The Formation of Housing Price Expectations in China: A General Research Proposal

1. Introduction

It has long been recognized that the expectations of market participants plays a role in business cycles, there is also a prolonged interest in the economic literatures on the formation of expectations, especially the rational expectations and adaptive expectations hypothesis. As far as the real estate economics is concerned, despite many studies have been devoted to test the rational expectations hypothesis in the housing market, there are still many questions to be answered. Consequently the last decade's intense housing price volatility in China provides a good opportunity to conduct a research on the formation of housing price expectations and its role in the price volatility.

China has been undergoing an unparalleled booming housing market since the housing reform launched in 1998, which year is regarded as the real beginning of housing market in China: it is in this year that the welfare-oriented public housing distribution system ceased and the residential mortgage system was established, also in this year the central government launched the public housing program. Over the last decade housing prices in urban area of China have escalated significantly, some metropolitan cities even tripled, such as in Beijing, Shanghai and Shenzhen. According to the National Bureau of Statistics of China, housing transaction volume has increased almost 14 times from 1998 to 2007, housing floor area sold has also increased by 10 times. Despite the great achievement of the housing reform in China, the soaring housing price has already led to many concerns from the whole society, especially the low-income households. Due to the relatively sluggish increase of households' income, many of them have been excluded out of the housing market, which makes housing prices sway beyond the affordability level of many urban families. Specifically, compiling data revealed by the bureau of Statistics of Beijing in 2009, it is reported that the ration of housing price to disposable income in Beijing arises to a striking level of 27:1. Similar scenarios also exist in other coastal cities of China.

On the other hand, the fail of the public housing system also contributes to the low housing affordability of urban citizens. Since the housing reform launched in 1998, China has been trying to establish a housing market that is mainly consisted of public housing, which includes the affordable housing and the rental pubic housing. The difference between the two programs is that the former one is designed to help the low-income families to buy owner-occupied housing. Now it has been more then 10 years since the proposal was firstly brought on, the development of public housing program is still at a tardy pace, especially the development of the affordable housing program, which is largely due to the local government's lack of economic incentive: they are benefitting greatly from the high housing price, which bring the local governments with high tax revenue, high fixed asset investment, most importantly, the immense amount of land revenue. Hence, the public housing program has been a dilemma; that led even to the central government's pumping of four thousand billion stimulus package.

Not surprisingly, it is commonplace to see criticisms on the media of the high rocketing housing price and the affordability problem all over the country, which makes the real estate developers face to a moral judgment that the housing market, driven by the real estate tycoons, has already 'kidnapped' the macro-economy (Yi, 2006). Since nowadays in China, the economic growth lay heavily on the fixed asset investment brought by development of real estate: up to 2 percent of GDP growth in 2008 comes from the real estate industry; on the other hand, a significant component of incremental credit has flown to the real estate developers and the home buyers, which implies that once the housing prices collapse, the whole financial system and the economy will face to immeasurable risk.

Numerous researches have been conducted in China to explore issues concerning housing market, as far as the determination of housing price, most of these researches emphasize on the constitution of housing price, especially the causality relationship between housing price and land price, which largely has something to do with the dispute on whether land price (the supply of land in urban is directly controlled by the government.) causes the

soaring housing price.

Despite the widespread attention given to the skyrocketing housing price, however, these researches fail to identify the role of house buyers' or potential buyers' behavior in the price dynamics, especially how the market players form their expectations on housing price. This issue deserves special consideration, since expectations, both of the demand side and supply side of the housing market, play an important role in decision makings. It is the intrinsical driving force to entice home buyer willing to pay for a striking high housing price, at least compared to income of most households.

