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Recent Trends and Inter-Dependence

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Abstract

This study analyzes house price movements in the ASEAN+3 countries. Though there exist many reservations due to the serious limitations in the data quality and availability, the primary results appear to imply that the possibility of collapse in the ASEAN+3 region's house prices is smaller than those in the U.S. and European countries. However, it seems also legitimate to call policy-makers' attention on house prices in the ASEAN+3 region. Although relatively less serious than in the U.S. and European countries, the absolute magnitudes of house price appreciations in the region were substantial, and the current turmoil in housing markets in the U.S. and European countries is very likely to generate global recession, which will indirectly affect the region's house prices through lowering growth rates of the member countries. Once house prices begin to decline in one of the countries, house prices in neighbor countries will be likely to be affected. If the possibility of house price corrections needs to be reduced, a traditional package of boosting policies --- lowering interest rates and increasing government spending --- seems to be warranted.

Key Word: House Price, Global Recession, Contagion

JEL Codes: F42, F41, E32

1. Introduction

Since the second half of 2007, the global financial market has been severely disturbed by the collapse of house prices. Initially triggered by the sub-prime mortgage problems in the U.S., the current financial crisis is rapidly spreading across global markets including European countries. By now, many seem to agree that the current financial crisis is the most serious global financial and economic crisis since the Great Depression.

Although the magnitude and severity of the current crisis may not have been anticipated, the concerns regarding the possibility of contagion across sectors and countries have been consistently recognized. For example, IMF Managing Director Strauss-Kahn stated in one of his recent public addresses in February, 2008:

"If we look now at the current financial crisis from this perspective we can see that what began as a problem in a single sector in a single country --- the housing market in the United States --- has become a global problem. And, what was first manifested as a problem for financial institutions is now becoming a problem for economies. This is obviously the case in the United States. I believe that the effects will be felt increasingly in Europe. And I do not think the emerging economies are immune from this crisis."

As emphasized in this address, the global economy is now realizing how devastating a real estate price bubble could be. In fact, since the ultimate source of financial instability today is rooted in the house price bubble that has accumulated during the past decade, the stability of financial market will depend critically on the prospect of house prices.

Many commentators as well as policy-makers argue that unlike the U.S. and Europe, Asia is relatively safe, though not fully immune, from this global turmoil because the financial institutions in this region have not been much exposed to the U.S. housing market. Additional grounds for such optimism are that housing markets in Asia went through a major correction during the crisis period in the late 1990s, and that they also differ widely due to the different levels of their economic development and systems.

Is this a legitimate assessment? Are the housing markets of Asian economies relatively segregated from one another and the U.S.? Isn't there a possibility that the real estate markets in Asia might have triggered another round of bubble? Although the house prices in Japan, the biggest economy of the region, have been either stable or even deflated for the past decade, there have been many anecdotes of speculation in housing markets in East Asia such as Seoul and Shanghai.

Monitoring house price developments is always important because housing is

generally the single largest investment made by households. The experience during the Asian financial crisis has shown that downward corrections in house prices have caused considerable economic distress, and that a sharp fall in housing prices can possibly unleash systemic risks. Even in Asia, this fear is not unfounded in view of the disastrous housing bubbles in the 1990s. For example, Japan's housing price bubble from 1985 to 1990 (157%) was followed by a fall in real housing prices by 68% throughout 1990 to 2005, and in Singapore the bubble from 1990 to 1996 (282%) was followed by a fall in real housing prices by 55% over the period 1996-1998.

In this regard, it seems necessary to examine whether house prices in ASEAN+3 countries have indeed been on the rise at rapid paces to generate a concern for a sharp correction. If so, there are many important questions to be addressed. Are the house prices justifiable by fundamentals, or should they be considered as important risk factors to financial markets? In which countries do the problems appear to be more serious? Is there any evidence that house prices are affected by the fluctuations of other (presumably large) countries' real estate prices? Are there appropriate policy measures to maintain financial stability? What are the implications regarding monetary and financial policies?

Motivated by these important issues, this study attempts to provide preliminary

assessments on house prices of the region. Section 2 briefly explains the data used in this paper. Section 3 overviews the historical development of the region's house prices, while more detailed trends of each country are documented in the Appendix. Section 4 presents the possibility of contagion across countries including the U.S. Section 4 provides further explanations of the house price developments in comparison with the macro-economic fundamentals such as income growth, financial conditions (short-term interest rate) and general inflation. Section 6 introduces the recent debate regarding monetary and financial policies in relation to the asset price fluctuations such as house prices followed by conclusion in Section 7.

2. Data

Unlike stock prices, transactions in real estate markets are so infrequent and heterogeneous that designing a reliable aggregate index is a very difficult task even in advanced countries. Despite inevitable limitations in the quality of data, most advanced countries have published useful indexes on real estate prices. For some ASEAN+3 countries, however, the data on real estate prices appear to be either unavailable or non-existent.

Table 1 summarizes the data collected for this research, mostly through the Internet. As for Japan, long time-series data for the nation as a whole and various areas are available, but the problem is that the data are indexes for land prices, not for house prices. Like other researches on Japan's real estate prices (e.g., Girouard *et. al.* (2006) and Van den Noord (2006), OECD), this study uses the urban land price index as a proxy for house prices.

As for Korea, the time span is shorter than that of Japan's, but a relatively large amount of information is available from a semi-government agency (Kook-Min Bank). Besides, the time span is long enough to cover the "East Asian Bubble Period" of the late 1980s and the Asian Crisis period of 1997~1998, and its data-set also provides the price indexes not only for various regions, but also for different house types (e.g.,

detached vs. apartment).

As for China, a relatively broad set of information (regional, house types, etc.) is available, but its time span is too short: annual data are available from 1997 on and quarterly data only from 2004 on. This is in fact a serious limitation of this study, given the importance of the Chinese economy in the region.

Hong Kong, though not a member country of ASEAN+3, is included because it appears to be closely linked to the ASEAN+3 region and relevant data are readily available. The time span of the data for Hong Kong goes back to the 1980. And that for Singapore is as long as that for Japan: since 1976. There also exist more information about the prices of different types of houses.

Malaysia provides sufficiently long time-series data since 1988, while Thailand and Indonesia provide relatively short time-series from 1994 and 2000, respectively. There are no available data for other member countries (Vietnam, Brunei, Laos, Myanmar and Cambodia).

3. Historical Trends of House Prices

Nominal House Prices

Figure 1 shows the trends of house prices in each country with the fourth quarter of 2000 as the base year. It is well known that Japanese real estate prices have not co-moved with the global house price boom: after the explosive run-up in the late 1980s, the Japanese real estate prices were corrected by around 30 percent during the 1990s, and have continued to further decline by approximately 25 percent since 2000. The current level of the price index is more or less a half of its peak in 1991.

Except for Japan, however, the house prices in the ASEAN+3 countries have been rising after the Asian crisis. In the case of Korea, its current level is approximately 60 percent higher than that in 2000, while it is approximately 40 percent higher in China. A point to be considered, however, is that the house price in Korea began to rise after some 20 percent of correction during the 1990s, but no such information can be obtained from the data for China. In fact, the trend of house prices in Korea was similar to that of Japan until 2000, but it has been diverging from the Japan's trend since then.

There is an interesting pair of countries, Hong Kong and Singapore, two financial hub cities in Asia: house prices appear to co-move, though more volatile in Hong Kong.

With a huge bubble having accumulated until the outbreak of the Asian crisis in 1997, house prices in the two cities collapsed during the Asian crisis in 1998. In the case of Hong Kong, the house price index skyrocketed by almost 50 percent in 1997, and then collapsed to the level of 1996 in one year, recording a drop of almost 40 percent in 1998. In Singapore as well, its house price index declined by around 30 percent in 1998. After a period of re-adjustment, house prices began recovering in 2003 and its pace has accelerated since 2007. The current level is up 50 percent in Hong Kong and 33 percent in Singapore, compared to the level in 2000.

Another pair of countries to consider is Malaysia and Thailand. After 15 to 25 percent of corrections during the Asian crisis period, their house prices have been steadily appreciated by approximately 25 percent since 2000. The price hike in Indonesia is perhaps most astonishing, where its house price index has increased by 80 percent since 2000.

Real House Prices

However, this rapid increase of house prices in Indonesia is simply a result of high inflation in general prices. As Figure 1B shows, the real house price index in Indonesia has declined by almost 15 percent since 2000. Except for Japan where both nominal and real prices declined by 25 percent from the 2000 levels, Indonesia is the

only country in the sample that has experienced a real loss in house value since 2000.

While Korea has experienced the second largest house price appreciation (next to Indonesia) since 2000, it is Hong Kong that has experienced the largest house price appreciation --- almost 50 percent --- in real terms since 2000. This magnitude of real price appreciation is not as large as those in advanced countries --- ranging from 50 to 100 percent (Figure 2) --- where house prices finally collapse. Also, the pace of recent price appreciation has been far milder than that in 1997 --- more than 50 percent within one year --- right before the Asian crisis. Nevertheless, both the magnitude of price appreciation and the pace of price hike for the recent two years appear to be prominent enough to raise concerns. With regard to the recent hike, Singapore is similar to Hong Kong, though its magnitude is far milder --- approximately 20 percent since 2000.

In China and Korea, real house prices did not particularly run up for the recent couple of years. However, they have been steadily rising to the level of 25 to 30 percent higher than those in 2000. Nevertheless, there could be an issue with the base year of this assessment. In the case of Korea, for example, the base year happens to be the year when the real house price index hit the bottom after a long and significant correction from 187 in 1991 to 100 in 2000, which is more than twice as large as the magnitude of the Japan's correction over the same period.

Real house prices have been also steadily rising in Malaysia and Thailand, but their magnitudes are relatively modest ranging from 5 to 10 percent compared to those in 2000. In these countries as well, however, house prices have not yet recovered their pre-crisis levels in real terms.

