



INVESTIGATING THE HOUSING PRICE BUBBLE IN METROPOLISES OF IRAN DURING 2000-2006

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ABSTRACT

Non-optimal allocation of resources, increased levels of speculative activities, increased transfer of capital in asset market can be considered as the main results of housing price bubble. The main reason for the importance of study of housing price bubble, separate from its importance as an asset, is that its price has a significant effect on household and government decisions. Therefore, the identification of the price bubble in the housing market is very important for the policymakers to take the proper policy. In this study, the panel data method is used to estimate the housing demand function and identify the housing price bubble in 11 metropolises of Iran during 2000-2006. Then, the residual term of estimated model is considered as the housing price bubble. The results indicate the existence of price bubbles in metropolises such as housing price bubble in Tehran declined since the 2002 and continued until 2006. But due to this recession, the housing market in other provinces prospered so that it reflects the increased price bubble during intended period.

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Contribution/ Originality

This study is one of particular studies which have investigated the housing price bubble in metropolises of Iran (11 metropolis) during 2000-2006. In this study, the panel data method has

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been used to estimate the housing demand and the relationship between housing price bubble and GDP, stock price, the price of gold, housing, bank loans and inflation have been investigated for the first time as well.

1. INTRODUCTION

One of the most essential needs and basic human rights, housing nowadays not only the shelter but also is economic and political goods. One of the main components of assets and capital markets is housing market. On the other hand, housing is the most important sectors of Iran economy and a high percentage of investments have been performed in this sector. During the last years, the direct and indirect factors such as increasing demand, rising price of land, labor, building materials such as steel and cement, oil price fluctuations and rising liquidity, recession in the stock market and other markets and continuous migration to the urban areas have affected the housing price fluctuations in the short term and long term. Also, no existing a system for pricing housing, the lack of a coherent plan to control the speculative demand for housing, lack of proper allocation of banking facilities Besides the lack of persuasive and punitive tax policies in housing sector Can be considered as the main factors in recent years. The housing market in Iran has always been faced with speculative fluctuations which some of the price fluctuations is unusual that is known as speculative bubbles in economic literature. The deviation of the asset value from the long-term equilibrium value is called price bubble. The existence of a bubble in the housing market indicates that increase in prices is temporary and have not proper economies basis. Therefore, the housing prices would be fall down sharply in the future. The main reason for study of housing bubbles, regardless the importance of housing as an asset, is that the housing prices can affect the household and government decisions significantly. Therefore, pay no attention on housing price bubble trends makes the decisions and the policies wrong. Therefore, this study attempts to identify the bubble in the housing sector in 11 metropolitan cities of Iran. Accordingly, the rest of this paper is organized as follows. After the introduction, section 2 describes the concept of price bubbles in housing market and its types as well. Section 3 discusses the literature on housing price bubble. The research methodology is presented in Section 4. Section 5, reports the major findings and section 6 concludes.

2. PRICE BUBBLES IN HOUSING MARKET

The price bubble is a renowned phenomenon in the housing market that there is no consensus about its mechanism and the factors affecting its occurrence. Among the various presented definitions, [Kindleberger \(1987\)](#) explained the bubble as "a rapid increase in prices of one or a range of assets in a continuous process that the initial price increase create expected future price increases and lead to attract new buyers to the market". However, [Baker \(2002\)](#), the rapid rise in prices, [Stiglitz \(1990\)](#) and [Case and Shiller \(2003\)](#), unrealistic expectations of future price increases, [Garber \(2001\)](#), deviation of price from the value of the housing and [Black et al. \(2005\)](#), the deviation of prices from fundamental values, have introduced as the key concepts. Generally,

three approaches can be mentioned about the price bubble. The dominant opinion of most modern economists including ideas rose in the Chicago school and proponents of supply side economics deny the existence of any "bubbles". The second view which is supported by the Keynesians and Behavioral Finance fans, indicates that the bubbles are created due to psychological factors in the expression "irrational exuberance" is short. A third view is presented by the Austrian school who believes bubbles are composed of real and psychological changes that are caused by the manipulation of monetary policy. This view has the developed advantage than others and indicates the economic causes of price bubble. The Awareness from the economic causes of price bubble can adopt policies that would prevent future bubbles (Jafari Samimi *et al.*, 2007).

Generally there are two types of classification for bubbles. In a classification bubbles can be divided into two kinds, stochastic and deterministic bubbles that stochastic type can be seen in Blanchard and Watson (1982) study. Another classification is based on the factors that cause deviation from the fundamental values. This type of bubbles that deviation from the fundamental value is called speculative bubbles that can be divided in five categories: 1. rational bubbles, 2. near rational bubbles, 3. intrinsic bubbles, 4. Fad bubbles and 5. Informational bubbles (Jafari Samimi *et al.*, 2007).

