Research on the Reverse Declining Mode of Urban Housing Security Subsidy

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Abstract. In terms to the design of urban housing security system, this paper raises the idea that the way to achieve security should focus on "head" subsidies which can be subdivided into housing and rental subsidies. To the lowest-income households and low-income households, the government should employ rental subsidies; to the lower middle-income households, rental subsidies or housing subsidies can be employed by the Government which can be freely selected by the households needing the security. The amount of subsidy is equal to the subtraction of applicants' paying by themselves from renting(buying) standard of housing rents. The paper raises the calculation model of the housing allowance according to the four kinds of people enjoying subsidy who have or do not have income and house which realizes the housing subsidies' bi-directional linking to household incomes and housing area. Less income and housing area get more subsidies, achieving the reverse declining effect of unfair subsidies.

From the perspective of the practice of housing security in the developed countries, housing security can be summed up to two categories: one is the "brick and mortar" subsidies, the other is "head" subsidies. "Brick and mortar" subsidies for its inefficiency has been abandoned by every country. Instead, every country's security mode employs "head" subsidies. In China, housing security practices also show that there are many drawbacks and problems in the implementation process of low-rent houses and affordable houses which belong to the "bricks and mortar" subsidies.

Therefore, the author puts forward that housing security mode should be "head" subsidies in the design of new housing security system in China which can be subdivided into two types: housing subsidies and rental subsidies.

The determination of the subsidy

From table 1, the data of income class house price-income ratio, we can find that house price-income ratio of lower middle-income households is mostly between 6~7 times. According to the international standard of 6 times, these households have strong housing affordability compared to the lowest-income households and low-income households. They can have housing paid which just need a little help from the government.

Tab.1 2013 Housing security households price-income ratio (price-adjusted)

	Lowest-income households (10%)	Low-income households (10%)	Lower middle-income households (20%)
Nationwide	12.7	8.6	6.7
Beijing	11.9	8.4	6.9
Shanghai	13.6	9.9	9.1
Chengdu	13.1	7.6	6.0
Wuhan	11.7	7.6	6.0

And these households have capacity to accumulate the first payment of house-purchase (20% or 30% of total prices). Therefore, for the lower middle-income households, its solution to the housing problem can be renting or purchasing houses or renting first, buying second. If they choose to rent, the government provides rental subsidies. If they choose to buy, the government provides housing subsidies.

For the lowest-income households and low-income households, the house price-income ratio is generally more than 9 times, especially the house price-income ratio of households with the lowest-income being more than 10 times. Because these families have low income, if the purchase is employed to solve the housing problem, each month for most of the pressure will be borne on the government which will inevitably lead to excessive government pressure. Besides, this is not conducive to fostering the housing rental market. To this end, these residents should primarily rent a house to solve the housing problem.

Consequently, in the design of new urban security subsidy system, the solutions to urban housing problems: firstly, rental subsidies for lowest-income households and low-income households whose house price-income ratio is no less than 9, occupying 20% of the total households. Secondly, housing subsidies for lower middle-income households, whose house price-income ratio is less than 9 and is more than 6, occupying 20% of the total households. Thirdly, the market-oriented mode for middle income households, upper middle income households and high income households whose house price-income ratio is no more than 6, occupying 60% of the total households. Residents who need housing security occupy 40% of the total households.

The determination of the subsidy standard

The determination of the monthly rental subsidy

Monthly rental subsidy standard refers to the amount of rental subsidies that government gives to the housing difficulty families monthly for per rental unit area. The determination of monthly rental subsidy standard should take following principles into consideration, the principle of government's economic ability, the principle of housing step consumption, the principle of the satisfaction of basic housing need of the lowest-income family. If the monthly rental subsidy standard is too high, government cannot afford, or the living standard of appliers improves inappropriately, even exceeds the living standard of high-income class, which will cause the housing security system meaningless. If the monthly rental subsidy is too low, appliers cannot rent a suitable room and meet their basic housing need. As far as we concerned, it is appropriate to use 90% of the average level of last year's rent as the rental subsidy.

The determination of the standard of monthly house-purchase subsidy

The standard of monthly house-purchase subsidy refers to the house-purchase subsidy that government gives to the housing difficulty families monthly to purchase the house for per unit area. The monthly house payment is monthly payment under the condition of 20% of the total payment as its down payment and to mortgage a house for 20 years or 30 years. In this study, considering the economic capability of families those are relatively under the middle income level, we use 30-year-mortgage to calculate. Like the rental subsidy, we could use 90% of the average level of last year's house price as house-purchase subsidy.

The calculation method of housing subsidy

After the determination of above-mentioned standards, we can calculate the subsidy for appliers.

The goal of housing security system is letting everyone has suitable house. Hence, as long as the housing areas of policy-targeted group reach the appropriate standard, the goal can be reached, which means that the responsibility of government is to ensure that the housing area of appliers reaches area standard. (See Table 2).

Tab.2 Assured standards for the affordable housing area

	family size	Double-stranded (2.5%)	Difficult family (5%)	Lowest income household (10%)	Low income household (10%)	Lower middle income household (20%)
Per capita use area(m^2)	—	7	9	11	13	15
Construction area control standards(m^2)	1	10	15	20	25	30
	2	20	25	30	35	40
	3	30	40	45	55	60
	4	40	50	60	70	80
Household income for rent(purchase) spending ratio	—	5%	15%	20%	25%	30%

Owing to the fact that the rent or the housing price of appliers is shared by government and themselves, the subsidy of government equals to the amount of money that appliers rent or purchase for area standard house minus the section that appliers should bear by themselves.