House Price to Income Ratios

As was discussed, house prices in most Asian countries (except for Indonesia) have been appreciated in real terms since 2000. However, this observation does not mean that houses have become less affordable than in 2000. As the Asians' income (per capita) has grown more rapidly, they can more readily afford to purchase houses now than in 2000.

Figure 3 shows a housing affordability index --- house price index divided by income per capita. According to this index, houses have become far more affordable in most of the Asian countries than in 2000. The only exception is Hong Kong, where houses are less affordable by almost 30 percent than in 2002, though not as unaffordable as in 1996. For the other countries, houses have become more affordable by approximately from 10 percent (Korea, Japan and Singapore) to almost 40 percent (China, Malaysia, Thailand and Indonesia) than in 2000.

4. Correlations Across Countries

In relation to the current financial crisis, another important issue to check is contagion. The world is currently witnessing how fast one country's crisis can be propagated to other countries through integrated financial markets. An obvious piece of evidence for the global contagion is the close co-movement of the respective national stock markets including Asia even at a daily frequency.

What about the real estate markets? A common conjecture is that real estate markets are far less integrated than stock markets, and thus one country's real estate prices should not be greatly affected by other countries' real estate markets. However, the recent movement patterns of house prices in the U.S. and European countries appear to be closely linked across national borders. In fact, bilateral correlation coefficients of house price appreciation rates between the U.S. and individual European countries are well over 0.5 with statistical significances. (Figure 4)

Correlations with the U.S.

Are house prices in Asia also closely linked to those in the U.S.? Figure 4 indicates that the Asian real estate markets are not greatly influenced by those in the U.S.: the correlation coefficients are negative for a half of the sample countries for both nominal and real house price appreciation rates (as well as for both annual and quarterly

frequencies: not reported).

However, there is a noteworthy exception, China. The real house prices of China turn out to be closely correlated with those of the U.S.: the correlation coefficient is 0.75. This result is surprising in that Chinese financial markets are not much liberalized. It may be due to an implicit link between China and the U.S. through a deep involvement of the Chinese official foreign reserves into the U.S. financial market. Or, it may be simply due to a small sample problem: China's data are available from 1997, providing only a ten-year data period. In fact, the correlation coefficient for nominal house prices is only 0.13 and statistically insignificant.

Another intriguing result is that house prices, both nominal and real, of Hong Kong and Singapore are negatively correlated with those of the U.S. In fact, this result is robust for the sample period excluding the Asian crisis (not reported). As far as Hong Kong and Singapore are international financial hubs and maintain either fixed or "stable" exchange rates vis-à-vis the US dollar, financial conditions of the two cities are expected to be greatly influenced by the U.S. financial market situation. In this respect, the negative correlations between the two cities and the U.S. may indicate the possibility that Asian housing market is regarded as a substitute, rather than a complement, for the U.S. (and European countries) in the international capital market.

That is, a positive perception for the U.S. market (or a negative perception for the Asian market) tends to move global capital from Asia toward the U.S., and *vice versa*, generating negative correlations in house prices. Of course, there must be complementary effects as well, such as the global financial crisis or global monetary easing. However, the result for the sample period examined in this study, at least, shows that the substitute effect outweighs the complement effect.

Correlations among the ASEAN+3 Countries

Intra-regional correlations indicate that the housing markets of ASEAN+3 countries are not as inter-linked with one another as those in the U.S. and European countries: most of the correlation coefficients among Asian countries in Table 2 are smaller than those between the U.S. and individual European countries. Yet, the house prices do appear to be intra-regionally contagious in that most of the correlation coefficients are positive ranging from 0.2 to 0.7, except for Indonesia. In addition, there are some blocks of countries within which house prices appear to be closely inter-linked: (i) Japan and Korea, (ii) China, Hong Kong and Thailand, and (iii) Hong Kong, Singapore and Malaysia

As for the block of Japan and Korea, the correlation coefficients for nominal and real house prices are 0.51 and 0.42, respectively. However, a substantial portion of this

correlation seems to be generated from the late 1980s and early 1990s when the real estate bubbles were formed and busted in both countries. In fact, as the early years of the sample period is excluded from the data, the correlation coefficients decline toward 0~0.2 (not reported).

As for the second block, the correlation coefficients of Hong Kong and Thailand with China are over 0.7, respectively, for nominal prices. These results indicate that the housing markets of the three countries are very closely linked, although the correlations become weaker for real prices due to a peculiar inflation dynamics of China. In fact, the correlation coefficient for the real prices between Hong Kong and Thailand is over 0.5.

As for the third block, it was already noted in Section 3 that Hong Kong and Singapore are closely correlated with each other: the correlation coefficient is approximately 0.5. What was not noted in Section 3 is Malaysia, which produces even higher correlations with both Hong Kong and Singapore than the correlation between the two cities, for both nominal and real prices. An interesting observation in relation with the second block is that, unlike Hong Kong, Singapore and Malaysia do not show particularly high correlations with China and Thailand.

Overall, the ASEAN countries (except for Indonesia) are more mutually inter-linked than the +3 countries are. Among +3 countries, China is more linked to the

ASEAN countries than to the other +3 countries: the correlation coefficient between Japan and China is even negative. Korea appears to be related to both Japan and China, but the degree of correlations does not appear to be particularly high since the 1990s.

5. House Prices and Macro-Economic Fundamentals

Though not as closely inter-linked as in the U.S. and European countries, house prices in the ASEAN+3 region appear to be correlated across countries. A natural question that should be asked then is why? This co-movement of house prices can be a result of genuine housing market integration in the ASEAN+3 countries, or simply a reflection of the co-movement in macro-economic fundamentals that should affect house prices in each country.

Cross-Country Correlations of Macro-Economic Fundamentals

In this context, it is necessary to examine representative indicators of macro-economic fundamentals: GDP growth, CPI inflation and interest rates. We also tried aggregate money supply indicators, but failed to obtain any reliable results (not reported). As for interest rates, both short- and long-term rates were tried. Short-term interest rates (central bank's target interest rates except for China for which one year lending rate was used) were thought to be more relevant to monetary policy effects, while long-term interest rates (10-year government bond yield rates for Japan and Malaysia, 5-year government bond rates for Korea, 12-year government bond rates for Thailand and 5-year lending rates for China) were thought to be more directly relevant to house prices. As will be discussed, however, most of the analysis results are similar

regardless of whether short- or long-term interest rates are used. Therefore, this section's discussion will be mainly based on the results with short-term interest rates, which are more readily available than long-term rates for the ASEAN+3 countries.

Tables 3A~3D present the simple correlation coefficients of the macro-economic fundamentals across countries. A first look at the tables confirms that the macro-economic fundamentals are truly inter-linked across the ASEAN+3 countries except for Indonesia (as for interest rates, China and Hong Kong are also exceptional). In fact, the cross-country correlations of macro-economic fundamentals are higher and more significant than the cross-country correlations of house prices, suggesting the possibility that the house price correlations may be a simple reflection of the co-movement in macro-economic correlations.

Regression Results of Individual Countries

Therefore, we performed regressions of house prices on macro-economic variables in each country, along with another country's house prices as an additional explanatory variable to check whether the contagious effect still remains after controlling for the effects of its own country's macro-economic variables.

The regression results reported in Tables 4A~4D, where the house price index of the U.S. was used as an additional explanatory variable, are generally in accord with

common expectations: house prices rise when growth rates are high and interest rates are low. Also, high inflation rates tend to boost nominal house prices. It is also found that the house prices of the ASEAN+3 region have not been greatly influenced by the U.S. market, with a possible exception of China. These general patterns are observed no matter whether nominal (Tables 4A and 4B) or real house prices (Tables 4C and 4D) are regressed and no matter whether short-term (Tables 4A and 4C) or long-term interest rates (Tables 4B and 4D) are used as an independent variable.

Notwithstanding these general conclusions, there are some variations in the results across countries. As for Japan where house prices have ever been declining, the regression results are still encouraging. First, high growth does help boosting (or lessening the declining speed of) house prices. A low interest rate also appears to raise house prices in the short run (the same quarter), though not in the long run (negative coefficients for the interest rate were obtained only from the dynamic models with lagged dependent variable). Nevertheless, the most important factor for house prices in Japan seems to be the general price inflation/deflation inertia in the sense that the coefficient for the lagged dependent variable is close to 1.

The regression results for Korea's real house prices are just standard: high growth and low interest rate boost the real house prices with a 75 percent of quarterly inertia

(the coefficient of the lagged dependent variable). The only noticeable exception is that nominal house price appreciation rates are negatively correlated with general inflation in the short-run (a quarter), though not in the long run. This result seems to suggest the possibility that short-term fluctuations in Korea's inflation have been greatly affected by supply sides such as oil prices that create a negative correlation between inflation and economy's demand conditions.

As for China, the signs of all the coefficients are consistent, though some of them are statistically insignificant due to a small sample size. Most noteworthy for China, however, is the results that the coefficient for the U.S. house price appreciation rate is still significant after controlling for the effects of domestic fundamentals. According to the regression coefficients, a 1 percent fall in the U.S. house prices is associated with 0.20~0.25 percent decline in China's house prices both in nominal and real terms. It is beyond the scope of this study to rigorously examine why China's housing market is influenced by the U.S. market. Nevertheless, considering the recent global trend of house price collapse, this result seems to be worth some concerns.

In Hong Kong and Singapore, house prices are extremely sensitive to the fluctuations of macro-economic fundamentals of their own countries. For example, a 1 percent point increase in the growth rate is associated with more than 2~3 percent

increase in house prices. The results for the dynamic models with lagged dependent variables even imply that a one percent point increase in the growth rate boosts the house prices by approximately 1.5 percent in Hong Kong and 0.8 percent in Singapore within the same quarter, and gradually amply the effects up to 5 percent (=1.5/(1-0.7)) in Hong Kong and 4 percent (=0.8/(1-0.8)) in Singapore over time. Similar arguments also hold for the interest rates and inflation rates. A one percent point cut in interest rate boosts the house prices by 2 to 3 percent, while a one percent increase in the inflation rate is associated with approximately 2 percent increase in nominal house prices (or 1 percent increase in real house prices).

