DNB Occasional Studies
Vol.9/No.5 (2011)

Housing bubbles, the leverage cycle and the role of central banking

DNB Occasional Studies

Jeroen Hessel and Jolanda Peeters

De Nederlandsche Bank
Eurosysteem

Central bank and prudential supervisor of financial institutions

Authors: Jeroen Hessel and Jolanda Peeters

Aim of the Occasional Studies is to disseminate thinking on policy and analytical issues in areas relevant to the Bank.
Views expressed are those of the individual authors and do not necessarily reflect official positions of De Nederlandsche Bank.

Subscription orders for DNB Occasional Studies and requests for specimen copies should be sent to:

De Nederlandsche Bank NV
Communications
P.O. Box 98
1000 AB Amsterdam
The Netherlands
Internet: www.dnb.nl

Occasional Studies

Vol.9/No.5 (2011)

Jeroen Hessel and Jolanda Peeters[1]

Housing bubbles, the leverage cycle and the role of central banking

1 Economics and Research Division, De Nederlandsche Bank. E-mail: j.p.c.hessel@dnb.nl and j.j.w.peeters@dnb.nl. Helpful comments from Peter van Els, Gabriele Galati (De Nederlandsche Bank), Ettore Dorrucci, Roland Straub (European Central Bank) and the participants of a high-level conference at DNB on an earlier version of this paper are gratefully acknowledged. Any remaining errors are our own.

1 Introduction and conclusions

Housing cycles and financial cycles increasingly attract central banks' focus all over the world. Housing and financial busts have been associated with financial instability and significant costs to the real economy. The number of financial crises in the world has increased significantly over the last decades. In 1998, many advanced economies started an unusually long, pronounced and synchronized housing boom. The turn of the housing cycle in 2006 triggered housing downturns in several countries, notably in the United States, Spain, Ireland, and, to a lesser extent, the United Kingdom. This ultimately led to the most severe financial crisis and the deepest recession since the Great Depression.

With hindsight, it seems that the most recent housing boom could have been identified as a bubble, given the similarities of this crisis to earlier ones. For instance, the sharp increases in credit and household leverage are usually early warning indicators of financial vulnerabilities building up. Nonetheless, policymakers did not react to these signals. This was partly because of the widespread conviction that they should not try to pre-emptively deal with housing bubbles. Moreover, another reason was that the mindset of policymakers was shaped by the experiences of the 1970s and 1980s, when inflation was a big concern and financial imbalances were largely absent – at least in advanced economies. Therefore, policymakers were slow in recognizing major gradual changes in the world economy. First, inflation became low and stable, conceivably due to better monetary policy, benign shocks and globalisation on the real side of the economy. As monetary policy focused on achieving price stability exclusively, this Great Moderation contributed to lower interest rates, which in turn fuelled risk-taking not justified by fundamentals. Second, financial innovation and financial globalisation increased the importance of financial factors and the interconnectedness across countries. Regulation did not always keep up with this innovation and with the risk-taking by financial institutions, partly because markets were seen as efficient and self-correcting. These developments have enhanced excessive credit growth and the build-up of financial imbalances. These imbalances were insufficiently recognized as they did not lead to inflation in goods and services.

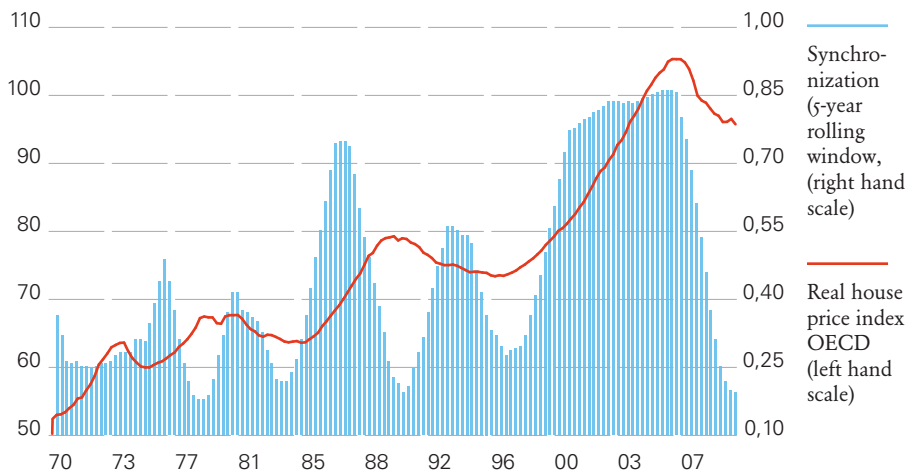
The consequences of not responding to these signals were severe, as it led to the global financial crisis. Gradually, policymakers are drawing lessons. Regarding

the role of central banks, the notion is gaining prominence that central banks should take considerable account of financial imbalances, even when the near-term outlook for inflation appears sound. Such an approach could consist of a framework for macroprudential policy, possibly with some form of "leaning against the wind" in monetary policy. The exact role, tools and institutional framework of macroprudential policy focussing on preventing the build-up of financial imbalances are still debated extensively, and will require more time and research to develop.

2 The global housing cycle

Housing cycles are quite common, as changes in house prices are very persistent. There are three main reasons. One reason is that transactions are infrequent and transaction costs are high. Another is that the purchase of houses is usually financed by mortgage loans with the home as collateral, and thus subject to the *financial accelerator*, which implies that adverse financial and credit conditions and conditions in the real economy tend to mutually reinforce each other. Finally, house prices seem subject to *adaptive expectations*, where increases in the past lead to expectations of further increases in the future (Shiller, 2007; Williams, 2011). It is therefore likely that initial changes in house prices due to fundamentals lead to longer cycles, possibly of a boom-bust nature. Housing cycles affect the wider economy via their influence on residential investment and on private consumption, due to wealth effects (IMF, 2008). Moreover, they tend to interact with the financial cycle, as housing booms are usually amplified by benign financial conditions, and as busts often cause financial fragilities and crises (Crowe et.al., 2011; Reinhart and Rogoff, 2009).

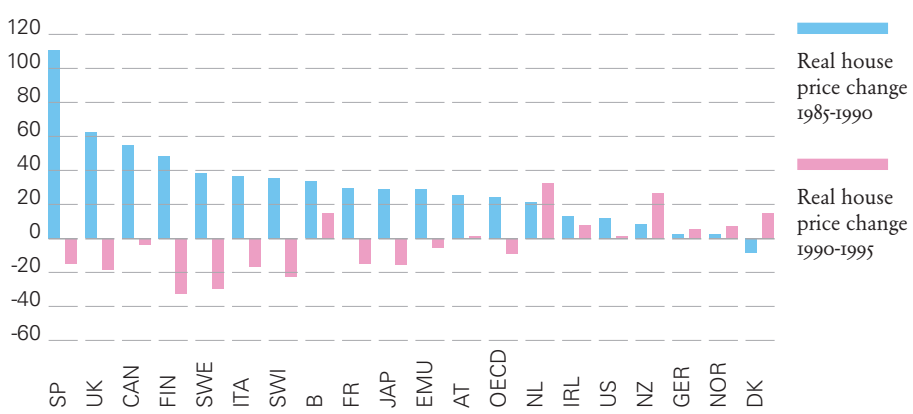
Graph 1 Real house prices OECD, 1970-2010 (quarterly data)



The housing cycle in advanced economies since 1970 is clearly visible in real house prices for an aggregate of 18 OECD countries (graph 1), despite the underlying differences between countries (graphs 2 and 3). Also clearly visible is that over the years, the housing cycle has become longer, more pronounced and more synchronized internationally. This trend was already apparent in the previous housing cycle that started in the late 1980s, when real house prices increased by on average 24% in about 5 years. During this upturn, price increases were also fairly widespread among OECD-countries (graph 2). In fact, the proportion of countries where house prices increased reached almost 75% in the five years before the turn of the cycle (graph 1). This is quite surprising as a house seems the ultimate non-tradable. The turn of the cycle around 1990 also led to a price correction in a significant number of countries, and notably to a banking and/or financial crisis in the UK, Japan, Finland and Sweden (graph 2). Still, the housing downturn was not universal, as real house prices continued to increase in for instance the Netherlands, New Zealand, Denmark and Belgium.

