Housing Speculation and Housing Price Bubble in Korea

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Abstract

One of the major social and economic problems in Korea in recent years has been and is the sustained housing price spiral, especially since 2000. In Seoul, the ratio of housing price to household annual income is about 10 times. This is three or four times higher than the corresponding ratios in advanced countries. To make the matter worse, the housing price continues to rise rapidly; in large cities including Seoul; it has been increasing by more twenty per cent per year lately. The excessively high housing price means worsening housing affordability, higher wage rate and worker's weakening desire to work. It is a common belief in Korea that the chief reason for such a high housing price is speculation and the government has applied a series of anti-speculative measures including major increase in capital gains tax and property tax. However, these measures have not produced the expected results. Another controversial issue has been the presence of bubbles in housing price and its impact on the economy. It goes without saying that the bubble is caused by speculative activities.

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This paper is designed on one hand to evaluate the contribution of speculative activities to housing price hike and, on the other to verify the presence of bubble in housing price. In order to quantify the impact of speculation on housing price, a simple devise is applied; the value of the explained variation of housing price resulting from a regression analysis is decomposed into the percentage share of each independent variable including the variable for speculation. The presence of bubble is verified through three estimation methods: the long-run equilibrium price approach, the fundamental market value approach and the price-income ratio approach.

This study has produced a set of interesting findings. First, speculative demand has, in Gangnam District, one of the most speculative areas in Seoul, an impact on housing price as much as five times the normal housing demand. Second, there are indeed bubbles in housing price, but their magnitudes differ somewhat depending upon the estimation methods. Third, the fear that the bust of bubbles might lead to general economic collapse in Korea does not seem to be well founded; the problems of bubble in Korea appears to be much less serious than those of bubbles in Japan in the 80s and 90s. Fourth, the best way of fighting speculation is not the sudden increase in capital gains tax or any other drastic anti-speculative measures, but orderly and sustained increase in the supply of housing.

JEL: C22, R21, R31

Keywords: housing speculation, housing price hike, housing price bubble
Introduction

One of the grave social and economic problems in Korea in recent years has been the never-ending housing price spiral. Since 2000, housing price in Seoul, Daejeon and other large cities has increased by over twenty percent. The continuous increase in housing price means worsening affordability for a great number of households for decent housing, worker's demand for higher wage, loss of competitiveness of business and even the weakening desire to work. One of the methods of measuring the seriousness of housing price is the ratio of housing price to household's annual income (PIR). The PIR for the country as a whole is about six times, while it is about ten times in Seoul as against about three or four times in advanced countries. Under these circumstances, it is quite normal to be very much concerned about the reasons for the housing price hike. A great number of people including academics, civil servants, politicians and people on the street believe that the fundamental reason for the price hike is housing speculation. The government has, therefore, applied a long series of anti-speculation measures consisting of the prohibition of the sales of housing pre-sale contract, upward adjustment of property tax, and especially drastic increase in capital gains tax. Unfortunately, these measures have not resulted in expected housing price stability partly because of wrong timing and partly because of low price elasticity of housing demand. Housing demand price elasticity being low, a good part of the increase in the capital tax has led to further rise in housing price

This study has two objectives. The first objective is to verify if housing speculation is in fact a reason for the housing price crisis and, if so, by how much. To estimate the relative importance of speculation in the determination of housing price, we have devised a simple method of decomposing the explained value of the dependent variable. This method shows the percentage contribution of each independent variable to the determination of the dependent variable. The other objective is to verify the existence of "bubble" in the housing price caused
by housing speculation. The question of the presence of bubble has provoked much controversy in Korea, for in case of its bust the economy may result in a serious economic slowdown as it happened in Japan in the 90s. This paper has three sections. In the first section, the role of housing speculation in the determination of housing price is estimated through an ordinary regression analysis, while in the second, the percentage share of bubble in housing price is estimated through three different methods. The conclusion and policy implications of the findings are summarized in the third section.

1. Speculation and Housing Price

1.1 Literature Survey

Generally there exist three approaches that have been extensively used to define and determine real estate prices: hedonic price approach, real estate forecasting modeling approach and traditional regression analysis approach. Hedonic price model has been widely used as it measures the importance of the value that the market places on the individual attributes of a housing unit. It views housing as a heterogeneous bundle of attributes that actually make up the services of a housing unit. The model can be easily specified; the hedonic price function is estimated by regressing either rent or housing price as dependent variable on the characteristics of a housing unit as independent variables. The partial derivatives of these functions with respect to a characteristic are the hedonic prices. They are used in many ways; developing an index to compare the cost of housing in different cities, real estate assessment, and consumer demand.

There have been many hedonic regression studies done in Korea from as early as 1979 (Lim Gill et al) and 1981 (Kim J). The early works primarily focused on estimating the demand parameters, the price elasticity in particular, using hedonic price index. More recently an extensive hedonic studies were
performed by Chung and Kang (2001). This study defines a housing unit as a bundle of three sets of characteristics, including housing characteristics, spatial characteristics and environmental characteristics. The first one comprises the size, story, construction year; the second comprises quality of education, distance to the urban center, access to subway stations, and residential location. The third represents the view only.