While house prices in Hong Kong and Singapore are very volatile, their correlations with the U.S. house prices still remain negative after controlling for the macro-economic fundamentals. As discussed in Section 4, this result may imply the possibility that the global capital market regards Hong Kong and Singapore as a substitute market to the U.S.

The results for Malaysia are very standard and fairly stable. A 1 percent increase in the growth rate boosts the house prices from approximately 0.4 percent in the same quarter to a 1.2 percent in the long run. Although the effect of interest rate does not appear to be significant in the non-dynamic models, the results for dynamic models are

very significant: a 1 percent point cut of the interest rate boosts the house prices by 0.64 percent in nominal terms and by 0.50 percent in real terms.

The regressions for Thailand do not provide the expected sign for the interest rate coefficients: they turn out to be all positive, some of which are even statistically significant. We do not have a good conjecture for why this result is produced for Thailand. Other than the interest rate effect, the coefficients for the growth rate and inflation rate are very stable.

Indonesia is the most extreme outlier as to the general conclusions of the regressions. Considering the small sample size (27 quarters for 7 years), however, we are not sure how seriously we have to take the regression results.

Controlled Cross-Country Correlations within the Region

In addition to the regressions reported in Tables 4A~4D where the U.S. house price index was used as an additional explanatory variable, we also conducted regressions with another ASEAN+3 country's house price index in place of the U.S. Tables 5A and 5B report the regression coefficients of another country's house price index (column) for each country (row). For example, the number in row "Japan" and column "Korea" in Table 5A, 0.115, reports the coefficient estimate of Korea's house price index in the regression of Japanese house price. In comparison with Tables 2A and

2B where unconditional correlation coefficients were reported, the results in Tables 5A and 5B are the estimates of coefficients after “controlling for” the effects of its own country’s macro-economic fundamentals. All the results in Tables 5A and 5B were obtained from the regressions using short-term interest rates.

Looking at Tables 5A and 5B, it appears that Japanese house prices are affected by many other ASEAN+3 countries. However, this seems to be a spurious result due to the secular declining trend of Japanese house prices, considering that most of the coefficient estimates are negative and most of these negative coefficients become insignificant in the regressions with the lagged dependent variables.

If there is a meaningful result for Japan, it may be the effect of Korea, 0.115. Literally interpreting, this result indicates that a 1 percent increase of house prices in Korea tends to increase the Japanese house prices by 0.115 percent. However, the reverse effect appears to be approximately 10 times greater than this effect: that is, a 1 percent increase of house prices in Japan tends to increase the house prices in Korea by 1.134 percent. These mutual effects between Japan and Korea are consistent with the close unconditional correlation between the two countries in Tables 2A and 2B, though the correlations appear to be getting weaker after the Asian crisis.

As for China, an interesting result is the effect of Japan. As seen in the

unconditional correlation, the Japanese house price fluctuations appear to have negative impacts on the Chinese house prices, in stark contrast with the positive effects of the U.S. house prices. Another country that appears to have positive effects on the Chinese house prices is Hong Kong. In the case of Hong Kong, however, it seems the case that Hong Kong is far more affected by China than the other way around in the sense that the coefficient estimate of the Chinese house price in the regression of Hong Kong's house price is more than ten times as high as that of Hong Kong's house price in the regression of the Chinese house price.

Hong Kong's (nominal) house prices appear to be greatly affected by the Japanese house prices as well as the Chinese house prices. In fact, Hong Kong is the only country that appears to be significantly affected by both Japan and China, the largest two countries in the region. However, the real house prices of Hong Kong do not appear to be much affected by other countries, reflecting the peculiar inflation dynamics of Hong Kong.

Perhaps the most interesting result in Tables 5A and 5B is the relationship between Hong Kong and Singapore. Even though their unconditional correlation was very high, they did not have any significant independent effects on the other country (if any, there are negative effects). These results strongly suggest that the high

unconditional correlation between the two countries was generated from the co-movements of macro-economic fundamentals rather than an “unfounded contagion.”

As for the region of Singapore, Malaysia and Thailand, it appears that Malaysia leads the house prices. For example, Singapore is significantly affected by Malaysia, but not by Thailand, while it affects neither Malaysia nor Thailand. Between Malaysia and Thailand, there exist mutual effects, but Thailand appears to be far more sensitively affected by Malaysia than the other way around.

In sum, the unconditional correlations in house prices in the three regional groups of countries do not seem to be completely attributable to the co-movements of the macro-economic fundamentals considered in this study (GDP growth, interest rates and inflation). The only exception is Hong Kong and Singapore, where the high unconditional correlation is completely attributable to the co-movements of macro-economic fundamentals. For the group of Japan and Korea, Japan appears to affect Korea, and for the group of China and Hong Kong, China appears to affect Hong Kong. For the group of Singapore, Malaysia and Thailand, Malaysia lead the house prices.

6. House Prices and Monetary Policy: Overview

From a welfare policy perspective, supplying houses at the lowest possible prices may be the policy goal. From a stabilization policy perspective, however, a sharp depreciation of house prices is, at least, as harmful as a sharp appreciation.

In relation to the house price fluctuations, the most arguable is monetary policy response. As was readily confirmed for the ASEAN+3 countries in the previous section, interest rate is probably the most effective policy measure for house price stabilization. Nevertheless, the effectiveness of monetary policy does not warrant the recommendation that it should be used for house price stabilization, or more broadly, asset price stabilization. It is still an on-going issue in both academia and policy circles whether monetary policy should respond to asset price fluctuations.

The main stream idea is not to use monetary policy as a direct asset price stabilization tool for the following reasons. First, it is extremely difficult to identify *ex ante* whether asset price fluctuations are due to productivity or bubbles, and thus a systematic response to asset price fluctuations is almost impossible. Second, as far as monetary policy tool is anchored by inflation targeting, this single monetary policy measure cannot be used for another target such as asset price stabilization (See, for example, Bean (2003)). Third, it is believed that asset prices can also be stabilized if

monetary policy successfully stabilizes inflation and growth (See, for example, Gilchrist and Leahy (2002)). Therefore, the monetary authority should take asset price into account only to the extent that it conveys meaningful information about the real economy such as growth and inflation.

The monetary authority of the U.S. has repeatedly confirmed this policy stance. Among many others, Alan Greenspan who served as the Chairman of the Federal Reserve Board stated in the American Economic Association's meeting (2004, p.40): "There is little dispute that the prices of stocks, bonds, homes, real estate, and exchange rate affects GDP. But most central banks have chosen, at least to date, to view asset prices not as targets of money, but as economic variables to be considered through the prism of the policy's ultimate objective." Not only the former, but also the current Chairman of the Federal Reserve Board, Ben Bernanke, presented an almost identical argument, when he was in academia (Bernanke and Gertler (1999, pp.40-41)): "In brief, it is that flexible inflation-targeting provides an effective, unified framework for achieving both general macroeconomic stability and financial stability. Given a strong commitment to stabilizing expected inflation, it is neither necessary nor desirable for monetary policy to respond to changes in asset prices, except to the extent that they help to forecast inflationary or deflationary pressures."

There have been counter-arguments, however, particularly during the period of IT bubbles and global house price run-ups. Perhaps the fore-runner of alternative views on monetary policy is Cecchetti (2002) with his colleagues (Cecchetti, Genberg and Wadhwani (2002)): "central banks seeking to smooth output and inflation fluctuations can improve … macroeconomic outcomes by setting interest rates with an eye toward asset prices in general, and misalignment in particular." Borio and Lowe (2002) and Helbeing (2005), both at the Bank for International Settlement, also emphasized the potential danger of asset price bubbles and called for appropriate policy responses. In particular, Borio and Lowe argued that identifying financial imbalances *ex ante* is not impossible and "sustained rapid growth combined with large increases in asset prices" are so dangerous for monetary responses to be necessary.

Considering the alternative views, Trichet (2005), the President of the ECB, proposed a monetary policy stance that was a bit more flexible than that by the Federal Reserve Board regarding asset price bubbles: "The ECB's primary objective is unambiguously the maintenance of price stability. … I mentioned though that boom-bust cycles in asset prices do exist and can potentially harm the entire economy, especially via the effect on the financial system. … allowing some short-term deviation from price stability in order to better ensure price stability over more extended horizons

might – under very restrictive assumptions – be the optimal policy to follow. The principle behind it should not be misunderstood as a systematic reaction to asset price booms, but rather as a selective response based on the careful analysis of all the available information."

7. Summary and Concluding Remarks

This study analyzes house price movements in the ASEAN+3 countries. Though there exist many reservations due to the serious limitations in the data quality and availability, the primary results can be summarized as follows:

(1) Since 2000, house prices in Asia, except for Japan and Indonesia, have been rising in real terms: approximately 50 percent in Hong Kong, 25~30 percent in Korea, China and Singapore, and 5~10 percent in Malaysia and Thailand. These price appreciations are substantial even though they are far less serious than the U.S. and many European countries where the real house prices have been appreciated by 50~100 percent.

(2) House prices in Asia do not appear greatly affected by those in the U.S. The only exception may be China, where 20 percent of the price fluctuation in the U.S. appears to be transmitted.

(3) Intra-regionally, house prices in most countries are inter-linked to some extents, except for Indonesia, though not as much correlated as those between the U.S. and European countries.

(4) The blocks of countries with particularly high correlations are: Japan and Korea; China and Hong Kong; Hong Kong and Singapore; and Singapore,

Malaysia and Thailand. Within these groups, Japan affects Korea, China affects Hong Kong, and Malaysia leads Singapore and Thailand. The unconditional correlation between Hong Kong and Singapore appear to be completely attributable to the co-movements in macro-economic fundamentals.