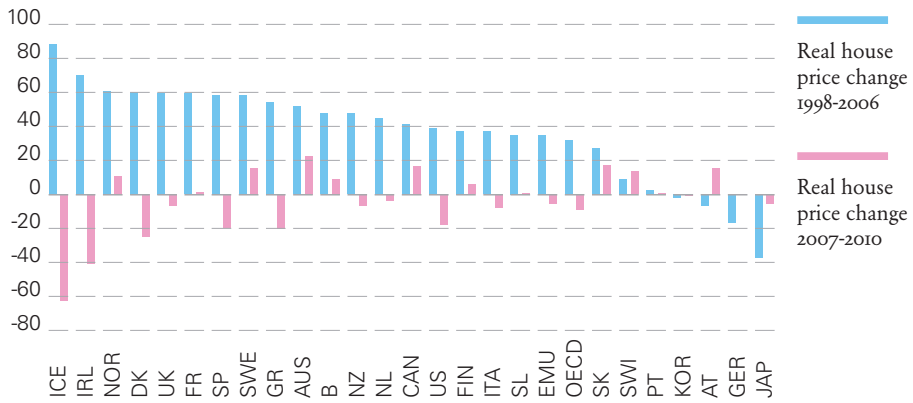
The trend of larger, longer and more synchronized housing cycles is even more pronounced for the latest cycle. The cycle started its upturn around 1998, while the downturn around 2006 ultimately led to the financial crisis. The upturn was even longer and even more pronounced than the one in the late 1980s: it lasted around 8 years, while real house prices increased by almost 32% on average (Girouard et.al., 2006; IMF 2008; Agnello and Schuknecht, 2009). It remains hard to determine to what extent this was a bubble, as at least part of this increase was justified by fundamentals, such as strong income growth and lower long-term interest rates. In addition, the upturn was even more synchronized internationally, with Germany

Graph 2 Changes in real house prices in individual OECD countries, 1985-1995 (%)



Source: OECD (Girouard et.al., 2006).

Graph 3 Changes in real house prices in individual OECD countries, 1998-2010 (%)



Source: OECD (Girouard et.al., 2006) for most countries; BIS for AT, PT, SK, SL and ICE. The OECD data are real house prices, other data are made real with data for CPI-infation.

and Japan as the biggest exceptions (graph 3, see also IMF, 2004; Girouard et.al., 2006). The proportion of countries where house prices moved in the same direction reached almost 90% in the five years before the crisis (figure 1). This cycle also had a strong downturn, where real house prices decreased by around 9% on average so far. Particularly strong corrections occurred in Iceland, Ireland, Spain, Greece, Denmark and the US (graph 3). But also during this cycle, the downturn was significantly less synchronized than the upturn. The downturn was not universal, as house prices continue to increase in for instance Sweden, Norway, France, Australia and Canada. It so far remains unclear whether these last countries have avoided a correction altogether, or whether they could still face a downturn in the coming years (OECD, 2011).

These characteristics of housing cycles in OECD countries seem to depend on a complex interaction between global and country-specific circumstances. The strong synchronization of the upturns and the timing of the downturns suggests the presence of spillovers or – more likely – common drivers in house prices. At the same time, significant cross-country differences remain, not only in the size of house price increases, but also in the extent to which these price increases lead to bubbles that are eventually corrected. Relevant country-specific factors may include demographics, such as population growth and household size, but also the ageing of the population. For example, part of the reason why Japanese house prices are in long-term decline after the 1991 financial crisis may be that the ageing of the population puts downward pressure on asset prices (Nishimura, 2011a,b). Other relevant country-specific factors seem housing market characteristics, such

as the responsiveness of housing supply and the tax treatment of owned-occupied housing, for instance via deductibility of interest payments (Andrews, 2010; Andrews, Caldera Sánchez and Johansson, 2011). Equally important may be financial sector characteristics, such as the speed and extent of financial deregulation, the development of mortgage markets and the strength of banking supervision (IMF, 2008, Andrews, 2010). As an example, the US housing market was very vulnerable to a downward correction before the crisis, even though the price increase was not exceptionally large compared to other countries. This was because the strong response of housing supply created an overhang of excess supply, and because the easing of US lending standards had gone much further than elsewhere (Ellis, 2008).

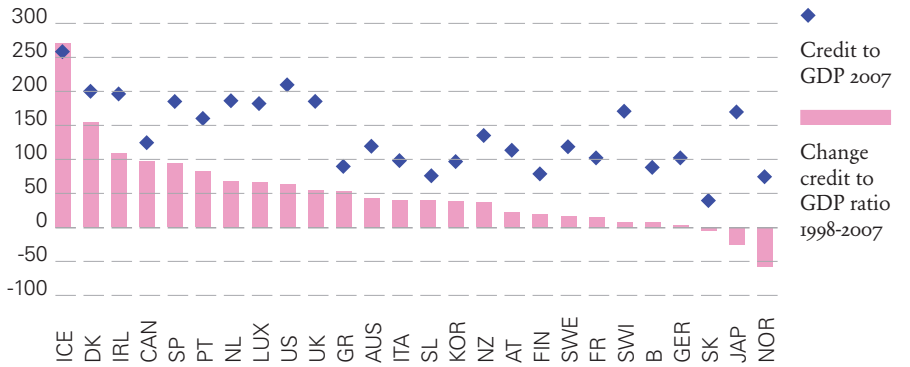
3 The leverage or financial cycle and the surge in global liquidity

Because purchases of houses typically involve household borrowing, house prices are likely to be also strongly driven by credit conditions and household leverage. Empirical evidence indeed shows a close correlation between house prices and (mortgage) credit growth. The IMF (2011) finds for OECD countries that a 10 percent increase in household credit on average is associated with a 6 percent increase in house prices. Higher house prices in turn lead to stronger credit growth by boosting both household net worth and expectations of further house price increases. Claessens et al (2010) moreover find that within countries cycles in credit and house prices appear to be the most highly synchronised. Also the recent housing boom coincided with a period of very rapid credit growth, sometimes referred to as the *global credit boom* (Hume and Sentance, 2009). To illustrate, between 1998 and 2007 the credit to GDP ratio in the OECD increased by an unprecedented 40% (graph 5). Data for individual countries confirm that strong credit growth was very widespread amongst advanced economies (graph 4.a) and that many advanced countries experienced strong growth in mortgage debt in the last decade before the crisis (graph 4.b). Germany and Japan are the main exceptions. A striking feature of this period was also the increased reliance of financial institutions on the credit markets to fund their activities (Bean, 2010).