The models seem to behave properly; they are well fit as their coefficients of determination are 0.91 for 1994 model, 0.90 for 1998 model and 0.93 for 2001 model. But some variables turned out to be statistically insignificant as their t-values were relatively low, including access to subway station in both 1994 and 2001 models and housing view in 1998 model. The rest of variables were statistically significant.

From the study results one can make a few conclusions. First of all the factors that influence the housing price most are residential location, distance to the city center and number of stories. Secondly, the quality of education is certainly significant, but not so much in monetary terms. For example, the quality of education was worth only 5.52 million won while the size, residential location and access to subway station were worth 30.33 million won, 152.2 million won and 17.42 million won, respectively. Consequently the argument that good quality of education is the key factor for rapid rise in home price in Gangnam area is not very convincing. In other words, the importance of education seems to be exaggerated as a primary cause for the price hike.

The second approach is that of forecasting model. A number of attempts have been made to forecast real estate prices in recent years. They use time series analysis, more specifically either VAR model or traditional ARIMA model, which basically assumes that the future variation in real estate price depends largely on the past price behavior in the market. Accordingly the dependent variable in ARIMA models is the current real estate price and the explanatory variables are the past prices.

The advantage of using ARIMA model is that it is more likely to correctly
predict the short-term future price, but the disadvantage is that one can not add any independent variables other than the dependent variable's lagged values. Thus, the model has only limited uses in analyzing real estate market behavior and policy. Vector Auto-Regression (VAR) model has emerged as a good substitute to avoid this problem. The model has been widely appraised as it combines ARIMA with traditional structural equation model. But it also has some defects because it assumes that all the variables are endogenous and each of them varies not only with its own time lag, but those of other variables. Accordingly, the more time-lag variables one may have, the more likely one may lose the degree of freedom. This may cause some difficulty when one tests the model's reliability.

Equally important is the model's assumption that all the variables should be stationary, which must be met to guarantee correct forecasting. It takes differencing procedure when a certain variable is found to be non-stationary through unit root test. In doing so one loses some valuable information from the level data. The other disadvantage of VAR model when one uses it for real estate market analysis is that it can't take so many variables all at once. Thus it seems to be inadequate tool for analyzing real estate market behavior and particularly, the effects of real estate policy on the market.

There are many time series analyses undertaken for Korean housing market. For example, ARIMA model was developed for a short term forecasting of housing price and also a number of VAR models have been tested for the purpose of real estate market forecasting since early 1990's. (Suh S.H, 1993; Kang W.C and Kim B.S, 1997; and Kim K.S and Suh S.H 1999). They studied the structural relationship between real estate price and macroeconomic variables such as consumer price, economic growth and business cycle by constructing VAR model. Son J.S and Kim K.Y.,(1998.1) and Kim Y.C.(1996) analyzed the real estate price changes and found that the land price inversely varied with the yield rate of corporate bond. The lower the bond rate, the more funds tend to be invested into real estate (land) market. Also the variables that influence the
land price most are the first differencing lag variables of own price, land transaction, and GDP. Land price is more likely to rise when there is high rate of economic growth and also relatively high frequency of land transaction.

Finally there are a large number of literatures on housing price determinants through using the traditional regression analyses. They normally have two objectives in mind. The first is to test some hypothesis regarding housing market behavior or decision making behavior of individual agent. For example, demand model is constructed to test the hypothesis that the price elasticity of housing demand is 1.0. In this simple case a regression model with one equation or a limited number of simultaneous equations would suffice. The other objective is to identify the real estate price determinants through estimating relevant parameters and to use them for policy impact analysis and also for real estate price/and demand forecasting. But clearly the power of forecasting is relatively weak when one uses a simple regression model for such a purpose, unless time series elements are incorporated into the modeling structure.

The size of model varies from one extreme to another. It could be a single equation model or a large number of simultaneous equations, depending on the study purpose. For example, Chung J (1976) constructed 30 simultaneous equation model when he studied Canadian housing and mortgage market, He analyzed equilibrium price and housing rent behavior through estimating the model. He also worked on a time series model to analyze housing price determinants as well as short and long-term factors that might affect housing construction cycle in Korea. (1984.12)

Another study by Kim K.S et al (2003) analyzed a set of determinants which explain spatial differences in housing price. They used traditional regression model. In the study, the housing price in time t is hypothesized to be a logarithmic function of chonsei price, total money flow, and rate of change in lagged price. The model turned out to be as predicted; housing price increases with chonsei price, increase in money flow. An interesting point is that the lagged price of housing is considered as reflecting the expected capital gain. In
other words the variable represents speculative motivation. Note that this variable has the largest t-value among the explanatory variables, implying that people still purchase homes for speculative purpose in mind.

The other point to note from the study result is the direction of the stock price index. It has an inverse relationship with housing price; investment funds move from housing to stock market when stock price rises, resulting in a decrease in housing demand and price.

1.2 Model for Housing Speculation

This study also opts for a traditional regression model for a few reasons. One is the possible loss of valuable information by using such traditional time series analysis as ARIMA and VAR models. As pointed out above the time series model assumes stationarity condition, and to satisfy such a condition one has to go through differencing procedure. In this process one loses a lot of information. Secondly, one can't incorporate into ARIMA and VAR models a large number of market and policy variables which may better explain changes in real estate prices.

