

The structure of housing finance markets and house prices in Asia¹

Emerging Asia has witnessed rapid growth of private housing and market-based housing finance in the past decade; nevertheless, market development has been uneven across countries. There is evidence that, in those economies with more flexible housing finance markets, house prices are more responsive to overall changes in market conditions, particularly equity price movements.

JEL classification: G12, G21, O53.

Over the past decade, Asia-Pacific economies have made significant progress in developing private housing markets and market-based systems for financing home purchases. However, development has been uneven across countries due to the heterogeneity in market infrastructure and economic development. This special feature documents structural characteristics of national housing markets in Asia, focusing on the private housing sector, and investigates their potential impact on house price dynamics. The study covers six economies in the region: China, Hong Kong SAR, Indonesia, South Korea (hereinafter Korea), Singapore and Thailand.

Since the 1997 Asian financial crisis, Asian governments have stepped up their efforts to improve the structure of the housing finance system. In the primary market, the share of private housing has increased substantially. In addition, commercial banks and other private financial institutions have gained importance in mortgage loan origination, and more diversified mortgage products have become available to households. In the secondary market, mechanisms for mortgage-backed securitisation have been established in most Asian economies, although the market is still not fully developed.

As pointed out in previous work, different arrangements in housing finance systems can have important implications for the linkages between house prices and macroeconomic factors (Tsatsaronis and Zhu (2004)). Whereas the previous study mainly focused on industrialised economies, this article provides complementary insights for emerging market economies.

¹ The views expressed in this article are my own and do not necessarily reflect those of the BIS. I thank Gert Schnabel for data support and Claudio Borio, Frank Packer, Ilhyock Shim, Kostas Tsatsaronis, Okja Yoon, Tao Zhang and Wenhong Zhang for helpful discussion.

The rest of this article is organised in three sections. The first section reviews the evolution of housing and housing finance markets in each economy. The second section examines structural characteristics of national housing finance systems from a cross-sectional perspective. In the last section, a common empirical framework is adopted to investigate the determinants of house price dynamics in each country. The principal finding is that, in those economies with more flexible housing finance arrangements, housing behaves more like an investment asset and is thus more responsive to changes in economic conditions, particularly equity market movements.

The evolution of housing and housing finance markets in Asia

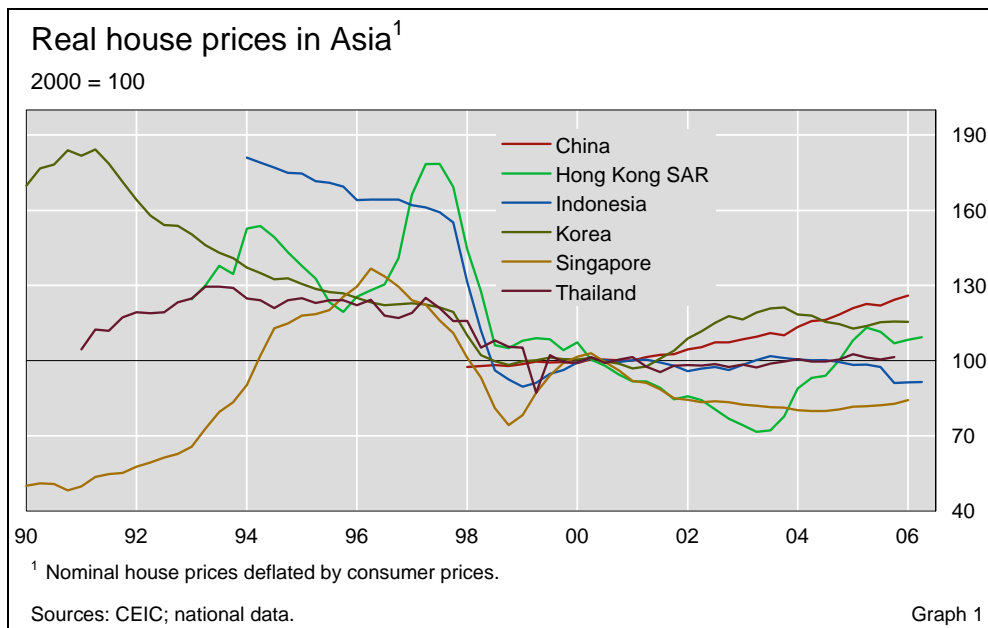
Housing has traditionally been one of the most important assets for households in Asia, and has played an important role in economic activity. In four out of the six economies (the exceptions being China and Korea), there was remarkable house price appreciation in the early 1990s, due to rapid urbanisation,² strong economic performance and the liberalisation of financial markets. Downward corrections in house prices subsequently played a significant role in inducing the Asian financial crisis and caused severe stress to the banking sector. Recently, housing market developments in some areas have again caught the attention of policymakers, notably the housing boom in Korea, Hong Kong and several of the largest cities in China (Graph 1).

