# The importance of property markets for monetary policy and financial stability[1]

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## 1. Introduction

The real estate sector has been a major source of strength for the global economy since the most recent economic downturn. This has been particularly true of the residential property sector: in most countries house prices have been quite strong over the past few years. Rising house prices, together with low interest rates, have boosted mortgage refinancing activities, encouraged consumer spending and supported macroeconomic performance. By contrast, real commercial property prices in most economies have remained well below their peak levels reached in the late 1980s and the early 1990s. Despite this, delinquency rates for commercial real estate loans have been much lower than their historical averages. As a result, banks' loan portfolios have remained in reasonably good shape overall and the share of non-performing loans has been relatively low (BIS (2003a)).

The strong performance of the property sector and the general resilience of financial institutions stand in sharp contrast to the experience of the early 1990s. In the previous episode, the boom and subsequent bust in the property sector, particularly on the commercial side, were a major contributor to the banking problems. Sharp downward corrections in commercial property prices caused a broad-based reduction in profitability and a widespread deterioration in asset quality in the banking industry, driving many financial institutions into distress.

Despite these obvious differences between the two episodes one decade apart, a common underlying theme is the sizeable impact of property markets on the soundness of financial institutions and on macroeconomic activity. This impact is of course not a new observation. It is generally believed that the boom-bust nature of property price fluctuations has played a role in past business cycles, fuelling the upswing and magnifying the downswing. Falling property prices tend to impose downward pressure on the banking sector, not only because of increases in bad debt expenses for real estate loans, but also because of a deterioration in the balance sheets of corporate borrowers that rely on real estate as collateral. Hence, questions about the movements of real estate prices and the extent to which they interact with the financial sector and the macroeconomy have come to the attention of monetary authorities and financial regulators.

Against this background, this paper has three major objectives. The first is to explore the determinants of real estate prices and to examine exogenous and endogenous factors that contribute to property price fluctuations. It is shown that, although property price movements share some similarities as belonging to the same class of assets, they can differ substantially across sectors and countries. The second objective is to discuss the policy implications of the real estate cycle for the conduct of monetary policy. Finally, the paper seeks to identify important channels through which bank performance would be affected by movements in property prices. The next three sections tackle these three issues sequentially.

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## 2. Real estate as a particular type of asset

The determinants of property prices are in many ways similar to those of other assets, namely the expected service stream (consumption service) or expected future cash flow (rents) and the required rate of return (the long-term interest rate plus the risk premium) as a discount factor. In the long run, property prices therefore depend on demand factors, such as national income and average discount rates, and on supply factors, such as cost of construction, land availability and the quality of the existing stock.

Nevertheless, property markets also have a number of distinctive features compared with other types of asset. The supply of property is intensively local; delivery of the new stock can take quite a long time owing to the length of the planning and construction phases; rents can be very sticky because of the use of long-term rental contracts; market prices lack transparency and most transactions occur through bilateral negotiations; the liquidity of the market is constrained because of the existence of high transaction costs; borrowers rely heavily on external finance; real estate is widely used as collateral; and short sales are usually not possible. These features cause property prices to behave differently. In particular, in the short run, property prices are more likely to deviate from their long-term fundamentals. And fluctuations in property prices can arise not only owing to cyclical movements in economic fundamentals, interest rates and the risk premium, but also as a result of the intrinsic characteristics of the property market itself.

The business cycle causes property price fluctuations for obvious reasons. Improvements in overall economic conditions tend to increase the average income of households and therefore boost the demand for new homes, putting upward pressure on house prices. Similarly, businesses see profitable opportunities and seek to expand the scale of their investments. Such an expansion implies a higher demand for office space and storage, driving up commercial property prices. In addition, the market perception of risk changes with the phases of the cycle. During a booming phase, the risk involved in a given project is considered to be lower than in a downward phase. The changing risk premiums, in combination with time-varying interest rates (decided by policymakers), determine the discount rates and by extension have a sizeable impact on real estate prices.

Property price oscillations are also driven by endogenous factors, most notably supply lags and the historical dependence of investment decisions. On the one hand, the supply response in the property market is much slower compared with that of other goods, mainly as a result of limited land supply and the length of the approval process and the construction phase. On the other hand, the flow of information in the property market is usually inefficient. Because the turnover rate of properties is usually very low, the price information is rather limited and often inaccurate. In particular, much of the information that is important to understand the dynamics of property prices is related to knowledge of local markets, which is accessible only at a substantial cost. Therefore, it is usually very difficult, if not impossible, for market participants to forecast the future movements of property prices. In practice, market forecasts either rely heavily on current property prices or are computed by extrapolating past trends. This so-called "myopic" or "rule of thumb" expectation (Hendershott (1994) and Herring and Wachter (1999)) can contribute to endogenous oscillation of property prices or deviations from their long-run equilibrium values.

For example, during a booming period real estate prices continue to rise. Based on the past trend or current prices, constructors and developers decide to start new construction. However, as new construction may take several years to be completed, the adjustment process is slow. By the time the construction is delivered, the market demand may have fallen off. As a result, vacancy rates climb. The oversupply forces rents and real estate prices to fall, sometimes even below their fundamental values.

This "overbuilding" story can occasionally result from the distortion of private incentives by inappropriate or flawed government policies on both the regulatory and legislative fronts. One notable example is related to financial liberalisation after the 1970s in a number of industrial and emerging market economies (see Borio et al (1994) and BIS (1993)). Following liberalisation and deregulation, new financial institutions emerge and compete with existing lending institutions by offering loans on cheaper terms. As competition among lenders intensifies and more resources for financing real estate projects become available, the number of potential investors in the real estate sector increases and property prices will rise above their fundamental values. The distortion effect is even stronger when there are moral hazard problems in the market related to inappropriate policies such as overly generous guarantees and inefficient regulation. Guarantees against losses create an incentive for lenders to invest in high-return, high-risk projects, resulting in excessive risk-taking and overly

exuberant property assets. This mechanism of real estate cycles has attracted a lot of attention in the past two decades. It is widely believed that financial liberalisation has contributed to a series of real estate boom and bust episodes, including the collapse of the US thrift institutions in the late 1980s and the 1997 East Asian crisis.

Beyond these common characteristics, the dynamics of property prices can vary substantially across sectors (residential vs commercial, office vs retail, etc) and across countries as a result of differences in a number of specific demand and supply factors. For example, while housing prices on average have posted robust growth since the mid-1990s, experience has differed considerably across countries. House price growth has been particularly strong in Australia, Ireland, the Netherlands, Spain and the United Kingdom, followed by the United States and some of the Nordic countries. At the other end of the spectrum are Germany, Japan and Switzerland, where prices have remained rather flat or even declined over the past decade. A second example is the usual divergence between housing markets and commercial property markets. In the most recent economic downturn, the residential sector was very strong, reflecting the substantial role of low interest rates. Conversely, the commercial property sector seemed to be more constrained by the sluggish macroeconomic environment and posted capital losses in most industrial countries. Such national and sectoral differences can be attributed to asynchronous business cycles, as well as to distinctive local factors (elasticity of supply, funding methods, subsidy/tax polices, legal framework, etc).

## 2.1    Residential property prices

A house is a long-lived asset that delivers consumption services over many periods. In many respects it is more like a durable good than an investment asset. Given that residential property can provide accommodation to its owner, it has an intrinsic reservation value determined by the discounted value of the expected service stream. As a result, nominal housing prices are usually less likely to fall as sharply as equity prices and commercial real estate prices. Indeed, in many situations the downward pressure on the housing market is typically reflected in shrinking transaction volumes rather than in a collapse in nominal prices, as owners refrain from selling at a loss.

