
“Housing Affordability in China; A Stock and Flow Approach”

By Alain Bertaud

Paper presented at Peking University at the Symposium on Low-income Housing in China, Beijing, on July 10-11, 2009

Summary

During the last 20 years, China has established an impressive record in reforming its housing policy and in following up reform with action on the ground. No country before has ever improved urban housing conditions for such a large number of people in such a short time. However, two major issues still need to be solved: 1) the provision of affordable housing to low income households and 2) improving land use efficiency at the periphery of cities. The two issues are linked because the adequate provision of residential land at the periphery of cities has a large impact on the entire housing market. Quotas currently imposed by the central government, controlling the size of new units being built and limiting the conversion of agricultural land into urban use, are unlikely to solve either problem. A new approach to housing affordability is required.

First, we cannot disassociate affordability from a minimum socially acceptable standard. Every household unable to afford on the free market a housing unit meeting this minimum standard should logically receive a subsidy. It is impossible to set these standards without having a thorough knowledge of the current housing stock disaggregated by the various income groups who are currently living in each housing type.

The establishment of a minimum housing standard must be linked to the capacity of government to subsidize the households who cannot afford these standards under current market conditions. The minimum threshold therefore is not a scientific measure of “minimum housing need” but a measure of the financial capacity of the government to deliver the subsidies to households who otherwise would fall under the standard.

The supply of new housing built each year increases the number of existing older housing units constituting the housing stock. Older units filter down to lower income groups or on the contrary are reclaimed by higher income groups through

gentrification or are removed from the housing stock through demolition and urban renewal. Therefore, a “balance sheet” of the housing stock sorted by price or rent has to be maintained and adjusted every year in order to evaluate the supply of low income housing. This is the “stock and flow” approach to evaluate supply and demand for housing from various income groups.

The government should be carefully monitoring the transformation of the housing stock over the years. The most important action the government can take to improve the housing quality of lower income groups is to allow a steady increase in the number of housing units built each year, without much concern for the income group they are built for. Any constraints imposed by government on the construction of new units – whether these units are low or high cost – will eventually trickle down to the poor and reduce their housing standards by increasing the price of housing in the entire stock. However, supply subsidies, in particular subsidized interest rate for developers may slow down the adjustment process that eventually filters down to the poor. Demand subsidies are far more effective than supply subsidies in improving access to housing by low-income households.

China has a very successful housing reform track record

Before arguing about what should be done about current housing affordability issues in China it is important to acknowledge the very successful record of the Chinese government in reforming housing policy and supplying developed land for urban extension during a long period of unprecedented high rate of urbanization.

In the beginning of the 90s housing was mostly provided by enterprises as part of an “in kind” employees compensation and by municipalities as part of a welfare service. At the time when the Chinese government initiated the reforms, the private provision of housing was insignificant and consumers’ choice in making tradeoff between distance, floor area, design quality and price was inexistent.

After a period of 20 years of pragmatic and persistent policy reforms, the bulk of urban housing is now provided by the private sector, and salaries paid by enterprises have been adjusted to reflect workers’ productivity. The impact of housing reform went far beyond increasing floor space consumption per capita and improving spectacularly the design and comfort of housing units. It has also allowed enterprises to focus on the production of their core products rather than having a large part of their staff distracted by housing construction and real estate management issues.

These reforms were carried out while the country was urbanizing rapidly. Cities had to create from scratch a new real estate industry to build housing according to consumers' preferences and to develop new land at the periphery of cities. The demand for urban land was generated by three main factors: (1) the need to accommodate a flow of new migrants from the countryside, (2) the new housing expectations created by rapidly increasing urban incomes, and (3) a reduction in household's size that created demand for new units in addition to the demand coming from demographic growth.

The manners by which Chinese cities have developed new urban land and the quantity of land developed have often been subject to criticism. It is quite possible that in the periphery of many Chinese cities more land was developed than would have been necessary for a "just in time" approach. However, this possible oversupply of developed land might prove in the long run much less expensive – if it get corrected in time – than its opposite, the undersupply of urban land found in many countries around the world that have not yet completed their urbanization process. The apparent absence of supply constraint on urban land is so rare in the rest of the developing world that the Chinese example should be a cause of emulation rather than criticism. The efficiency in the use of the new developed land remain however an issue to be solved.

Housing affordability and the use of urban land are now the main urban issues in China

While the improvement of housing standards has been spectacular in the past, a number of issues remained to be solved as economic conditions have evolved from what they were at the time of the first reforms. A successful housing policy can never be static but must constantly evolve to respond to changing conditions. In China, these changing conditions are (i) the large yearly migration flows of unskilled migrants from the countryside and (ii) the rapidly increasing urban incomes of the most productive urban households.

Housing affordability and the alleged over extension of urban land into agricultural areas appear to be the two main government's urban issues concerns. Policy measures have already been taken to address these issues. In many Chinese cities a maximum limit is being put on the size of new apartments being built, in some cities a minimum quota for smaller apartment is imposed on developers. To address the alleged excessive urban land extension the central government is now imposing agricultural land conversion quotas to every large city.

These regulatory actions are likely to be not only ineffective but to have side effects that may produce an outcome opposite to the government objectives. The

quotas imposed on large apartments may deflect the demand from the higher income groups away from new units built in suburbs toward a gentrification of the older part of the stock that is now affordable to lower income group. Agricultural land conversion quotas might put a constraint on the supply of new developed land and result in higher housing prices. The lack of new greenfield land to develop makes it financially attractive for developers to destroy the old housing stock – currently affordable to low income households – and to replace it by higher income housing (*Figure 1*).

