

A Study on the Influence and It's Regional Differences of Housing Prices on the Reform of China's Household Registration System: A Consumer's Perspective of the Rural - Urban Migrants

ZHANG Bo, LV Ping

(Department of Land & Real Estate Management, School of Public Administration and Policy, Renmin University of China; Housing Development Research Center, Renmin University of China, Beijing 100872)

Abstract: The reform of China's household registration system (RHRS) is the key part to boost the transformation of China's urbanization, and an important mean to promote the fairness and equalization of urban and rural public services and social welfare. But in recent years, the housing prices in some parts of China sustain rapid growth, does this phenomenon have "baffle" effect in the process of rural-urban migration, and thus hinder the progress of the RHRS? Are the laws of housing prices affecting the RHRS differences? These issues need to be analyzed and verified in the theoretical and empirical ways. By introducing the variables of the housing prices into the life-cycle theory function, we found that housing prices influence the RHRS through the expected wealth effect, crowding-out effect and benefits dissipation effect. On the basis of crowding-out effect and welfare dissipation effect hypothesis, hypothesis I, we can come to the conclusion that high housing prices will play a negative role in the reform of the household registration system. Through expected wealth effect hypothesis, hypothesis II, we estimate that housing prices rise will promote the reform of the household registration system to some extent inversely. On this hypothesis basis, using the panel data model of China's 31 provinces and cities in 1995-2012, we found that at the national level, the influence of housing prices on the RHRS was not significant. From the view of regional differences, the rise of housing prices in the eastern region have a negative impact on the RHRS, indicating that the welfare dissipation effect rates more than the expected wealth effect, in line with the hypothesis I. The increase of housing prices will promote the RHRS to a certain extent in the central region, this phenomena explain that the expected wealth effect is greater than the welfare dissipation effect, in line with the hypothesis II. Housing prices in the western region did not have an impact on the RHRS.

Keywords: housing prices; the reform of China's household registration system; effect channels and mechanisms; regional differences

1. Introduction

In August 1950, "Special Population Interim Measures (Draft)" marked the beginning of China's household

registration system. July 1951, "National Urban Household Registration" issued by the Ministry of Public Security marked the unity of urban household registration system. June 1955, "Indicates on the Establishment of Regular Household Registration System" issued by the State Council marks the unitive work of urban and rural household registration. January 1958, with "People's Republic of China Household Registration Ordinance" as a symbol, Chinese government began to implement strict restrictions and government regulation on free movement of people (Cai, 2010; Cheng 2014), and the first time make a distinction between "agriculture accounts" and "non-agricultural accounts" explicitly. The differences of urban and rural population identity, as well as the social welfare bundled by the household registration system began to move towards "duality" that is urban-rural dual structure. With the benefits (including education, health, housing and pension and other security) be carried on the urban and rural household registration gradually widening, and the the contradictions between the migrant population's (especially young migrants) willness to integrate into the urban life and the identity barriers generated by the household registration system, the reform of China's household registration system (RHRS) has become an important factor to promote the transformation of urbanization development. The main group of household RHRS can be divided into two types: the first are farmers from the countryside into the city, second are the population who leave registered permanent residence and want to settle in the urban field (Li 2003). Regardless of the group, the expected revenues and expected costs are the most considered important factors in the process of transfer decision making (Sun et al, 2011). The expected revenues which is expected to expand employment opportunities for revenue and enjoy the various benefits of invisible income, the expected cost of living is relatively fixed to living consumption whose main body is living rent and investment spending which is dominated by the purchase of housing, both of which are inextricably linked with the housing prices, so housing prices will have a significant impact on the RHRS. Since the RHRS is related to the migration, the micro bodies' expected income-cost function and the optimal allocation of social welfare and other issues, it is necessary to review journal from these areas.

The present study focusing on the influence of Chinese household registration system on the housing prices are more comparatively, their basic logic chain is "Chinese urban-rural dual household registration system → migrant population are blocked from low-cost housing → market demand are further expand → housing prices rise" (Nguyen et al, 2013; Hu 2002; Liu, 2014; Jeanty et al, 2010). Hukou system is to increase transaction costs in the form of "identity discrimination", and thus become a major obstacle to the urban and rural labor mobility, and ultimately led to the paradox that coexistence of labor mobility enhancement and expansion of the income gap between urban and rural (Cai, 2005). While some cities have approach that relaxed the restrictions on affordable housing residence, but because of location, rent-to-income ratios, as well as ancillary facilities and other considerations, the wishes of migrants to stay affordable housing is not high (Song, 2011), a simple unity of identity can not be achieved to solve the housing problem of migration. Increasing the supply of affordable housing to "dilute" the market demand is so limited. High prices will increase the cost of living in the city, this law called "the price blocking effect". This effect would lead to a reduction in employment relatively, and thus impede migration (Gao, 2012). Conversely, increasing population mobility will promote the market demand, thus

resulting in regional housing prices growth (An et al, 2011; Li, 2008), but the influence order of housing prices and the mobility of population did not come to the an unitive conclusions. For China, 1995-2005 is a critical period of real estate reform, during this period, the delivery of rural-to-urban population and the rapid urbanization had a significant impact on the housing prices, especially migrants to eastern coastal areas from western areas, leading to boost the living pressure in the eastern areas , thus promoting the rapid growth rates of housing prices(Chen et al, 2011; Fan & Stark, 2008). Meanwhile, housing prices will cause impact on population movements, the long-term economic growth in China comes from the support of labor supply, especially the cheap labor from rural to urban, but with the changes of the migrants' structure, potential labor dividends are shrinking (Zhong et al, 2013). Jeanty et al (Jeanty et al, 2010) noted that the relationship between housing prices and migration population is simultaneous and spatially interdependent, but this relationship cannot be sufficiently identified by the amount of data and the traditional econometric model. So he use the space mathematical equation model based on Michigan census data, and found that if the population moving into larger, the regional housing prices will grow; housing prices decline, the population will be relocated.

