
# Department of Economics Discussion Paper Series

## The Receding Housing Ladder: House Price Inflation, Parental Support, and the Changing Intergenerational Distribution of Housing in China

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Number 949
October, 2021

Department of Economics
Manor Road Building, Manor Road
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ISSN 1471-0498

# The Receding Housing Ladder: House Price Inflation, Parental Support, and the Changing Intergenerational Distribution of Housing in China

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**Abstract:** China has experienced very rapid house price inflation in recent years – by some 10% per annum relative to consumer price inflation. Existing house-owners have benefited from capital gain and have been able to climb the housing ladder. Young household heads – wanting to own a house and facing rising house prices relative to their incomes - have found it increasingly difficult to get onto the housing ladder. However, their difficulty is eased by the strength of family support and the developing market for housing loans. The China Household Income Project (CHIP) surveys of 2002 and 2013 are analysed to test the hypothesis that the age distributions of house ownership and of housing wealth have moved against the young. There is indeed evidence of a receding housing ladder, especially in the large cities. The paper, on an original topic, is of interest both for China and for other countries with rapid house price inflation.

**Key words:** China; Family support; House price inflation; House ownership; Housing ladder; Housing wealth; Intergenerational distribution.

**AEA classification:** D31; O18; R31.

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## 1. Introduction

Arguably the most important event in the world economy in recent years is the rise of China in little more than forty years, from being on a par with black Africa at the start of its economic reforms to becoming an economic superpower. This remarkable economic growth, and the drastic changes that accompanied it, deserve more research attention than they have received.[1] Associated with China's rise has been a remarkable housing boom and relative house price inflation - due to a combination of the privatisation of urban housing, the strengthening of market forces, the creation of a mortgage market, 'the greatest migration in human history', tardy release of land for housing, and speculation that the inflation would continue. House price inflation has had important implications for the inequality among households of total wealth and of housing wealth (Knight et al., 2021). However, a neglected implication is its effect on the intergenerational inequality of housing wealth, and on the housing ladder.

The term 'housing ladder' or 'property ladder' is sometimes used to denote the first purchase of a house, i.e. getting onto the housing ladder, and thereafter the purchase of a better house or improvement of the existing house, i.e. climbing the housing ladder. The housing ladder might recede in the sense that young people must wait longer to first own a house. It is a common complaint, in Britain and in some other advanced economies, that in recent years young people have found it increasingly difficult to get onto the housing ladder. The same complaint is often heard in the cities of China. The probable reason is that the price of houses has risen relative to incomes. Whereas the older generation benefited from the rising values of their previously purchased houses, young people must

[1] Among the book-length exceptions is the attempt to explain and evaluate China's economic growth by Knight and Ding (2012).

struggle to buy houses given the high prices in relation to their income and their capacity to get housing loans or parental support.

Our hypothesis is that the housing ladder facing young people has receded, and house price inflation has involved a decrease in the share of housing wealth held by the younger generation and an increase in that held by the older generation. We examine the age distribution of house ownership and of (net) housing wealth in China in the 21st century, using national household surveys conducted in 2002 and 2013, and the change in those distributions which occurred over these eleven years.

The receding housing ladder is a phenomenon that might be found in any country which has experienced rapid house price inflation relative to incomes. For instance, in England, where housing prices have outstripped incomes in the twenty-first century, the mean age of first-time buyers increased from 30 years in 1995/6 to 31 in 2005/6 and to 32 in 2015/6, and the figures for house-ownership among those aged 35 and under were 19%, 13% and 9% respectively (English Housing Survey 2016-2017, online).

In section 2 we describe the data sets to be used, and in section 3 their previous use in the study of China's household wealth. We show that housing wealth is the predominant form of wealth holding, that wealth, especially housing wealth, has grown very rapidly over the study period, and that a considerable part of this growth is the result of house price inflation. Section 4 considers reasons why the housing ladder might recede. It examines two issues: whether house price inflation is greater in urban than in rural China, and greatest in the large cities; and whether young people face a higher ratio of house price to income than do older people, and more so in 2013 than in 2002. In section 5 we consider possible reasons why the housing ladder might advance rather than recede. This

could be due to the expansion in the supply of loans for house purchase; or to intergenerational intra-family transfers. We then examine the hypothesis that the housing ladder did indeed recede over the eleven-year period, analysing the age distribution of house ownership (section 6) and of housing wealth (section 7) - first for China as a whole, then rural China, then the large cities, and finally other urban areas. Section 8 summarises and concludes. We expect the paper to make an original contribution for China and more widely.

## 2. The data

Our data are from the 2002 and 2013 surveys of the Chinese Household Income Project (CHIP). These are household sample surveys, being sub-samples of the national household surveys of the National Bureau of Statistics. The year 2013 is the latest for which we have data. We opted for 2002 as the base year rather than an earlier or later year because the 2002 CHIP survey is the first comprehensive data source on housing wealth. We need the data to be as comparable as possible. Fortunately, the variables relating to housing wealth are very similar in the two surveys. Thus the estimates of housing wealth distributions can be compared given appropriate weighting. The weights used were effectively the same as those applied generally in the CHIP 2002 and 2013 surveys to achieve national representativeness.

We concentrate on the most important data issues. Valuing wealth – in particular housing and land wealth – inevitably encountered problems given China's marketising, but still semi-marketised, economy. Net housing is housing value minus housing loan. This is based on respondents' reported values (of both owner-occupied and other houses) in each year, despite the weakness of the housing market in rural China. Missing values had to be interpolated. For instance, where a housing value is missing, the imputation of

housing value is on the basis of price per square metre at the local level. Real wealth is obtained by reflating 2002 nominal wealth by the NBS's consumer price indexes, so as to express the 2002 values in constant prices. We use province-level consumer price indexes, distinguishing also between urban and rural indexes. Throughout the paper our discussion of wealth is real wealth, i.e. measured at constant cpi-adjusted prices. When we use the term housing wealth, we mean real household housing wealth per capita. As the rural and urban surveys are separate, it is possible to examine housing wealth in each of them as well as in the weighted national survey. There is an analytical case for doing so because the rural sector is much poorer and subject to sharply different economic policies and institutional arrangements: relevant trends might differ. There is no direct information on the year in which a householder first owned a house, nor on the means by which the house was funded. This is important for our testing strategy.

It will become evident below that the growth of housing wealth and of house prices is central to our story. Analysis is complicated by the fact that our two data sets do not constitute a panel: a pseudo-panel must be created. Two approaches were tried. One was to use data published by the Ministry of Housing and Construction, which show the value of sales of commercialised buildings, and the corresponding sold floor space, at district and county level. From this information it was possible to construct a housing inflation index. The other approach was to calculate house prices from the CHIP surveys for each of the urban and rural areas within each included province. Districts within cities were used in the case of metropolitan areas. Reflecting the data available, each subsample was divided into ranked subgroups based on average house value per square metre, and these subgroups were compared in 2002 and 2013. If an area was not included in both years another location with very similar housing price was substituted. The resultant house price inflation index was then applied to all households in each area. Robustness tests

were passed. The results obtained by the two approaches were fairly similar. Our estimates of house price inflation are based on the second approach. Our interest is in the relative house price inflation, measured as house price inflation in relation to consumer price inflation. We shall refer to this measure as relative house price inflation or real capital gain from house ownership.