High growth of housing markets in Asia

China

Traditionally, urban residents in China lived under a welfare housing system in which state sector employers owned properties and provided essentially free

Country-specific experience



² The urban population in the six economies increased from 335 million in 1985 to 705 million in 2005. The growth was most remarkable in China and Indonesia, with their urban population reaching 528 million and 105 million, respectively, in 2005.

housing for their workers. In the 1980s, privately owned residential units (also called commercial housing) emerged and formed the basis for the private housing market. Nevertheless, the market was very small until 1998, when the government put an end to the welfare housing system and began to encourage workers to buy their own homes.³ In the same year, the People's Bank of China issued guidelines to banks on granting housing loans. The new policies speeded up the privatisation of residential housing and led to the full-scale development of the primary mortgage market. At the end of 2005, the majority of residential units were traded at market prices, and the subsidised segment (known as affordable housing) accounted for less than 10% of the private housing market.

Commercial banks are currently the dominant lender in the primary mortgage market, supplemented by the Housing Provident Fund (HPF) scheme established in 1990. The HPF scheme, which follows the Singapore model (see below), requires compulsory saving by employees (plus contributions from employers) for entitlement to a housing loan in the future. Currently, HPF loans represent approximately 12% of total mortgage balances outstanding.

Hong Kong SAR

The mortgage market in Hong Kong is one of the most developed in Asia. Housing is an important component of household assets and mortgage loans account for approximately 25–30% of bank loans. Traditionally, the government has played an important role in the housing market. On the supply side, it runs a large public housing programme (including low-cost housing and public rental units) that provides accommodation for about half of Hong Kong's population. In addition, land ownership and land restrictions by the government often restrict the adjustment of housing supply to changing demand.⁴ On the demand side, the government affects the availability of housing finance via various measures, including limits on banks' exposure to mortgage loans and maximum loan-to-value (LTV) ratios. In 1999, the government established the Hong Kong Mortgage Corporation to promote mortgage loan securitisation and to provide the Mortgage Insurance Programme for high LTV loans. Nevertheless, commercial banks are the predominant source of housing finance and there is no government-run housing loan bank in Hong Kong.

Indonesia

In Indonesia, land ownership and tenure can be classified into four categories: ownership rights, the right to build, the right to exploit and the right to use. Ownership rights represent the majority of land ownership. Since the 1970s, the housing development policy of the government has focused on providing

³ Land in China is nationalised. Home purchasers could hold legal rights to occupy the building for a specific period (typically 70 years) and could transfer the title to another party. Hong Kong has a similar system of ownership rights.

⁴ The government imposed a limit on its annual land sales in 1985. Although this limit was lifted after the transfer of sovereignty on 1 July 1997, the uncertainty concerning land supply has remained.

low-cost housing for low-income households, by imposing a compulsory “1:3:6” rule for developers⁵ and providing subsidised loans for low-cost housing through state-owned mortgage banks. Despite this, medium- and high-cost houses, which represent only 10% of housing units, have dominated the market in terms of sales value. Given that private sector lenders (including a number of domestic banks and one large foreign bank) have been actively involved in housing finance for high-end houses, they have played an important role in the primary mortgage market alongside two state-owned mortgage banks.

Korea

Korea’s housing and housing finance system used to be heavily regulated. Since 1991, this sector has experienced major changes due to interest rate liberalisation and financial deregulation. Price controls on new apartments were abolished, and market-based housing finance emerged. In 1996, commercial banks were allowed to provide long-term mortgages. The following year, the Korea Housing Bank, which used to be the dominant mortgage provider and had been subsidised by the state, was privatised. After a decade of rapid growth, housing banks and commercial banks have become the major source of mortgage loans for medium- and high-cost houses. However, for low-income homebuyers, policy loans of the National Housing Fund (NHF) remain the primary funding source. In addition, there exists a huge market for informal housing finance that is unique to the Korean housing sector.⁶

Singapore

Home ownership in Singapore is segmented into private and public housing markets. It is worth noting that public housing in Singapore can be purchased by upper- or middle-income groups and therefore is not equivalent to low-cost housing as in other Asian countries. The public housing sector is dominant and accommodates 84% of total households. It is strictly under the authority of the Housing Development Board (HDB), which has responsibilities that affect both the demand and supply sides of the housing market, including housing planning and development, housing management and housing finance. Since the 1990s, the government has taken measures to encourage the development of private housing and the share of private housing has increased rapidly. In 2005, the value of contracts awarded for new private sector construction work was almost twice as great as the value of contracts for public housing. In terms of mortgage financing, two systems coexist in Singapore: the HDB public finance system that grants subsidised loans to first-time homebuyers, or second-time homebuyers who upgrade to another HDB flat, and the private

⁵ That is, for every high-cost house, developers must build a minimum of three middle-class houses and six simple or very simple houses.

⁶ The arrangement, known as *chonsei*, used to be dominant and remains an important channel of housing finance in Korea. It requires the tenant to give the landlord a lump sum deposit up front in lieu of monthly rent payments. The deposit is fully refunded at the end of the lease, or otherwise the tenant is granted full control over the property. This arrangement is essentially a housing loan provided by tenants to owners.

mortgage system. In addition, the majority of households have used the Central Provident Fund scheme, a mandatory social security savings plan, to finance their home purchases.