The model for this study is based on both theories of excess demand and cost push in real estate market. Figure 1. below illustrates the points. Suppose that \( P_1 \) is the price of real estate in time \( t \) and at this price level the quantity demanded for real estate is \( OH_2 \) and the quantity supplied is only \( OH_1 \). Thus, the excess demand is represented as \( OH_2-OH_1 = H_1H_2 \). If the market normally behaves, the price will continuously rise until it reaches an equilibrium price of \( P_2 \) in time \( t + 1 \). Suppose also that the real estate cost increases due to an increase in land price (land as an input for real estate commodity). This will push the supply curve upward from \( S_1 \) to \( S_2 \) and end up with a new equilibrium price of \( P_3 \). Consequently the real estate price moves from \( P_1 \) to \( P_3 \) and the difference between \( P_2 \) and \( P_1 \) results from excess demand and that between \( P_3 \) and \( P_2 \), from cost push. Thus, housing price hike is assumed to be caused by
both factors of demand pull and cost push simultaneously.

\[ P_t = a_0 + a_1 I_t + a_3 P_{t-1} - a_4 i_t - a_5 H_{t-1} + a_6 C_t \quad \cdots \cdots (1) \]

Where

- \( P_t \): housing price in time \( t \)
- \( I_t \): household income in time \( t \)
- \( P_{t-1} \): expected yield rate of housing investment
- \( i \): yield rate of alternative investment
- \( H_{t-1} \): housing stock at \( t-1 \)
- \( C \): housing cost (land cost, construction cost, etc.)

It is assumed that, in the model, housing demand has two components: "normal" demand and "speculative" demand. Normal demand is assumed to depend on income and bond yield. As income increases and bond yield falls, the normal consumer would allocate increased income and the proceeds of the sales of bond to buy the house to live in. The normal consumer is a risk averter and would buy the house on the basis of such determinants as income increase and
bond yield. On the other hand, the speculative consumer is assumed to be a risk taker and make up his or her decision to buy the house on the basis of such high risk determinant as unknown increase in housing price.

This model is estimated through OLS method and applied to four different spatial units: Korea, Kyunggi province, Seoul and Gangnam district. It is expected that the importance of speculation decreases as one moves from Korea to Gangnam district. As pointed above, Gangnam is known to be experiencing the most active real estate speculation.

1.3 The Data and Estimation Results

The Data used are the comprehensive index of housing price estimated by Kookmin Bank (formerly Korea Housing Bank) covering the period, 1987 1/4 - 2003 2/4. Table 1 presents the estimates of the regression analysis where housing price variation is regressed on a number of independent variables, presumably influencing the price one way or the other. They include per capita GDP as a proxy for income, yield of 3-year maturity corporate bond yield, land price representing construction cost, expected rate of return on housing investment, represented by lagged price variable and housing construction permit representing housing stock. Quarterly data were used for the analysis. Also included in this model were two dummy variables, one for the third quarter of 1990 and, the other, the first quarter of 2002. The dummies were used to observe any changes in price by the effects of the announcement on anti-speculation measures. All the independent variables are lagged. The number of lags are selected empirically. The first dummy variable (1990 3/4=1.0) reflects the impact of "the conception of public land" that included the upper ceiling on land ownership, tax on non-realized capital gains and development tax. The second dummy (2002 1/4=1.0) represents the government anti-speculation

3) The comprehensive index refers to all types of dwellings including apartments, raw houses, single-family dwellings, etc.
The regression analysis appears quite reliable. The adjusted coefficient of determination exceeds 90% for all areas studied. The traditional Durbin-Watson test is not applicable here, for one of the independent variables is lagged dependent variable. Further examination for auto-correlation is needed. The variation in GDP has relatively low t-value, although it shows expected positive sign. It is significant at 10% probability level for Korea and Gangnam. For Kyunggi province and Seoul, it is significant at 20% probability level. This may suggest that GDP is not a good proxy variable for household income or the