The *global credit boom* reflected at least partly a broader cycle in financial activity, as the global credit boom was accompanied by the build-up of large imbalances in the financial sector. Manifestations were a very large increase in household debt and leverage, very low risk perception, a *search for yield* and excessive risk taking, and deteriorating lending standards in the pre-crisis period (see a.o. Rajan, 2005; Geanakoplos, 2010). As these phenomena were very widespread across advanced economies, the surge in global liquidity may partly explain the broader financial cycle and therefore the synchronized upturn in house prices across the OECD.[2] This is supported by the fact that there are some indications that financial conditions started to move more closely together. Both the correlation of credit growth and of changes in long term interest rates have increased clearly in the last decades

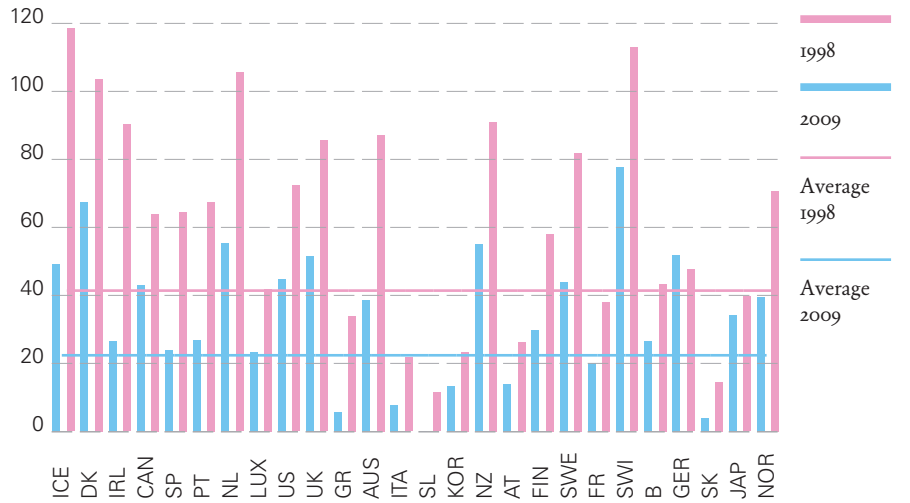
2 This surge in global liquidity is generally attributed to a number of macroeconomic factors, most notably low policy interest rates, capital inflows from current account surplus countries and innovation and risk-taking within the financial sector. There is no consensus yet on the relative importance of these factors (see paragraphs 4 and 5 below).

Graph 4a Credit growth in individual countries



Source: Worldbank.

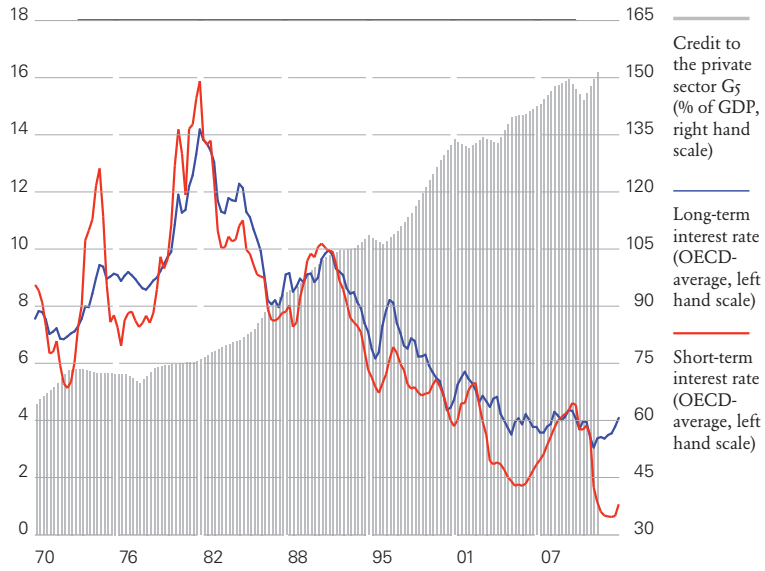
Graph 4b Mortgage debt to GDP ratio in individual countries



Source: IMF Global Financial Stability Report, Asian Development Bank, European Mortgage Federation and various Central Banks.

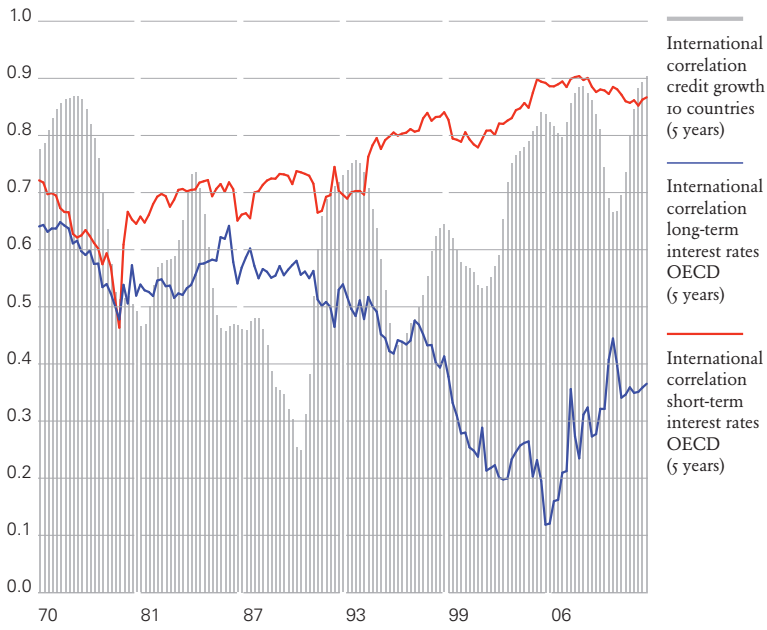
(graph 5), which suggests that the global factors that drive financial cycles have become stronger (IMF, 2004; Moutot and Vitale, 2009; Kamin, 2010). At the same time, the changes in long term interest rates have become less correlated with changes in policy interest rates (graph 6), which suggests that the link between monetary policy and the broad financial conditions in the economy may have weakened.

Graph 5 Global interest rates and credit



Source: DNB calculations on OECD, national data.

Graph 6 Comovement financial conditions



Source: DNB calculations on OECD, national data.

4 The role of monetary policy and the Great Moderation

With hindsight, it seems that the housing boom could have been identified as a bubble, given the similarities of this crisis to earlier ones. In particular, excessive accumulation of debt, particularly in several mortgage markets, was also a prominent feature of previous crises, while usual *early warning indicators* for financial crises, such as credit growth, asset prices and current account deficits were also indicating clearly that financial imbalances were building up (Reinhart and Rogoff, 2009). However, there were two main reasons why policymakers did not react to these signals. First, before the crisis the widespread pre-crisis consensus was that monetary policymakers should follow a "benign neglect" approach to financial imbalances like housing bubbles. This meant that monetary policymakers should not try to pre-emptively deal with financial imbalances (see e.g. Bordo and Jeanne, 2002, Mishkin, 2007).[3] Monetary policy should instead remain focused on achieving price stability, defined over a horizon of no longer than two years. Monetary policy would contribute to macroeconomic stability by aiming exclusively at price stability, given that price stability would always support financial stability.[4] Only in case financial imbalances suddenly unwind leading to a major fall in real activity, monetary policy should react by aggressively loosening the monetary policy stance and/or by injecting enough liquidity. This would not only support financial stability, but also help stem an excessive decline in real activity. This asymmetric approach has been nicknamed as the "mop up after" or alternatively the "not lean, but clean" approach (White, 2009).

While some economists already prior to the financial crisis argued that this asymmetric approach to monetary policy might imply the risk of creating moral hazard and encouraging excessive risk-taking by investors (Ahearne et.al., 2005;

3 While the discussion is generally couched in terms of responses to "asset price bubbles" or "financial imbalances", the discussion certainly applies to housing bubbles, as housing busts tend to be more costly than for instance stock market busts.