In fact as early as 1988, a survey conducted by Case and Shiller (1988) on the home buyers in the US has revealed a fact that the boom market is driven largely by expectations. They note that people seem to form their expectations on the basis of past price movements rather than any knowledge of market fundamentals. The question raised by this survey spurs the interest among academics, then a series of papers investigate the informational efficiency and the rational expectation hypothesis in the housing market, see Mankiw and Weil (1989), Case and Shiller (1989, 1990), Poterba (1991), Gatzlaff (1995), Capozza and Seguin (1996), Man Cho (1996), Capozza et al.(2002). These findings have produced a profound impact on the development of real estate economics, in particular on the study of housing price volatility. Consequently, this study tries to shed some light on this issue in China around the following perspectives: In which way the price expectations in China are formed: a rational way or adaptive way or someway else? Is there any difference between the formation of housing price expectations in China and other countries/districts?

This report proceeds as follows: the second section is the literature review, and the third section presents the theoretical framework and methodology, while the fourth section discusses the dataset and the research design.

2. Theoretical Framework and Methodology

This section presents the theoretical frame and methodology employed to investigate the

formation of housing price expectations in the city of Beijing, it proceeds as follows: firstly an asset-based forward looking housing price model will be estimated; next step is the methodology used to test the rational expectations hypothesis in the housing market of Beijing; Secondly, if the rational hypothesis is rejected, as implicated in several previous studies, the second part of this section employs a present value model to test the adaptive expectations hypothesis in the housing market. Lastly, this section presents a brief plan of a simple survey, which will be conducted to directly explore how the housing market players form their expectations.

2.1 Test of rational expectations hypothesis and Relevant Empirical Issues

This section estimates a housing price dynamics model incorporated rational expectations hypothesis (RE), and illustrates the test of RE, a brief discussion is presented in the last.

2.1.1 Modeling Housing Price Dynamics

The modeling of housing price dynamics has historically been investigated in numerous papers, it is widely agreed that the housing price dynamics can be largely explained by market fundamentals and the deviations from the equilibrium prices. Goodman and Thibodeau (2008) classify these researches into three stands: models of long-run equilibrium in housing markets, models of the short-run dynamics of house prices and estimates of housing supply elasticities. Unfortunately in these frameworks the mechanism of price expectations formation is usually neglected, thus they cannot be employed to directly test the rational expectations hypothesis.

While in the literatures testing rational expectations hypothesis in the housing market, there is a body of researches concentrate on the excess return measurement, which is borrowed from the tests of efficiency in the stock market, mainly enlightened by Case and Shiller (1990). However as criticized by Man Cho (1996), there are several shortcomings underlying in this methodology, for example the measurements of the rental stream and the maintenance costs; besides that, the forward looking housing prices in these tests are even not derived from a housing price determinant model, which makes the evidence reported relatively groundless. Just like Man Cho concludes: "*testing these*

rational-expectations hypothesis is in fact a joint test of the model specifications and the hypotheses themselves. Therefore, a better model specification that properly incorporates market fundamentals and disequilibrium factors will help generate more sound evidence……"

Another frequently used avenue is to derive an asset-based housing price model that explicitly incorporates the rational expectations hypothesis, the rational in this method is that the expected return on housing should be equal to the return on the alternative investments. This method is employed by Poterba (1984,1991), Case and Shiller(1988,1989), and Clayton (1996), Ayuso and Restoy (2006). In a standard stock-flow model framework provide by Rosen and Smith (1983) and Poterba (1984,1991), which holds that the housing market comprises of two separate but interrelated markets: one for the flow of housing service and another for the stock of housing capital. Assume that all the participants are risk neutral, then the equilibrium condition is that the expected return equals to the rate of return available on alternative investments, which is to say,

$$R_t + g^e_t P_t - (i_m + pt_t + d_t)P_t = i_t P_t \qquad (1)$$

While R is the annual rental income, imputed or actual rent of the house if the house is owner occupied or rented); i_m is the mortgage rate, pt is the property tax and d is the depreciation rate, $pt_t + d_t$ denotes the holding cost of houses; P is the present asset value of the house, g^e_t is the expected annual rate of capital return; on the right side, i is the nominal return available on alternative assets, such as the risk free rate, the 9-monthes or 1-year rate on government bonds. Specifically, with the quarterly data observations,