## 3. Previous research

The CHIP 2002 and 2013 household wealth data were examined in the descriptive chapter (Knight et al. (2020) and the analytical paper (Knight et al. (2021); both explain the sources and methods in some detail. The main evidence from those sources that provides background for this paper is as follows:

At the national level, overall net (real) wealth per capita increased by 16.6% per annum, and net housing was the asset type that increased fastest (19.9%). Similar patterns were found in urban and rural China, the corresponding figures being 16.8% and 19.4% respectively (urban) and 14.1% and 17.9% respectively (rural). The share of net housing rose from 53% to 73% of China's total wealth. Housing clearly plays a central role in China's accumulation of wealth.

The share of the richest wealth per capita decile rose from 37% to 48%, a rise of 11 percentage points. In fact, only the top decile experienced an increase in share over the period: the shares of each of the other nine deciles fell. The share of household wealth per capita is positively related to household income per capita, and increasingly so. The Gini coefficient of household wealth per capita increased over the eleven years, from 0.50 in 2002 to 0.61 in 2013. The Gini coefficient for housing wealth increased correspondingly

from 0.64 to 0.72. The contribution of net housing to the inequality of wealth rose, being 64% in 2002 and a remarkable 79% in 2013.

It is possible to divide the increase in housing wealth into that part which is due to relative house price inflation and that part due to a real increase in housing. However, our measure of relative house price inflation necessarily includes the value of house improvements per square metre: it is not a pure price effect. Thus the real increase (the increase in housing quantity) represents an increase in the average number of square metres reported. Insofar as part of the increase in house values is due to housing improvements, these improvements add to the difficulty faced by young people wanting to own a house. Relative house price inflation accounts for most of the increase in housing wealth.

The annual rate of return on housing wealth (excluding real capital gain) was estimated to be 4.9% in 2002 and 4.6% in 2013. The rate of return on relative house price inflation over the period was estimated to be 14.9% per annum. We have to assume that this rate of return applied in the year 2002 and in the year 2013. The overall rate of return on housing wealth was therefore 19.8% in 2002 and 19.5% in 2013. This high return illustrates why there is a strong incentive for people to try to climb onto the housing ladder.

## 4. Reasons why the housing ladder recedes

Before testing the receding ladder hypothesis (Section 6) we provide reasons why the housing ladder might recede (Section 4) and reasons why it might instead advance (Section 5). The outcome will be the net product of both sets of forces.

*4.1 The increase in house prices*

Table 1 produces three results. One is the rapid annual increase in relative house prices in each residential area. That increase exceeds 10% in all but the other urban areas, and is highest in China as a whole. This is because the the proportionate weight of urban areas, with their higher house prices, increased over the period. The high CHIP national estimate (12.2%) is confirmed by the equivalent figure for residential buildings derived from the *China Statistical Yearbook* (10.1%).

Secondly, the higher the concentration of population in a residential area the higher the average house price: rising from rural to other urban to large cities; urban is of course a weighted average of large cities and other urban, and national is a weighted average of rural and urban. This progression in prices by residential area reflects the corresponding progression of land values and the rapid pace of urbanisation. The third result is that, with one exception, the percentage increase in average house prices by residential area between 2002 and 2013 coresponds to the pattern of house price levels in 2002. Other urban areas had the lowest increase, then rural areas, and large cities had the highest increase. The table indicates why the difficulty of climbing onto the housing ladder is likely to be greatest in large cities.

*4.2The house price/income ratio*

Table 2 shows that the ratio of average house value to income per capita increased in all areas over the eleven-year period. Moreover, the proportionate increase was least in other urban areas and greatest in the large cities. It became increasingly difficult to afford a house, particularly in the big connurbations

Table 2 also shows that, in both years, the ratio of average house price to household income per capita is lower for the household head age group 25-34 than for all age groups. The ratio increased dramatiacally for young household heads between 2002 and 2013 but the annual percentage increase was generally lower for them than for all heads, being 7.4% and 9.0% per annum respectively at the national level. Both young and old generally encountered a rising ratio over the period. It might nevertheless be inferred that, in both years, it was easier for young than older household heads to get onto the housing ladder.

However, this misses the point that most young household heads are not yet on the ladder, and the few who are already there are likely to have done so through inheritance or parental help. By contrast, most household heads beyond the age of 34 are likely to be on the ladder. Insofar as they wish to ascend the ladder by improving their housing conditions, they face an easier challenge. House-owners will have had the advantage of capital gain because of the rapid increase in house prices, which was 12.2% per annum between 2002 and 2013. Their existing houses will have risen in value, so it is only a matter of funding the additional cost of improved housing.

There is considerable recognition in the literature that house prices have risen relative both to the consumer price index and to income per capita in China, partricularly in the big cities, and that houses have become less affordable as a result. See, for instance, the special issue of the *Journal of Housing Economics* in 2019, including Chen et al. (2019) and Li and Wu (2019). Some consequences of this growing unaffordability were examined (such as the increase in co-residence with parents, and the growing relative attractiveness of second-tier cities). However, to the best of our knowledge, our questions have not been explicitly addressed. Chen et al (2010) come closest to doing so. Using the necessary mortgage payment/income ratio as an indicator of affordability, they show

that the ratio declined as each cohort of market entrants grew older but that the later a cohort entered the market, the higher was the ratio and thus the less affordable house purchase became for each sequential cohort.

There is evidence that the rapid increase in China's urban house prices has elicited several behavioural responses to a receding of the housing ladder. Chen et al (2020) analysed the causal relationship between the urban household saving rate and home ownership. Using a natural experiment which created an exogenous variation in housing demand and using a difference-in-difference strategy, the authors found that the reform measures over the period 1998-2001, shifting the burden of funding from the state to households, caused a sharp increase in the saving rates of private households. Li and Wu (2019) showed an increasing tendency of adult children to co-reside with their parents during the recent period of rapidly rising house prices. The incentive for house purchase did not diminish: the authors argued that co-residence reflected the incentive to economise on living costs while saving to buy a house.

Behavioural responses to house price inflation have some notable socioeconomic effects. The average age at which men in China first marry has risen by 1.8 years over 15 years, from 24.5 in 2000 to 26.3 in 2015[2] , but faster in large cities, by 1.4 years over the seven years 2005-2012.[3] Nie (2020) has argued that this rise is endogenous: an increase in the male/female ratio among young adults has increased marriage competition. The greater need for young men to improve their marriage prospects has resulted in a higher average saving rate among unmarried men and a higher average male age at marriage. However, we have an additional explanation. The increase in relative house prices is likely to have

[2] National Population Census, 2000, 2015.

[3] China General Social Survey.

intensified marriage competition via house ownership: the greater need of the unmarried to build up savings has increased the average age at which men marry. Indeed, there is evidence of a causal effect. Using data from the 2005 sample population census on a man's age at first marriage and average city house prices, Wrenn et al. (2019) find that marriage age does indeed rise in response to a rise in house prices.

Li and Wu (2014) argued that that the high return on housing investment and increasing competition in the marriage market make house purchase a priority for young people, so crowding out entrepreneurship. Analysing the effects of city house prices on entrepreneurship (being self-employed or an employer), they found that, for those who do not own a house, a higher ratio of city house price to income reduces the probability of entrepreneurship. This suggests that they choose to save for a house rarher than invest in a business.

