

# How Should Central Banks Respond to Asset-Price Bubbles? The ‘Lean’ versus ‘Clean’ Debate After the GFC

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## Introduction

One of the most important issues facing central banks is whether they should respond to potential asset-price bubbles. Because asset prices are a central element in the transmission mechanisms of monetary policy, the issue of how monetary policy might respond to asset-price movements is not whether it should respond at all but whether it should respond over and above the response called for in terms of objectives to stabilise inflation and employment. Another way of stating the issue is whether monetary policy should try to ‘pop’, or slow, the growth of possibly developing asset-price bubbles to minimise damage to the economy when these bubbles burst? Alternatively, should the monetary authorities not respond directly to possible asset-price bubbles, but instead respond to asset price declines only after a bubble bursts to stabilise both output and inflation? These two positions have been characterised as leaning against asset-price bubbles versus cleaning up after the bubble bursts and so the debate over what to do about asset-price bubbles has been characterised as the ‘lean’ versus ‘clean’ debate. In this article, I examine where this debate stands after what has

become known in Australia as the global financial crisis (GFC).

The conclusion that I reach is that the debate has been miscast. Instead of focusing on asset prices, the focus should be on credit market conditions. The case for leaning against potential credit bubbles, a manifestation of financial market imbalances, is much stronger than the case for leaning against asset-price bubbles. Not only does this suggest that macroprudential measures should be used to restrain over-exuberance in credit markets, but there are times when monetary policy may need to be tightened to lean against financial imbalances.

## The Debate Before the GFC

Even before the global financial crisis, there was general agreement that asset-price bubbles have negative effects on the economy. As Dupor (2005) emphasised, the departure of asset prices from fundamentals can lead to inappropriate investments that decrease the efficiency of the economy. Furthermore, the bursting of bubbles throughout history has been followed by sharp declines in economic activity, as Kindleberger’s (1978) famous book demonstrated.

The clear-cut dangers of asset-price bubbles led some economists before the crisis, both inside and outside central banks, to argue that central banks should at times ‘lean against the wind’ by raising interest rates to stop bubbles from getting out of

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hand.<sup>1</sup> They argued that raising interest rates to slow a bubble's growth would produce better outcomes because it would either prevent the bubble or would result in a less severe bursting of the bubble, with far less damage to the economy.

The opposing view to the 'leaning against the wind' perspective – that asset prices should have a special role in the conduct of monetary policy over and above that implied by their foreseeable effect on inflation and employment – is often referred to as the 'Greenspan doctrine'. As Chairman of the Federal Reserve Board, Alan Greenspan strenuously argued that monetary policy should not try to lean against asset-price bubbles, but rather should just clean up after they burst (Greenspan 2002).<sup>2</sup> There are several elements to this argument.

First, bubbles are hard to detect. In order to justify leaning against an asset-price bubble, a central bank must assume that it can identify when asset prices have deviated from fundamental values. That assumption was viewed as highly dubious because it is hard to believe that the central bank has such an informational advantage over private markets. If the central bank has no informational advantage, and if it knows that a bubble has developed, the market will almost surely know this too, and the bubble will burst. Thus, any bubble that could be identified with certainty by the central bank would be unlikely to develop much further.

A second objection to leaning against bubbles is that raising interest rates may be ineffective in restraining the bubble, because market participants expect such high rates of return from buying bubble-driven assets.<sup>3</sup>

A third objection is that there are many asset prices, and at any one time a bubble may be present in only a fraction of assets. Monetary policy actions are a very blunt instrument in such a case, as such actions would be likely to affect asset prices in general, rather than solely those in a bubble.

Fourth, although some theoretical models suggested that raising interest rates could diminish the acceleration of asset prices, others suggest that raising interest rates would cause a bubble to burst more severely, thus doing even more damage to the economy (Bernanke, Gertler and Gilchrist 1999; Greenspan 2002; Gruen, Plumb and Stone 2005; and Kohn 2006). This view was supported by historical examples, such as the monetary tightening that occurred in 1928 and 1929 in the United States and in 1989 in Japan.<sup>4</sup> Another way of saying this is that bubbles are departures from normal behaviour, and it is unrealistic to expect that the usual tools of monetary policy will be effective in abnormal conditions. Attempts to prick bubbles were thus viewed as possibly violating the Hippocratic oath of 'do no harm'.