$$g^e_t = \frac{P^e_{t+4,t} - P_t}{P_t} \qquad (2)$$

$P^e_{t+4,t}$ is the expected housing value one year from now at the present information set. If the housing market participant forms housing prices rationally, then $P^e_{t+4,t}$ is defined as the mathematical expectation of the one-year ahead price conditional on all current and past information set, which is:

$$P^e_{t+4,t} = E_t[P_{t+4} | I_T] \qquad (3)$$

As indicates by the rational expectations hypothesis, if the all available information has

been incorporated into the expectations and the expectation is unbiased, the realized housing price should differ from the expected values only a random error, which is a serially uncorrelated, mean zero disturbance constant term. Then we have,

$$P_{t+4} = E_t[P_{t+4} \mid I_T] + \varepsilon_{t+4} \qquad (4)$$

P_{t+4} is the realized home price four quarters later. Merging the equations (1), (2), (3), an expression for the one-year ahead home price can be shown as:

$$E_t[P_{t+4} \mid I_T] = (1 + i_m + i_t + pt_t + d_t)P_t - R_t \quad (5)$$

It can be inferred that the expected housing price is a function of housing prices, rent, interest rates and the holding cost consisted of tax and depreciation, under the joint null hypothesis of rational expectations, risk neutrality and the asset market equilibrium condition given by the equation (1). Particularly, it is noticeable that all else equal, expected home prices is positively related to current home prices and negatively relatively related to current rents.

Then substituting equation (5) to (4) will lead to testable restrictions implied by rational expectations and housing market efficiency:

$$P_{t+4} = (1 + i_m + i_t + pt_t + d_t)P_t - R_t + \varepsilon_{t+4} \qquad (6)$$

Hence, to test the hypothesis of rational expectations under risk neutrality is to test the regression model estimated as bellow:

$$P_{t+4} = \mu_0 + \mu_1(1 + i_m + i_t + pt_t + d_t)P_t - \mu_2 R_t + \varepsilon_{t+4} \qquad (7)$$

If the assumption of rational expectations and risk neutrality holds, the joint null hypothesis that $\mu_0 = 0$ and $\mu_1 = \mu_2 = 1$ should not be reject, as well as the disturbance constant term ε_{t+4} should be a serially uncorrelated, mean zero stochastic sequence. Of course, this test specification is valid when all of these variables are stationary time series. This is the basic housing price model to test the rational expectations hypothesis.

2.1.2 Econometric and Measurement Issues in the test of rational expectations hypothesis

Before conduct the test based on the stock-flow market equilibrium condition defined by equation 7, there are several empirical issues underlying the model need to be discussed.

A significant difficulty lies in the equation 7 is that the rental income of the owner-occupied houses is unobservable, hence the previous studies provides several proxies to deal with this problem. The most common method is using the rent component of the CPI (Consumer Price Index) as a proxy; Case and Shiller (1989) include the cit-specific index for residential rent, which is derived from a constant define as the 'dividend price ratio'; Meese and Wallace (1994) resort to constructing a rent series based on asking rent for two-bedroom condos pulled from local media; Clayton (1996) impute rent as a function of observable market fundamentals. Since this research conducted in Beijing, the rental income is also observable; this will be one key issue to be dealt with in the subsequent study.

Another troublesome empirical issue is that for the test sample containing different metropolitan areas, the variables should be identified as varying cross-sectionally from the others varying time serially, for example, Man Cho (1996) points out that the risk-free rate is usually regards as varying intertemporally but not contemporaneously.

