



Lean-Against-the-Wind Monetary Policy: The Post-Crisis Shift in the Literature

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Abstract

The debate concerning central banks' response to potential asset price bubbles initially referred to whether monetary policy should respond at a level over and above the one warranted by the objectives of inflation and output gap stability, trying to slow the growth of perceived asset price bubbles, so as to minimise the adverse effects when the latter burst (the 'lean-against-the-wind' -LATW- view). Alternatively, it argued whether it should respond to declines in asset prices only after the bubble bursts (often termed as conventional or 'cleaning-up' view), in order to stabilise both output and inflation. The article reviews the shift in the monetary policy literature addressing the above debate in the aftermath of the global financial crisis, and demonstrates that this shift has been in favour of the LATW view. In particular, we contend that the pre-crisis conventional view has incorporated elements of the opposing view, in that it addresses financial frictions in the models of the economy used for the design and conduct of monetary policy. In addition, even the LATW view has altered, in that it advocates further co-operation between monetary and macroprudential policies; the latter designed to promote and ensure financial stability.

JEL Classification: E52, E58, E44

Keywords: monetary policy, lean-against-the-wind, financial imbalances.

1. Introduction

The global financial crisis that surfaced in August 2007, to the surprise of most central bank practitioners and academics alike, led to a long and ongoing period of economic slack (termed as the 'Great Recession'). The latter brought into question the consensus views regarding monetary policymaking, that had been shaped over almost three decades of overall successful central banking practice. The aforementioned success had been reflected in well-anchored private agents' inflation expectations around pertinent central bank policy rates, the stabilization of inflation around the policy-relevant rate, and the attainment and maintenance of a sustainable rate of output growth in most major developed economies. That period has been proudly (and rightfully) termed the 'Great Moderation' (see e.g. Bernanke, 2004). Voices have been ignored which were pointing out, as early as the late 1990s, that such benign economic regimes may actually be feeding the roots to major financial and economic crises (for early accounts see e.g. Goodhart, 1995; Kent and Lowe,

1997; Shiratsuka, 1999, 2001). The latter is effected by masking the growth of financial imbalances, which may eventually produce immensely adverse economic effects.

Such views have been reaffirmed and acquired credence at the outburst of the crisis, and, currently, stir the debate among both academic and central bank economists, on how monetary policy design and conduct should be altered in order to incorporate elements of such growth of financial imbalances and, in general, of risks to financial stability. It is worth noting, however, that when asset prices deviate from their fundamental levels, inappropriate investments may take place, which decrease the efficiency of the economy (see e.g. Dopor, 2005), and, in addition, the bursting of bubbles, as demonstrated in Kindleberger (1978, 2000) has been throughout history followed by sharp declines in economic activity. Japanese experience during the 1990s demonstrated that subsequent asset-price collapses may be highly damaging to the economy. Therefore, there has been mutual agreement by both academics and central bank practitioners (even during the years of the ‘Great Moderation’) that monetary policy needs to be conducted in a way that counters the adverse consequences brought forward in the aftermath of the bursting of a bubble. Therefore, the current analysis does not address this issue¹.

Financial imbalances refer mainly to the presence of debt and capital stock overhangs (i.e. disequilibrium excess stock) (for an elaboration on their distinctive features and possible policy implications see e.g. Borio, 2012; Drehman et al., 2012)², and are addressed by the relevant literature in a distinctive way from asset price misalignments from fundamental values (irrespective of how these fundamental values are defined and measured). In this way, as Mishkin (2011) asserts, “the case for leaning against financial market imbalances is far stronger than the case for leaning against asset-price bubbles” (Mishkin, 2011:80). Borio and Lowe (2002) make an early distinction in the following: “Booms and busts in asset prices, whether characterized as ‘bubbles’ or not, are just one of a richer set of symptoms. It is the *combination* (emphasis in the original) of these symptoms that matters. Other common signs include rapid credit growth, ... rapid increases in asset prices and, in some cases, high levels of investment –rather than any one of these alone– These developments can, jointly, sow the seeds of future instability. As a result the financial cycle can amplify, and be amplified by, the business cycle” (Borio and Lowe, 2002:1). They further distinguish the policy implications as follows: “For policymakers, therefore, the more relevant issue is not whether a ‘bubble’ exists in a given asset price, but rather what combination of events in the financial and real sectors exposes the financial system to a materially increased level of risk” (Borio and Lowe, 2002:11). Additionally, for example, White (2010) recently remarks that “a multi-period perspective, recognizing the procyclical interactions over time between the real sector and the financial sector, can improve policies directed to both crisis prevention and crisis management” (White, 2010:55).

For the debate to hold it is essential that the risks to financial stability inherent in the financial system and the perceived trade-offs (with respect to monetary policy deviating the projected rule-based path) are substantial. However, as Borio and Lowe

¹ For an account of optimal monetary policy in the aftermath of a financial crisis, when lower rates reduce imminent default risk, see e.g. Farhi and Tirole (2012) and Diamond and Rajan (2012), that address the effect of ex-post interest-rate bail-outs on ex-ante risk-taking incentives.

² However, as for example Borio (2012) admits, “there is no consensus on the definition of the financial cycle” (Borio, 2012:2), let alone on a definition of financial stability useful for policy-making.

(2002) stress: “perceived trade-offs are themselves to a significant degree a function of what we think we know about the workings of the economy and the role of policy, ... [this] determines views about the consequences of actions and of failures to act by the central bank, [and] such views change over time, in the light of evolving circumstances” (Borio and Lowe, 2002:26). The recent severe financial crisis and the consequent Great Recession are stark examples of such shift in attitude.

The debate over whether and (if appropriate) how monetary policy should respond to an asset price boom has been actually generated by the recession following the U.S. stock-market boom during 1994-2000. As financial crises and economic contractions tended historically to follow periods of explosive asset-price growth not only in advanced economies but also in emerging market countries (see e.g. Kindleberger, 1978, 2000; Mishkin, 1991, 1996), it is argued that monetary policy can restrain the adverse effects that financial instability may impose on the economy overall, just by attempting to defuse asset-price booms at a relatively early stage. A term often used to describe such pre-emptive design and conduct of monetary policy is ‘*lean against the wind*’ (henceforth LATW) after a 1956 remark from then Federal Reserve Board of Governors Chairman William McChesney Martin Jr. famously describing to the Congress the purpose of the Federal Reserve as “leaning against the winds of deflation or inflation, whichever way they are blowing”³.

Apart from the uncontested view that asset prices offer to monetary policymakers (even partially) useful information in the short-term, theoretical and empirical research has not yet yielded solid widely accepted results as to whether they bear any strong link to the primary indicators of monetary policy (such as output gaps and inflation forecasts) (for a concise review see e.g. ECB, 2005). However, since asset prices constitute a central component in the monetary policy transmission mechanism, optimal monetary policy theory postulates that monetary policy responds to asset prices in order to obtain good outcomes in terms of output and inflation (see e.g. Mishkin, 2011:79-80 and references therein). Monetary policymakers tend to utilize vast amounts of information, which may at times be conflicting, as well as imprecise indicators, and, in addition, they reach decisions pertaining to inflation and economic growth prospects in real time without the benefit of hindsight.

How likely it is that an eventual collapse in asset prices leads also to a macroeconomic decline, which will necessitate a monetary policy response, may depend on the underlying reasons of their appreciation. It has been proposed (see e.g. Bordo and Wheelock, 2004) that so long as booms in asset prices are justified by fundamental behaviour, such as the presence of realistic prospects for future earnings growth, they do not constitute any threat to the outlook for inflation or overall economic activity. On the contrary, if booming asset prices are evaluated to reflect irrational behaviour, such as excessive optimism about future economic prospects, they may threaten economic stability and, thus, warrant a monetary policy attempt to encourage market participants towards more realistic asset price valuations (Bordo and Wheelock, 2004:21).

Therefore, as Mishkin (2011) highlights central banks’ response to potential asset price bubbles pertains to whether monetary policy should respond at a level over and above the one warranted by the objectives of inflation and output gap stability (Mishkin, 2011:80), and, thus, before the corresponding forecasts used as policy indicators are affected. Similarly, the debatable issue is whether monetary policy should try to hamper the growth of *perceived* asset price bubbles, so as to minimise

³ Cited in <http://www.federalreservehistory.org/People/DetailView/113>.

the adverse effects when the latter burst. The alternative aspect of the debate, the conventional view (often termed as ‘cleaning up’), has, thus, been whether monetary policy should *just* correspondingly respond to declines in asset prices *only after* the bubble bursts, in order to stabilise both output and inflation. From these two opposing views the debate has often been termed as the “lean versus clean” debate.

The current article reviews the shift in the monetary policy literature in the aftermath of the global financial crisis, and demonstrates that this shift in the literature addressing the “lean versus clean” debate has been in favour of the LATW view. In particular, we contend that the pre-crisis conventional view has in fact incorporated elements of the opposing view in that it, eventually, addresses financial frictions in the models of the economy used for monetary policy. It is worth noting that most models of the New Keynesian Dynamic Stochastic General Equilibrium (DSGE) paradigm, that had been widely used by central banks in most developed economies, did not incorporate elements pertaining to frictions in the operation of the financial sector (from either the borrower’s or the lender’s side) and its interaction with the real sector (through, for example, alternative channels of the monetary transmission mechanism). In addition, even the LATW view has been altered in the aftermath of the crisis, in that it advocates the merits of further co-operation between monetary and macroprudential policies; the latter designed to promote and ensure financial stability. The underlying reason behind such co-operation is the presence of complex interactions between monetary and macroprudential policies (for a concise account see e.g. Dunstan, 2014) and the potential for material spill-over effects between them. Therefore, the following section summarises the main highlights of the debate before the crisis, while section 3 distinguishes how these points have been reaffirmed, after the crisis. Section 4 concludes.

2. The Debate before the Global Financial Crisis: An Overview

According to the conventional approach⁴ a reaction of monetary policy to asset-price misalignments is justified only when the latter are known to provide useful information about the future course of inflation. In particular, the view contends that so long as monetary policy maintains price stability, it promotes financial stability as well (see, for example, Schwartz, 1995; and Bordo, Dueker, and Wheelock, 2002, 2003). This view holds that financial crises (or simply “financial imbalances”) need to be tackled by lender-of-last-resort practices or regulatory policies (as in Schwartz, 2002)⁵. Bernanke and Gertler (1999) express this view in the following concise way: “The inflation targeting approach dictates that central banks should adjust monetary policy actively and pre-emptively to offset incipient inflationary and deflationary pressures. Importantly, for present purposes, it also implies that policy should *not* respond to changes in asset prices, except insofar as they signal changes in expected inflation” [emphasis is in the original] (Bernanke and Gertler, 1999:78).