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<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Korea</th>
<th>Kyunggi</th>
<th>Seoul</th>
<th>Gangnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.4364</td>
<td>-0.4245</td>
<td>-0.3855</td>
<td>-0.4804</td>
</tr>
<tr>
<td></td>
<td>(-1.070)</td>
<td>(-1.3198)</td>
<td>(-1.432)</td>
<td>(-1.498)</td>
</tr>
<tr>
<td>GDP (t-1)</td>
<td>0.0751</td>
<td>0.0712</td>
<td>0.0624</td>
<td>0.0847</td>
</tr>
<tr>
<td></td>
<td>(1.529)*</td>
<td>(1.2528)</td>
<td>(1.2664)</td>
<td>(1.4760)*</td>
</tr>
<tr>
<td>Rate of Yield of 3-year Industrial Bond (t-1)</td>
<td>-0.0311</td>
<td>-0.0251</td>
<td>-0.0367</td>
<td>0.0357</td>
</tr>
<tr>
<td></td>
<td>(-1.8343)**</td>
<td>(-1.1702)</td>
<td>(-2.0159)**</td>
<td>(-1.6235)**</td>
</tr>
<tr>
<td>Land Price (t-1)</td>
<td>0.1272</td>
<td>0.1633</td>
<td>0.1689</td>
<td>0.1949</td>
</tr>
<tr>
<td></td>
<td>(2.4604)***</td>
<td>(2.4636)***</td>
<td>(3.0156)***</td>
<td>(2.9216)***</td>
</tr>
<tr>
<td>Expected Housing Price (t-1)</td>
<td>0.9033</td>
<td>0.9318</td>
<td>0.9324</td>
<td>0.9196</td>
</tr>
<tr>
<td></td>
<td>(21.1467)***</td>
<td>(20.5817)***</td>
<td>(22.6109)***</td>
<td>(22.3515)***</td>
</tr>
<tr>
<td>Housing Building Permit (t-1)</td>
<td>-0.0126</td>
<td>-0.0136</td>
<td>-0.0136</td>
<td>0.0183</td>
</tr>
<tr>
<td></td>
<td>(-2.2216)***</td>
<td>(-1.9971)**</td>
<td>(-2.3378)***</td>
<td>(-2.6000)***</td>
</tr>
<tr>
<td>D 90.3/4</td>
<td>0.9303</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1.6050)*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D 02.1/4</td>
<td>1.2217</td>
<td>1.6540</td>
<td>1.4598</td>
<td>1.9482</td>
</tr>
<tr>
<td></td>
<td>(2.1901)***</td>
<td>(2.3264)***</td>
<td>(2.4316)***</td>
<td>(2.6913)***</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.926</td>
<td>0.903</td>
<td>0.923</td>
<td>0.921</td>
</tr>
<tr>
<td>F</td>
<td>100.27</td>
<td>86.058</td>
<td>111.355</td>
<td>108.182</td>
</tr>
</tbody>
</table>

Note: * - significant at 10% probability
      ** - significant at 5% probability
      *** - significant at 1% probability
      (    ) : t-value
The impact of normal demand on price is rather weak. The bond yield variable shows expected minus sign and is significant for all the areas under study with the exception of Kyunggi province. The combined performance of GDP and bond yield seems to indicate that what determines housing price hike in Korea is not "normal" demand but "speculative" demand. In fact, expected price variable representing "speculative" demand shows an expected sign and has the highest t-value. The housing permit variable representing housing supply shows, as expected, a minus sign and is highly significant. Thus, given housing demand, housing price variation is inversely related to housing supply. Finally, land cost shows an expected sign and very significant suggesting that it also exerts a strong impact on housing price inflation. The first dummy variable representing the anti-speculation measures adopted early 1990 is significant at 10% probability level, while the second dummy variable reflecting these (e.g.: designation of speculative zone) adopted early 2002 is very significant at 1% probability level. Both variables show a plus sign implying that they failed. If the measures were successful, they should show a negative sign. The performance of the dummy variables seems to indicate that the anti-speculation measures are either ineffective or time consuming to take place.

1.4 Decomposition of Estimated Dependence Variable

The share of an independent variable in influencing dependent variable within a certain period of time can be measured with the formula below.

\[
W_i = \frac{\sum_{t=1}^{T} b_i X_{it}}{\sum_{t=1}^{T} Y_t} \cdots \cdots (2)
\]

Where \( W_i \): share of \( X_i \) in the value of estimated \( Y \) at time \( t \)

\( b_i \): regression coefficient of \( X_i \) a variable influencing housing price inflation
\[ X_i : X_i \text{ at time } t, \]
\[ t : 1, 2, \ldots, T \]
\[ \hat{Y}_t : \text{estimated value of the housing price at time } t \]

This method of estimating the impact of independent variables has the advantage, compared to elasticities, \( \beta \) coefficients and other measures, of making allowance for the variation of independent variables themselves and showing different impacts on the dependent variables in different time periods.

The results of the analysis are shown in Table 2. During the period of 71 quarters between the first quarter of 1987 and the second quarter of 2003, the percentage share of the per capita GDP and bond yield representing "normal" demand for Korea, as a whole, is 86%, as against 35% for Kyunggi; 34% for Seoul and 24% for Gangnam district.

[Table 2] Degree of Contribution to Housing Price Inflation(%)  

<table>
<thead>
<tr>
<th></th>
<th>Korea</th>
<th>Kyunggi</th>
<th>Seoul</th>
<th>Gangnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total Estimated Housing Price Variation</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2. Contribution of Each Independent Variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>55</td>
<td>24</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Bond Yield</td>
<td>31</td>
<td>11</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Expected Housing Price</td>
<td>107</td>
<td>92</td>
<td>97</td>
<td>94</td>
</tr>
<tr>
<td>Land Price</td>
<td>42</td>
<td>25</td>
<td>23</td>
<td>16</td>
</tr>
<tr>
<td>Home Building Permit</td>
<td>-38</td>
<td>-19</td>
<td>-17</td>
<td>-14</td>
</tr>
<tr>
<td>3. Ratio of Speculative Demand to Normal Demand</td>
<td>1.24</td>
<td>2.62</td>
<td>2.85</td>
<td>3.91</td>
</tr>
</tbody>
</table>

Note: The sum of the independent variables' weights cannot be 100 because of the constant.