Additionally, there is another measurement issue for the test in China: the holding costs of houses in the model, consisting of the property tax, depreciation value and maintenance costs. In China, the property tax on the owner-occupied houses is still under formulation and experiment, at present only the rented houses are taxed on the rental income. On the other hand, the depreciation value and maintenance costs vary greatly between different districts, even in the same city. Hence, as a matter of convenience, this part is omitted from the model; actually this is also adopted in many other studies (See Clayton (1997) and Capozza et al (2004)). It is clearly that more supplicated measure of user cost is needed also possible, but it is beyond the scope of this research.

2.1.3 Test of Rational Expectations Hypothesis

After the previous empirical issues clarified, the following steps are taken to test the rational price expectations in the housing market of Beijing.

Step 1. Unit Root Test

As noted previously, the regression model defined by Equation 7 is only valid that all of the underlying series are weakly or covariance stationary. If the series under study are nonstationary, which is to say, there are a unit root exist in the serial, which may lead to misleading results. Hence an Augmented Dickey-Fuller unit root test is employed to examine if the series are stationary. Noticeably is that there are also other studies using other unit roots test method, such as Phillips-Perron method, Dickey-Fuller GLS method, etc.

Step 2. Percentage Change Model Specification

As we know, a time serial with the existence of unit root must be first-differenced to render it stationary. But at the same time, the first-differenced treatment will result in loss of valuable long-run time serial information and a misspecification of short-run dynamics (Johansenn and Juselius, 1990). Taking in consideration that the short history of housing market in China, the time serial is only ten years long, hence the first-differenced treatment may lead to inevitable loss to the dataset.

Consequently a percentage change on the equation 7 is conducted here to prevent the unwanted first-differenced treatment as Clayton (1997) suggested. Subtracting the current price, P_t, form each side, then dividing both sides of the resulting expression by P_t yields the following test of the rational expectations hypothesis:

$$\frac{P_{t+n} - P_t}{P_t} = \mu_0 + \mu_1(i_m + i_t)P_t - \mu_2\left(\frac{R_t}{P_t}\right) + \varepsilon_{t+n} \qquad (8)$$

In which, n denote the different forecast horizons quarterly and annually by defining n=1 and n=4. Consistent with the previous null hypothesis of rational housing price expectations, the hypothesis holds when $\mu_0 = 0$ and $\mu_1 = \mu_2 = 1$. Clearly that the realized housing price appreciation equals optimal expected appreciations plus a random error.

After the percentage specification, the unit root test should be conduct again on the Equation 8 to ensure the series are stationary. It can be seen from the previous studies that this treatment could effectively eliminate the unit root.

Step 3. Empirical Test

If there are no unit roots exist in the right hand side of equation 8, the OLS regression method will be conducted to directly test the model and the joint null hypothesis. The empirical results will reveal if the risk neutral housing market participants form the expectations 'rationally' under the asset market equilibrium condition defined by equation 6.

2.1.4 A Brief Discussion

This section presents a directly test of rational expectations hypothesis, mainly enlightened by Clayton's asset-based forward looking housing price model (1996), which is under the assumption of the risk neutral market players and the equilibrium condition of the stock-flow housing market model. However, there are several theoretical and empirical issues needed to be discussed.

First, this model, similar to other models, also assumes a frictionless housing market, certainly it is unrealistic. In a report revealed by the OECD in 2008(Cruz, 2008), In OECD countries, roundtrip transaction costs in the housing market are generally above 5%, there are some countries with transaction costs which are even unnecessarily high. Specially, South Korea has the highest housing transaction cost in the OECD, accounting for 22% of the property's value in Seoul. Although there is no available data in Beijing, this report implies that the roundtrip transaction, consisting by the searching cost, transaction cost and transfer taxes, cannot be ignored in the housing market research.