The conventional approach, however, had been (at least partially) criticised by several economists during the years prior to the crisis. For example, according to

⁴ Sometimes, also, referred to as the ‘Greenspan doctrine’, from then Chairman of the Federal Reserve Board Alan Greenspan, who fervently advocated this view that monetary policy should just ‘clean up’ after asset price bubbles burst, rather than leaning against their potential growth (see e.g. Greenspan, 2002). Similar views are shared in e.g. Mishkin (2001a,b, 2007) and Kohn (2006).

⁵ This approach has been famously supported by Bernanke and Gertler (1999), (2001) in the context of a Taylor rule, as well as, among others, in Schinasi and Hargraves (1993), Bullard and Schaling (2002), and White (2004).

Smets (1997), in the presence of ‘irrational exuberance’ in the financial markets, a monetary policy tightening is actually optimal. In a similar manner, Cecchetti et al. (2000) suggest a monetary policy reaction to asset-price misalignments. However, Bernanke and Gertler (2001) doubt whether policymakers are in fact capable of reliable judgement of whether asset price movements reflect “irrational exuberance” or that the possibility of a collapse in asset prices is substantial and imminent⁶. Nevertheless, Cecchetti et al. (2000) employ simulations of the model used in Bernanke and Gertler (2001). In contrast to the latter, however, the results in Cecchetti et al. (2000) strongly support the inclusion of stock prices in the central bank’s policy rule.

Conversely, Bordo and Jeanne (2002a,b) are in favour of a monetary policy reaction to asset price booms, as they view that pre-emptive actions so as to contain asset-price misalignments, in fact, provide insurance against the high economy-wide costs of lost output in the event of the bubble bursting. They argue that policymakers must try to defuse asset-price booms either when there is a high risk of a bust (and the consequences it may bring considerably damaging to the economy) or when the cost of such an attempt is estimated to be low in terms of foregone output. They point-out that the more optimistic investors get, the higher the risk of a market-sentiment reversal becomes. However, a higher cost is attached to monetary policy actions of ‘leaning against the wind of investor optimism’. Therefore, they contend that monetary policymakers need to evaluate not only the probability of a crisis occurring, but also the extent to which monetary policy is capable of reducing this probability.

Greenspan (1996) famously saw a conundrum in the attempts of monetary policymakers to defuse an asset-price boom. He argued that the likelihood of stock-market booms occurring is relatively high in low inflation environments:

“...We have a very great difficulty in monetary policy when we confront stock market bubbles... it is not obvious to me that there is a simple set of monetary policy solutions that deflate the bubble.” (Federal Open Market Committee meeting transcript, 24th September, 1996:30-31).

Bordo and Wheelock (2004) survey US stock-market booms and find that “booms do not occur in the absence of increases in real economic growth and perhaps productivity growth” (Bordo and Wheelock, 2004:41)⁷. They argue that “although one can offer plausible theoretical arguments for responding proactively to an asset price boom”, as their survey suggests, “policymakers should be cautious about attempting to deflate asset prices without strong evidence that a collapse of asset prices would have severe macroeconomic costs” (Bordo and Wheelock, 2004:41).

Nevertheless, any attempt to evaluate the appropriate monetary policy response to asset price bubbles should not fail to consider primarily the explicit objectives of monetary policy (stabilising inflation and economic activity), and its ultimate aim to promote public welfare by fostering economic prosperity. As Mishkin (2008) remarks, since asset price movements lead to macroeconomic fluctuations affecting prices and employment, the monetary authorities are bound to be concerned. It is also

⁶ Nevertheless, on this account, e.g. Cecchetti (2003) argues that the task of identifying promptly and accurately asset-price misalignments is not more challenging than other elements of policy-design, such as potential output (for the shortcomings and the challenge of accurately defining the non-accelerating inflation rate of unemployment –NAIRU– and in general measuring the output gap see e.g. McCallum, 2001; Ball and Mankiw, 2002; Orphanides and Williams, 2004; and Orphanides and van Norden, 2004).

⁷ Their analysis, however, does not support the proposition that excessive money or credit growth leads to a boom in asset prices.

considered that if monetary policy manages to give a fitting and prompt response to the asset-price misalignments under consideration, the adverse macroeconomic consequences of the latter will be neither severe, nor long-lasting (Mishkin, 2008:2).

Issing (2003), however, points out that the very choice of the monetary policy strategy imposes a considerable influence on the stability of the financial system. He argues that if the primary objective of the central bank is to maintain price stability over the medium-term, then to pursue an inflation-targeting strategy with respect to a forecast of inflation spanning over one or two years may not be the optimal policy strategy at all times. He views that in a limited-horizon inflation forecast overall costs (that in terms of the central bank most commonly used tend to be future deflation that succeeds a financial crisis) may not receive the appropriate weight (see also Borio, 2005, for further discussion on this point). Optimal monetary policy should, at times, under considerable strains in the financial system, accept deviations from the desired inflation rate over shorter periods so as to preserve price stability over the medium to long run (Issing, 2003:17). Rajan (2005) also warned that price stability may not suffice to foster financial stability and that a central bank's leaning against emerging financial imbalances is warranted.

Following the above line of argument and serving to the analysis as an example, Issing (2003) also expresses the robustness of the ECB stability-oriented two-pillar monetary policy strategy over inflation (forecast) targeting. He stresses that "explicitly focusing on monetary and credit developments in order to form a judgment on consumer price inflation in the medium to long run, forces the ECB to take a sufficiently forward-looking perspective.... This longer perspective highlights risks to price stability stemming from financial imbalances,... [and, thus,] the optimal price stability-oriented policy reaction based on monetary and credit developments is likely to diminish financial imbalances" (Issing, 2003, p.17). The pre-emptive role of the first pillar of the ECB monetary policy strategy is also identified by Borio, English and Filardo (2003), who argue that: "...policy frameworks in which monetary aggregates still play a prominent role can more naturally accommodate policies aimed at addressing the build-up of financial imbalances... Pillar I in the ECB strategy is rationalised precisely in terms of providing better signals about inflationary pressures beyond short horizons, complementing the assessment of more near-term inflation pressures based largely on real-side indicators under Pillar II" (Borio et al., 2003:43).

Therefore, it remained debatable whether monetary policy should react directly to asset prices or, even, if asset prices need to appear in some form in a reaction function a central bank uses as a guide for monetary policy. Trichet (2003) suggests that "we should remain cautious about it, perhaps because it would be like opening Pandora's Box if we started setting our key policy rates according to asset price changes" (Trichet, 2003:16). He argues that extreme caution needs to be exercised by monetary policymakers on this issue since it is considerably difficult both to assess asset price valuations and mostly to determine and measure fundamental asset-price values, which he views as highly hypothetical (Trichet, 2003:16). Furthermore, Bernanke (2002) points out that when the monetary authorities are not confident in their estimations about both the presence of a bubble and its amplitude, the monetary policy actions aiming to affect asset price developments may lead to a misallocation of resources. Nevertheless, Trichet (2003) stresses that a crucial issue is whether the central bank's stance should be different in a reversal of expectations due, for example, to a reassessment of expected profitability asset prices decline, in the effort to foster monetary and financial stability (Trichet, 2003:17).

Also, Mishkin (2008) argues that actions aiming to ‘prick’ an asset-price bubble should better be avoided for (at least) three reasons. Initially, because he accepts that it is difficult to identify asset price bubbles accurately and promptly, and secondly, because he contends that even if this is not the case, still the effect that interest-rate policy can impose on asset price bubbles is highly uncertain. He stresses that tightening interest-rate policy may prove considerably ineffective in its effort to restrain the bubble, since “market participants expect such high rates of return from buying bubble-driven assets”⁸ (Mishkin, 2008:2). Since he views bubbles as “departures from normal behaviour” he accepts that “it is unrealistic to expect that the usual tools of monetary policy will be effective in abnormal conditions” (Mishkin, 2008:2). Furthermore, he points out that since asset prices span over a large spectrum of assets trading in the relevant markets, and since in a single period a bubble may be present only in a segment of those assets, monetary policy actions may prove to be “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”⁹ (Mishkin, 2008:3). Finally, Bernanke, Gertler, and Gilchrist (1999), Bernanke and Gertler (2001) and Gruen, Plumb, and Stone (2005) support the above view that monetary policy should not attempt to defuse asset price bubbles and only respond to changes in the prospects for inflation and aggregate demand, as it is thought to lead to superior results even in the event of a bubble.

Borio and Lowe (2003) form an index of imbalances based on a credit gap (defined as credit growth deviations from trend), an equity price gap, and an output gap aiming to identify incipient declines in asset prices, which may create significant real output losses. They argue in favour of the use of such an index as a guide for proactive monetary policy action. A similar index is used for the US during the 1920s by Eichengreen and Mitchener (2004), who show that it provides explanations of the severity of the Great Depression. They reach the conclusion that asset prices provide useful information and that individual as well as aggregate asset prices should be used as a tool for conducting monetary policy. According to Filardo (2003), however, the suggestions in Borio and Lowe (2003), that a LATW approach to policymaking may be the best policy, need further empirical research into robustness of their policy recommendations under alternative economic environments¹⁰. In addition, Filardo (2003) suggests that further investigation into bank regulation may uncover some unintended adverse consequences of some of the policy recommendations given by Borio and Lowe (2003). Hence, according to Filardo (2003) in this case, a LATW policy may have the opposite effect on financial stability than policymakers would expect (Filardo, 2003:296).

Detken and Smets (2004) study financial, real and monetary policy developments during asset price booms examining 38 boom periods in 18 OECD countries since the 1970s. Their results reinforce the findings of Borio and Lowe (2003) referring to the build-up of large real, financial and monetary imbalances, which may constitute a good indicator of potential financial and macroeconomic instability. However, they do not provide an answer to whether ‘pre-emptive’ LATW monetary policy

⁸ Greenspan (2002) also further discusses this point.

⁹ An additional reason proposed has been that many crashes of asset prices which have become associated with asset price bubbles have had very limited effects on the economy (see the propositions of Mishkin and White, 2003).