(5) For most of the countries, it is confirmed that house prices are boosted by high growth, low interest rates and high inflation.

From these results, it seems legitimate to claim that the possibility of collapse in the ASEAN+3 region's house prices is smaller than those in the U.S. and European countries. The price appreciations in the region were less serious, and the possibility of rapid contagion appears to be smaller.

However, it seems also legitimate to call policy-makers' attention on house prices in the ASEAN+3 region. Although relatively less serious than in the U.S. and European countries, the absolute magnitudes of house price appreciations in the region were quite substantial. Also, the result that the region's house prices do not appear to be greatly affected by the U.S. house prices should not be over-emphasized as a comforting factor. The current turmoil in housing markets in the U.S. and European countries is very likely to generate global recession, which will indirectly affect the region's house prices

through lowering growth rates of the member countries. Once house prices begin to decline in one of the countries, house prices in neighbor countries will be likely to be affected.

If the possibility of house price corrections needs to be reduced, a traditional package of boosting policies --- lowering interest rates and increasing government spending --- seems to be warranted. Although it is strongly recommended to take expansionary policy stance in a coordinated manner, the degree of boosting policies and the mix of monetary and fiscal policies need to be fine-tuned depending upon each member country's macro-economic situations, such as inflation, fiscal position and exchange rate. In any case, prudent financial supervision cannot be over-emphasized in that the adverse effects of asset price collapses are most likely to be propagated through financial market instability and credit crunches.

Before concluding, it is necessary to re-emphasize that the assessments of this study should be taken with many reservations in relation to the data availability. First, many analyses in this study were carried out for relatively short time periods for many countries such as China and Indonesia. Considering the immense magnitude of China's influence on the region in particular, the limited availability of data for China can impair the reliability of the assessment about the whole region. Second, analyses in this study

are mostly based on house price *indexes*. This implies that this study could not directly address the issue that the current *levels* of house prices can be justifiable by fundamentals such as rents. Third, this study mostly looks at nation-wide data, which may conceal the serious price run-ups of major cities that can be potential threat to the financial system if the real estate lending was focused on those cities.

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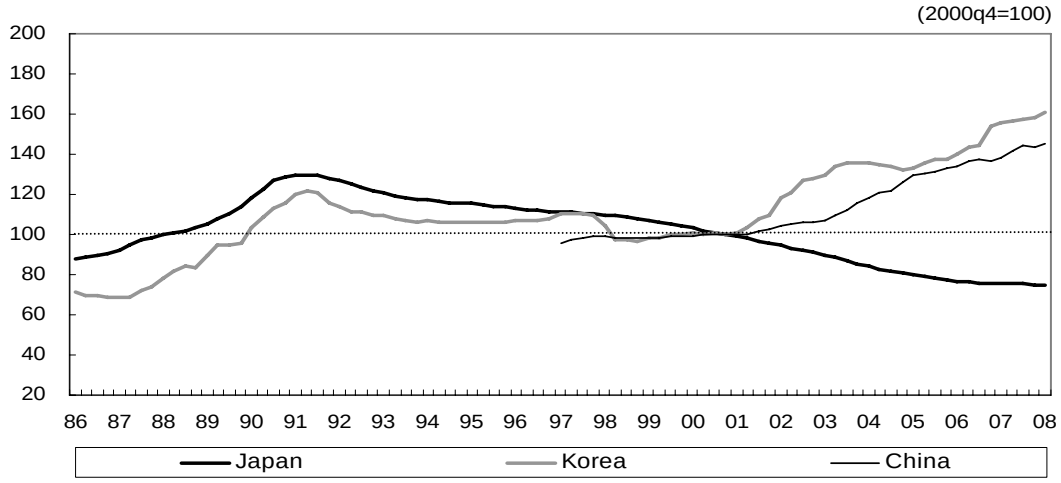
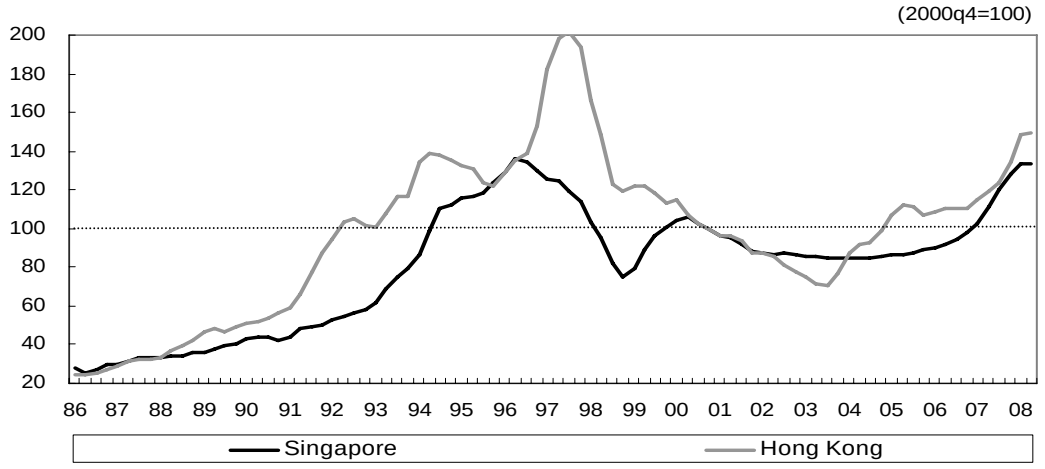
[Table 1] Data for House Prices: Definition, Period and Source

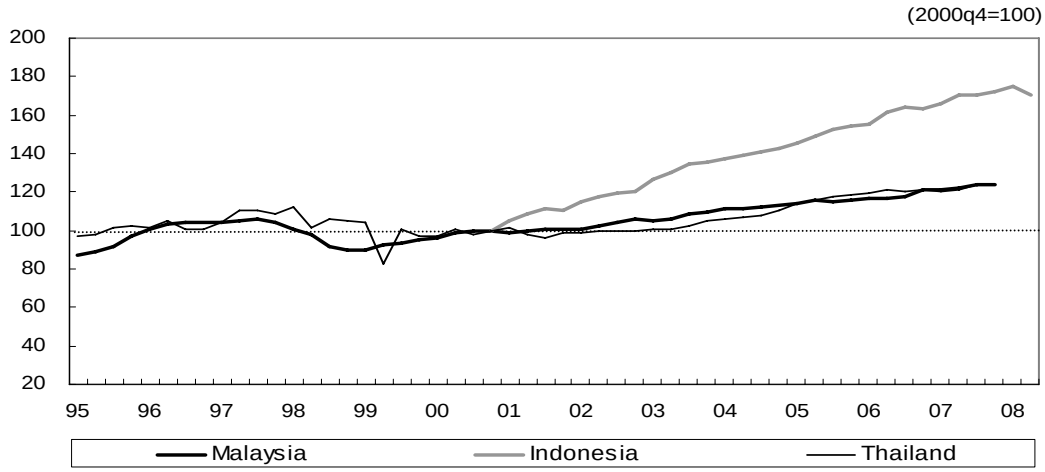
	House price definition	Period	source
Japan (JPN)	Urban Land Price Index (residential)	1975q1~2008q1	Japan Real Estate Institute (http://www.reinet.or.jp/)
Korea (KOR)	Purchase Price Index	1986q1~2008q2	Kookmin Bank (http://www.kbstar.com/)
China (CHN)	Property Price Index	2004q1~2008q2 (1997~2007)	National Bureau of Statistics, CEIC (http://www.stats.gov.cn/english/)
Hong Kong (HKN)	Private Domestic Unit Price Index	1979q4~2008q2	Rating and Valuation Department (http://www.rvd.gov.hk/en/publications/pro-review.htm)
Singapore (SIN)	Property Price Index: Private Residential	1975q1~2008q2	Urban Redevelopment Authority, CEIC (http://www.ura.gov.sg/)
Malaysia (MAL)	House Price Indicators	1999q1~2007q4 (1988~2007)	Central Bank of Malaysia (http://www.bnm.gov.my/index)
Thailand (THA)	HPI: Single-detached house (including land)	1994q1~2007q3	Bank of Thailand (http://www.bot.or.th/English/Pages/BOTDefault.aspx)
Indonesia (IND)	Residential Property indices	2000q4~2008q2	Bank of Indonesia (http://www.bi.go.id/web/en)

* Note: Time-series data of house-price are not produced in Vietnam, Cambodia, and Laos.
House price data are not available for Philippines, Myanmar and Brunei.
Years in parentheses for China and Malaysia are the time periods for annual data.