Thailand

The real estate industry in Thailand developed quickly in the 1980s, a period when the Thai economy performed remarkably well. In 1986, the government issued guidelines to encourage commercial banks to participate more actively in mortgage lending. Currently, commercial banks and the Government Housing Bank (GHB) are the two dominant mortgage lenders with a combined share of 80–90%. The GHB is the leading mortgage financial institution with a market share of 39% of all residential mortgages and 48% of new mortgage originations in 2005.

Characteristics of national housing finance markets

This section examines the structural characteristics of national housing finance markets. From a cross-sectional perspective, the analysis below compares the commonalities and differences across the six economies. On the basis of this analysis, the six economies are then divided into two groups with distinctive market characteristics.

The size of the mortgage market

Expansion of
mortgage markets

Mortgage markets in Asia have witnessed rapid expansion in the past decade, even though development has been uneven across countries. Growth has been particularly remarkable in China and Korea and has led to a fundamental change in the mortgage market landscape. In China, housing mortgages were launched as late as 1998, but the market quickly expanded to \$227 billion at the end of 2005 (about 10% of GDP) to become the largest mortgage market in Asia. Korea came next, with total mortgage debt outstanding almost tripling in less than five years from \$67 billion at the end of 2001 to over \$200 billion in 2006. In terms of relative size, the two frontrunners are Singapore and Hong Kong, with mortgage loans accounting for 61% and 44% of GDP, respectively. At the other end of the spectrum is Indonesia, where the mortgage market accounts for only 2% of GDP (Table 1).

The uneven development of mortgage markets is in line with the overall state of financial markets in the various economies. Hong Kong and Singapore are the two regional financial centres and have well developed banking sectors and equity markets.⁷ By contrast, financial markets in Indonesia, China and Thailand are still less developed, particularly in terms of direct financing via capital markets.

⁷ Overall, the bond market in Asia remains rather limited. However, the situation started to change after the East Asian crisis, as Asian governments adopted various measures to promote bond market development (see Gyntelberg et al (2005)).

Mortgage markets in Asia								
	Market size ¹	Mortgage rate	Length of contract ²		Maximum LTV (%)	JLL transparency score ³	First MBS issued	MBS framework ⁴
			Max	Typical				
China	10.0	Variable	30	10–15	80	3.50	2005	1.07
Hong Kong SAR	44.0	Variable	30	20	70	1.30	2004	4.86
Indonesia	2.0	Variable	20	15	80	3.90	none	2.07
Korea	26.6	Variable	20	3	70	2.88	2001	4.50
Singapore	61.3	Variable	30–35	...	80	1.44	1998 ⁵	4.86
Thailand	8.8	Variable	30	10–20	80	3.40	2006 ⁶	3.29

¹ The ratio of mortgage debt outstanding to GDP in 2005, in per cent; definition of mortgage loans varies across countries. ² In years. ³ The lower the score, the higher the transparency. See box for details. ⁴ A higher score indicates a more favourable framework for MBS issuance. See box for details. ⁵ First ABS issued. ⁶ Under plan.

Sources: Arner et al (2006); Ong (2005); Asian Development Bank; Jones Lang LaSalle (2006b); national data. Table 1

Primary mortgage market

Table 1 summarises the main characteristics of mortgage lending practices in the private housing finance markets in Asia. There are substantial differences across countries, as discussed below in four major aspects.

In terms of the structure of mortgage lenders, domestic commercial banks and mortgage banks typically are dominant mortgage lenders in the private housing finance market, and foreign banks have only a limited role. The degree of competition among mortgage lenders varies across countries, and is sometimes affected by government policies such as interest rate controls that existed in most of the six economies at a certain period.⁸

Commercial banks and mortgage banks dominate

In terms of the payment of mortgage interest, all six economies have relied primarily on adjustable rate products.⁹ This implies that households, rather than mortgage lenders, are bearing the interest rate risk. Fixed rate mortgages exist but lack popularity. For instance, fixed rate mortgages were introduced into the Hong Kong market in 1998, but enthusiasm quickly receded when interest rates began to fall and the cost advantage of floating rate mortgages increased. In China, fixed rate mortgage products have been introduced very recently but the market reaction remains to be seen.

Floating rate mortgages are popular

In terms of the length of mortgage contracts, the maximum mortgage term ranges from 20 years in Indonesia and Korea to 30 years in other economies. In practice, however, the average mortgage term is typically shorter, ranging between 10 and 20 years in most countries. As a result, commercial banks bear the liquidity risk arising from the maturity mismatch between long-term mortgage assets and short-term deposit liabilities. A noticeable exception is

⁸ For instance, interest rate controls existed in Korea before 1996 and in Hong Kong before 2001. In China, there is still a lower limit on mortgage rates to households.

⁹ Adjustable rate mortgage loans are defined as loans with variable interest rates for the entire life of the loan or fixed for the first one to five years and then adjustable. By contrast, fixed rate mortgage loans refer to loans with interest rates fixed for at least five years.

Korea, where short-term mortgage loans represent the majority of mortgage originations and three-year bullet-type mortgages are most popular.