Migration decision-making was based primarily on the expected utility maximization for migration population especially the "rural-urban" migrants (Cheng 2014), and the expected utility often monetize into net income, pension, medical security, educational security, housing security and other social benefits after chang into urban household registration. Working in the city can greatly improve the working income levels and fight the realities that agricultural production is vulnerable to the impact of economic fluctuations, thereby increasing the effectiveness of welfare, which is particularly prevalent in developing countries (Nguyen et al, 2013). "China's Floating Population Development Report 2013"¹ shows that the major group of the migrant population is the "rural – urban" migrants, and is undergoing generational change. Report also indicates that the average age of the migrant population in 2012 was about 28 years old, that is a "new generation" migrants , this group willing to settle in the metropolis and have the hukou accounts for 70% in the total who want to change into urban hukou, and the family migrated to become the main mode of the new generation of migrants. With respect to the elder generation, the new generation not only take income that may produce "wealth effect" after have the urban hukou into account, but also think about the expected cost of living in cities whether can afford (Luo et al, 2013). The expecte per capita real income and the expected rate of return is the main factors of real estate price persistently rising and rapid fluctuating (Zhang et al, 2011), so housing prices rise have a dual effect, the first is to promote family asset value, that is the "expected wealth effect", the second is to repay loans and compress consumption for the purchase, that is the "house slaves effect" (Yan & Zhu, 2013). High housing prices can also produce distorting effect through the "substitution effect" and "redistributive effect" on household savings and investment behavior, thus making the general decline in the level of welfare of urban residents, especially the low-income residents (Chen & Qiu, 2011; Li et al, 2013). For example, about 5,000,000 rural people living in Beijing, the results of employment and residence choice is that the most rural people have to live in the rented basement (Yu & Cai,

¹ Details, see the "China's Floating Population Development Report 2013" issued by National Health and Family Planning Commission People's Republic of China.

2013), and this part of the rural population increases will lead to serious social risk and transformation costs.

In summary, the housing prices influence the RHRS through the expected wealth effect¹, crowding-out effect and welfare dissipative effects. But scholars tend to focus on a single effect to analyze the influence housing prices on the RHRS, lacking in systematic discusses. So to study the functionary channels of housing prices affect the RHRS is the first objective. In addition, even Gao Bo et al (2012) based on the core-periphery model made by Krugman and Helpman and Baldwin paradigm constructed core-periphery model of real estate price, to explore the impact of real estate price on labor mobility, but still has insufficient that is losing sight of the impact of housing prices on the RHRS, and lack of consumers' life-cycle to study the impact of rising price on the migrants' current consumption, savings behavior and social welfare allocation. So we second research target is to carry out the empirical analysis. Due to the different level of China 's economic and social development and the regional housing prices, population migration also presents regional heterogeneity characteristics. Therefore, researching on the role of housing prices in the progress of RHRS in different regions may make RHRS policy suiting to the local conditions.

2. Theoretical analysis

2.1. Effect chennel of housing prices on the RHRS

From the above, we can see that housing prices are supposed to influence the RHRS through the expected wealth effect, crowding-out effect and welfare dissipation effect. The expected wealth effect is related to the theoretical model in our article among these three effects, so we will discussed this effect in the section 2.2. Crowding-out effect perform a certain conduction chain, that is housing prices continue to rise → real estate investment will be rising → numerous construction land, especially the good location land, are used for real estate development → affordable housing will be pushed to the urban fringe on suburbs or area with imperfect infrastructure. The rural-urban migrants are going to live in the affordable housing even though, the majority of migrants are not willing to live because of the high commuting costs and the not so good living environment. The crowding-out effect will force migrants to flow back to the ordinary housing market, in order to meet their housing needs, and ultimately cause "vicious cycle" that prices continue to rise, hinder the pace of the RHRS.

The welfare dissipation effects can be expressed a continuous process, that is housing prices will bring real estate investment to increase, which led to inflation and over-currency that are serious in the first-tier cities (table 1). Most rural-urban migrants willing to integrate into the city life and eager to live and work in peace and contentment through the hukou transform, "Home Ownership" demands and risk aversion effect drive the migrants to form a long-term stable storage behavior, but the continuing price level will "dilute" the family store of wealth, so the high housing prices will reduce household economic utility indirectly, and ultimately weaken the process of RHRS.

In summary, from the view of crowding-out effects and welfare dissipative effects, the high housing prices will play a negative role in the reform of the household registration system. Whereby we can put forward the

¹ The expected wealth effects are embodied in more the behavior of the secondo-accedants, but the rise of housing prices will bring this effects to the first-time buyers, which may be hidden wealth that have not been realized.

hypothesis I : With the rising of housing prices, the working of promoting the RHRS may has some difficulty.

Tab.1 Housing prices, inflation and residents' income of China, Beijing, Shanghai and Guangzhou 2000-2012

Year	Growth rate of commercial housing sales price (%)				Growth rate of urban residents disposable income (%)				Growth rate of inflation (%)	Growth rate of broad money supply (%)
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)		
	2000	2.87	-2.89	4.18	2.12	7.28	12.71	7.19		
2001	2.75	2.91	8.44	2.39	9.23	11.87	9.95	6.70	0.69	17.60
2002	3.69	-5.89	6.93	1.94	12.29	7.65	2.84	6.93	-1.00	16.87
2003	4.84	-0.57	23.80	1.42	9.99	11.38	12.21	11.16	0.91	19.58
2004	17.76	6.67	14.40	8.98	11.21	12.64	12.21	10.07	3.30	14.86
2005	14.03	34.34	16.86	27.59	11.37	12.89	11.76	8.38	1.60	17.57
2006	6.29	21.97	5.17	9.23	12.07	13.17	10.85	8.43	1.49	15.68
2007	14.77	39.54	16.19	21.88	17.23	10.07	14.30	10.51	4.50	16.74
2008	-1.65	7.48	3.99	0.65	14.47	12.44	12.92	11.49	5.60	17.78
2009	23.18	11.12	56.68	9.41	8.83	8.14	8.11	9.33	-0.91	27.58
2010	7.50	28.86	12.65	14.94	11.27	8.73	10.40	10.77	3.21	19.73
2011	6.46	3.23	0.96	5.25	14.13	13.17	13.80	12.55	5.29	17.32
2012	8.10	1.01	1.71	2.96	12.63	10.84	10.92	12.38	2.70	14.39

Note: (1), (2), (3) and (4) mean Nationwide, Beijing, Shanghai and Guangzhou respectively. Rate growth = (average selling price of commercial housing this year - average selling price of commercial housing last year) / average selling price of commercial housing last year $\times 100\%$, the growth rate of the rest indexes are calculated using this calculation method. Data measured based on urban consumer price index (1978 = 100) come from annual "China statistical Yearbook" 2000-2013.