Particularly important was the view that the monetary authorities had the tools to keep the harmful effects of a bursting bubble at a manageable level, as long as they respond in a timely fashion. This was true even if interest rates fell and approached the zero lower bound, and so the conventional tool of lowering the policy interest rate was no longer an option. In this situation, the economy could be stimulated by:

1. managing expectations so that the policy rate would be viewed as staying low for an extended period, thereby lowering long-term interest rates;
2. lowering risk and term premiums by purchasing securities, thereby changing their relative supply; and

1 See Cecchetti *et al* (2000). The Bank for International Settlements (BIS) view, as represented by Borio and Lowe (2002), Borio, English and Filardo (2003), Borio and White (2003) and White (2004), has been viewed as advocating leaning against asset-price bubbles, but the BIS view is far more nuanced. Instead, it advocates leaning against financial imbalances, only one element of which was an asset-price boom. As we will see, the case for leaning against financial market imbalances is far stronger than the case for leaning against asset-price bubbles and so characterising the BIS position as advocating leaning against potential asset-price bubbles is misleading.

2 I was also a proponent of this view (Mishkin 2001, 2007).

3 For example, see the discussion in Greenspan (2002).

4 For example, see Hamilton (1987), Cargill, Hutchison and Ito (1995), Jinushi, Kuroki and Miyao (2000) and Posen (2003).

3. exchange rate interventions to lower the value of the domestic currency, thereby increasing foreign demand for domestic production.<sup>5</sup>

One counterargument to this view was the disastrous experience of Japan after the bursting of the stock market and real estate bubbles. However, as Posen (2003) noted, the problem in Japan was not so much the bursting of the bubble as it was the subsequent policies. The imbalances in Japan's banking sector were not resolved, so they continued to get worse well after the bubble had burst. In addition, as pointed out in Ahearne *et al* (2002), the Bank of Japan did not ease monetary policy sufficiently or rapidly enough in the aftermath of the crisis.

The bottom line from this analysis was that the cost of leaning against asset-price bubbles was likely to be high, while the costs of bursting bubbles could be kept low. Instead of trying to lean against bubbles, this analysis supported an approach in which central banks just clean up after the bubble. This approach was fully consistent with monetary policy focusing on stabilising inflation and employment without a special focus on asset-price bubbles.<sup>6</sup>

I would argue that the Greenspan doctrine, which was strongly supported by Federal Reserve officials, held great sway in the central banking world before the crisis. However, there were dissenting voices. Most prominently, the Reserve Bank of Australia during the period from 2002 to 2004 argued that rising housing prices in Australia posed a risk to the economy and engaged in so-called 'open-mouth operations' to warn the public and the markets about emerging imbalances in the housing market. In addition, the Bank indicated that expansionary monetary policy could fuel potential imbalances in the housing market, and there is evidence that

developments in the housing market encouraged the Bank to tighten monetary policy earlier rather than later (see Bloxham, Kent and Robson 2010).

## How the GFC Changed the Debate

The global financial crisis undermined one of the key linchpins of the argument for the Greenspan doctrine that the cost of cleaning up after an asset-price bubble burst would be low. To the contrary, it is now recognised that the cost of cleaning up after an asset-price bubble bursts can be very high if it is followed by a financial crisis, as occurred during the GFC period.

Besides the obvious cost of a huge loss of aggregate output as a result of the worldwide recession, the global financial crisis suggests that there are likely to be additional costs that make the overall costs of bursting bubbles much larger. First, financial crises are typically followed by very slow growth, and second, the budgetary position of governments sharply deteriorates.<sup>7</sup>

When economies experience deep recessions, the typical experience is that they subsequently have very strong recoveries, often referred to as V-shaped recoveries. However, as Reinhart and Reinhart (2010) document, this V-shaped pattern is not characteristic of recessions that follow financial crises because the deleveraging process takes a long time, resulting in strong headwinds for the economy. Having analysed 15 severe post-World War II financial crises, the Great Depression, the 1973 oil shock period and the recent crisis, they find that real GDP growth rates are significantly lower during the decade following these episodes, with the median decline in GDP growth being about 1 per cent. Furthermore, unemployment rates stay persistently higher for the decade after crisis episodes, with the median unemployment rate 5 percentage points higher in advanced economies. Although we have many

<sup>5</sup> For example, see Svensson (2001), Bernanke (2004).

<sup>6</sup> Another argument against focusing on asset prices is that it could lead to public confusion about its objectives. As reported in Giavazzi and Mishkin (2006), interviews with participants from different sectors of Swedish society suggested that statements on house prices by the Riksbank confused the public and led to a general weakening of confidence in the Swedish central bank.