On the other hand, the rate of increase in home building permit contributes to price stabilization by 38%(Korea), 19%(Kyunggi), 17%(Seoul) and
14% (Gangnam). Land cost also contributes significantly to housing price hike accounting for between 16% to 42%. Interestingly, the percentage share of speculative demand in housing price spiral is very high. The share of expected housing price which represents speculative demand is much more powerful: 107% for Korea, as a whole, 92% for Kyunggi, 97% for Seoul and 94% for Gangnam area. In order to investigate more precisely the relative weight of speculative demand variable, the share of the speculative demand is divided by that of "normal" demand. The ratio of speculative demand (expected housing price) to normal demand (GDP and bone yield) for Korea is 1.24, but it jumps to 2.6 times for Kyunggi province, 2.85 times for Seoul and 3.91 times for Gangnam area.

1.5 Determinants of Housing Speculation

What are the causes of the housing speculation? There seem to be many reasons why speculation has occurred particularly over the last two years. There are five generally accepted scenarios: low rate of interest on savings; expansion of money supply (or increase in liquidity); availability of home mortgage loan funds; rising demand for housing and demand-supply mismatch; and government measures to revitalize the economy. These factors combined would have drastically increased the expectation for large windfall capital gains from housing investment.

The interest rate on short-term bank deposit fell from 13.3% in 1998 to 4.7% in 2002, and ever since it has gradually dropped down to 3.9% in August 2003. A fall in interest rate has directly affected the real estate market in many ways. It resulted in the reduction of the chonsei\(^4\) value from the standpoint of the landlord, who would then switch to monthly rental, and this would have caused the number of chonsei apartment stock to substantially decrease. And the

\(^4\) Chonsei rent is a lump-sum payment paid by the tenant which is returned without interest to the tenant at the end of the lease. Chonsei is at times 70% of the housing prices.
subsequent effect was the rise in chonsei price and more renters would have purchased homes rather than paying high chonsei rent. In fact, the ratio of chonsei over the purchase price rose from 60% in January 2000 to 68% in January 2002. They would have otherwise been renters, had the chonsei price not gone up so high. The whole cycle that started with low rate of interest would eventually be ended up with rise in home purchase demand. Increase in housing demand would obviously push the housing price up.

Secondly, the fall in interest rate would reduce the financial burden of interest payment on the part of the consumers, which would have led to the increase in the demand for home mortgages. More households would have purchased homes through mortgage financing, which would also have pushed the demand for housing and eventually raise the price of housing. In general a fall in interest rate tends to make investors prefer real estate to financial asset because the former yields relatively higher rate of return than the latter. And also theoretically if interest falls, the present value of the future income streams increases. Asset value is computed simply by dividing future income by interest rate. Therefore, if interest rate falls, the real estate value goes up, other things being equal, and again it stimulates speculative housing demand and pushes housing price up.

A substantial increase in money supply is another important factor that would have significantly contributed to housing price spiral. Too much money has been supplied since the financial crisis of 1997-1998 in part to stimulate the depressed economy. Ever since 1999 the rate of increase in M3 has exceeded that of GDP. The international trade surplus has also contributed to the excess supply of liquidity. It amounted to 41.4 billion dollars in 1998 and 44.9 billion dollars in 1999.

Another factor that might have caused the housing price inflation is a record rise in both home mortgage and personal lending. Personal borrowing became easy due to low rate of interest and availability of funds to go around. Financial institutions carried a sufficiently large amount of liquid funds for
lending, but private firms hesitated to borrow money for facility expansion and addition because of uncertainty about the economy. Therefore a huge amount of money have remained "dormant." Meanwhile they concentrated on home mortgage loans as they were considered profitable and relatively risk-free because they were securitized with high priced real estate asset. Besides those who borrowed money were upper-middle class households and credit worthy. Accordingly a large amount of liquid money has flown into the housing market, especially the Gangnam submarket where the housing price was expected to continuously rise. The amount of home mortgage loans outstanding held by the financial institutions almost doubled within a year from 38.2 trillion won in 2000 to 63.5 trillion won in 2001. And the figure reached over 125 trillion won in 2002. Clearly credit availability helped increase housing demand and thus, raise the housing price as much.

Finally the government's expansion policy after the financial crisis targeted the housing sector as one that could promote national income and employment, because the multiplier effect of housing investment was estimated to be as high as 1.9. The government relaxed, liberalized or even repealed various measures being largely geared to preventing speculative home purchases and land dealings including repeal of new apartment sale price control system, ease of the regulation on mandatory percentage ratio of supplying small sized apartment units (for example, from 70% down to 40%), permission of transfer of the apartment pre-sale contract and also relaxation of land use regulations within the green belt area that surrounded large metropolitan areas. Furthermore, various financial and tax incentives were provided for both ordinary investors and developers alike to invest money into housing and land developments. In particular home buyers were given incentives to borrow money for home purchase at subsidized interest rate and also to write off interest payments from income taxes. These highly stimulative policy packages have clearly resulted in housing price inflation.
2. Housing Price Bubble

Real estate price bubble raised some heated discussion among the academics in the 90's when Japanese economy experienced "bubble to bust" which led the country to financial crisis afterwards. Many scholars and mass communication claimed that the recent housing price escalation taking place in Gangnam area would be a symptom of a price bubble, and warned that if unchecked it would eventually lead to bust and to a serious asset deflation as observed in Japan and Thailand.