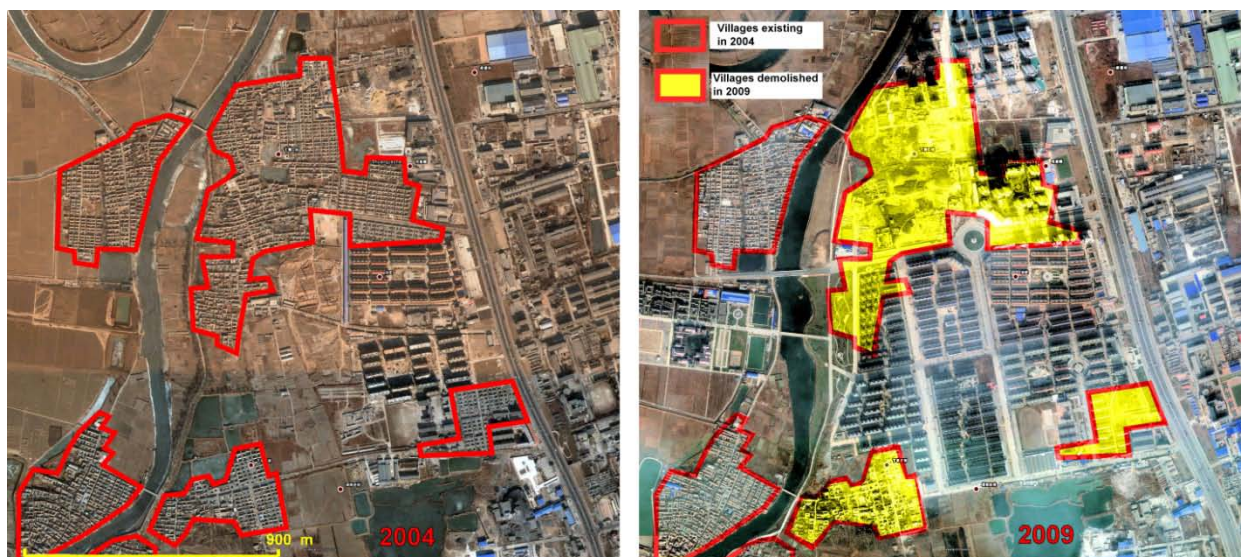


Figure 1: Change in Land use in Tianjin Northern suburb 2004-2009

Quotas are a clumsy way of solving supply and demand issues. It is urgent to redefine the affordability issue and to look at the housing market as a continuum where existing stock and new housing flows are part of the same housing market. Constraining the supply of new units at the high end of the market through quotas is unlikely to increase supply at the lower end of the market.

I will focus on the affordability issue only – leaving the issue of the efficiency of land development at the urban fringe as a subject for another paper. I will try to redefine affordability and propose a methodology that might clarify the debate on housing and put it back in a context of adaption to changing supply and demand.

Redefining affordability

The notion of housing affordability needs to be redefined. A number of housing affordability indicators based on a ratio between the median price of housing and the median household's income allow to grade housing in various cities as “affordable” or “unaffordable” or even “highly unaffordable”. Usually,

and arbitrarily, affordable housing is defined as a dwelling where less than 30% of monthly household's income is devoted to rent or when the purchase price of a dwelling is less than 3 years of household's income.

The “affordable“ terminology is misleading as by definition every households in a city live in a house it can afford, with the exception of those who face immediate foreclosure or expulsion. The meaning of these indicators has very little to do with affordability but indicates mainly on average how much of their income households are allocating to housing. For instance, most “affordability” indexes are showing that housing in Seoul is “highly unaffordable”. We would then expect most households in Seoul, being unable to afford housing, to live under bridges or under plastic sheets in vast squatters' settlements. This is clearly not the case. What the “affordability” index really means is that households in Seoul are paying a much larger share of their income for housing than, say, their American counterparts. That high price generally paid for housing may be an area of concern for the Korean government but it doesn't mean necessarily that a new housing product called an “affordable house” has to be introduced on the Korean housing market.

Some so called “affordability indicators” are based on the median housing prices of new housing and do not take into account housing prices of the existing housing stock, which is often much cheaper, but for which price data is more difficult to collect. In the US the number of transaction for existing housing represents from 3 to 4 times the number of new houses put on the market every year. It just shows the importance of the trade in existing housing in any affordability calculation. To my knowledge, no aggregate data on the volume of transaction of existing housing is available for China. However, in every Chinese city real estate brokers' windows display an abundance of data on transactions of existing housing, including all their design and location characteristics.

A high percentage of income devoted to housing does not necessarily implies that housing is “too expensive”. It may simply reflect a consumer choice for higher standards housing, or better location, reflecting culture rather than a malfunction in the housing delivery system. High housing prices might of course also imply the existence of some supply constraints, which artificially increase the price of housing, including at time the existence of a housing bubble.

The usefulness of most “affordability” indicators is therefore limited. They can be used as an inter city comparator to show on average the amount of income that households are devoting to housing. These affordability indicators may also be useful to establish time series to detect trends in a specific city in which households have to allocate over time more, or less, of their income for housing. In

general, a high ratio of income devoted to housing suggests the existence of supply constraints.

While all households live by definition in a dwelling they can afford, the low quality or poor safety of some dwellings at the low end of the market might be considered as socially unacceptable.

The question therefore is not whether current housing is affordable, but rather (i) what housing standards fall below the minimum that is socially acceptable and (ii) how many households, at current market prices, cannot afford a dwelling equal or higher than the minimum socially acceptable standard.

The problem of affordability, therefore, cannot be separated from a definition of locally acceptable minimum standards. In the case of urban dwellings the notion of affordability is meaningless if it doesn't include location. While it does not make sense to say that in city X housing is unaffordable, it makes perfect sense to say that in city X households below the 20th income percentile cannot afford a formal dwelling of 20 m² within 5 km from the city center.

This is not a semantic discussion about words definition. Housing policy based on the traditional affordability concept has often resulted in misallocation of resources. Much too often subsidies are given to middle-income housing, bypassing low-income households for whom they were originally designed. In other cases, the government builds “affordable” housing for the poor in far away suburbs where government contractors can build cheap housing. However these houses are often far away from jobs and constitute a poverty trap for their beneficiaries.

In most countries poor government policies concerning urban land and housing results in the development of large informal settlements. In China the affordability policy failure is seen mostly in the overcrowding of the older stock and in poor migrants having to rely entirely on a limited stock of informal rental rooms in urban village enclaves.

In many cases, governments, when designing a housing policy, set the minimum acceptable standards far too high without proper discussions of possible trade off between location, dwelling areas and costs. A different approach is needed based on (i) the market idiosyncrasy of each individual city, (ii) the income distribution of households and (iii), on the geographic location of housing and not only its price.