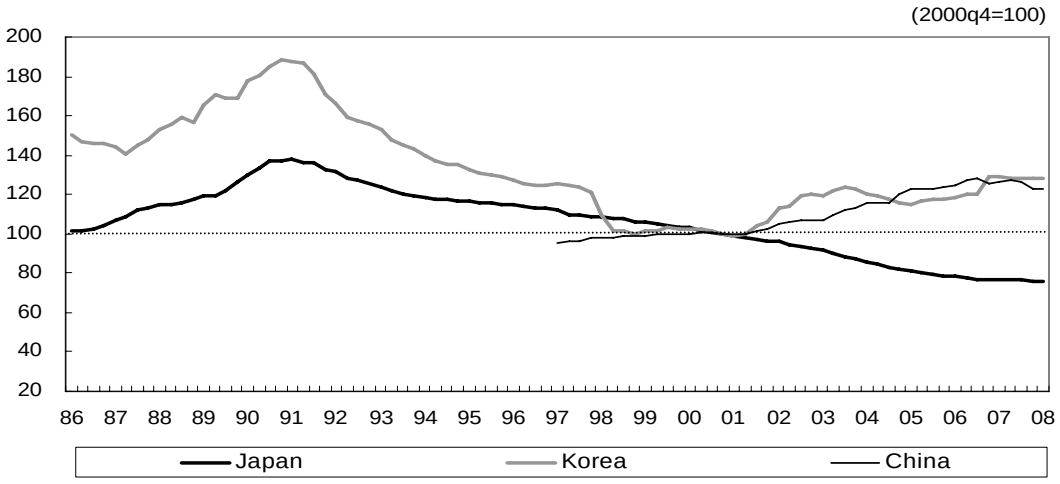
[Figure 1A] House Price Index (Nominal)

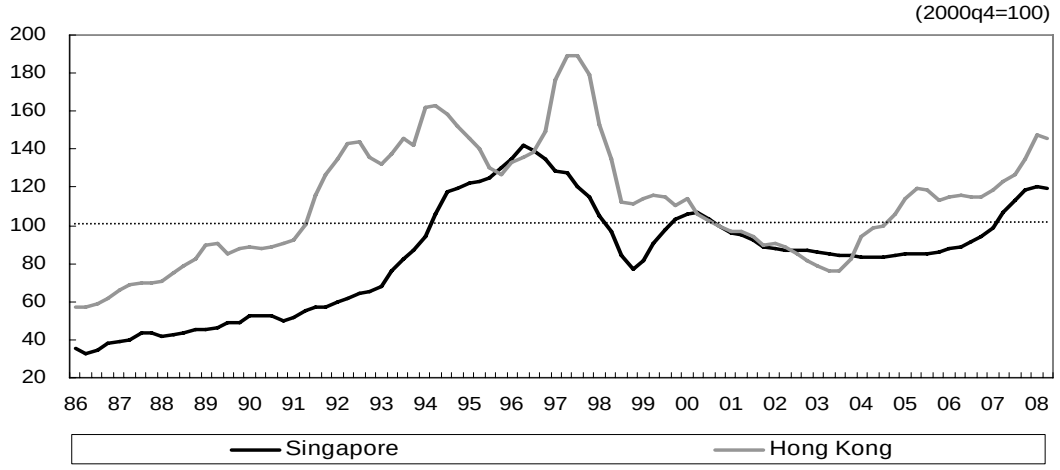


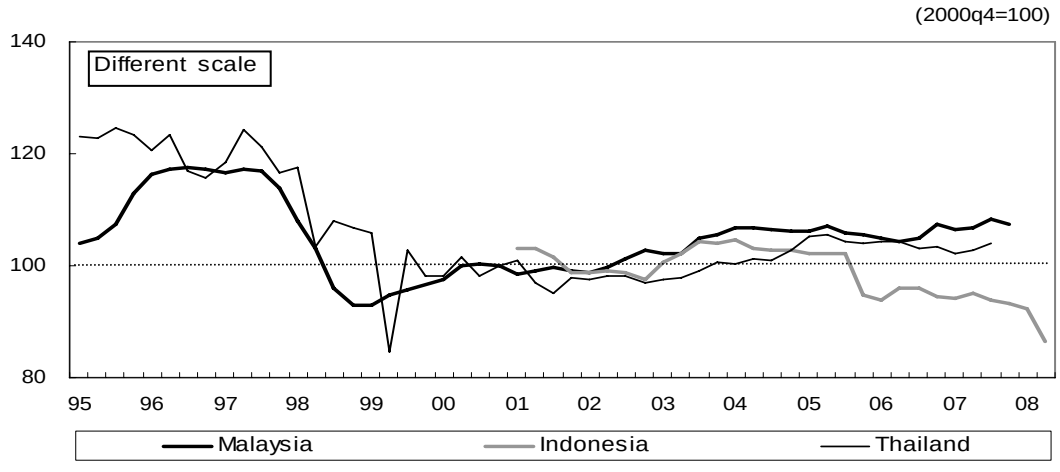




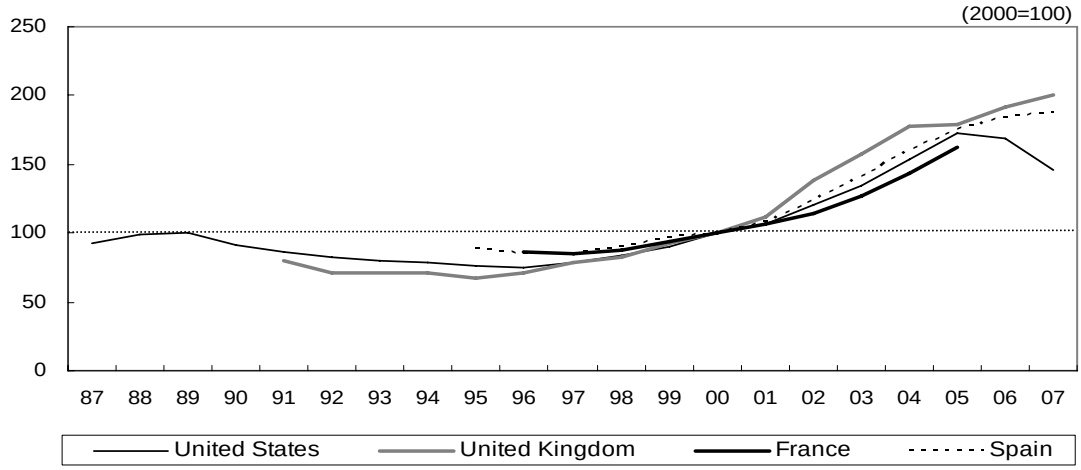
[Figure 1B] House Price Index (Real)



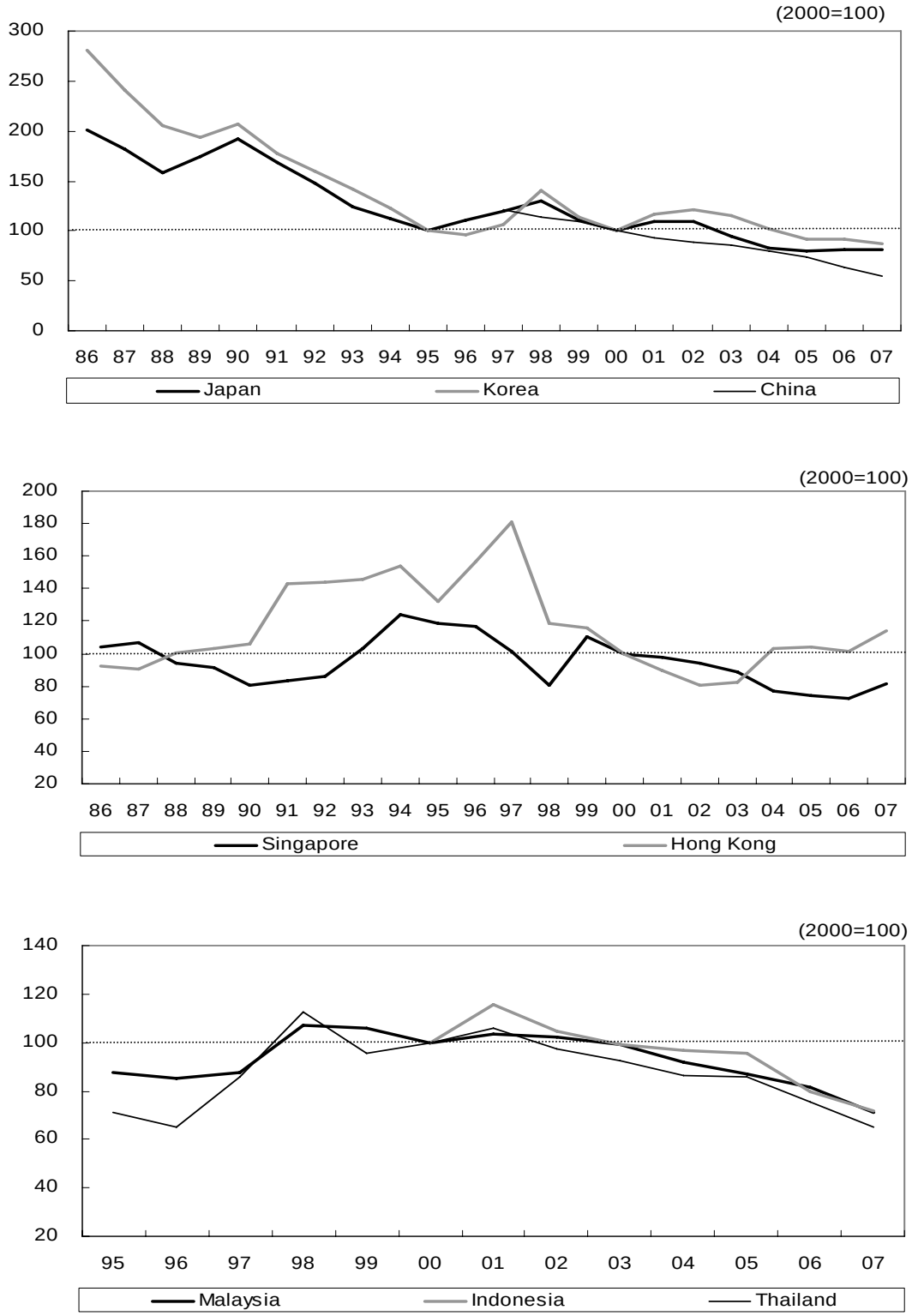




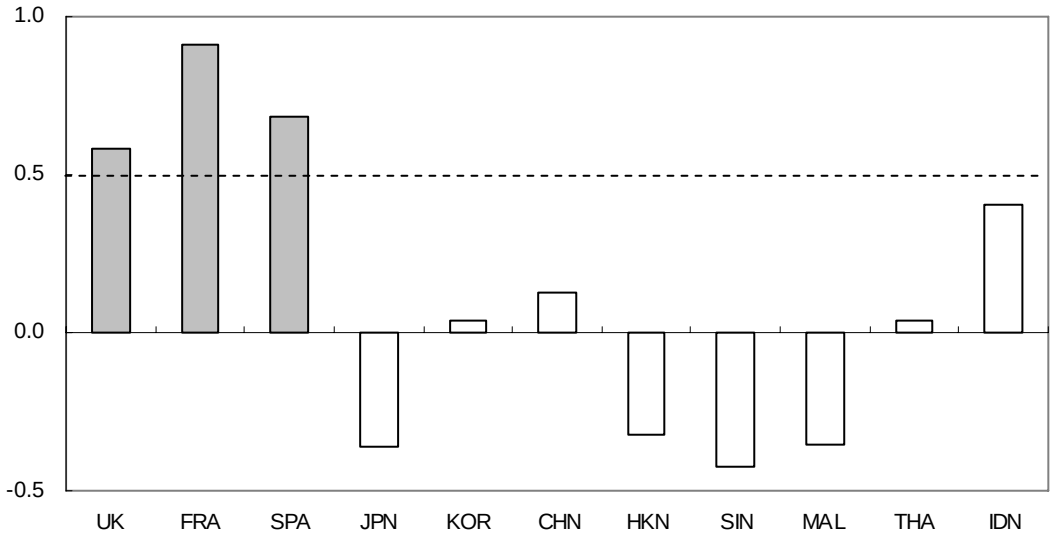
[Figure 2] House Price Index (Real): U.S. and European Countries



