

Housing Price Bubble and Housing Policy in Korea

Hee-Soo Chung (Professor, Quebec State University in Montreal)

Abstract

Hee-Soo Chung

There have been hot debates on housing price bubble throughout the world after U.S. sub-prime mortgage crisis. Those debates, however, could not provide logical understanding on housing price bubble. This paper thinks that the current housing price bubble policies adopted by many countries including Korea appear to be based on insufficient understanding of the dynamics of the housing price bubble. Thus, this paper tries to answer the following questions : What is meant by housing price bubble? How can one measure it? What are its causes? What are its impacts? What are its policy implications?

This paper is interested in discussing the possible answers to the above five questions. We will discuss the definition of the housing price bubble; the methods of measuring the bubble and the application of these methods to Korean experiences; causes of the bubble; the U.S experience of the recent sub-prime mortgage loan related to the burst of the housing price bubble; the policy implications of the housing price bubble for Korea.

This paper concludes that Korea has had housing price bubble in selected areas. However, this bubble did not provoke a crisis similar to the U.S. sub-prime mortgage crisis. It is unlikely that Korea will experience the market meltdown because of the price bubble. However, the undisciplined lending practices and the risky types of mortgage products could cause serious damage to the housing and the mortgage market even without violent price bubble. The policy implication is that the government should be more concerned as much with the mortgage lending practices and mortgage products as with speculation and price decrease.

주제어: 주택정책, 주택가격 거품, 모기지,

Keywords: housing policy, housing price bubble, mortgage

I. Introduction

Housing bubble has become one of the main concerns of academics, policy makers and even general public throughout the world. This is quite understandable, for the housing price bubble can produce dramatic impact not only on the real estate market but also the national economy and the welfare of all. In fact, the housing price bubble has become a worldwide phenomenon. It happened in Japan, China, Korea, Thailand, Greece, the U.S. and many other countries.

By housing price bubble is generally meant the process of sustained increase followed by continuous decrease in housing price. Korea is one of the countries which has, for extended period, experienced rather violent housing price hike. The housing price index (2008=100) prepared by the Kookmin Bank shows that the housing price which had steadily increased up until the 1980s because of housing shortage and speculation hit the peak in 1993 (68), fell to attain the trough in 1999 (59), then increased again until 2004 (83), fell in 2005 (81), increased until 2008 (100), fell a little in 2009 (99), then started to increase in 2010(104) and continued to increase in 2011 (106).

In the period, 1993-1999, the housing price fell by 2.3% per year; in the period of 1999-2004, rose by 8.8%; in the period of 2004-2005, fell by 2.3%; in the period of 2005-2008, rose by 3.3%; in the period of 2008-2009, fell slightly; and in the period of 2009-2011, increased by 3.5 %.

The first quarter variation in housing price in the period of 2005-2011 showed this: 2005 (-0.36%), 2006 (0.98%), 2007 (3.50%), 2008 (0.92 %), 2009 (-1.39 %), 2010 (0.59 %), 2011 (1.74 %). Thus, the overall housing price in Korea rose rapidly from 2005 to 2007, fell in the period of 2007-2009 to increase again since 2010.

These data show the possibility of housing price bubble in Korea and the Korean government is much concerned about the adverse impact of the possible burst of the bubble, if it really exists. However, before the application of bubble policy, we have to answer the following questions. What is meant by housing price bubble? How can one measure it? What are its causes? What are its impacts? What are its policy implications?

Unfortunately, the current housing price bubble policies adopted by many countries including Korea appear to be based on insufficient understanding of the dynamics of

the housing price bubble. More precisely, these policies are based on the absence of clear answers to the above questions.

This paper is interested in discussing the possible answers to the above five questions. Therefore, in first section, we will discuss the definition of the housing price bubble; in the second section, the methods of measuring the bubble and the application of these methods to Korean experiences; in the third section, causes of the bubble; in the fourth section, the U.S experience of the recent sub-prime mortgage loan related to the burst of the housing price bubble; in the final and fifth section, the policy implications of the housing price bubble for Korea.

II. Definition of Housing Price Bubble

By and large, there are two groups of definitions of bubble. The first group is concerned with the process of rising housing price. Professor Kindleberger's definition falls into this group: "A bubble is a sharp rise in price of an asset or a range of assets in a continuous process with the initial rise generating expectation of further rises and attracting new buyers—generally speculators interested in profit from trading rather than its use or earning capacity" (The New Palgrave Dictionary of Economics, 2008).