Second, as this model is derived from the asset pricing model, there are several important variables used in other models absent in it, such as per capita income and population. Even the effect of income can be supposed to be transmitted from rent or other variables, it still seems unconvincing without the effect of income, which is almost included in every housing price dynamics model. On the other hand, China is undergoing a fast urbanization, there is a huge number of people flow into the city, certainly including Beijing. This is an inevitable factor for the soaring housing price. Thus the omitted of these variables may lead to the failure of this model to capture the housing prices

movement.

Third, obviously that the variables contained in this model are all census data. Consequently this model can only be explained as a macro-level examination of rational expectations, since it could not reveal any micro-level information. That is, what it examines is the way in which the 'market' forms expectations, not the housing market players, including the potential home buyers, housing market investors, house occupiers, formation their price expectations. The latter only could be revealed in a survey method, as presented in the successive section.

2.2 Test of Adaptive Expectations Hypothesis in the Booming Market

It is mentioned in the literature review that rational expectations hypothesis is generally rejected in the previous studies, and the survey on the homes buyers by Case and Shiller (1988) suggests that the market for residential real estates is very different from the traditionally modeled in the literatures, people seem to form their expectations on the past price movements rather than any knowledge of market fundamentals. Herring and Wachter (1999) and Malpezzi and Wachter (2005) also argue that investors show a particular form of adaptive expectation. These findings indicate that it still worth a try to test the adaptive expectations hypothesis, especially in the booming market, although the adaptive expectations hypothesis has already been abandoned since the emergence of rational expectations.

Additionally, Chow (1989) use data on stock prices and dividends and on interest rates, test an important implication of present value models, that current value is a linear function of the conditional expectations of the next-period value and the current determining variable. It is very interesting that this implication combined with rational expectations （RE）is strongly rejected, the implication combined with adaptive expectations (AE), is accepted. Besides that, the logarithmic form of the model for stock price shows that the AE version is not only preferable, but also helps to explain the phenomenon of mean version. Thus he concludes that the RE assumption should be used with caution; the AE assumption may be useful in econometric practice. Following in this section is a brief methodology to test the rational expectations hypothesis in Chow's

sense.

Step 1. Modeling the Adaptive Expectation of Housing Price

According to the error learning nature of the hypothesis, a simple adaptive expectations hypothesis could be simply described as the bellowing equation:

$$E_t P_{t+1} = \sum_{i=0}^{\infty} \lambda(1-\lambda)^i P_{t-i}; \quad 0 < \lambda < 1 \quad (8)$$

Where E denotes the expectation of housing prices, P; t indexes time. This equation can also be manipulated readily to deliver:

$$E_t P_{t+1} = E_{t-1}P +_t \lambda(P_t - E_{t-1}P_t) + \varepsilon_t \quad (9)$$

In which ε_t summarize other factors than $(P_t - E_{t-1}P)$ that effect the expectations. It is noticeable that the expected housing price is not observable, thus the equation 10 is unable to test. Here the present value model taken by Chow (1989) is performed, to render the unobservable expectation housing price measureable.

Step 2. Transmitting the Unobservable Adaptive Expectations

In Chow's model, tock price is modeled to be the present value model of expected dividends as bellowing,

$$Y_t = \theta \sum_{i=0}^{\infty} \delta^i E_t Z_{t+i} + c \quad (11)$$

Where Y_t denotes the price of stock at the beginning of period t, while Z_t is the dividend derived from the above stock during period t, δ is the discount factor. The equation 11 can lead to:

$$Y_t = \delta E_t (Y_{t+1} + Z_t) \quad (12)$$

Similarly, in the case of housing market, the dividend of housing investment is the rental income, denoted by R. Substituting equation 12 to 10, it becomes,

$$P_t - P_{t-1} = \delta\lambda(P_t + R_{t-1}) - \lambda P_{t-1} + \delta\varepsilon_t \quad (13)$$

Solving this equation for P_t, the result is:

$$P_t = \frac{(1-\lambda)P_{t-1} + \delta\lambda R_{t-1} + \delta\varepsilon_t}{1 - \delta\lambda} \quad (14)$$

Finally, the housing price model incorporating the adaptive expectations hypothesis is the defined by Equation 14, it can be estimated using the past ex post housing price data and the rental income data. As far as the residual variance, Chow (1989) assumes it to be proportional to $(P_{t-1})^2$, since he finds a regression of log of the square of the residual of equation 14 on the log of $(P_{t-1})^2$ has a coefficient of 1.075 with a standard error of 0.166 in the stock market.