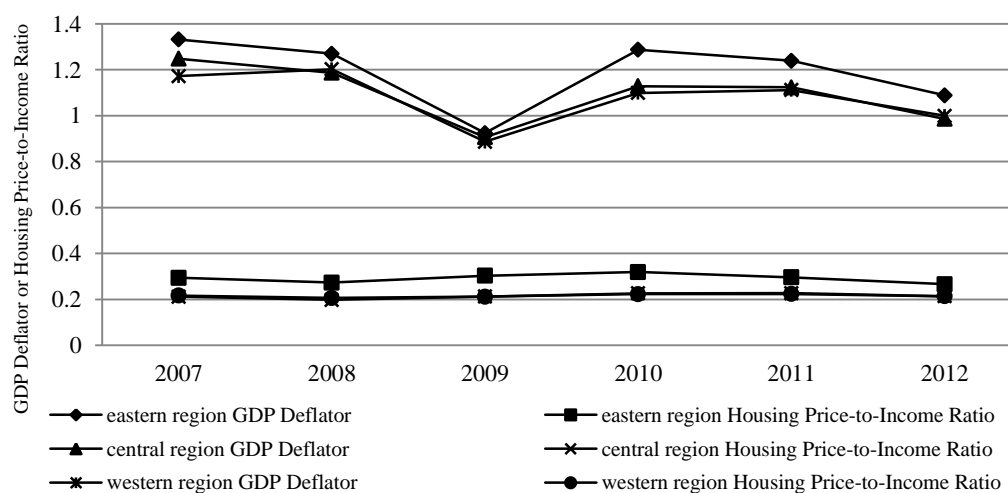


Fig.2 GDP deflator and Housing Price-to-Income Ratio of eastern, central and western 2007-2008

Due to the location factors, housing prices are characterized significantly by the regional differences. without considering the crowding-out effect, the welfare dissipation effect will also manifest spatial differences, resulting in the differences of path selection of the RHRS in different regions. Seen above, welfare dissipative effects can be summarized in two aspects: First, the long term stability storage for buying houses, namely the "house slaves effect"; Second, inflation brought by the rising housing prices may lead welfare "shrink". In order to get a comprehensive reflection of the welfare dissipation effect, we choose the regional Housing Price-to-Income Ratio

and the GDP deflator¹ to characterize the "house slaves effect" and inflation levels. 2007-2012, the housing prices of eastern, central and western rose 7.84%, 8.65% and 7.48% respectively, but the Housing Price-to-Income Ratio and the GDP deflator show a characteristics, that is "significantly higher in eastern, convergence approximately in central and western" (Figure 2), which Housing Price-to-Income Ratio in eastern makes an average of 0.07 more than that in midwest annually, meanwhile, GDP deflator up more 0.10 per year. From the actual data, it seems the hypothesis that can be further hypothesis I: Even though the housing prices increase the same proportion, welfare dissipative effects in the eastern is stronger than that in the midwest. This shows that with respect to the central and western regions, housing prices rise in eastern region will play a greater negative effects in the RHRS.

2.2. Expected effects: Benefit framework of Rural - City migrants' costs of changing hukou

Rural - urban migrates is the main groups in the RHRS, for the assume of rational people, these groups will compare the total utility brought by hukou before and after changing, then make the transfer decision. According to the individual migrant's utility functions, that is $M_i = f(\Delta Y_i, \Delta E_i, \Delta P, C_i)$, proposed by Rabe & Taylor (2012), where M represents the expected utility after migration. ΔY represents the difference between expected working revenue and pre-migration. ΔE is difference of the working choices. ΔP means the difference of housing prices. C is the migration costs (including information search costs and contacts reconstruction costs). i means the different individuals. Borrowing this function, we can express the expected utility of transfer into $U_i = f(\Delta S, \Delta W, \Delta L, \Delta H)$, where ΔS is expressed as the difference of working income before and after transfer. ΔW is the difference of social welfare. ΔL means the difference of non-investment spending (or spending of necessities of life). ΔH means the difference of housing consumption. On these grounds, we can compare the U_{i1} of before transfer to the U_{i2} after transfer. If $U_{i1} > U_{i2}$, indicating that transfer can enhance the individual resident's utility, and residents are willing to change hukou. If $U_{i1} < U_{i2}$, indicating that transfer will reduce the utility, so the residents do not want to change the existing household registration. If $U_{i1} = U_{i2}$, indicating the individual resident's utility is not associated with the transfer. Here we think ΔH it is the main costs of purchasing houses, excluding the cost of rent, which is included in the ΔL . Visibility, regional prices as the most important indicator to characterize housing consumption. According to Viggo's (2013) point of view, in a time of rapid rise of housing prices, the majority of buyers have money short-sighted, and they based on the historical trend to make judgment of the future trend of housing prices. That is to say, the expected often manifest as the adaptive expectations, rather than the rational expectations. Therefore, the expected wealth effects can be written in this form, that is $\ln P_t^e = \varphi \ln P_{t-1} (\varphi > 0)$.

Thus we get the hypothesis II: In the framework of the expected wealth effects, rise in housing prices will lead to the desire of having urban residents' status for the rural - urban migrants, especially in the areas implementing the measures of purchase restrictions. which promotes the RHRS to some extent. Thus we can see that the hypothesis I and II are contrary, so we need the empirical results to proof. In addition, because prices

¹ Housing Price-to-Income Ratio is the real data of excluding the inflation. GDP deflator is calculated by the nominal GDP index and the real GDP index in different provinces or cities. Data are obtained from the "China Statistical Yearbook," 2008-2013, over the years.

obvious geographical characteristics, significant regional differences, housing prices have characteristics of regional differences, so comparing the hypothesis I and II and measuring the suitability in different regions are necessary.