This study is intended to explore and further elaborate on a few propositions with regard to the subject of real estate price bubble. What is bubble? And if it does exist, how serious is it? Is it serious enough to go bust in a foreseeable future? Are there any policy measures that can prevent the price bubble, or the bust of bubble if bubble really exists? These are some of the questions that this study addresses itself to.

Generally price bubble is defined to be the substantial difference between actual price and theoretical or normal price. No matter how one may define it, bubble is abnormal and irregular price as pointed out by Frankel and Rose (1996). But the question then is; what is the normal price level? Theoretically normal price is the one that is determined under the normal market conditions; in other words as Garber(1988) there would be no bubble, where the housing market normally behaves.

2.1 Estimation Models for Speculation

There are several ways of estimating bubbles. However, the followings are the most often used models applied to real estate price;

- Long-run equilibrium price approach
- Fundamental market value approach
- Price-income ratio approach

**Long-run Equilibrium Price Approach**

Several studies (Samsung Research Institute, 2003. 5; Korea Deposit Insurance Corp. 2002; Kim, Kyung Hwan, 2003) assume that variation in such macroeconomic variables as GDP and consumer price index reflect a long-run equilibrium housing price. This approach can be summarized;

\[
B_t = \Delta P_t - \Delta GDP_t \quad \cdots \cdots (3)
\]

and \( B_t(\%) = \frac{B_t}{\Delta P_t} =\) % share of \( B_t \)

Where \( B_t \): the amount of bubble
\( \Delta P_t \): the rate of change in actual price
\( \Delta GDP_t \): the rate of change in GDP

**The Fundamental Market Value Approach**

This approach is based on the assumption that deviation from the fundamental market is "abnormal" and bubble. The fundamental market value is the present value of future stream of benefit (income on utility) coming from the dwelling. This approach can be summarized as follows:

Now \( B_t = P_t - \hat{P_t}/P_t \)

\[
\hat{P_t}/P_t = R/i
\]

\( \hat{P_t} \): fundamental market value
\( R \): income (or utility) stream of real estate
i : discount rate

Monthly rent (income) was estimated as follows: chonsei rent is converted into monthly rent by applying 0.9% of interest rate. The discount rate is 1/12 of the annual yield on 3-year corporate bond.

□ Price-Income Ratio (PIR)

Some studies (Flood, Carber, 1980, Samsung Research Institute, 2003) assume that the "normal" housing price should not exceed excessively the household annual income. To be more precise, the normal housing price should be the average PIR plus one standard deviation. If we assume normal distribution of PIR, the assumed probability range would cover 85% of the PIR sample. This approach can be summarized.

\[ B_t = P_t - \hat{P}_t \]

\[ \hat{P}_t = \text{average PIR} + \text{standard deviation of PIR} \]

Data used for the long-run equilibrium price approach are the comprehensive housing price indices compiled by Kookmin Bank, covering the period of the first quarter of 1997 through that of 2002, whereas those for the fundamental market value approach and the PIR approach are the actual housing prices comprising mainly apartment prices provided by Budongsan Bank covering the period of the first quarter of 1997 through that of 2003.

The estimates of bubble are summarized in Table 3, 4 and 5. Table 3 shows the share of bubble estimated according to the long-run equilibrium price approach. It is very high: 36% (Gangbuk), 61% (Seoul) and 71% (Gangnam). The bubble in Gangnam is twice that of Gangbuk. It is interesting to note that the housing price bubble reached the peak in the fourth quarter of 2001 to fall
substantially in the first quarter of 2002. These results appear much more pronounced than what one might have expected. The high level of bubble shown here is explained by the fact that it refers to the variation of the housing price not the absolute price level. Therefore, in order to estimate bubble's share in the housing price itself, one has to make downward adjustment of the bubble estimated by the long-run equilibrium price by applying the rate of price variation. Estimated shares of bubble in the price are shown in bracket. It seems that the bubble's share in the absolute level of housing price is very low varying between 2.6% and 5.4% even in Gangnam area. This unexpected findings may be explained by the fact that the data used covered the price of all dwellings. If one used data on price of apartments alone, one would have obtained larger share of the bubble.

[ Table 3 ] Estimate of Bubble in the Variation of Housing Price by the Long-run Equilibrium Approach

<table>
<thead>
<tr>
<th>Period</th>
<th>Seoul</th>
<th>Gangbuk*</th>
<th>Gangnam**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 3/4</td>
<td>0.56(0.017)</td>
<td>0.32(0.006)</td>
<td>0.66(0.026)</td>
</tr>
<tr>
<td>2001 3/4</td>
<td>0.75(0.033)</td>
<td>0.60(0.016)</td>
<td>0.81(0.047)</td>
</tr>
<tr>
<td>2002 1/4</td>
<td>0.61(0.027)</td>
<td>0.36(0.012)</td>
<td>0.71(0.054)</td>
</tr>
</tbody>
</table>

* - refers to Autonomous Districts of Seoul located in the northern side of Han river  
** - refers to Autonomous Districts of Seoul located in the southern side of Han river  
(   ) - refers to the bubble's share in the absolute level of housing price  
Period - 3/4 refers to September, 4/4 refers to December and 1/4 refers to March

The estimates of housing price bubble according to the fundamental market value are summarized in Table 4. In Gangnam-gu, the bubble's share in the price rose from 14% in the 3rd quarter of 2001, 16% in the 4th quarter of 2002 to as much as 23% in the 1st quarter of 2002. In Socho-gu, on the other hand, the bubble's share rose from 7% in the 3rd quarter of 2001, 9% in the
4th quarter of 2001 to 17% in the 1st quarter of 2002. Finally, in Songpa-gu, it rose from 17% in the 3rd quarter of 2001, 22% in the 4th quarter of 2001 to 29% in the 1st quarter of 2002.