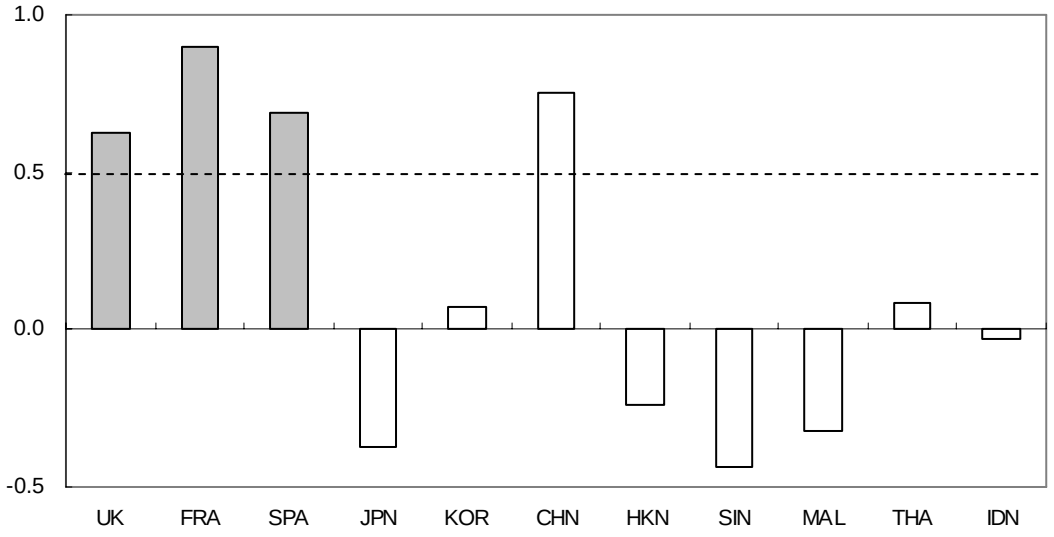
[Figure 3] Index of House Price to Income per Capita



[Figure 4A] Correlation Coefficient with the U.S. (Nominal)



[Figure 4B] Correlation Coefficient with the U.S. (Real)



[Table 2A] Correlation Coefficients among ASEAN+3 Countries (Nominal)

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start	1976	1987	1998	1980	1976	1989	1995	2001
year	(1976Q1)	(1987Q1)	(1998Q1)	(1980Q4)	(1976Q1)	(1989Q1)	(1995Q1)	(2001Q4)
# of obs.	32	21	10	27	32	19	13	7
	(129)	(85)	(41)	(110)	(129)	(76)	(51)	(26)
JPN	1.00	**0.51****	-0.54	0.15	0.29	0.21	-0.12	-0.55
		(0.52)**	**(-0.51**)**	**(0.17*)**	**(0.38**)**	**(0.23**)**	(-0.09)	**(-0.50**)**
KOR		1.00	0.24	0.30	0.24	0.33	0.13	0.35
			(0.18)	(0.05)	(0.01)	**(0.19*)**	(0.07)	(0.30)
CHN			1.00	**0.71****	0.29	0.37	**0.71****	-0.04
				(0.78)**	(0.16)	**(0.39**)**	**(0.52**)**	(-0.12)
HKN				1.00	**0.54****	**0.68****	0.45	**-0.71****
					(0.39)**	**(0.47**)**	**(0.42**)**	**(-0.68**)**
SIN					1.00	**0.77****	0.03	-0.66
						(0.57)**	(0.18)	**(-0.64**)**
MAL						1.00	0.26	-0.14
							(0.41)**	(-0.01)
THA							1.00	-0.09
								(-0.22)
IDN								1.00

Note: Figures in parenthesis are for quarterly data.

[Table 2B] Correlation Coefficients among ASEAN+3 Countries (Real)

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start year	1976	1987	1998	1981	1976	1989	1995	2001
	(1976Q1)	(1987Q1)	(1998Q1)	(1981Q4)	(1976Q1)	(1989Q1)	(1995Q1)	(2001Q4)
# of obs.	32	21	10	27	32	19	13	7
	(129)	(85)	(41)	(106)	(129)	(76)	(51)	(26)
JPN	1.00	**0.42***	**-0.93****	-0.07	0.21	0.21	-0.46	-0.35
		(0.40)**	**(-0.76**)**	(-0.11)	**(0.25**)**	(0.18)	**(-0.37**)**	**(-0.37*)**
KOR		1.00	0.18	0.27	0.24	0.36	0.39	0.06
			(0.15)	(-0.004)	(-0.002)	(0.18)	**(0.30**)**	(-0.02)
CHN			1.00	0.22	-0.12	0.21	0.32	0.21
				(0.21)	**(-0.28*)**	(0.13)	**(0.30*)**	(0.31)
HKN				1.00	**0.43****	**0.65****	**0.51***	-0.12
					(0.27)**	**(0.38**)**	**(0.41**)**	(-0.06)
SIN					1.00	**0.76****	0.22	-0.12
						(0.55)**	**(0.26*)**	(-0.18)
MAL						1.00	0.46	0.55
							(0.47)**	**(0.73**)**
THA							1.00	0.35
								(0.30)
IDN								1.00

Note: Figures in parenthesis are for quarterly data.

[Table 3A] Correlation Coefficients of GDP Growth Rates

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start	1988	1991	1998	1992	1991	1992	1997	2001
year	(1988q1)	(1991q1)	(1998q1)	(1992q2)	(1991q1)	(1992q1)	(1997q1)	(2001q4)
# of obs.	20	17	10	16	17	16	11	7
	(82)	(70)	(42)	(65)	(70)	(66)	(46)	(28)
JPN	1.00	**0.57****	**0.65****	**0.79****	**0.52****	**0.68****	**0.73****	0.74
		(0.47)**	**(0.57**)**	**(0.66**)**	**(0.45**)**	**(0.56**)**	**(0.62**)**	**(0.37*)**
KOR		1.00	0.11	**0.62****	**0.64****	**0.87****	**0.80****	0.10
			(0.14)	**(0.60**)**	**(0.58**)**	**(0.83**)**	**(0.80**)**	(-0.23)
CHN			1.00	**0.61***	0.46	0.42	0.47	**0.94****
				(0.60)**	**(0.45**)**	**(0.40**)**	**(0.44**)**	**(0.64**)**
HKN				1.00	**0.79****	**0.77****	**0.75****	**0.78****
					(0.74)**	**(0.74**)**	**(0.72**)**	**(0.54**)**
SIN					1.00	**0.83****	**0.53***	**0.84****
						(0.74)**	**(0.49**)**	**(0.47**)**
MAL						1.00	**0.82****	0.74
							(0.78)**	**(0.48**)**
THA							1.00	0.32
								(0.03)**
IDN								1.00

Note: Figures in parenthesis are for quarterly data. End year(quarter) is 2008(2008q2).

Source: *Bank of Korea, Global Insight, IMF.*

[Table 3B] Correlation Coefficients of Inflation Rates

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start	1988	1991	1998	1992	1991	1992	1997	2001
year	(1988q1)	(1991q1)	(1998q1)	(1992q2)	(1991q1)	(1992q1)	(1997q1)	(2001q4)
# of obs.	20	17	10	16	17	16	11	7
	(82)	(70)	(42)	(65)	(70)	(66)	(46)	(28)
JPN	1.00	**0.80****	0.55	**0.65****	**0.69****	0.41	**0.61****	-0.48
		(0.72)**	**(0.44**)**	**(0.67**)**	**(0.55**)**	**(0.53**)**	**(0.64**)**	(-0.28)
KOR		1.00	-0.01	**0.67****	**0.62****	**0.55****	**0.68****	-0.62
			(0.06)	**(0.66**)**	**(0.40**)**	**(0.59**)**	**(0.70**)**	(-0.36)
CHN			1.00	**0.80****	**0.85****	-0.31	0.03	-0.72
				(0.57)**	**(0.84**)**	(-0.11)	(0.19)	(-0.42)
HKN				1.00	**0.81****	**0.57****	**0.57***	-0.18
					(0.53)**	**(0.67**)**	**(0.81**)**	(0.05)
SIN					1.00	0.15	0.02	-0.56
						(0.18)	**(0.27*)**	(-0.15)
MAL						1.00	**0.80****	0.58
							(0.76)**	**(0.49**)**
THA							1.00	0.20
								(0.31)
IDN								1.00

Note: Figures in parenthesis are for quarterly data. End year(quarter) is 2008(2008q2).