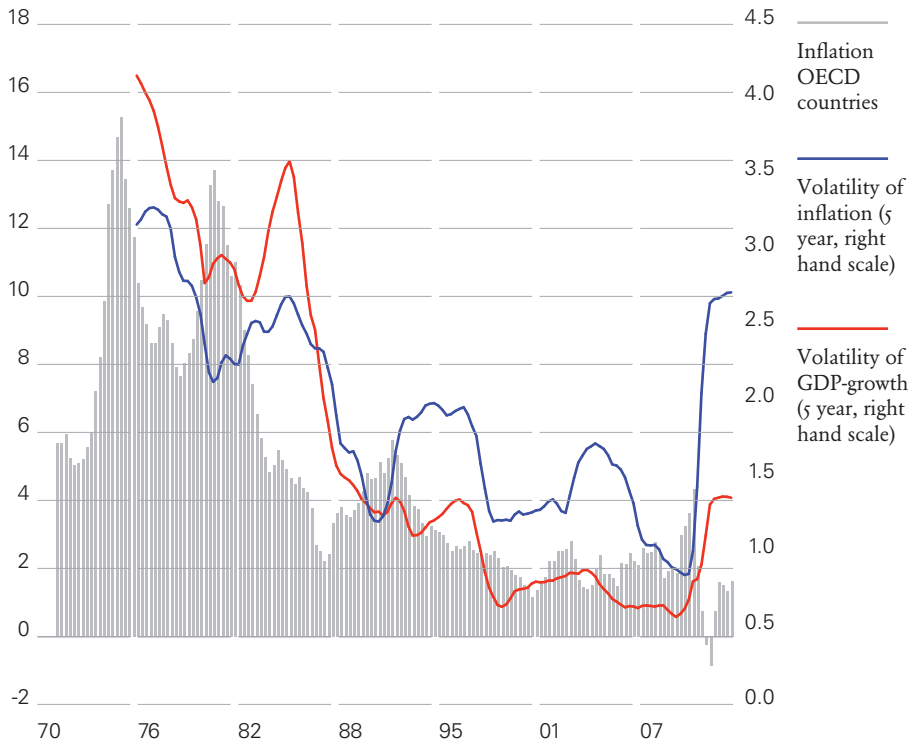
4 Central banks with a dual mandate, as for example the Federal Reserve, also strove for maximum sustainable employment.

Rajan, 2010)[5], proponents of the "benign neglect" approach argued that there were good reasons to adopt this approach. First, it is very difficult to identify unsustainable asset price booms in a timely matter, as it will be very hard to determine whether for instance a house price increase is warranted by its fundamentals or rather based on misplaced expectations (Greenspan, 2002). Second, monetary policy is a blunt instrument to deal with financial imbalances, because it affects the entire economy and therefore is likely to entail substantial costs if the imbalance is limited to a specific market like the housing market. Therefore, the costs of cleaning up after a bust are smaller than the distortions associated with preventing a boom. A third concern is the ability of monetary policy to influence asset price bubbles. During housing booms, for instance, a monetary tightening may not be sufficient to affect the speculative component of housing demand (Crowe et.al., 2011). Finally, given the 'Tinbergen rule' which requires that the number of effective policy instruments is (at least) as large as the number of independent policy objectives and given the mandate of price stability in the majority of advanced countries, central banks could have only adressed financial imbalances, if they had seen an immediate threat to price stability coming from the financial system.

The second reason why policymakers did not react to signals that financial imbalances were building up was that policymakers believed that the world economy had entered a "new era" characterised by stability and low inflation. Indeed, one of the most defining trends over the approximately 25 years prior to the ongoing financial crisis has been the substantial decline in macroeconomic volatility (see graph 7). Both industrial and emerging market economies had entered a relatively long phase of low and stable inflation. At the same time, large parts of the world have experienced lower output volatility. This remarkable decline in both inflation and GDP volatility has come to be known as the Great Moderation (Bernanke, 2004). During the Great Moderation, the world economy was growing strongly, macroeconomic indicators were significantly less volatile than before and, most importantly for central bankers, inflation was low and less volatile, enabling a gradual and structural decline in short- and long term interest rates. Notably, however, the reduction in macroeconomic volatility was accompanied by greater asset price volatility (OECD, 2011). While central bankers liked to believe that the improved performance of monetary policy was a main reason behind the declined macroeconomic volatility, others emphasised instead the changes in the structure of economies which have improved the ability of economies to absorb shocks. One of these changes concerns the advancing globalisation of the real economy. The increased integration of low-wage countries like China, India and Eastern-

5 See also, Borio (2006) and White (2009), who blame the Fed's policy to react strongly to the downturn of the financial cycle, rather than to the upturn. The so-called "Greenspan put" led to ever further monetary easing after financial downturns since the stock market crash in 1987. Already prior to the financial crisis, these economists claimed that there are major benefits to be derived from "leaning against the wind", that is, raising interest rates beyond the level necessary to maintain price stability over the short to medium run to stem the build-up of financial imbalances.

Graph 7 The great moderation (quarterly data)



Source: DNB calculations on OECD, IMF, national data.

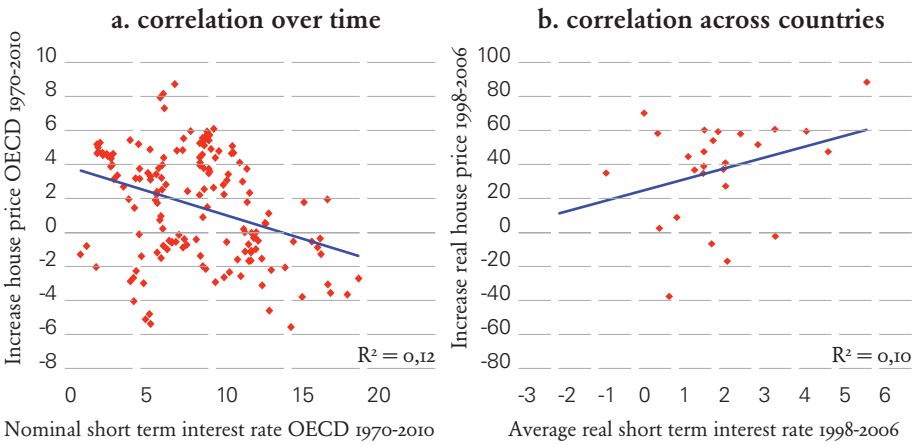
European countries in the world economy since the early 1990s constitutes a series of positive supply shocks, which have intensified international competition. This has put additional downward pressure on wages and inflation, and therefore has contributed to the Great Moderation.[6]

Although the low inflation environment was generally welcomed, it also resulted in an overly optimistic assessment of (macroeconomic) risks and an extended period of low interest rates. Taken together, these factors encouraged financial institutions to take risks not justified by long-term fundamentals and to leverage up their balance sheets. This contributed to the rally in the house prices in many countries. Moreover, in particular against the background of massive declines in global equity markets in the beginning of this millennium, policymakers were worried that deflationary pressures were deepened and spread more widely. Because

6 While increased competition in product and labour markets might explain donward price and wage pressures, it is however less clear why globalisation should necessarily lead to lower price and wage volatility. In fact, greater openness could imply a stronger impact of foreign shocks on business fluctuations inducing overall higher volatility to the economy

preventing deflation in a low inflation environment requires pre-emptive and possibly aggressive action, the US Federal Reserve aggressively loosened policy after the burst of the dot.com bubble. According to some (e.g. Taylor, 2007), the loose monetary policy of that time was sowing the seeds for the housing bubble, as the Fed did not counteract the buildup of the housing bubble. Indeed, Taylor (2007) shows that the policy interest rate in the US (and other advanced economies) was far below the Taylor-rule between 2002 and 2005. Bernanke (2010) and Dokko et.al. (2009) argue that this was justified by the growth and inflation forecasts at the time and by the risk of deflation, although the forecasts may have been too pessimistic in hindsight. Recent evidence indeed suggests that loose monetary policy decreases risk aversion and increases risk-taking in bank lending, both in the US and in euro area countries (Bekaert et.al., 2010; Maddaloni and Peydro, 2010). There is also some relation between increases in house prices and the level of policy interest rates for the aggregate of OECD countries (figure 8.a). Nevertheless, formal evidence of a strong influence of monetary policy on credit growth and house prices since 1998 remains more mixed. Studies for the US generally find – to a varying degree – that monetary policy contributed to the boom at some stage (Reinhart and Reinhart, 2011; Bean et.al., 2010; Dokko et.al., 2009; Sá and Wieladek, 2010; Eickmeier and Hofmann, 2010). But most of these studies do not see monetary policy as the main driver as the housing bubble. International comparisons point to the weak cross-country relationship between the strength of house prices and the monetary policy stance (figure 8.b, see also Dokko et.al., 2009; IMF, 2009; Merrouche and Nier, 2010). Several studies find an influence of monetary policy, but not as the main driver (Aizenman and Jinjarak, 2008; Sá, Towbin and Wieladek, 2011). This raises the question to what extent other factors can explain the recent housing bubble.