¹⁰ However, according to Filardo (2003), Borio and Lowe (2003) “paint a picture of a very risky policy environment where financial instability is omnipresent and a natural consequence of economic success” (Filardo, 2003:295) and he recognises that this view reflects a long tradition in macroeconomics, as e.g. in Minsky (1982).

tightening may be successful in preventing or alleviating subsequent asset price collapses without imposing a considerably high cost. Nevertheless, Filardo (2003) suggests that policymakers should be sceptical about reacting to asset price movements that look like bubbles (Filardo, 2003:294).

Even though asset prices are considered to convey useful information for monetary policy makers in the short term, it is still debated whether asset prices have any significant relationship to the primary indicators for monetary policymakers. Cecchetti et al. (2000) examine the potential usefulness of a monetary policy reaction to changes in asset prices generalising the seminal analysis in Poole (1970), which indicates that LATW of interest-rate changes is useful when disturbances originate in the money market. In the case, for example, of a rise in equity prices due to positive productivity shocks, they suggest that LATW of the asset price changes is recommended. They contend that monetary policy should automatically react to asset price changes, but point out the importance of separate evaluation of each situation before the relevant actions are undertaken.

Cecchetti et al. (2000) also use the insights of Kent and Lowe (1997) that build a dynamic model, which explicitly qualifies for misalignments in asset prices, in order to demonstrate that asset price misalignments should be taken into account in the normal course of determining monetary policy, due to the impact they impose on expected inflation, and due to their potential of creating unnecessarily large business cycle fluctuations. Their conclusions are further confirmed by the results in the simulations presented by Cecchetti et al. (2003). Although monetary policy actions may, under certain circumstances, be effective in affecting asset prices, they stress that such policy actions are considerably difficult to apply. They, thus, reach the conclusion that a mechanical monetary policy response to all asset price changes can eventually give rise to outcomes that are worse than those created when there is no response at all. They further draw attention to certain factors that may weaken the effectiveness of monetary policy responses, like the role of the banking sector, the resilience of the financial system, and the openness of the economy. This issue corresponds to the post-crisis view shared by several LATW pre-crisis proponents that a co-operation between monetary and macroprudential policies may be beneficial to the implementation of both policies.

Given the universal agreement that monetary policy should respond to asset prices if they do contain such information, the operative question for debate is what to do if asset prices do not contain such information. The view expressed in Goodfriend (2003) is that if asset prices do not contain incremental information about the macroeconomic goals of monetary policy, the central bank should ignore them. However, because the central bank cares about the consequences of asset prices for the financial markets, it is generally argued that it should take asset price movements into account even if they do not directly contain incremental information about the macroeconomic goals of monetary policy¹¹. Making reference to the damaging potential implications for the financial markets liquidity, Greenspan (1999) gives a logical explanation for why the central bank would plausibly react to asset prices even if they did not bear information that is directly useful for predicting future outcomes of the macroeconomic goals of monetary policy.

¹¹ Greenspan (1999), for example, has argued, “... that there is a form of asymmetry in response to asset rises and asset declines ... Central banks do not respond to gradually declining asset prices ... to gradually rising asset prices ... but to sharply reduced asset prices, which will create a seizing up of liquidity in the system” (Greenspan, 1999:143).

Cecchetti et al. (2003) give an entirely different reasoning from Greenspan (1999) to the same answer that the central bank should react to asset prices even if they do not contain incremental information about the macroeconomic goals of monetary policy. Their main argument is that central banks should respond to asset prices since they contain information about macroeconomic goals that a central bank has, and indeed ought to have, but either cannot or will not publicly admit to have.

According to Friedman (2003), Cecchetti et al. (2003) focus on “medium-run macroeconomic stability”, in other words, on the second moment of real economic outcomes. Medium-run macroeconomic stability, as defined in the latter, is accepted by Filardo (2003) as a plausible enough goal for monetary policy to pursue, presumably alongside the goal of low and stable price inflation. If asset prices provide useful information to the best available forecast of prospects for such medium-run macroeconomic stability, Filardo (2003) wonders why this is not simply a specific case of the general proposition on which everybody already agrees. He contends that the answer lies in the fact that Cecchetti et al. (2003) take as given (and, in fact, applaud) the monetary policymaking framework of “inflation targeting” (Friedman, 2003:460).

Thus, economists generally advocate an aggressive monetary policy response to the contractionary effects generated by sharp declines in asset prices, especially if deflation risk becomes significantly high. Posen (2003), for example, clearly states the above, even though he also highlights that fiscal policy should be utilised in addition to monetary policy, and policymakers need identify any form of fragility in the financial and corporate sectors.

We must add, however, that, even though, as Richards (2003) recognises, a few years prior to the year of (pertinent) publication opinions were rather polarised on the problem of devising an appropriate monetary policy response to the development of an asset-price boom, as he also stresses “the debate has shifted towards the middle ground”, arguing that “monetary policy should not aggressively attempt to burst perceived asset-price bubbles, but should take account of asset-price fluctuations, to the extent that they provide information about the shocks affecting the economy, or have possible implications for output and inflation in the medium term, beyond the usual inflation-targeting horizon” (Richards, 2003:3). This implies that an inflation-targeting framework for the conduct of monetary policy needs to be exercised with greater flexibility. Earlier evidence on this argument is found in Ball (1997).

Furthermore, Gruen et al. (2005) suggest that a central bank’s tightening of interest rates may cause a bubble to burst more severely, and, thus, increase the potential detrimental effects to the economy. They provide further evidence to support the view expressed in Bean (2004) that monetary policy cannot make a ‘single automatic response’ to asset-price developments. They, yet, reach the conclusion that the appropriate monetary policy relies heavily on the policymakers’ judgment, as under certain circumstances the central bank should better “lean against the bubble”, while under others this policy response would be counterproductive. They, finally, point out that, given the information available, it may be difficult to distinguish *in real time* which of the above is the case. In response to the latter argument, Barrett et al. (2008) prove in a theoretical model stressing the strategic interaction between the financial sector and the monetary policy authorities, that a rule-based LATW monetary policy yields better results than its discretionary equivalent. These are in terms of better control over inflation, anchored inflation expectations and increased incentives to the financial sector to impose more prudence on its operation. Additionally, Farooq-Akram et al. (2007) in a flexible inflation-targeting monetary policy regime (in the

lines of e.g. Svensson, 1999), give support to the LATW view that generally warrants a longer target horizon for inflation.

Cecchetti (2003) argues more fervently in favour of monetary policy reacting to asset-price misalignments so as to counter potential instability, yet exercising caution. The results in Cecchetti (2003) show that the officials at the U.S. Federal Reserve had been more concerned in their discussions with asset prices when valuations were increasing during the 1990s, and discussing a possible adjustment of policy in order to “lean against the bubble”. Contrasting the results to his analysis to Federal Reserve officials’ public statements, Cecchetti (2003) concludes that not enough evidence has been given that monetary policy can be used to defuse bubbles and limit the destructive consequences when they burst. For example, Greenspan (2002) concluded that “it seems reasonable to generalize from our recent experience that no low-risk, low-cost, incremental monetary tightening exists that can reliably deflate a bubble. But is there some policy that can at least limit the size of the bubble and, hence, its destructive fallout? From the evidence to date, the answer appears to be no” (Greenspan, 2002:5).

In addition, despite the useful role asset prices may have as a guide to monetary policy, Mussa (2003) raises the question of how this can be explained to the public. He even questions “why ... central bankers generally appear so reluctant to admit that the behaviour of asset prices might influence their decisions about monetary policy when many (but not all) outside analysts of monetary policy suggest that there should be such an influence” (Mussa, 2003:49). He argues that part of the answer lies in the fact that while consumer-price inflation is generally unpopular, asset price inflation is much appreciated by those who own the assets. He notes that a central bank that proclaims an effort to depress asset prices makes few friends and many enemies (see Orphanides, 2014, for a more detailed exposition of the argument). Thus, aside from the legitimate substantive reasons to treat seemingly anomalous asset-price declines and asset-price increases somewhat asymmetrically, there are significant public-relations reasons why a central bank might want to explain these actions in somewhat different terms. Indeed, as Mussa (2003) remarks, even an independent central bank needs to be politically responsible through some mechanism, and it needs to maintain public support of its general policy behaviour, if not necessarily for every individual policy action (Mussa, 2003:50).

In favour to the conventional approach, Giavazzi and Mishkin (2006) assert that a focus of monetary policymakers to asset prices may clash with central bank accountability issues and, eventually, lead to public confusion with respect to the objectives of such a policy. They provide as an example, the public and market participants’ confusion and overall loss of confidence to the monetary policymaker in Sweden stemming by Swedish central bank’s statements on house prices in the years 2005-2006 (Giavazzi and Mishkin, 2006:53, 71-73). It is worth noting additionally, that Sweden’s experience of high and rising household indebtedness in a low-interest-rate regime and the Riksbank’s response of tighter monetary policy levels, than if based solely on a price stability objective, has received additional criticism (see e.g. Ekholm, 2014) pointing out the costs of the resulting sustained period of below target mid-point inflation and higher unemployment.

To sum up, the inability to identify asset price bubbles *ex ante* should be sufficient reason for policymakers to be cautious about taking pre-emptive actions to deflate an asset-price bubble and, according to Krozner (2003), while the inability to identify asset price bubbles *ex post* not only reinforces this cautious approach but also “should cause policymakers to take pause about whether the rhetoric of asset-price bubbles is

a useful concept for policy discussions” (Kroszner, 2003:7). In order to answer the question of what other policies should the policymakers pursue in the light of the above inability to deflate a bubble, one should delve into the source of an asset price bubble, namely the mispricing of assets. A policy implication is that better information, easily accessible to all investors makes bubbles more difficult to form and to be sustained. He notes that “when a price seems to outstrip fundamentals, investors logically ask whether it is a bubble or whether they do not have access to important information about fundamentals, [therefore] it is important that information is available not only to selected individuals, but to the general public”¹² (Kroszner, 2003:8).