Source: *Bank of Korea, Global Insight, IMF*

[Table 3C] Correlation Coefficients of Short-term Interest Rates

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start	1988	1991	1998	1992	1991	1992	1997	2001
year	(1988q1)	(1991q1)	(1998q1)	(1992q2)	(1991q1)	(1992q1)	(1997q1)	(2001q4)
# of obs.	20	17	10	16	17	16	11	7
	(82)	(70)	(42)	(65)	(70)	(66)	(46)	(28)
JPN	1.00	**0.53****	**0.90****	-0.15	**0.61****	**0.57****	0.51	-0.38
		(0.64)**	**(0.84**)**	(-0.150	**(0.50**)**	**(0.55**)**	**(0.58**)**	(-0.30)
KOR		1.00	**0.66****	0.28	**0.67****	**0.87****	**0.97****	0.03
			(0.73)**	**(0.24*)**	**(0.60**)**	**(0.87**)**	**(0.93**)**	(0.13)
CHN			1.00	0.46	**0.62***	**0.64****	0.50	-0.24
				(0.43)**	(0.20)	**(0.76**)**	**(0.72**)**	(-0.24)
HKN				1.00	**0.63****	0.19	0.35	-0.10
					(0.59)**	**(0.22*)**	**(0.36**)**	(0.05)
SIN					1.00	**0.61****	**0.65****	0.16
						(0.45)**	**(0.57**)**	(0.17)
MAL						1.00	**0.93****	-0.18
							(0.88)**	(-0.03)
THA							1.00	0.15
								(0.21)
IDN								1.00

Note: Figures in parenthesis are for quarterly data. End year(quarter) is 2008(2008q2).

Source: *Bank of Korea, Global Insight, IMF*

[Table 3D] Correlation Coefficients of Long-term Interest Rates

	JPN	**KOR**	**CHN**	**HKN**	**SIN**	**MAL**	**THA**	**IDN**
start	1988	1988	1998			1992	1995	
year	(1988q1)	(1988q1)	(1998q1)			(1992q1)	(1995q1)	
# of obs.	20	20	10			16	13	
	(82)	(82)	(42)			(64)	(54)	
JPN	1.00	**0.80****	0.07			**0.50***	**0.75****	
		(0.84)**	**(0.35**)**			**(0.61**)**	**(0.76**)**	
KOR		1.00	0.35			**0.90****	**0.88****	
			(0.70)**			**(0.87**)**	**(0.92**)**	
CHN			1.00			0.19	0.43	
						(0.52)**	**(0.69**)**	
HKN								
SIN								
MAL						1.00	**0.83****	
							(0.89)**	
THA							1.00	
IDN								

Note: Figures in parenthesis are for quarterly data. End year(quarter) is 2008(2008q2).

Source: *Bank of Korea, Global Insight, IMF.*

[Table 4A] Regression Results of (Nominal) House Prices (Short-term Rates)

Sample period (# of obs.)	Lagged Dependent Variable	Growth rate	Short-term interest rate	Inflation rate	Growth rate of US House Price Index	R^2
JPN		**0.872****	**0.806****	**0.866***	-0.029	0.734
1988q1~2008q1		(5.250)	(3.093)	(1.850)	(-0.607)	
(81)	**0.991****	0.100	**-0.244****	0.233	0.007	0.962
	(21.199)	(1.363)	(-2.203)	(1.286)	(0.388)	
KOR		**0.617****	**-0.590****	0.260	-0.066	0.250
1991q1~2008q2		(3.051)	(-2.459)	(0.456)	(-0.637)	
(70)	**0.828****	0.086	-0.045	**-0.805****	-0.058	0.892
	(19.467)	(1.043)	(-0.464)	(-3.568)	(-1.460)	
CHN		**0.664****	-0.177	**0.877****	**0.208****	0.661
1998q1~2008q2		(2.257)	(-0.295)	(4.922)	(3.575)	
(42)	**0.812****	-0.068	**-1.252****	0.197	-0.059	0.870
	(7.097)	(-0.323)	(-2.566)	(1.307)	(-1.145	
HKN		**3.151****	**-2.269****	**1.952****	0.001	0.650
1992q2~2008q2		(7.873)	(-2.297)	(4.387)	(0.003)	
(65)	**0.697****	**1.462****	**-1.427****	-0.166	**-0.316***	0.877
	(10.412)	(5.050)	(-2.390)	(-0.496)	(-1.981)	
SIN		**2.222****	**-2.500***	**2.322***	**-0.741****	0.614
1991q1~2008q2		(6.569)	(-1.940)	(1.807)	(-3.140)	
(70)	**0.816****	**0.837****	**-1.354****	**-1.203***	**-0.358****	0.900
	(13.495)	(4.146)	(-2.028)	(-1.695)	(-2.871)	
MAL		**1.146****	0.019	0.620	-0.062	0.679
1992q1~2007q4		(9.691)	(0.056)	(1.105)	(-0.689)	
(64)	**0.698****	**0.443****	**-0.636****	**0.643****	-0.040	0.910
	(12.204)	(5.182)	(-3.294)	(2.145)	(-0.839)	
THA		**1.055****	0.398	**1.554****	0.189	0.403
1997q1~2007q3		(4.273)	(1.615)	(2.649)	(1.193)	
(43)	0.070	**1.008****	0.389	**1.416****	0.177	0.406
	(0.444)	(3.726)	(1.559)	(2.113)	(1.092)	
IDN		**-0.985***	0.412	-0.232	**0.088****	0.559
2001q4~2008q2		(-2.031)	(1.406)	(-1.329)	(2.135)	
(27)	**0.691****	0.108	0.353	-0.159	**0.072***	0.673
	(2.749)	(0.153)	(1.359)	(-1.010)	(1.914)	

Note: *, ** denote significance at 10% and 5% respectively. Figures in parentheses are t-statistics.

[Table 4B] Regression Results of (Nominal) House Prices (Long-term Rates)

Sample period (# of obs.)	Lagged Dependent Variable	Growth rate	Long-term interest rate	Inflation rate	Growth rate of US House Price Index	R^2
JPN		**0.934****	**0.735****	**1.344****	-0.015	0.720
1988q1~2008q1		(5.445)	(2.270)	(3.230)	(-0.288)	
(81)	**0.957****	0.089	-0.115	0.063	0.006	0.960
	(21.207)	(1.162)	(-0.886)	(0.369)	(0.314)	
KOR		**1.217****	**-1.144****	**2.022****	0.100	0.334
1988q1~2008q2		(5.889)	(-3.490)	(3.632)	(0.967)	
(82)	**0.895****	**0.259****	-0.094	-0.255	0.006	0.878
	(18.398)	(2.509)	(-0.615)	(-0.945)	(0.142)	
CHN		**0.721****	0.086	**0.875****	**0.228****	0.660
1998q1~2008q2		(2.568)	(0.249)	(4.921)	(4.533)	
(42)	**0.845****	-0.007	**-0.662****	0.114	-0.037	0.866
	(7.119)	(-0.033)	(-2.311)	(0.727)	(-0.760)	
HKN						
SIN						
MAL		**1.146****	0.024	0.616	-0.061	0.679
1992q1~2007q4		(9.691)	(0.070)	(1.096)	(-0.685)	
(64)	**0.700****	**0.441****	**-0.646****	**0.653****	-0.041	0.911
	(12.255)	(5.179)	(-3.357)	(2.184)	(-0.854)	
THA		**0.635****	-0.325	**1.672****	0.179	0.324
1995q1~2007q3		(3.679)	(-0.718)	(3.881)	(1.290)	
(51)	0.110	**0.583****	-0.229	**1.415****	0.172	0.325
	(0.666)	(3.040)	(-0.457)	(2.428)	(1.213)	
IDN						

Note: *, ** denote significance at 10% and 5% respectively. Figures in parentheses are t-statistics.

Long-term interest rates are: 10-year government bond yield rate for Japan; 5-year government (National Housing) bond yield rate for Korea; 5-year lending rate for China; 10-year government securities average yield rate for Malaysia; and 12-year government bond yield rate for Thailand.

[Table 4C] Regression Results of (Real) House Prices (Short-term Rates)

Sample period (# of obs.)	Lagged Dependent Variable	Growth rate	Short-term interest rate	Growth rate of US Real House Price Index	R^2
JPN		**0.868****	**0.717****	-0.035	0.632
1988q1~2008q1		(5.617)	(4.455)	(-0.751)	
(81)	**0.960****	0.053	-0.095	0.003	0.938
	(19.366)	(0.695)	(-1.211)	(0.131)	
KOR		**0.664****	**-0.761****	-0.030	0.397
1991q1~2008q2		(3.598)	(-4.907)	(-0.305)	
(70)	**0.751****	**0.241****	**-0.371****	-0.022	0.862
	(14.810)	(2.587)	(-4.681)	(-0.465)	
CHN		**0.626****	-0.062	**0.236****	0.554
1998q1~2008q2		(2.700)	(-0.112)	(4.428)	
(42)	**0.634****	0.013	-0.817	0.028	0.707
	(4.030)	(0.052)	(-1.376)	(0.433)	
HKN		**3.087****	**-2.302****	**-0.335***	0.552
1992q2~2008q2		(7.784)	(-2.356)	(-1.737)	
(65)	**0.642****	**1.446****	**-1.384****	-0.128	0.843
	(10.551)	(5.107)	(-2.349)	(-1.098)	
SIN		**2.263****	**-2.629****	**-0.908****	0.579
1991q1~2008q2		(7.245)	(-2.096)	(-5.339)	
(70)	**0.783****	**0.720****	**-1.162***	**-0.184***	0.880
	(12.778)	(3.481)	(-1.698)	**(-1.710)**	
MAL		**1.115****	-0.111	-0.048	0.685
1992q1~2007q4		(10.066)	(-0.413)	(-0.557)	
(64)	**0.665****	**0.444****	**-0.497****	-0.052	0.910
	(12.136)	(5.460)	(-3.357)	(-1.110)	
THA		**0.893****	**0.503****	0.228	0.336
1997q1~2007q3		(4.202)	(2.548)	(1.496)	
(43)	0.132	**0.819****	**0.438****	0.186	0.351
	(0.915)	(3.592)	(2.082)	(1.161)	
IDN		**-1.736****	**-1.067****	0.057	0.436
2001q4~2008q2		(-2.338)	(-3.728)	(0.869)	
(27)	**0.628****	-0.139	-0.293	0.063	0.560
	(2.429)	(-0.129)	(-0.708)	(0.982)	

Note: *, ** denote significance at 10% and 5% respectively. Figures in parentheses are t-statistics.

