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Study of Herding Behavior on China's Real Estate Market Price Fluctuations

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Abstract: In this study, the Beijing housing market is the research object. From the point of asset prices, using chang to put forward CSAD, refers to the DongZhiYong, HanXu 's Generalized Capital Asset Pricing Model of the measurement method of the securities market behavior to the basic idea of the flock of empirical analysis. The empirical research shows that China's real estate price fluctuations exist serious herd behavior.

Key words: Herd behavior, behavioral finance, real estate market, price fluctuation

INTRODUCTION

There are multiple factors that affect the real estate prices, such as interest rates, the rates of down payment, the expectations rise rates of house prices, urbanization degree, Demographic Structure. Even if the above factors have something to the commodity house price fluctuations, it is not enough to explain the status of China's real estate price fluctuations (Zhao, 2008; Wang, 2005). As for the reasons, these factors are all failed to take the human action into the scope of investigation. In a sense, Any economic activities can be regarded as the result of human comprehensive behavior, so the human behavior and motives are certainly the important factors of impacting the Macro-economic indicators. On this basis, the author try to probe the human behavior factors of China's real estate market price fluctuation by herding effect theory (Zhang and Lan, 2007; Zhu, 2004; Wenmin, 2010).

HERD BEHAVIOR RESUME

Herd behavior refers to the market main body participation in the information environment conditions of uncertainty, its action was the influence of other participating subject, imitating others decision, or excessive relying on public opinions without considering own information. In general, it means the investors take irrational behaviors in the "group pressure" which under the influence of the moods. In the uncertainty and fuzziness environment, people usually show some group activities, such as social comparison, suggestibility and herd behavior. The social comparison theory think when there is no objective standard, people usually compare their own decisions with others, and then decide to choose. The investors' group psychology or group activities often weaken the connection between the information and markets so that affect the prices of Capital Goods (Lu, 2006).

In the real estate market, speculators tend to follow the group thinking and the group decisions, thus show obvious group psychology and behaviors. There are always a batch of irrational speculators who have not enough information source, also can't observe accurate information and be lack of recognition of information. They regard prices rise and fall as the reasons of trade, and for the formation of the expected future depends on the behaviors and expectations of others, so they can make their own decisions by imitating others' behaviors. At this time, house prices are no longer base on its theoretical value, but depends on the interaction of the trading group psychology and behaviors of real estate market.

THE FEASIBILITY OF INDICATOR APPLICATION

In relation to the experience of the research on herd behavior, the absolute majority is to use pure statistical methods to explore the Sequential decisions of stock markets whether exist setting sequence of phenomenon, which is not aimed at the inspection of a theoretical model, it can be said that the theoretical model and empirical research of herd behavior is independent.

The real estate market is more complex and there are no high frequency data, the empirical analysis is less, considering the real estate area development difference is very big, so the local research is more reasonable. Considering the data availability, in this paper, the Beijing housing market is the research object. From the point of asset prices, using chang to put forward CSAD, refers to the DongZhiYong, HanXu 's Generalized Capital Asset Pricing Model of the measurement method of the securities market behavior to the basic idea of the flock of empirical analysis so as to discuss whether exists the herd behavior (Jack, 1975; DeLong *et al.*, 1990).

Christie and Huang use Dispersion index to depict the degree of stocks returns approach to the market average income. If they are equal, then the dispersion

index equal to zero. In this article, through this method, using the degree of consistency between the growth rate of housing prices of various cities and nationwide to depict characteristics of consumers. The real estate market research divide into n provinces and cities, the time t means the growth rates of housing prices of I provinces and cities equal to Rit:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \quad (1)$$

The P_{it} is for the real estate average prices of time t and city I, the R_{it-1} is for the average prices of time t-1. The growth rates of nationwide house prices is \bar{R}_t , so the dispersivity of growth rates of nationwide residential housing prices of time t can be defined:

$$D_t = \sqrt{\frac{\sum_{i=1}^n (R_{it} - \bar{R}_t)^2}{n-1}} \quad (2)$$

In recent years, the national real estate market prosperity and the rapidly rising of housing prices in most areas are of convergence. Therefore, taking example by the securities market of herding behavior on the real estate market indicators to inspection price fluctuation of research is feasible. The dispersion index is on the whole market which can't find out whether a particular area exist herd behavior.

