

Anatomy of Housing Price Explosion in Urban Areas in Korea

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Abstract

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The sustained trend of the explosion of housing price in urban areas in Korea has been, for a long time, one of the most heated debates in Korea. This debate has been centered on the fundamental cause of housing price explosion. Most of policy makers, journalists, ordinary citizens and even some academics tend to connect the housing price hike to what is called Gasooyo or “false demand” as opposed to Shilsooyo or “true demand.” Gasooyo refers to speculative demand, while Shilsooyo means normal demand. In urban areas in Korea, speculative demand is wrongly connected to “professional speculators” who are perceived as immoral people. However, one must remember that even an ordinary consumer does speculate as long as he or she hopes to make some capital gains. The debate on housing price explosion begs some fundamental questions. Is housing price inflation due to speculative demand or normal demand? To what extent cost increase worsens housing price inflation? What is the contribution of housing supply to the stabilization of housing price?

The objective of this study is to test the hypothesis that housing price explosion is attributable to the excess demand and construction cost increase. In other words, the hypothesis to be tested in this study refers to a combination of demand-pull and cost push theories of housing price hike. Housing demand in this study comprises the speculative demand and the normal demand. This study finds that cost increase does play a part in pushing up the house price and that the increase in supply does stabilize housing price. The most interesting finding is that the speculative demand contributes much more than normal demand to the explosion of housing price. The findings of this study have some important policy implications and it is hoped that they would be useful in improving the effectiveness of housing policy in urban areas in Korea.

주제어 : 주택가격, 주택정책, 주택가격 급등, 도시지역, 주택공급

Key Words : housing price, housing policy, explosion of housing price, urban area, housing supply

I . Introduction

One of the grave social and economic problems in Korea has, for decades, been the never - ending housing price spiral in rapidly growing urban areas. For instance, for some years, since 2000, the average housing price in such large metropolitan regions as Seoul and Busan has increase more than twenty per cent per year. The sustained housing price hike means worsening housing affordability and inevitable wage hike, which may weaken international competitiveness of the national economy. The gravity of high housing price may be measured by the price-income ratio which is computed by dividing housing price by annual household income. The price-income ratio (PIR) in 2004 was six times in the country as a whole and ten times in the City of Seoul as against three or four times in some of the advanced countries. It seems obvious that no matter how we measure it, housing price in Korean urban areas is really high, given its income level.

The problem of housing price inflation has, naturally, been one of the principal concerns of policy makers, academics, social organizations and consumers at large. The academics have been trying, without much success, to understand and analyze the determinants of housing price increase. Community organizations have been trying to make it a political issue of government failure to solve the problem of housing affordability and social justice. Under the mounting political pressure, policy makers have adopted the strategy of fighting against the housing price inflation, as the core of housing policy for last forty years. Korea's policy designed to stabilize housing price have been consisting of the two sets of measures: increase in supply and anti-speculative measures. Of these two sets of measures, the anti-speculation measures have been given much greater importance than measures of supply increase. This is explained by the generalized belief that it is the Gasoooyo (false demand) or "speculative demand" which is regarded as the primary cause of housing price explosion. The anti-speculation policy has included a series of measures, including restriction of speculative land transaction, imposition of capital gains tax and even restrictions of urban land ownership. Unfortunately, all these measures have not been very successful in stabilizing housing price.

This paper deals with the following questions. What are the determinants of housing price? How much of housing price increase can be attributed to speculative activities? To what extent has the normal demand contributed to housing price explosion? Has the increase in supply really stabilized housing price? What has been the role of construction cost in housing price inflation? What are policy implications of the findings in this study?

This paper has the following parts: literature survey of housing speculation and housing price; formulation of a model of analysis adopted; explanation of data used; estimation of the model; explanation of finding; policy implications.

II. Survey of Literature

Generally speaking, there are three approaches to the analysis of housing price: the hedonic price approach, the housing price-forecasting model approach and the traditional regression analysis approach. The hedonic price approach has been widely used to determine the value of such various parts of the dwelling as the orientation of the dwelling, the floor, the floor size, design and particularly the localization of the dwelling. This approach has been used by builders and evaluators. This model has its usefulness but it is not an appropriate one for the analysis of housing speculation. There have been several studies on hedonic housing price (Lim Gil et al., 1979; Kim J. 1981). More recently Chung and Kang (2001) have made an interesting study of apartment hedonic price. This study defines a housing unit as a bundle of three sets of characteristics, including physical housing characteristics, spatial characteristics and environmental characteristics. The first set comprises such characteristics as floor size, the floor in the building and the age of the building. The second set includes such variables as the quality of schools nearby, the proximity of subways, shopping facilities and nearby residential areas. Finally, the third set of characteristics consists of the view which the building commands.