Affordability based on current housing consumption

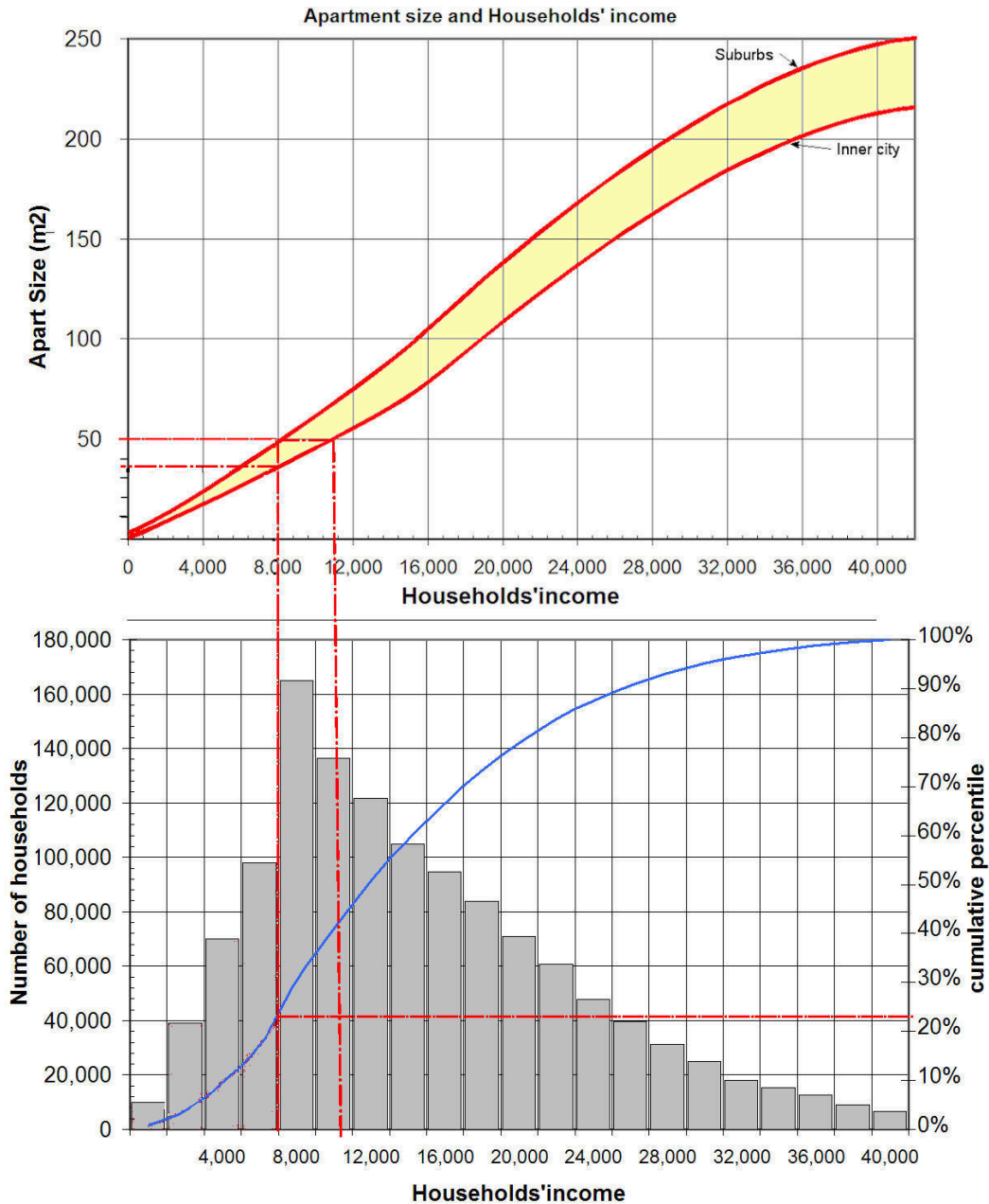


Figure 2: Households' income and housing consumption

Let us assume that households in city X have an income distribution as shown in the histogram located in the lower part of *Figure 2*. In the absence of housing subsidies the consumption of floor space in square meter per dwelling in relation to income would probably look like the one shown on the graph in the upper part of *Figure 2*. This housing consumption curve should be established through stratified field surveys and represents what households in city X actually

spend on housing; the curve should not be based on an arbitrary formula such as 30% of income spent on housing.

The consumption as a function of households' income is defined by an area within the 2 curves shown on the graph (in fact the envelope of the points of a scattergram representing the response of various households in the survey). The upper curve shows the consumption of floor space in suburbs at the edge of the built-up area. The lower curve shows the consumption of floor space in the inner city. Depending on the location of their dwellings in the city, households with the same income would consume more in the suburbs because land would be cheaper and less in the inner city because land there would be more expensive.

For instance we can see that according to the graph shown on Figure 1, representing the income distribution and housing consumption in a hypothetical city X, a household with an income of Rmb 8,000 per year would be able to consume about 36 m² of floor space in the inner city or alternatively about 50 m² in the suburbs. Conversely, houses with a floor space of 50m² and located in the inner city would require an income above or about Rmb 11,500.

The graph shows only the consumption of floor space but we could as well represent on the vertical axis an index of housing quality that could represent both floor space and infrastructure quality.

We can see that under free market conditions every household is able to afford a dwelling; although at the bottom of the income range (in the left part of the graph) the floor consumption becomes very small. When households' income tends toward zero, the affordable housing consumption might well be a piece of plastic under an overpass or a bunk bed rented in shift in a rented room in an informal building. The fact that very poor people cannot afford a formal house is not a market failure – as it is sometime argued; it is just simply how the market works.

The shape of the consumption area (defined by the colored area between the 2 red curves) depends on a number of supply factors specific to each city. For instance, in a city surrounded by mountains the curves would be flatter and lower as land supply for city extension would be constrained; on the contrary, in a city located in a flat plain where land is not particularly fertile the consumption of housing would be much higher for all income groups except for the very low one; because for an income close to zero the housing consumption in absence of subsidies must also be close to zero whatever the price of land.