As noted, housing price fluctuations can be driven by macro factors and intrinsic characteristics of the housing market itself. Empirical evidence suggests that the market has its own distinct dynamics. On average, almost three fifths of the overall variation in housing prices can be explained by innovations in the housing market itself. The combined effect of other explanatory factors, such as GDP, interest rates, bank credit and equity prices, accounts for the rest (Graph 1).

However, Graph 1 also suggests that the importance of individual factors differs substantially across countries. This could be so for various reasons: the demand for houses is determined by demographic dynamics in each country; the supply of new homes can be constrained by land availability and the local land planning system; the financing cost of home purchases depends to a large extent on the housing financing system; and the liquidity of the housing market may be further constrained by the existence of transaction costs such as VAT, stamp duties and registration fees, as well as real estate taxes. All of these factors are local and specific to each market, leading to cross-country differences in housing price movements and in the relative importance of various factors.

An important factor that exhibits substantial cross-country variation is the responsiveness of supply. While house prices are determined by construction costs in the long run, the supply of new housing can only respond sluggishly to demand in the short horizon. Hence house prices may deviate from their long-term trends for a considerable period of time. The inertia of supply responsiveness depends to a large extent on local legislative and structural factors, as well as on tax and subsidy policies. The fact that new housing policy is less responsive to price movements in some countries, such as the Netherlands, the United Kingdom and some of the Nordic countries, has partially contributed to recent housing booms in these areas. Extreme cases are the Netherlands and the United Kingdom, which have witnessed actual reductions in the supply of housing during their latest round of housing booms. This pervasive development, which may be attributable to strict land development policies and caps on the supply of new housing, in turn drove housing prices even higher. By contrast, housing prices in Germany have remained flat in the past decade. Many believe that the flatness can at least be partly explained by the more flexible supply conditions in Germany relative to the other European countries.

The functioning of the housing markets also relies heavily on the housing financing system, where there is a bewildering variety of contract arrangements, policies, tax breaks and subsidies. First, the duration of the interest rate that anchors mortgage rates is different across countries. In particular,

mortgages in Australia, Canada, Finland, Ireland, Luxembourg, Norway, Portugal, Spain and the United Kingdom are mainly based on short-term interest rates, making house prices generally more responsive to short-term interest rates in these countries. By contrast, the majority of mortgage financing is tied to long-term interest rates in Belgium, Denmark, France, Germany, Italy, Japan, the Netherlands and the United States (see Borio (1995) and ECB (2003)). Second, the nature of the penalties on early repayment has a significant impact on how far households will be willing and able to refinance their mortgage debts when interest rates fall or when house prices rise. Refinancing in the United States is notably easier and cheaper than in other countries, not only because of smaller penalties but also due to innovations in mortgage securitisation introduced by Fannie Mae and Freddie Mac (see Deep and Domanski (2002)). Third, collateral valuation practices have potentially major implications for credit supply. Valuation methods that are very sensitive to market values, in combination with high loan-to-value (LTV) ratios, would generate a boom in credit supply when property prices rise and a credit crunch when prices fall (see Borio et al (2001) and G10 (2002)). Finally, lower transaction costs may stimulate turnover and enhance the responsiveness of housing markets to macroeconomic shocks. The ratios of transaction costs (including stamp duty, registration fees and real estate taxes) to house prices vary from a low level of 2% in the United Kingdom to exceptionally high levels of 20% in Belgium and 14% in France. Other things being equal, rising demand is more likely to have a larger impact on house prices in the group of countries with lower transaction costs (Graph 2).

While house prices are mainly determined by the above housing market factors, they can also be responsive to returns on other asset classes. An interesting issue that has drawn a lot of attention lately is the comovement between equity prices and housing prices. Given that equity holdings and housing are the two largest portfolio components of household wealth in developed countries, price inflation in one asset will influence the investment decisions of households; the resulting reallocation of portfolios will affect the price of the other asset. In theory, there might be two effects working in opposite directions. The substitution effect suggests that the two asset prices should move in opposite directions, as higher returns in one market will shift investment away from the other market and cause its price to decline. By contrast, the wealth effect predicts that an increase in equity (or house) prices, by increasing the value of household wealth, will allow households to expand their investment in both markets. As a result, the two asset prices will tend to move in the same direction. Depending on the relative importance of the two effects, the interaction between the two markets may be very different.

The connection between the two assets is supported by empirical evidence, which shows a clear pattern in the lead-lag relationship between equity prices and housing prices in many developed countries over the past 30 years. In particular, equity price fluctuations tend to be highly correlated with house price fluctuations six quarters later (Graph 3). Further evidence can be derived from impulse response analyses based on a VAR analysis (see Appendix). The results suggest that equity price fluctuations contribute to the variation in house prices, and the cumulative effect usually peaks after eight to 10 quarters (Graph 4). The fact that housing prices continued to rise three years after the collapse of the equity market in the most recent slowdown is mainly attributable to the current low interest rate environment, which partly offsets the downward pressure associated with falling equity prices. Overall, the substitution effect appears to have played a more important role lately as households which were disappointed with the prospects of equity market investments shifted a large proportion of savings into residential real estate.

## 2.2 Commercial property prices

Commercial property markets have some unique characteristics, such as longer construction lags, long-term leases and volatile income streams, which cause the commercial and residential property cycles to show distinct patterns. Moreover, commercial property cycles may be asynchronous across regions and sectors. Depending on the elasticity of supply, development lags, durability of assets and funding methods, different types of commercial property may themselves have varying dynamics.

Unlike residential real estate, commercial property is more of a pure investment asset and its value is determined by the discounted value of future rents. When macroeconomic conditions weaken, shrinking business activity cuts down the demand for commercial property and results in higher vacancy rates. Rising vacancy rates and lower rental rates lead to a deterioration of real estate market fundamentals and cause prices to fall. Compared with a residential property, the reservation value for a commercial property is much lower, because its consumption value is low while its maintenance cost is very high. As a result, commercial property prices tend to be more responsive to macroeconomic

conditions, and it is common to observe a sharp decline in nominal commercial property prices during an economic downturn. As Graph 1 suggests, the dynamics of commercial property prices are somewhat less "autonomous" than those of residential sector prices, in the sense that shocks in the commercial property sector explain only 50% of the variation in property prices while the equivalent figure in the residential sector is about 60%.

Graph 1 also reveals the importance of bank credit in determining commercial property prices. This might relate to the fact that commercial property has been widely used as collateral, so that property prices are closely connected with borrowers' financial positions. This idea has been formerly modelled in the seminal work of Bernanke et al (1994) and Kiyotaki and Moore (1997), who highlight the importance of credit market imperfections resulting from asymmetric information between borrowers and lenders. To overcome the adverse selection and moral hazard problems, banks choose to link the terms of credit to the net value of borrowers' balance sheets. In other words, the borrowers' borrowing capacity and cost of external finance largely depend on the value of collateral assets. This introduces a strong interaction between bank credit and the balance sheets of borrowers. Higher collateral (such as real estate) values improve the debtors' balance sheets and allow them to finance new projects on more favourable terms. The availability of extra credit in turn pushes the asset price even higher. By contrast, falling property prices weaken the financial position of borrowers, reduce bank credit to the real estate sector and push property prices even lower. This amplification effect, which is known as the "financial accelerator", can significantly contribute to the high volatility that has been observed in commercial property markets.

The close connection between bank lending and commercial property prices, however, may have been changed in the past decade in the wake of the emergence of new financing methods. A new trend since the early 1990s is that the commercial property sector has been less reliant on funds from traditional sources such as banks and insurance companies. As a substitute, capital market sources of financing, in both equity and debt form, have grown rapidly. This may have resulted in important changes in the dynamics of commercial real estate markets (see Zhu (2002)). On the equity side, the development of real estate investment trusts (REITs) has been particularly remarkable in Australia and the United States. In the United States, REITs have overtaken the pension funds to become the most important institutional investors in the real estate equity market. In Australia, the listed property trusts (LPTs) now control about one third of the commercial real estate assets in the country. On the debt side, securitisation of commercial mortgage-backed assets (CMBSs) has become very popular in both Europe and the United States.

