

Chapter 28

Policy Change from Affordable Housing to Public Rental Housing: A Comparative Analysis Based on IAD Framework

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Abstract At a time when affordable housing gradually withdraw from the stage of history and public rental housing instead become the main part of indemnificatory housing, in order to explore the efficiency of the policy change, as well as social welfare and housing affordability, this paper first combs the policy change of indemnificatory housing. Learning from the Institutional Analysis and development Framework put forward by Ostrom, this paper then builds the IAD framework of the indemnificatory housing policy change analysis. After that, it analyzes the short-term changes in efficiency and long-term changes in social welfare using econometric models. In the empirical part, this paper compares the reasonable price for the target groups and the current benchmark price of indemnificatory housing, taking Hangzhou for example. It can be concluded that policy change from affordable housing to public rental housing has enhanced the affordability of housing for middle- and low-income families, meanwhile, policy efficiency and social welfare have been increased, which is beneficial to the whole society.

Keywords Affordable housing • Public rental housing • Policy change • IAD framework • Social welfare

28.1 Introduction

Nowadays, with the rapid improvement of China's urbanization level, the concept of "home ownership" is further strengthened in everyone's heart. However, since the system of welfare housing has been abolished and replaced by the commercial

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residential building from 1998, the price of commercial residential building increased significantly. The issue of housing security for the middle- and low-income families has become a focused topic.

In fact, “the notice on further deepening the system reform of urban housing and speeding up housing construction” issued by the State Council in 1998 had made it clear that families of different income levels should be implemented with different housing supply policies. That is, high-income families should buy commercial housing according to the market price; middle-income families should buy affordable housing and low-income families should rent low-rent housing.

The concept of affordable housing was initially proposed in the 1990s and the “Twelfth Five-Year Plan” made it clear that within the next 5 years China will build 36 million units of indemnificatory housing. However in the past years, affordable housing hasn’t formed a perfect mechanism. It has advantages such as more favorable price than commercial housing and full ownership comparing to public rental housing, which makes corruption and irregularities common occurrences in recent years.

It is precisely because that affordable housing has all kinds of problems, Zhengzhou stopped new affordable housing project in 2012; Shenzhen launched the last batch of affordable housing in February 2013 and Guangzhou suspended the application for affordable housing since April 2013 and included the new qualified people into the scope of protection of public rental housing..... Thus, it has become a general trend that public rental housing will replace affordable housing to be the main part of indemnificatory housing.

28.2 Literature Review

On the issues of housing security, foreign scholars mainly focused on two aspects. The first one is the link between indemnificatory housing policy and social justice. Charles, Sinan and Kuzey developed a general equilibrium model of residential choice and study the effects of two housing aid policies, public housing units and housing vouchers [1]. Anniz and Mazlin addressed the challenge of finding innovative ways to reduce the cost of building houses making it affordable for every family and then provided a theoretical alternative – the Affordable Mosaic Housing concept as a possible inventive solution [2]. Another aspect is how to balance the relationship between indemnificatory housing policy and market economy. Bruce and Alex studied the new indemnificatory housing policy in the UK which claimed the rent of public housing should be determined with reference to those obtaining in the local private rented sector [3].

As China has been implementing a welfare housing system for a long period, the research on indemnificatory housing started late. In the areas of macro research, Su Duoyong and Zhang Yuxiang analyzed the reasons for the shortage of indemnificatory housing supply from deficiencies in the system, land finance and other perspectives [4]. Ren Pengchong and Ren Fanxing concluded the experience

for the sustainable development of indemnificatory housing after comparing the indemnificatory housing policies in Germany, the U.S. and Singapore [5].

In the areas of micro research, scholars focused on the price of affordable housing and public rental housing, using many models to conduct quantitative study. Zhang Shuangtian and Luo Xiaogeng built the autonomous decision-making model of local government and incentives model of central government to research the price of indemnificatory housing [6]. Using system dynamics model, Fu Hongyuan, Chen Yuhong and Liang Huaiqing predicted per capita annual income of middle- and low-income families and then measured the reasonable price of indemnificatory housing, taking Chongqing for example [7]. Wu Di, Gao Peng and Dong Jichang established the Comprehensive regional cost pricing model for public rental housing in order to find the reasonable price that people could afford [8].