Graph 8 Correlation between monetary policy and house price increases



Source: DNB calculations based on data from OECD, BIS, national sources.

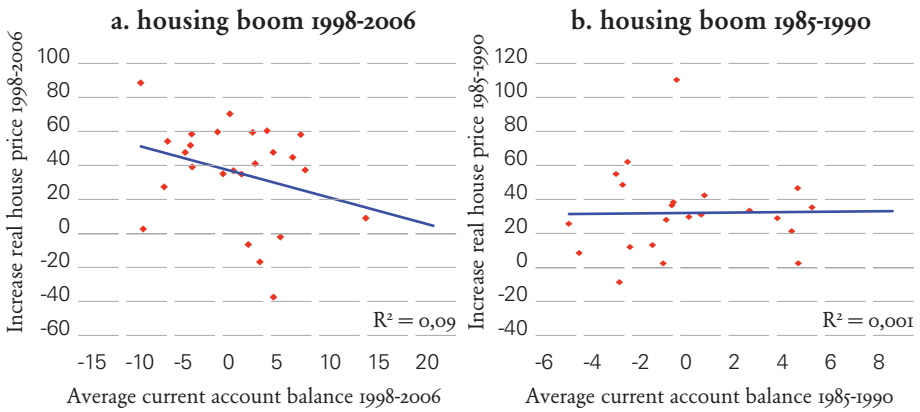
5 The role of financial globalisation and financial innovation

Apart from the integration of low-wage economies in the global economy, several interconnected and mutually reinforcing trends like financial development and innovation and financial integration and globalisation have gradually changed the economic environment in the world over the past decades (Borio, 2006). As a result, the global economy has not only moved towards a period where inflation was low and stable, but where financial factors and imbalances also became much more important. This is for instance illustrated by the emergence of large and persistent global imbalances since the mid 1990s and the increasing number of banking crisis in the world, which increased from only 1 in the 1960s and 9 in the 1970s to 55 in the 1980s and even 82 in the 1990s (Reinhart and Rogoff, 2009). Conceivably, these reinforcing trends have also been possible drivers of the housing boom. So far, there is no consensus on their relative importance however (Sá, Towbin and Wieladek, 2011).

Over the past two decades, financial integration has increased dramatically. In this process, many advanced economies gradually liberalized their capital accounts, which - together with financial market reforms - has enormously increased cross-border financial linkages. While these cross-border linkages were particularly strenghtened among advanced economies, the global economy has since the mid-1990s also been faced with rising imbalances on the balance of payments. These global current account imbalances and the net capital flows they entail have played an important role in policy debates in recent years. Some have argued that the savings glut and reserve accumulation in EMEs, i.e. the excess of savings over investment as reflected in corresponding current account surpluses, has been a driver of the housing boom.[7] These savings flowed to advanced economies, where they eased financial conditions, contributed to increases in credit growth and exerted significant downward pressure on long-term interest rates. The case is most clear for the US, which received much of these savings due to the demand for risk-free assets (Caballero and Krisnamurthy, 2009), its deep and liquid financial

7 Several factors play a role in the high savings ratios of many EMEs. First, these high ratios partly reflect the underdevelopment of the financial markets and deficient social welfare systems. In addition, many emerging countries pro-actively seek to create surpluses on their current accounts as insurance against sudden stops, in response to financial crises in Asia (1998) and Latin America (2001). Apart from precautionary motives, several EMEs pursued export-led growth strategies via fixed exchange rates vis-à-vis the US dollar and in certain cases supported by persistently undervalued exchange rates.

Graph 9 Correlation between house price and current account deficits



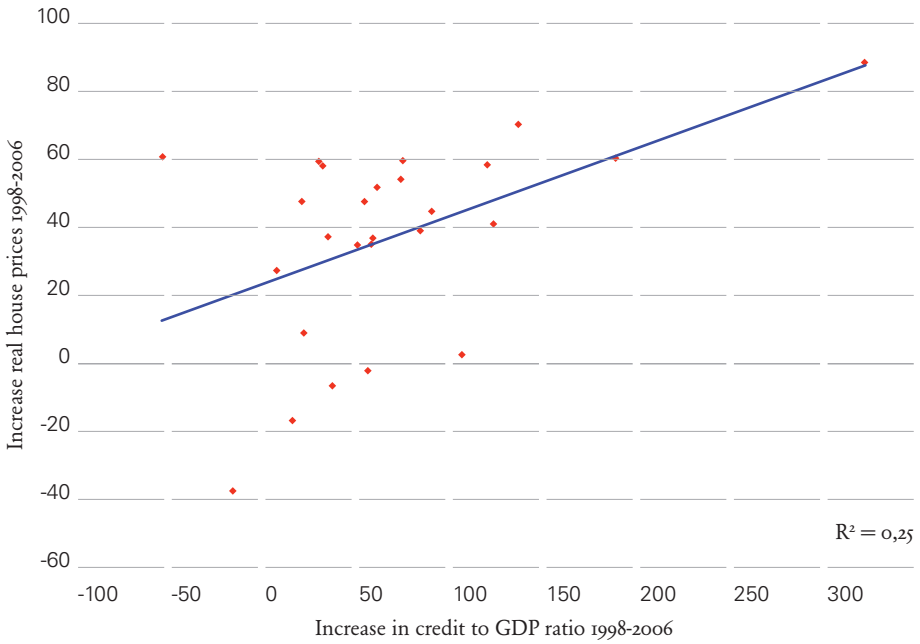
Source: DNB calculations based on data from IMF, OECD, BIS, national sources.

markets and the dollar as international reserve currency.[8] Some evidence for the claim that global imbalances have contributed to the housing boom is given in Figure 8.a, which shows that there seems to be a link between house price increases since 1998 and the average size of the current account deficit (see also Dokko et.al, 2009; Merrouche and Nier, 2010; Aizenman and Jinjarak, 2008; Sá, Towbin and Wieladek, 2011). Although the causation between these variables is unclear, it can be interpreted as capital inflows being a driver of the housing boom.

Others, however cast serious doubt on the conclusion that the savings glut is the most important driver of the housing boom (Obstfeld, 2009, Borio and Disyatat, 2010). First, the link between housing booms and current account deficits is not universal. There have been housing booms in countries with current account surpluses (China, Japan, Sweden and the Netherlands), and the link was not present during the housing upturn in the late 1980s (figure 8b). Second and more importantly, Borio and Disyatat (2010), Caballero (2010) and Bernanke et.al. (2011) show that although the largest net capital inflow into the US came from emerging markets in Asia, gross capital flows were dominated by advanced economies, and in particular by European banks. It therefore seems plausible that an important part of the credit boom was created within the financial systems of advanced economies themselves.