The calculation method of housing rental subsidy

Provided: W represents monthly housing rental subsidy, S* (square meters) is original housing area of housing subsidy appliers, R (yuan) is annual household income of appliers, T (yuan/square meter) is rental subsidy standard of government. Then provided: S (square meter) is the area of housing rental subsidy standard.

The first step is to choose S from the number of most vulnerable families of the selected program (see table 1). The second step is to choose the number of lowest income families (5%). The third step is to choose the number of lowest income families (10%).The fourth step is to choose low and middle income families (10%).And take related numbers according to different family numbers.

At last, provided: the rent expenditure ratio in annual household income of housing subsidy appliers is G. G is taken 5% at the first step, 15% at the second step, 20% at the third step and 25% at the fourth step. According to the condition that whether appliers has house or incomes or not, W, the monthly housing rental subsidy should be calculated in four conditions. Formula is as follows:

(1) No house and no income

$$W = S \times T \tag{1}$$

(2) Only has house

$$W = (S - S^*) \times T \tag{2}$$

(3) Only has income

$$W = S \times T - \frac{G \times R}{12} \tag{3}$$

(4) With both house and income

$$W = (S - S^*) \times T - \frac{G \times R}{12} \tag{4}$$

If appliers rented public house before, the formula above is suitable for the time before and after the selling of public house. When public house is sold completely, the monthly housing rental subsidy can be calculated under the condition that considering the income factors only by formula 1 and formula 3.

Only when S exceeds S*, namely the original housing area of appliers S* is less than S, the standard of housing area security, government will provide subsidy. If S is less than or equals to S*, government will not provide subsidy. Only when W exceeds zero, namely an appropriate ratio in annual household income of housing subsidy appliers (such as those families has difficulty in both housing and living) cannot afford the price even in 0.9 times of average price of house rent in the market, government can provide subsidy. If W is lower than zero, government will not provide subsidy.

As for the relationship between the amount of government subsidy and household income level we can know that housing subsidy and household income level shows an inverse relationship. When there is no household income, government will provide full subsidy. As t income increases, housing subsidy declines. When household income level reaches a certain level, those families will not be housing security targets and government will not provide housing subsidy.

Government is only requested to provide rental subsidy within related limits and guarantee the financial need of low-income people to rent standard area. The rest of items, such as location, time, size, rental duration and real payment, are solved by appliers themselves. If the real payment exceeds the housing rent limit, the exceeding part is paid by appliers themselves, not the government. If the real payment is lower than the limit, government will also provide subsidy that is equal to the housing rent limit.

The calculation of housing subsidies

Supposed: the amount of monthly housing subsidies is W, the applicant's primary housing area is S m^2, the primary housing price is T yuan/ m^2, his annual income is R yuan, the standard housing subsidy set by the government is T yuan/ m^2 and the standard housing subsidy area is S m^2. Supposed: the mortgage period is Y, Y is equal to 30 and the monthly interest of loan for purchasing houses is r. Supposed: the applicant's housing price occupies G of the household annual income and the G is equal to 30%. Two ways of calculating the amount of housing subsidies W are adopted according to whether the applicants have already had the house.

(1) No house

$$\text{principal amount of loan} = S \times T \times 0.8$$

$$\text{monthly repayment of loan} = \frac{S \times T \times 0.8 \times r \times (1+r)^{360}}{(1+r)^{360} - 1}$$

$$W = \frac{S \times T \times 0.8 \times r \times (1+r)^{360}}{(1+r)^{360} - 1} - \frac{R \times G}{12} \tag{5}$$

(2) With house

$$\text{principal amount of loan} = S \times T \times 0.8 - S^* \times T^*$$

$$\text{monthly repayment of loan} = \frac{(S \times T \times 0.8 - S^* \times T^*) \times r \times (1+r)^{360}}{(1+r)^{360} - 1}$$

$$W = \frac{(S \times T \times 0.8 - S* \times T*) \times r \times (1+r)^{360}}{(1+r)^{360} - 1} - \frac{R \times G}{12} \qquad (6)$$

Only if S is more than S, namely the primary housing area S is less than the security area S, the government will offer the housing subsidy. If S is no more than S, the government will not offer the subsidy. Only when W is more than zero, namely the proper ratio of applicant's annual income(such as 30%) cannot purchase the standard area house with 90% average market price, the government will offer the subsidy. If W is less than zero, the government will not offer the subsidy.

According to the housing subsidy mode designed by the author, it realizes the housing subsidies' bi-directional linking to household incomes and housing area. Less income and housing area get more subsidies and more income and housing area get less subsidies that the government will fully play its role in housing subsidy. The reverse mode is called Reverse Declining" Mode.

According to the housing security mode designed by the author, the government only needs to offer housing subsidies to guarantee the applicants' funding need to purchase or rent the standard housing area. The other matters such as the location of the house, time, the area and the the actual price should be settled by the applicant. If the applicant's amount paid in purchasing or renting the house is more than the amount of purchasing or renting the house, he will be responsible for the extra amount and the government will not be responsible. If the applicant's amount paid in purchasing or renting the house is less than the amount of purchasing or renting the house, the government will pay the quota of housing subsidies.

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