The increasing importance of public real estate markets may lead to a closer integration between commercial real estate and the capital market. Some market participants have argued that this could, on balance, dampen the commercial real estate cycles. From the funding perspective, the development of new funding methods can help to even out the flow of capital into the commercial property sector. For example, in the early 1990s, when most US banks and thrifts were reluctant to extend commercial real estate loans, REIT and CMBS markets developed and successfully removed the potential risk related to financing uncertainty in the commercial property market. Moreover, the development of public markets can strengthen market discipline. Arguably, the low-leverage ownership structure of REITs makes them less likely to build aggressively for speculative future demand. Improved information disclosure and publicly observable prices reflect the changing preferences and concerns of market participants in a more timely manner, so that the market may be able to detect asset price imbalances at an early stage. If so, commercial property prices could be less prone to large swings owing to funding cycles, and their impact on bank performance will be weakened. Nevertheless, given that the integration of the commercial property sector with capital markets could introduce new sources of market volatility, the validity of such an argument remains to be tested.

## 3.      Real estate prices and monetary policy transmission

Movements in property prices could affect aggregate demand and economic activity in various ways. First, rising property prices lead to more optimistic expectations of the returns on property investment. As a result, builders start new construction and market demand in property-related sectors increases. Second, rising house prices induce households to increase private expenditure and therefore provide a big support for private consumption. Third, changes in commercial property prices may significantly

change the investment decisions of those firms that are financially constrained. Similarly, movements in house prices influence the financial behaviour of homeowners and would-be home purchasers.

The role of real estate prices in the conduct of monetary policy has attracted much attention among researchers and policymakers in recent years. There has been extensive evidence that property price movements have a large impact on private consumption and the real economy. For example, Helbling and Terrones (2003) examine the downside effect of property price movements and find that house price busts are associated with output losses twice as large as equity bubbles. In addition, Graphs 5 and 6 demonstrate the cumulative responses of real GDP to 1% shocks in house prices and commercial property prices based on a structural VAR analysis (see Appendix). The results show that increases in property prices tend to have a positive impact on real GDP in many countries. Importantly, the magnitude of this impact is different across countries and sectors. The commercial property sector seems to have a larger impact on the real economy, reflecting the fact that it is more important in affecting the investment decisions and financial conditions of corporate firms. Besides, the national difference suggests that the role of property prices in monetary policy transmission might be influenced by local factors.

### 3.1    The investment channel

Real estate is an important investment asset in the economy. According to Tobin's q approach, the profitability of property investment depends on the ratio between property prices and property replacement cost. When property prices rise above the cost of construction, it is profitable for property developers and other non-financial firms to construct new buildings. Accordingly, the boom in the construction sector boosts employment and demand in property-related sectors. As real estate investment usually represents a significant proportion of the economy as a whole in most countries, the impact can be substantial.

The impact of property prices on construction depends on the importance of the real estate sector in the economy as a whole, the elasticity of property supply and credit conditions in the country. Owing to rigidities in supply, this impact often builds up gradually. The lagged effect can arise from constraints on the availability of land, the local land planning system or the competitive conditions in the construction sector. The lag is also affected by the ease of access to credit and the availability of new sources of funds. Particularly, a construction boom is more likely to take place in financially liberalised economies. With the entry of new financial institutions and intensified competition, property developers and builders can easily receive loans on favourable terms for new construction. Cheap loans then stimulate building activity, as exemplified in a number of countries (G10 (2002)).

In addition to the impact on the construction sector, fluctuations in property prices can have an important influence on investment decisions in other sectors via the liquidity effect or, equivalently, by changing the financial position of various economic agents. Increases in property prices improve the financial condition of property owners, enabling them to raise external funds to finance new projects. Empirical evidence suggests that the impact of financial conditions on investment decisions is greatest for financially constrained firms. Higher property prices can improve the capacity of these firms and allow the economy to invest to its full capacity.

The liquidity effect is, however, a double-edged sword. While rising property prices alleviate credit constraints for property owners, falling property prices can amplify the adverse effect through the interaction between the credit constraint and balance sheet conditions. An initially constrained investor will find it more difficult to access loans, as fewer loans are available in the credit market. The investor either has to give up the investment project or borrow at very high costs. Similarly, an initially unconstrained investor may find himself no longer able to finance new projects on the initial terms and conditions. Rising funding costs and limited accessibility force both groups of investors to cut back the scale of their projects.

### 3.2    The wealth effect

The argument for the wealth effect goes back to the permanent income hypothesis of the life cycle model. According to this hypothesis, the level of household consumption is determined by permanent income, which is the present value of all future incomes of the household. Given that housing and equity are the two most important financial assets for an average household in most industrial countries, with housing typically the greater of the two, an increase in house prices implies that

household wealth increases. As a result, owner-occupiers may reduce their savings and increase their expenditure.

The strength of the aggregate wealth effect, however, is uncertain and depends on several factors. First, it depends on whether the house price gains are perceived to be permanent or temporary. Second, the size of the wealth effect is also related to the home ownership rate in the economy. Rising house prices tend to increase the wealth of homeowners but make houses less affordable for those households that are planning to purchase their own homes. First-home buyers need to save more for higher mortgage payments and their consumption actually drops when house prices increase. Third, the ability of households to consume capital gains from houses depends on the flexibility of the housing financing system. In other words, whether refinancing is permitted, on what terms and at what cost - these are the main financial factors that determine the magnitude of the wealth effect. For example, an important channel through which households extract consumption from house wealth is the mortgage equity withdrawal (MEW) mechanism, which is mainly based on refinancing. In most euro area countries (except the Netherlands), MEW has been almost entirely absent, as the mortgage market is not very competitive, the cost of refinancing is high and households are rather reluctant to extract equity from their housing stock. In sharp contrast, MEW has been very prominent recently in Australia, the Netherlands, Sweden, the United Kingdom and the United States. In 2002, cash-out refinancing pumped an estimated USD 97 billion from home equity back into the economy in the United States, providing important support for consumer confidence and private consumption. Similarly, the ratio of MEW to disposable income in the United Kingdom hit a very high level of 6.7% by end-2002 (Graph 7).

## 3.3     Challenges for the monetary authorities

The link between property prices and aggregate demand suggests that the monetary authorities can benefit from monitoring developments in property markets. The view that policymakers should respond to excessive increases in property values which are manifestations of excess demand in the economy as a whole has received much sympathy within central bank circles. In particular, monetary policymakers need to identify the sources and nature of property price fluctuations in order to understand their implications for price stability and the general economy, and then to formulate the appropriate policy response. However, in practice, critical issues arise, suggesting that implementation is not an easy task.

First, it is often not straightforward to identify "excessive" property price inflation at an early stage. Lack of reliable data, diversity in valuation methods and unpredictability of market movements make it difficult for policymakers to design an early warning signal of asset price imbalances in the property market with a comfortable degree of confidence.

Second, it is technically difficult to predict the exact effects of monetary policy on the property market and on the macroeconomy. In many cases the monetary authorities find themselves in a dilemma, as price stability in the goods market and in the asset market (including the real estate market) may call for different policy responses. For example, in recent years many industrial countries have witnessed booms in housing markets, at the same time as macroeconomic performance was sluggish and inflation rates were very low. The coexistence of strong house price inflation and low inflation in the goods market has posed a serious dilemma for policymakers. The tightening consistent with stability in the housing market may risk excessive deflation in the goods market and a subsequent negative impact on an already weakened macroeconomy. On the other hand, the build-up of household debt, which has mainly been a result of low interest rates, has increased household indebtedness and may finally impair the ability of households to continue servicing their debts without adjustments in their expenditure.