The second group which is the most generalized sees the bubble as deviation of the actual price above some benchmark price. Stiglitz(1990) defines the bubble as "rise in price due to investor's expectation for further increase above a level justified by fundamental factors." Flood and Hodrick(1990) see the bubble as deviation from the "market fundamentals." Smith and Smith(2006) define it as deviation from the present value of anticipated stream of cash flow from operation and resale of the property. Malpezzi et al. (2001) and Glindro (2008) see it as deviation from the "long-run equilibrium value." On the other hand, Hou (2010) takes only the extreme part of the deviation as bubble. For instance, he takes, as bubble, the part of the deviation above three times the deviation of the distribution.

III. Measurement of the Bubble

1. Model

The most difficult task is to find proper benchmark value from the actual price. In general, there are three models often used by research people. The first is what is called the fundamental value model or the long-run equilibrium model; the second, intrinsic value model; the third, the price-income ratio model or the price-rent ratio model. The long-run equilibrium model has been used or discussed by several authors (Malpezzi and McLeman, 2001; Goodman and Thibodeau, 2008; Hou, 2010; Glindro, 2008; Orikanen, 2009; Chung, Kim and Kwon, 2004). On the other hand, the intrinsic value model has been used such authors as (Flood and Hodrick, 1990; Chan, 2001; Chung, Kim and Kwon, 2004). The price-income ratio model has been used by such authors as (Hou, 2010; Chung, Kim and Kwon, 2004)

The theoretical basis of the fundamental value model or the long-run equilibrium model is the behavior of the national economy represented by such macroeconomic variables as income, population, interest rate, user cost and housing supply shifters. After all, the housing market is only a part of the national economy so that the demand-supply equilibrium of housing is established by the performance of the national economy. However, in the actual model of estimation of the bubble, the per capita GDP or the per capita disposable income is used as the proxy for the national economy. On the other hand, the intrinsic value model is based on the assumption that the real (intrinsic) value of housing is the present value of the stream of future rental income or utility and the resale price of the property. This is the usual method of estimating the price of commercial housing used in the actual real estate asset market. As for the price-income ratio (PIR) model, its basic assumption is that the "normal" housing affordability varies from country to country and from region to region in the same country. For instance, it can be 6 times in Korea as against 3 times in Canada. In other words, in Korea, given the limited habitable territory and very high population density, house "normally" costs 6 times the annual income of the household, while it is lower elsewhere. In fact, in 2006, the PIR was 6.26 in Korea as against 3.55 in the U. S. and 3.72 in the U.K. This model proposes the idea that if the PIR exceeds a given level, it is a bubble. In other words, bubble means

excessive affordability burden.

There is no doubt that each of these models has cons and pros. The fundamental value or the long-run equilibrium model has the advantage of being relatively easy to find the data for the bench marking. But it is based on rather vague idea that the long-run equilibrium price can be represented by some indices of macro-economy. We need much more studies for the proof that these indices do really represent the long-run equilibrium housing price.

On the other hand, the intrinsic value model has the advantage of being used in the actual real estate asset market and being rationalistic in the sense that it represents the long-run yield of real estate investment. In the model of Chung et al (2004), it is assumed that the property will last very long time. On the other hand, there is no clear guarantee that the intrinsic value itself has no bubble element. It is more than probable that the stream of future rental income and the resale price include already some part of the bubble. If this is true, then the intrinsic value cannot be a proper bench-mark value. Finally, the PIR model has the merit of judging the bubble in terms of housing affordability.

However, it has the problem of defining the bench-mark value in terms of two variables, price and income, each of which varies in function of different sets of variables. For instance, the PIR can increase simply because of a decrease in household income which has little relationship with the housing market. Besides, the primary concern with the bubble is for the possible impact of the housing price on the housing market and the economy in general and not the housing affordability. Strictly speaking, the PIR model cannot be compared with the other models. Thus, there seems to be no perfect and ideal model. But we will adopt, all the same, these three models in order to compare the models used by many research people. The common feature of these models is that the bubble is expressed as deviation from some bench-mark values

The models are specified in the following manner.