The second approach is the forecasting model approach. A number of attempts have been made to forecast the variation of housing price. Typical models used have been either the VAR model or the ARIMA model, which basically assumes

that future variation in housing price depends on its past variation. The endogenous variable in the ARIMA model is the current price which is regressed on its previous variations. The advantage of these models is their capacity to predict relatively accurately the short-term variation of the housing price. On the other hand, its chief weakness is that it cannot integrate exogenous variables other than lagged endogenous variable. The Vector Auto-Regression Model (VAR) has emerged as a possible alternative model which may be able to correct the weakness of the ARIMA model. This model is, in fact, a combination of the ARIMA model with the traditional structural equation model. This model has an advantage of including variables other than the lagged endogenous variables. However, all the variables are endogenous and each of them varies not only with their own lagged values but also with those of other variables. This means an important loss of the degree of freedom, which one cannot allow, when one has to work with data available for short period of time.

There have been a number of studies using the ARIMA or the VAR model. The former has been used to make short-term forecasting of housing price by a number of researchers (Suh S.H. 1993; Kang W.C. and Kim B.S. 1997; Suh S.H. 1993). Others applied the VAR model to study the impact of macroeconomic variables on housing and land price (Son J.S. and Kim K.Y. 1998; Kim Y.C. 1996). One interesting result of these studies is that land price is inversely related to corporate bond yield, suggesting the possible substitution between investment in bonds and investment in land. Another interesting finding is that the lagged land price has a significant positive impact on the current land price. To the extent that lagged land price represents expected land price, the positive relationship between the current and the lagged land price variable suggests significant speculative activities in the land market.

Finally, a large number of studies of housing price based on the traditional regression analysis are available. These studies are motivated by two sets of objectives: tests of hypotheses related to the behavior of individual decision makers in the housing market; the objective of housing policy formulation. For instance, in the literature of housing economics, there has been heated debate over the magnitude of housing demand elasticity with respect to price, income or mortgage rate. In fact, it is possible to verify, based on the estimate of the

housing demand function, if the demand elasticity with respect to income is greater or smaller than 1.0. The other objective is to analyze housing market demand and supply behavior, make forecast for housing activities and price and evaluate impact of policy variables on the market behavior.

The size of model varies a great deal; the model may have one equation or tens of equations. For instance, Chung (1976) developed a model consisting of thirty structural simultaneous equations allowing the estimate of the behavior of the existing dwelling stock market, new construction activities, mortgage rate, housing price, rent, vacancy rate and many other aspect of Canadian housing sector. Another study by Chung (1984) on the Korean housing market also comprises a great number of equations. This study showed that the cyclical stability of housing construction can contribute to the stabilization of housing price.

The study by Kim K.S. et al (2003) analyzed also the behavior of housing price. The basic hypothesis is that the current housing price depends on rent, money flow and the rate of change in lagged price. It shows that the current housing price varies directly with rent and money supply. The behavior of money supply is not surprising, for, in Korea, mortgage rate being often pegged, the housing market reacts to the variation in money supply. Another interesting finding is that the lagged price variable exerts direct influence on the current price, which implies active speculative activities in the housing market. The stock price has a negative impact on the current housing price, which is normal. The rise in stock price would make investors to transfer funds from the housing market to the stock market so that less funds would be available in the housing market causing decreasing housing demand and price.

III. Model

The basic hypothesis adopted in this study is that housing price, at a given point in time, depends on the excess demand of housing. There are two types of housing demand: consumption demand and investment demand. The former refers to the demand for such services as protection, security comfort and convenience which are offered by the house. This demand is motivated by the consumer

intention to reside in the house. The demand for housing services is called "normal demand." On the other hand, investment demand refers to the tendency to buy a house in order to make capital gains made possible by the increase in housing price.

There are two groups who are agents of investment demand. In urban areas in Korea, when the consumer buys a house, he or she is motivated by twofold objectives: maximize utility deriving from housing services and at the same time he or she hopes to make capital gains. Then there are those who buy a house not to live there, but to rent it and sell it at higher price making capital gains. The investment demand may be called "speculative demand. In short, housing demand comprises normal demand and speculative demand. Another reason for housing price increase is the increase in cost of construction

The model adopted in this paper assumes that the housing price inflation is attributable to the following two types of market behavior: the excess of demand over supply and cost increase. In short, the housing price hike is assumed to be caused by demand pull and cost push mechanism. This model is illustrated in the following expressions.