ANALYSIS MODEL INTRODUCTION

The real estate can be in accordance with the CAPM model to determine the capitalization rate. According to the CAPM model, the capitalization of the rate for real estate is:

$$E(RN) = R_f + \beta_{it}[E(R_{mt}) - R_f] \quad (3)$$

The R_{mt} means the average rate of return of national real estate market. R_f means Risk-free rate of return.

The hypothesis is that the market has investors who invest in effective market combination M. Another is herding investors, its held portfolio of assets in H number is far less than the number of M. If θ means the market wealth proportion of investment in H, the $1-\theta$ means the proportion in M. From the whole market to see, the wealth investment of H is a small fraction of the total market, so θ is a number which near zero. The hypothesis is that θ is determined by the D-value of market average expected rate of return $E(\bar{R}_m)$ and the expected rate of return $E(RN)$ of combination H.

$$\theta = \lambda_0 + \lambda_1[E(R_h) - E(\bar{R}_m)] \quad (4)$$

M is effective market combination, so the expected rate of return of combination H should meet the following relationship:

$$E(R_h) = R_f + \beta_{mh}[E(R_m) - R_f] \quad (5)$$

β_{mh} means the beta coefficient of portfolio H. The market average expected rate of return should meet the following relationship:

$$E(\bar{R}_m) = (1-\theta)E(R_m) + \theta E(R_h) \quad (6)$$

The portfolio which included in the M with H have the same asset composition but different proportion named stans, accounting for the proportion of M is ω , make all included in the H and H 'assets form a new combination G, so the expected rate of return is:

$$E(R_g) = R_f + \left[\frac{(1-\theta)\omega}{(1-\theta)\omega + \theta} \beta_{mh} + \frac{\theta}{(1-\theta)\omega + \theta} \beta_{mh} \right] [E(R_m) - R_f] \quad (7)$$

To deform (6) type so we can get:

$$E(\bar{R}_m) = (1-\theta + \theta \beta_{mh})[E(R_m) - R_f] + R_f \quad (8)$$

To take (8) type substitute into (7) type, we can get the relationship between the expected rate of return of combination G and The market average rate of return:

$$E(R_g) = R_f + f(\theta)[E(\bar{R}_m) - R_f] \quad (9)$$

And:

$$f(\theta) = \frac{\frac{(1-\theta)\omega}{(1-\theta)\omega + \theta} \beta_{mh} + \frac{\theta}{(1-\theta)\omega + \theta} \beta_{mh}}{1 - \theta + \theta \beta_{mh}} \quad (10)$$

If θ equal to zero, the above model is CAMP form: group G degenerated into combination H' and $E(\bar{R}_m)$ degenerated into $E(R_m)$, meanwhile, herd behavior does not exist. But when θ is not equal to zero, the combination G and market average rate of return no longer present simple linear relationship, indicating there are herd investors who hold H.

While θ equal to zero, expanding the equation $f(\theta)$, in the first order approximation:

$$f(\theta) = f(0) + f'(0)\theta + o(\theta) \tag{11}$$

$$\approx \beta_{mh} + \frac{(\beta_{mh} - \beta_{mh'}) + \omega\beta_{mh}(1 - \beta_{mh})}{\omega} \theta + o(\theta)$$

To take (4) type, (11) type substitute into (9) type:

$$E(R_g) = R_f + \left\{ \alpha_0 - \alpha_1 [E(R_h) - E(\overline{R_m})] \right\} [E(\overline{R_m}) - R_f] \tag{12}$$

$$\alpha_0 = \beta_{mh} + \frac{[(\beta_{mh} - \beta_{mh'}) + \omega\beta_{mh}(1 - \beta_{mh})] \lambda_0}{\omega}$$

$$\alpha_1 = \frac{[(\beta_{mh} - \beta_{mh'}) + \omega\beta_{mh}(1 - \beta_{mh})] \lambda_1}{\omega}$$

Because there are high correlation between $E(R_g)$ and $E(R_h)$, taking $E(R_g)$ substitute $E(R_h)$, we can get:

$$E(R_g) = R_f + \left\{ \alpha_0 - \alpha_1 [E(R_g) - E(\overline{R_m})] \right\} [E(\overline{R_m}) - R_f] \tag{13}$$

If nonlinear coefficient is greatly different from zero, indicating that there are herd investors in real estate market.