Irrespective of dissenting voices mainly expressed from academic economists, the conventional view had been strongly advocated by Federal Reserve officials and the central banking world, in general, before the crisis. Yet, for example, Mervyn King, while serving as the Governor of the Bank of England, even though he did not advocate LATW, he did suggest that to prevent a build-up of financial imbalances a central bank might extend the horizon over which inflation is brought back to target (see e.g. King 2004a,b). Additionally, European Central Bank and other central banks’ officials similarly suggested that if an asset boom or bust occurs, a longer period than the usual one to two years might be required to assess whether the price stability goal is being met (see e.g. Issing, 2003a,b; Stevens, 2004; Selody and Wilkins, 2004; Trichet, 2005; Bank of Canada, 2006; Rosenberg, 2006; Papademos, 2008; Stark, 2009; Trichet, 2009).

Thus, before the global financial crisis both monetary policymakers and academic and central bank economists seemed to share the opinion that monetary authorities should concentrate on price stability while also aiming to stabilize employment and resource utilization. Indeed since the end of the inflation episodes of the 1970s and 1980s the focus of most central banks remained in macroeconomic stabilization. Nevertheless, the global financial crisis altered the context on which central banks operate and urged monetary policymakers to consider the implications of their policy decisions on the stability of financial markets.

3. The Post-Crisis Shift in the Literature

The unexpectedly acute adverse consequences of the global financial crisis and the inability of monetary authorities in most affected economies to contain them in a timely manner, called for a thorough reassessment of the macroeconomic policy framework that has proven successful during the Great Moderation years. This has been, mainly, demonstrated by incorporating explicit (and transparently articulated) financial stability considerations in the conduct of monetary policy in most developed economies. It also shed light to the workings and merits of macroprudential policies (that incorporate a system-wide approach to ensuring financial stability – see e.g. Galati and Moessner, 2011, for a review) and the necessity of their implementation, in addition to microprudential policies passed over in most developed economies before the crisis so as to ensure a financial institution-based approach to safeguarding the stability of the financial system. This shift in attitude, right at the onset

¹² Kroszner (2003) notes that academic work suggests particular avenues through which public information can prevent bubbles from forming as for example, Allen and Gale (2003) building on their earlier work identify the agency relationship as a key transmission mechanism in the formation of bubbles. He remarks that the agency problem arises from an asymmetry of information (Kroszner, 2003:8).

of the crisis, has been based in a de facto realization that an effort to ensure the soundness and safety of individual financial institutions may at times not suffice to guarantee the stability of the whole financial system. Macroprudential policy objectives are the reduction of potentially adverse asset and credit-boom effects, as well as an increase in the scope for banks to continue lending following a period of financial stress. Early contributions constitute e.g. Crockett (2000), Borio (2003) and Knight (2006), yet it is worth noting that in New Zealand, for example, prudential policies have had a strong system-wide focus even before the crisis (see e.g. Dunstan, 2014).

It is contended in the current research that, in the aftermath of the global financial crisis, a shift in the literature addressing the “lean versus clean” debate has been in favour to the LATW view. In particular, one may distinguish that the pre-crisis conventional view has in fact incorporated elements of the opposing view in that it, eventually, addresses several aspects of financial frictions in the models of the economy used for monetary policy. Additionally, the LATW view has also been altered, in that it advocates the merits of further co-operation between monetary and macroprudential policies due to, apparently, the presence of complex interactions between the implementation of each policy and an inherent potential for material spill-over effects between them.

Since monetary policy during the last thirty years is, in essence, interest-rate policy one could distinguish an inherent interdependence between a monetary policymaker’s decision making process and the corresponding financial sector participants’ strategy choices. Therefore, the operational definition of a LATW monetary policy may not suffice only to include financial frictions in the models of the economy (used by the central banks), but by thoroughly and/or thoughtfully ameliorating, in light of the recent developments after the global financial crisis, the models explaining the monetary transmission mechanism and the changes of the later at times of a crisis or during the build-up of a bubble. Yet, the above still remains a challenge for future research.

3.1 Modelling the Monetary Transmission Mechanism

The global financial crisis shed light to the shortcomings of modern macroeconomic analysis with respect to the inability to adequately model the role of financial intermediaries as key factors in the workings of the monetary transmission mechanism. Regarding the *effectiveness* and *efficiency* of monetary policy and, in essence, the ways through which the latter influences the real economy (i.e. what is termed as the monetary transmission mechanism), alternative models of the broad credit channel highlight the role of financial frictions stemming from the behaviour of the borrowers. A variety of surveys and overviews of the credit channel (and the other main channels used in conventional macroeconomic analysis) is available, see eg. Gertler (1988), Bernanke (1993), Ramey (1993), Gertler and Gilchrist (1993), Kashyap and Stein (1994), Bernanke and Gertler (1995), Cecchetti (1995), Hubbard (1995). Similarly e.g. Bernanke, Gertler and Gilchrist (1996) and Kashyap and Stein (1997) give surveys of this channel and provide relevant empirical results for the United States. The pre-crisis consensus was based in the theoretical propositions of models that consider variants of financial frictions only on the borrowers’ side of the credit markets (see eg. Bernanke and Gertler, 2000, 2001; Filardo, 2000; Cecchetti et al., 2000; Batini and Nelson, 2000; Gilchrist and Leahy, 2002; and Iacoviello, 2005).

Credit-supply effects stemming from the incentives facing the intermediaries themselves where in effect ignored.

In the aftermath of the crisis, however, three additional monetary transmission channels (not new in concept, but literally ignored by relevant research) have been identified. These are thought to raise the effectiveness of monetary policy during financial boom periods and, according to e.g. Detken et al. (2010) relate to (a) risk-taking behaviour, which highlights how at times of economic expansion and low interest rates monetary policy can lead to the creation of vulnerabilities via an endogenous increase in risk-taking (for early accounts see e.g. Borio and Zhu, 2008; and Adrian and Shin, 2008), (b) the signalling effects of monetary policy, that as in e.g. Hoerova et al. (2009), potentially small increases in the policy rate (effectively conveying monetary policy information) could have large effects on investment behaviour via efficient investment and better coordination among investors and (c) the breaking of herding behaviour, as in e.g. Loisel et al. (2012) who find (in a model where investors observe decisions of other entrepreneurs) that raising policy rates may be effective in affecting entrepreneurs' cost of resources, thus stopping herding behaviour and persuading investors to base decisions on their own information set.

Empirical evidence that confirms the existence of the risk-taking channel is provided by e.g. Jimenez et al. (2007), which find that riskier loans tend to be issued in a period of low interest rates, while the other two channels remain to be tested empirically by future research (mainly because few central banks have actually implemented policies akin to LATW in the past). Nevertheless, as Adrian and Liang (2014) remark, the growing research advancing a risk-taking channel of monetary policy, in addition to the inherent interdependence of monetary and macroprudential transmission channels, calls for greater central bank consideration of the effects on both financial conditions and financial stability when setting monetary policy, reaffirming, thus, postulates of the LATW view.

A further challenge, as in e.g. Smets (2014), referring both to theoretical and empirical research, stresses the balance-sheet aspect in the monetary transmission mechanism and calls for a combination of the buildup of vulnerabilities on the asset side with those on the liability side. He recognizes that a focus on credit and asset prices by the growing relevant literature ignores the important link with increasing fragility stemming from a shortening and much more complex liability side (Smets, 2014:287). Furthermore, he recognizes that the effectiveness of the standard monetary policy instrument in, first, containing the growth of financial imbalances and, second, affecting the risk-taking capacity of financial intermediaries, will eventually result in whether monetary policy should take an active, preventive role in maintaining financial stability¹³. Adrian and Shin (2008, 2009), for example, address the view that relatively small changes in short-term interest rates may result in a large impact on financial intermediaries' risk-taking, and argue in favor of a key role for the short-term interest rate. Following Rajan (2005) (where an institutional factor driven search-for-yield leads some fund managers to seek higher risk to maintain yields after rates on safer assets decline) and Borio and Zhu (2008) (where riskier

¹³ Similar to the propositions in Assemacher-Weche and Gerlach (2010), also Detken et al. (2010) point out that due to the 'Lucas critique' (see footnote No. 20 for a definition) one cannot defend any empirical evidence seemingly supporting the argument that LATW monetary policy is too blunt an instrument (since the negative effects to the real economy are of a greater magnitude than the effects on asset prices). They thus contend that "only in a policy regime in which the principle of LATW has explicitly been adopted could a test be conducted regarding the effectiveness of the signalling and herd-breaking channels" (Detken et al., 2010:322).

profiles stem from valuation effects, such as collateral which gains value from expansive policy)¹⁴ an increasing number of papers have both theoretically and empirically investigated the link between the monetary policy stance and the risk-taking behavior of banks and other investors¹⁵. Holmström and Tirole (1998) give a seminal account of the impact of liquidity injection and De Nicolò et al. (2010) a survey; see also Smets (2014:282), for an account of some of the evidence for the euro area related to the question of whether monetary policy was too loose in the most recent boom and has, thus, contributed to the building-up of imbalances.

3.2 The Conventional View Revisited

The post-crisis reevaluation of monetary policy frameworks focused primarily on maintaining price stability, since it has been proven that price stability does not suffice to guarantee financial stability and the crisis gave ample evidence that lack of financial stability can also have large negative feedback effects on price stability (see e.g. Smagi, 2009; Blanchard et al., 2010; Mishkin, 2011; Eichengreen et al. 2011; Baldwin and Reichlin, 2013; and Smets, 2014).

As noted above, conventional scepticism about LATW tended to relate to the costs of asset price boom-bust cycles. In theory, the welfare consequences of bubbles tend to be ambiguous (see e.g. Fahri and Tirole, 2012), and, furthermore, theoretical models (as in e.g. Tirole, 1985) propose that certain paths of bubble behaviour can be consistent with individual optimising behaviour in general equilibrium. The counterargument proposed is that (to our knowledge) most theoretical models to date rely on specific restrictive assumptions that can explain the growth of bubbles and allow for the existence of the latter in general equilibrium, and tend not to encompass elements of bubble behaviour that make them costly in the real world (see e.g. Santos and Woodford, 1997). However, the global financial crisis proved that boom-bust cycles with the potential to trigger systemic crises do exist, and, therefore, constitute a significant hazard to global economic growth.