Step 3. Test the adaptive expectation hypothesis

Then the ultimate form of the housing price model under adaptive expectations hypothesis is as following:

$$P_t = \alpha P_{t-1} + \beta R_{t-1} \qquad (15)$$

Using the value of α and β in the equation 15, the value of $\hat{\delta}$ and $\hat{\lambda}$ can be derived. If the model defined in equation 15 holds, then it indicates that the housing price expectations form in consistent with the AE.

As Chow (1989) points out that the acceptance of the AE hypothesis is just under the implication of present value model identified in equation 12, how the equation 12 might explain the volatility of stock price is another topic deserving further study. However, this finding also suggests that the assumption of adaptive expectations can sometimes be a useful working hypothesis in econometric practice. Hence by using this model, this research may contribute the existing knowledge of housing price expectations formation.

2.3 A Simple Survey on Housing Prices Expectations

As discussed in the previous section, the existing studies on the housing market expectations all rely on the census data and aggregate market data, these researches can only test if the 'market' forms expectations rationally or adaptively on the macro level, but little information concerning how specific market players form their price expectations has been revealed. The only way to detect this process is to conduct a survey on the different housing market actors, including the home buyers, potential home buyers and the real estate developers, as accessional practical evidence to this research.

So far few similar surveys have been done. Perhaps the most known survey of this kind is conducted by Case and Shiller on four metropolitan areas of the U.S in 1988, but their survey only covers home buyers in the booming market, which may lead to some misleading results, since the home buyers, or investors must one of the most optimistic and radical groups on housing market among the society, otherwise they would not choose to purchase a house, not rent one, in the booming period. Hence the responds from them may be not appropriate to represent the whole society's behavior on housing price expectations. On the other hand, the survey of Case and Shiller is designed to investigate the home buyers' purchase and investment behavior, not to explore the expectations formation process.

Another available survey of this kind is conducted in Hong Kong by Wong et al.(2005), it is a cross-sectional market outlook survey to measure differential housing price expectations in November 2000. Their result shows that both of the numerical value and direction of the correlation between housing price movements and expectations differs among different housing market actors and changes over time in Hong Kong. But as the authors admit these findings may suffer from the potential non-response errors in the survey, and it is difficult to determine the extent to which the nonrespondents differ and the degree to which this biases the study, since only 212 completed questionnaires were coded form a valid sample of 1239. They point out that a better designed survey and a larger sample size can minimize the influence of the bias.

In addition, there are some unique factors of the housing market in China. Firstly, China is undergoing rapid urbanization, which is paralleled by million of people flowing into cities. In 2008, the urbanization level has surged to 45.68% from the level of 30.1% in 1998; the urban population is growing at a rapid pace of 5.8% in the last decade[1], which is an important impulse of the soaring housing price;

Secondly, the China economy (GDP) has been growing at a rate of 9.8% since the

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[1] National Bureau of Statistics of China, < Series Statistics Report 10th: 60 years of the New China> http://www.stats.gov.cn/tjfx/ztfx/qzxzgcl60zn/t20090917_402587821.htm, <Assed by Nov. 17th, 2009>

economic reform launched at 1978[2], the pre capita income is also increasing steadily, which is also a reason for the future housing price appreciation. Lastly, as in China, the housing market is still strictly controlled by the governments: the residential land supply is controlled by the government, since according to the <Law of Land Management>, urban land is totally stated-owned; besides that, the government also controls the finance system. Hence the housing price movements are greatly influenced by the government's regulation and relevant policies towards housing market, which will inevitably affect the formation of market players' expectations.