(1) The Long-Run Equilibrium Model

$$B_t = \Delta P_t - \Delta GDP_t \dots \textcircled{1}$$

B_t = the amount of bubble time t

ΔP_t = variation of actual housing price at time t

ΔGDP_t = variation of GDP at time t

(2) The Intrinsic Value Model

$$B_t = P_t - EP_t \dots \dots \dots \textcircled{2}$$

$$EP_t = R/i \dots \dots \dots \textcircled{3}$$

EP_t = expected price at time t

R = rental income or utility

i = discount interest rate

(3) PIR Model

$$B_t = (APIR)_t - \delta (PIR)_t \dots \dots \dots \textcircled{4}$$

δ = standard deviation of PIR

PIR_t = price-income ratio at time t

$APIR_t$ = average PIR at time t

2. Data

The data used for the estimate of the models are different for each model. The data for the long-run equilibrium model are the comprehensive housing price series published by the Kookmin Bank covering the period from the first quarter of 1997 to the first quarter of 2002. The data are comprehensive in the sense that they cover all types of dwelling and a great number of urban centers for the survey.

The data for the intrinsic value model are actual prices of apartments provided by the real-estate data company, Budongsan Bank, covering the period from the first quarter of 1997 to the first quarter of 2003. The discount interest rate is the monthly 3-year corporate rate. This was considered as the opportunity cost of apartment investment. In Korea, monthly rental apartments are very rare; real monthly rental apartments are only government subsidized public apartments. In the private market, the rent is what is called “the Chonsei Rent” of rented dwellings. Under the Chonsei-Rent regime, the tenants pays a lump sum deposit amounting sometimes up to 80% of the housing price. The tenants will gets back the Chonsei deposits at the end of the lease, while the landlord uses the deposits for investments and other uses. Therefore, for the estimate of the intrinsic value model, the Chonsei rent is converted into monthly rent and applied 0.9%, the 1/12 of 11%, which was considered as the yield of Chonsei rent investment.

The data used for the PIR model were actual price of apartments provided by Budongsan Bank covering the period from the first quarter of 1997 to the first quarter of 2003. The data of household income are found in the census data. The estimation results were originally published in Chung, Kim and Kown (2004)

3. Results of Estimate

<Table 1> Estimate of Housing Bubble Price: The Long-Run Equilibrium Model (%)

Period	Seoul	Gangbuk Area*	Gangnam Area**
Q3 2001	1.7	0.6	2.6
Q4 2001	3.3	1.6	4.7
Q12002	2.7	1.2	5.4

* The area of Seoul located in north of Han River

** The area of Seoul located south of Han River

The figures shown in <Table 1> refer to the proportion of the bubble reflecting housing price variation above the rate of variation of GDP. By and large, the bubble was the worst in Gangnam area and in the fourth quarter of 2001. In that quarter, the bubble was 4.7% in Gangnam area as against 1.6% in Gangbuk area and 3.3 % in the Special City of Seoul as a whole. The bubble appears to be quite moderate. This might seem rather unexpected, because there was genuine concern over housing price hike at that time. However, one explanation is that the data cover all types of dwelling. If we took the price of apartment alone, the situation could be different, for the most rapidly increasing price has been, for long time, the price of apartment which has been the object of speculation.

<Table 2> Estimate of Housing Price Bubble: The Intrinsic Value Model (%)

Period	Gangnam-gu	Socho-gu	Songpa-gu
Q3 2001	14	7	17
Q4 2001	16	9	22
Q1 2002	23	17	29

<Table 2> summarizes the result of the estimates for the intrinsic value model. In Gangnam-gu, the bubble's share in the price increase rose from 14% in the third quarter of 2001 to 16% in the fourth quarter of the same year and 23% in the first quarter of 2002. In Socho-gu, on the other hand, the bubble's share rose from 7% to 9% and to 17% in the same period, respectively. On the other hand, In Songpa-gu, the bubble's sharer rose from 17% in the third quarter of 2001 to 22% in the fourth quarter of the same year and to 29% in the first quarter of 2002.

<Table 3> Estimate of Housing Price Bubble: the PIR model (%)

Period	Gangnam-gu	Socho-gu	Songpa-gu
Q3 2001	7.6	11.3	6.4
Q4 2001	3.9	5.5	1.2
Q1 2002	13.0	9.0	14.6

In <Table 3>, we see the summary of estimate results for the PIR model. The bubble share of the price-income ratio in Gangnam-gu was 7.6% in the third quarter of 2001, 3.9 % in the following quarter and 13.0% in the first quarter of the following year. In Socho-gu, a similar pattern was observed. The bubble's share was 11.3%, 5.5% and 9 % in the three consecutive quarters, respectively. Finally, in Songpa-gu, the bubble's share was 6.4%, 1.2% and 14.6% in the same three consecutive quarters, respectively, in the period of 2001-2002.

