

RESEARCH ARTICLE

Research on the Rent Pricing Mechanism of Public Rental Housing PPP Mode

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Abstract

In order to solve the housing difficulties of low-income families, the government clearly put forward to establish and improve the housing supply system, concentrating on the development of public rental housing. But the government lacks a large amount of construction fund. So introduce the PPP mode in the construction of public housing, which can effectively solve the problem. However, too high public housing rents to attract the low income, therefore, public rental housing rent pricing should be the core content of housing policy. In order to alleviate government's financial pressure, guarantee the sustainable development of public housing system, this paper combined with local economic level, people's income, consumption ability to pricing reasonable rents of public rental housing. Focuses on analyzing the PPP mode of public rental housing rent's theory composition, and connecting with the actual measured the rents, so as to determine the pricing mechanism of public rental housing rents.

Keywords: *Public renting housing, The PPP financing mode, Public rental housing rents, Rent pricing mechanism.*

Introduction

It is the duty of the government to solve the housing problems of low-income families. Countries clearly put forward the "establish and improve the housing supply system, concentrating on the development of public rental housing, gradually make it affordable housing subject". A lot of affordable housing construction requires a lot of money. If all the investment by the government, will be a huge financial burden, the introduction of PPP mode, is conducive to reducing the government's financial burden directly, to reduce or transfer of financing risk, also mobilized folk rich social resources, at the same time realize reasonable allocation of resources.

However, how to formulate a reasonable rent is a difficult problem. If the public housing price is too high for the vast majority of low-income people to attract, public housing has lost its important public welfare attribute [1]. In the PPP financing

mode, research on how to make reasonable price not only to satisfy most of the housing needs of low-income families, but also maintain the operation of public rental housing project is important.

Public Rental Housing PPP Mode

The PPP (Public Private Partnership), refers to the Public sector by establishing partnerships with the Private sector to provide Public goods or services [2]. In this mode, encourage private enterprises to cooperate with the government, participate in the construction of public infrastructure. Through this kind of cooperation, the parties can achieve better results compared with expected to act alone. All parties involved in a project, the government is not transferred all of the responsibility of the project to the private sector, but by the parties to cooperate to share responsibility and financing risk.

With the introduction of the PPP mode to private enterprise, provide public services more effectively. The PPP model introducing competition mechanism changed the traditional government management mechanism. Government has realized the risk distribution, different from the traditional model, the PPP at the beginning of the project can achieve risk distribution, at the same time as the government share a part of risk, to reduce the risk of private enterprises, which reduces the financing difficulty, the PPP mode to achieve the power sharing [2].

The Existing Public Housing Rent Pricing Mode

Public rental housing system has just started in our country, but in the early exploration practice, there have been some symbolic rent of determination method [3].

Beijing Mode

Public rental housing rent is determined in accordance with the principle of small profit and combining the tenant family burden ability, and a certain proportion of similar housing market rent down, is about to 70% - 80% of regional market rents. From authorities to release, mainly according to Beijing public rental housing rent land prices, take the cost, all kinds of taxes and fees, loan interest and management fees, etc. Among them, the land prices mainly for relocation expenses.

Chongqing Mode

Chongqing is the first domestic city to introduce public rental housing. Its regulation: public rental housing rent standard according to the loan interest, maintenance fee and according to the different location, different houses category and other factors, by the municipal commodity price departments jointly with Bureau of finance, housing guarantee agencies, related departments negotiate the rent. Public rental housing rent is not higher than 60% of the same location, same quality standard, the same type of commodity housing market rents, and public rental housing rent standard will be dynamic adjusted with the city market, urban economic development situation.

Xiamen Mode

Xiamen provides that the public rental housing rent calculation according to the market standards, For renting family practice the rent subsidy policies, for middle-low income families according to different income subsidies to 70% ~ 90% respectively. Among them: annual family income (3 persons) in 25000 yuan to 50000 yuan, subsidies 70% of the rent. For annual family income (3 persons) below 25000 yuan, subsidies 80% of the rent; For low-income guarantee residents, 90% of the rent subsidies.