In summary, it is believed that in the long run, the housing price expectations in China will be based on optimistically economic expectations and faced to uncertainty policy changes towards the housing market, which is significantly different with other countries. In this research a more comprehensive survey will be conducted in the city of Beijing to reveal how the housing market players form their price expectations. In terms of coverage of the survey, the home buyers and potential home buyers in the market will be surveyed to capture the full scenario.

In terms of the questions, consider that the aiming is to explore the expectations formation process; the questions will focus on the variables influencing their expectations of further housing prices; and the time interval of their price forecasting.
In terms of the areas of survey, this survey will focus on the very center of the urban area in Beijing, that is, not include the outlying suburban districts, such as Yanqing, Shunyi. This selection is also adopted in other researches, for example, Zheng and Kahm (2008).As far as the sample size, since this survey only aims to identify the variables concerning the formation of expectations, provided appropriate control of sample selection, the sample size would not need to be too large to capture the factors roughly. This also can refer to the sample size of Case and Shiller (1989) and Wong et al.(2005)

3. Data and Research Design

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[2] National Bureau of Statistics of China, < Series Statistics Report 1st: 60 years of the New China>, http://www.stats.gov.cn/tjfx/ztfx/qzxzgcl60zn/t20090907_402584869.htm, <Assed by Nov. 17th, 2009>

3.1 Why Beijing?

This study chooses Beijing, the capital of China, to conduct the case study of the housing price expectations in China, which is because of the following considerations:

Firstly, as the housing market in China has merely been established since the year of 1998, the development of local housing markets are significantly diversified across the country. Beijing as the capital of China, is one of the most developed cities, is believed to have the most perfect and matured housing market mechanism. Moreover, nowadays the housing market climate in Beijing is an important weather vane for the whole country. Therefore the housing market participants in Beijing should be the most experienced and educated ones on the housing market in China, hence the formation of their housing price expectations is very representative for the whole country.

Secondly, for the concern of data availability, Beijing has the most completed and longest dataset of the relevant variables in the housing market. The earliest monthly housing price index can be traced the year of 1998; this is not available in other metropolitan areas in China. Beside that, Beijing is the city that is most exposed to the media and public opinion, which means the information of housing market in Beijing should be the most sufficient to conduct this survey.

3.2 Dataset

The variables employed in this research are included in the equation 8 and 14, listing as blow: *ex post* housing price, rental income, residential mortgage rate, risk-free interest rate. As many monthly data of these variables is not available until the year after 2004, since all the variables are quarterly data, covering from 1998:1 to 2008:4 sample period. This sample period will also extend as the research goes on.

Specifically, the ex post housing price is a quarterly housing price index of Beijing, provided by Beijing Municipal Bureau of Statistics, available at the Wind databank. The rental income is derived from the rent component of CPI, also the rent index can be found at DTZ. Residential mortgage rate is also available at the Wind databank. The interest

rate of one year government bond is adopted as the risk-free interest rate.

As far as the data collected in the survey, it is up to the further planning and execution of the survey. Additionally, this survey is conducted to do a qualitative analysis on the housing price expectations; hence the relevant data and statistics should not be a key concern.

4. A Brief Conclusion

Generally in this paper, a two-level research on the housing expectation in China is roughly designed. It concludes a two-stage econometric test on the expectation hypothesis in the housing market, rational and adaptive, and a survey on the housing buyers and potential buyers. The two econometric tests are responding enlightened by Ayuso and Restoy (2006) and Chow (1989), while the survey mainly follows the similar questionnaire by Wong et al.(2005).

It is easy to tell that this two-level research is aiming to make a comprehensive investigate on the formation of housing expectation in China from both of the theoretical and practical perspectives. And I hope this PhD thesis could shed some light on the subsequent researches in China.

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