The finding for the three models may be summarized. First, the magnitude of the bubble varies with the model used. The intrinsic value model yields highest bubble share followed by the PIR model and the long-run equilibrium model. The lower bubble share in the long-run equilibrium model is explained by the fact that data refer to all types of dwelling and the areas covered are much wider than the areas covered in the other models. In the long-run equilibrium model, areas included are Seoul, Gangbuk area covering all the "gus" located north of Han River and Gangnam area covering all "gus" located south Han River, while the other two models refer to three "gus" all located in Gangnam area. Second, according to <Table 1>, by and large, the housing bubble seems to be more pronounced in Gangnam area compared to Gangbuk area and Seoul as a whole. This is a well know fact in Korea. Third, according to <Table 2>, within the Gangnam area, the bubble appears to be more

pronounced in Songpa-gu than Gangnam-gu and Socho-gu. This is also a well known fact in Korea. Fourth, according to <Table 1> and <Table 2>, the housing bubble seems to have appeared in the third quarter of 2001 and intensified steadily to attain the highest level in the first quarter of 2002. However, the PIR model shows a different pattern. In this model, the bubble started in the third quarter of 2001, then, decreased in the following quarter to increase again in the first quarter of 2002.

Perhaps, the most important finding is that the share of bubble differs in function of the model used. Such difference derives necessarily from the choice of the bench-mark value. This has serious policy implication. If the government conceives housing price stabilization policy in function of the magnitude of the bubble share, the policy contents varies inevitably in accordance with the model chosen. The important contribution of this paper is, precisely, the finding that the magnitude of bubble can vary greatly depending upon the model used. Therefore, the debate on the housing bubble should not be centered on the quantitative magnitude of the bubble. Instead, the debate should focus on the determinants of the bubble.

IV. Determinants of Bubble

The current literature on the determinants of the housing price bubble is not very rich. Much more research should be done. Many authors point out the role of mortgage loans in the formation of the bubble. Hou (2010) points out the expansion of credits as one of the causes of the bubble. Renaud (1995) attributes the bubble to irregular bank loans. Allen and Gale (2000) find the bank proxy loan practices as one cause. Shiller (2007) relates the long-term low interest rate to high housing price. Wheaton and Nechayev (2008) and Glindro et al (2008) think that the macro variables and institutions are significant causes of bubble. Balnchard and Watson (1982) and Allen and Gale (2000) find credit expansion and liquidity are the primary causes. On the other hand, Brissimis and Vlassopoulos (2008) and Oikarinen (2009) see the importance of the bilateral relationship between housing loans and the price. Thus, most of the research people find the impact of financial variables as a significant determinant of the bubble.

Housing speculation is also found to be one of the determinants of the bubble. Kim and Suh (1993) find that the housing price speculation and, more importantly,

government's anti-speculation policy are the key determinants of the bubble. Chung (2009) has quantified the speculative part of housing price increase.

What is the most interesting is that some of the non-quantifiable variables seem to also play an important role in the formation and the collapse of housing price bubble. Bank proxy loans (Hou, 2009; Allen and Gale, 2000), corruption and property right (Glindro et al, 2008), political regulatory actions (Major et al, 2008) are some of the qualitative determinants. Thus, the current academic literature on the determinants of housing price bubble may be grouped into four sub-groups: macroeconomic variables, housing market fundamentals, speculation and institutional variables.

No country in the world has experienced the pain and hardship of the housing price bubble as the U.S. If we summarize the U.S. experience on the basis of academic and non-academic publications, we can group the determinants of housing price bubble into several sub-groups.

First, deregulation, especially the Gram-Leach-Bliley (GLB) Act of 1999 sponsored by Senator Phil Gramm was a kind of corporate welfare favoring undisciplined mortgage loans. Second, the government mandated loans almost forced the banks to make low-income risky loans by virtue of the Community Reinvestment Act (1977). Most of such loans were supposed to come from the public sector, but, in reality, 84% was provided by the private sector lenders.

Third, the American mania of home ownership led to home purchase beyond the financial means of many Americans. In the U.S., owning home is a symbol of social success and, moreover, it is considered as good investment. The U.S. home ownership rate increased from 64% in 1994 to 69.2% in 2004. This is indeed an incredible rise of home ownership in such a short period of time, rarely seen in the world.

Fourth, the belief that housing price will increase forever is another factor which encouraged home purchase beyond financial means of households. These factors combined with the accumulation of liquid funds as well as more than 100 % LTV led to the sub-prime mortgage crisis. The fixed-rate mortgage has encouraged more borrowing owing to cumulating home equity funds.