The setting of a minimum socially acceptable standards

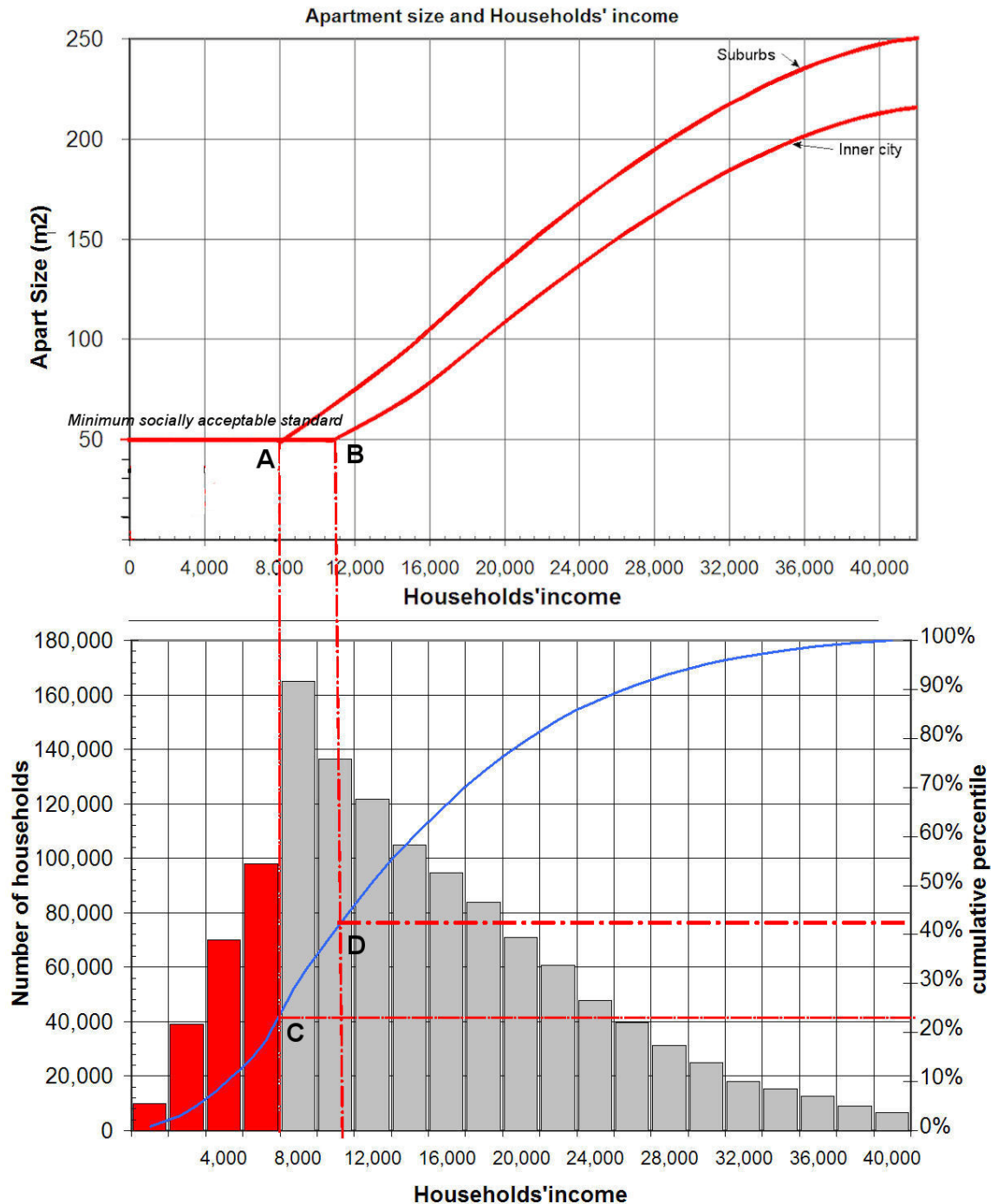


Figure 3: Affordability defined as a minimum consumption under current market conditions

The extension of the transport network, land use regulations, taxes, the productivity and competitiveness of the construction industry, the speed with

which the government deliver building permits will also change the slope of the 2 curves. The better the real estate industry is performing the steepest would be the 2 curves. But because the curves always start from the origin, a better performing real estate industry will create much larger inequalities between rich and very poor than a poorly performing industry will. In the same way, a city with many employment opportunities will have more housing inequalities than a city where the economy is stagnant and most workers are paid the minimum wage. We could well imagine that a number of new unskilled migrants coming to the city may have initially and for some months, if not years, a very low income at time close to zero. At the same time, the local government and local public opinion, concerned by the shanty towns growing within the town will probably establish a minimum housing standard below which no houses should be allowed to be built or rented.

Let us say that in city X this minimum standard is set by the municipality at 50 square meters of floor space (it might also be defined by other associated standards like connection to water supply and sewer, minimum access road width, etc). We can see on the graph of *Figure 3* that the consumption curve should now be changed; when the market curve cross the 50 m² mark, the curve become a straight line until it crosses with the y axis. We see that the upper curve defining housing consumption in the suburbs cross the 50 m² horizontal line at the point corresponding to an income of Rmb 8,000 per year. If we draw a vertical line from this point toward the income distribution histogram at the bottom of the graph we have defined the number of households who cannot afford anywhere in the urban area the minimum housing standards established by the city (represented by red bars on the histogram at the bottom of *Figure 3*).

We can then define affordability in a new meaningful way. We can say that in city X households with an income below Rmb 8,000 cannot afford a formal and legal dwelling of 50 m². More importantly we can evaluate the number of people who cannot afford – under current market conditions – the minimum standard established by the city. The income percentile of the households who cannot afford the minimum acceptable housing standard can be obtained by the intersection of the vertical line drawn from the intersection **A** of the upper consumption curve with the minimum standard line. This vertical line cut the cumulative income curve (represented in blue on the graph) in **C**. In this case, households below the 22 percentile (right hand axis) cannot afford the minimum standards of 50 m² of floor space.

We should note that if the minimum standard had to be met not only in the suburb but also in the inner city the number of households who would be unable to afford the minimum standards would increase from the 22 percentile to the 41

percentile (line **B D** on *Figure 3*).