3. LITERATURE OVERVIEW

The housing price bubble has been considered in later studies extendedly. This section of the paper presents some of these essays. For example, Levin and Wright (1997) tested a model of house price speculation using time-series data for the UK and the Greater London area (1969-95). Overall, the analysis exhibited some evidence of the process of speculation as a possible determinant of house prices in the London and UK-wide housing markets. Roche (2001) decomposed house prices in Dublin into fundamental and non-fundamental components using a variety of measures. A regime-switching model was estimated and tested to explore whether speculative bubbles, fads or just fundamentals drive house prices in Dublin. The findings suggested that there may be a speculative bubble in the Dublin house prices. Himmelberg *et al.* (2005) measured of the annual cost of single-family housing for 46 metropolitan areas in the United States over the last 25 years and compare them with local rents and incomes as a way of judging the level of housing prices. The results showed during the 1980s houses looked most overvalued in many of the same cities that subsequently experienced the largest house price declines. Also, trough of 1995 to 2004, the cost of owning rose somewhat relative to the cost of renting, but not, in most cities, to levels that made houses look overvalued. Eschker (2005) investigated the housing bubble in Humboldt County in a rural California region using the price of the house divided by the current yearly rent that the house could earn, after adjusting for maintenance costs during 1989-2004. Shen *et al.* (2005) investigated whether there was a housing price bubble in Beijing and Shanghai in 2003. With monthly data and standard econometric methodologies: i.e. Granger causality tests and generalized impulse response analysis and the reduced form of housing price determinants, they indicated that there appeared a bubble in Shanghai in 2003, accounting for 22 percent of the

housing price. By contrast, Beijing had no sign of a bubble in the same year. [Taipalus \(2006\)](#) indicated the existence of real estate bubbles for Finland, USA, UK, Spain and Germany. The results strongly suggested the existence of bubbles in nearly all of these countries. [Cameron et al. \(2006\)](#) investigates the bubbles hypothesis with a dynamic panel data model of British regional house prices between 1972 and 2003. The study showed no evidence for a housing price bubble. [Goodhart and Hofmann \(2008\)](#) assessed the linkages between money, credit, house prices and economic activity in industrialized countries over the last three decades. They presented evidence for a significant multidirectional link between house prices, monetary variables and the macroeconomic. [Eadil \(2009\)](#) analyzed the hypothesis of housing price bubble in the Czech economy. The analysis revealed a possibility of speculative demand and housing price bubble on the Czech housing market. [Hlavacek and Komarek \(2009\)](#) discussed housing price bubbles and their determinants in the Czech Republic and its regions. The results identified overvalued property prices in 2002-2003 and partly also in 2007-2008. But, the size of the housing price overvaluation in 2007-2008 was relatively low. [Holt \(2009\)](#) investigated the primary causes of the housing bubble and the resulting credit crisis in U.S. This study concluded that the combination of four primary factors included low mortgage interest rates, low short-term interest rates, relaxed standards for mortgage loans, and irrational exuberance caused the housing bubble to be more extreme and the resulting credit crisis to be more severe.

Recently, [Moradi \(2009\)](#) studied the price bubble in the housing market of some provinces of Iran included Kurdistan, Kermanshah and Ilam and beside this point of view, also purposed to study the relationship of housing price with GDP, stock quotes, prices of gold, paid bank facilities and housing inflation rate during 1997 -2007. The results indicated that housing prices had a positive relationship with payment facilities by Housing Bank and inflation and with gold prices has a negative relationship. [Gholizadeh and Kamyab \(2010\)](#) studied the different responses of monetary policy to bubble in housing prices. They using ARDL model with quarterly data concluded that monetary authority should tighten when house price bubble are inflating and should ease when house price bubble collapse. [Nazari and Farzanegan \(2011\)](#) investigated the relationship between monetary policy and housing price bubble in Tehran. The results indicated that real interest rates had negative effect and the lag of housing real return and GDP have positive effect on housing real return during 2001-2008. [Biabani and Khosravi \(2012\)](#) studied the existence of housing price bubble in during the period of 1992-2009. The findings showed that all inflation, real rent, number of households and housing stock are the determining elements of the fundamental value of house price in Tehran. [Fattahi et al. \(2012\)](#) analyzed the determinants of housing price in Iran using quintile regression during 1991-2009. The results of this study indicated that there is a negative relationship between real interest rate and housing price while the variables real exchange rate, per capita income and gold price have the positive impacts on housing price. [Morovat and Bahrami \(2013\)](#) using a simple model of a speculative housing demand indicated that the weight of agents by extrapolative demand (chartists) is more than 90% during last two decades. [Fallah Shams et al. \(2013\)](#) showed that the bubble in Iranian housing market is a short term subject and in the

long term it is a fundamental component of housing price during 1996-2010. Komijani *et al.* (2014) investigated the effect of monetary factors on the housing market bubble indicated a significant relationship between all independent variables and the dependent variable during 1990-2011. Chandler and Disney (2014) argued the evidence for and against the existence of a house price bubble in the UK is inconclusive.