<sup>7</sup> A third cost is that the exit strategy for central banks from non-conventional monetary policy may be both complicated and hinder the ability of the central bank to successfully manage the economy in the future. This additional cost is discussed in Mishkin (2011b).

years to go before a decade goes by after the most recent crisis, the early data make it quite conceivable that it might have worse outcomes than the average crisis episode studied by Reinhart and Reinhart. They found that 82 per cent of the observations of per capita GDP during 2008 to 2010 remain below or equal to the 2007 level, while the comparable number for the 15 earlier crisis episodes was 60 per cent. It is now recognised that the cumulative output losses from financial crises is massive, and this current crisis looks like it will be no exception.

As pointed out by Reinhart and Rogoff (2009), the aftermath of financial crises is almost always a sharp increase in government indebtedness. We have seen exactly this situation in the aftermath of the current crisis. The massive bailouts of financial institutions, fiscal stimulus packages, and the sharp economic contractions that reduced tax revenues have adversely affected the fiscal situation for many countries throughout the world. Budget deficits over 10 per cent of GDP in advanced countries like the United States have become common. Furthermore, this rise in indebtedness has the potential to lead to sovereign debt defaults, which has become a serious concern in Europe after the Greek sovereign debt crisis and the problems that the Irish Government is facing because of the spiralling cost of bailing out their banking system. The fiscal retrenchments required to put fiscal balances on a sustainable path are likely to not only be contractionary, but may also increase societal stress. Indeed, there is even a possibility that the fiscal problems brought on by the crisis could lead countries to exit the euro.

### Where is the Lean versus Clean Debate Now?

The high cost of cleaning up after asset-price bubbles burst has led to major rethinking on the lean versus clean debate. Initially the debate had a lot of its focus on whether monetary policy should react to potential asset-price bubbles. However, given the interaction between the housing-price bubble and

credit markets in the run-up to the GFC, there is now a recognition that we need to distinguish between two different types of asset-price bubbles.

### Two Types of Asset-Price Bubbles

As pointed out in Mishkin (2010), not all asset-price bubbles are alike. Financial history and the financial crisis of 2007–2009 indicates that one type of bubble, which is best referred to as a ‘credit-driven bubble’, can be highly dangerous. With this type of bubble, the following chain of events is typical: Because of either exuberant expectations about economic prospects or structural changes in financial markets, a credit boom begins, increasing the demand for some assets thereby raising their prices. The rise in asset values, in turn, encourages further lending against these assets, increasing demand, and hence their prices, even more. This feedback loop can generate a bubble, and the bubble can cause credit standards to ease as lenders become less concerned about the ability of the borrowers to repay loans and instead rely on further appreciation of the asset to shield themselves from losses.

At some point, however, the bubble bursts. The collapse in asset prices then leads to a reversal of the feedback loop in which loans go sour, lenders cut back on credit supply, the demand for the assets declines further, and prices drop even more. The resulting loan losses and declines in asset prices erode the balance sheets at financial institutions, further diminishing credit and investment across a broad range of assets. The decline in lending depresses business and household spending, which weakens economic activity and increases macroeconomic risk in credit markets. In the extreme, the interaction between asset prices and the health of financial institutions following the collapse of an asset-price bubble can endanger the operation of the financial system as a whole.

However, there is a second type of bubble that is far less dangerous, which can be referred to as an ‘irrational exuberance bubble’. This type of bubble is driven solely by overly optimistic expectations and

poses much less risk to the financial system than credit-driven bubbles. For example, the bubble in technology stocks in the late 1990s was not fuelled by a feedback loop between bank lending and rising equity values and so the bursting of the tech-stock bubble was not accompanied by a marked deterioration in bank balance sheets. The bursting of the tech-stock bubble thus did not have a very severe impact on the economy and the recession that followed was quite mild.

## The Case for Leaning versus Cleaning

The recent crisis has clearly demonstrated that the bursting of credit-driven bubbles not only can be extremely costly, but are very hard to clean up afterwards. Furthermore, bubbles of this type can occur even if there is price and output stability in the period leading up to them. Indeed, price and output stability might actually encourage credit-driven bubbles because it leads market participants to underestimate the amount of risk in the economy. The case for leaning against potential bubbles rather than cleaning up afterwards has therefore become much stronger.