If the government of city X is consistent with its minimum housing standards policy it should have set aside a fund to subsidize the housing of all the households who cannot afford the minimum housing standards through the free market. The amount of the subsidy (whether it is a rent voucher or a capital subsidy) is easily derived from the graph of *Figure 3*. The subsidy required is the difference between what households are currently paying and what it would cost to provide them with a dwelling meeting the minimum standard.

At this stage, the municipality of city X should review its decision to set the minimum standard at 50 m² and start to evaluate the impact of different minimum standards on its need for capital to fund the housing subsidy. We can see on *Figure 3* that moving the minimum standard to 40m² or even 30 m² would greatly decrease the city financial obligations. By contrast moving the minimum standard up to 60 m² would imply subsidizing the housing of more than half of the city population.

This approach shows the fallacy of having national minimum standards for housing. Selecting a minimum standard of, say, 50m² of floor space, has a number of important housing policy, financial and spatial implications:

1. Housing policy: setting the minimum socially acceptable standard will divide the housing sector into two parts: the first one where housing is provided by the free market and the second one where housing price is subsidized by the government and submitted to special regulations; the relative size of the 2 sectors depends on the selection of the minimum standard. If the government fails to meet the subsidy allocation implied by the minimum standard, a third housing sector will be created: the informal housing sector, or slums.
2. Financial : By setting a minimum housing standard the government implicitly guarantees that within a short time it will be able to subsidize all the households who cannot afford the minimum standards so that they can meet that standard with government assistance. So no minimum standards should be established without a good data base to justify that the city can afford the consequences of its policy.
3. Spatial: If the government decides to subsidize housing so that all new housing built meet the minimum standard, it will have to define a different minimum standards for the suburbs and for the inner city based on difference in the price of land. If it set just one uniform standard (as it is usually done) it would imply that all the new housing

for the poor will be located in the suburbs as the subsidy would not cover the cost of buying or renting a minimum standard house in the inner city. In the long run setting the minimum standard would result in segregating spatially the poor in the suburbs, and even worse probably segregating them from access to most job locations. This has happened in a number of European countries where public housing units were located where the land was the cheapest. It is happening right now in South Africa where the government was successful in subsidizing and delivering rapidly a large number of housing units in the wrong locations, creating poverty traps.

What to do then to “measure” affordability?

The best approach when establishing the minimum socially acceptable housing standard is to:

1. Realize that setting a minimum housing standard is meaningless or even detrimental if there are no sufficient funds immediately available to subsidize housing for households who cannot pay for the minimum standards under prevailing market conditions;
2. Carefully consider the number of potential beneficiaries implied in setting minimum standards and making trade-off between minimum standards and cost to the government to subsidize these beneficiaries;
3. Establish the minimum standard based on inner city housing cost, so that the subsidy does not result in a spatial segregation between subsidized and non subsidized housing and do not push the poor in areas with bad job accessibility.

Hong Kong history provides a good example of realistic policy based on setting minimum housing standards affordable to the government. Hong Kong in the sixties and seventies received a flow of unskilled migrants that increased the areas of the shantytowns found all around the territory. Hong Kong government established a minimum standard consisting in one room per households in high rise buildings with communal kitchen and bathrooms. Very low standards, certainly, but the high rise buildings were well connected to public transport and the rest of the city; good schools were also provided in the neighborhood.

The low standards selected at the time allowed the Hong Kong government to relocate within a few years every household living in shantytowns plus the flow of yearly new migrants in this Spartan type of public housing. After a generation, the formerly poor households well integrated into Hong Kong economy were able to afford higher standard public housing or in the case of some, private housing.

There was no need any more for the very low standards high rise buildings, which were then demolished and the land on which they stood recycled.

This example is selected only to show how Hong Kong government managed to solve the issue of socially acceptable housing for very low income migrants. It does not necessarily imply on my part a general endorsement of Hong Kong housing policy, subsequently resulting in more than 48% of households living in mostly rental public housing (48% in 1997)¹.

A more dynamic view of affordability: the stock and flow approach

We have discussed the problem of the definition of affordability in a static way until now. In reality the housing stock is constantly modified by new constructions, demolitions, aging and subsequent deteriorations of the older housing stock, gentrification and pauperization of individual neighborhoods. In addition, the households' income distribution shown in the preceding graphs changes continuously; the flow of new migrants and their skills vary from year to year, adding more poor households; urban income, in particularly for the more skilled, increase continuously, adding more higher income households with higher housing expectations. We have to take these possible changes into account if we want to define a housing policy that provides the best possible shelter affordable to both households and government.

Dividing the housing stock into housing types² is the first step to look at the dynamic of housing transformation in a city. In the case of City X in China we will adopt a simplified housing typology including 7 types:

1. Farmers housing rental
2. Farmers housing ownership
3. Traditional dwelling pre-1947
4. Privatized “danwei” housing pre 1985
5. Privatized “ “ post 1985
6. Commodity housing
7. Luxury townhouses and villas

Each of these housing types corresponds to a housing quality and generally to a location in the inner city or suburbs. We can then distribute the housing types

¹ Peter Fong, 2008, “*Housing Policies in Hong Kong and Singapore & Their Comparative Advantages*”, CPN Housing conference, Beijing july 2008

² The proposed typology for Chinese cities is a simplified version of the typology proposed by Professor **Ya Ping Wang** in his paper “**CHINA’S HOUSING POLICY REFORM AND SOCIAL AND SPATIAL IMPLICATIONS**” presented at the Lincoln Institute in May 2009.

by income group using the income histogram previously presented in *Figure 2*.