4. THE RESEARCH MODEL

In general, the factors affecting the housing market, like other markets, can be classified into two groups, demand side and supply side factors. In determining the cost of housing, the housing supply is considered constant, i.e. inelastic housing supply is considered. Therefore, the demand side of housing has an important role in determining the price of housing (Rafiei, 2003). Housing market demand-side factors can be divided into two categories, real housing demand (demand caused by household demand) and capital demand of housing (housing demand to preserve its value) (Jafari Samimi *et al.*, 2007). Therefore, the housing demand function is needed to evaluate the price bubble in the housing market. This function depends on economic and non-fundamental variable that the latest can be considered as error term. Accordingly, the error term can be used as bubble size or non-fundamental price (Levin and Wright, 1997). This demand function can be considered as follows:

$$RHP_{it} = f(\ln(GDP_{it}), INF_{it}) \quad (1)$$

Where, $i = 1, 2, \dots, 11$ indicates the metropolises as the cross-sectional units and $t = 1, 2, \dots, T$ denotes intended period (2000-2006). RHP is the real price of i^{th} cross-sectional unit in year t . $\ln(GDP_{it})$ is logarithm of Gross Domestic Production of i^{th} cross-sectional unit in year t and INF_{it} indicates inflation rate of i^{th} cross-sectional unit in year t . therefore, the following model can be presented for housing demand as bellow:

$$RHP_{it} = \alpha + \beta_1 \ln(GDP_{it}) + \beta_2 INF_{it} + u_{it} \quad (2)$$

Where, u_{it} is residual term for i^{th} cross-sectional unit in year t . The equation (2) can be rewriting as following formula:

$$P_{it} = P_{it}^* + u_{it} \quad (3)$$

Where, p_{it} is price of housing in i^{th} cross-sectional unit in year t , p_{it}^* denotes the fundamental price of housing in i^{th} cross-sectional unit in year t and u_{it} is non-fundamental price of housing in i^{th} cross-sectional unit in year t . Accordingly, the panel data technique is used to estimate presented model which combines time series data with cross-sectional data.

4.1. F-Limer's Approach

The F-Limer test can be used for select the panel or pooling data. This method is down by compare the sum of squares of each panel or pooling data. By using restricted residual sum of squares (RRSS) obtained from estimation of OLS and unrestricted residual sum of squares (URSS) obtained from inter-group regression, the F- statistic can be written as bellow:

$$F_{N-1, NT-N-K}^* = \frac{RRSS-URSS/N-1}{URSS/NT-N-K} \quad (4)$$

Where, RRSS and URSS denote restricted residual sum of squares and unrestricted residual sum of squares respectively. K is the number of explanatory variables and N indicates the number of cross sections. In F-test, assumption H_0 means being identical the intercepts (pooling method) and against assumption H_1 means being no identical the intercepts (panel data method). Therefore, if assumption H_0 would be rejected, the panel data method is accepted (Sameti and AlBooSoveilem, 2009)

4.2. Hausman Test

Hausman test is based on this assumption $H_0 = \text{Cov}(\mu_i, X_{it}) = 0$. In fixed effect method or inner group estimation under assumption H_0 , model is compatible, but no efficient, while under opposite assumption, the model is only compatible. And about the random effect method, the model under assumption H_1 is compatible and efficient, but under opposite assumption is incompatible. Hence, under assumption H_0 , two estimations mustn't have regular difference, now we can test the hypothesis based on this difference as:

$$\text{Var}(\beta - \hat{\beta}) = \text{Var}(\beta) + \text{Var}(\hat{\beta}) - \text{Cov}(\beta, \hat{\beta}) - \text{Cov}(\beta, \hat{\beta}) \quad (5)$$

The essential result of Hausman test is the covariance of efficient estimator with difference of efficient and inefficient estimator is zero.

$$\text{Cov}((b - \hat{\beta})', \hat{\beta}) = \text{Cov}(b - \hat{\beta}) - \text{Var}(\hat{\beta}) \quad (6)$$

$$\text{Cov}(b - \hat{\beta})' = \text{Var}(\hat{\beta}) \quad (7)$$

By replacing the equation (7) in equation (5), the required matrix of for Hausman test is gotten:

$$\text{Var}(b, \hat{\beta}) = \text{Var}(b) - \text{Var}(\hat{\beta}) = \Sigma \quad (8)$$