Lending practices are relatively conservative

In terms of collateral requirements, the typical maximum LTV ratio ranges from 70 to 80%, and is normally based on an appraisal evaluation.¹⁰ This constitutes relatively conservative practice compared to market norms in industrialised economies (Tsatsaronis and Zhu (2004), CGFS (2006)). In Korea, mortgage lenders typically adopt even lower LTV ratios in practice (averaging 52.7% in January 2006); hence the financial constraint is often binding for home purchasers. Moreover, prudential regulators can adjust LTV requirements based on market conditions or impose different LTV requirements on different types of loans. For instance, the Hong Kong Monetary Authority lowered the maximum LTV ratio to 70% in November 1991, several years before the collapse of the real estate market. This measure proved to be successful in containing mortgage defaults and maintaining the resilience of the banking industry during the Asian crisis. In recent years, the People's Bank of China has imposed stricter LTV requirements, particularly for second-home mortgages, aiming to contain speculative investment in the housing market.

Secondary mortgage market

Development of MBS markets ...

The secondary mortgage market has grown rapidly in recent years, despite the fact that the first mortgage-backed security (MBS) was issued as late as 2001 in the six selected Asian economies.¹¹ So far, Hong Kong and Korea have already established relatively advanced MBS markets, while China issued its first MBS only in 2005.

Governments have played an important role in the development of MBS markets (Chan et al (2006)). The growth in MBS markets has helped mitigate the maturity mismatch risk in the banking system, improve liquidity in the primary mortgage market and deepen the local debt market. By contrast, another function of MBS instruments, credit risk transformation via risk enhancement techniques, has so far been limited.

... is still limited

Nevertheless, MBS markets in Asia are far from full-fledged. In some countries (such as China and Thailand), there are legal, tax and accounting impediments to the development of secondary mortgage markets. Even in more developed markets, trading of MBS instruments has not been very active. The market illiquidity may be attributable to various reasons, including insufficient information, lack of expertise in risk management and banks' unwillingness to remove mortgage loans from their balance sheets as the loan quality is usually high.

¹⁰ Banks also impose a payment-to-income ratio in practice, which, according to Ong (2005), can range widely from 33% in Indonesia to 70% in China.

¹¹ The first MBS in Asia was issued in Malaysia in 1987. For an extensive discussion of the secondary mortgage market in Asia, see Gyntelberg and Remolona (2006).

Real estate taxes and transaction costs in Asia					
As a percentage of property value					
	Property tax ¹	Stamp duty and legal costs	Deeds and transfer tax	Sales tax or business tax	Other
China	0.96	0.13	3	5	0.05–0.35 ²
Hong Kong SAR	0.7	1.25–5.75			
Indonesia	0.1–0.2	1–2	1	10	
Korea	1	0.23–0.83	4		0.6 ³
Singapore	0.2	1–3			
Thailand	0.6	0.50 ⁴	2	3	1.05 ⁵

¹ In Hong Kong SAR, Singapore and Thailand, the property tax is calculated based on the annual value (rents), which is assumed to be 5% of the property value. ² City maintenance and construction tax. ³ Including 0.2% rural development tax and 0.4% education tax. ⁴ The stamp duty is waived if the special business tax (3%) is paid. ⁵ Including 1% withholding tax and 0.05% income tax.

Sources: World Bank; Jones Lang LaSalle (2006a); author's calculations. Table 2

Real estate taxes and transaction costs

Housing is essentially a local product, and trading of houses is affected by transaction costs and real estate taxes that are region-specific. High real estate taxes and high transaction costs can reduce the volatility of house price movements, because they squeeze potential arbitrage profits and reduce the incentive to trade. Nevertheless, they can also be detrimental to the housing market because the lack of trading can cause house prices to deviate from their fundamental values for a long period. Conversely, low real estate taxes and low transaction costs stimulate trading and could cause house prices to react more quickly to changes in demand and supply factors, but might also amplify residential property cycles¹² and cause excess volatility in the market.

Table 2 compares real estate taxes and transaction costs across the six economies, including the annual real estate tax imposed on homeowners, stamp duty and legal costs, sales tax, and deeds and transfer tax that would be incurred by both buyers and sellers in a typical housing transaction.¹³ The average total cost is as low as 2.2% in Singapore and as high as 12.5% in Indonesia.

Categorising housing finance systems

To summarise, there are substantial differences between national housing finance markets, ranging from contractual arrangements to the overall development of market infrastructure and market liquidity. In order to better examine the impact of these distinctions on the pattern of house price dynamics, it is useful to classify the six economies into two separate groups,

Transaction costs are region-specific

Two groups of housing finance systems

¹² Real estate cycles may exist due to distinctive features in the housing market, such as lags in the delivery of new housing, usage of current property prices in loan appraisal, and the absence of futures and options markets. See Davis and Zhu (2004) for a review of the literature.

¹³ The table does not list other related costs, such as value added tax (VAT) imposed on new housing and capital gains tax, which also differ substantially across countries.

using the cluster analysis method that maximises the commonality of characteristics for countries within the same group and maximises the differences between those that belong to different groups (see box). The classification of housing finance systems is based on a list of variables that reflect various aspects of national mortgage markets. These include: primary mortgage markets (market size, mortgage contracts, taxes and transaction costs, and market transparency); secondary mortgage markets (market development and infrastructure); and financial market development (banking, equity and bond markets).