28.3 Conception of IAD Framework for Housing Policy Change in China

28.3.1 Policy Review

Chinese indemnificatory housing policy has been dramatically changed for 15 years since it is first developed in 1998. Let us look at these changes in retrospect.

In 1998 the State Council issued “on further deepening the system reform of urban housing and speeding up housing construction,” which defined to provide different housing policy for families with different income and proposed to establish affordable housing based multi-level urban housing supply system.

In 2003 the State Council established the real estate industry as a pillar of the national economy and emphasis was to be placed on the commercial housing, which resulted in inadequate supply of indemnificatory housing and made the housing problems of “sandwich-layer” groups even tougher.

Housing policy after 2007 returned to indemnificatory housing based livelihood security policy orientation and in 2009 central government made it clear that public rental housing will become the main form of indemnificatory housing in the future. Under this policy guidance, the country’s various types of affordable housing construction volume changed significantly.

Early in 2011 released of economic and social development Twelfth Five-Year Plan clearly emphasized the importance of the development of public rental housing. At the same time, as affordable housing is susceptible source for corruption, irregularities and difficult to meet the affordability of target groups, from 2012 to early 2013, Zhengzhou, Shenzhen, Guangzhou and many other regions have clearly announced the exit of affordable housing and public rental housing will become the main part of indemnificatory housing.

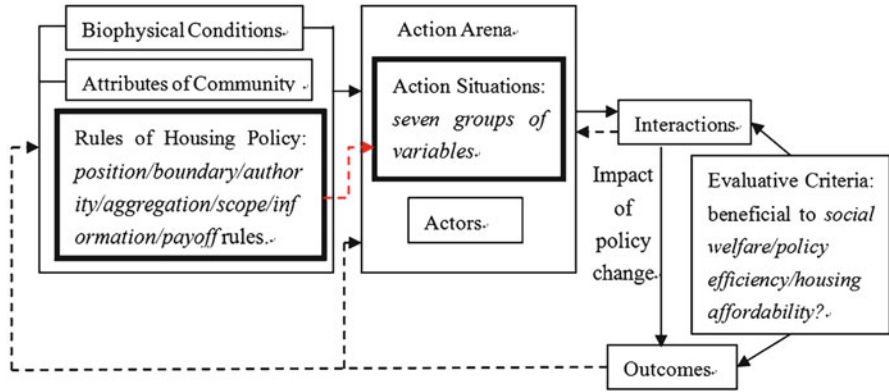


Fig. 28.1 Schematic of IAD framework on indemnificatory housing policy analysis

28.3.2 Building of IAD Framework on Housing Policy Analysis

Institutional Analysis and Development framework (IAD framework for short) is proposed by Ostrom, who won the 2009 Nobel Economics Prize. The framework is a generic term about rule, natural and physical conditions how to affect the action situations and outcomes. It is widely used in governance of common pool resources. This paper introduces IAD framework into analysis on policy change of indemnificatory housing, building of IAD framework on housing policy analysis is shown as below.

In general, biophysical conditions, attributes of community and rules-in-use act as exogenous variables. Action arena, a kind of social space where the interaction between stakeholders groups happen, including two variables: action situations and actors. And action situations act as endogenous variable.

In the policy change from affordable housing to public rental housing, regime change of housing policy, which refers to government selling affordable housing to middle- and low-income families in the past but now renting public rental housing to them, is the independent variable. Biophysical conditions and attributes of community are unchanged overall and there are seven groups of variables in action situations which can affect on the outcomes: (1) Set of participants, (2) participants' identities, (3) allowed collection of behaviors, (4) association with the outcome, (5) decision-making control, (6) available information, (7) cost and benefit. Meanwhile, Ostrom also divided the rules which restrain participants' action into seven categories, that is (1) position rules, (2) boundary rules, (3) authority rules, (4) aggregation rules, (5) scope rules, (6) information rules, (7) payoff rules. It is believed that each category of rules corresponds to a set of variables in action situation and change of rules could affect on one or more variables.

Figure 28.1 also shows how rules affect variables in action situation in the policy change of indemnificatory housing. Our research emphasis is what on earth happens to social welfare, housing affordability and benefit coverage of housing policy after the interaction of rules and action situation.