On balance, whether the monetary authorities are able to use monetary policy to contain asset market imbalances remains debatable. The above two problems, namely "when to do it" and "how to do it", need to be resolved before the monetary authorities can refine their policy framework to deal with asset market imbalances.

# 4. Real estate prices and financial stability

Bank lending is the primary source of real estate funding; not surprisingly, there are close connections between real estate prices and bank credit. On the one hand, sharp falls in property prices can lead to a large-scale deterioration in asset quality and in the profitability of the banking industry, particularly for those banks that are deeply involved in property or property-related lending businesses. They also undermine the value of bank capital, reducing the banks' lending capacity. On the other hand, banks' lending attitude has important implications for property prices. Bank credit to property buyers and constructors may change the balance between the demand and the supply side and cause property prices to fluctuate.

The linkage between property prices and bank credit is confirmed by empirical evidence based on the VAR analysis (see Appendix) in a number of countries. Graphs 5 and 6 show that increases in property prices often lead to expansion of bank credit and this impact is notably high in some countries. Recent studies by Hofmann (2001) and Davis and Zhu (2004) suggest that bank credit and property prices are positively related in the long run. They further point out that the impact of property prices on bank credit is significantly positive, yet the impact in the reverse direction in less clear.

## 4.1 Risks for banks

Movements in real estate prices can have a substantial impact on banking performance. In particular, falling property prices may lead the banking sector into distress via various channels, eg through increases in bad loan expenses in real estate loans, or through a deterioration in the financial conditions of borrowers and banks themselves, or indirectly through a contraction in financial transactions and in economic activity.

First of all, real estate lending is one of the most important components of bank loans. In most developed countries it accounts for one third, sometimes even more than half, of total bank loans. Declines in real estate prices imply a lower return in the property industry and hence real estate loans are more likely to default. This reduces the profitability of bank lending and increases the banks' bad debt expenses as well.

The complexity of the credit risk channel increases given the prevalent use of collateralised lending in real estate loans. On both residential and commercial property markets, mortgage loans are often collateralised by the underlying property. Nevertheless, the use of a low LTV ratio does not necessarily shelter banks from loan losses. When property prices decline sharply, even ratios that were initially considered to be very conservative may turn out to be insufficient. In particular, when a high LTV ratio is used in combination with the market value (defined as the expected price if the target asset was traded on the date of valuation), it could be very risky for mortgage lenders because default risk could be extremely high during a downward phase.

The credit risk exposure of property loans also depends largely on the usage of these loans. Residential mortgage loans are usually considered to be very safe, as a home is more like a consumption good and the repayment of these loans often comes from household income, which is relatively stable. By contrast, loans to developers and constructors for commercial purposes are much riskier. The repayment of these loans is backed by the sale prices or rents generated from the property upon its completion. Declines in property prices imply a deterioration in the financial position of developers and constructors; therefore they are not able to borrow new funds that are essential for the completion of the project. When the property under construction is left unfinished, the value of collateral drops close to zero and the commercial mortgage loan is deemed to default. In fact, increases in non-performing loans in the commercial property sector have been a major contributor to a number of banking crises, such as the financial distress in the early 1990s in many industrial countries and the 1997 East Asian crisis.

The credit risk, however, is not confined to the real estate sector. Because real estate assets are also widely used as collateral for other types of loans, fluctuations in property prices would have a broader impact on the banking industry through the balance sheet effect as noted above. When real estate prices fall, a typical borrower is more likely to face financial constraints in the form of reduced borrowing capacity. These constraints restrict the scale of new investment and reduce the profitability of corporate firms. As a result, the credit risk exposure of other types of bank loans increases as well, exacerbating the fragility of the banking sector.

This credit risk channel and its interaction with financial constraints become even more complex under certain conditions. One example is that the banks' lending criteria are arguably procyclical. Banks tend to underestimate the default probability of property-related loans in a real estate boom for various reasons, including poor risk management practices, poor data and perverse incentives linked to the safety net. This "disaster myopia", as defined by Herring and Wachter (1999), can be a major contributor to the build-up of asset price inflation and increases in banks' credit risk exposure. Another worrisome situation occurs when one bank or a particular type of financial institution has extremely high concentration in the real estate sector, as exemplified by the US thrift institutions and the Japanese "Jusen". This concentration of property-related risk turned out to be very dangerous in both cases. The collapse of property prices easily dragged down these specialised institutions, and generated systemic risk for the whole financial system.

In addition to the credit risk effect, declines in property prices would also lead to a reduction in bank profitability via indirect channels. During the downward phase of property markets, banks' capital base is weakened because of increasing provisions and declines in the value of fixed assets. As a result, banks' lending capacity is limited and inevitably their interest income will fall. Moreover, as construction and borrowing activity shrink, banks' fees and commission income from real estate related transactions decline. Finally, as noted above, declines in property prices may generate a negative feedback on the overall economic conditions. This type of risk, because of its nature, is more difficult to hedge and is likely to affect the sector as a whole.

Table 1

**Banking profitability at different stages of property cycles:[1] 1979-2001**

|  | Return on equity | | Return on assets | | Loan loss provisions (% of total loans) | | Memo: Number of years | |
|---|---|---|---|---|---|---|---|---|
|  | Up swing[2] | Down swing | Up swing | Down swing | Up swing | Down swing | *Up swing* | *Down swing* |
| Australia | 12.44 | 9.61 | 1.27 | 0.85 | – | – | *9* | *7* |
| Belgium | 12.22 | 12.31 | 0.37 | 0.36 | 0.32 | 0.62 | *15* | *6* |
| Canada | 18.71 | 17.24 | 0.98 | 0.90 | 0.72 | 0.71 | *10* | *10* |
| Finland | 6.75 | 6.30 | 0.46 | −0.02 | 0.41 | 0.23 | *15* | *8* |
| France | 11.07 | 1.77 | 0.41 | 0.04 | 0.56 | 1.04 | *7* | *7* |
| Germany | 10.86 | 12.74 | 0.51 | 0.60 | 0.63 | 0.87 | *12* | *11* |
| Italy | 15.21 | 12.61 | 0.99 | 0.71 | 0.88 | 1.16 | *9* | *9* |
| Japan | 17.67 | −3.65 | 0.48 | −0.13 | 0.06 | 0.70 | *13* | *10* |
| Netherlands | 16.34 | 14.41 | 0.73 | 0.51 | – | – | *15* | *8* |
| Norway | 15.13 | −37.78 | 0.87 | −0.72 | 0.24 | 2.47 | *14* | *8* |
| Spain | 10.50 | 7.89 | 0.96 | 0.75 | 0.81 | 1.30 | *13* | *10* |
| Sweden | 15.82 | 11.53 | 0.86 | 0.60 | 0.49 | 0.15 | *12* | *11* |
| Switzerland | 10.96 | 9.26 | 0.70 | 0.54 | – | – | *12* | *11* |
| United Kingdom | 21.47 | 15.64 | 1.05 | 0.67 | – | – | *13* | *5* |
| United States | 17.03 | 16.02 | 1.34 | 1.12 | 0.90 | 0.87 | *14* | *9* |
| Average | 14.15 | 7.06 | 0.80 | 0.45 | 0.55 | 0.92 |  |  |

[1] Aggregate property prices are constructed as a weighted average of real house prices and real commercial property prices. [2] "Up (down) swing" refers to the years when real aggregate property prices in the country concerned increase (decrease).

Sources: OECD; BIS; author's calculations.

