local high-price commodity housing market. By contrast, many inland provinces are experiencing a process of rapid urbanization due to relatively low urbanization levels at the beginning of the analysis period. The migrants to urban areas in inland provinces may find it easier to obtain urban household registration (*Hukou*) due to a much lower threshold of urban *Hukou* status. The fast increase in urbanization levels in those less-developed inland provinces means that the rapid increase in population, mainly rural–urban migrants, has moved to urban centres and generated a huge demand for housing.

Conclusion

In recent years, it has been increasingly concerned about urban housing reform and the rapid increase in urban housing prices in China. In the long period after 1998, many Chinese policy makers have regarded the urban housing market as the main (even the sole) source of housing provision and the major dynamic of Chinese economic growth. In part, public housing policies concerning the demand for housing from low-income earners and migrants in urban areas have been ignored. This article uses the time-series and cross-sectional data to address mainly the urbanization and migration factors that lie behind China's rapid growth, measured by the housing prices, in the urban housing market in the critical period 1995 to 2005. The detailed empirical analysis in this article could inform Chinese housing policy makers to be concerned about the regional variability in Chinese urban housing growth and the demand for basic housing from low-income earners and migrants. The findings of the article can be summarized as follows.

The results of our analysis suggest that the urban housing supply has no significant effect on the price of urban commodity houses for the critical period 1995 to 2005. The possible explanation for this result is that the supply of urban housing in China is not decided by the actual demand from the urban housing market, but controlled by the land supply approved by the state and the business strategies of real estate development companies. Although many scholars suggest that China has joined the ranks of housing market nations (Lee, 2000; Shaw, 1997), the urban housing market in China, to some extent, still retains some statism features, such as the state-controlled land market. The close relationship between local government and land development corporation (LDC) is not a secret in China (Dowell, 1993). As these qualitative policies and social relationships are much more difficult to model, it is impossible to completely illustrate institutional effect from this analytical model without any essential exclusion. However, the unique result of the urban housing supply at least suggests that the over-dependence on the urban housing market as the major provider of housing recently caused a serious problem in many regions in China: a substantial amount of land has been left standing idle by Land Development Corporation (LDC) and not developed to add to the supply of urban houses. The hoarding of land in many cities in China is serious.[3] The latest policy from the central government that regulates the real estate companies state that must develop

[3] Because the cost of land reserves is very cheap, many developers purchase land at relatively low prices and keep it undeveloped until its value has risen. According to the report from CCTV (China Central. Television), a total of 330 million square meters of land sit idle between 2006 and 2008 in China. In Beijing, 12 plots of land bought for reasonably high prices are still waiting development. In Shanghai over 1000 ha of land set aside for residential housing is still lying untouched. Many developers prefer to hold on the land and resell later at a higher price, hoping to obtain a profit. Shiyi Pan, the Chairman of SOHO China, said that almost one third of Land Development Corporations (LDC) in China profit from the resale of their purchased land, and never develop real estate. (Huangqiu, 2009).

the land within two years, otherwise government has the right to reclaim the land. This ironic policy reveals the unique mechanism of urban housing supply in China which seems to be inconsistent with the widely accepted economic notions.

Second, while the results in this paper suggest that the increase in urban household incomes can drive the growth in urban housing prices, the power of urban household income on the urban housing market is not clear. Compared with the increase in urban household incomes, the rise in urban housing prices is too fast. After 1998, the speed of the upward movement in urban housing prices has been far quicker than that of urban residents' incomes and economic capacity. The Chinese government should give further consideration to its urban housing policy, which regards the housing industry as the major dynamic of national economic development. An overrated urban housing market without essential provision and allowance for public housing may cause serious social problems and damage the national economy. Such lessons were clearly evident in the current subprime financial crisis in a number of Western countries.

Third, policy implications regarding migration and the urban housing market could be drawn from this study. The analytical models in this paper suggest that the change in numbers of migrant rural workers have no significant impact on the growth of urban housing prices in coastal provinces which are the main destination of most rural–urban migrants. In contrast to other countries, the migration of Chinese people comprises two categories based on the status of these migrants' *Hukou* registration. Most rural–urban migrants are excluded from the category of urban residents in official censuses. Moreover, this special population group is not considered as a part of the urban housing provision system by Chinese housing policy makers. Many scholars also support this policy and argue that most rural–urban migrants have houses in their rural hometown and, accordingly, have no right to enjoy the provision of urban public housing (Wu, 2002). This suggestion is based on an assumption that all rural–urban migrants would return to their hometowns and continue to live in their houses there. However, this assumption is disproved by the fact that more and more rural–urban migrants choose to reside in urban areas over the long term (Zhao, 2000).

Last, in this paper it has been shown that the varieties of provincial urbanization process and migration situation have significant effect on urban housing prices in China. Due to regional variations in urbanization levels, the pattern of migration in China's provinces is also substantially different. Coastal provinces receive a large number of migrants from inland provinces (including both official migrants and floating people) due to their rapid economic growth and availability of employment opportunities. Governments in these coastal provinces need to take effective measures to deal with the accommodation of migrants. Until recently, there has been no specific public housing policy for the migrants who suffer poor economic conditions and a surge in demand for houses in urban areas. By contrast, inland provinces have relatively low pressure from accommodating migrants. The migrants find it easier to obtain houses in the local housing market, as well as the second-hand housing market. This might be a good opportunity for inland provinces to utilise the urban housing industry to establish newly developed urban centres and cities and therefore to increase their urbanization levels, which in turn might drive further economic growth in the future.