Fifth, the media has also played a role. David Lereah's book "Are you missing the real estate?" and several other books published in the period of 2005-2006 further

encouraged home buying, which surely benefited the realtors. Lereah was the head of American Real Estate Association. All these factors have tremendously contributed to the violent rise in housing price. The ratio of housing price to annual rent steadily increased and reached in 2006 as high as 26 times. The normal ratio should be about 15 times.

Sixth, probably, the most significant factor of increasing home ownership and home price was the low interest rate in the early years of the 2000s. The crash of the dot-com bubble in 2000 and subsequent 70% drop of NASDAQ composite index had devastating impact on the housing market causing free fall of housing price. The economic slump due to the dot-com crash made the monetary authorities to cut down the Federal Reserve interest rate from 6.5 % to 1.0 % in the period of 2001-2002. In the period of 2002-2003, the 30-year fixed-rate mortgage rate decreased from 8% to 5.5%. The one-year adjustable mortgage rate dropped from 7% to 4 %.

We must remember that a slight change in interest rate can produce drastic impact on housing price. It is estimated that 1% decrease in interest rate produces 10% increase in housing price, other things being equal. On the other hand, a slight increase in interest rate could greatly weaken the demand for home ownership and provoke a sharp fall in price. In front of the danger of over-heating of the housing market and the economy, the U.S. monetary authorities decided to increase the interest rate in the period, 2004-2006, from 1% to 5.25%.

Seventh, the sub-prime mortgage lending was the most important factor of the U.S. housing price bubble. The low interest rate since 2001 combined with high housing price intensified mortgage demand and the lender armed with abundant liquid funds made massive low-quality and high risk loans. The amount of sub-prime mortgage loans increased from \$ 35 billion in 1994 to \$ 160 billion in 1999 and \$ 600 billion in 2006. In 2006, the sub-prime loans represented 20% of the total amount of mortgage loans in the U.S.

Eighth, apart from the sub-prime loans, lenders made other risky loans. The adjustable-rate interest mortgages (ARM), the interest-only mortgages, the no-doc loans were all very risky loans. The no-doc loans mean loans for which the lender does not check the borrower's income. In addition, the loans-to-value ratio (LTV) was in many cases above 100%. That is, the amount of the loans was above the

mortgage value of the house. In San Diego, in 2004, 80% was adjustable-rate mortgage (ARM); in some regions, the interest-only mortgages accounted for 47% of loans.

Ninth, in many cases, the lenders provided the down payment for the borrowers. In 2000, more than 600,000 buyers used this system. This gave further impetus for price rise. The situation was so alarming that HUD intervened, in 2007, to stop the practice. Tenth, the lending practice was undisciplined so that the rate of loan denial dropped radically from 28% in 1998 to 14% in the period of 2002-2003.

To sum up, the abnormally high housing price is attributable to a host of factors including government regulations. However, we may point out the most important ones. First, the American mania of home ownership was the definite factor of the crisis. In the U.S. owning a home is a symbol of social stability, high quality dwelling maintenance and social prestige. In fact, even the governments including the Bush government encouraged home ownership. At the same time, home ownership is considered as good investment and this belief has been enhanced by the real estate industry. Second, the sustained low interest rate which went down as low as 1 % after the dot-com crash surely strengthened demand for ownership homes and led the housing price to rise. Third, factors related to the U.S. banking system also played a very large part. The U.S. banking system is characterized by the very large number of banks of small size which are poorly endowed with funds. Moreover, a good part of these banks are state-controlled so that the federal supervision function is limited. Many of the mortgage lenders are not authorized to receive deposits so that they are obliged to sell the originated mortgages in the secondary market. This is the case of Mortgage Banks. In addition, the large inflow of foreign funds into major banks provided huge amount of liquid funds which must be loaned to earn profit.

Fourth, the core of the bubble formation is undoubtedly the proliferation of risky mortgage products. The sub-prime mortgages, the interest-only mortgages, the adjustable-rate mortgages and the lender-assisted down payment mortgages and high LTV mortgages are all low quality and risky products. The common characteristic of these products is their sensitivity to an increase in interest rate; a slight increase in mortgage rate is bound to provoke delinquent mortgagors and even massive foreclosure.