28.4 Comparative Analysis Between Affordable Housing and Public Rental Housing Based on IAD Framework

28.4.1 *Changes of Rules*

Boundary rules declare the conditions and criteria required for those who want to apply for indemnificatory housing should have. Only when people are qualifying, could they become the participants. In the process when public rental housing replace affordable housing to be the main part of indemnificatory housing, changes of boundary rules expand the scope of security object. Apart from the middle- and low-income families with local household registration, the new employments of university graduates and migrant workers who have a stable job also have the right to apply for public rental housing.

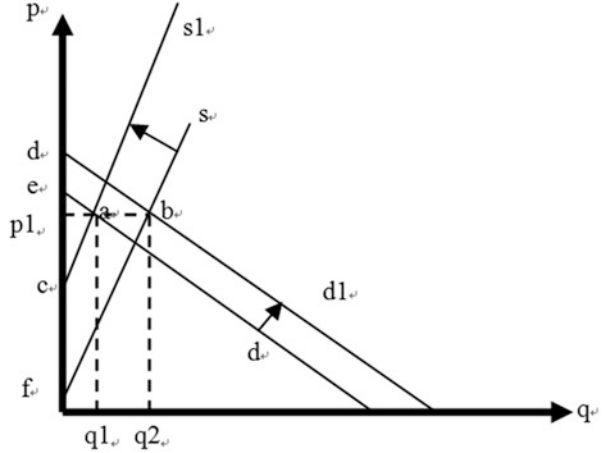
Payoff rules are about rewards and sanctions. In this paper, the focus of payoff rules is the exit mechanism of indemnificatory housing. In the past, after symbolically paying land premium, affordable housing buyers can obtain full property rights of the house and then enter the market. That is to say, the lack of exit mechanism allowed buyers to continue having affordable housing even after their economic strength increased. As a result, the sustainability of affordable housing greatly reduced and power corruption occurred. However, public rental housing holders should submit an application to renew the lease and only when they pass the qualifications re-examined by the government department in charge of housing security, could they continue renting the house. So the changes and perfections of payoff rules better achieve the value of indemnificatory housing and make it transform from disposable indemnificatory housing to transitional one.

28.4.2 *Comparative Analysis on Social Welfare*

28.4.2.1 **Short-Term Changes in Efficiency**

As shown in the Fig. 28.2, assuming at the initial stage, the supply curve of affordable housing is s , the demand curve is d . Because the lack of affordable housing exit mechanism, after a certain time, buyers who pay a nominal land premium can obtain full ownership of affordable housing, which makes affordable housing enter the market and has the same general nature as real estate. In the short term, it is difficult for governments and developers to respond to market conditions, so the affordable housing supply suffers a shortage. Therefore, the supply curve translates inward to $s1$. On this occasion, the equilibrium point is a , the equilibrium price is $p1$ and the equilibrium quantity is $q1$. We could see the consumer surplus is the area of $\triangle ep1a$, the producer surplus is the area of $\triangle cp1a$ and social welfare is the sum of both, that is the area of $\triangle eac$.

Fig. 28.2 Supply and demand curves in short-term



As the application of public rental housing exceeds residence restrictions, its demand increases comparing to affordable housing and the demand curve translates outward to $d1$. Since the exit mechanism of public rental housing is better, householders are required to vacate their house when their economic strength increases and no longer belong to the “sandwich-layer” group. In the short term, the amount of public rental housing supply won’t be in a significant reduction, so the supply curve can be considered unchanged, still be as s . On this occasion, the equilibrium point is b , the equilibrium price is $p1$ and the equilibrium quantity is $q2$. We could see the consumer surplus is the area of $\triangle dp1b$, the producer surplus is the area of $\triangle fp1b$ and social welfare is the sum of both, being as the area of $\triangle dbf$.

Through the analysis above, it is noticeable that the policy change from selling affordable housing to renting public rental housing keeps the equilibrium price almost unchanged, while the equilibrium quantity is increased from $q1$ to $q2$. Obviously, the area of $\triangle dbf$ is larger than that of $\triangle eac$, which means policy change have increased both the social welfare and efficiency of housing policy.

28.4.2.2 Long-Term Changes in Welfare

In the long term, the indemnificatory housing supply from government and developers needs to be considered. Government reduces the land-transferring fees and related taxes to reduce the construction cost of affordable housing in order to achieve the housing security for middle- and low-income families indirectly. In contrast, the property of public rental housing is owned by government or public bodies and lessee get public housing at a price cheaper than market rent. If lessee’s income is under local standards, rental subsidies will be provided by the government. To sum up, when it comes to the government subsidies in the long term, for affordable housing it is subsidies per brick and for public rental housing it is subsidies per person.