2.3. A theoretical model: Joint consideration of expected wealth effects and welfare dissipation effects¹

People behavior more rationally. According to the expected earnings in lifetime, they make choice to consume and invest, and to avoid the risk of cross-aging with the goal of maximizing the utility (Gao & Yao 2004; Cecile et al, 2008). Life-cycle theory believes that consumption and savings behavior of consumers conducted in a certain period, depends not only on their current income, but also on the current property, expected income and age. Consumers will arrange their consumption in a lifetime, in order to ensure the consumption remained relatively stable or increased slightly. Present value of spending flows equal to the present value of income flow in lifetime periods, its budget constraint function is :

$$\sum_{t=1}^T \frac{C_t}{(1+r)^{t-1}} = \sum_{t=1}^T \frac{I_t}{(1+r)^{t-1}} \quad (1)$$

Where C_t is the residents' consumption in t time. I_t is the residents' income. r is the discount rate. T is the life cycle. Under budget constraints, consumers will optimize their income in all life, in order to maximize the utility that can be expressed $U(C_1, C_2, \dots, C_T)$. So the deducing the consumption function is equal to solve the extremum problem of Lagrangian function:

$$U(C_1, C_2, \dots, C_T, \lambda) = U(C_1, C_2, \dots, C_T) + \lambda \left[\sum_{t=1}^T \frac{I_t}{(1+r)^{t-1}} - \sum_{t=1}^T \frac{C_t}{(1+r)^{t-1}} \right] \quad (2)$$

Extreme conditions is:

$$\frac{\partial L}{\partial C_t} = \frac{\partial U}{\partial C_t} - \sum_{t=1}^T \frac{\lambda}{(1+r)^{t-1}} = 0 \quad (3)$$

$$\frac{\partial L}{\partial \lambda} = \sum_{t=1}^T \frac{I_t}{(1+r)^{t-1}} - \sum_{t=1}^T \frac{C_t}{(1+r)^{t-1}} = 0 \quad (4)$$

Where $t = 1, 2, \dots, T$, the solution of equations to obtain the optimal consumption:

$$C_t = f(I_1, I_2, \dots, I_T, r) \quad (5)$$

Formula (5) shows that consumption in lifetime is a function that include the income of each period and the discount rate. Life cycle consumption function is generally expressed in approximate as follows:

$$C_t = \alpha A_t + \beta I_t + \mu \quad (6)$$

Where A_t means the stock of assets. α is to reflect the impact of the stock of assets on current consumption, β is the current marginal propensity to consume.

Formula (6), the calculation of A_t can be used as saving for alternative variable, but saving strongly dependent on income, both of which have multicollinearity. Here we learn from Davidson et al (1978) to deform

¹ There is no consideration of crowding-out effect. There are two reasons: First, the crowding-out effect would involve the macro-level data, such as the structure and spatial distribution of the number of commercial housing and affordable housing, so we have difficulties in building model on the microscopic data, such as the commuting costs. Second is that the policies that rural – urban migrants can live in the affordable housing are not significantly spread, so we omit to consider the crowding-out effect.

formula (6) as:

$$A_t = I_{t-1} - (\alpha A_{t-1} + \beta I_{t-1}) + A_{t-1} \quad (7)$$

Substitute A_t for A_{t-1} and simplify, we get:

$$A_t = \frac{\alpha - \beta}{\alpha C_{t-1}} - \frac{1 - \alpha}{\alpha I_{t-1}} \quad (8)$$

Put formula (8) into formula (6), and remove I_{t-1} that may has linear and introduce constant term, we get:

$$C_t = \beta_0 + \beta_1 I_t + \beta_2 C_{t-1} + \mu \quad (9)$$

Where C_{t-1} is the pre-consumption, indicating that consumption depends not only on current income, but will be affected in the past consumption. When income decline, consumption that has a certain "irreversible" effect does not reduce immediately.

Plantinga et al (2013) consider the housing prices, the convenience of transportation facilities, the characteristics of residents' own property, residents' income and consumption, which form, are the main factors of the utility function. Because medical security, retirement pension and education ,as well as other components, are included in the RHRS, so C_{t-1} should be divided into three parts. For the major rural –urban migrants, the children's education securities are an important determinant of make transfer decision for most migrants, so we subdivide non-investment consumption¹ into the life necessities consumption², education consumption, which the life necessities consumption including the housing rents and fees of real estate management. Since the investment that the purchase of houses are positively correlated with the expected housing prices significantly, so the investment consumption should be written δP_t^e ($\delta > 0$). Subdivide the variable in the formula (9), and logarithmic both sides of the equation, we can get the following equation:

$$\ln D_t + \delta \ln P_t^e = \beta_0 + \beta_1 I_t + \beta_2 \ln L_{t-1} + \beta_3 \ln E_{t-1} + \beta_4 \ln P_{t-1} + \mu \quad (10)$$

Because of $\ln P_t^e = \phi \ln P_{t-1}$, formula (10) can be simplified that:

$$\ln D_t = \beta_0 + \beta_1 \ln I_t + \beta_2 \ln L_{t-1} + \beta_3 \ln E_{t-1} + \beta_4 \ln P_{t-1} + \mu \quad (11)$$

Where D_t is the residents' non-investment consumption at t . L_{t-1} is the residents' life necessities consumption at $t-1$. E_{t-1} is the educational consumption at $t-1$. P_t and P_{t-1} are housing prices at t and $t-1$. If $\beta_4 > 0$, illustrates that housing prices make positive marginal contribution to the residents' consumptions, and expected wealth effects $>$ welfare dissipation effects, that is the regional housing prices become more reasonable, which will promote the RHRS to a certain extent, in line with the hypothesis II. Similarly, if $\beta_4 < 0$, states that expected wealth effects $<$ welfare dissipative effects, and the regional housing prices actually hinder the RHRS, in line with the hypothesis I.

¹ Non-investment consumptions including the food consumption, clothing consumption, housing consumption (housing rents, fees of real estate management, and culture & entertainment consumption (education and entertainment services). In the life cycle, the consumption of medical security is uncertain, which bring difficulty to the calculation, so that part is not included in the non-investment consumption. As the non-investment consumption does not reflect the purchase of houses, so we introduce the adaptive expectation to calculate the consumptions on the purchase of houses.

² Life necessities consumption include food consumption, clothing consumption, household equipment and consumer goods consumption and transportation consumption.