However, the distinction between the two types of bubbles, one (credit-driven) which is much more costly than the other (irrational exuberance), suggests that the lean versus clean debate may have been miscast, as White (2009) and Cagliarini, Kent and Stevens (2010) indicate. Rather than leaning against potential asset-price bubbles, which would include both types of bubble, there is a much stronger case for leaning against credit-driven bubbles but not irrational exuberance bubbles. As White (2009) and Mishkin (2010) have pointed out, it is much easier to identify credit bubbles than it is to identify asset-price bubbles. Financial regulators and central banks often have information that lenders have weakened their underwriting standards, that risk premiums appear to be inordinately low or that credit extension is rising at abnormally high rates. The argument that it is hard to identify asset-price

bubbles is therefore not a valid argument against leaning against credit bubbles.

## Macroprudential Policies

Although there is a strong case to lean against credit bubbles, what policies will be most effective? First, it is important to recognise that the key principle for designing effective policies to lean against credit bubbles is whether they fix market failures. Credit extension necessarily involves risk-taking. It is only when this risk-taking is excessive because of market failures that credit bubbles are likely to develop. Recognising that market failures are the problem, it is natural to look to prudential regulatory measures to constrain credit bubbles.

Some of these regulatory measures are simply the usual elements of a well-functioning prudential regulatory and supervisory system. These elements include adequate disclosure and capital requirements, liquidity requirements, prompt corrective action, careful monitoring of an institution's risk-management procedures, close supervision of financial institutions to enforce compliance with regulations, and sufficient resources and accountability for supervisors.

The standard measures mentioned above focus on promoting the safety and soundness of individual firms and fall into the category of what is referred to as microprudential supervision. However, even if individual firms are operating prudently, there still is a danger of excessive risk-taking because of the interactions between financial firms that promote externalities. An alternative regulatory approach, which deals with these interactions, focuses on what is happening in credit markets in the aggregate, referred to as 'macroprudential regulation and supervision'.

Macroprudential regulations can be used to dampen the interaction between asset-price bubbles and credit provision. For example, research has shown that the rise in asset values that accompanies a boom results in higher capital buffers at financial institutions, supporting further

lending in the context of an unchanging benchmark for capital adequacy; in the bust phase, the value of this capital can drop precipitously, possibly even necessitating a cut in lending.<sup>8</sup> It is important for research to continue to analyse the role of bank capital requirements in promoting financial stability, including whether capital requirements should be adjusted over the business cycle. Other macroprudential policies to constrain credit bubbles include dynamic provisioning by banks, lower ceilings on loan-to-value ratios or higher haircut requirements for repo lending during credit expansions, and Pigouvian-type taxes on certain liabilities of financial institutions.<sup>9</sup>

Some policies to address the risks to financial stability from asset-price bubbles could be made a standard part of the regulatory system and would be operational at all times – whether a bubble was in progress or not. However, because specific or new types of market failures might be driving a particular credit bubble, there is a case for discretionary prudential policies to limit the market failures in such a case. For example, during certain periods, risks across institutions might become highly correlated, and discretionary policy to respond to these higher-stress environments could help reduce systemic risk.

### Monetary Policy

The fact that the low interest rate policies of the Federal Reserve from 2002 to 2005 was associated with excessive risk-taking suggests to many that overly easy monetary policy might promote financial instability. Using aggregate data, Taylor (2007) has argued that excessively low policy rates led to the housing bubble, while Bernanke (2010), Bean *et al* (2010), Turner (2010) and Posen (2009) have argued otherwise. Although it is far from clear that the Federal Reserve is to blame for the housing bubble, the explosion of microeconomic research, both theoretical and empirical, suggests that there is a case for monetary policy to play

a role in creating credit bubbles. Borio and Zhu (2008) have called this mechanism the ‘risk-taking channel of monetary policy’.

The literature provides two basic reasons why low interest rates might promote excessive risk-taking. First, as Rajan (2005, 2006) points out, low interest rates can increase the incentives for asset managers in financial institutions to search for yield and hence increase risk-taking. Incentives could come from contractual arrangements which compensate asset managers for returns above a minimum level, often zero, and with low nominal interest rates only high-risk investments will lead to high compensation. They also could come from fixed-rate commitments, such as those provided by insurance companies, forcing firms to seek out higher yielding, riskier investments. Or they could arise from behavioural considerations, such as money illusion in which investors believe that low nominal rates indicate that real returns are low, encouraging them to purchase riskier assets to obtain a higher target return.