Rental criteria and calculation measures shall be formulated by the related departments; For renting affordable rental housing home rent subsidy system, apply for middle-income families according to different income subsidies given to 70% ~ 90% respectively. Among them: annual family income (3) in 25000 yuan to 50000 yuan, 70% of the rent subsidies. For annual family income (3) in 25000 yuan the following, 80% of the rent subsidies; For low-income residents, 90% of the rent subsidies.

The Pricing Mechanism of Public Rental Housing of PPP Mode

The Main Body of Public Rental Housing PPP Mode's Pricing Mechanism

In public rent housing PPP mode, there are three stakeholders, in which the government and the private sector and the general public. The interests of the three interdependent, influence, change in the pricing system.

The three sides in public rental housing PPP mode have their own goals. Government goal is through the PPP project pricing to provide abundant and high quality service for social public housing, to promote the economic development of the region and improve the performance of their own, and maximize public housing PPP project social benefits; Private investors by the PPP project pricing based on recoup their investment can also profit, namely to maximize investment profits; The public wants the PPP project to provide the high quality service at the same time, their use of minimum cost, namely realize own benefit maximization. Obviously, the public rent housing PPP project pricing is to satisfy the interests of the above

three objectives and is critical to achieving, eventually determine the price of the main body between the efficiency of mutual cooperation and trust relationship.

However, the above three main pricing goals often cannot meet at the same time, reduce the use cost is bound to cause, jeopardizing the interests of the private sector, improve the interests of the private sector will lead to the economic burden of the government or the public. Therefore, public rental housing PPP project pricing must be comprehensive consideration, balance the interests of all parties, so as to achieve the optimization of the target [4].

Public rental housing PPP project belongs to the category of public products, a strong external and public welfare attribute, therefore, the price can't simply rely on market spontaneous, and the government need to supervise and manage and supply the corresponding subsidies. Government through franchise agreements provide certain financial subsidies to private investors, at the same time, considering the welfare of the community and investors earnings; Therefore, the government's fiscal subsidies, private investors earnings level and the public affordability restricts the public rental housing rent of the PPP mode pricing.

The Composition of the Public Rental Housing Rent of PPP Mode

Public rental housing rent is sure to consider the following factors: the project in the period of validity can return on investment, the investment recovery period and public rental housing rental rates, combined with bank lending rates, give full consideration to the private sector investment profits. The public rental housing rents, according to its cost is divided into totally cost, standard cost and operation cost three types. Totally costs include the cost of a project, there are usually land, construction and installation cost, interest, depreciation, property management, maintenance, repair decoration furniture, operation maintenance, investment profits, etc.; Operating costs mainly from the perspective of guarantee housing costs of

operation and management to make the rent price, is the most basic management fee; Standard cost is between completely costs and operating costs.

The Establishment of the Public Rental Housing PPP Mode's Rent Pricing Model

Public rental housing PPP mode's rent pricing must fully to ensure that the private sector cost can be recovered and can get reasonable economic returns, according to the net present value method, the basic model can describe[4].

$$P = \sum_{t=0}^{T_c} \frac{C_D + C_{MD} + TAX_D}{(1+i)^t} \quad (\text{Formula 1})$$

In the formula:

T_c - construction period;

C_D -development and construction costs (including the land, take, decoration, furniture, etc.);

C_{MD} - costs of capital in construction period (mainly the cost of borrowing);

TAX_D - taxes and fees in construction period.

And get the profits of operation period of formula (converted into net present value) :

$$P = \sum_{t=T_c}^{T_c+T_o} \frac{r_n S \rho - C_o - C_M - TAX_o}{(1+i)^{T_c+t}}$$

(Formula 2)

In the formula:

T_o - franchised operation period;

C_o -operating costs (including property management, maintenance, repair, etc.;

C_M - the cost of capital in concession period;

TAX_o -- the tax in the franchising period (taxes, construction tax calculate on project take a cost);

R_n - rent theory, the unit is yuan/m² * month;

S - total building area;

ρ -rental rates.