## 5. Reasons for an advancing housing ladder

### *5.1 The expanding housing loan market*

There was no private housing market and no residential mortgage market under central planning. There was, however, a distinction between rural and urban China. Rural households were permitted to own, build and inherit housing: they owned their houses but their collective owned their land. Each household could have only one house-building plots and there could be transfers only within the village. Rural housing markets were suppressed and underdeveloped, but rental and sale of housing gradually emerged especially near the cities (Sato et al., 2013).

Urban housing was social housing, owned by central and local government and work units. Privatisation of urban housing occurred in the 1990s, through the sale of social houses to their occupants at subsidised prices. The housing provident fund, introduced in 1994 and adopted nationally before 2000, required contributions from both workers and employers and made possible low-interest bank loans for house purchase (Sato et al., 2013). The sale of urban land rights became an increasingly important revenue source for local governments. There was unprecedented growth in both the housing markets and the mortgage markets. The market was initially supply-constrained but became demand-constrained in the 2000s.

Government played a role as the sole supplier of urban land and in the regulation of mortgage markets. It was important in establishing lending standards and in changing the attitudes of banks towards residential lending. The five (previously) state-owned banks dominated this lending, although other financial institutions (such as city banks, joint-equity banks, and rural financial institutions) also grasped the new lending opportunities.

Table 3 records how rapidly the mortgage market grew over the period from 1998 to 2013, i.e. roughly the period examined in this paper. Housing investment rose from 2.5% of GDP to 17.2% in 15 years. The balance of individual mortgage loans rose from 0.5% of GDP to 17.2%. This showed the great increase in demand for housing, reflected in the rise in house prices and the expansion of urban floor area per capita. The supply of loans responded but only if various conditions were met.

All residential mortgages in China are adjustable rate mortgages, following the base rate set by the central bank. Default rates are kept low by good due-diligence procedures of

lenders, e.g. requiring tax returns, bank statements, and proof of other assets. The minimum down-payment is set by the central bank at 20% of the purchase price and the maximum mortgage maturity was 30 years before 2013. Applicants for house loans must therefore pass stringent tests and find 20% of the purchase value from other sources, usually own savings or family savings. The increased availability of mortgage loans should have conditionally advanced the housing ladder between 2002 and 2013.

*5.2 Intergenerational transfers*

The housing ladder might be advanced through family inheritance or through family transfers. Consider inheritance, it is unusual for young people to be household heads. It can happen, however, through the death of a parent who was the household head. The child of the deceased might then become the head. Among heads in the younger age groups there are likely to be some who have inherited a house by this means. We are describing a form of selection in the sense that some young household heads were not subject to the difficulties that others are likely to face in acquiring a house. This is not a standard form of selection bias for which there are econometric methods of correction, Correction would be simple if there were sample information about the reasons for having acquired the house. It might be possible if there were sample variables which are indicators that a young person has inherited a house. The most likely available variable is whether the father, or mother, or father and mother of the household head is not alive.

Consider the possibility of intergenerational transfers within the family. Wei et al. (2017) examine the effect of the male-female sex ratio among 5-19 year-olds, used as a proxy for for the strength of future competition for marriage, on house prices in Chinese cities. In support of their hypothesis they cite evidence that 80% of Chinese mothers would object to their daughter marrying a man who does not own a house, and that 70% of unmarried

women prefer that their future husbands own a house (pp.169-170, 177). The authors find that possession of a young son raises the house price, and that variation in the sex ratio accounts for 30-48% of the rise in urban house prices in Chinese cities over the period 2003-9. We take this to be evidence that parents are willing to improve their housing so as to strengthen their child's marriage prospects, implying that the child will himself benefit from ownership of the house in the future.

Intergenerational gifts of housing are plausible features of China's family-centred society. They are more important in China than in Western countries, partly because of the traditional custom that children, especially sons, are responsible for supporting their parents in old age. Investment in a house is widely perceived to be the best investment open to an individual in China. That norm and that perception create incentives for parents to provide a house for their son. The incentives might well have grown stronger as house price inflation has spiralled and the ratio of house price to household income per capita has risen: parental support might have responded. In rural areas a young couple normally live with the son's parents after marriage, with the likely house extension producing a direct channel of wealth transfer. In urban areas either the same co-residence applies or the parents of the bridegroom buy a house for the couple or at least cover the downpayment portion of the cost of the new house (Wei et al., 2017: 177). In some cities, including Beijing and Shanghai, the parants have to purchase of a second home in the name of the child, so that to avoid fiscal disincentives or regulations of the city government.

Wei and Wang (2021) examined the role of inheritance in the determination and distribution of household wealth in China, using the China Health and Retirement Longitudinal Survey (CHARLS) – its 2013 survey and its 2014 life history survey which

provided information on inheritance. Unfortunately, the survey covered only inheritors aged 45 or over. 18% of households had inherited wealth, and inherited wealth accounted for less than 5% of their net assets; this figure was less than 1% for all households. Real estate was the main form of inheritance. It was shown on various alternative assumptions that household wealth per capita had a slightly higher Gini coefficient when inherited wealth was excluded. A possible reason given for the unimportance of inherited wealth, and for its equalising effect, is that parents, especially wealthy parents, transfer wealth to their children during their lifetimes owing to the strength of family ties in China.

Table 4 reports a probit analysis of the probability of a male aged 20-34 owning a house. We test the two hypotheses – the inheritance hypothesis and the parental support hypothesis – against each other. If young household heads have no parents alive, the probability that they will have inherited the ownership of a house is higher than for other young household heads. If young household heads have one or both parents alive, the probability that they will have received parental support to acquire a house is increased, again relative to other young household heads. The table contains one dummy variable: neither parent is alive (the omitted category), one or both parents are alive. The effect of the coefficients generated by a probit equation on the probability depends on the values of the other explanatory varuables. The table shows the marginal effects on the probability of owning a house when explanatory variables are set at their mean values.

The control variables indicate that having more education (possibly a proxy for parental wealth or own income) raises the probability of owning a house and that higher income does so in large cities and other urban areas. So also does membership of the Communist Party, except in rural areas, and increasingly so over time. It is understandable that rural China is exceptional because of the ease with which all households can acquire a village

house. The negative coefficients at the national level are due to the much lower income but - institutionally determined - higher house ownership in the rural than in urban areas.

The coefficient on having one or both parents alive is expected to be positive if lifetime family transfers of wealth are more important than inherited wealth, and negative if the reverse is the case. The marginal effect is indeed positive and large in large cities (0.96*** and 0.89***), in other urban areas (0.96*** in 2013), and in China as a whole (0.69**and 0.64***). It suggests that intra-family gifts are more important than inheritance. This disadvantage of orphanhood is consistent with the finding that inheritance is unimportant in explaining household wealth, referred to above (Wei and Wang, 2021). It is possible, moreover, that becoming an orphan at an early age reduces the parental wealth available to be inherited. When a distinction is made between householders with one parent alive and both alive (not reported in the table), the coefficient on both parents is consistently positive but not significantly so. Having two parents alive might help to strengthen family support.

## 6. The age distribution of house ownership, 2002 and 2013

We examine the age distribution of house ownership in two ways: first, by means of a descriptive figure, showing how house ownership varies by age group; second, by conducting a probit analysis of the determinants of house ownership including age-group of the household head. In both cases it is the difference in outcomes between 2002 and 2013 that is important to our argument. Figure 1 shows the percentage of each five-year age group who own a house in 2002 and in 2013. It enables us to conduct a difference-in-difference analysis. For clarity it is divided into Figures 1A and 1B. The former distinguishes rural and urban China and the latter large cities and other urban areas plus the national picture.