[Table 4] Estimated of Bubble by Fundamental Market Value Approach

<table>
<thead>
<tr>
<th>Period</th>
<th>Gangnam-gu</th>
<th>Socho-gu</th>
<th>Songpa-gu</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 3/4</td>
<td>0.14</td>
<td>0.07</td>
<td>0.17</td>
</tr>
<tr>
<td>2001 4/4</td>
<td>0.16</td>
<td>0.09</td>
<td>0.22</td>
</tr>
<tr>
<td>2002 1/4</td>
<td>0.23</td>
<td>0.17</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Note: The three Autonomous Districts (Gu) are a part of Seoul located in the southern side of Han river. These districts are known to have, in recent years, experienced most serious housing speculation in Korea.

Finally, the estimates of the bubble by the price-income ratio approach are shown in Table 5. The average PIRs are 15.62% (Gangnam-gu), 15.39 (Socho-gu), 12.81 (Songpa-gu). The standard deviation of PIR are 2.04, 2.10 and 1.66 respectively for Gangnam-gu, Socho-gu and Songpa-gu. Hence, the critical PIR for the three gu's are 17.65, 17.50 and 14.48, respectively. According to the data examined, over the period, the 1st quarter of 1997 through that of 2003, the actual PIR exceeded the critical price only, as shown in the Table, in the 1st quarter of 1997 through that of 1998 and the 1st quarter of 2002. The resulting shares of the bubble in PIR for the 1st quarter of 2003 are 13% (Gangnam-gu), 9% (Socho-gu) and 15% (Songpa-gu).

[Table 5] Estimate of Bubble by the PIR Approach

<table>
<thead>
<tr>
<th>Period</th>
<th>Gangnam-gu</th>
<th>Socho-gu</th>
<th>Songpa-gu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997. 03</td>
<td>0.076</td>
<td>0.113</td>
<td>0.064</td>
</tr>
<tr>
<td>1998. 03</td>
<td>0.039</td>
<td>0.055</td>
<td>0.012</td>
</tr>
<tr>
<td>2002. 03</td>
<td>0.130</td>
<td>0.090</td>
<td>0.146</td>
</tr>
</tbody>
</table>
The findings related to housing price bubble may be now summarized. First, the magnitude of the bubble varies somewhat depending upon the estimate methods used. The fundamental market value approach appears to yield the largest magnitude of bubble, being followed by the PIR approach and the long-run equilibrium price approach. However, the last approach may be an underestimation of the bubble, because the data used covered all types of dwellings, whereas, in the other two approaches, actual prices of apartments were used. Second, the view that the housing bubble is more than 40% of the housing price and of alarming proportion appears to be a little exaggerated. Third, of the three most speculative Autonomous Districts in Seoul, it is Songpa-gu which has experienced the largest housing price bubble.

2.2. Impact of Bubble on National Economy

Real estate experts, reporters, politicians and even ordinary people are wondering about the possible impact of real estate bubble on the national economy and many are concerned about the possibility of repeating Japanese experiences. It appears that such worries are not well founded. It must be remembered that housing situations in the two countries were very different. For instance, the price bubble in Japan initially started with land and spread throughout the country, but the one that Korea went through recently was limited largely to housing in Gangnam area and Incheon and Daejun to a lesser extent. But similarities exist with respect to financial situation, i.e., the low interest rate and abundance of liquid money, and also the recovery policy that stimulated domestic consumption through extension of personal credit. In both countries the financial institutions "competitively" expanded personal loans, particularly mortgage loans. But it should be noted that the loan to value ratio (LTV) in Japan was as high as 120% on average while that in Korea was only 20 to 40% at the maximum, implying that the Korean financial institutions would be significantly less venerable than the Japanese counterparts even if asset
deflation may occur.

What impacts such a price bubble might have on national economy? As emphasized, bubble means abnormal or irregular increase in real estate price. Bubble has a long history in capitalistic countries and it has affected national economy either in positive or negative way. For instance, the history saw to it that the railroad and canal bubbles in Great Britain during the industrial revolution contributed to the expansion of major transport infrastructure facilities (Kindleberger, 1978). More recently the price bubble arising from the memory system of computer in the U.S. is known to have revolutionized the computer industry.