Therefore, through the combination of the construction cost and operating income can get comprehensive net present value formula:

In the rental market, which requires the above formula meet r_n (theory rent) is lower than the market rents the r_m ,

$$P = - \sum_{t=0}^{T_C} \frac{C_D + C_{MD} + TAX_D}{(1+i)^t} + \sum_{t=T_C}^{T_C+T_O} \frac{r_n SP - C_O - C_M - TAX_O}{(1+i)^{T_C+t}} \quad (\text{Formula 3})$$

otherwise the PPP pattern of public housing rental price is higher than the market, lost its public welfare attribute. In addition, according to the structure of the service life, maintenance, repair cost, the concession of the public housing T_0 must be lower than the average service life of the building (T_0) Max.

Theory of rent pricing can be combined with the above information. Theory of rent and concession period is a negative correlation relationship: the higher the rent of theory, the shorter the payback period, the private enterprise risk will reduce accordingly, but it means that the higher the government subsidies, the greater the financial pressure; On the other hand, is just the opposite. Therefore, the government and the private sector should trust each other, detailed analysis of the ability to bear risks, proper consultation, determine the concession of the reasonable.

The Dynamic Adjustment of Public rental Housing PPP Mode Rent

The rent adjustment range is decided by operating companies and government departments jointly negotiate, can also be decided through social hearing, in order to ensure the rights and interests of low-income earners, specific Suggestions are as follows:

- The rent is to consider the location difference, reflect the difference of house

Regional different geographical conditions, economic level, create the economic benefits of difference obviously, therefore the rent shall be adjusted accordingly. For different public rental housing project, quality, location, facilities, rent levels should also be different[5].

- In order to embody fairness, the rent shall be dynamically adjusted

Housing difficult family income and market rents are constantly changing. In the process of project operation, with the development of regional economy and the improvement of people's living standards, national policy and the impact of

factors such as inflation and interest rates, public housing rents should make corresponding adjustment. Adjustment should follow the "efficiency and fair unity, balance the interests of all parties" principle.

Rent Adjustment Method

When the PPP projects price need to be adjusted with environment change pricing reference infrastructure, can be requested by the project company approved by the government then implementation; Price adjustment can also be by the project company. The former can effectively avoid the project company gain more profits for violations of the tenant's interest, but this way will reduce project the adaptability to dynamic environment, reduce the enthusiasm of investors. Therefore, the government should give the project company autonomy. Literature [6] is for infrastructure projects, designing a restricted price adjustment mechanism. Specific implementation process, can be prescribed by the government pricing project number and adjust the ceiling, in this range, the pricing scheme shall be formulated by the PPP project company.

The Actual Measuring of the Public Rental Housing PPP Mode Rent

Public Rental Housing Cost Estimates

Niutian fields of public rental housing project more convenient transportation, basic life form a complete set, regional development prospect is good, all kinds of large-scale facilities are in the planning and construction. Niutian fields of project planning a total land area of 1.0 hectares, with a total construction area of 57000 square meters, construction area of about 47800 square meters on the ground, 1180 households. The public housing project family is 35, 40 square two types. According to the formula3:

For calculating formula above, the following assumptions:

- The government transfer land, no land costs.
- Enterprise long-term loan interest rate is of 6.5%.
- Concession period: assume that the government and the private sector agreed upon through

consultation of franchising period of 30 years, the investment rate of return (discount rate) of 10%.

- Construction and installation project cost: according to the specific situation of the project, the surrounding public data project survey, the construction cost is about 3000 yuan/m², construction period take 2 years; Decoration fee is about 800 yuan/m².
- Money makes up: according to the project actual situation, the private enterprise loan amount is about 70% of the total value. And in the first year construction loan accounts for 55% of its own funds, in the second year is of 45%. Assumptions are year-end pay fees.
- Operation management costs: franchising period for 10 years before property management, the management of the repair cost is 0.5 yuan/m², 20 years after the property repair management cost is 0.8 yuan/m².
- Rental rate: according to the rental market analysis, the demand for housing is greater

than the supply, assume that the occupancy rental rate of 90%.