[Table 4D] Regression Results of (Real) House Prices (Long-term Rates)

Sample period (# of obs.)	Lagged Dependent Variable	Growth rate	Long-term interest rate	Growth rate of US Real House Price Index	R^2
JPN		**0.900****	**0.877****	-0.031	0.609
1988q1~2008q1		(5.585)	(3.777)	(-0.619)	
(81)	**0.939****	0.052	-0.053	0.007	0.937
	(19.879)	(0.666)	(-0.509)	(0.332)	
KOR		**1.028****	**-0.668****	0.048	0.318
1988q1~2008q2		(5.363)	(-3.346)	(0.477)	
(82)	**0.817****	**0.333****	**-0.280****	0.018	0.851
	(16.626)	(3.356)	(-2.897)	(0.368)	
CHN		**0.669****	0.109	**0.249****	0.555
1998q1~2008q2		(2.985)	(0.343)	(5.775)	
(42)	**0.645****	0.054	-0.337	0.057	0.700
	(4.012)	(0.225)	(-0.993)	(0.977)	
HKN					
SIN					
MAL		**1.116****	-0.108	-0.047	0.685
1992q1~2007q4		(10.075)	(-0.403)	(-0.551)	
(64)	**0.666****	**0.443****	**-0.501****	-0.053	0.910
	(12.174)	(5.451)	(-3.402)	(-1.132)	
THA		**0.511****	0.062	0.174	0.219
1995q1~2007q3		(3.129)	(0.163)	(1.208)	
(51)	**0.225***	**0.451****	0.080	0.148	0.262
	(1.689)	(2.658)	(0.207)	(1.031)	
IDN					

Note: *, ** denote significance at 10% and 5% respectively. Figures in parentheses are t-statistics.

Long-term interest rates are: 10-year government bond yield rate for Japan; 5-year government (National Housing) bond yield rate for Korea; 5-year lending rate for China; 10-year government securities average yield rate for Malaysia; and 12-year government bond yield rate for Thailand.

[Table 5A] Regression Coefficients of Other Countries' House Prices (Nominal)

Explanatory / Dependent	JPN	KOR	CHN	HKN	SIN	MAL	THA	IDN
JPN		**0.115****	**-0.193****	**-0.052****	**0.036****	**-0.219****	**-0.066****	-0.034
		(2.374)	(-5.455)	(-3.514)	(2.979)	(-4.737)	(-2.297)	(-0.430)
Jpn(-1)		-0.013	0.027	0.000	0.006	**-0.080****	0.007	**-0.095****
		(-0.661)	(1.039	(0.042)	(1.457)	(-4.402)	(0.979)	(-3.326)
KOR	**1.134****		0.277	-0.025	**-0.133****	**0.339***	0.121	0.969
	(3.339)		(0.827)	(-0.658)	(-2.563)	(1.838)	(0.902)	(2.851)
Kor(-1)	0.174		-0.170	-0.015	-0.032	-0.029	-0.083	0.031
	(1.159)		(-1.139)	(-1.010)	(-1.509)	(-0.379)	(-1.500)	(0.105)
CHN	**-2.310****	-0.076		**0.123****	**-0.071****	-0.125	0.087	-0.100
	(-7.874)	(-1.303)		(3.816)	(-2.919)	(-1.256)	(1.377)	(-0.553)
Chn(-1)	**-1.202****	0.020		0.008	-0.013	-0.040	-0.029	0.200
	(-3.265)	(0.537)		(0.282)	(-0.764)	(-0.627)	(-0.682)	(1.151)
HKN	**3.193***	-0.138	**1.999****		**-0.394****	**-0.818****	-0.024	**-1.861****
	(1.972)	(-0.473)	(2.886)		(-3.437)	(-2.620)	(-0.072)	(-2.141)
Hkn(-1)	**3.620****	0.025	1.054		-0.112	-0.331	**-0.559****	-0.348
	(3.912)	(0.139)	(1.686)		(-1.351)	(-1.597)	(-2.806)	(-0.509)
SIN	-0.105	0.041	-0.639	-0.025		**0.661****	-0.209	-0.401
	(-0.123)	(0.188)	(-1.064)	(-0.288)		(2.673)	(-0.694)	(-0.571)
Sin(-1)	0.593	0.131	-0.410	0.042		0.020	**-0.464****	-0.168
	(1.379)	(1.181)	(-1.168)	(0.937)		(0.138)	(-3.294)	(-0.841)
MAL	0.126	0.068	0.166	-0.018	0.064		**0.183****	0.031
	(0.353)	(0.648)	(1.489)	(-0.667)	(1.377)		(2.238)	(0.280)
Mal(-1)	0.179	0.043	-0.009	-0.024	0.034		-0.036	0.032
	(0.947)	(0.771)	(-0.147)	(-1.628)	(1.373)		(-0.840)	(0.282)
THA	-0.864	0.030	0.533	0.067	-0.051	**0.654****		**-0.340***
	(-1.195)	(0.175)	(1.583)	(1.205)	(-0.650)	(2.289)		(-1.895)
Tha(-1)	-0.797	0.012	0.522	0.063	-0.045	**0.683****		-0.209
	(-1.049)	(0.068)	(1.473)	(1.123)	(-0.555)	(2.175)		(-1.157)
IDN	-0.408	-0.032	0.030	**-0.141****	-0.078	0.322	0.117	
	(-1.693)	(-0.215)	(0.109)	(-4.237)	(-1.574)	(0.966)	(0.607)	
Idn(-1)	-0.209	-0.237	-0.122	**-0.109****	-0.041	-0.076	0.145	
	(-0.941)	(-1.626)	(-0.491)	(-2.808)	(-0.867)	(-0.224)	(0.920)	

[Table 5B] Regression Coefficients of Other Countries' House Prices (Real)

Explanatory / Dependent	JPN	KOR	CHN	HKN	SIN	MAL	THA	IDN
JPN		**0.110****	**-0.287****	**-0.059****	**0.026***	**-0.201****	**-0.091****	**-0.134****
		(2.301	(4.954)	(-3.894)	(1.658)	(-4.233)	(-3.100)	(-3.590
Jpn(-1)		-0.013	-0.031	-0.007	**0.009***	**-0.079****	-0.021	**-0.070****
		(-0.630)	(0.582)	(-1.099)	(1.842)	(-3.873)	(-1.407)	(-2.576)
KOR	**0.971****		0.413	-0.024	**-0.140****	0.228	0.198	0.384
	(2.779)		(1.153)	(-0.594)	(-2.649)	(1.519)	(1.408)	(1.314)
Kor(-1)	0.187		0.080	-0.031	**-0.063****	**-0.166****	-0.097	-0.268
	(1.004)		(0.412)	(-1.641)	(-2.387)	(-2.198)	(-1.311)	(-1.216)
CHN	**-1.289****	-0.082		0.022	**-0.073****	-0.127	0.037	0.027
	(-5.013)	(-1.497)		(0.891)	(-3.059)	(-1.607)	(0.565)	(0.294)
Chn(-1)	**-0.628****	-0.007		0.007	-0.030	-0.082	-0.021	0.042
	(-2.289)	(-0.177)		(0.407)	(-1.582)	(-1.352)	(-0.420)	(0.479)
HKN	-0.428	**-0.488****	-0.102		-0.180	-0.297	0.109	-0.600
	(-0.294)	(-2.232)	(-0.149)		(-1.568)	(-0.998)	(0.297)	(-1.020)
Hkn(-1)	**1.714***	0.035	-0.380		-0.095	-0.224	-0.454	**0.797****
	(1.997)	(0.247)	(-0.872)		(-1.389)	(-1.278)	(-2.140)	(2.520)
SIN	1.302	-0.061	**-2.162**	0.095		**0.899****	0.105	-0.195
	(1.423)	(-0.273)	(-3.277)	(1.039)		(4.158)	(0.337)	(-0.342)
Sin(-1)	0.307	0.115	-0.366	0.020		0.015	-0.410	**0.341****
	(0.713)	(1.122)	(-0.826)	(0.474)		(0.114)	(-2.590)	(2.270)
MAL	0.395	-0.002	0.041	-0.033	0.035		0.216	**0.355****
	(1.308)	(-0.020)	(0.213)	(-1.166)	(0.854)		(2.365)	(4.620)
Mal(-1)	**0.291***	0.001	0.016	**-0.034****	**0.041**		-0.042	**0.290****
	(1.789)	(0.030)	(0.182)	(-2.234)	(1.911)		(-0.848)	(2.886)
THA	**-1.151***	-0.111	0.465	0.085	-0.056	**0.594****		-0.019
	(-1.770)	(-0.694)	(1.176)	(1.457)	(-0.686)	(2.381)		(-0.122)
Tha(-1)	-0.970	-0.103	0.380	0.074	-0.043	**0.550***		0.059
	(-1.396)	(-0.648)	(0.944)	(1.238)	(-0.527)	(1.962)		(0.477)
IDN	-0.040	**0.410****	0.203	**-0.215****	-0.059	**0.972****	-0.148	
	(-0.099)	(3.384)	(0.873)	(-4.837)	(-0.656)	(3.439)	(-0.436)	
Idn(-1)	-0.128	**0.351****	0.170	**-0.194****	-0.056	**0.813****	-0.151	
	(-0.332)	(2.688)	(0.736)	(-4.473)	(-0.648)	(2.406)	(-0.489)	

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