V. The Impact of Housing Price Bubble

The combination of all the factors mentioned above resulted in excessive housing price increase. In the period of 2001–2006, in such areas as Los Anglos, Las Vagas, Phoenix and Washington D.C. housing price sore by 85%. The high price led to over-supply of housing, which eventually forced the price to fall.

High level of price is accompanied by active transactions. And the market becomes overheated. But the market has to be eventually corrected and find itself a normalcy. The market correction is represented by price fall and shrinking sales. In fact, the market correction came as early as 2004 when the interest rate started to increase again. In March of 2006, the sales of housing was dropped from 554,000 units to 482,000 three months later or by 13%.

The real policy issue of housing price bubble is not so much the high level of the price; it is rather the sudden fall of the price. The price may fall because of over-supply, government regulations, higher interest rate and many other reasons.

The challenge is that an excessive fall of price can provoke massive foreclosures, sharp decrease in the value of assets, shrinking bank loans, rise of unemployment and general economic slowdown. The foreclosure of households is caused by the incapacity of households to pay back mortgage loans. This can happen either because of interest rate increase or excessive price decrease. Suppose that a consumer would like to buy a house of \$300,000 and borrows from a bank \$200,000 at annual interest rate of 5% compounded every month for 30 years. Hence, the LTV is 75%. The consumer pays back every month \$1,069. If the mortgage rate increases to 8%, the monthly payment will be \$ 1,457, or \$388 more per month. Suppose that the consumer's annual income is \$ 50,000, or monthly income of \$4,170. This means that the consumer allocates 25% of income at 5 % mortgage rate, but at 8% interest rate, he or she should allocate as much as 35% of his or her income. Under such circumstance, it becomes very difficult to keep the house.

The situation becomes even worse at higher LTV. Suppose that LTV rises to 85% so that the amount of mortgage loan increases to \$255,000 from \$200,000 or \$ 55,000 more. At 5% interest rate, the monthly payment will be \$ 1,363, but, at 8% interest rate, the monthly payment will be \$1,858. The burden of monthly payment will increase to 32% and 45%. This simple illustration shows how the burden of monthly

payment increases as a result of increase in interest rate and the LTV. In many cases, in the period of 2001-2004, the LTV exceeded 100%.

The practice of adjusted-rate mortgage (ARM) was another factor of the bubble collapse. In many cases, the terms of ARM was a year, that is, every year, the borrower has to renew the loan contract so that the borrower has to pay the current increased interest rate. The rise in mortgage rate after 2004 would have forced a great number of borrowers to declare foreclosure. The interest-only mortgage was another element accelerating the foreclosure process. Under this type of mortgage, the borrower pays only the interest payment and pays back the principal at the end of the term. However, if the lender asks the payment of the principal, most of the borrowers would be unable to do so and the result is the foreclosure.

The fall of the housing price is another major factor of the bubble crisis. Suppose that the price of a dwelling is \$300,000 and the amount of loan is \$200,000. If the price decreases to \$150,000, the bank asset value deriving from the house decrease from \$200,000 to \$150,000, or by 25%, which is not tolerable for the bank. If the borrower declares foreclosure, the bank will get back at most only 75% of the value of its mortgage asset. Under such circumstance, the bank will cut down not only mortgage loans but also other loans leading to the crunch of the financial system; even an overall economic recession can result. The U.S. sub-prime mortgage crisis generated a drastic increase in foreclosures; in some areas the rate of foreclosures was as high as 20%.

The Shiller index of housing price fell by 33% in the period of 2007-2009. The stock price of such major sub-prime lenders as New Century Finance dropped by 84%. However, the stock price collapse was not limited to the real estate industry. Such huge Wall Street investment banks as Bear Stearns, Lehman Brothers, Goldman Sachs, Merrill Lynch and Morgan Stanley experienced violent fall of their asset value and stock price. The Bear Stearns funds lost billions of dollars. To save the whole financial system, the federal government spent trillions of dollars for bailout of major financial institutions.

The economic recession was represented by a fall in GDP. For instance, GDP loss of 361 metropolitan areas was \$166 billion. The foreclosures would have generated as many as 524,000 jobless people. The foreclosures would have resulted in the tax revenue loss of \$6.6 billion in ten states.

The collapse of the stock price was observed not only in the U.S. but also in other countries. In January of 2008, it fell by 7% in Germany, 5.5% in the U.K., 5.1% in China and 3.9% in Japan. Thus, the sub-prime mortgage crisis in the U.S. provoked a global recession.