Thus calculate the r_n (the calculation process is abbreviated) = 21.07 yuan

Calculate theory of rent (21 yuan/m²) and the surrounding rental market rent (30 yuan/m²), in contrast, the PPP mode relative to the public housing rent rental market average rent price down 30%, have certain price advantage to attract public housing in low-income families, the public welfare attribute is certain.

Public Rental Housing Rent Subsidy Scheme

Selecting the most representative four investment proportion mode in public rental housing and calculating analysis of public housing rent subsidy policy, specific measure is as following:

Table 1: the relationship of government investment rate and the rent

The relationship of government investment rate and the rent	Units: ten thousand yuan			
government investment rate	30%	50%	70%	100%
total investment	6804.5	11340.4	15876.5	22515.8
rent	29.1	21.07	12.9	/

Through the above-mentioned actual measurement, it can be seen that the amount of government funding and the corresponding investment under the rent. This paper based on the government and private sector investment half way to measure analysis. Compared with government investment accounted for 50% of total investment and 100%, in the construction period can save capital of 111.754 million yuan, if 50% of the funds for subsidies, according to the formula:

$$P = A \frac{(1+i)^n - 1}{(1+i)^n * i}$$

$$5587.7 = A \frac{(1+0.1)^{30} - 1}{(1+0.1)^{30} * 0.1}$$

A = 5.9273 million yuan

Share to the public housing rent per square metre per month subsidy for: 8.67 yuan. Through the subsidy after the public housing rent, only 12.4

yuan that are attractive to the low and middle income earners, and the government also had to save the purpose of the initial investment.

Calculating the Object's Ability to Pay

According to the statistical yearbook 2012, Hangzhou, the resident per capita disposable income is 34065 yuan in 2011, grouped by income level, family average per capita disposable income can be divided into 5 groups, the per capita disposable income is 14397 yuan, 23699 yuan and 23699 yuan respectively, 40246 yuan, 68781 yuan. Disposable income less than 23699 families can enjoy public rental housing policy.

It is generally believed that the monthly housing costs should not be more than 25% -30% of the total household income. Otherwise the resident will face a heavy burden of life and economic pressure. Therefore, according to the 30% of household income to measure of housing affordability.

Table 2: Calculating the ability to pay of the public rental housing object

The ability to pay of the public rental housing object			
Family situation	Per capita disposable income (month)	Housing affordability(single) (RMB/month)	Housing affordability (two) (RMB/month)
Low-income earners	1199.75	360	720
Low and middle income earners	1974.92	592	1184

In view of the above calculated data, low-income (single) to control the monthly disposable income within the normal range of only rent ($360 \div 21.07 = 17.09$ m²) while two persons family can rent 34.2 m²; Low and middle income earners (single) payable ($592 \div 21.07 = 28.10$ m²), and two persons family can take 56.2 m² of public housing. Low-income, by contrast, the lease of public housing area is finite, relatively poor living conditions; While the low and middle income earners can very good pay rent.

The Actual Rent Adjustment

According to changes in the consumer price index, calculates an average of 3.8% for nearly four years, considering the rents rose by no more than the CPI, otherwise the residents quality of life greatly affected, pricing parameters is 2%, so the assumption that once every five years to adjust the rent, or 5 years later the pricing is based on the theory of rent is up 21.90% [7-8].

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The Conclusion

In this paper the rents of public rental housing PPP mode pricing mechanism is analyzed. And assume that a lot of relative idealized conditions, such as government and private sector investment accounted for 50%, the investment rate of return is 10%, the condition such as franchise operation period of 30 years. Niutian fields of public rental housing project as an example for analysis and calculation. At the same time, draw lessons from foreign mature PPP financing mode of pricing mechanism, combined with local specific economic situation calculus. To public rental housing construction costs and per capita disposable income considering rent pricing, according to the user's ability to pay for checking, to have difficulty corresponding policies and subsidies for the family, so as to improve the pricing mechanism for public rental housing.

Remark

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