We see in Figure 1A that rural house ownership is extremely high, being generally over 90% in both years. This reflects the institutional arrangements by which each household is allocated land for a house – but no more than one building plot - and also the strength of village family ties enables even young household heads to build a house. The drop in house ownership among the elderly suggests that they have passed ownership to the next generation. As transfers of house ownership are permitted only among villagers, house prices are little influenced by market competition. It is understandable, therefore, that there is no sign of a receding housing ladder in rural China. In subsequent analyses we concentrate on urban China.

The urban curves provide some evidence for the existence of a receding housing ladder. We might expect the later curve to be above the earlier one because incomes rose and housing loans became more freely available. However, this is true only of the older household heads. The two curves are very similar until age 40, beyond which the percentage owning a house in 2013 is well above that in 2002. Whereas house ownership of those climbing the housing ladder rose over the eleven years, those trying to get onto the housing ladder were unable to make progress.

Figure 1B provides clearer evidence that the housing ladder has receded. However, there is a sharp difference between large cities and othe urban areas. In the latter, the 2002 and 2013 curves follow each other closely with ageing. By contrast, in large cities the percentage of owners in 2013 is well below that in 2002 up to age 45 and well above it beyond that age. For instance, the gap in favour of 2002 exceeds 15 percentage points in the age-group 30-34 and and falls short by nearly 15 percentage points in the age-group 45-49. Older householders could benefit from their rising incomes and easier access to

housing loans over those years, whereas younger householders faced increasing difficulty to get on the housing ladder. The municipalities dominated the picture for China as a whole. Up to age 45 the national percentage of owners was lower in 2013 than in 2002 – by over 15 percentage points in the age-group 30-34 - but beyond that age the two curves were closely aligned.

Like Table 4, Table 5 conducts a probit analysis of the probability of house-ownership, but this time uses all households and employs age-groups as the test variables. There are five age groups, with the youngest, ages 20-34, being the omitted category in the dummy variable analysis. Consider the control variables. The marginal effects for years of education are positive and significant in all eight cases. The marginals for the income variable are positive and significant in large cities and other urban areas, but at national level are negative, reflecting the institutional divide between rural and urban China: rural areas are poorer but have a higher incidence of house-ownership. Except in rural China, Communist Party membership raises house-ownership. However, the marginal effects are lower in 2013 than in 2002, suggesting that party membership has become less important.

Our hypothesis is that young household-heads became relatively disadvantaged over the period. The marginals show the increase in probability of owning a house of the higher age-groups over the (omitted) group 20-34. The test is whether the disadvatage of the youngest age-group increased between 2002 and 2013. We therefore expect the marginals for age-group 35-44, and for subsequent age-groups, to increase between the years. This is indeed true of all 32 cases. For instance, in the age-group 35-44 the relative probability increases by 0.31 in large cities and by 0.50 in China as a whole. The hypothesis test should be not only that the disadvantage of the younger age group is

greater in 2013 but that it is significantly greater. A significance test is provided by pooling the 2002 and 2013 data in each residential area and introducing 2013 x age-group interaction terms: the coefficient on the 2013 x age-group 35-44 should be positive and significantly so. We see in the final row of Table 5 that the coefficient is indeed significant except in other urban areas. We take the results as evidence that young household-heads have experienced much more difficulty in accessing the housing ladder.

**7. The age distribution of housing wealth, 2002 and 2013**

Figures 2A and 2B show household wealth by five-year age group. We choose household wealth rather than household wealth per capita because sharp changes in household size complicate the picture. For instance, in large cities the average household size for heads aged 25-29 in 2002 was 3.4 in 2002 but fell to 2.0 in 2013. Indeed, this fall might reflect the decisions of young household heads to postpone having children as the housing ladder receded.

Our hypothesis is that the wealth of young household heads fell relative to that of older heads. Figure 2A shows no evidence of that in rural China. By contrast, urban wealth rises sharply between the age-groups 20-4 and 35-9 in 2013 but not in 2002. Up to age-group 35-9, urban household heads in 2013 were at a huge wealth disadvantage relative to older heads. Their accumulation of housing wealth was postponed by the increasing difficulty that they faced.

It is clear from Figure 2B that the contrast between 2013 and 2002 is particularly marked in large cities. Young household heads were at little disadvantage in 2002 but were at a huge disadvantage relative to older heads up to age-group 35-9 in 2013. The same pattern

can be observed at the national level and, more weakly, in other urban areas. The figures provide descriptive evidence of a receding housing ladder.

Table 6 reports the determinants of household real housing wealth in different residential areas of China. Tobit analysis is employed, reflecting the fact that some households have zero housing wealth. The table reports both coefficients and marginal effects. The coefficients reflect the effect of each explanatory variable on the housing wealth of house-owning households. The marginal effects, taking account of the fact that a marginal increase in a variable might have no effect on the wealth of households which do not own a house, is relevant for the sample of all households.[4]

The control variables have marginal effects that differ somewhat from those in Table 5. Years of education, household income per capita and (except for rural China in 2013) Communist Party membership raise household housing wealth, and increasingly so. Our test concerns the different age groups, Again, 20-34 is the omitted category in the dummy variable analysis. The coefficients on the older age-groups are expected to be positive, and indeed all but one of the 32 are; young household heads have less wealth. Our hypothesis is that the young became increasingly disadvantaged over time as they faced greater difficulties in acquiring housing wealth. Thus, we expect the coefficients on the older age-groups to be larger in 2013 than in 2002. Indeed, this is true of all 32 cases.

[4] We choose household real housing wealth as the dependent variable because the logarithm of household real housing wealth would eliminate households with zero housing wealth, and because household housing wealth per capita results would be confounded by sharp changes of household size in some age-groups.

The strongest evidence for our hypothesis is to be found in large cties. Comparing those aged 35-44 with those aged 20-34, the coefficient rises from 8.77*** in 2002 to 71.09*** in 2013, an eight-fold gain of 62.32. The marginal effects are 4.50*** and 43.25***, a gain of 38.75. The same comparison in other urban areas yields a gain in coefficient of 8.31 and in marginal of 6.24. At the national level, the gains are 21.61 and 13.70 respectively. However, there is no support for the hypothesis in rural China.[5] The final row of Table 6 follows Table 5 in testing whether the increase in the coefficient is not only positive but also significantly so. The increase is significant nationally, in rural areas, and in large cities.

In some large cities, including Beijing and Shanghai, there are regulations that forbid or penalise ownership of multiple houses. The restrictions on owning a second house were introduced in Beijing in 2010. In these circumstances parents have an incentive to transfer ownership of a second house to a child. The wealth disadvantage of young adults might be reduced in that way. In Table 7 we test this hypothesis by adding to the large cities equation of Table 6 a dummy variable denoting Beijing and interaction terms combining Beijing with the different age-groups. In 2013 the coefficient on Beijing is significantly positive, and larger than in 2002. There is a good explanation: house prices are higher and have risen more in Beijing than in other large cities. The coefficients on the interaction terms in 2002 are not significantly different from that on age-group 20-

[5] OLS estimates for households that own a house and for all households, although not consistent, yield very similar patterns and interpretations to those of the tobit coefficients and marginals respectively. As a further robustness test, we confined the sample to house-owners and compared the OLS results with housing wealth or ln. housing wealth as the dependent variable. In both estimations and in each sample except the rural, the coefficient on age-group 35-44 was positive, significant and greater in 2013 than in 2002. The choice of ln. housing wealth would make no difference to the story.