Table 1 computes the average levels of banking profitability and loan loss provisions during the upward phase and downward phase of property markets in a number of industrial countries. On average, the profits of banks almost halve and loan loss provisions nearly double in "bad" years. A striking example is Norway, where bank performance was dramatically affected by property market conditions. Similarly, it is widely believed that the large exposure of the banking industry to the real estate sector and the collapse of land prices have been at the heart of Japanese banking problems, contributing to the increase in non-performing loans in the banking sector and distorting the performance of the real economy.

In sum, given the large effect of property prices on bank profitability, booms and busts in real estate prices have important implications for financial stability. Even if large swings in property prices do not necessarily bring the banking sector into distress, they do feature in a number of banking crises in industrial and emerging market countries alike (see Herring and Wachter (1999)). Typical examples in recent decades are Spain in the late 1970s and early 1980s, the Nordic countries in the late 1980s, Mexico in the early 1980s and mid-1990s, Japan in the whole past decade, Thailand in 1994-97 and a number of other episodes (see Hilbers et al (2001)). An important observation is that the financial system is more vulnerable to property market movements in financially liberalised economies where effective prudential regulation is not fully developed. After financial liberalisation, lending rates tend to be driven down as a result of the entry of new financial institutions, intensified competition among lenders, and removal of interest rate control and administrative control on credit growth. As net interest margins shrink, banks come under pressure to search for new opportunities and may tend to underestimate the risk of new loans. Especially if an effective prudential regulation system is not in place, excessive competition can easily lead to a build-up of financial imbalances. The unwinding of financial imbalances at a later stage triggers the onset of a banking crisis.

## 4.2      Implications for risk management

Risk management is at the heart of all financial activities. It is crucial for managers and financial regulators to measure accurately the credit risk exposure of banks and to make sure that such risk does not jeopardise the stability of the financial system. In the current revision of the capital adequacy framework by the Basel Committee on Banking Supervision (BCBS), the main theme is to improve measurement of the credit risk exposure of banks.

Given the important share of real estate loans and property-related loans in bank portfolios, banks need to have a clear understanding of the impact of property market movements on their balance sheets. However, owing to lack of reliable data and the heterogeneity of property markets, the task is typically a difficult one.

The difficulty arises first from the regional and sectoral differences mentioned above. For example, real estate loans can have different maturities; they can be granted at fixed or floating interest rates; and the levels of household debt and debt service burden vary across countries. All these features make property assets non-comparable across national boundaries. To understand the risk involved in individual loans, including default risk and prepayment risk, requires a thorough knowledge of local markets and market dynamics. These national differences imply that the risk weights, which are used to decide the level of economic capital, should vary across countries and differ between residential and commercial mortgage loans. Even within the same category of residential mortgage loans (in the same country), the credit exposure for principal residence and that for second-home investors can be quite different in the event of a housing price decline.

Default correlations add another layer of complexity. The correlation is relevant in at least three dimensions. First, mortgage loans tend to have a substantial systematic component in that the default correlation is high. Although mortgage loans on average have a lower default probability, the defaults usually come together, when a national market falls into distress. This high correlation is particularly important in small economies, where the national market offers only limited diversification opportunities. By contrast, default correlations will tend to be lower in large countries with more regional economic profiles.

The second dimension is the relationship between probability of default (PD) and loss-given-default (LGD). While most credit risk models, including those underlying the Basel Accord, treat PD and LGD as independent, empirical evidence suggests a strong positive correlation between these two variables. This result is not surprising, as default rates are usually higher during economic downturns. Such periods also tend to go hand in hand with depressed property prices. The procyclical relationship

between the two variables raises questions about the market practice of assuming a zero correlation, as the latter would underestimate the expected loan losses in bad times.

The final dimension relates to the potential for cross-country diversification. Cross-border real estate investment has traditionally been considered a strategy to achieve diversification benefits, and has been on the increase in the past decade. However, empirical evidence (Graph 8) suggests that global commercial property markets have become more integrated since the mid-1980s, even though a significant diversification benefit from global housing markets is still present. Case et al (2000) find that the high correlation across national commercial property markets links strongly to effects of changes in GNP, suggesting that real estate investments are akin to a bet on fundamental economic variables that are correlated across countries. Ignoring the trend of global market convergence will also lead to an underestimation of the capital reserves that are needed for a sound banking system.

## 5.     Final remarks

The nature of real estate price dynamics and their relationship with financial stability and monetary policy are much debated questions among academics and policymakers alike. They pose important challenges for risk management, financial regulation and policy design. These issues may not be fully resolved in the near future, mainly because of the complexity of the market and varieties of market functioning. To a large extent this is a consequence of inadequate data and weak analysis. The collection of reliable and comparable data on property markets has proved very difficult, restricting the scope of meaningful analysis. Looking forward, there is a need for action aimed at improving the quality of property data and enhancing the comparability of national statistics across countries.
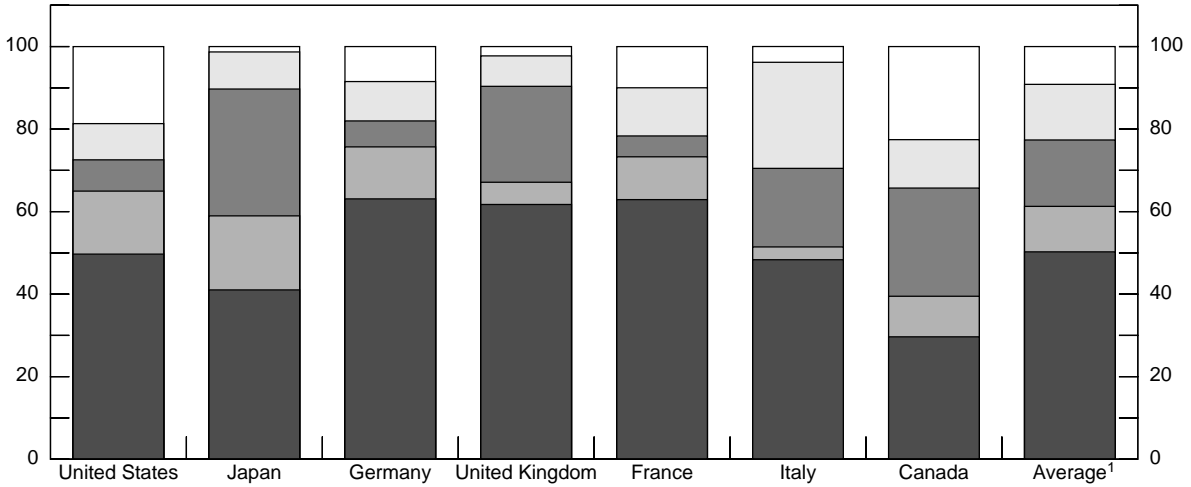
Graph 1