Even though, central banking practitioners realised the damaging effects of financial disruptions to the economy even before the crisis¹⁶, the macroeconomic models used for forecasting and policy analysis, (belonging either to the dynamic stochastic general equilibrium paradigm (DSGE), as e.g. Christiano, Eichenbaum and Evans (2005) and Smets and Wouters (2003), or be it more traditional macroeconometric models such as FRB/US, used at the Federal Reserve) did not allow for the impact of financial frictions and disruptions on economic activity (Mishkin, 2011:75). As Goodhart and Tsomocos (2011) point out, the main limitation of much modern macroeconomic theory (standard Walrasian models, from which the DSGE model is directly descended), is a failure to incorporate the possibility of default, including that

¹⁴ Another main mechanism through which monetary policy may affect financial intermediaries' risk-taking behavior is as in e.g. Agur and Demertzis (2012) and Dell' Ariccia et al. (2010), where cheaper short-term debt raises leveraging incentives, as well as asset risk incentives through interaction with banks' limited liability.

¹⁵ See e.g. Ioannidou, Ongena and Peydro (2009), Altunbas, Gambacorta and Marquez-Ibanez (2010), Buch, Eickmeier and Prieto (2010), Brissimis and Delis (2010), Delis and Kouretas (2011), Maddaloni and Peydro (2011), Delis, Hasan and Mylonidis (2011), Paligorova and Santos (2012) and Dell' Ariccia, Laeven and Suarez (2013).

¹⁶ Evidence to this point is given by the extraordinary unconventional actions that central banks took during the crisis to support the functioning of financial markets (the US Troubled Asset Relief Program - TARP, being a vivid example) (see also Oda and Okina, 2001, for an early account on central bank actions to support the functioning of segmented markets at times of a crisis).

of banks, into the core of the analysis. They remark that if incidents of default are not incorporated in the workings of the model, there remains no role for financial intermediaries, for financial disturbances, or even for money. Nevertheless, to incorporate default makes a model harder to construct, and, in addition, financial crises are hard to predict and to resolve (Goodhart and Tsomocos, 2011:51).

The link between business cycle fluctuations and financial frictions is supported, for example, by theoretical research that stresses the effect of asymmetric information to the obstruction of the efficient functioning of the financial system (as in Akerlof, 1970; Myers and Majluf, 1984; Greenwald, Stiglitz and Weiss, 1984; and the growing literature that followed). The roughly concurrent (with the above-mentioned strand of research) rediscovery of Fisher (1933), as Mishkin (2011) points out, led to the recognition that financial instability played a central role in the collapse of economic activity during that Great Depression years (see Calomiris, 1993, for a survey), and it generated a vast amount of research on the role of financial frictions in business cycle fluctuations (see previous subsection and references therein) (Mishkin, 2011:75).

Some recent theoretical research even suggests that benign economic environments may promote excessive risk-taking and may actually make the financial system more fragile (Gambacorta, 2009). As Mishkin (2011) (member of the U.S. Federal Reserve Board of Governors from September 2006 until August 2008) points out: “although price and output stability are surely beneficial, the recent crisis indicates that a policy focused solely on these objectives may not be enough to produce good economic outcomes” (Mishkin, 2011:90). Additionally, recent empirical research (as in e.g. Gilchrist et al., 2009; Adrian and Shin, 2010; Ciccarelli et al., 2010) highlights the effect of loose credit conditions in several advanced economies to the amplification of the business cycle prior to the global financial crisis, as well as of the tightening of lending standards after the collapse of Lehman Brothers Holdings Inc. investment bank, to the strong decline in U.S. output during the years end of 2008 and 2009. Therefore, theoretical research shifted focus on the implications of the credit-supply channel for the conduct of monetary policy (see e.g. Meh and Moran, 2010; Woodford, 2011; Gertler and Karadi, 2012; Gambacorta and Signoretti, 2014).

Woodford (2011) that considers financial frictions on the side of lenders, points out that “decisions about interest-rate policy should take account of changes in financial conditions” (Woodford, 2011:39)¹⁷. Cúrdia and Woodford (2009, 2010), for example, formally treat this aspect and introduce an ad hoc financial intermediation friction which creates a spread between the loan and the policy rate in a standard New Keynesian model and demonstrate that credit-augmented rules outperform the standard Taylor rule, for a number of different shocks. Woodford (2012) also builds on Cúrdia and Woodford (2011) in order to analyze the implications of financial imbalances for monetary policy, in a model where endogenous state variables (like leverage) affect the probability of a crisis, and considers the effects on optimal monetary stabilization policy. The implication for the latter is that (while price

¹⁷ He introduces banks’ leverage target levels, which give rise to a positively sloped loan-supply curve that shifts procyclically with banks’ profitability and capital, as well as with changes in the policy rate. He contends that such a loan-supply curve may arise due e.g. to intermediaries’ facing costs for originating and servicing loans, with marginal costs increasing with the volume of lending; or to regulatory limits or market-based constraints restraining leverage. Similarly, Woodford (2011a) introduces a risk-taking channel of monetary policy by applying a regime as in Stein (2012), where fire sales during a financial crisis distort the behavior of financial intermediation, into an otherwise traditional New Keynesian model of monetary policy.

stability remains the primary policy objective over the medium term) financial stability concerns should also be taken into account in the adjustment path. According to this model it may be appropriate to use monetary policy to “lean against” a credit boom, even if this requires both inflation and the output gap to be below their medium-run target values for a time.

An agency consideration of the monetary transmission mechanism is introduced in Acharya and Naqvi (2012), who accept bank loan officers to be compensated on the basis of new loans issued. An asset-price bubble is thus generated, which calls for a LATW monetary policy. Angeloni and Faia (2013), Angeloni et al. (2013) and Gertler and Karadi (2011), introduce a risk-taking channel in a DSGE framework, and make quantitative comparisons of welfare under different central bank objectives, testing thus the validity of financial policy objectives. See Gertler and Kyotaki (2010) for a review of a growing literature that uses the framework in Bernanke, Gertler and Gilchrist (1999) to introduce financial frictions in DSGE models. The focus is on the effect monetary policy has on the buildup of financial sector risks, and the presence of a negative relationship between the interest rate and risk taking.

According to Smets (2014) in their effort to LATW “central banks may face additional trade-offs which will require increased credibility of the price stability target. So, monetary policy becomes more complicated, but not different in setup” (Smets, 2014:273). Moreover, it is stressed that since central banks are the first in line to clean up when the bubble bursts, they need the right incentive to lean against the building up of the bubble *ex ante*. However, as Smets (2014) points out, the main counterargument is that the central bank’s involvement in financial stability may undermine the credibility of its pursuit of price stability¹⁸ (Smets, 2014:266). LATW monetary policy may shift the trade-off between price and output-gap stability inward and thus result to an overall improvement of macroeconomic performance, as in Fahr et al. (2013), who include financial frictions in a model of the euro area using macroeconomic simulations.

As Barrett et al. (2011) demonstrate, LATW monetary policy (where financial stability is an explicit policy objective of an inflation-targeting central bank) is not optimal when the financial sector is uncertain as to whether the central bank will conduct such a policy, raising issues of transparency of monetary policy. In their model without a clear commitment to LATW, central banks will be expected to conduct this style of policy only when large inflationary shocks are likely. Yet, for a central bank to consider LATW, inflation forecasts should not signal any threat, and, therefore, this type of policy is sustainable only when the central bank credibly commits to it.

Barrett et al. (2008), Diamond and Rajan (2009), Fahri and Tirole (2009), Ueda and Valencia (2012) and Smets (2014) formally treat certain additional aspects of time-inconsistent monetary policy addressing separate elements of the ‘financial cycle’. Borio (2014) identifies the latter in that “... policies that are too timid in leaning against financial booms but are then too aggressive and persistent in leaning against

¹⁸ Smets (2014) distinguishes two main channels for this effect to hold: (1) a need for a stronger involvement in distributional policies (see e.g. Brunnermeier and Sannikov, 2013) and a resort to quasi-fiscal operations (see e.g. Pill, 2013), which both call for a greater monetary policy accountability, as well as political involvement, that both jeopardize central bank independence and give rise to political pressure; (2) the presence of time-inconsistency problems for monetary policy as the monetary authorities may end up providing more liquidity than needed for long-run price stability, if the fundamental problems of debt overhang following a financial crisis are not addressed (Smets, 2014:277).

financial busts, may end up leaving the authorities with no further ammunition over successive financial and business cycles”¹⁹ (Borio, 2014:16). The end-result of a downward trend in policy rates across cycles and the essential incessant resort to balance-sheet policies (yet with minor gains in terms of financial and macroeconomic stability) is reinforced in a global level as the stance of monetary policy is transmitted from core economies to the rest of the world.

In the presence of credit-supply effects, a response to financial variables allows the central bank to achieve a better trade-off between inflation and output stabilization, as in e.g. Gambacorta and Signoretti (2014) who combine frictions in both borrowers’ and lenders’ side (with loan spreads endogenously depending on banks’ leverage) and show that LATW is indeed desirable when the economy is driven by supply-side shocks and the central bank is concerned with output stabilization. They use a model similar to Gerali et al. (2010) (who estimate a medium-scale model for the euro area) and focus on (current) aggregate supply shocks, which create a trade-off for a central bank that aims at stabilizing output and inflation (since, conditional on the shocks, the two variables tend to move in opposite directions). They thus demonstrate how the presence of financial frictions may amplify financial-cycle fluctuations (thus affecting macroeconomic stability) during a benign economic outlook. In addition, they run simulations that demonstrate a ‘LATW’ rule to outperform a standard rule in terms of macroeconomic stabilization, suggesting, thus, that compared to output fluctuations financial variables are better indicators of the procyclical effects stemming from financial frictions. They argue that these gains from a LATW approach to monetary policy are shown to be amplified under a high degree of private sector indebtedness and tend to be larger if financial stability were also of explicit concern to policymakers.

An account of shocks on expected future economic conditions and their effect on a LATW monetary policy, yet without a credit-supply channel, is also given by Lambertini et al. (2011) and Christiano et al. (2010). In addition, Agur and Demertzis (2013) demonstrate that financial stability objectives render monetary policy more aggressive, since in reaction to negative shocks, policy-rate cuts are deeper but shorter-lived than otherwise in an effort also to achieve standard objectives. Recent research highlights that prolonged accommodative monetary policy increased risk-taking incentives of financial intermediaries that (among other reason) spurred the recent financial crisis (see e.g. Dell’Ariccia et al., 2008, Calomiris, 2009, Brunnermeier, 2009, Brunnermeier et al., 2009, Allen, Babus and Carletti, 2009, Diamond and Rajan, 2009, and Kannan et al., 2009, Adrian and Shin, 2010, and Borio and Zhu, 2008).