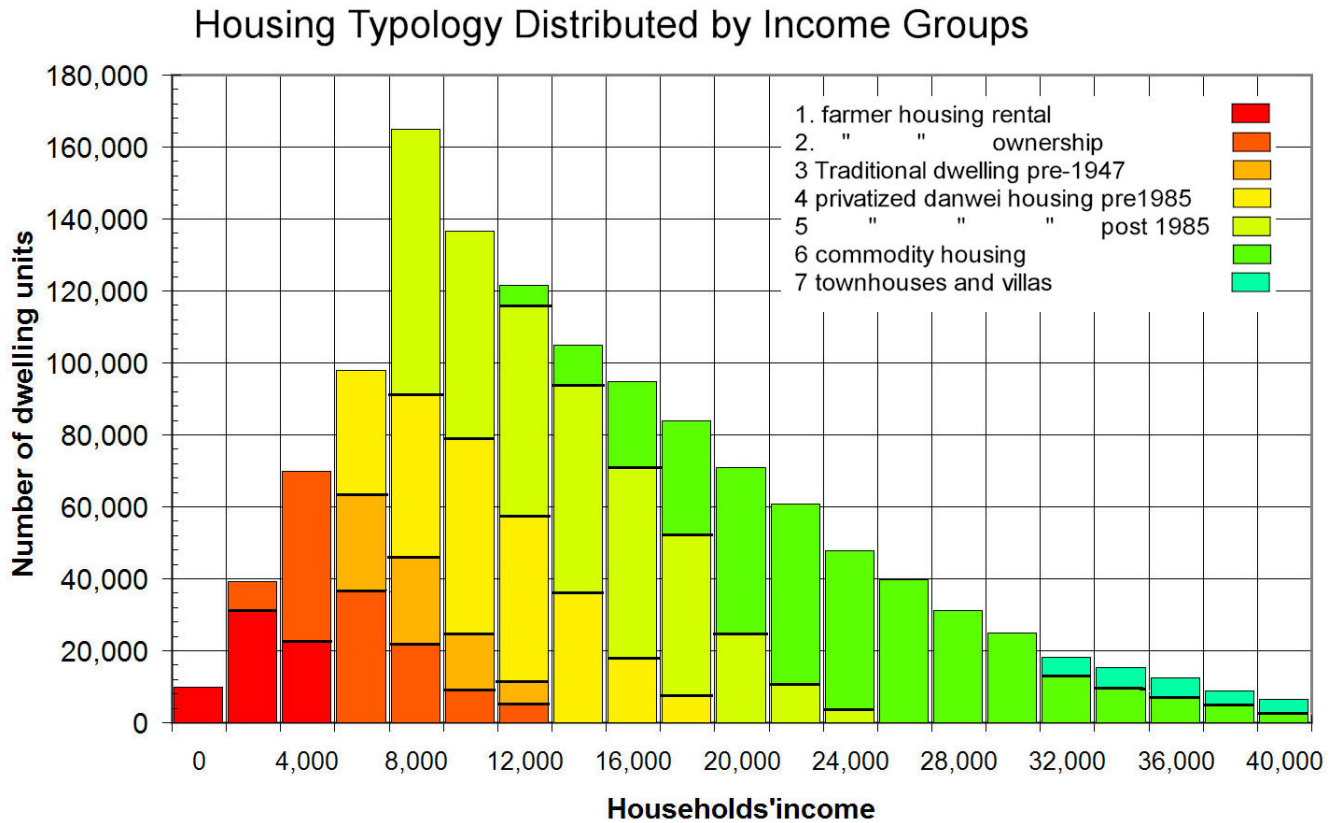


Figure 4: Housing typology by income group

The distribution of housing types by income groups in City X would look like the graph shown on *Figure 4*. This is the view of the housing stock at year T_0 . After, say, a period of 5 years at date T_5 this distribution of the stock by income group will be different. The total floor area in types 3, 4 and 5 can only decrease through demolition and decay; new housing units of these types are not being built anymore. However, in some cases the number of households living in type 3 to 5 could increase through subdivision of existing apartments. Most of the growth of the new housing stock will be for types 6 and 7. Type 1 and 2 are severely limited by the special status of rural collective land and could either increase through densification or decrease through demolition and redevelopment (as illustrated in the case of Tianjin on *Figure 1*).