**Contribution of different factors in
explaining the variation in property prices**



Legend: ■ Property prices  ▨ Real GDP  ▦ Bank credit  ▢ Equity prices  ▭ Real short-term interest rates
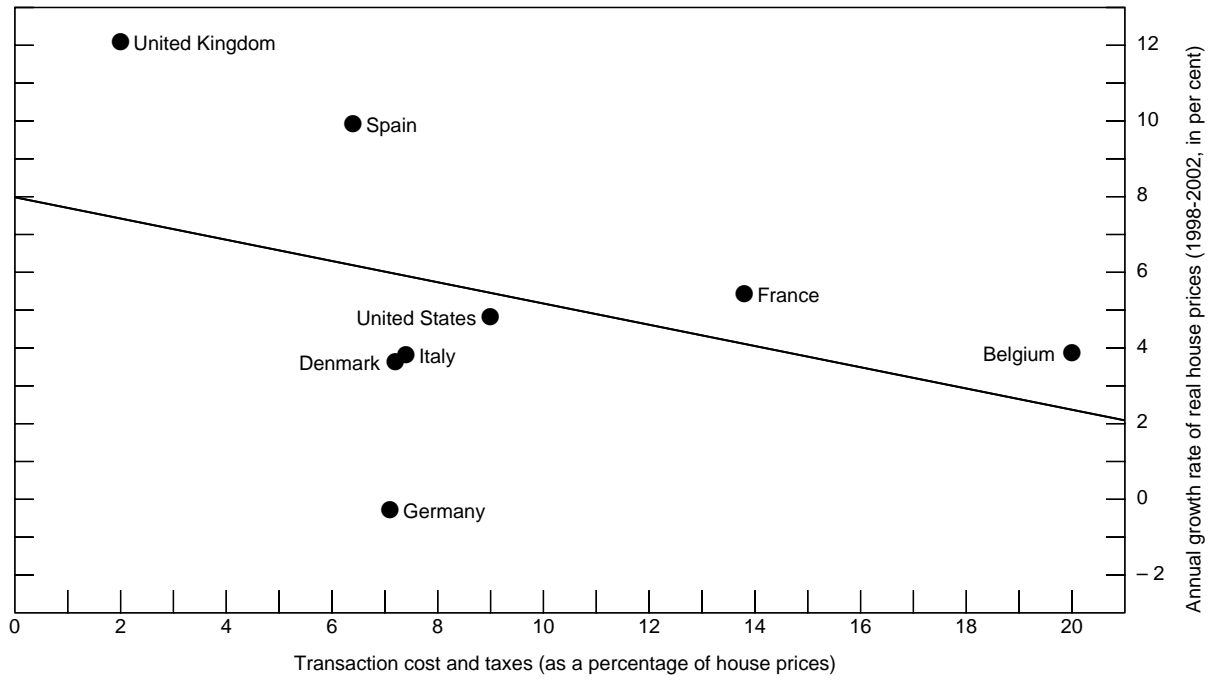
**Residential property prices**
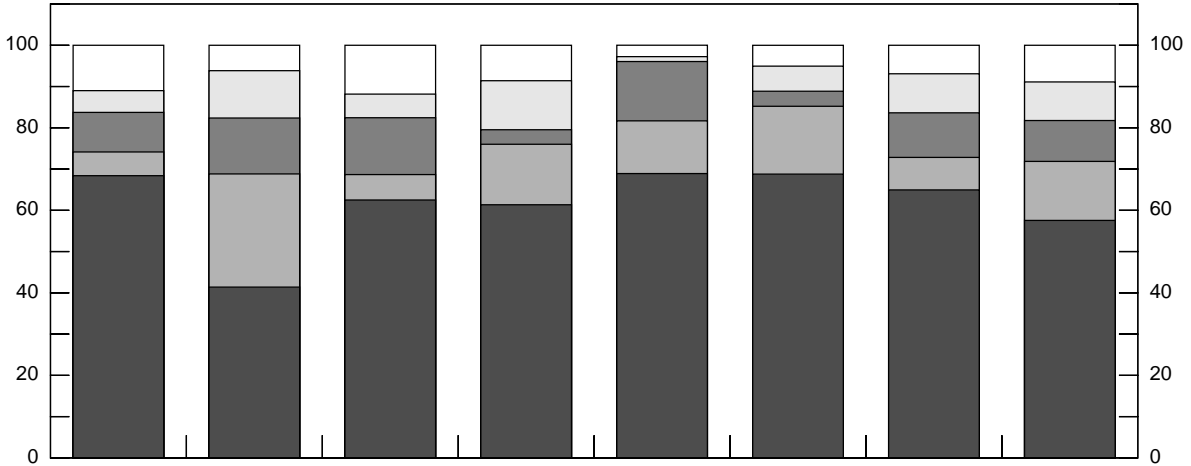
**Commercial property prices**

[1] Of the G7 countries plus Australia, Belgium, Denmark, Finland, Ireland, the Netherlands, Norway, Spain, Sweden and Switzerland.
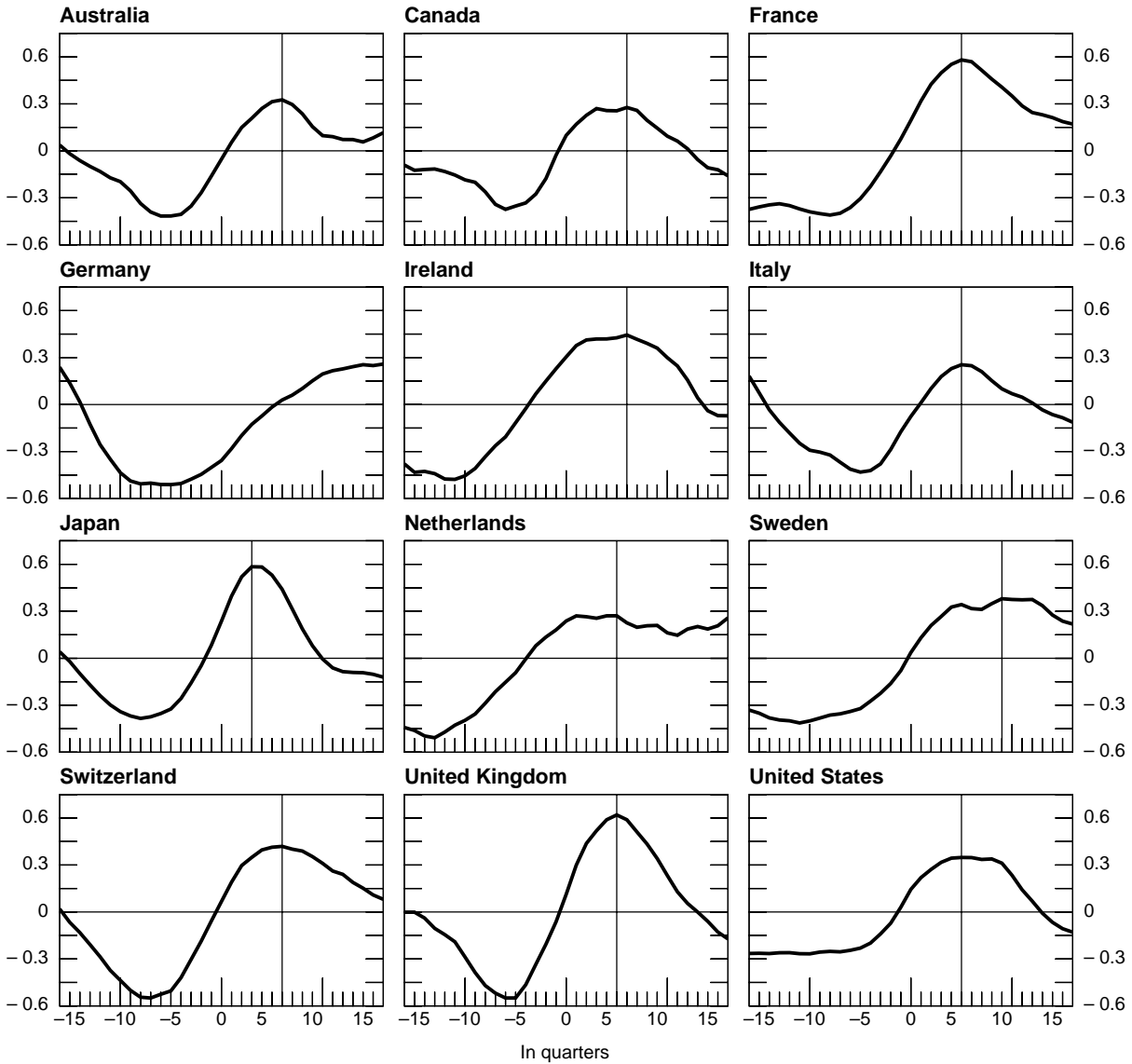
Source: Author's calculations.