VI. Policy Implications for Korea

Korea is one of the countries in the world which have experienced violent housing price hike in the past, especially before the 1990s when the housing shortage dominated the market. The trend of rapid increase in the price was attributable not only to the housing shortage but also to speculative activities, which itself was caused by housing shortage. There were periods of price bubble in some areas, especially Gannam-gu, Socho-gu and Songpa-gu.

The policy concern has been about the attenuation of price hike, because the period of price fall was rare and, when the price fell, the magnitude of the fall was not very pronounced. In other words, Korea's policy concern was not really one of bubble; rather it was about the speculation. In fact, most of the policy measures taken by the Korea government have been anti-speculation measure including the increase in the capital gains tax, restriction of mortgage loans, control of land transactions, increase in real estate tax basis and so on. In 2009, the slight fall in the housing price led the government to adopt some policy measures designed to facilitate mortgage loans and increase housing demand.

The most important question should be more related to the burst of the bubble rather than its formation. We should ask the following questions. Is the housing price bubble possible in Korea? In other words, is it possible to see "excessive" price hike followed by "excessive" fall in the price? Let us tackle the first part of the question. It is not likely to see violent price increase as we did in the 1980s. This is explained by the simple fact that there are now plenty homes. In fact, the national housing supply ratio is as high as 116; there are 116 homes for 100 households. However, given favorable conditions, the demand for ownership homes may increase again so that there will some price increase, despite the high housing supply ratio. Now, as es. the second part of the question, "excessive fall" in the price is not likely,

as long as there is no excessive increase in the price. If we let the market do its function, there will be neither excessive increase nor excessive fall in the price. In short, it is unlikely that Korea will experience a bubble crisis of magnitude we saw in the U.S. in the period of 2006-2009.

Furthermore, even if Korea encounters violent price increase, it would not provoke the meltdown of the real estate market. Several reasons would explain why. First, the LTV in Korea is below 50% so that unless the price falls as much as 50%, the bank's mortgage value would not be severely compromised. Second, the secondary mortgage market in Korea is very limited; the rate of mortgage securitization is much below 10% compared to 80% in the U.S. Moreover, Korea has no market of mortgage derivatives. Therefore, even if the value of the MBS falls, its impact would be very restricted.

However, the sales of risky mortgage products could generate a crisis, although it may not be as violent as it was during the U.S. sub-prime mortgage crisis. There are several reasons for possible crisis in Korea. First, the lack of discipline in the process of mortgage origination and the low quality due diligence could make the lender end up with delinquent borrowers.

Second, there are still mortgage loans with no document showing the borrower's capacity of repayment; this is what is called "no doc" mortgages practiced during the U.S. housing price bubble. Third, most of mortgage loans are short-run adjustable rate mortgages. If the mortgage rate increases beyond a certain level, many borrowers may find difficult to continue the monthly payment. Fourth, most of the mortgage loans in Korea are interest-only mortgages. If the lender asks the full payment of the principal, the borrower may be unable to do so.

Thus, the Korean mortgage market seems to have similar characteristics of the U.S. mortgage market during the bubble crisis. As long as Korea does not improve the quality of mortgage lending practices and mortgage products, it can experience the market meltdown even without major price increase or decrease. In short, it is possible to have the collapse of the housing and the mortgage market without the price bubble.

To conclude, Korea has had housing price bubble in selected areas. However, this bubble did not provoke a crisis similar to the U.S. sub-prime mortgage crisis. It is unlikely that Korea will experience the market meltdown because of the price bubble.

However, the undisciplined lending practices and the risky types of mortgage products could cause serious damage to the housing and the mortgage market even without violent price bubble. The policy implication is that the government should be more concerned as much with the mortgage lending practices and mortgage products as with speculation and price decrease.