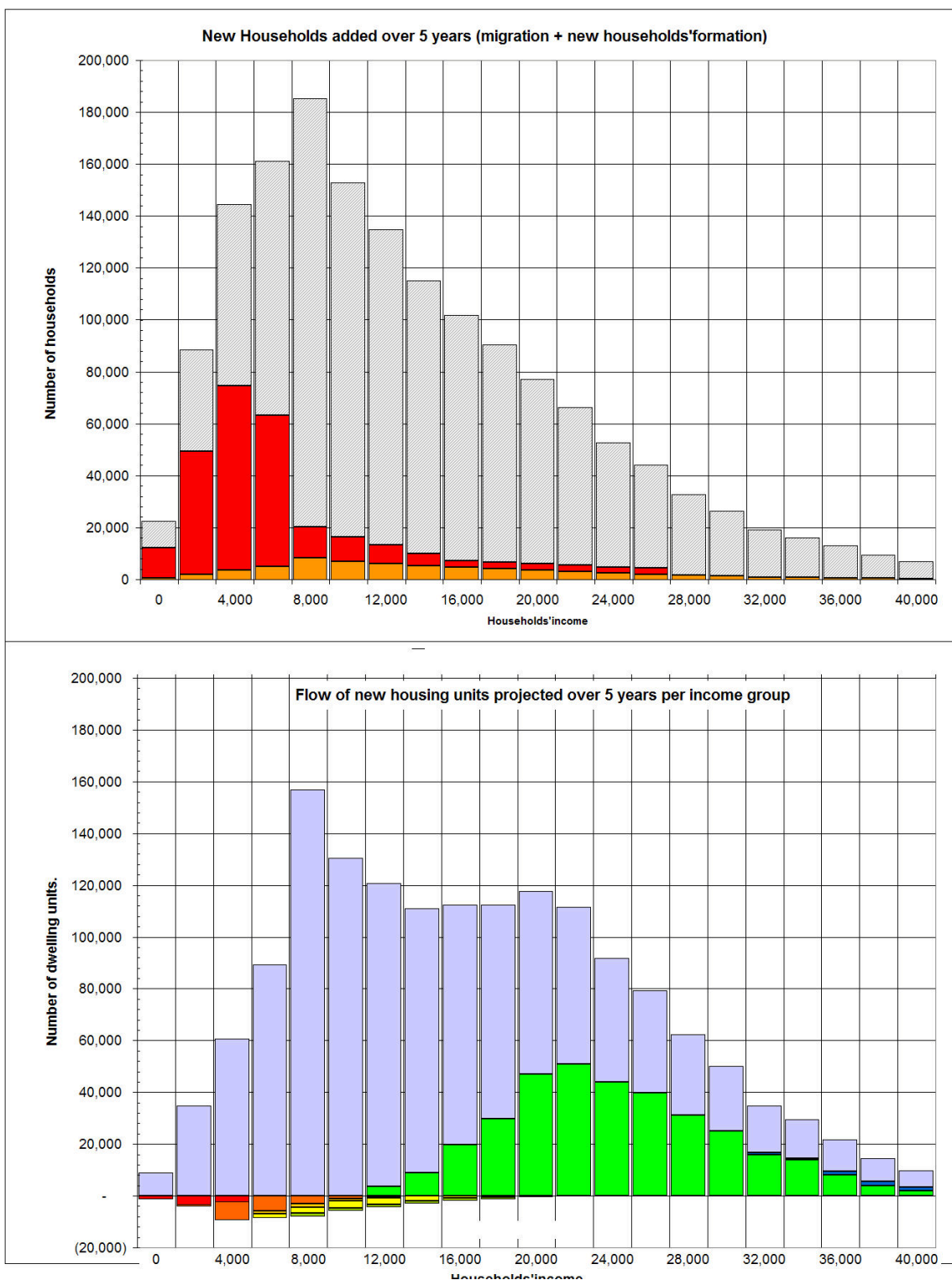


Figure 5: addition to the population and addition and subtraction to the housing stock between T0 and T5

The households' income distribution presented on *Figure 4* is going to

change over time. New households will be formed through natural households' formation over the 5 years period. New migrants will arrive in the city probably adding new households in the income categories below Rmb 5,000. At the same time the income of the households who were already urban in year T_0 as shown on *Figure 4* will mostly grow (average median household income in Tianjin has grown from Rmb 8,100 per year to Rmb 12,600 per year between 2000 and 2005, a 55% increase over 5 years (in nominal terms)).

If we add the changes to the population and to the housing stock (without yet taking increase in households income into account) we get a new distribution for the year T_5 that is represented on *Figure 5*. In this example, the historic housing types (3 to 5) and the farmers housing have decreased because of demolition. The large increase has been mostly in commodity housing.

We now can see that we have a mismatch between the households' income groups represented on the upper part of *Figure 5* and the housing stock shown on the lower part. It appears that there are too many commodity housing units compared to the number of households who can afford them. In preparing this scenario we have assumed that the total number of units on the market – new and existing – match the number of households but that the price of the units produced do not necessarily match the new distribution of households' income, as it often happens in reality.

The units in the existing and new housing stock will then have to get redistributed through the market among the different income group. Let us look at different scenarios (*Figure 6*).

In the upper part of *Figure 6* we have superimposed the number of households in each income groups (shown in gray with heavy line contour) with the number of dwelling units per type old and new. We have kept the households income similar to what they were in year T_0 . We see that we have a deficit of housing units for households below RMB 16,000/ month and a surplus of new housing units for households with income above Rmb16,000/month.

Some households who can afford the newly built housing units but who are currently living in older and possibly less attractive units will move to the new units. For instance a number of households living in privatized danwei units with income between 18,000 and 26,000 Rmb/month are likely to move into the new units. They will have to sell the housing units they currently occupy to other households who are likely to be from slightly lower income groups than themselves, who in turn would have to sell their units to lower income groups. Eventually the surplus will be absorbed through the trickling down of older units

toward lower income households.