3. Empirical analysis

3.1. Model specification

To compare the impact of changes of hukou on the utility level of residents, we use the formula (11) to measure the level of rigid demands and the level of educational security of urban residents and rural residents. The consumption function of urban residents under the life-cycle theory is:

$$\ln D_t^u = \beta_0^u + \beta_1^u \ln I_t^u + \beta_2^u \ln L_{t-1}^u + \beta_3^u \ln E_{t-1}^u + \beta_4 \ln P_{t-1}^u + \mu \quad (12)$$

The consumption function of rural residents under the life-cycle theory is:

$$\ln D_t^r = \beta_0^r + \beta_1^r \ln I_t^r + \beta_2^r \ln L_{t-1}^r + \beta_3^r \ln E_{t-1}^r + \mu \quad (13)$$

The variables in the formula (12) and (13) have the same meaning as the formula (11). The coefficient β_4 to test the truth and correctness of hypotheses I and hypotheses II in explaining China's present situation. In addition, if $\beta_2^u > 0$, $\beta_2^r > 0$, and $\beta_2^u > \beta_2^r$; or $\beta_2^u > 0$, and β_2^r is non-significant; or $\beta_2^u > 0$ and $\beta_2^r < 0$, have express that the life necessities after transfer has a marginal positive effect on the non-investment consumption, and the effect is increasing. That is RHRS makes the consuming willingness more strongly, which will be conducive to the RHRS. If $\beta_2^u < 0$, $\beta_2^r < 0$, and $|\beta_2^u| > |\beta_2^r|$; or $\beta_2^u < 0$, and $\beta_2^r > 0$; or β_2^u is non-significant and $\beta_2^r > 0$, have express that the life necessities after transfer has a marginal negative effect on the non-investment consumption, and the effect is increasing, which will go against the RHRS. The mutual relations between β_1^u and β_1^r , and the relations between β_3^u and β_3^r , as well as their representation and meaning consistent with β_2^u and β_2^r and need not be repeated.

3.2. Data sources

Urban residents' or rural residents' non-investment consumptions = Per annual cash consumptions on average - Health care consumptions. Residents' income = Per urban resident's annual disposable income on average or per rural resident's annual net income on average. Urban or rural residents' life necessities consumptions = Per household food consumptions + Clothing consumptions + Household equipment consumptions + Traffic consumptions from the. Urban or rural resident's educational consumptions = per education and entertainment consumptions from the statistical yearbook. Housing prices = annual average commodity housing selling prices. The above figures are from the "China Statistical Yearbook" 1996-2013. With 1996 as the base year, we change the urban and rural resident's income, consumption, housing prices and other nominal variables of the country and the country's 31 provinces (excluding Taiwan, Hong Kong and Macao) into real variables by the CPI.

3.3. Descriptive analysis

For the national average, the per urban resident's annual disposable income is higher than the non-investment consumption 2996.78 yuan, of which the gap is 3556.55 yuan between the two in eastern area, and shows the largest gap, 2518.66 yuan in the central area, and 2321.39 yuan in the western (Fig. 1), which illustrate that the gap in western is smallest due to the differences in the level of economic and social development. 1995-2012, the average housing prices are presented that the eastern (3020.66 yuan / m²) was significantly higher

than the midwest (1636.63 yuan / m² and 1667.26 yuan / m²), housing prices in the eastern are higher than 1.85 times and 1.81 times in the central and western. Like the housing prices , per rural resident's non-investment consumption and net income in the eastern and midwest also showing a significant dual differentiation characteristics, which per non-investment consumption in the eastern is 2305.17 yuan / year that are more than 1.58 times in the central and 1.99 times in the western respectively.; per rural resident's net income in the eastern reaches 4,129.61 yuan / year, which are more than 1.50 times in the central and 1.59 times in the western respectively. From here we see that eastern and western living standards of rural residents have significant differences. VSM (vector space model) established by Hu (2002) shows that due to the lower international trade costs of China's eastern coastal areas, so the area became an industrial agglomeration area. The farmers' income levels in this area play a significant difference from the inland areas, so a large number rural labor migration are attracted to the coastal area, which further amplifies the regional differences. Therefore, relying on industrial transfer and spatial layout optimization, gradually narrowing regional differences has become an important work in China's new round of urbanization.

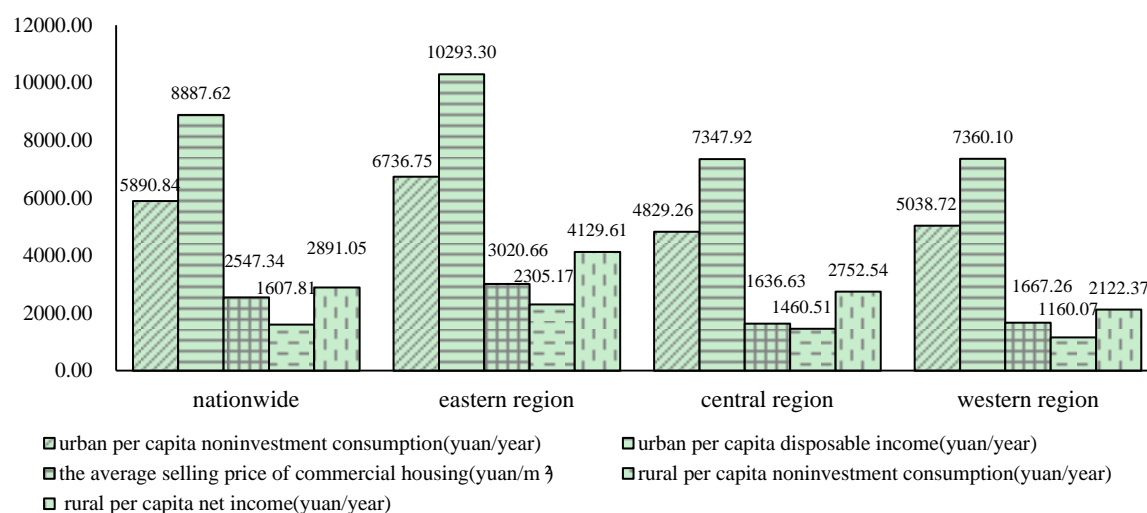


Fig.1 Per capita consumption, income and housing prices of urban and rural areas in different areas 1995-2012,