34.[6] in 2013 they are negative and significantly so for all age-groups within the range 35-64. Young household heads aged 20-34 are at a lesser wealth disadvantage relative to older household heads in Beijing than in other large cities. The evidence is consistent with our hypothesis.

In summary, we have adduced evidence that the age group 20-24 in all but rural China experienced a relative fall in housing wealth over the period. However, the most powerful evidence of a receding housing ladder was to be found in the large cities, where house prices rose rapidly and the young suffered a substantial disadvantage in housing wealth by comparison with all older age-groups.

## 8. Conclusion

We have examined the consequences of China's rapid house price inflation in recent years, analysing evidence from the CHIP national household surveys relating to 2002 and 2013. There is a contrast between those households which were already house-owners - and which therefore benefited from capital gain - and those which did not own a house. The latter faced increasing difficulty in getting onto the housing ladder as as the ratio of house prices to their incomes rose.

This difficulty was to some extent eased by the expanding market for housing loans, previously very weak, and by the strength of family ties in China, providing inter-

[6] The Stata program failed to estimate the corresponding marginal effects. However, the coefficients are adequate for our purpose as the marginals are a certain proportion, between zero and one, of the coefficients, and thus have the same sign.

generational sources of funding for house purchase. We cited evidence that house price inflation also induced higher saving and less entrepreneurship among young men, postponement of their marriage age, and more or longer cohabitation with parents.

Nevertheless, evidence was adduced that younger households became relatively disadvantaged, both in house-ownership and in the value of their housing wealth. For instance, in large cities the probability of house ownership in the age-group 35-44 over that of the age-group 20-34 increases by 0.31 between 2002 and 2013. Similarly, in large cities the premium on real wealth of the older age group over the wealth of the younger age-group increases eight-fold over the eleven years. We explained why the phenomenon is not found in rural China and why it is particularly important in large cities.

Intergenerational distribution deserves more attention in the economic literature. To the best of our knowledge, our question has not previously received serious analysis. Yet it is a complaint increasingly heard in the cities of China that young people cannot afford to buy a house. The receding housing ladder is an important phenomenon not only for China but also for all countries which have experienced rapid house price inflation.

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**Table 1. The level and percentage increase in average house prices by area**

| Residential area | National | Rural | Urban | Large cities | Other urban |
|---|---|---|---|---|---|
| 2002 | 1,107.8 | 419.3 | 2,003.8 | 2,897.6 | 1,334.4 |
| 2013 | 3,942.0 | 1,214.7 | 5,819.2 | 9,873.1 | 3,403.0 |
| Increase 2002-13 (% p.a.) | 12.2 | 10.2 | 10.2 | 11.8 | 8.9 |

Notes: The source of data in this table, and in all other tables and figures except Table 3, is the China Household Survey Project (CHIP) national household surveys of 2002 and 2013. All the prices in this table, and in all other tables and figures except Table 3 are shown in constant consumer prices. House prices are measured as wealth per square metre. There are seventeen officially designated large cities in the samples.

**Table 2. The ratio of average house value to household income income per capita by area: national, rural, urban, large cities, other urban; all household heads and household heads aged 25-34**

| | | National | Rural | Urban | Large cities | Other urban |
|---|---|---|---|---|---|---|
| All household heads | 2002 | 2.5 | 2.2 | 2.8 | 3.2 | 2.4 |
| | 2013 | 6.4 | 6.4 | 6.4 | 8.4 | 5.2 |
| | Increase 2002-13 | 3.9 | 4.1 | 3.6 | 5.2 | 2.7 |
| | Increase 2002-13 (% p.a.) | 9.0 | 10.1 | 7.9 | 9.1 | 7.1 |
| Household heads 20-34 | 2002 | 1.9 | 2.0 | 1.8 | 1.7 | 1.8 |
| | 2013 | 4.1 | 5.0 | 3.9 | 4.2 | 3.7 |
| | Increase 2002-13 | 2.2 | 3.0 | 2.2 | 2.5 | 1.9 |
| | Increase 2002-13 (% p.a.) | 7.4 | 8.6 | 7.6 | 8.6 | 6.7 |

**Table 3. The development of the housing loan market in China, 1998-2013**

| | 1998 | 2013 |
|---|---|---|
| Real estate investment, % of GDP | 4.3 | 25.1 |
| Housing investment, billion yuan | 208 | 5,895 |
| % of real estate investment | 57.6 | 68.5 |
| % of GDP | 2.5 | 17.2 |
| Balance of individual mortgage loans, billion yuan | 43 | 9,800 |
| % of real estate loans | 13.7 | 61.6 |
| % of GDP | 0.5 | 17.2 |
| National housing price, yuan/sq.m. | 2,063 | 6,237 |
| Urban floor area, p.c. /sq.m. | 8.8 | 32.9 |

Source: Zhou (2015), table 5 and p.52, on which this section draws.

**Table 4. The marginal effect of inheritance and of parental support on the probability of male household heads aged 20-34 owning a house: probit analysis**

| | National | | Rural | | Large cities | | Other urban | |
|---|---|---|---|---|---|---|---|---|
| | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 |
| At least one parent alive | 0.69*** | 0.64*** | 0.26* | 0.28 | 0.96*** | 0.89*** | 0.25 | 0.96*** |
| | (0.084) | (0.074) | (0.143) | (0.180) | (0.213) | (0.177) | (0.168) | (0.166) |
| Education years | 0.02** | 0.09*** | 0.17*** | 0.08*** | 0.11*** | 0.41*** | 0.04** | 0.13*** |
| | (0.009) | (0.009) | (0.022) | (0.030) | (0.024) | (0.033) | (0.015) | (0.015) |
| Log of income p.c. | -0.22*** | -0.35*** | -0.02 | 0.11 | 0.45*** | 0.21* | 0.39*** | 0.19** |
| | (0.041) | (0.036) | (0.087) | (0.076) | (0.103) | (0.107) | (0.078) | (0.081) |
| CPC member | 0.25*** | 0.56*** | 0.22 | -0.20 | 0.12 | 0.33** | 0.21** | 0.36** |
| | (0.071) | (0.088) | (0.228) | (0.303) | (0.182) | (0.158) | (0.098) | (0.148) |
| Constant | 1.60*** | 2.25*** | 0.42 | -0.34 | -6.14*** | -9.01*** | -4.09*** | -2.92*** |
| | (0.363) | (0.367) | (0.711) | (1.050) | (0.902) | (1.168) | (0.652) | (0.783) |
| Observations | 5,239 | 2,662 | 2,695 | 1,313 | 964 | 482 | 1,441 | 867 |
| Pseudo R-squared | 0.163 | 0.149 | 0.157 | 0.110 | 0.185 | 0.468 | 0.093 | 0.203 |
| Proportion of correct predictions | 0.81 | 0.74 | 0.98 | 0.94 | 0.58 | 0.54 | 0.59 | 0.65 |

Notes: The dependent variable is: household head owns a house. The subsample analysed is male household heads in the age group 20-34. Omitted dummy variables: Neither parent alive; not a member of the Communist Party. ***, **, and * denote statisticsal significance at the 1%, 5% and 10% levels respectively, in this and other tables, and in the text.