<References>

- Allen, F., Gale, D. (2000). Bubbles and crisis. *Economic Journal*. 110: 236-255.
- Blanchard, O. Watson M.(1982). Bubbles, rational expectations and financial market. *NBER Working Paper*. 945, July.
- Brissimis, S.N. Vlassopoulos T. (2008). The Interaction between mortgage financing and housing prices in Greece. *Journal of Real Estate Finance and Economics*. 39: 146-164.
- Case, K.E., Shiller, R.J.(2003). Is there a bubble in the housing market. *Brookings Papers on Economic Activity*. 2: 299-342.
- Chan, H.L. (2001). Detecting rational bubble in the residential housing market of Hong Kong. *Economic Modeling*. 18: 61-72.
- Coi, Hee Kap (2003). The trend possibility of bubble in asset price. *Samsung Research Institute*. March.
- Chung, Joseph H., Kim, J.H., Kwon, H.I. (2004). Housing speculation and housing price bubble in Korea, KDI School of Public Policy and Management. *Working Paper 04-06*. February.
- Chung, Joseph H. (2009). Anatomy of housing price explosion in Korea. *Korea Local Administration Review*. December: 363-378.
- Chung, Joseph H. (1976). *Cyclical Instability in Residential Construction in Canada*. Economic Council of Canada
- Dispaquale D., Wheaton W.C. (1994). Housing market dynamics and the future of housing prices. *Journal of Urban Economics*. 35: 1-27.
- Disquale D., Wheaton, W.C. (1996). *Urban Economics and Real Estate Market*, Prentice Hall. Cliffs NJ.
- Englund, P., Y, M.Ioannides(1997),. Hosing price dynamics: An international empirical Perspectives. *Journal of Housing Economics*. 2: 119-126.
- Flood, R.P., Hodrick, R.J. (1990). On testing for speculative bubble. *Journal of Economic Perspectives*. 4(2): 85-101

- Garber, P.M.(1990). *Famous first Bubble. Journal of Economic Perspectives.* 4: 35-54.
- Gindro, E.I., Subhanij,T.,Szeto, J.,Zhu, H.(2008). Determinants of house prices in nine Asia-Pacific economies. *Bank of International Working Papers.* 263, October.
- Goodman, A.C.,Thibodeau, T.G.(2008). Where are the speculative bubbles in US housing markets?. *Journal of Housing Economics.* 17: 11.
- Hou, Y. (2010). Housing price bubble in Beijing and Shanghai?. *International Journal of Housing Market and Analysis.* 3(1): 3-37.
- Hui, E.C.M.,Shen, Y.(2006). Housing price bubbles in Hong Kong, Beijing and Shaghai: A comparative study. *Journal of Real Estate Finance and Economics.* 33: 299-327.
- Kim, K.H. (2004). Housing and the Korean Economy. *Journal of Housing Economics.* 13: 321-341.
- Kim, K.H., Suh, S.H. (1993). Speculation and Price Bubbles in the Korean and Japanese real estate markets. *Journal of Real Estate Finance and Economics.* 6: 73-87.
- Kim, K.H., Lee, H.S., Y.J. Park. (2003). Real estate price dynamics in Korea. *the Weimer School of Advance d Studies in Real Estate and Land Economics.* May.
- Kindleberger, C.P. (2008). Bubbles in history. in Durlauf, S.N., Blum, L.E. (Eds). *The New Palgrave Dictionary of Economics, 2nd edition.* Palgrave M cMillan, 5 October 2009.
- Lind, H. (2009). The price bubble in housing market: concept and indicators. *International Journal of Housing Markets and Analysis.* 2: 78-90.
- Major, C.IV, Michael,L., Vandell,K.D. (2008). Subprime lending and the housing bubble: Tail wags dog?. *Journal of Housing Economics.* 17: 272-90.
- Malpezzi, S., MacLennan,D.(2001). The long-run elasticity of supply of new residential construction in the United States and the United Kingdom. *Journal of Housing Economics.* 10: 278-306.
- Oikarinen,E. (2009). Household borrowing and metropolitan housing price dynamics-empirical evidence from Helsinki. *Journal of Housing Economics.* 18: 126-139.
- Quigley, J.M. (2001). Real Estate and the Asian Crisis. *Journal of Housing Economics.* 10: 129-161.
- Renaud,B. (1995). The 1985-1994 global real estate cycle: its causes and consequences. *Policy Working Paper of the World Bank.* May.
- Shiller, R.J. (2007). Low interest rate and high asset prices: An interpretation in terms of changing popular models. *Cowles Foundation Discussion Paper.* 10(1632).

- Shiller, R.J. (1981). do stock prices move too much to be justified by susquent changes in dividends. *American Economic Review*. 3: 555-574.
- Smith, M., Smith, G. (2006). Bubble, bubble, where is the housing bubble. *Brooking Panel on Economic Activity*. March
- Stiglitz, J.E. (1990). Symposium on bubble. *Journal of Economic Perspectives*. 4 : 13-18.
- Wheaton, W.C., Nechayev,G. (2008). The 1998-2005 housing 'bubble and the current corrector ': What different this time. *Journal of Real Estate Research*. 39(1): 1-26.

Received November 10, 2010

Revised November 23, 2010

Accepted December 7, 2010