From the the point of national average growth rate, the average annual growth rate of consumption of urban and rural residents are 6.98% and 8.84% (Tab. 1), the variance are 10.83 and 89.65, which shows that the growth rate of rural resident's consumption is not only fast and volatile. The gap between average annual growth rate of urban and rural resident's income is small, 8.41% and 7.58% respectively, variance are 5.83 and 11.40 respectively. Compared to urban residents, rural residents' income volatility is slightly larger. During the same period, average annual growth rate of housing prices was 5.72 %, variance reaches 45.98, which manifests that housing prices are rising through the shock rapidly. The fundamental characteristics of the country also perform in other regions, the growth rate of urban residents' average annual income and consumption are not very different, the differences remain around 7.5% in all regions. But the differences of fluctuations are large, perform a trend that eastern < central < western, the urban residents' variances of consumption and income in eastern are 8.53 and

4.78, 12.61 and 7.28 in the central, 28.73 and 37.04 in the western. The annual growth rates of housing prices have smaller differences between regions, 7.82% in the eastern, 8.65% in the central, and 7.48% in the western, but the volatility of housing prices are greater in the central and eastern, their variance are 64.35 and 75.53 respectively, western are 20.98, relatively smaller. The average growth rates of rural residents' consumption and income are characterized by the eastern < central < western, their fluctuations also showed the same characteristics, indicating China's narrowing regional differences policy from top to down has effectiveness gradually, but the pace is not steady.

Tab.2 Urban and rural growth rates and fluctuations of per capita consumption, income and housing prices in China 31 provinces 1995-2012

		Units: %											
Urban / Rural	Year	1996	1998	2000	2002	2004	2006	2008	2010	2012	AAGR	Variance	
N	Urban	C	1.91	3.79	6.76	16.49	6.37	8.09	5.47	7.39	6.86	6.98	10.83
		I	4.61	6.09	7.28	13.32	7.34	10.19	7.53	7.97	9.55	8.41	5.83
		P	5.14	4.21	2.87	4.64	11.04	4.50	-7.61	4.31	5.14	5.72	45.98
	Rural	C	15.02	0.67	10.04	8.83	36.51	10.55	8.15	6.25	10.42	8.84	89.65
		I	13.03	4.38	1.95	5.58	8.09	8.35	8.01	11.46	10.35	7.58	11.40
EA	Urban	C	1.59	2.59	5.63	13.79	6.51	8.23	5.13	6.83	6.10	6.54	8.53
		I	4.11	5.06	7.02	9.92	7.04	10.46	7.10	8.29	9.05	8.06	4.78
		P	19.48	1.88	4.62	5.12	10.47	8.96	-1.41	13.39	-2.03	7.82	64.35
	Rural	C	14.33	1.77	8.91	10.21	22.14	9.89	4.90	7.00	8.60	7.79	36.31
		I	10.59	5.34	3.06	-7.85	6.01	8.36	6.46	10.56	9.62	7.46	34.83
CE	Urban	C	1.87	2.41	6.88	3.08	6.01	8.70	4.34	7.23	6.60	6.77	12.61
		I	4.34	4.25	6.68	14.20	7.39	10.24	6.61	7.59	9.99	8.23	7.28
		P	35.91	-0.46	6.20	6.08	8.34	4.69	-0.60	14.67	3.59	8.65	75.53
	Rural	C	12.49	-1.94	10.76	3.26	43.26	12.20	11.22	5.55	11.43	9.28	125.48
		I	16.43	3.97	0.46	23.38	11.07	9.03	9.12	12.42	10.74	8.12	56.09
WE	Urban	C	13.64	3.76	6.52	13.85	6.03	2.95	6.19	7.52	8.53	7.36	28.73
		I	18.43	7.31	6.88	9.14	6.67	7.87	7.35	7.46	10.23	8.64	37.04
		P	11.16	14.23	-1.76	5.36	8.60	5.50	2.15	12.83	5.57	7.48	20.98
	Rural	C	15.99	2.28	11.76	9.38	55.90	10.96	7.71	8.11	12.76	10.37	214.19
		I	12.97	8.44	1.76	17.86	7.32	7.51	8.86	12.51	11.93	8.16	28.87

Note: N means nationwide. EA means eastern. CE means central. WE means western. AAGR means average annual growth rate. C denotes consumption. I denotes income. P denotes housing prices.

3.4. Unit root and cointegration test

To avoid spurious regression problems, we need to do unit root test on variables, where we use homogeneous panels LLC (Levin, 2002) and heterogeneous panel LPS (Im, 2003), Fisher-ADF and Fisher-PP (Josep & Kaddour, 2010) to do unit root test. Table 3 shows that $\ln I_{it}^u$, $\ln D_{it}^r$ and $\ln I_{it}^r$ are $I(1)$, other variables are already stationary series.

Despite first difference of all the variables are stationary series, to determine the specific form of the equation, we should do cointegration test on the relationship between the dependent variable and the independent variables and report intra-groups and inter-groups statistics respectively. Table 4 shows that there is no long-term

cointegration between dependent and independent variables. Therefore, the first difference equation is in line with modeling requirements.

Tab.3 Unit root test of variable

Variables	Level-value equation				First difference equation				
	LLC	IPS	Fisher-ADF	PP	LLC	IPS	Fisher-ADF	PP	
U	$\ln D_{it}^u$	-15.45*** (0.00)	-8.90*** (0.00)	200.49*** (0.00)	513.92*** (0.00)	—	—	—	—
	$\ln I_{it}^u$	6.73 (1.00)	13.98 (1.00)	1.47 (1.00)	1.64 (1.00)	-20.29*** (0.00)	-15.22*** (0.00)	310.03*** (0.00)	372.41*** (0.00)
	$\ln L_{it-1}^u$	-14.68*** (0.00)	-7.68*** (0.00)	172.09*** (0.00)	430.35*** (0.00)	—	—	—	—
	$\ln E_{it-1}^u$	-12.14*** (0.00)	-4.85*** (0.00)	130.86*** (0.00)	259.63*** (0.00)	—	—	—	—
	$\ln P_{it-1}^u$	-16.88*** (0.00)	-16.31*** (0.00)	339.18*** (0.00)	621.99*** (0.00)	—	—	—	—
R	$\ln D_{it}^r$	-0.91 (0.18)	0.33 (0.63)	50.95 (0.84)	51.67 (0.82)	-19.32*** (0.00)	-15.50*** (0.00)	296.40*** (0.00)	398.90*** (0.00)
	$\ln I_{it}^r$	-1.37* (0.09)	1.09 (0.86)	80.34* (0.06)	71.79 (0.19)	-17.36*** (0.00)	-15.17*** (0.00)	293.04*** (0.00)	514.01*** (0.00)
	$\ln L_{it-1}^r$	-6.27*** (0.00)	-2.95*** (0.00)	89.59** (0.01)	94.67*** (0.01)	—	—	—	—
	$\ln E_{it-1}^r$	1.03 (0.85)	2.08 (0.98)	38.97 (0.99)	36.49 (0.99)	-16.59*** (0.00)	-10.75*** (0.00)	210.25*** (0.00)	253.81*** (0.00)