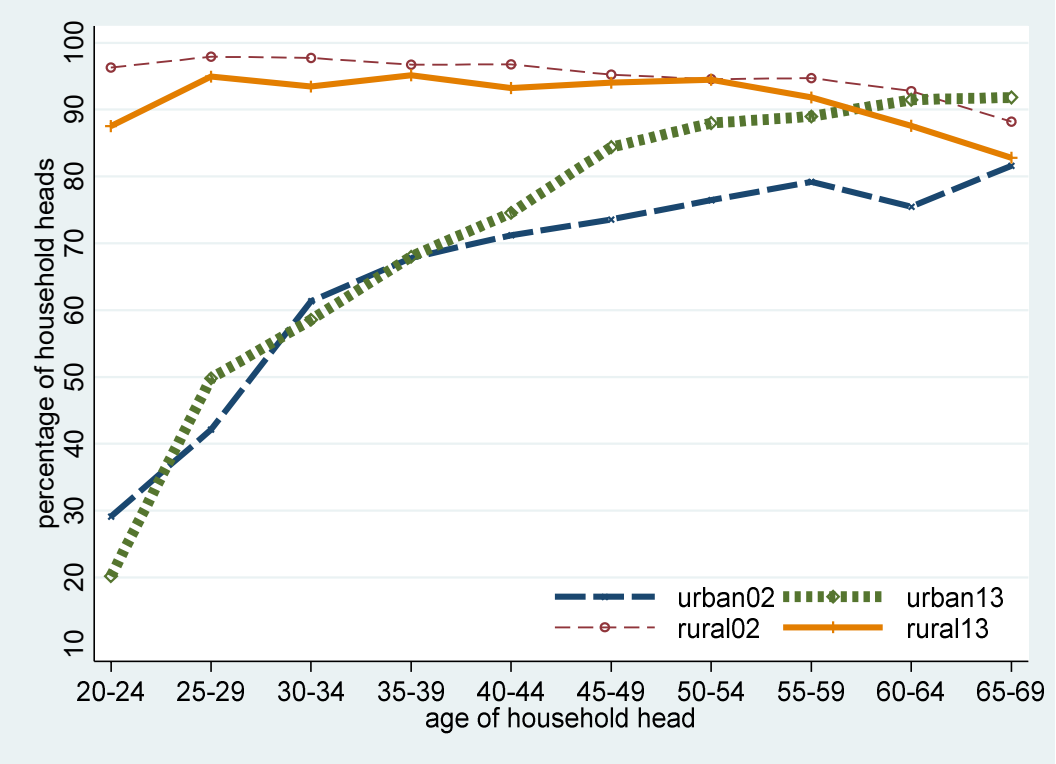


**Figure 1A. The proportion of household heads owning a house by five-year age group, by area (rural, urban), 2002 and 2013**

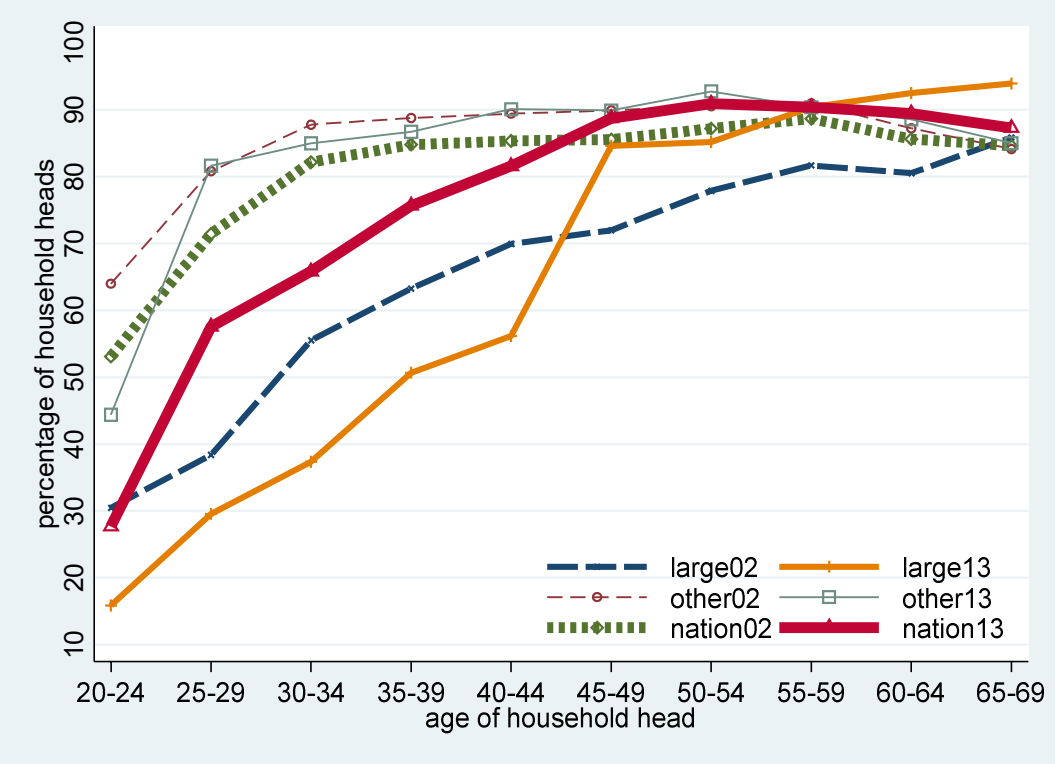


**Figure 1B. The proportion of household haeads owning a house by five-year age-groups, by area (national, large cities, other urban Cities), 2002 and 2013**

**Table 5. The determinants of the probability that the household head owns a house, by age group and by area, 2002 and 2013: probit analysis, marginal effects**