Nonetheless, the real estate bubble, particularly the housing price bubble, has bad connotations because it is known that it would do more harms than good to the economy. It causes housing costs to rise, and, in this process, the hardest hit are the poor and salaried workers who live on fixed income. Also hurt are those who save money to purchase a home because there is no way to catch up with the price increase. It is quite clear that housing price bubble is partially, if not totally, correlated with labor disputes, for labor unions claim for a raise of wages and salaries to cover the additional costs of living resulting from high priced housing. In other words housing cost may provoke labor dispute. And such a raise eventually undermines not only the competitiveness of the given industry, but the national competitiveness itself. Even more serious would be the scenario of long lasting economic slump as a result of "bust" and corresponding asset deflation that Japan experienced over the last ten years. The figure below illustrates in a summary form how housing price bubble may affect the national economy.
Busting of bubble

Sudden fall of housing price

Rapid increase in bank's Non-Performing Loans: NPL

Household bankruptcies

Sudden decline of bank loans

Sudden fall in consumption

Rapid decrease in production

Increase of jobless

Economic recession

[Figure 2] Impact of Housing Price Bubble in the National Economy

Once bubble busts, the price of real estate goes down dramatically and in particular, the value of mortgage collateral falls to the extent that it becomes well below the amount of loans outstanding. If the LTV ratio is high as it was in Japan, there is no way to recover the loan and consequently, many financial institutions would go bankrupt. And those remaining in business would not only hesitate to issue new loans, but also request advance payments from the borrowers. The incidences of personal bankruptcy would then be on the rise, leading to substantial reduction of consumption and production as well, and eventually to an increase in unemployment. Such a vicious circle would continue for a long time and if so, the economy would suffer from depression. This scenario is exactly what happened in Japan in 1990's as a result of real estate bust.

Is there any sign of such a "malignant" real estate bubble in Korea as well? The answer is not yet! The magnitude of the bubble's effects on the economy may be determined by its level and depth. In Japan the bubble spread
so widely and deeply that almost every economic agent, household, firm and the government alike, felt its effect badly. It was also spatially wide-spread. But the bubble effects in Korea have been limited to only a few areas and to small number of economic agents. Bubble occurred only in a few housing sub-markets such as Gangnam and its surrounding areas, and only a limited number of financial institutions were engaged in mortgage financing. And even those institutions that are involved in full fledged mortgage financing would be secure and safe because the LTV ratio is not that high, ranging from 20 to 40% on average in real terms. The term is also very short, averaging between three and five years at the maximum.

But if the current price spiral continues and spreads fast as it used to during the 2nd quarter of 2003, it would certainly be disturbing. And that is why the government announced the "10.29 (October 29th, 2003) Measures" to prevent the bubble from further spreading and to contain it from ultimate bust. But price bubble is likely to reoccur any time because those factors, as pointed out in the earlier discussion, which might cause the price bubble, remain unchecked as yet. Besides, the government has announced too many development plans and programs which may ignite another round of real estate bubble sooner or later.

Koreans are very much used to making capital gains through speculative transactions of real estate deals. There underlies a speculative mind among many Koreans, particularly among "the haves." Unless such a mind stops once and for all, there is always a chance for real estate price bubble to reemerge. Therefore, a monitoring system must be designed whereby one must closely watch the sign of price bubble and if such a symptom arises, one must activate the early warning mechanism.
3. Conclusion

This study has led to the following conclusions. First, as the theory suggested, the housing price spiral in Korea is attributable to excess demand and increasing cost of production, especially, land cost. However, the most significant finding is that the speculative demand is far more important than normal housing demand. In fact, the contribution of speculative demand to the determination of housing price is much more important than that of normal housing demand. The surge of speculative housing demand since 2000 has been largely attributable to the trend of declining interest rate, rapidly increasing money supply, and above all the government policy of economic recovery based on very liberal housing policy including the allowance of selling the pre-sale contract. Second, the findings do show that there are bubbles in housing price in Korea. However, the actual magnitude of bubbles varies widely depending upon the estimation methods used. By and large, the long-run equilibrium price approach produces the smallest amount of bubbles in comparison with the fundamental market value approach and the price-income ratio (PIR) approach. Third, contrary to what many might have thought, the seriousness of housing bubble in Korea is much less apparent than it was in Japan because of differences in basic market conditions, in particular much lower level of loan to value ratio (LTV) and a greater degree of housing shortage prevailing in Korea since 2000. To be more specific, it is unlikely that housing price might fall as drastically as it did in Japan, and even if housing price does fall, the low LTV ratio implies much less danger of loan delinquency and banks' insolvency.

These findings have interesting policy implications. First, the government should not repeat the policy conducive to speculation including the allowance of the sale of pre-sale contract and the politically motivated announcements of large housing construction projects, including new town projects. Such announcements have often created an environment suitable for housing speculation. Second, the policy of increasing capital gains as an anti-speculative measure has its limitation.
because low price elasticity of housing demand means forward shifting of the tax burden leading to housing price hike. The capital gains tax is of course needed not only for government's tax receipts but also for better income distribution; but it is not a suitable way of discouraging speculative activities, unless it imposes a very heavy burden on the seller of house. If it carries a very heavy burden, then the supply of housing has the risk of being frozen. The best way of fighting speculation and stabilizing housing price is to minimize the excess demand through the sustained increase of housing production on one hand, and, to cut down land cost through more aggressive land banking and well pre-planned land supply through better regional development planning on the other.
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