Notes: U means urban. R means rural. (1) ***, ** and * denote rejecting the null hypothesis that there is unit root at the 1%, 5% and 10% levels. (2) The P value is in parentheses. (3) The estimated equation with the intercept, lags and time trend.

Tab.4 Multivariate cointegration

		Intra-groups statistics				Inter-groups statistics		
		v-Statistic	rho-Statistic	PP-Statistic	ADF-Statistic	rho-Statistic	PP-Statistic	ADF-Statistic
Urban	Statistical value	-5.17	3.21	-26.41	-5.91	5.32	-33.30	-5.00
	P value	1.00	0.99	0.06	0.00	1.00	0.08	0.00
Rural	Statistical value	-4.92	-1.83	-33.98	-11.03	0.64	-45.36	-10.80
	P value	1.00	0.13	0.00	0.00	0.74	0.00	0.00

Note: (1) The null hypothesis of cointegration test is "no cointegration". (2) The P value is in parentheses. (3) The estimated equation with the intercept, lags and time trend.

3.5. Econometric results

Panel data model usually have three forms: the first is PRM (Pooled Regression Model), the second is FRM (Fixed Effects Regression Model), the third is RRM (Random Effects Regression Model) (Gao, 2009). In the form of panel data model selection method, F-test is often used to select PRM or FRM, and then use the Hausman test to determine these two model. Table 5 shows that the national urban data with a significant regional differences, so IFRM (Individual Fixed Effects Regression Model) is selected. Due to the regional differences, we should use the weighted cross-section regression here to reflect the differences, but sub-regional cross-section regression model without weighting. The model applied to eastern select RRM, central select PRM, western select IFRM.

Similarly, take into the data of rural area consideration, National Rural choose weighted IFRM; eastern select RRM, central select PRM, western select IFRM.

Tab.5 Model selection basis of different regions

		Nationwide	Eastern	Central	Western
Urban	<i>F</i> value	8.13 > 1.78	2.72 > 1.72	1.29 < 1.79	2.88 > 1.85
	<i>Chi 2</i> statistic	19.40*** (0.00)	4.74 (0.32)	—	10.79** (0.03)
Rural	<i>F</i> value	12.53 > 1.69	3.84 > 1.72	1.73 < 1.75	3.63 > 1.81
	<i>Chi 2</i> statistic	14.11*** (0.00)	5.32 (0.15)	—	10.96** (0.01)

Notes: (1) ***, ** and * represent the 10%, 5%, and 1% significance levels, respectively. (2) *F* value at 5% is to judge IFRM or PRM, and check the calculated results based on the *F* value distribution table to see whether through test criteria. When $F > F_{0.05}(T-1, NT-T-k)$, where *T* is the number of years, *NT* is the total number of observations, *K* is the explanatory variable. If the inequality is true, then reject the null hypothesis and concluded that it should establish IFRM, on the contrary, to accept the null hypothesis. (3) *Chi2* values are used to determine PRM or FRM, *P* values are in parentheses.

From a national regression results, the model (2) shows that the influence of prior period housing prices on the current non-investment consumptions is not significant (Table 6), Through β_4 coefficient in formula (12), we can infer that the impact of housing prices on the RHRS is not significant. But it should be noted that housing prices have regional differences characteristics, the prices of the national level are not representative of the regional level, so the impacts of prices on the RHRS should also be discussed in the regional areas. Model (1), model (2), model (9) and model (10) shows that the urban and rural residents' current income have positive marginal effect of non-investment consumption, and $\beta_1^u > \beta_1^r$, so improve the income level to a certain extent can promote the RHRS.

From the regional differences, the model (4) shows that the prior period housing prices of the eastern region have negative marginal effect on the current non-investment consumptions, and is significant at the 5% level. From the meaning of β_4 coefficient, we can see that the rises of housing prices of eastern region hinder the RHRS to certain extent, which shows the welfare dissipation effect is greater than the the expected wealth effect. Model (3) and model (4) shows that the residents' current income of the eastern area have positive marginal effect on the current non-investment consumption. Model (11) and model (12) show that the rural residents' current income in this region have no significant effect on the current non-investment consumption, that is $\beta_2^u > 0$, and β_2^r without significant, which means increase in income of eastern region will promote the RHRS to a certain extent. From statistical description, in the eastern area, the average annual growth rate of income reaches 8.06%, and less volatility (variance is only 4.78), which provides expectations that steady revenue growth for the migrants. Therefore, by increasing the marginal product of labor and enhancing the long-term contracts to constraint human behavior, as well ad other measures, we may improve the income of migrants in the eastern area, and prepare the conditions for the RHRS. Similarly, in the eastern area, $\beta_3^u > 0$ and β_3^r with not significant, similar to the income, residents' educational consumption increase of this eastern region will promote the RHRS, which indicates that the desire to the good educational resources is an important active factor of the transfer. Similarly, with regard to central and western regions, we can analyze the influences of housing prices, income, life necessities consumptions and educational consumptions on the RHRS. In central region, housing prices rises

will promote the RHRS to a certain extent, so in this region, housing prices show more expected wealth effect to the residents. Therefore, by broadening the housing values in this region can inspire the migrants' transfer motivation. Income levels, life necessities consumptions and educational consumptions have little difference before and after transfer, so we can see that the impact of these factors on the RHRS is not significant. In the western region, housing prices do not affect the RHRS, the impact of income levels and life necessities consumptions on the RHRS is also not significant. Enhance the level of prior period educational consumptions, the current non-investment consumptions will go down, that is $\beta_3^u < 0$, $\beta_3^r < 0$, but because $|\beta_3^u| < |\beta_3^r|$, negative marginal effect of urban hukou is more smaller relative to the rural hukou, from this perspective, the transfer decisions made by this regional residents are still rational.