References

Alonso, W. (1964). The historic and the structural theories of urban form: their implications for urban renewal. *Land Economics, 40*, 227–231.

Chan, K. W., & Zhang, L. (1999). The *Hukou* system and rural–urban migration in china: processes and changes. *The China Quarterly, 160*, 818–855.

DiPasquale, D., & Wheaton, W. C. (1994). Housing market dynamics and the future of housing prices. *Journal of Urban Economics, 35*(1), 1–27.

Dowell, D. E. (1993). *Urban residential redevelopment in the People's Republic of China*. Working Paper No. 591. Berkeley: University of California.

Glaeser, E. L., Gyourko, J., & Saks, R. E. (2006). Urban growth and housing supply. *Journal of Economic Geography, 6*, 71–89.

Huang, Y. (2003). A room of one's own: housing consumption and residential crowding in transitional urban China. *Environment and Planning A, 2003*(35), 591–614.

Huang, Y. (2004). Housing markets, government behaviors, and housing choice: a case study of three cities in China. *Environment and Planning A, 2004*(36), 45–68.

Huang, Y., & Clark, W. A. V. (2002). Housing tenure choice in transitional urban china: a multilevel analysis. *Urban Studies, 39*(1), 7–32.

Huangqiu. (2009). http://finance.huanqiu.com/roll/2009-11/619511.html (in Chinese).

Kain, J. F. (1962). The journey-to-work as a determinant of residential location. *Regional Science, 9*(1), 137–160.

Lau, K. M., & Li, S. (2006). Commercial housing affordability in Beijing, 1992–2002. *Habitat International, 30*(3), 614–627.

Li, S. (2000). Housing consumption in urban China: a comparative study of Beijing and Guangzhou. *Environment and Planning A, 32*(6), 1115–1134.

Li, S. (2003). Housing tenure and residential mobility in urban China. *Urban Affairs Review, 38*(4), 510–534.

Li, S. (2007). The road to home ownership under market transition: Beijing, 1980–2001. *Urban Affairs Review, 42*(3), 342–368.

Lin, J. Y., Wang, G., & Zhao, Y. (2004). Regional inequality and lalor transfers in China. *Economic Development and Cultural Change, 52*(3), 587–603.

Liu, J. J. (2 January 1989). Privatisation of housing in China. *People's Daily*. Overseas ed., 2.

Lee, J. (2000). From welfare housing to home ownership: the dilemma of China's housing reform. *Housing Studies, 15*(1), 61–76.

Ma, L. J. C. (2002). Urban transformation in China, 1949–2000: a review and research agenda. *Environment and Planning A, 34*, 1545–1569.

Mankiw, W. G., & Weil, D. N. (1989). The baby boom, the baby bust and the housing market. *Regional Science and Urban Economics, 19*, 235–258.

Muth, R. (1969). *Cities and housing*. Chicago: University of Chicago Press.

Poterba, J. M., Weil, D. N., & Robert, S. (1991). House price dynamics: the role of tax policy and demography. *Brookings Papers on Economic Activity, 1991*(2), 143–203.

Shaw, V. N. (1997). Urban housing reform in China. *Habitat International, 2*(2), 199–212.

Shen, J. (1996). Internal migration and regional population dynamics in China. *Progress in Planning, 45*, 123–188.

The People's Bank of China. (2002). *The executive report of Chinese monetary policy in 2002*. Beijing: China Finance Press.

Tong, Z. Y., & Hays, R. A. (1996). The transformation of the urban housing system in China. *Urban Affairs Review, 31*, 625–658.

Tsatsaronis, K. (2004). What drives housing price dynamics: cross-country evidence. *Quarterly Review – Federal Reserve Bank of Minneapolis, 3*, 65–78.

Wang, D., & Xu, B. (1984). *The commentary on the constitution of the People's Republic of China 1984*. Beijing: Qunzhong Press. (in Chinese).

Wang, F. (2004). Reformed migration control and new targeted people: China's Hukou system in the 2000s. *China Quarterly, 177*, 115–132.

Wang, Y. P. (2001). Urban housing reform and finance in China: a case study of Beijing. *Urban Affairs Review, 36*(5), 620–645.

Wang, Y. P., & Murie, A. (1996). The process of commercialization of urban housing in China. *Urban Studies, 33*, 971–989.

Wang, Y. P., & Murie, A. (1999a). Commercial housing development in urban China. *Urban Studies, 36*(9), 1475–1494.

Wang, Y. P., & Murie, A. (1999b). *Housing policy and practice in China*. London: Macmillan Press.

Wu, F. (1996). Changes in the structure of public housing provision in urban China. *Urban Studies, 33*, 1601–1627.

Wu, W. (2002). Migrant housing in urban China. *Urban Affairs Review, 38*(1), 90–119.

Zhang, J., Zhang, L. X., Rozelle, S., & Boucher, S. (2006). Self-employment with Chinese characteristics: the forgotten engine of rural China's growth. *Contemporary Economic Policy, 24*(3), 446–458.

Zhang, K. H., & Song, S. (2003). Rural–urban migration and urbanization in China: evidence from time-series and cross-section analyses. *China Economic Review, 14*(4), 386–400.

Zhang, X. Q. (1998). *Privatization: A study of housing policy in urban China*. New York: Novo Science Publishers.

Zhao, Y. (2000). Rural-to-urban labor migration in China: the past and the present. In L. West, & Y. Zhao (Eds.), *Rural labor flows in China*. Berkeley: Univ. of California Press.

Zhou, Y., & Ma, L. J. C. (2003). China's urbanization levels: reconstructing a baseline from the fifth population census. *China Quarterly, 173*, 176–196.