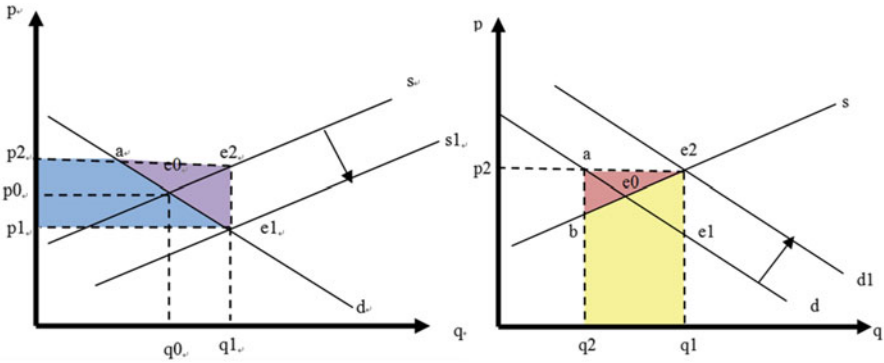


Fig. 28.3 Supply and demand curves of subsidies per brick and subsidies per brick

The left one in Fig. 28.3 shows the supply and demand curves of subsidies per brick for affordable housing. The supply curve is s , the demand curve is d , the equilibrium point is e_0 , corresponding to the equilibrium price p_0 and the equilibrium quantity q_0 . Because of the subsidies per brick, the reduction of the construction cost results in the supply curve's moving outwards to s_1 , intersecting the demand curve at e_1 , corresponding to the new equilibrium price p_1 and the new equilibrium quantity q_1 . It can be seen that under the action of subsidies per brick, the positive effects is the prices of affordable housing decreases while the quantity increases.

Assuming without subsidies per brick provided by government, in order to achieve supply quantity q_1 , the actual price developers could get is p_2 . The area of quadrilateral $p_1p_2e_2e_1$ is the housing subsidy government paid for middle- and low-income families, among which the area of quadrilateral $p_1p_2ae_1$ is obtained by purchaser, namely consumer surplus, but the area of $\triangle ae_1e_2$ is neither obtained by consumer nor by provider. The loss of social welfare shows its low efficiency.

The right one in Fig. 28.3 shows the supply and demand curves of subsidies per person for public rental housing. Assuming in order to achieve the same supply quantity q_1 as affordable housing, the demand curve translates outward to d_1 in the condition of subsidies per person, intersecting the demand curve at e_2 , corresponding to the new equilibrium price p_2 and the new equilibrium quantity q_1 .

Without the subsidies per person, when the price of Public rental housing on the market reaches p_2 , the actual demand is only q_2 . The area of quadrilateral $q_1q_2ae_2$ is the currency subsidy paid by government, among which the area of $\triangle abe_2$ is obtained by provider, namely producer surplus while the area of quadrilateral $be_2q_1q_2$ is obtained by consumer, namely consumer surplus. It is sure that the policy of public rental housing is of high efficiency because social welfare is all obtained by suppliers and consumers.

28.5 Empirical Analysis

This paper studies the policy change of indemnificatory housing and its impacts from an affordable housing based mode to a public rental housing based mode. It is in 2009 that the national government clearly stated that public rental housing will be the main part of indemnificatory housing, so at present, many cities' public rental housing projects are still in the construction phase, which makes empirical analysis on social welfare difficult to carry out. In this part, taking Hangzhou as an example, policy change's impacts on housing affordability will be the focus.

28.5.1 *Study on the Affordability of Affordable Housing's Price*

Firstly, effective demand price model is built as $P = \frac{bY[(1+i)^n - 1]}{12aMi(1+i)^n}$. Where, b is the ratio of housing consumption, Y is the average annual disposable income, i is the monthly interest rate, n is the number of months, a is the loan-to-value ratio and M is the housing area. Secondly, try to determine the value of these parameters according to Hangzhou Statistical Yearbook for 2012 and other related data. Then plug the above values into the effective demand price model for housing, we could get the reasonable housing price for middle- and low-income families is $P = 2,651.44$ yuan/square meter. By looking up the price of the 24 different properties for affordable housing in Hangzhou and sorting them by geographic location, we could get the average price of affordable housing prescribed by Hangzhou government regulation is $P0 = 3,022$ yuan/square meter. It is obvious that $P0 > P$, and the gap between the two is 13.98 %. This means that under the existing affordable housing policy system, middle- and low-income households still have big difficulty buying affording housing, and there are still difficulties achieving housing affordability.