Tab.6 The regression results of urban and rural residents' consumption and housing prices, China's 31 provinces, 1995-2012

$\Delta \ln D_{it}^u$	Variables	Nationwide		Eastern		Central		Western	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Urban statistics	$\Delta \ln I_{it}^u$	1.44*** (0.18)	1.45*** (0.18)	1.00*** (0.34)	1.03*** (0.34)	1.75*** (0.39)	1.38*** (0.41)	0.85** (0.35)	0.85** (0.35)
	$\Delta \ln L_{it-1}^u$	-0.10 (0.06)	-0.10 (0.06)	-0.01 (0.12)	-0.02 (0.12)	0.39** (0.18)	0.35** (0.18)	-0.01 (0.14)	-0.01 (0.14)
	$\Delta \ln E_{it-1}^u$	-0.10 (0.08)	-0.10 (0.08)	0.43** (0.17)	0.42** (0.17)	-0.28*** (0.11)	-0.28*** (0.10)	-0.20** (0.10)	-0.21** (0.10)
	$\Delta \ln P_{it-1}^u$		-0.02 (0.09)		-0.13** (0.15)		0.61** (0.26)		0.03 (0.15)
	Constant	0.26*** (0.02)	0.26*** (0.02)	0.22*** (0.03)	0.23*** (0.04)			0.20*** (0.03)	0.20*** (0.03)
	R^2	0.38	0.44	0.21	0.24	0.26	0.26	0.22	0.25
	F statistic	2.84	2.75	5.40	4.25	—	—	1.27	1.18
	D-W statistic	2.15	2.15	2.11	2.14	2.43	2.31	2.02	2.02
	Observations	372	372	160	160	128	128	144	144
	$\Delta \ln D_{it}^r$	Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Rural statistics	$\Delta \ln I_{it}^r$	0.23*** (0.09)	0.26*** (0.08)	0.08 (0.13)	0.09 (0.12)	2.19*** (0.30)	1.75*** (0.39)	0.83** (0.36)	0.85** (0.35)
	$\Delta \ln L_{it-1}^r$		-0.95*** (0.08)		-0.76*** (0.19)		0.39** (0.18)		-0.01 (0.14)
	$\Delta \ln E_{it-1}^r$		-0.15*** (0.06)		0.04 (0.09)		-0.28*** (0.11)		-0.34** (0.14)
	Constant	0.15*** (0.01)	0.21*** (0.01)	0.14*** (0.02)	0.19*** (0.02)	—	—	0.20*** (0.03)	0.20*** (0.03)
	R^2	0.26	0.36	0.20	0.30	0.21	0.23	0.18	0.22
	F statistic	1.68	4.94	1.38	5.44	—	—	0.99	1.27
	D-W-statistic	2.52	2.14	2.31	2.05	2.39	2.43	2.29	2.02
	Observations	527	496	170	160	136	128	156	144

Notes: (1) ***, ** and * represent the 10%, 5%, and 1% significance levels, respectively. (2) standard errors are in parentheses.

4. Conclusions

Through literature review, housing prices influence the rural-urban migrants' behavior and settlement decisions through three channels, which are the expected wealth effect, crowding-out effect and the welfare dissipation effect, and this mechanism and expected utility introduced could be extended to the decision-making behavior of RHRS, namely that housing prices will also affect the RHRS by the above three channels. In addition, as to the influence of housing prices on the RHRS, existing studies lack empirical analysis. So carrying out empirical analysis based on life-cycle theory, while studying the effectiveness of housing prices on the RHRS according to different regional characteristic will have important practical significance for making differentiated transfer policy.

In the views of crowding-out effect and welfare dissipation effect, the high housing prices will play a negative role in the RHRS. Whereby this conclusion, we can get Hypothesis I, that rising prices will hamper the RHRS. Meanwhile, according to the utility function of migration population household proposed by Rabe, and the hypothesis that most houses buyers have the funds "short-sighted" during the period of prices rising, we can get the hypothesis II, that is the expected wealth effect generated by the prices rise will lead the rural-urban migrants to change their hukou, which will promote the RHRS to some extent.

From the empirical results, at the national level, the influence of housing prices on the RHRS is not significant, it may be due to the combined influence which include the working income, social welfare and life necessities consumption. From the view of regional differences, in eastern region, housing prices rise have a negative impact on the RHRS to some extent, indicating that in this region welfare dissipation effect is greater than the expected wealth effect for the migrants, in line with the hypothesis I. In central region, housing prices rise will promote the RHRS, which stems from reason that the expected wealth effect is greater than the welfare dissipation effect, in line with the hypothesis II. In western region, prices rise do not have an impact on the RHRS.

For other control variables, in the nationwide and the eastern region, improving the income levels will promote the RHRS, while not significant in the central and western regions. In the eastern region, increased education consumption will promote the RHRS largely, which is applicable to the western region. But in this region, the negative marginal effect brought by urban hukou is less than the rural hukou. Whether the national level or regional level, life necessities consumption will not affect the transfer decisions made by the migrants.

Rural - urban migrants are the main component of RHRS, so the government should make differentiated related policies to promote the RHRS from the "humanism" perspective, and to effectively improve the quality and speed of urbanization. Such as in the eastern cities, housing prices control policy is expected to lead the prices gradually return to rational level. to dispel the migrants' scruples of the identity transformation. By initiatives that increasing the marginal product of labor, such as pre-job vocational training, long-term contract to constraint stakeholder's behavior, such as the signing of long-term employment contracts or paying social insurance and house fund for the migration, and continue to increase educational investment, to increase the migrant's working income and to push forward conditions for the RHRS. For the central region, broadening the space of housing

prices rising value, such as increasing the supporting public service facilities and optimize the ecological environment, is can be used to increase residents' expected wealth effect, and to stimulate the motivation of transfer. For the western region, urgent need to increase educational investments in large, to improve the efficiency of educational resources, and to change the forced mechanism of transfer into positive guide mechanism.

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