A second mechanism for how low interest rates could promote risk-taking operates through income and valuation effects. If financial firms borrow short and lend long, as is often the case, low short-term interest rates increase net interest margins and increase the value of these firms, increasing their capacity to increase their leverage and take on risk (Adrian and Shin 2009, 2010, and Adrian, Moench and Shin 2010). In addition, low interest rates can boost collateral values, again enabling increased lending. This mechanism is closely related to the financial accelerator of Bernanke and Gertler (1999) and Bernanke, Gertler and Gilchrist (1999), except that it derives from financial frictions for lenders rather than borrowers.

Monetary policy can also encourage risk-taking in two other ways. Although desirable from a viewpoint of establishing credibility and a strong nominal anchor, which helps stabilise the economy, more predictable monetary policy can reduce uncertainty and contribute to asset managers underestimating risk (Gambacorta 2009). Monetary

8 For example, see Kashyap and Stein (2004) and Adrian and Shin (2009).

9 For example, see Bank of England (2009), French *et al* (2010).

policy which cleans up after financial disruptions by lowering interest rates – which has been named the ‘Greenspan put’ because this was the actual and stated policy of the Federal Reserve when Alan Greenspan headed the Fed – can lead to a form of moral hazard in which financial institutions expect monetary policy to help them recover from bad investments (for example, see Farhi and Tirole 2009, Keister 2010, and Wilson and Wu 2010). The Greenspan put can also increase systemic risk because it is only exercised when many financial firms are in trouble simultaneously and so they may be encouraged to pursue similar investment strategies, thereby increasing the correlation of returns.

Micro empirical analysis provides a fair amount of support for the risk-taking channel of monetary policy. Jiménez *et al* (2009), using Spanish credit registry data, find that low nominal interest rates, although reducing the probability of defaults in the short term, lead to riskier lending and more defaults in the medium term. Ioannidou, Ongena and Peydró (2009) examine a quasi-controlled experiment in Bolivia and find that a lower US federal funds rate increases lending to low-quality borrowers resulting in a higher rate of defaults even at lower interest rate spreads. Delis and Kouretas (2010), using data from euro area banks, find a negative relationship between the level of interest rates and the riskiness of bank lending.

Adrian and Shin (2010) discuss and provide evidence for the risk-taking channel of monetary policy using more aggregate data. They find that reductions in the federal funds rate, increase term spreads and hence the net interest margin for financial intermediaries. The higher net interest margin, which makes financial intermediaries more profitable, is then associated with higher asset growth, and the higher asset growth, which they interpret as a shift in credit supply, predicts higher real GDP growth.

Given the support for the risk-taking channel, does this mean that monetary policy should be

used to lean against credit bubbles? Besides some of the previously listed objections, an additional objection is that if monetary policy is used to lean against credit bubbles, there is a violation of the Tinbergen (1939) principle because one instrument is being asked to do two jobs: stabilise the financial sector and stabilise the economy.<sup>10</sup> Because there is another instrument to stabilise the financial sector – macroprudential supervision – wouldn’t it be better to use macroprudential supervision to deal with financial stability, leaving monetary policy to focus on price and output stability?

This argument would be stronger if macroprudential policies were able to do the job. However, there are doubts on this score. Prudential supervision is often subject to more political pressure than monetary policy because it affects the bottom line of financial institutions more directly. Thus they will have greater incentives to lobby politicians to discourage macroprudential policies that would rein in credit bubbles. After all, during a credit bubble, financial institutions will be making the most money and so have greater incentives and more resources to lobby politicians to prevent restrictive macroprudential policies. A case in point has been the recent Basel III accord. Press reports suggest that the capital standards in the accord was substantially weakened because of complaints by the German Landesbanken. Furthermore, implementation of the accord was put off for 10 years, and the accord did not contain measures to deal with systemic risk considerations such as having higher capital requirements on systemically more important financial institutions. The Basel III episode suggests that political considerations may make it extremely difficult to have effective macroprudential supervision.

<sup>10</sup> Stabilising the financial sector is not a completely separate objective from stabilising the economy because financial instability leads to instability in economic activity and inflation. However, because the dynamics of financial instability is so different to the dynamics of inflation and economic activity, for purposes of the Tinbergen principle, promoting financial instability can be viewed as a separate policy objective from stabilising the economy.