$$P(t) = F [D(t) - S(t), C(t)] \cdots (1)$$

$$D(t) = D_1(t) + D_2(t) \cdots \cdots \cdots (2)$$

$$P(t) = F \{ [D_1 + D_2], C(t) \} \cdots (3)$$

In Equation (1), $P(t)$ represents housing price at time (t); $D(t)$ total demand at time (t); $S(t)$, supply of housing supply at time (t); $C(t)$, cost of construction at time (t). In Equation (1) it is assumed that the current housing price is a function (F) of the excess demand over supply and the construction cost. In Equation 2, it is assumed that housing demand consists of normal demand, $D_1(t)$, and speculative demand, $D_2(t)$. Equation(3) is obtained by substituting Equation(2) into Equation(1).

It is further assumed that the normal demand is a function of household income, $I(t)$ and the yield of bonds, $i(t)$. It is assumed that the normal housing demand varies directly with household income and inversely with the bond yield. It is a well established fact that income has significant positive effect on normal housing demand. The relation between the bond yield and normal housing demand is inverse, for as the bond yield falls and bond price increases, the consumer would sell bonds and allocate the sales proceeds to housing.

On the other hand, it is assumed that the speculative demand depends on expected housing price represented by lagged $P(t-1)$. In the absence of better indicator of speculative demand, the lagged price is often used by many researchers. The housing supply is represented by the lagged building permit variable in the absence of quarterly data on stock $S(t-1)$. Finally the cost of construction is represented by lagged land cost.

The final expression of the model is as follows.

$$P(t) = a_0 + a_1P(t-1) - a_2i(t) - a_3S(t-1) + a_5C(t) + DUM_1 + DUM_2 + \dots \quad (4)$$

The next step is to compute, based on the estimated values of Equation (4), the contribution of each explicative variable to the total explained variation in the housing price. Let us examine the following relation:

$$+ \dots \quad (5)$$

Where = Total explained variation in housing price; = Explained variation in housing price due to normal demand; (D2)= Explained variation due to speculative variation; (C)= Explained variation in housing price due to cost increase.

Four geographical areas are analyzed: Korea as a whole, the Province of Kyunggi, the City of Seoul and the Gangnam district, which is a part of Seoul City and located south of Han River. For years, it has been a common knowledge in Korea that the most speculative area is the Gangnam district followed by the City of Seoul, the Province of Kyunggi and Korea as whole.

IV. Data

The data used in this paper are the comprehensive housing price index provided by Kookmin Bank covering the period from the first quarter of 1987 and second quarter of 2003. The price data used is the price index of apartments. In the absence of data on household income on quarterly basis for different geographical areas, GDP per capita is used as proxy.

The data on GDP per capita are provided by the Bureau of Statistics. Bond yield represents the yield of alternative investment on the part of house buyers; 3-year industrial bond is used, for this type of bond appears to be the popular

investment of consumers.

The data on three-year bond yield are provided by the Bureau of Statistics. In the absence of data on housing stock, building permits lagged one quarter are used; data on building permit are provided by the Ministry of construction. Reliable data on construction cost of housing are difficult to obtain.

Data on land cost are used instead. There are two dummy variables: $(DUM)_1$ represents the third quarter of 1990, while $(DUM)_2$ represents the first quarter of 2002. The first dummy variables is designed to capture the impact of "Public Interest Land" policy comprising heavy capital gains tax, development tax and restriction of land ownership. The second dummy variable is expected to show the impact of speculative measures announced in 2002 involving the imposition of stiffer holding tax and capital gains tax.

V. Findings

The findings of the regression analysis of housing price are summarized in Table 1. The dependent variable is the variation of housing price for four areas: Korea as a whole, the Province of Kyunggi, the City of Seoul and the Gangnam district located south of Han River. There are seven explicative variables which, as a group, explain more than 90 % of the total variation in housing price. The coefficient of determination (\hat{R}^2) adjusted for the degree of freedom is very high varying between 90.3% for Kyunggi Province and 92.6% for Korea as a whole. The value of F-Statistic varies between 86.0 for Kyunggi and 108.2 for Gangnam district. Thus, there liability of the models seems to be the most pronounced for the Gangnam district. Inshort, the overall reliability represented by the adjusted coefficient of determination appears very high for all of the four geographic are as analyzed. As for the auto correlation test, the usual Durbin-Watsonstatistic cannot be applied, because one of the explicative variables is the lagged value of the dependent variable.