One group identified via this technique consists of China, Indonesia and Thailand, and the other consists of Hong Kong, Korea and Singapore. Comparison between the two groups shows that the second group has more flexible housing markets in the following senses. First, as regards primary mortgage markets, the economies in the second group have a lower cost of holding and transferring a house (averaging 4.2% of property value vs 9.5% in the first group) and higher transparency (the three economies have the three highest transparency scores among the six; see Table 1 and box). By contrast, the differences in mortgage contract arrangements (mortgage term and lending criteria) are less noteworthy. Second, as regards secondary mortgage markets, in the second group of economies, market development is more advanced and market infrastructures (legal, tax and accounting framework) are more favourable to the development of MBS markets. Finally, as regards broader

Classifying housing finance systems using the cluster analysis method

The cluster analysis is divided into two steps. In the first step, a list of variables are chosen to reflect the characteristics of national housing finance markets (as shown in Tables 1 and 2). They include:

- the ratio of mortgage loans to GDP;
- maximum loan-to-value ratios;
- maximum mortgage term;
- real estate taxes and transaction costs;
- the Real Estate Transparency Index compiled by Jones Lang LaSalle, which reflects various attributes of real estate transparency, including data availability, regulatory and legal factors and ethical standards among professionals. The score varies between 1 (high transparency and low corruption) and 5 (the opposite);
- the scale of MBS market development. Hong Kong and Korea score 2 for relatively high issuance of MBSs, China and Singapore score 1 for very limited existence of MBSs, and Indonesia and Thailand score 0;
- an average score reflecting the institutional framework for MBS issuance, including the effectiveness of the legal framework, the enforcement of ownership transfer, the enforcement of foreclosure, SPV arrangements, tax treatment and restrictions on multiple-tranche securitisation. The score is calculated based on the indices compiled by Arner et al (2006, Table 5) and ranges between 1 (poor) and 5 (very good);
- the size of the banking industry (domestic credit), equity market and bond market in each economy, all represented as a percentage of GDP in 2004 (see Gyntelberg et al (2005), Table 1).

Each variable has been standardised using its own maximum and minimum values across the countries. In the next step, standard cluster analysis techniques are applied to classify the six economies into two groups. One group consists of China, Indonesia and Thailand, and the other consists of Hong Kong, Korea and Singapore.

financial market developments, the economies in the second group also have relatively more developed equity and bond markets,¹⁴ though all six economies rely heavily on finance via the banking sector.

Determinants of housing price dynamics

Methodology

Tsatsaronis and Zhu (2004) suggest that the structure of housing finance markets has important implications for house price dynamics in major industrialised economies. In this section, the same question is examined for the selected Asian economies. The results provide complementary insights to the existing literature, particularly because mortgage market developments in Asia have distinct features that are relevant for other emerging market economies.

To investigate the impact of housing finance markets on house price dynamics, a common econometric method is first applied to each country to examine the determinants of house price dynamics. Then the differences in house price dynamics are linked to distinctive features of housing finance systems. In particular, the common econometric method used in the first stage is the two-step Engle-Granger (1987) error correction method, which provides insights regarding both the short-term and long-term determinants of house prices.¹⁵ The following explanatory variables are included: GDP, bank credit, equity prices, short-term interest rates, the consumer price index (CPI) and the exchange rate.¹⁶ Except for the CPI and the exchange rate, all variables are defined in real terms. The economic motivation for the inclusion of these variables is fairly clear, as already discussed in previous studies.

Econometric method to examine house price dynamics

Empirical findings

The empirical results are shown in Table 3. In the upper panel of the table, the cointegration analysis results reveal the long-term relationships between house prices and other economic factors.¹⁷ The lower panel of the table, instead, shows the determinants of house price dynamics. Two kinds of dynamic

¹⁴ Equity market capitalisation on average accounts for 35% of GDP (weighted by GDP) in China, Indonesia and Thailand, compared with 172% in the other three economies. Similarly, bond markets account for 28% and 64% of GDP, respectively, in the two groups of economies.

¹⁵ The error correction method focuses exclusively on the determinants of house prices. Other important issues, such as the feedback effects from housing price movements to bank lending or equity prices, can be investigated using alternative econometric methods (such as vector autoregression or vector error correction models) but are left out here due to data limitations.

¹⁶ Urban population was dropped from the study due to its insignificance in determining house prices, probably because the population data are only available on a low-frequency basis. In addition, long-term interest rates (or term spreads) are excluded because their influence on house prices is mainly through the impact on the cost of fixed rate mortgages, which have very limited use in the six economies.

¹⁷ House prices implied from the long-term relationship can be considered as their long-term fundamental equilibrium. Alternatively, equilibrium house prices can also be derived using a financial approach (see, for example, Ayuso et al (2006)).