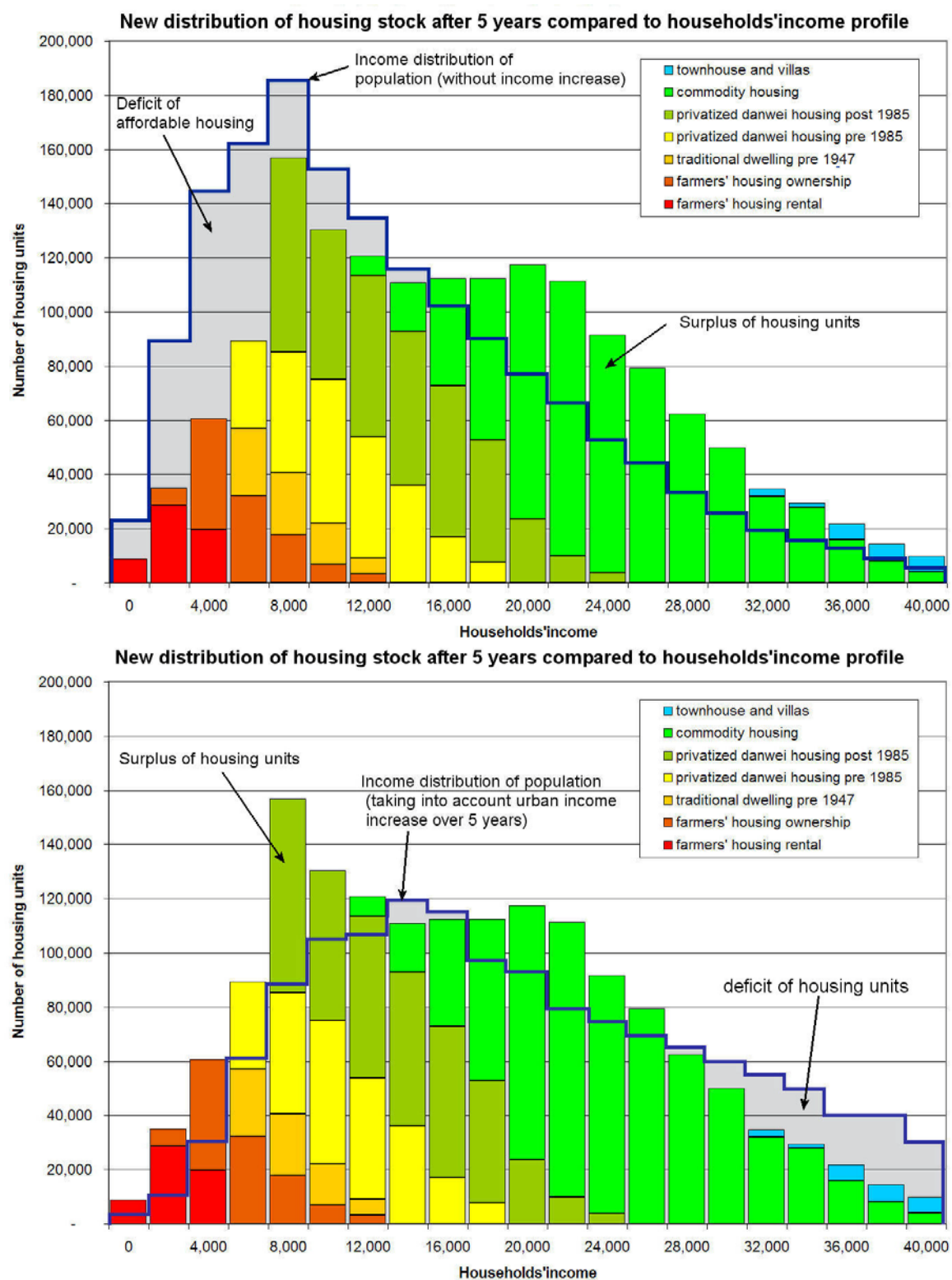


Figure 6: Distribution and filtering of the new housing stock after 5 years

It is not certain that the trickling down will in a short time eventually reach the poorer households. If it doesn't, then the poorer households will have to subdivide the current low income units in order to access housing units that they can afford. The trickling down will not reach the poor if a number of new units remained unsold, or if the number of new units built is below the number of households added to the population of city X. For instance, some housing units will remain unsold if households who can afford them find them less attractive (possibly because of their location) than the units they currently occupy.

If some new units stay empty there are two possible scenarios:

1. The developer try to keep them empty until a willing buyer shows up after a few years (this is more likely to happen if the developers has access to very low interest construction loans); or,
2. The developer discount the current price of new units until they can be all sold.

Under the first scenario the housing shortage for lower income group will persists, as the supply of new occupied units is less than the total demand; the housing standards of poor households further deteriorates by subdivision of the existing low income stock.

Under the second scenario new units currently occupied by higher income groups will eventually filter toward the lower income group and the housing situation of these groups will improve over the years.

The graph in the lower part of *Figure 6* shows the new distribution of households by income groups assuming that the income of all households already present in the city at time T_0 have increased by the same amount as Tianjin households' income between 2000 and 2005. However, the new migrants who arrived during the 5 years after T_0 will have the same income distributions than the households below the 10th percentile in year T_0 . The income distribution curve become flatter and more stretched, reflecting the increased income inequalities between unskilled new migrants and urban households with increasing higher skills.

With the shift in households' income the situation is quite different from the one shown in the upper graph of *Figure 6*. There is now a surplus of cheap housing and a slight surplus of middle income housing (between 18,000 and 26,000 Rmb/month). However there is a shortage of expensive housing (for households' income above 30,000 Rmb/month).

This situation is not as favorable for low income groups as it may appears. Because of the unsatisfied housing demand from higher income groups, we may

see a gentrification of older neighborhoods where often two apartments will be merged into a larger one in a renovated unit. The gentrification will eventually also trickle down toward the poor, but by pushing them out of the type of housing that they could traditionally afford. The shortage of new high income housing units eventually will have a very adverse impact on the housing quality of the poor.

Conclusion

Two measures recently taken by the Chinese government will make housing affordability by lowest income groups worst than they are now. These measures are (1) the land conversion quotas established at the central government level, and (2) the quotas on the number of apartments above a certain size in large Chinese cities. Quotas distort markets and in general create shortages not abundance.

Improving the housing consumption of low income households requires first a good understanding on the way housing markets work in China, including the market in existing units.

The measure of housing affordability can be done only for specific cities and for specific standards. The spatial elements of housing affordability cannot be ignored.

Minimum housing standards fixed by regulations should be matched by government resources to subsidize the housing units of all the households who cannot afford the minimum standards. If a municipality has no resources to subsidize poor households, it should not set minimum housing standards.

Demand side subsidies are much preferable to supply side subsidies. Establishing minimum housing standards without a government matching fund to subsidize housing will only increase the production of illegal and informal units.

When governments do not have enough resources to subsidize the housing of the poor, they should abstain from setting minimum housing standards and should instead upgrade the infrastructure of the poorer neighborhoods and provide in these locations more intensive social services in health and education. The long range impact of better health and education will be able to lift the income of most of the poor so that they can afford better quality housing in the future.

An analysis of the entire housing stock, taking into account the interaction between newly constructed stock and older housing units, will provide a very different perspective from the traditional affordability analysis. In particular, quotas consisting in arbitrary restriction on housing supply – for instance limiting the construction of one type of housing and favoring another – could very well backfire to the detriment of lower income groups.

Urban renewal and urban redevelopment often decrease the number of older housing units affordable to the poor. These units might not be able to be replaced at their current price in the newly built housing market (this is the case in Tianjin in the case study shown on *Figure 1*). Cost benefit analysis of urban renewal projects should take this effect on affordability into account.

A housing policy focusing on the housing affordability problem encountered by lower income households should always rest on a thorough knowledge and understanding of the characteristics and prices in the entire housing stock. Solving the housing problem of the poor cannot be done in isolation as all income groups compete for the same land. Housing units do trickle down, in the same way as used cars trickle down to the poorest households. Restricting the supply of housing at the high end of the market has therefore a detrimental effect on the housing of the poor as it may result in gentrification, which is a trickling up of low income housing units toward higher income groups. Older housing units are often better located and might be the only one affordable to the poor.

To develop a sound housing policy, it is indispensable to create a housing typology that reflects the dwelling units' universe in a specific city. The typology should be matched with the households' income distribution and with spatial characteristics.

The spatial dimension of affordability has to be taken into account. A housing unit affordable to low income households in a location far from the major jobs concentration could become a poverty trap, as it has been shown in other countries (see the recent experience of South Africa in this matter).

Most cities lack the data to perform the analysis recommended in this paper. In fact the data usually exists but it is dispersed among different institutions. Most cities have now relatively elaborate GIS but few are using them for spatial analysis. No housing policy can succeed if it is not based on data which include current market prices, physical characteristics and location of the entire housing stock (flow and stock). Knowing the transaction price of existing units is at least as important as knowing the price of the new flow of housing being constructed each year.