The behavior of the normal housing demand seems to be as expected. The income variable, GDP per capita, appears with expected positive sign in all of the four equations. However, the statistical significance at 10% probability is applicable

only to Korea as a whole and the Gangnam district. Data on household income could have produced better results. However, it is encouraging to see that the income variable behaves normally. The three-year bond yield appears with a negative sign which is as expected. Moreover, it is highly significant for all of the four geographical areas with the exception of Kyunggi Province. This might be attributable to the possible fact that the citizens of Kyunggi Province being more rural with lower income might not use bond investment as an alternative investment. The speculative housing demand is represented by the lagged housing price variation. It is very highly significant with t-values varying between 20.6 for Kyunggi Province and 22.6 for the City of Seoul. They appear with a positive sign in all of the four equations. This means that the speculative demand is the principal determinant of housing price inflation in Korea.

<Table 1> Regression Analysis of Housing Price

Dependent Variable: Rate of Change in Housing Price				
Independent Variable	Korea	Kyunggi Province	Seoul	Gangnam
Constant	-0.4363 (-1.070)	-0.4245 (-1.3198)	-0.3855 (-1.3855)	-0.4804 (-1.498)
GDP (t-1)	0.0751 (1.529)*	0.0712 (1.2528)	0.0624 (1.2664)	0.0847 (1.4760)*
3-Year Bond Yield	-0.311 (-1.8343)**	-0.0251 (-1.1702)	-0.0367 (-2.0159)***	-0.0357 (-1.6235)**
Land Price (t-1)	0.1272 (2.4604)***	0.1633 (2.4636)***	0.1689 (3.0156)***	0.1949 (2.9126)***
Housing Price(t-1)	0.9033 (21.1467)***	0.9318 (20.5817)***	0.9324 (22.6109)***	0.9196 (22.3515)***
Housing Building Permit (t-1)	-0.0126 (-2.2216)***	-0.0136 (-1.9971)**	0.0137 (-2.3378)***	-0.0183 (-2.6000)***
Dum: Q3 of 1990	0.9303 (1.6050)*			
Dum: Q1 of 2002	1.2217 (2.1901)***	1.6540 (2.3264)***	1.4598 (2.4316)***	1.9482 (2.6913)***
\hat{R}^2	0.926	0.903	0.923	0.921
F	100.27	86.058	111.355	0.921

* Note: *Significant at 10% probability; **:Significant at 5% probability; ***:Significant at 1 % probability; (): t-value

The housing supply variable represented by the housing building permits appears with a negative sign, which is as expected. Moreover, it shows relatively high t-values varying between -1.99 for Kunggi Province and -2.33 for the City of Seoul. Given the demand, the larger the supply of housing, the lower would be the housing price; conversely, the smaller the supply, the higher would be the housing price. This behavior of supply combined with that of the demand makes the excess -demand model of housing price quite credible.

The cost push theory of housing price inflation is verified by the behavior of the construction cost variable represented by the land price. It has definitely strong and significant impact on housing price hike. In all of the four equations, it appears with a positive sign and very high t-values varying between 2.46 for Korea as a whole and Kyunggi Province and 3.01 for Seoul City. Thus, land cost seems to be a very powerful and highly significant determinant of housing price explosion in urban areas in Korea.

The first dummy variable for the adoption of so-called "Public- Interest- Land" housing policy announced in the third quarter of 1990 appears with a positive sign with significance of 10% probability. This variable is not included in the models for other three geographical areas, for it was far from being significant. The second dummy variable was included in all of the four models, for the anti-speculation policy adopted in the first quarter of 2002 was applied differently to different geographical areas. It appears with a positive sign with a statistical significance of 1%. The behavior of these dummy variables is rather puzzling, for one would expect that they show a negative sign. If the anti-speculation policy measures were effective, the sign should be negative, because the objective of the policy was to stabilize housing price. The results observed should mean either the failure of policy or time lag needed before the policy effect is felt. On the other hand, the rumor of the coming policy might have intensified speculative activities so that, by the time policy was announced, housing price increases substantially. At any rate, the impact of anti-speculation policy should be further studied.

The next step of our analysis consists in estimating the contribution of the normal demand, speculative demand and cost-push and housing supply to the explained variation in housing price. Findings are summarized in Table 2 below

<Table 2> Contribution of Independent Variables to the Total Explained
Variation in Housing Price

	Korea	Kyunggi	Seoul	Gangnam
1. Total Estimated Variation in Housing Price	100	100	100	100
2. Contribution of Independent Variables				
GDP(t-1)	55	24	19	16
Bond Yield(t-1)	31	11	15	9
Land Price (t-1)	42	25	23	16
Housing Price (t-1)	107	92	97	94
Housing Building Permit (t-1)	-38	-19	-17	-14
3. Ratio of Speculative Demand to Normal Demand	1.24	2.62	2.85	3.91

* Note: The sum of the weight of independent variables cannot be 100% because of the constant.