The possibility that macroprudential policies may be circumvented and so might not be able to constrain credit bubbles, suggests that monetary policy may have to be used as well.<sup>11</sup> But this raises another objection to using monetary policy to lean against credit bubbles: it may not work. I am sympathetic to the view discussed earlier that tightening monetary policy may be ineffective in restraining a particular asset bubble because market participants often expect very high rates of return when purchasing bubble-driven assets. On the other hand, the evidence on the risk-taking channel of monetary policy suggests that there is a stronger case that raising interest rates would help restrain lending growth and excessive risk-taking. Furthermore, the theoretical analysis discussed immediately above suggests that if the public believes that the central bank will raise interest rates when a credit bubble looks like it is forming, then expectations in credit markets will work to make this policy more effective. The expectation that rates will go up with increased risk-taking will make this kind of activity less profitable and thus make it less likely that it will occur. Furthermore, expectations that rates will rise with increased risk-taking means that interest rates will not have to be raised as much to have their intended effect.

Nonetheless, using monetary policy to lean against credit bubbles is not a monetary policy strategy that can be taken lightly. Doing so could at times result in a weaker economy than the monetary authorities would desire, or inflation that falls below its target. This suggests that there is a monetary policy trade-off between having the inflation forecast at the target and the pursuit of financial stability. Also, having monetary policy focus on financial stability might lead to confusion about the central bank's

commitment to the inflation target, with potentially adverse effects on economic outcomes.

Another danger from having monetary policy as a tool to promote financial stability is that it might lead to decisions to tighten monetary policy when it is not needed to constrain credit bubbles. A situation of low interest rates does not necessarily indicate that monetary policy is promoting excessive risk-taking. One lesson from the analysis here is that policymakers, and especially monetary policymakers, will want tools to assess whether credit bubbles are developing. Research is underway (for example, see Borio and Lowe 2002, and Adrian and Shin 2010) to find measures that will signal whether credit bubbles are likely to be forming. High credit growth, increasing leverage, low risk spreads, surging asset prices and surveys to assess if credit underwriting standards are being eased are pieces of data that can help central banks decide if there is imminent danger of credit bubbles. Monitoring of credit market conditions will become an essential activity of central banks in the future and research on the best ways of doing so will have a high priority in the future.

## Conclusion

The global financial crisis has led to major rethinking on how central banks should respond to possible asset-price bubbles. Prior to the GFC, the prevailing view in central banks was that they should not try to lean against potential asset-price bubbles. The arguments in this article indicate that there is a much stronger case to lean, not against asset-price bubbles per se, but rather against potential credit bubbles, when financial imbalances appear to be building up. The analysis here, however, indicates that the first line of defence against possible credit bubbles should be to use macroprudential tools to restrain excessive risk-taking in the credit markets. However, because macroprudential policies may either be hard to design or the political will to implement them when needed may be weak, there

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<sup>11</sup> However, as pointed out in Boivin, Lane and Meh (2010), whether monetary policy will be effective in countering financial imbalances depends on the nature of shocks. They conduct simulations that show that where financial imbalances reflect specific market failures and regulatory policies can be directed to such failures, monetary policy is less likely to be effective. Monetary policy is likely to be more effective when financial imbalances arise from economy-wide factors.

is a case to use monetary policy to lean against credit booms.

The debate on lean versus clean has thus moved to a position that is more supportive of the actions taken by Australian policymakers in the period from 2002 to 2004 when they responded to a rise in housing prices that was accompanied by a rapid growth of credit and a weakening of lending standards. Although the RBA appears to have tightened monetary policy somewhat earlier than it might have otherwise, it is hard to evaluate how successful it was in restraining credit growth.<sup>12</sup> In addition, there were measures by policymakers that could have contributed to the slowdown of the housing boom and so had macroprudential features. The RBA and the Australian Prudential Regulation Authority (APRA) raised concerns about weakening of lending standards and ARPA conducted stress tests of banks' housing loans. In addition, policymakers pursued measures to restrain fraudulent activities related to property investments and more strictly enforced tax laws related to housing (Bloxham 2010).

The lean versus clean debate after the GFC suggests that central bankers face a more complex policy environment. Not only must they design their policies to stabilise both inflation and employment, but these policies will also have to focus on promoting financial stability. Although this will present central bankers with additional challenges, it will make central banking an even more stimulating profession. ❖

<sup>12</sup> One possible benefit of the RBA's publicly expressed concerns about rising housing prices is that it may have convinced the public and markets that the RBA would pursue tighter monetary policy to restrain this market, if necessary, and these expectations helped prevent a bubble from developing. Thus, although the amount of monetary tightening to restrain the housing market was not very large, this 'management of expectations' might have prevented the financial imbalances that developed in other advanced countries before the GFC. It is obviously very hard to quantify the impact of this 'management of expectations'.

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