In this equation, b is a matrix of estimated coefficients by fixed effect method and $\hat{\beta}$ is a matrix of estimated coefficients by random effect method.

$$W = \chi^2(k) = (b - \hat{\beta})' \hat{\Sigma}^{-1} (b - \hat{\beta}) \quad (9)$$

Σ is gotten from covariance matrix of estimated coefficients by fixed effects method and covariance matrix of estimated coefficients by random effects. W has distribution χ^2 with freedom degree laterally. If W would be bigger than χ^2 in table, the fixed effect method is accepted (Sameti and AlBooSoveilem, 2009)

5. RESULTS

In order to investigate the existence of housing price bubble in 11 metropolises of Iran during 2000-2006, the required data has been received from the Central Bank and the Maskan Bank of Iran. The analysis of achieved data has been performed base on panel data method using Eviews software.

The Levin and Wright (1997) approach is used to determine the existing of housing price bubble. Accordingly, the equation (2) has been used that indicate the housing price depends on GDP and inflation rate. At first, Subject to F-limer statistic that was evaluated 33.06 at the significant level 0.05, the panel data method was accepted.

Since the panel data method was accepted, the Housman test was used to order to select random or fixed effects method. According to the evaluated Housman statistic that was equal to 272.5 with freedom degree 5, at a significance level of 5%, the null hypothesis is rejected and random effects method was accepted. The results of F-Limer and Huasman Test are presented in table 1.

Table-1. F-Limer and Huasman Test

| Test | Estimated Value | Prob. | Result |
|----------|-----------------|--------|----------------|
| F- limer | 33.06 | 0.0000 | Panel Data |
| Housman | 272.5 | 0.0000 | Random Effects |

Source: authors' findings

After estimating the housing demand function, the residual terms are used as non-fundamental price or housing price bubble. Housing demand model is estimated as follow:

$$\text{RHP} = -164.3 + 13.58 \ln(\text{GDP}) + 0.59 \text{INF} \quad (10)$$

The results of estimation are presented in table 2.

Table-2. Estimation the model by panel data

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|--------|
| intercept | -164.2610 | 20.46038 | -8.028246 | 0.0000 |
| GNP | 13.58576 | 1.087301 | 12.49494 | 0.0000 |
| INF | 0.590250 | 0.446478 | 1.322014 | 0.1902 |

Source: authors' findings

According to the theoretical principles, it is expressed that the effect of GDP and inflation on housing price is positive. As can be seen in table (2) the results of estimation are in line with the literature. There is a significant and positive relationship between national income and housing price at the 5% significance level.

This means that a unit change in the GDP changes the housing prices by 13.58 units. Also, the inflation variable affects the housing price positively.

As mentioned before, the error term of estimated model can be used to analyze the housing price bubble as the non-fundamental price as bellow:

$$P_{it} = P_{it}^* + u_{it} \quad (11)$$

That P_{it} and P_{it}^* denote the real and fundamental price of housing respectively. Also, u_{it} indicates the non-fundamental price or housing price bubble. After estimating the model for 11 metropolitans and evaluating the error terms as the price bubbles, the trends of price bubbles changes for metropolitans investigated during the 2000-2006.

The Changes of residuals in all of counties indicates that the price bubble has increased drastically and bubble growth in most of them has continued until 2003-2004.

The trends of price bubble have continued to increase in some counties such as Isfahan, Rasht, Oromieh and Mashhad, but in other provinces during the period have fluctuated so that at first decreased and then increased. However, the price bubble declined only in Tehran province.

6. CONCLUSION

According to the results of estimations in this study, the housing price bubble exists in metropolises of Iran as whole. Only, the fluctuation of the housing price bubble in Tehran is descending and in other metropolises this trend is increasing during 2000-2006. Also, GDP has a positive and significant impact on house prices at a significance level of 5%, i.e. with a unit increase in GDP, 3 units of housing prices has increased during the studied period in the housing market of intended metropolises.

According to current theories, as mentioned before, the results are somewhat consistent with the second view, so that if the second opinion about the housing market is adapted for these provinces, the phenomenon of empty houses should be considered as well. This means that owners of these houses hope the increase in prices and consequently increase the rate of return on their investment. Therefore, despite having market demand, they don't sell their houses.

Accordingly, in these conditions, housing can be considered as capital or speculative goods. By considering the housing situation in the past 40 years, it is evident that the construction and housing sector has experienced the boom and recession periods due to lack of proper mechanisms to control the housing price market so that with entrance of speculative demand to the market and then boom and recession periods, the exit of investment from housing market has resulted consequently.

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