Determinants of house price dynamics						
Two-step error correction method (ECM)						
Step 1: Long-run relationship (cointegration analysis)						
Variables	China	Indonesia	Thailand	Hong Kong SAR	Korea	Singapore
GDP	0.197	1.172	0.423		-2.100	-1.468
Bank credit	0.081		0.173	0.938	1.357	0.609
Equity prices				0.495	0.067	0.647
Short-term rate	0.471	-0.470		-0.865	1.834	2.777
Consumer price index	0.827	-0.789	-1.369			3.143
Exchange rate		-0.265			-0.489	-0.850
Step 2: Explaining changes in real house prices						
Variables	China	Indonesia	Thailand	Hong Kong SAR	Korea	Singapore
Lagged ECM term	insig ¹	insig	insig	-0.357	insig	-0.143
Lagged dependent variable	0.708	1.042		0.834	0.698	0.712
Δ GDP					-1.010	
Δ Bank credit					0.395	
Δ Equity prices				0.176	0.048	0.199
Δ Short-term rate						
Inflation	0.288	0.542				
Currency depreciation		-0.195			-0.229	-0.356
<p>Note: The country-specific regressions employ data in the following sample periods: China 1998 Q4–2005 Q4, Hong Kong SAR 1993 Q1–2006 Q1, Indonesia 1994 Q1–2006 Q1, Korea 1991 Q4–2005 Q3, Singapore 1985 Q1–2006 Q1 and Thailand 1994 Q4–2005 Q4. In the first step of the analysis, an OLS regression is run for the level of real house prices and explanatory variables, which are all defined in real terms (deflated by consumer price indices) except consumer price indices and exchange rates. In the second step, changes in real house prices are regressed on the lagged error correction term, the lagged own variable and contemporaneous changes in other economic factors. In order to prevent simultaneity bias, the contemporaneous variables are instrumented using four own lags. In addition, to keep the model parsimonious, insignificant explanatory variables (at the 5% level) are dropped from the estimation in both steps (except the ECM term). Coefficients for constant terms are omitted here.</p>						
¹ Statistically insignificant (at the 5% level).						Table 3

linkages are reported here. The coefficient of the error correction term reflects the long-run influence from economic factors to house prices. Specifically, a negative coefficient implies that house prices tend to adjust to changes in market conditions, and its magnitude indicates the speed of price adjustments. In addition, the other coefficients reflect short-term influences from other economic factors to house prices.

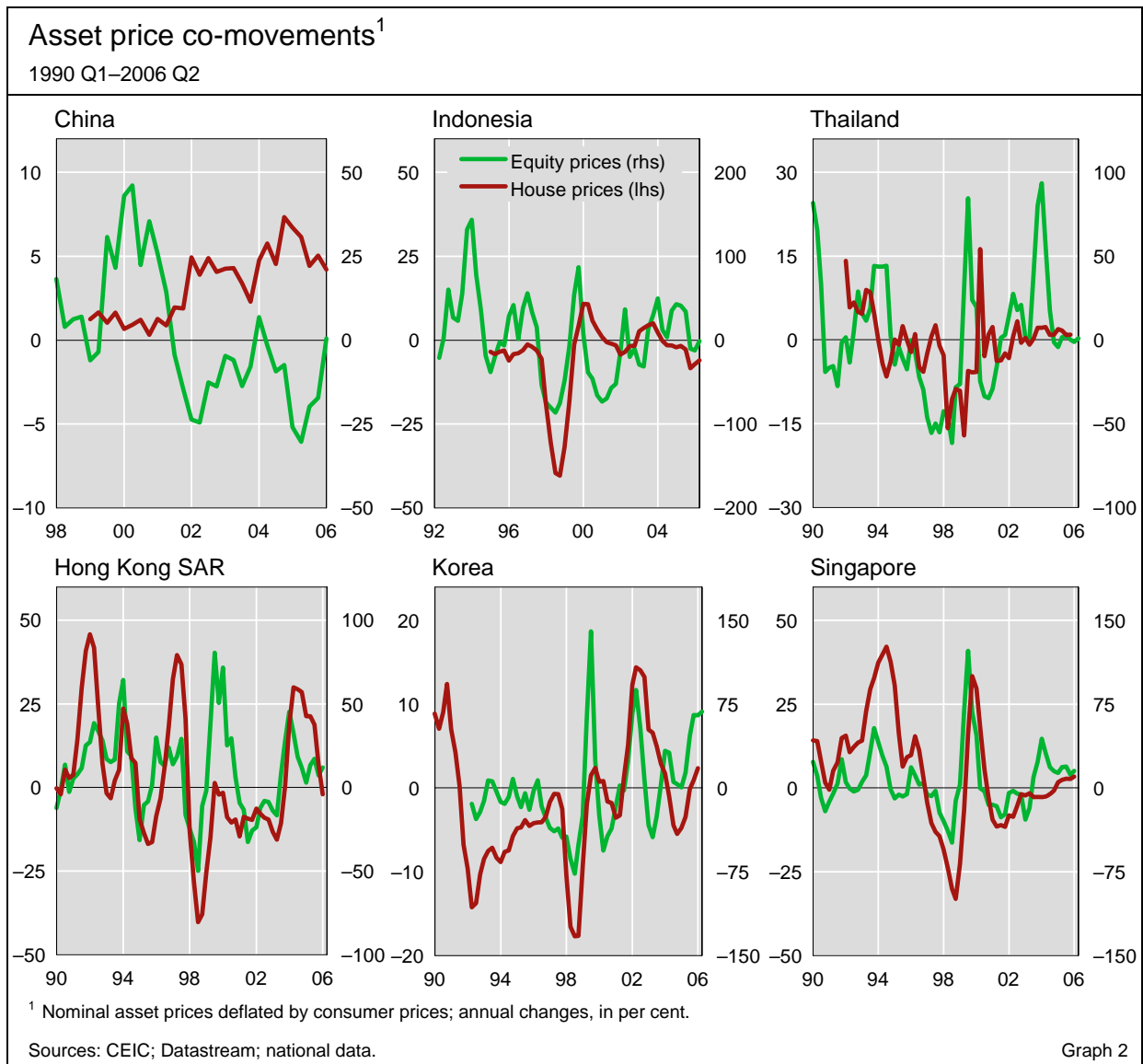
Housing finance system matters for ...