Benes and Kumhof (2012) add a calibrated model of the banking system in a DSGE model of the US economy in an effort to reaffirm the so-called ‘Chicago Plan’ proposal for monetary reform passed over during the Great Depression envisaging the separation of the monetary and credit functions of the banking system (through a 100% reserve requirement over deposits). They reiterate the four main advantages of this plan as in Fisher (1936) as follows: (1) Much better control of a major source of business cycle fluctuations, sudden increases and contractions of bank credit and of the supply of bank-created money. (2) Complete elimination of bank runs. (3) Dramatic reduction of the (net) public debt. (4) Dramatic reduction of private debt, as

¹⁹ Borio (2012, 2013) stress that the adverse outcome of that form of inconsistency applies also to prudential, as well as fiscal policies, while Smets (2014) formally addresses the concept with respect to the macroprudential authority’s setting its policy, taking the monetary policy reaction into account in a context similar to Barrett et al. (2008).

money creation no longer requires simultaneous debt creation. They find support for all four of Fisher's claims, while output gains amount a 10 percent, and steady state inflation can drop to zero without posing problems for the conduct of monetary policy.

Bofinger et al. (2013) suggest that a standard Taylor rule is not well-suited to maintain macroeconomic stability in the wake of monetary policy shocks. As persistent boom-bust cycles cannot be explained in a standard DSGE model with rational expectations, they address the question of whether monetary policy can cause pronounced boom-bust cycles in house prices and create persistent business cycles by introducing heuristics into a standard DSGE model. Their model, thus, accounts for cognitive limitations of agents, waves of optimism and pessimism (animal spirits) that drive house prices, which, in turn, have repercussions on the real economy. Their results demonstrate that an augmented rule that incorporates house prices or debt is superior to the standard Taylor rule.

It is worth noting, the shortcomings in the forecasting methods used by most central bank economists and their effect in policy design and conduct that e.g. Goodhart and Tsomocos (2011) point out. Additionally, similar to Mishkin (2011) and Trichet (2011), Smets (2014) (after reviewing an extensive literature, pertaining especially to the euro area), stresses that the existing empirical analysis is mostly performed using linear regression methodologies, while it is deemed necessary to acquire non-linear approaches capturing the possibly time-varying nature of interest rate changes on credit and house prices and their effect on the probability of a crisis as in e.g. Hubrich and Tetlow (2012) and Hartmann et al. (2013).

Smets (2014:269) distinguishes a view termed as the 'Modified Jackson Hole Consensus' (as in e.g. Bean et al., 2010, Gerlach, 2010, and Svensson, 2012, 2013) which postulates that monetary authorities should address financial stability concerns only to the extent that they affect the outlook for price stability and economic activity, while it is a task for macroprudential authorities to pursue financial stability, with each policy having distinct instruments. This view argues that the objectives, the instruments, and the transmission mechanisms of monetary and macroprudential policy can easily be separated, that the interaction between the two policies is limited and that the effectiveness of the short-term interest rate to deal with financial imbalances is limited. This conjecture, however, still remains to be supported by empirical research.

As highlighted in the next subsection, a growing empirical and theoretical research strives to provide evidence on the room for co-operation between monetary and macroprudential policies mainly based on the premise of a complex interaction between the two (in terms of both effectiveness of instruments used and attainment of primary objectives). Antipa and Matheron (2014), nevertheless, provide a counterargument in that "well-targeted macroprudential policies can contain the undesirable effects of monetary policy, thereby reducing policy dilemmas and creating additional room for manoeuvre for monetary policy" (Antipa and Matheron, 2014:227). As examples they provide the following: the limits on debt-to-income ratios attenuating the impact on defaults from a tightening of monetary policy (as in e.g. Igan and Kang, 2011); capital requirements or leverage ratios possibly containing increases in bank leverage in response to low policy rates and eliminating risk-taking incentives (as in e.g. Fahri and Tirole, 2012); limits on loan-to-value ratios reducing asset-price booms, when accommodative monetary policy inflates asset prices (as in e.g. IMF, 2011); and limits on foreign exchange lending reducing the systemic risk associated with capital flows (as in e.g. Hahm et al., 2012).

Gilchrist and Zakrajsek (2015), for example, demonstrate that the interaction of customer markets with financial frictions in their calibrated DSGE model implies a significant attenuation of the response of inflation to demand shocks and a strong negative co-movement between inflation and output in response to financial disruptions. The latter creates a major policy dilemma for monetary authorities that aim to stabilize both inflation and output fluctuations. According to Gilchrist and Zakrajsek (2015) “their results highlight the challenge of applying a specific interest-rate rule in a world where financial market distortions influence firms’ pricing behavior” (Gilchrist and Zakrajsek, 2015:37).

3.3 The Lean-Against-the-Wind View Revisited

In an early account, Trichet (2005) described the LATW principle in the following terms: “... [it] describes a tendency to cautiously raise interest rates even beyond the level necessary to maintain price stability over the short to medium term when a potentially detrimental asset price boom is identified ... It should be mentioned that LATW has the advantage that it can to some degree ameliorate the moral hazard problem of the purely reactive approach to asset price boom-bust cycles. By reacting more symmetrically – i.e. being tighter in booms as well as looser in busts – the central bank would discourage excessive risk-taking and thereby reduce over-investment already during the boom. This in turn would lead to a lower level of indebtedness and less severe consequences of a possible future bust” (Trichet, 2005:7).

In support to the conventional view Assenmacher-Wesche and Gerlach (2010) offer a sceptical view regarding LATW monetary policy. They use quarterly data between years 1986-2008 from 18 countries and argue that deviations of credit and asset prices from trend used to capture financial imbalances contain little information useful for forecasting the future economic conditions, which casts doubts on the LATW view. They also argue that tightening monetary policy in response to such imbalances is likely to depress real growth substantially, accepting, however, that their finding is subject to the Lucas critique²⁰.

It is worth highlighting the remark in Smets (2014) that: “a concern for financial stability may lead to so-called financial dominance. To mitigate these risks, it is important that price stability remains the primary objective of monetary policy and a lexicographic ordering with financial stability is maintained. This will allow the central bank to LATW (if necessary, for example, because macroprudential policies fail), while maintaining its primary focus on price stability in the medium term”²¹ (Smets, 2014:267, 292).

²⁰ It constitutes a criticism of econometric models used for policy evaluation which do not qualify for optimal decision rules of economic agents varying systematically with policy alterations. Specifically, the criticism addresses the use of past data to estimate pertinent statistical relationships so as to forecast the effects of adopting a new policy, since the estimated regression coefficients are not invariant but will change along with agents’ decision rules in response to a new policy (Ljungqvist, 2008).

²¹ It is contended (see e.g. Mishkin, 2011; Smets, 2014) that a lexicographic ordering, namely that the central bank assigns primary focus to the price stability objective than the financial stability one (while ensuring the attainment of financial stability concerns) may protect the central bank from an inflationary bias stemming from its involvement with financial stability. Nevertheless, as Barrett et al. (2008) propose, modeling the trade-off between price and financial stability such an inflation bias may be addressed by rule-based LATW monetary policy. Smets (2014) additionally asserts that “such a credible mandate of the monetary authorities will also give the right incentives for the macroprudential

In view of the recent developments, according to the LATW view, financial stability concerns should be part of the secondary objectives in the monetary policy strategy, which leads to a lengthening of the policy horizon of the monetary authorities, since as in e.g. Borio (2012) the financial cycle is typically longer than the business cycle (Drehmann et al., 2012, give empirical evidence on the latter argument). Apart from the complex interactions in their implementations, according to e.g. Caruana and Cohen (2014), financial stability and monetary policies can coexist, so long as monetary policy maintains a longer-term price-stability perspective avoiding conflict with financial stability objectives and accepting the premise that the financial cycle tends to be longer in duration than the business cycle. They remark that:

“This longer-term perspective, in fact, relieves some of the possible tensions between monetary policy and macroprudential decisions...Since financial crises can generate huge disinflationary pressure, a tightening of monetary policy will promote longer-run price stability. Moreover, if macroprudential considerations do call for a different calibration of a policy instrument (such as the policy rate) than would be derived solely from monetary policy considerations, the size of this deviation need not be large...if a build-up of credit pressures calls for macroprudential policy measures, the appropriate response could be to LATW through a small but persistent increase in the policy rate as long as these pressures continue. This is unlikely to impose much of a burden on price stability which would continue to be the main driver of movements in the policy rate”
Caruana and Cohen (2014:20).

Furthermore, as in International Monetary Fund (IMF) (2013), in the emerging macroeconomic framework both monetary policy and macroprudential policies are used for countercyclical management, with monetary policy focused *primarily* at price stability and macroprudential policies *primarily* at financial stability²², aiming to prevent, or at least to contain, the buildup of financial imbalances and to ensure that the financial system is able to withstand their unwinding and be resilient to shocks. An answer pertaining to the relative importance of the twin objectives of smoothing the financial cycle and improving the resilience of the financial system in response to shocks depends in part on how effective macroprudential policies are expected to be in LATW.

In general, according to Smets (2014) the introduction of macroprudential policies can improve the trade-offs for monetary policy and increase its room for maneuver. Maintaining financial stability can help ensure a well-working financial system and an effective transmission process which makes the effort to achieve price stability more efficient. Moreover, macroprudential policies can, by managing the financial cycle and increasing the resilience of the financial sector, reduce the probability of systemic stress and therefore the probability that monetary policy becomes constrained by the zero lower bound and needs to resort to non-standard policies to address malfunctioning financial markets. It can also reduce trade-offs that may arise when exiting accommodative monetary policies (as e.g. Bernanke, 2013, that discusses an exit from expansionary Federal Reserve policies in the current context) (Smets, 2014:265).

policymakers to lean against the buildup of leverage and growing imbalances and not rely on inflation to solve their problems” (Smets, 2014:291).

²² See e.g. Brunnermeier et al. (2009), DeBandt, Hartmann, and Peydró (2009), European Systemic Risk Board (2011) for accounts on the objectives of macroprudential policy and the concept of systemic risk.

As noted in the previous subsection and, for example, stated by Smaghi (2009) “financial stability is best ensured through instruments other than the policy interest rate and in the context of a broader framework of macro-prudential supervision, yet, nevertheless, a central bank should actively monitor asset prices and credit flows” (Smaghi, 2009:1). He reports that in this way timely and useful information can be extracted, which helps to “better calibrate the course of monetary policy and to avoid the risk of being ‘behind the curve’ ” (Smaghi, 2009:1).