28.5.2 *Study on the Affordability of Public Rental Housing's Price*

Public rental housing is primarily designed for sandwich-layer groups, including low-income, middle- and low-income, middle-income groups. Still according to the data from Hangzhou Statistical Yearbook for 2012, the reasonable housing rents they could afford are shown in Table 28.1.

From May 2012 onwards, considering the costs and administrative expenses as well as the lessees' economic capacity, Hangzhou Price Bureau announced the prescribed rents of public rental housing. The rents are different according to the

Table 28.1 Rent for different income groups can afford (yuan/month/sqm)

Income groups	Low-income	Middle-and low-income	Middle-income
Affordable rent	20.99	34.56	44.55

Table 28.2 Prescribed rent of public rental housing in Hangzhou (yuan/month/sqm)

Land grade	1	2	3	4	5	6	7	8
Normal rent	36	32	29	27	21	16	12	10.5
Reduced rent	25.2	22.4	17.4	16.2	10.5	8	6	5.25

grades of land, and low-income families that meet the standards of urban minimum living guarantee could enjoy a certain rent relief on this basis. Specific amount of rents are shown in Table 28.2.

We know that siting of Hangzhou public rental housing are relatively peripheral due to urban planning, and most of them are located on land on or under the 3rd grade. Compare the data from Table 28.1 and Table 28.2, we find that for low-income families, the reduced rent according to the policy is lower than the actual rents then can afford; for middle- and low-income and middle-income groups, the prescribed rent is much lower than the affordable rent. In other words, large scale of families benefit from the existing public rental housing policy, and the income of the target groups could afford the rent. To sum up, the policy changes is useful for enhancing housing affordability of disadvantaged groups in Hangzhou.

28.6 Conclusions

This paper builds the IAD framework on policy change of indemnificatory housing to investigate the effects of it. The conclusions can be draw as follows.

1. The most intuitive phenomenon is that indemnificatory housing policy changes from selling rooms to renting housings to people, which makes more people’s housing problems, especially the sandwich layer group, be guaranteed.
2. The mechanisms of entry and exit become more rigorous and comprehensive, which ensures the liquidity of public rental housing market, making affordable housing sustainable.
3. The policy change further eliminates corruption and reduces monitoring costs.
4. The policy change makes the equilibrium price remain unchanged and the equilibrium quantity increased, as well as social welfare and policy efficiency improved in the short-term. Meanwhile, In the long-term, it makes both the equilibrium price and quantity increased but avoid the loss of social welfare.
5. In Hangzhou, the benefit of the policy change is that the housing affordability greatly enhanced and group of housing security extended, which show the policy change is giving superiority.

References

1. Charles KYL, Sinan S, Kuzey Y (2012) Public housing units vs. housing vouchers: accessibility, local public goods, and welfare. *J Housing Econ* 21:310–321
2. Anniz FIB, Mazlin G (2009) Affordable mosaic housing: rethinking low-cost housing. *Procedia-Soc Behav Sci* 49:245–256
3. Bruce W, Alex M (1998) Pricing public housing services: mirroring the market. *Housing Stud* 13(3):549–566
4. Su Duoyong, Zhang Yuxiang (2010) Analysis on causes and policy recommendation for the insufficient supply of indemnificatory housing. *Gold Master* 3:38–40
5. Ren Pengchong, Ren Fanxing (2010) International experience comparison of indemnificatory housing system in. *Hebei Finance* 4:61–64
6. Zhang Shuangtian, Luo Xiaogeng (2010) Game analysis on the supply of indemnificatory housing. *J Ind Eng Eng Manag* 24(5):568–573
7. Fu Hongyuan, Chen Yuhong, Liang Huaiqing (2008) Measure of a reasonable price for affordable housing. *Consum Econ* 24(5):63–66
8. Wu Di, Gao Peng, Dong Jichang (2011) Analysis on pricing of public rental housing rent. *Math Pract Th* 41(5):47–55