The results differ substantially across the six economies, suggesting that the driving factors behind house prices tend to be country-specific. Nevertheless, the differences can be linked to differences in housing finance markets and economic arrangements. The responses of house prices to changes in market conditions, particularly equity price movements, are similar in those economies with similar housing finance systems (based on the cluster analysis results). Bank credit has an important impact on house prices in all the economies except the one with the least developed banking sector. In addition, the impact of exchange rates on house prices largely depends on whether an economy adopts a fixed or a floating exchange rate regime.

First, equity price movements have different impacts on house price dynamics in the two groups of housing finance markets. In the three economies with more flexible housing finance markets (Hong Kong, Korea and Singapore), there is a strong positive relationship between the two asset prices in the long run (Table 3, top panel). In addition, equity price movements have a strong short-term impact on house prices as well (Table 3, bottom panel). These results suggest that equity price movements tend to have a larger wealth effect than the substitution effect in these economies. This stands in sharp contrast to what has been generally observed in a number of industrialised economies since the 1990s. By contrast, the link between the two asset classes disappears in the three economies with less flexible housing finance markets.

... asset price co-movements ...

The difference in asset price co-movements is also illustrated in Graph 2. The average correlation between changes in the two asset prices is only 1% in China, Indonesia and Thailand, compared with 56% in the other three



economies.¹⁸ The results may reflect the possibility that, in a more flexible housing finance system, housing behaves more like a tradable asset because of lower transaction costs, higher market liquidity and the more mature business environment. The more active trading and better flow of information might cause house prices to move more closely with other types of asset prices in response to changes in economic conditions.

Second, it appears that, in those economies with more flexible housing finance markets, house prices are more likely to adjust so as to eliminate their deviation from long-term relationships. As shown in Table 3, the coefficients of the error correction term, which represent the responsiveness of house prices to short-term supply and demand imbalances, are significantly negative only in Hong Kong and Singapore. This finding is consistent with the above conjecture that housing is more actively traded and house prices are more informative of economic conditions in these economies.

... and responsive-
ness of house
prices to changes in
market conditions

The high responsiveness of house prices can be a double-edged sword. More flexible market conditions and improved transparency can mitigate price distortions due to depressed market conditions, but cannot resolve other structural issues in the housing markets such as supply lags. In fact, house prices tend to be more volatile in these economies (see Graph 3), posing new challenges for the financial sector and more broadly for the real economy.

Bank credit is
important

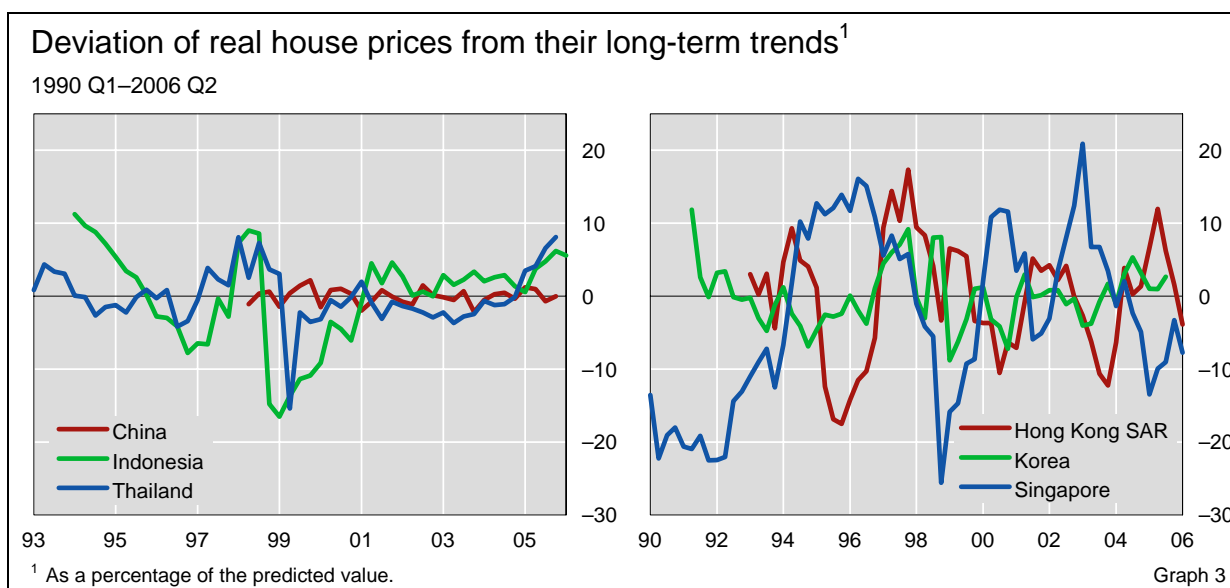
Third, consistent with findings in industrialised economies (Tsatsaronis and Zhu (2004)), bank credit is found to be positively related to house prices in all the economies. The exception is Indonesia (Table 3, top panel), where the banking sector is least developed and bank credit represents only 43% of GDP. The strong link between house prices and bank credit is economically intuitive for several reasons. One possibility is that increases in house prices imply a lower default probability for mortgage loans, so that banks are more willing to extend new credit for home purchases and new construction, and even to other sectors if housing or land is used as collateral. In addition, increases in bank credit, particularly to home purchasers, will boost demand and raise house prices. Finally, changes in economic conditions or in the monetary policy stance tend to cause house prices and bank credit to move in the same direction.