| | National | | Rural | | Large cities | | Other urban | |
|---|---|---|---|---|---|---|---|---|
| | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 |
| age-group 35-44 | 0.25*** | 0.75*** | -0.24** | 0.44*** | 0.40*** | 0.71*** | 0.36*** | 0.53*** |
| | (0.038) | (0.037) | (0.101) | (0.119) | (0.083) | (0.068) | (0.065) | (0.065) |
| age-group 45-54 | 0.42*** | 1.35*** | -0.00 | 0.57*** | 0.64*** | 1.95*** | 0.57*** | 0.75*** |
| | (0.039) | (0.040) | (0.100) | (0.116) | (0.080) | (0.079) | (0.070) | (0.066) |
| age-group 55-64 | 0.46*** | 1.56*** | 0.06 | 0.75*** | 0.73*** | 2.53*** | 0.53*** | 1.04*** |
| | (0.046) | (0.046) | (0.110) | (0.122) | (0.096) | (0.097) | (0.084) | (0.078) |
| age-group 65- | 0.35*** | 1.40*** | -0.15 | 0.65*** | 1.03*** | 3.29*** | 0.64*** | 1.10*** |
| | (0.058) | (0.050) | (0.129) | (0.126) | (0.118) | (0.136) | (0.099) | (0.088) |
| Education years | 0.06*** | 0.13*** | 0.32*** | 0.31*** | 0.05*** | 0.16*** | 0.05*** | 0.11*** |
| | (0.004) | (0.004) | (0.013) | (0.009) | (0.009) | (0.008) | (0.007) | (0.007) |
| Log of income p.c. | -0.23*** | -0.02* | -0.02 | 0.27*** | 0.51*** | 0.25*** | 0.25*** | 0.22*** |
| | (0.020) | (0.013) | (0.044) | (0.024) | (0.048) | (0.042) | (0.039) | (0.030) |
| CPC member | 0.16*** | 0.07* | 0.09 | -0.40*** | 0.14** | 0.05 | 0.15*** | 0.12* |
| | (0.031) | (0.039) | (0.083) | (0.087) | (0.058) | (0.074) | (0.050) | (0.065) |
| Constant | 0.06*** | 0.13*** | 0.32*** | 0.31*** | 0.05*** | 0.16*** | 0.05*** | 0.11*** |
| | (0.004) | (0.004) | (0.013) | (0.009) | (0.009) | (0.008) | (0.007) | (0.007) |
| Observations | 17,881 | 17,991 | 9,188 | 10,452 | 3,624 | 2,609 | 5,069 | 4,930 |
| Pseudo $R^2$ | 0.098 | 0.163 | 0.316 | 0.419 | 0.123 | 0.360 | 0.095 | 0.150 |
| Proportion of correct predictions | 0.83 | 0.77 | 0.97 | 0.87 | 0.57 | 0.51 | 0.67 | 0.74 |
| Pooled years, interaction term: Marginals | | | | | | | | |
| 2013 x age-group 35-44 | 0.43*** | | 0.64*** | | 0.26** | | 0.09 | |
| | (0.053) | | (0.155) | | (0.106) | | (0.090) | |

Notes: The dependent variable is the household head owns a house. The table reports marginal effects with other explanatory variables held at their mean values. Omitted categories in the dummy variable analysis:age-group 20-34, not a member of the Communist Party. The equation for the final row is based on the pooled year samples and includes a full set of interaction terms combining 2013 and all age-groups (2002 being the omitted category).