8 Warnock and Warnock (2007) for instance estimate that capital inflows depressed US long-term interest rates by up to 90 basis points. Merrouche and Nier (2010) claim that long-term interest rates were also low compared to policy rates in other countries, and that differences in the slope of the yield curve can be linked to differences in current account balances.

Graph 10 House prices and credit growth



Source: DNB calculations based on OECD, BIS, Worldbank data.

The pre-crisis favourable environment of low risk, low inflation and technological progress combined with a long-running process of financial market deregulation has also spurred financial innovation. One of the most remarkable developments in this regard has been the explosion of securitisation activity and the spreading of new innovative credit risk transfer instruments more generally. In this process housing finance markets were also affected drastically (IMF, 2008; Green and Wachter, 2007), with far-reaching consequences for housing markets. Until the 1980s mortgage lending was dominated by specialized lenders under heavy government regulation, such as interest rate ceilings and quantitative limits on credit. But mortgage market deregulation increased access to mortgage credit via more responsive prices, new products and new players, such as traditional banks and even non-banks. Related was the stronger link of mortgage lending with the capital market, not only via the funding of lenders involved, but also via securitization. All these developments led to a flood of cheap credit, greatly expanded LTV ratios and falling lending standards and were consequently critical elements of the credit expansion. Importantly, these developments have played a crucial role in the increase of house prices before the crisis. Since owner-occupied housing generally requires external financing, financial (mortgage market) innovations have been associated with a noticeable increase in demand pressures for housing. This is confirmed by the strong cross-country

correlation between credit growth and house price increases (graph 10). Obviously, these developments also raised the financial system's vulnerability to a housing price collapse.

The recent empirical literature conforms that financial innovation may be an important driver of the recent credit and housing boom.[9] First, there is some evidence that financial innovation has directly influenced house prices during the recent boom. A number of studies for instance show that more developed mortgage markets increase the sensitivity of house prices to interest rates (IMF, 2008) and amplify the effect of monetary policy and capital inflows on house prices (Sá, Towbin and Wieladek, 2011; Aizenman and Jinjarak, 2008). Moreover, Andrews (2010) and Andrews, Caldera Sánchez and Johansson (2011) show that in 18 OECD countries, financial innovation has increased real house prices directly by 30% on average since 1980.[10] Apart from this direct effect, financial innovation may have interacted with monetary policy and capital inflows by strenghtening the transmission mechanism (Brender and Pisani, 1997). This applies for instance to the transmission to credit growth and broad financial conditions. Maddaloni and Peydro (2010) show that the effect of monetary policy on bank lending standards is increased by the growing importance of securitization, while the strength of supervision and capital regulation also plays an important role. Merrouche and Nier (2010) find that the effect of capital inflows on credit growth and bank leverage are amplified by weak financial supervision. All in all, there is convincing evidence that financial innovation has affected house prices, both through time and across countries.

In sum, interconnected and mutually reinforcing trends have gradually changed the global economy. As a result, the global economy has moved towards a period where inflation was low and stable and where financial factors and imbalances became much more important. Policymakers may have been slow in recognizing the consequences of these changes. As a result, low policy interest rates – although justified by the outlook for growth and inflation – may have contributed to the housing boom, also because the relationship between monetary policy and broad financial conditions in the economy has changed due to globalisation and financial

9 Adrian and Shin (2008a, 2009) for instance show that financial sector leverage is highly procyclical and that this influences residential investment. With the ongoing financial innovation, and especially the increasing importance of securitization (see also Shleifer and Vishny, 2010), this effect has become stronger.

10 These effects of financial innovation vary per country, due to differences in the speed and extent of financial market deregulation. Moreover, these effects are amplified when i) the supply of housing is more rigid and ii) the tax treatment of owner-occupied housing is more generous.

innovation.[11] This raises the question what are the best tools for central banks to prevent the build-up of excessive financial imbalances.

11 Obviously, this does not imply that central banks should use monetary policy to fully counteract the influence of globalisation and financial innovation. Financial innovation can also be affected via regulation (such as the Basel III framework), while the effects of globalisation will be affected by attempts to reduce current account imbalances (such as currently debated in the G20). These other policy options are beyond the scope of this paper. But it does imply that central banks should be alert to these developments and should think about the consequences for monetary policy.

6 What should central banks do about housing bubbles?

The main risks from housing cycles are associated with excessive credit growth and sharp increasing leverage by households and financial institutions, as particularly credit-boom-fueled housing booms are damaging (Reinhart and Rogoff (2009)). Therefore, central bankers should aim their policies at containing these risks rather than housing price increases per se. Broadly speaking, central bankers have two policy options to deal with these risks: macroprudential policy and monetary policy. Of these two, macroprudential policy is probably the best candidate to deal with the dangers associated with housing cycles. It has been argued that macroprudential tools, such as higher LTV ratios or stringent amortization requirements, could be designed to target narrow objectives (such as curbing excessive credit growth and/or leverage) and tackle the risks associated with housing booms more directly than a monetary tightening. Indeed, to the extent that financial imbalances are specific to a sector or market – as was the case during the dot.com bubble – a well-targeted macroprudential tool is able to tackle the build-up of the financial imbalance at its source and can therefore prevent the build-up of the imbalance at a much lower cost compared with an across-the-board monetary tightening. Besides, many macroprudential tools have an added benefit in that they increase the resilience of the banking system (Crowe et.al., 2011).

On the other hand, given that macroprudential measures are often specific to a sector or market, they may be easier to circumvent and consequently may turn out to be counterproductive (Crowe et.al., 2011). Another drawback is that these macroprudential measures may be more difficult to implement from a political economy standpoint, as they could be considered as an unnecessary intrusion into the functioning of markets (Crowe et.al., 2011). A final drawback of macroprudential measures is that some of the problems associated with using monetary policy to control bubbles remain for macroprudential policy as well, like the problems related to identifying bubbles in real time or the uncertainty regarding the impact of policy.

In spite of these drawbacks, most economists agree that macroprudential policies may be able to play a more significant role in financial and macroeconomic stability. In fact, it is increasingly recognised that in the pre-crisis policy set-up, macroprudential policy was certainly a missing ingredient, as prudential policy was

oriented towards the safety of individual financial institutions instead of the safety of the financial system as a whole. The exact role, tools and institutional framework of macroprudential policy are still debated extensively however (see e.g. CGFS, 2010). One main point in this debate is that pinning down the precise goals of macroprudential policy is not obvious. Another issue is finding the appropriate tools for macroprudential policy, as there is a broad range of available tools used in the prudential regulation and supervision of individual financial institutions, which could be adapted to limit the risk of episodes of system-wide distress.[12] A third issue is how macroprudential policy should be organised from an institutional point of view: should the central bank be responsible for macroprudential policy, or should this task be assigned to a different institution for instance? While there are clear advantages of centralising monetary and macroprudential policies within one institution and central banks are the most obvious institutions to locate these policies in (see e.g. Caruana, 2010), central banks will need to transform somewhat in order to be able to perform this enlarged role.

In developing the appropriate macroprudential policies – the set of measures and institutional frameworks that is specifically aimed at containing risks in the financial system as a whole – it is important to use the experience acquired so far. While macroprudential policy in most advanced countries is still in its infancy, central banks in some emerging countries have taken the lead in implementing extensively macroprudential tools (in particular limits to LTV ratios). The limited evidence thus far shows that some of the measures adopted so far have been effective (Caruana, 2010). In the 1990s for instance the use of LTV regulation for real estate lending in Hong Kong reduced the growth of mortgage credit in response to housing price hikes, leaving banks in a better position to survive the subsequent crash (Caruana, 2010). However, the evidence gathered so far is tentative and surrounded by many uncertainties. It is for instance very difficult to isolate the independent effect of macroprudential instruments as they have often come into use in conjunction with other stabilisation measures or interventions to the supply side of housing markets. On the positive side, Crowe et.al. (2011) note that when policy succeeded in slowing down a boom and avoiding a systemic crisis in a bust, it almost always involved some macroprudential measures.