The role of
exchange rates

Fourth, exchange rates have a significant impact on house prices in most countries that adopt flexible exchange rates.¹⁹ In particular, currency appreciation (against the US dollar) is associated with housing booms and vice versa. This perhaps reflects the co-movements of the two variables driven by common economic fundamentals. In addition, it can be partly explained by the important role of foreign investors, who invested heavily in Asian property markets during the boom period (thereby boosting property prices and local currencies) but retreated after the Asian crisis, putting further downward pressure on the already weak currency and property markets.

¹⁸ The difference is smaller but still noteworthy if lagged correlations are calculated.

¹⁹ China and Hong Kong had a fixed exchange rate regime during most of the period under review.



At the same time, some puzzling results emerge from the regressions. For instance, GDP and house prices are negatively related in Korea and Singapore and unrelated in Hong Kong, and short-term interest rates are positively related to house prices in China, Korea and Singapore.²⁰ These results contradict intuition as well as previous findings for industrialised economies and are perhaps driven by specific economic episodes that have occurred in the sample period. For instance, the relationship between house prices and GDP in Hong Kong and Singapore might be explained by the fact that corrections in house prices after the Asian financial crisis took much longer than the recovery in the macroeconomy in these two economies, which caused the two variables to move in opposite directions. As for the relationship between house prices and interest rates, changes in interest rates may reflect the removal of interest rate restrictions and can be positively related to the availability of bank credit. The positive link between the two variables may also reflect the shift from a public housing system towards a market-based housing market.²¹ Therefore, the interactions between house prices and macroeconomic factors during crisis or transition periods may be worth further investigation in future research.

Conclusion

This article has documented recent developments in housing markets in Asia and investigated the impact of these distinctive features of national housing finance markets on the pattern of house price dynamics. The results suggest that the adoption of a more flexible housing market facilitates transactions and enhances the role of housing as a tradable investment asset. However, having

²⁰ As Tsatsaronis and Zhu (2004) have suggested, inflation can have either a positive or a negative impact on house prices.

²¹ Under the public housing system mortgage rates were held down to subsidise low-income households. In addition, the positive relationship between interest rates and house prices may reflect the monetary policy response to asset price movements, such as the recent upward adjustment in policy rates in China to contain excessive house price growth.

a market-oriented housing finance system does not remove all risks. Indeed, new sources of volatility can arise. Given the growing role of mortgage loans in the financial sector, it is increasingly important to improve our understanding of the potential risks embedded in the new housing market structure in Asia and elsewhere.

References

Arner, D W, C D Booth, B F C Hsu, P Lejot, Q Liu and F Pretorius (2006): "Property rights, collateral, and creditor rights in East Asia", in I Dalla (ed), *East Asia finance: selected issues*, World Bank.

Ayuso, J, R Blanco and F Restoy (2006): "House prices and real interest rates in Spain", paper presented at the BIS Autumn Economists' Meeting, 30–31 October, Basel.

Chan, E, M Davies and J Gyntelberg (2006): "MBS markets in Asia: the role of government-supported housing agencies", *BIS Quarterly Review*, this issue, pp 71.

Committee on the Global Financial System (2006): "Housing finance in the global financial market", *CGFS Papers*, no 26, Bank for International Settlements.

Davis, E P and H Zhu (2004): "Bank lending and commercial property cycles: some cross-country evidence", *BIS Working Papers*, no 150.

Engle, R and C Granger (1987): "Cointegration and error-correction: representation, estimation, and testing", *Econometrica*, vol 55, pp 251–276.

Gyntelberg, J and E Remolona (2006): "Securitisation in Asia and the Pacific: implications for liquidity and credit risks", *BIS Quarterly Review*, June, pp 65–75.

Gyntelberg, J, G Ma and E Remolona (2005): "Corporate bond markets in Asia", *BIS Quarterly Review*, December, pp 83–93.

Jones Lang LaSalle (2006a): "Asia Pacific property investment guide 2005/2006", mimeo.

——— (2006b): "Real estate transparency index", mimeo.

Ong, S E (2005): "Mortgage markets in Asia", presented at the European Real Estate Society Conference 2005, Dublin.

Tsatsaronis, K and H Zhu (2004): "What drives housing price dynamics: cross-country evidence", *BIS Quarterly Review*, March, pp 65–78.