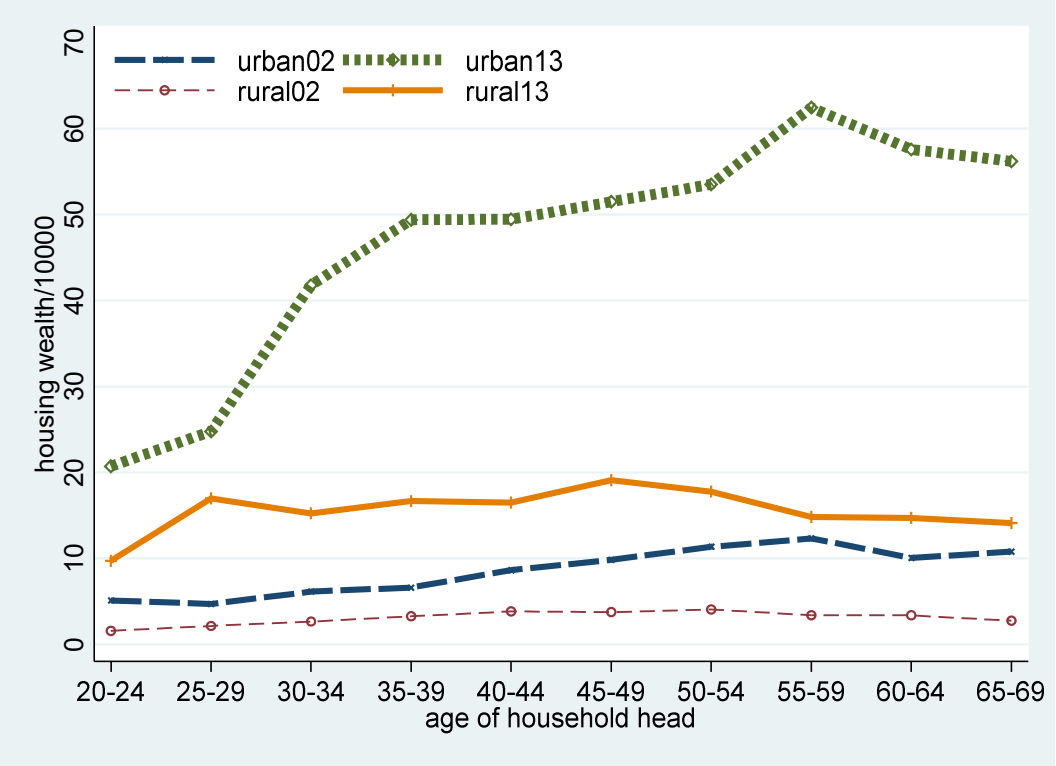


**Figure 2A. Household real housing wealth, urban and rural, 2002 and 2013**

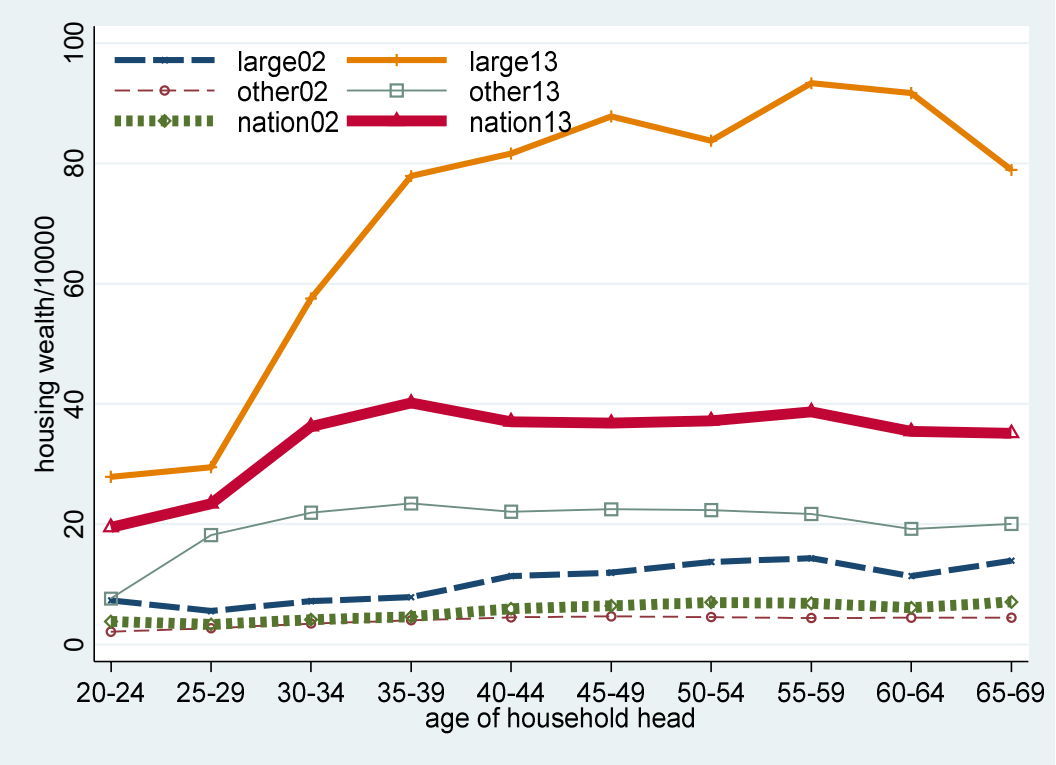


**Figure 2B. Household real housing wealth, large cities, other urban, and national, 2002 and 2013**

**Table 6. The determinants of household housing wealth, 2002 and 2013: tobit analysis**

| | National | | Rural | | Large cities | | Other urban | |
|---|---|---|---|---|---|---|---|---|
| | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 | 2002 | 2013 |
| **Coefficients** | | | | | | | | |
| Age-group: | | | | | | | | |
| 35-44 | 1.64*** | 23.25*** | 0.39*** | 2.20 | 8.77*** | 71.09*** | 2.89*** | 11.20*** |
| | (0.201) | (1.616) | (0.124) | (1.466) | (1.147) | (6.923) | (0.438) | (1.542) |
| 45-54 | 3.05*** | 25.73*** | 0.60*** | 3.18** | 13.66*** | 80.62*** | 4.55*** | 14.72*** |
| | (0.201) | (1.588) | (0.124) | (1.412) | (1.101) | (7.077) | (0.458) | (1.541) |
| 55-64 | 3.13*** | 31.13*** | 0.07 | 0.76 | 14.74*** | 99.66*** | 4.72*** | 19.21*** |
| | (0.231) | (1.707) | (0.142) | (1.457) | (1.252) | (7.830) | (0.534) | (1.702) |
| 65-98 | 3.96*** | 37.47*** | -0.34 | 4.08** | 17.19*** | 102.69*** | 5.26*** | 18.53*** |
| | (0.300) | (1.881) | (0.210) | (1.591) | (1.423) | (8.502) | (0.627) | (1.839) |
| Education years | 0.30*** | 2.59*** | 0.04** | 0.41*** | 0.88*** | 4.70*** | 0.28*** | 1.49*** |
| | (0.022) | (0.139) | (0.016) | (0.110) | (0.109) | (0.690) | (0.046) | (0.139) |
| Log income p.c. | 2.86*** | 16.46*** | 1.42*** | 7.46*** | 10.45*** | 58.26*** | 3.81*** | 8.37*** |
| | (0.095) | (0.518) | (0.064) | (0.341) | (0.582) | (3.790) | (0.253) | (0.695) |
| CPC member | 1.24*** | 3.84*** | 0.31*** | -0.59 | 2.65*** | 11.06* | 0.81*** | 2.20* |
| | (0.148) | (1.253) | (0.100) | (0.998) | (0.692) | (6.038) | (0.300) | (1.163) |
| Constant | -17.97*** | -107.28*** | -4.57*** | -15.77*** | -111.93*** | -663.45*** | -40.40*** | -92.57*** |
| | (0.890) | (5.593) | (0.663) | (4.280) | (5.245) | (37.735) | (2.228) | (6.880) |
| Observations | 17,881 | 17,991 | 9,188 | 10,452 | 3,624 | 2,609 | 5,069 | 4,930 |
| Pseudo R-squared | 0.039 | 0.026 | 0.054 | 0.014 | 0.047 | 0.021 | 0.030 | 0.021 |
| **Marginals** | | | | | | | | |
| Age-group: | | | | | | | | |
| 35-44 | 1.12*** | 14.82*** | 0.32*** | 1.57 | 4.50*** | 43.25*** | 1.86*** | 8.10*** |
| | (0.135) | (0.982) | (0.101) | (1.037) | (0.549) | (4.115) | (0.271) | (1.080) |
| 45-54 | 2.19*** | 16.60*** | 0.50*** | 2.30** | 7.80*** | 50.07*** | 3.09*** | 10.89*** |
| | (0.138) | (0.960) | (0.101) | (0.999) | (0.532) | (4.291) | (0.294) | (1.089) |
| 55-64 | 2.25*** | 20.59*** | 0.05 | 0.53 | 8.59*** | 64.35*** | 3.22*** | 14.57*** |
| | (0.164) | (1.075) | (0.114) | (1.025) | (0.696) | (5.096) | (0.363) | (1.254) |
| 65- | 2.91*** | 25.49*** | -0.27 | 2.97*** | 10.48*** | 66.70*** | 3.64*** | 14.01*** |
| | (0.228) | (1.250) | (0.165) | (1.141) | (0.890) | (5.688) | (0.448) | (1.373) |
| Education years | 0.22*** | 1.87*** | 0.03** | 0.30*** | 0.60*** | 3.27*** | 0.21*** | 1.18*** |
| | (0.017) | (0.100) | (0.014) | (0.081) | (0.074) | (0.480) | (0.034) | (0.110) |
| Ln income p.c. | 2.15*** | 11.88*** | 1.17*** | 5.47*** | 7.08*** | 40.51*** | 2.78*** | 6.64*** |
| | (0.072) | (0.377) | (0.053) | (0.252) | (0.393) | (2.649) | (0.185) | (0.553) |
| CPC member | 0.93*** | 2.77*** | 0.26*** | -0.43 | 1.80*** | 7.69* | 0.59*** | 1.75* |
| | (0.111) | (0.904) | (0.083) | (0.731) | (0.469) | (4.199) | (0.218) | (0.923) |
| Percentage of owners | 79.4 | 87.6 | 95.1 | 89.7 | 55.8 | 75.8 | 67.8 | 89.3 |
| Pooled years, interaction term: | | | | | | | | |
| **Coefficients** | | | | | | | | |
| 2013 x age-group 35-44 | 13.38*** | | 2.15* | | 22.03** | | 2.31 | |
| | (1.708) | | (1.268) | | (8.806) | | (1.868) | |

Notes: The dependent variable is household housing wealth/10000 (Y). The marginal effects are estimated with other explanatory variables held at their mean values, Omitted categories in the dummy variable analyses: age group 20-34, not Communist Party

member. The equation for the final row is based on the pooled year samples and includes interaction terms combining 2013 and each age-group (2002 being the omitted category).

**Table 7. The determinants of household real housing wealth in large cities, distinguishing Beijing from others, 2002 and 2013, tobit coefficients**

| | 2002 | 2013 |
|---|---|---|
| Beijing | 1.55 | 46.54*** |
| | (1.038) | (6.234) |
| Beijing x age-group 35-44 | -1.11 | -20.89*** |
| | (1.112) | (6.145) |
| Beijing x age-group 45-54 | 0.18 | -23.61*** |
| | (1.038) | (5.946) |
| Beijing x age-group 55-64 | 1.18 | -19.38*** |
| | (1.166) | (6.156) |
| Beijing x age-group 65- | 1.35 | -0.19 |
| | (1.412) | (6.879) |
| age-group 35-44 | 2.02*** | 28.26*** |
| | (0.413) | (2.531) |
| age-group 45-54 | 3.29*** | 33.92*** |
| | (0.396) | (2.631) |
| age-group 55-64 | 3.82*** | 48.25*** |
| | (0.452) | (2.958) |
| age-group 65-98 | 5.15*** | 55.05*** |
| | (0.506) | (3.179) |
| Observations | 3,624 | 2,609 |
| Proportion of owners (%) | 55.76 | 75.83 |

Notes: The specification is the same as in Table 6 but with the addition of Beijing and Beijing x age-group interaction terms; only the additional variables are reported. Omitted categories in the dummy variable analysis: other cities; other cities x age-group 20-34. Shanghai is not included in the survey.