The contribution of the normal demand to the explained variation in housing price is the sum of that of GDP and that of bond yield. According to Table 2, the contribution of normal demand is: 86% for Korea as a whole, 35% for Kyunggi Province, 34% for Seoul City and 24 % for Gangnam district. On the other hand, the contribution of speculative demand is: 107% for Korea as a whole, 92% for Kyung gi Province, 97% for Seoul City and 94% for Gangnam district. Thus, surprisingly, the weight of speculative demand appears greater for Korea as a whole than for other geographic areas including the Gangnam district. However, to see the true importance of speculative demand in the process of housing price inflation, one should compare speculative demand with normal demand. In fact, the ratio of the contribution of speculative demand to that of normal demand is: 1.24 for Korea as a whole, 2.62 for Kyunggi Province, 2.85 for Seoul City and 3.01 for the Gangnam district. In short, in general, speculative demand contributes much more than normal demand to the explosion of housing price. This is particularly so in the Gangnam district. These findings are by no means surprising, for in Korea, for long time, Gangnam district has been know as a synonym of housing speculation.

Housing price hike due to cost push appears to be of similar importance for all

the geographical areas varying between 92% for Kyunggi Province and 94% for the Gangnam district. However, it is as high as 107% for the country as a whole.

The findings show, at the same time, the importance of housing supply in fighting housing price inflation. For Korea as a whole, increase in housing supply leads to a decrease in the explained variation in housing price by 38% as compared to 14% for the Gangnam district, 19% for Kyunggi Province.

VI. Conclusion

The objective of this study was to analyze the behavior of housing price explosion which urban areas in Korea has experienced since last twenty years, on the one hand and, on the other hand, to quantify the contribution of the normal housing demand, the speculative housing demand, increase in housing supply and increase in land cost to the variation of housing price. The basic model is that of excess demand and cost push. Normal demand is assumed to vary in function of income and alternative investment of housing funds represented by bond investment yield. Speculative demand is assumed to depend on expected housing price increase represented by lagged housing price. Housing supply is represented by lagged building permit. Cost of construction is represented by land price. The time lags for income, bond yield and land price are determined on the empirical ground, whereas time lags for building permit and expected price are determined for theoretical reasons.

Findings are highly significant. First, housing price inflation is attributable to both normal demand and speculative demand. However, for a given geographical are, especially the Gangnam district, the speculative housing demand contributes much more to the housing price hike than normal housing demand. Second, findings seem show with strong evidence that supply increase reduces considerably housing price inflation. Third, increase in construction cost represented by land cost constitutes one of the powerful determinants of housing price explosion. Finally, according to the performance of the two dummy variables, Korea's anti-speculation policy seems to be ineffective. However, further studies on its impact on housing price should be carried out in coming years.

This study has important policy implication. As long as demand, whether it is normal or speculative, exceeds supply, housing price is bound to increase. This implies that policy makers have a choice between policy measure to weaken demand or policy measures to increase supply. The great part of policy measure applied by the Korean government has been designed to weaken demand. This is understandable, for, as this study has shown, the impact of demand on price hike appears to be stronger than that of supply. However, it is not easy to implement demand policy, because the bulk of housing demand is private sector demand. Frequent policy measures deployed by the Korean government to weaken housing demand have comprised housing related taxes, especially, the capital gains tax. However, it should be pointed out that the imposition of taxes on housing is likely to shift the tax incidence forward to the consumer and invite further increase in housing price. This is even more so, if the elasticity of demand with respect to price is less than one. It is generally accepted that the price elasticity of demand is much less than one. Therefore, measures designed to expand supply should be given priority.

The findings of this study definitely show that the increase in supply has highly significant impact of the stabilization of housing price. The agenda of housing supply policy concerns the price elasticity of housing supply. One should make the supply elasticity with respect to price as large as possible. In other words, one should make the supply curve as flat as possible so that the production is maximized at the lowest price.

However, the production of housing is time consuming process requiring several years of preparation, because of the long process of acquiring land. The development of residential land is monopolized by the Korea Housing Land Corporation.

This situation has the disadvantage of making it difficult to restore the market equilibrium between the demand for and the supply of land. There must be some mechanism of competition in the land market. Therefore, the government of Korea should foster the development of the private land development industry so that the private builders can acquire in advance needed land.

The findings of this study shows also uncertain impact of anti-speculation policy on the stabilization of housing price. However, the actual impact of

anti-speculative policy is not well known. There is definite need for further study of the impact of such policy.

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