While macroprudential policy will become an important approach to limit the risks of system-wide distress that has significant macroeconomic costs, macro prudential policy alone may not be sufficient to maintain financial stability. Monetary policy also need to play a role. The current financial crisis has rekindled the debate on whether monetary policy should be used to tackle the build-up of financial imbalances, even

12 While macroprudential tools can be classified in a number of ways, one important distinction is between tools geared towards addressing the time-series dimension of financial stability – i.e. the procyclicality in the financial system – and tools that focus on the cross-sectional dimension – i.e. on sources of distress within the financial system (Crockett, 2000).

when the outlook for inflation and growth in the near future appears sound. By and large, the notion that monetary policy could support macroprudential policy to limit the risks of system-wide distress is increasingly meeting with positive response from economists and central banks.[13] This burgeoning sympathy in the first place arises from the fact that the financial crisis has clearly demonstrated that a low and stable inflation need not be sufficient for financial stability. Now the view prevails that price stability need not lead to financial stability and, what is more, may for a long time be attended by excessive credit growth and asset price bubbles. In the second place, the crisis has clearly shown that it is very difficult to contain the macro-economic damage of a financial crisis effectively. While central banks have ventured far beyond their traditional comfort zone by their policy actions, these unprecedented policy measures did not succeed in foiling a deep contraction of economic activity (although admittedly a meltdown of the financial system has been prevented).[14] On top of this, the crisis has suggested that market intervention may be attended by distortions.[15] In the third place, changing insights about the ex ante identification of financial imbalances have also increased support for the notion that central banks should take serious account of financial imbalances. In particular, recent research, by, *inter alia*, Borio and Drehman (2009) and Gerdesmeier et.al. (2009), demonstrates that it is possible to identify and use early warning signals of the build-up of financial imbalances. Finally, also the insights on the effectiveness of monetary policy seem to be changing; Adrian en Shin (2008b) for instance show that even small interest rate steps could have considerable effects of financial institutions that wish to borrow short term and lend long term, suggesting that a timely monetary tightening might be more effective in containing the cyclical expansion of leverage, credit, asset prices and risk taking than is often thought.

13 Although views still differ widely on the specific role of monetary policy in doing so. Some argue that only in exceptional circumstances monetary policy may have to go beyond targeting macroeconomic stability (see e.g. Bernanke, 2010), while others have taken the extreme approach of targeting housing prices (Allen and Carletti, 2011).

14 Additional evidence is given in the World Economic Outlook (April 2009), which shows that in recessions which occur in combination with a financial crisis, monetary policy has no clear impact on the lenghts of the recession.

15 In the event of central bank interventions, these distortions are notably manifest in distorted financial market relations and moral hazard (see van den End et.al., 2009).

References

- Adrian and Shin (2008a), Liquidity and Leverage, Federal Reserve Bank of New York Staff Reports, nr. 328.
- Adrian and Shin (2008b), Liquidity, monetary policy and financial cycles, Current Issues in Economics and Finance, Federal Reserve Bank of New York, January 2008.
- Adrian and Shin (2009), Money, Liquidity and Monetary Policy, Federal Reserve Bank of New York Staff Reports, nr. 360.
- Agnello and Schuknecht (2009), Booms and busts in housing markets: determinants and implications, ECB Working Paper, nr. 1071.
- Ahearne, Ammer, Doyle, Kole and Martin (2005), Monetary policy and house prices: A cross-country study, International Finance Discussion Papers, nr. 841.
- Aizenman and Jinjarak (2008), Current account patterns and national real estate markets, NBER working paper, nr. 13921.
- Allen and Carletti (2011), What should central banks do about real estate prices?, European University Institute, 21 January.
- Andrews (2010), Real house prices in OECD countries. The role of demand shocks and structural and policy factors, OECD economics department working paper, no. 831.
- Andrews, Caldera Sánchez and Johansson (2011), Housing markets and structural policies in OECD countries, OECD economics department working paper, no. 836.
- Bean, Paustian, Penalver and Taylor (2010), Monetary Policy After the Fall, paper for the Federal Reserve 2010 Jackson Hole conference.
- Bekaert, Hoerova and Lo Duca (2010), Risk, Uncertainty and Monetary Policy, NBER working paper, nr. 16397.
- Bernanke (2004), The Great Moderation, speech 20 February 2004.
- Bernanke (2005), The Global Savings Glut and the U.S. Current Account Deficit, Sandridge Lecture delivered to the Virginia Association of Economists, Richmond, 10 March.
- Bernanke (2010), Monetary policy and the housing bubble, speech at the annual meeting of the American Economic Association, 3 January 2010.

- Bernanke, Bertaut, DeMarco and Kamin (2011), International capital flows and the return to safe assets in the United States, 2003-2007, Federal Reserve International Finance Discussion paper, nr. 1014.
- Bordo and Jeanne (2002), Monetary policy and asset prices: does benign neglect make sense?, IMF Working Paper, nr. 2002/225.
- Borio (2006), Monetary and prudential policies at crossroads? New challenges in the new century, BIS working papers, nr. 216.
- Borio and Drehman (2009), Assessing the risk of banking crisis – revisited, BIS Quarterly Review, March 2009.
- Borio and Disyatat (2010), Global imbalances, interest rates and the financial crisis: A reconsideration, mimeograph.
- Brender and Pisani (2007), Global imbalances. Is the world economy really at risk?, www.dexia.be
- Caballero (2010), The "other" imbalance and the financial crisis, NBER working paper, nr. 15636.
- Caballero and Krisnamurthy (2009), Global imbalances and financial fragility, NBER working paper, nr. 14688.
- Caruana (2010), Macroprudential policy: Working towards a new consensus, speech 23 April 2010.
- CGFS (2010), Macroprudential instruments and frameworks: A stocktaking of issues and experiences, CGFS Publications, nr. 38, May 2010.
- Claessens, Kose and Terrones (2011), Financial cycles: What? How? When?, IMF working paper no. 11/76.
- Crockett (2000), Marrying the micro- and macroprudential dimensions of financial stability, BIS speeches, 21 September 2000.
- Crowe, Dell'Ariccia, Igan and Rabanal (2011), Policies for macrofinancial stability, options to deal with real estate booms, IMF staff discussion note, SDN 11/02.
- Diamond and Rajan (2009), The credit crisis: conjectures about causes and remedies, NBER working paper, nr. 14739.
- Dokko, Doyle, Kiley, Kim, Sherlund, Sim and Van den Heuvel (2009), Monetary policy and the housing bubble, Federal Reserve Finance and Economic Discussion paper, 2009-49.
- Dorucci and McKay (2011), The International Monetary System after the financial crisis, ECB Occasional Study, nr. 123.
- Eickmeier and Hofmann (2010), Monetary policy, housing booms and financial (im)balances, ECB working paper, nr. 1178.
- Ellis (2008), The housing meltdown: why did it happen in the United States, BIS working papers, nr. 259.
- End, van den, Verkaart and van Dijkhuizen (2009), Distortionary effects of anti-crisis measures and how to limit them, DNB Occasional Study, nr. 3.
- Geanakoplos (2010), The leverage cycle, Cowles Foundation paper, nr. 1304, Yale University.