Graph 2

**Transaction cost against house price variation**



Sources: Maclennan et al (1998); national data.

Graph 3

**Lead-lag correlation between real residential
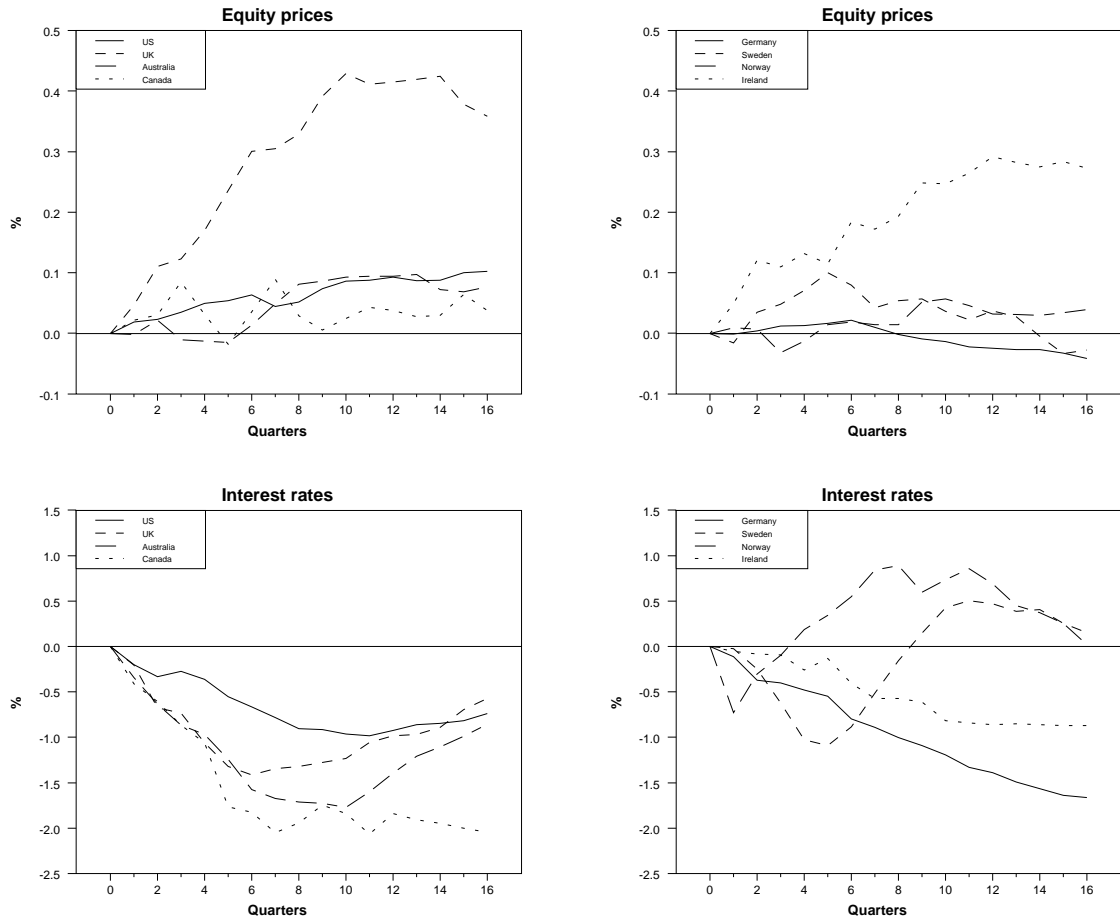property prices and real equity prices[1]**



[1] Based on the detrended ratio of both series. The vertical line indicates the time of maximum correlation (for Germany, after 16 quarters). The x-axis refers to the number of quarters that equity prices lead (positive values) or lag (negative values) residential property prices.

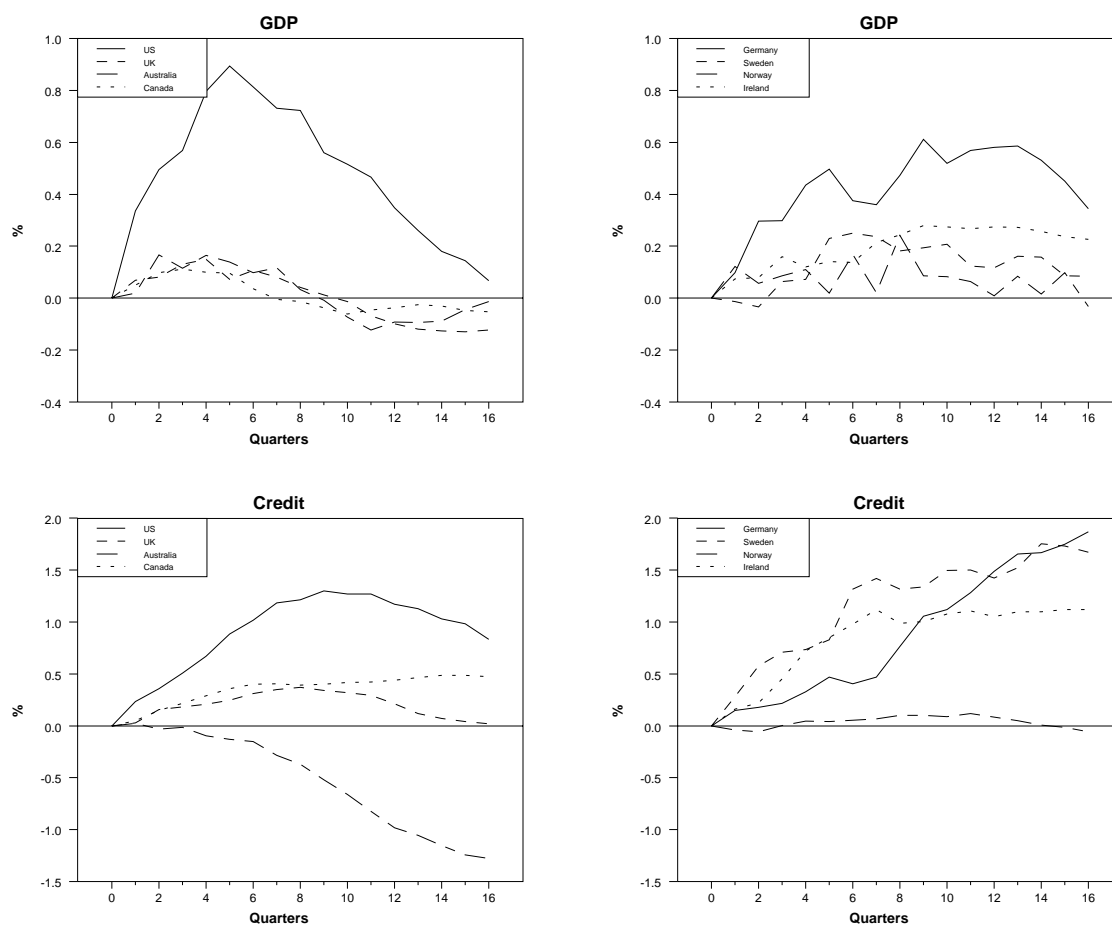Source: Author's calculations.

Graph 4

**Cumulative responses of house prices to a 1% shock in:**



**Equity prices**

(US, UK, Australia, Canada)

**Equity prices**

(Germany, Sweden, Norway, Ireland)

**Interest rates**

(US, UK, Australia, Canada)

**Interest rates**

(Germany, Sweden, Norway, Ireland)

Source: Author's calculations.