Nevertheless, as distinguished by Smets (2014), a certain strand in the post-crisis literature (which he terms as ‘*financial stability is price stability*’, as in e.g. Brunnermeier and Sannikov, 2012; and Whelan, 2013) “is based in the premise that price and financial stability are so intimately intertwined due to financial frictions that it is impossible to make a distinction, and therefore, both standard and non-standard monetary policies are in the first place attempts at stabilizing the financial system, as well as addressing segmented financial markets, and unclogging the monetary transmission process” (Smets, 2014:274) and thus calls for a more radical change in the monetary policy objectives. It is argued, as e.g. in Blinder (2010) and Duff (2014), that since the objectives of financial and price stability seem to be closely interlinked, a central bank is legitimately motivated to ensure financial stability.

On the other hand, a certain strand of literature contends that since monetary and macroprudential objectives may, at times, diverge, therefore concerns about price stability may undermine the attainment of macroprudential policy objectives, and vice-versa (see e.g. Buiters, 2009; and Svensson (2015) who argues that the Swedish experience of macroprudential concerns adversely affecting the conduct of monetary policy, is an example of this problem). Similarly, as remarked in Cihák (2010), poor macroprudential policy performance may possibly damage central bank reputation, thus raising concerns about monetary policy independence. Nevertheless, Blinder (2010) argues on the opposite direction, that central bank reputation may actually be enhanced by an effective handling of a financial crisis.

Time-inconsistency issues are also highlighted as a co-ordination of monetary and financial stability is deemed appropriate due to threats of financial dominance. Or, equivalently, because, as argued in Whelan (2013), most efficient monetary policy trade-offs take place in central banks with mandates encompassing financial stability objectives in addition to the traditional price and output-gap stability ones.

It has, thus, been proposed in recent literature to embed macroprudential policymaking in central banks. Nier et al. (2011) stress that central bank practitioners’ expertise may enhance the efficiency of the conduct of macroprudential policies, while, also, Lim et al. (2013) propose that central bank involvement may improve the timeliness of macroprudential policy responses. Also, Berger and Kießmer (2013) build a model where the degree of central bank independence influences the optimal choice of monetary policy strategy during potentially unsustainable asset price booms, and demonstrate that the more independent central bankers are, the more likely it is that they refrain from implementing preemptive monetary tightening to maintain financial stability. Therefore, one may contend that extra co-operation between the two policy authorities is necessary.

Nevertheless, Kamper et al. (2015) point out a tension associated with the consolidation of power in a single institution in that it increases the possibility of groupthink, while conversely they admit that spreading policymaking power across institutions may complicate coordination and communication, but may also foster greater diversity in views, providing healthy checks and balances on the

implementation of policy. They, also, distinguish another problem arising if macroprudential policies were to reside in central banks, in that it increases the influence and power of central bank officials in determining macroeconomic outcomes also giving rise to agency relationships.

De Paoli and Paustian (2013), however, show in a dynamic context using a welfare-based criterion that, if faced with cost-push shocks (as for example an increase in VAT), policy authorities should cooperate and commit to a given course of action, while in a regime where monetary and macroprudential tools are set independently and under discretion, their findings suggest that coordination problems can be mitigated by assigning conservative mandates (as in Rogoff, 1985) and one of the authorities acting as a leader.

A growing literature addresses the issue of co-operation between macroprudential and monetary policy by incorporating the former in monetary models (see e.g. Angeloni and Faia, 2009; Angelini et al., 2011; Darracq-Pariès et al., 2010; Lambertini et al., 2011; Baillu et al., 2012; Cecchetti and Kohler, 2012; Collard et al. 2012; Gelain et al., 2012; Kannan et al., 2012; Brzoza-Brzezina et al., 2013, and Quint and Rabanal, 2014; and references in Beau, Clerc, and Mojon, 2012, Smets, 2014 and Galati and Moessner, 2011). As highlighted in Smets (2014), the conclusions of this strand of research can be classified in the following: (i) introducing macroprudential policies is useful in leaning against the financial cycle driven by overoptimistic expectations or expectations of reduced volatility and risk premia and increase welfare; (ii) there are potential coordination problems due to the “push-me, pull-you” nature of both policy instruments; and (iii) the introduction of macroprudential policies does not change the optimal reaction function of the monetary authorities very much (Smets, 2014:271).

4. Conclusions

As Hetzel (2007) eloquently remarks, “consensus in macroeconomics coalesces around common interpretations of major historical events” (Hetzel, 2007:1). The costs associated with financial instability and systemic financial crises, have proven during the post-crisis era to be of such great extent that have rendered the option of ‘cleaning up’ obsolete. Remarkably, Bernanke (2009) asserts (during the economic turmoil) that “due to the problems credit markets in most economies experience, conventional monetary policy alone seems inadequate to bolster the economy now that is most necessary” (Bernanke, 2009:2).

The global financial crisis has demonstrated how shifts in credit supply may crucially affect macroeconomic fluctuations, reaffirming, thus, the importance of financial factors in the conduct of monetary policy. Cecchetti et al. (2006) and Dynan et al. (2006) have suggested that changes in the financial system have been an important source of stabilization over the past several decades. In particular, e.g. Cecchetti (2008) points towards the argument of, not only whether there is a linkage between financial system development and the level of real growth (for a survey see Levine, 1997), but also between financial development and the stability of real growth. He further contends that this argument is followed by the natural question of whether the impact of bubbles on GDP at risk or price level at risk depends on financial structure (Cecchetti, 2008:28).

Nevertheless, credit-supply effects stemming from financial intermediaries’ behavior were completely neglected from pre-crisis models assessing aspects of the conventional view of the ‘lean versus clean’ debate. In fact, most models of the New

Keynesian Dynamic Stochastic General Equilibrium (DSGE) paradigm, that had been widely used by central banks in most developed economies, did not incorporate elements pertaining to frictions in the operation of the financial sector and its interaction with the real sector.

The current research reviews the shift in the monetary policy literature in the aftermath of the global financial crisis, and demonstrates that this shift in the literature addressing the “lean versus clean” debate has been in favour of the LATW view. In particular, we contend that the pre-crisis conventional view has in fact incorporated elements of the LATW view in that it, eventually, addresses financial frictions in the models of the economy used for monetary policy. The LATW view has also been altered in the aftermath of the crisis. By accepting the presence of complex interactions between monetary and macroprudential policies and the potential for material spill-over effects between them, it tends to advocate the merits of further co-operation between monetary and macroprudential policies.

The latter co-operation is also reinforced by a further important lesson gained by the recent experience, namely the inability of financial regulators to fully or accurately forecast the depth and extent of financial fragility or even the advent of a financial crisis. Notably, Mishkin (2009) points out that “the focus on individual institutions can also cause regulators to overlook important changes in the overall financial system” and as an example he states that “although the markets for securitised assets and the shadow banking system of lightly regulated financial institutions grew dramatically in the years before the current crisis, the existing regulatory structures did not evolve with them” (Mishkin, 2009:1)²³. Even though, academic economists and central banking practitioners address macroprudential policy as the primary tool for maintaining financial stability, they also accept that its effectiveness and design are both under an evolving process, as well as largely yet unproven in terms of avoiding systemic crises. It is also contended that certain non-standard instruments used for monetary policy conduct during the recent crisis (e.g. collateral rules, reserve requirements and asset purchases) are difficult to distinguish from relevant macroprudential policy tools. This holds both with respect to their intermediate objectives (addressing financial market malfunctioning), as well as their transmission channels.

Therefore, standard conduct of monetary policy (as recent evidence supports) intimately interacts with important drivers of financial imbalances such as liquidity, credit and risk taking. In essence, the global financial crisis shed light to the shortcomings of modern macroeconomic analysis with respect to the inability to adequately or appropriately model the role of financial intermediaries as key factors in the workings of the monetary transmission mechanism. Regarding the *effectiveness* and *efficiency* of monetary policy and the ways through which the latter influences the real economy, a growing literature of alternative models highlights the role of financial frictions stemming from several aspects of the behaviour of the *participants* in the financial system (e.g. borrowers, lenders, regulators, lender-of-last resort policymakers). Yet, for a consensus model to emerge, it remains a challenge of future research.

²³ Greenspan (2009) remarks though that typically regulation, apart from often being costly and counterproductive, tends to fail the test of improving the ability of financial institutions to direct a nation’s savings into the most productive (welfare improving) capital investments (Greenspan, 2009, p.2).

Acknowledgements

The author has benefited greatly from constructive comments by John H. Wood, Taxiarchis Kokores, Somnath Sen, Richard Barrett and Sophocles Brissimis. All remaining errors are mine.

References

- Acharya, V.V. and Naqvi, H., 2012. The Seeds of a Crisis: a theory of bank liquidity and risk-taking over the business cycle. *Journal of Financial Economics* 106 (2), 349-366.
- Adrian, T. and H.S. Shin, 2010. Financial Intermediaries and Monetary Economics. In B.M. Friedman and M. Woodford (eds.) *Handbook of Monetary Economics* 3.Elsevier, Amsterdam
- Adrian, T. and Liang, N., 2014. Monetary Policy, Financial Conditions, and Financial Stability. *Federal Reserve Bank of New York Staff Reports* 690.
- Adrian, T. and Shin, H. S., 2008. Liquidity and Leverage. *Federal Reserve Bank of New York Staff Report* 328.
- Adrian, T. and Shin, H. S., 2009. Money, Liquidity and Monetary Policy. *American Economic Review: Papers and Proceedings* 99 (2), 600-605.
- Agur, I. and Demertzis, M., 2012. Excessive Bank Risk-taking and Monetary Policy. *ECB Working Paper* 1457.
- Agur, I. and Demertzis, M., 2013. Lean-Against-the-Wind and the Timing of Monetary Policy. *Journal of International Money and Finance* 35, 179-194.
- Akerlof, G.A., 1970. The Market for 'Lemons': Quality, Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 84, 488-500.
- Allen, F. and Gale, D., 2003. Asset Price Bubbles and Stock Market Interlinkages. In C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Mass., pp. 323-336.
- Allen, F., Babus, A. and Carletti, E., 2009. Financial Crises: theory and evidence. *Annual Review of Financial Economics* 1, 97-116.
- Altunbas, Y., Gambacorta, L. and Marquez-Ibanez, D., 2010. Bank Risk and Monetary Policy. *Journal of Financial Stability* 6, 121-129.
- Angelini, P., Neri, S. and Panetta, F., 2011. Monetary and Macroprudential Policies. *Banca d' Italia Working Paper* 801.
- Angeloni, I., and Faia, E., 2009. A Tale of Two Policies: Prudential Regulation and Monetary Policy with Fragile Banks. *Kiel Institute for the World Economy Working Paper* 1569.
- Angeloni, I., and Faia, E., 2013. Capital Regulation and Monetary Policy with Fragile Banks. *Journal of Monetary Economics* 60 (3), 311-324.
- Angeloni, I., Faia, E. and Lo Duca, M., 2013. Monetary Policy and Risk Taking. *Mimeo*, SAFE.
- Antipa, P. and Matheron, J., 2014. Macroprudential Policies: Implementation and interactions. *Banque de France Financial Stability Review* 18, 225-239.
- Assenmacher-Wesche, K. and Gerlach, S., 2010. Monetary Policy and Financial Imbalances: facts and fiction. *Economic Policy* 25(63), 437-482.
- Baillu, J., Meh, C. and Zhang, Y., 2012. Macroprudential Rules and Monetary Policy When Financial Frictions Matter. *Bank of Canada Working Paper* 2012-06.
- Baldwin, R., and Reichlin, L. (eds.), 2013. *Is Inflation Targeting Dead?* VoxEU e-book.
- Ball, L., 1997. Round-up Discussion. In Reserve Bank of Australia (ed.) *Monetary Policy and Inflation Targeting*. Proceedings Reserve Bank of Australia Conference, Kiribilli, 21-22 July, 320-324.
- Ball, L. and Mankiw, N.G., 2002. The NAIRU in Theory and Practice. *Journal of Economic Perspectives* 16(4), 115-136.