THE EMPIRICAL RESULTS ANALYSIS OF HERD BEHAVIOR ON REAL ESTATE MARKET PRICE FLUCTUATION

This article uses the risk-free rate index data from 2002, So the empirical analysis of data interval is from the first quarter of 2002 to the fourth quarter of 2011 which from the database in statistics, the people's bank of China website and Beijing statistics yearbook. Beijing and the national growth rate of the house prices historical data R_g and R_m are substituted by $E(R_g)$ and $E(R_m)$, the risk-free rate of weighted with quarter is substituted by the bond of the bank repurchase rate in 7days. we can get:

$$R_g - R_f + \left\{ 0.752378 - 4.276828 [R_g - \overline{R_m}] \right\} [\overline{R_m} - R_f]$$

(4.112460)*** (2.526457)** DW=1.816462
 R2 = 0.434108 By the Eviewss5.0 realized

The numerical value in brackets is t statistic, *** to represent the 1% significant, ** to represent the 5% significant. In the 5% confidence level remarkable, indicating that the Beijing real estate market price fluctuations might exist herd behavior. To take Chow dividing point of inspection for the regression equation, the results are the followings:

From the Table 1 , we can see that when taking the first quarter in 2003 as Discontinuities, the test results reject the null hypothesis, indicating that the structure

Table 1: Chow dividing point of inspection

The fourth quarter of 2002	F-statistics	0.038852	Probability value	0.983943
The first quarter of 2003	F-statistics	3.676136	Probability value	0.043688
	likelihood ratio	7.513617	value	0.023358

Table 2: The regression results from the first quarter of 2003 to the fourth quarter of 2011

	α_0	α_1	R ²	DW value
2003-01~2011-04	0.9102	6.105353	0.607891	1.648011
	5.346063)***	(3.839955)***		

changes from start to finish. We can get the results of the Table 2 from the first quarter of 2003 to the fourth quarter of 2011 by regression.

The hypothesis of α_1 is rejected under a marked level of one percent and compared with initial regression, model has a stronger explanatory ability which shows that herd behavior is obviously existing in the fluctuation of housing market prices in Beijing since 2003. The statistic on housing price growth is measured by average housing price. However, the real growth rate is higher, implying a worse situation. Residents make their judgment on expected price and intention to buy a house on the basis of people's responses and media's propaganda. Some investment of "noise dealer" exerts great force of impact on housing price. Real estate developers fabricate hot sales scene and recklessly make sensationalism of Olympics, resulting in a distortion of economic symbol. All these lead to the fact that citizens buy houses influenced by both macro-economies and herd behavior.

Due to the herd behavior, the increasing housing supply hasn't altered buyer's expectation that housing price will change nothing but increase. The number of real estate enterprises rise from 81 in 1994 to 3035 in 2006. real estate investment is on the rise year by year from 2.4 billion in 1991 to 303.63 billion in 2011. In recent years, real estate investment takes up over 50% of all fixed assets.

Per capita housing in urban areas has increased from 18.7 square meters to 31.6 square meters in 2010. Despite rapid growth in real estate and massive increase in housing, it's still profitable for investors to purchase houses. Tremendous supply won't change the current status that both price and need expand.

Because of limited statistics, we can't carry out empirical analysis from the perspective of every entity in real estate.

CONCLUSIONS

In s sense, each economic activity is formed and decided by people's comprehensive behavior, thus, no economic analysis can be isolated from consideration on our behavior. The theory of herd effect is a theoretical exploration and one of successful illustrations of

behavioral finance, meanwhile, it happens to be the theoretical basis and thought source. According to previous analysis, we can reach the conclusion that herd behavior obviously exists in the fluctuation of housing market prices. Whether the macro control policy will come through or not primarily lies in how to steer consumers to steady expectation on property market and how to further curtail herd effect's impact on decision-making.

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