Graph 5

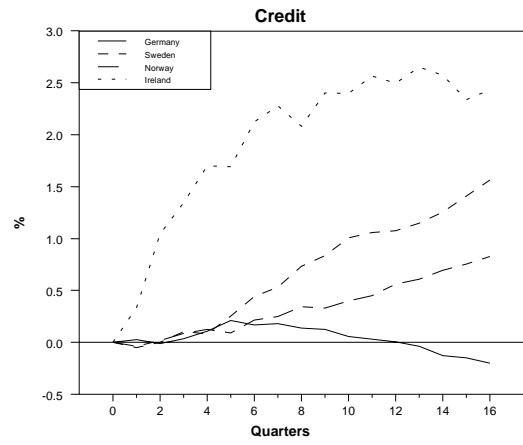**Cumulative responses to a 1% shock in house prices**



**GDP**

US
UK
Australia
Canada

**GDP**

Germany
Sweden
Norway
Ireland

**Credit**

US
UK
Australia
Canada

**Credit**

Germany
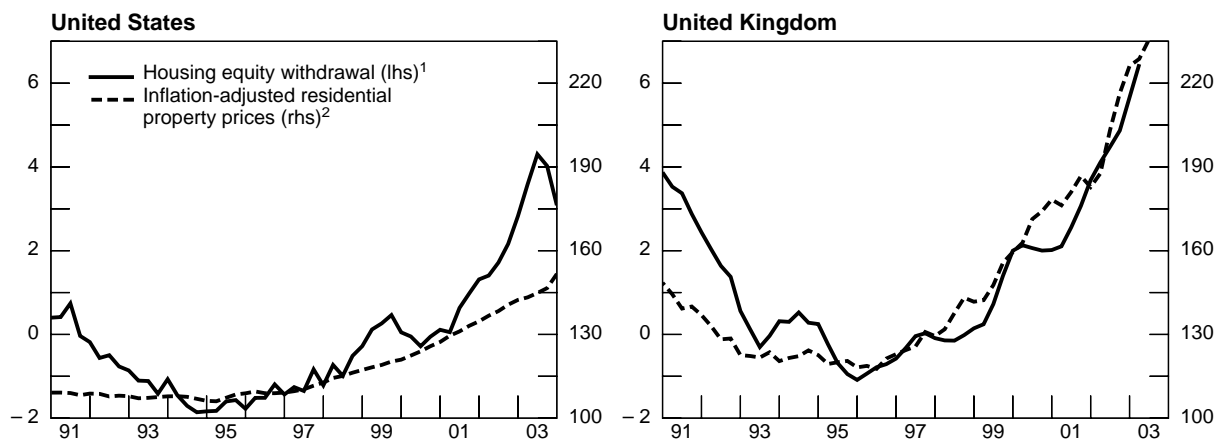Sweden
Norway
Ireland

Source: Author's calculations.

Graph 6

**Cumulative responses to a 1% shock
in commercial property prices**
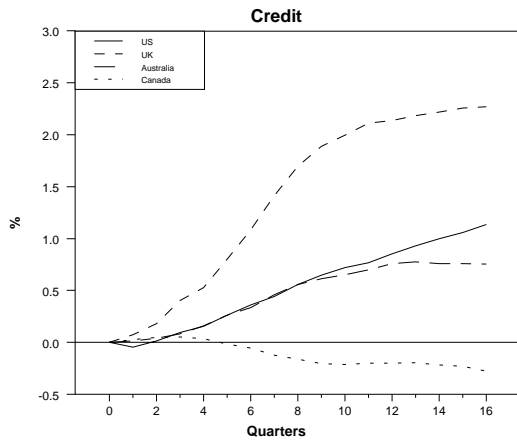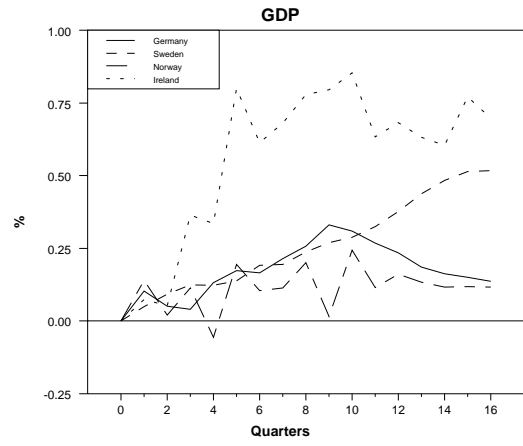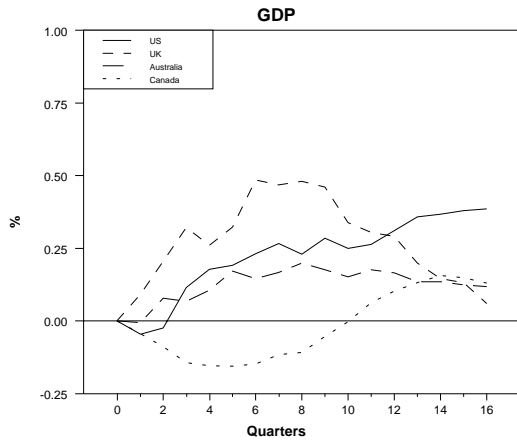


Source: Author's calculations.

Graph 7

**Housing equity withdrawal
and residential property prices**

**United States**



**United Kingdom**



[1]  Change in housing finance less households' investment in housing as a percentage of household disposable income; three-quarter moving average.   [2]  1985 = 100.

Sources: Bank of England; Board of Governors of the Federal Reserve System; national data.

Graph 8

**Rolling average correlation of
global property markets**



The sample comprises 17 countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. The average correlation is calculated in two steps. First, I compute the correlation matrix of property price series (either real house prices or real commercial property prices) in the 10-year window (year $t-9$ to $t$). In the second step, the average of all bivariate correlations is defined as the world average.

# Appendix:
# The VAR framework

A standard VAR system is the reduced form of a linear dynamic simultaneous equation model in which all variables are treated as endogenous. This framework is employed in this paper to study the joint behaviour of property prices (either house prices or commercial property prices), national income, short-term interest rates, bank credit and equity prices.[3] Each variable is regressed on a number of lags (eight quarters in this study) of itself and of all other variables in the information set.

The VAR model is estimated for each country. In the next step the aim is to provide some quantitative estimates of the dynamic interaction among the variables of interest. To do this, I orthogonalise the estimated reduced-form model to identify the effect of the innovations of the variables in the system in isolation from each other. In this paper the identification uses Sims' lower triangular ordering (the standard Choleski decomposition), and the ordering of the variables is: GDP, bank credit, property prices, equity prices and interest rates.

The justification of the ordering is as follows. Real GDP is considered to affect all other variables within the same quarter, but it does not respond contemporaneously to innovations in any of the other variables. And the interest rate is ordered last because policymakers may react quickly to all innovations but it usually takes a while for the policy to become effective. These assumptions are fairly standard in existing literature. The trickier part is the ordering among bank credit, property prices and equity prices. The logic of the current ordering[4] is: (1) equity prices can respond immediately to shocks in other variables; (2) property prices are relatively more sticky than equity prices; (3) financing conditions (bank credit) may affect property prices contemporaneously, but there is a lag between the changing property prices and their effect on bank credit, owing to decision lags and loan processing time.

Based on the identifying assumptions embodied in the specified ordering of the variables, the key outputs of the VAR model are the variance decomposition and impulse responses. The variance decomposition is able to break down the variance of the forecast error for each variable into components that can be attributed to each of the endogenous variables. In addition, the impulse response functions are computed and the results show the interrelationship between any two of the variables of interest. With a model of five variables, this model generates 25 solutions. Therefore, only a few key results are presented here (Graphs 1, 4, 5 and 6).

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[3]   All variables are in real terms. Except for interest rates, all of them are measured as first log differences (equivalent to percentage changes) because the series in levels are non-stationary.

[4]   I also experimented with other orderings and the results do not change significantly.

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