- Gerdesmeier, Reimers and Roffia (2009), Asset price misalignments and the role of money and credit, ECB working paper, nr. 1068.
- Girouard, Kennedy, Van den Noord and André (2006), Recent house price developments: the role of fundamentals, OECD economics department working paper, nr. 475.
- Green and Wachter (2007), The Housing Finance Revolution, paper for the Federal Reserve 2007 Jackson Hole conference.
- Greenspan (2002), Economic Volatility. Remarks at a symposium sponsored by the Fed of Kansas City, Jackson Hole.
- Herring and Wachter (1999), Real Estate Booms and Banking Busts: An International Perspective, Wharton Financial Institutions Center Working paper, 99-27, University of Pennsylvania.
- Hume and Sentence (2009), The global credit boom: challenges for macroeconomics and policy, Bank of England external MPC Unit discussion paper, nr. 27.
- IMF (2004), The global house price boom, Chapter 2 World Economic Outlook October.
- IMF (2008), The changing housing cycle and the implications for monetary policy, Chapter 3 World Economic Outlook April.
- IMF (2009), Lessons for monetary policy from asset price fluctuations, chapter 3 World Economic Outlook October.
- IMF (2011), Housing Finance and Financial Stability – back to basics?, chapter 3 Global Financial Stability Review April.
- Kamin (2010), Financial Globalisation and Monetary Policy, Federal Reserve Board International Finance Discussion papers, nr. 1002.
- Khan (2011), Asian housing markets: Bubble Trouble? In: An eye on East Asia and Pacific, World Bank.
- Landau (2009), Bubbles and macroprudential supervisor, remarks at the joint conference of the Banque de France and Toulouse School of Economics, 28 January 2009.
- Maddaloni and Peydro (2010), Bank risk-taking, securitization, supervision and low interest rates. Evidence from the euro area and the U.S. lending standards, ECB working paper, nr. 1284.
- Merrouche and Nier (2010), What caused the global financial crisis? Evidence on the drivers of financial imbalances 1999-2007, IMF working paper 10/265.
- Mishkin, F. (2007), Housing and the monetary transmission mechanism, Finance and Economics Discussion Series, Federal Reserve Board, 2007-40.
- Moutot and Vitale (2009), Monetary policy strategy in a global environment, ECB occasional study, no. 106.
- Nadauld and Weisbach (2011), Did securitization affect the cost of corporate debt?, NBER working paper, no. 16849.

- Nishimura (2011a), This time may truly be different – balance sheet adjustment under population ageing, speech at the American Economic Association annual meeting, Denver, January 2011.
- Nishimura (2011b), Population ageing, macroeconomic crisis and policy challenges, speech at the 75th anniversary conference of Keynes General Theory, University of Cambridge, June 2011.
- Nyberg (2010), Monetary policy and house prices, speech at the Swedish Investment Fund Association, 19 May 2010.
- Obstfeld (2009), The immoderate world economy, Journal of International Money and Finance.
- OECD (2011), Countercyclical economic policy, Economic Outlook, Spring 2010.
- Rajan (2005), Has financial development made the world riskier?, paper for the Federal Reserve 2005 Jackson Hole conference.
- Rajan (2010), Fault Lines. How hidden fractures still threaten the world economy, Princeton University Press.
- Reinhart and Rogoff (2009), This time is different. Eight centuries of financial folly, Princeton University Press.
- Reinhart and Reinhart (2011), Pride goes before a fall: federal reserve policy and asset markets, NBER working paper, nr. 16815.
- Sá and Wieladek (2010), Monetary policy, capital inflows and the housing boom, Bank of England working paper, nr. 405.
- Sá, Towbin and Wieladek (2011), Low interest rates and housing booms: the role of capital inflows, monetary policy and financial innovation, Bank of England working paper, nr. 411.
- Shiller (2007), Understanding recent trends in house prices and homeownership, paper for the Federal Reserve 2007 Jackson Hole conference.
- Shleifer and Vishny (2010), Unstable banking, Journal of Financial Economics, 97, pp. 306-318.
- Taylor (2007), Housing and Monetary policy, remarks for the Federal Reserve 2007 Jackson Hole conference.
- White (2009), Should Monetary Policy "Lean or Clean"?, Federal Reserve Bank of Dallas Globalisation and Monetary Policy Institute working paper, nr. 34.
- Williams (2011), Monetary Policy and Housing Booms, International Journal of Central Banking, vol.7, nr. 1, pp. 345-355.
- Warnock and Warnock (2007), International capital flows and US interest rates, NBER working paper, nr. 12560.
- Zhu (2006), The structure of housing finance markets and house prices in Asia, BIS Quarterly Review, December 2008.

Publications in this series as from January 2003

Vol.1/No.1 (2003) Requirements for successful currency regimes:
The Dutch and Thai experiences
Robert-Paul Berben, Jan Marc Berk, Ekniti Nitihanprapas, Kanit Sangsuphan, Pisit Puapan and Piyaporn Sodsriwiboon

Vol.1/No.2 (2003) The blurring of distinctions between financial sectors:
fact or fiction?
Annemarie van der Zwet

Vol.1/No.3 (2003) Intermediation, integration and internationalisation:
a survey on banking in Europe
Jaap Bikker and Sandra Wesseling

Vol.1/No.4 (2003) A Survey of Institutional Frameworks for Financial Stability
Sander Oosterloo and Jakob de Haan

Vol.2/No.1 (2004) Towards a framework for financial stability
Aerdt Houben, Jan Kakes and Garry Schinasi

Vol.2/No.2 (2004) Depositor and investor protection in the Netherlands:
past, present and future
Gillian Garcia and Henriëtte Prast

Vol.3/No.1 (2005) Labour market participation of ageing workers
Micro-financial incentives and policy considerations
W. Allard Bruinshoofd and Sybille G. Grob

Vol.3/No.2 (2005) Payments are no free lunch
Hans Brits and Carlo Winder

Vol.4/No.1 (2006) EUROMON: the multi-country model of De Nederlandsche Bank
Maria Demertzis, Peter van Els, Sybille Grob and Marga Peeters

Vol.4/No.2 (2006) An international scorecard for measuring bank performance:
The case of Dutch Banks
J.W.B. Bos, J. Draulans, D. van den Kommer and B.A. Verhoef

Vol.4/No.3 (2006) How fair are fair values?
A comparison for cross-listed financial companies
Marian Berden and Franka Liedorp

Vol.4/No.4 (2006) Monetary policy strategies and credibility – theory and practice
Bryan Chapple

Vol.4/No.5 (2006) China in 2006: An economist's view
Philipp Maier

Vol.4/No.6 (2006) The sustainability of the Dutch pension system
Jan Kakes and Dirk Broeders

Vol.5/No.1 (2007) Microfinanciering, deposito's en toezicht:
de wereld is groot, denk klein!
Ronald Bosman en Iskander Schrijvers

Vol.5/No.2 (2007) Public feedback for better banknote design 2
Hans de Heij

Vol.6/No.1 (2008) Towards a European payments market:
survey results on cross-border payment behaviour of
Dutch consumers
Nicole Jonker and Anneke Kosse

Vol.6/No.2 (2008) Confidence and trust: empirical investigations for the
Netherlands and the financial sector
Robert Mosch and Henriëtte Prast

Vol.6/No.3 (2008) Islamic Finance and Supervision: an exploratory analysis
Bastiaan Verhoef, Somia Azahaf and Werner Bijkerk

Vol.6/No.4 (2008) The Supervision of Banks in Europe:
The Case for a Tailor-made Set-up
Aerdt Houben, Iskander Schrijvers and Tim Willems

Vol.6/No.5 (2008) Dutch Natural Gas Revenues and Fiscal Policy:
Theory versus Practice
Peter Wierts and Guido Schotten

Vol.7/No.1 (2009) How does cross-border collateral affect a country's central bank
and prudential supervisor?
Jeannette Capel

Vol.7/No.2 (2009) Banknote design for the visually impaired
Hans de Heij