- Barrett, C.R, Kokores, I. and Sen, S., 2008. Bubbles, Instability and Monetary Policy Games. *Proceedings of the Public Choice Society Annual Meeting 2008*, San Antonio, Texas, USA.
- Barrett, C.R, Kokores, I. and Sen, S., 2011. Monetary Policy Games, Instability and Incomplete Information. *University of Birmingham Discussion Paper 11-10*.
- Batini, N., and Nelson, E., 2000. When the Bubble Bursts: Monetary Policy Rules and Foreign Exchange Market Behaviour. *Mimeo*.
- Bean, C., 2004. Asset Prices, Financial Instability, and Monetary Policy. *American Economic Review (Papers and Proceedings)* 94 (2), 14-18.
- Bean, C., Paustian, M., Penalver, A. and Taylor, T., 2010. Monetary Policy after the Fall. In FRB of Kansas City (ed.) *Macroeconomic Challenges: The Decade Ahead. Proceedings of the Federal Reserve Bank of Kansas City Economic Policy Symposium*, Jackson Hole, Wyoming, August 26-28.
- Beau, D., Clerc, L. and Mojon, B., 2012. Macro-Prudential Policy and the Conduct of Monetary Policy. *Banque de France Working Paper 390*.
- Benes, J. and Kumhof, M., 2012. The Chicago Plan Revisited. *IMF Working Paper 202*.
- Berger, W. and Kießmer, F., 2013. Central Bank Independence and Financial Stability: A tale of perfect harmony? *European Journal of Political Economy* 31(0), 109-118.
- Bernanke, B. S., 1993. Credit in the Macroeconomy. *Federal Reserve Bank of New York, Quarterly Review* 18 (1), 50-70.
- Bernanke, B. S. and Gertler, M., 1999. Monetary Policy and Asset Price Volatility. In FRB of Kansas City (ed.) *New Challenges for Monetary Policy: A Symposium Sponsored by the Federal Reserve Bank of Kansas City*. Federal Reserve Bank of Kansas City, pp. 77-128.
- Bernanke, B. S. and Gertler, M., 2000. Monetary Policy and Asset Price Volatility *NBER Working Papers* 7559.
- Bernanke, B. S. and Gertler, M., 2001. Should Central Banks Respond to Movements in Asset Prices? *American Economic Review (Papers and Proceedings)* 91 (2), 253-257.
- Bernanke, B. S., and Gertler, M., 1995. Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives* 9, 27-48.
- Bernanke, B. S., Gertler, M. and Gilchrist, S., 1996. The Financial Accelerator and the Flight to Quality. *Review of Economics and Statistics* 78, 1-15.
- Bernanke, B. S., Gertler, M. and Gilchrist, S., 1999. The Financial Accelerator in a Quantitative Business Cycle Framework. In J. B. Taylor and M. Woodford (eds.) *Handbook of Macroeconomics*, vol. 1C. Elsevier Science, North Holland, New York, pp. 1341-1393.
- Bernanke, B.S., 2004. The Great Moderation. *Speech* at the Eastern Economic Association, Washington DC, February 20.
- Bernanke, B.S., 2009. Four Questions about the Financial Crisis. *Speech* at the Morehouse College, Atlanta, Georgia, April 14.
- Bernanke, B.S., 2013. Long-Term Interest Rates. *Speech* at the Annual Monetary/Macroeconomics Conference: The Past and Future of Monetary Policy, Federal Reserve Bank of San Francisco, San Francisco, California, March 1.
- Blanchard, O., Dell'Ariccia, G. and Mauro, P., 2010. Rethinking Macroeconomic Policy *IMF Staff Position Note* 10/03.
- Blinder, A. S., 2010. How Central Should the Central Bank Be? *Journal of Economic Literature* 48(1), 123-133.
- Bofinger, P., Debes, S., Gareis, J. and Mayer, E., 2013. Monetary Policy Transmission in a Model with Animal Spirits and House Price Booms and Busts. *Journal of Economic Dynamics and Control* 37, 2862-2881.
- Bordo, M. and Jeanne, O., 2002a. Boom-Busts in Asset Prices, Economic Stability, and Monetary Policy. *NBER Working Paper* 8966.
- Bordo, M. and Jeanne, O., 2002b. Monetary Policy and Asset Prices: Does Benign Neglect Make Sense? *International Finance* 5 (2), 139-164.
- Bordo, M. and Wheelock, D.C., 2004. Monetary Policy and Asset Prices: A Look Back at Past U.S. Stock-Market Booms. *Fed. Reserve Bank of St. Louis Review* 86 (6), 19-44.

- Bordo, M., Dueker, M.J. and Wheelock, D.C., 2002. Aggregate Price Shocks and Financial Stability: A Historical Analysis. *Economic Inquiry* 40(4), 521-538.
- Borio, C., 2003. Towards a Macroprudential Framework for Financial Supervision and Regulation. *CESifo Economic Studies* 49 (2), 181-216.
- Borio, C., 2005. The Search for the Elusive Twin Goals of Monetary and Financial Stability. Presented at "Financial Stability - Central Banking and Supervisory Challenges", Washington, 6-7 Sept., a conference organised by the IMF Institute and the Monetary and Financial System Department.
- Borio, C., 2012. The Financial Cycle and Macroeconomics: What have we learnt? *BIS Working Paper* 395.
- Borio, C., 2013. On Time, Stocks and Flows: Understanding the Global Macroeconomic Challenges. *National Institute Economic Review* August.
- Borio, C., 2014. Monetary Policy and Financial Stability: What Role in Prevention and Recovery? *BIS Working Paper* 440.
- Borio, C. and Lowe, P., 2002. Asset Prices, Financial and Monetary Stability: Exploring the Nexus. *BIS Working Papers* 114.
- Borio, C. and Lowe, P., 2003. Imbalances or 'Bubbles?' Implications for Monetary and Financial Stability. In Hunter, W.C., G. Kaufman and Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Massachusetts, pp. 247-270.
- Borio, C. and Zhu, H., 2008. Capital Regulation, Risk-taking and Monetary Policy: a missing link in the transmission mechanism? *BIS Working Paper* 268.
- Borio, C., English, B. and Filardo, A., 2003. A Tale of two Perspectives: Old and New Challenges for Monetary Policy? *BIS Working Paper* 127.
- Brunnermeier, M. K., 2009. Deciphering the Liquidity and Credit Crunch 2007–2008. *Journal of Economic Perspectives* 23, 77-100.
- Brunnermeier, M. K., Crockett, A., Goodhart, C., Persaud, A.D., Shin, H.S., 2009. The Fundamental Principles of Financial Regulation. *Geneva Reports on the World Economy* 11.
- Brunnermeier, M., and Sannikov, Y., 2012. A Macroeconomic Model with a Financial Sector. *Mimeo*, Princeton University.
- Brunnermeier, M., and Sannikov, Y., 2013. Reviving Money and Banking. In R. Baldwin and L. Reichlin (ed.) *Is Inflation Targeting Dead?* VoxEU e-book.
- Brzoza-Brzezina, M., Kolasa, M. and Makarski, M., 2013. Macroprudential Policy Instruments and Economic Imbalances in the Euro Area. *Mimeo*, National Bank of Poland.
- Buch, C.M., Eickmeier, S. and Prieto, E., 2010. Macroeconomic Factors and Micro-level Bank Risk. *CESifo Working Paper* 3194.
- Buiter, W., 2009. The Proposed European Systemic Risk Board is Overweight Central Bankers. *FT.com-Comment-Blogs*, Oct. 28. Available online: <http://blogs.ft.com/maverecon/2009/10/the-proposed-european-systemic-risk-board-is-overweight-central-bankers/#axzz3qRh4bzMM>
- Bullard, J. B. and Schaling, E., 2002. Why the Fed Should Ignore the Stock Market. *Federal Reserve Bank of St. Louis Review* 84 (2), 35-42.
- Calomiris, C.W., 2009. The Subprime Crisis: what's old, what's new, and what's next? *mimeo*.
- Caruana, J., and Cohen, B.H., 2014. Five Questions and Six Answers about Macro-prudential Policy. *Banque de France Financial Stability Review* 18(April), 15-23.
- Cecchetti, S. G., 1995. Distinguishing Theories of the Monetary Transmission Mechanism. *Federal Reserve Bank of St. Louis Economic Review* 77, 83-97.
- Cecchetti, S. G., 2003. What the FOMC Says and Does When the Stock Market Booms. In A., Richards and T. Robinson (eds.) *Asset Prices and Monetary Policy: Proceedings of the Research Conference of the Reserve Bank of Australia*. Reserve Bank of Australia, Sydney, pp. 77-96.
- Cecchetti, S. G., Genberg, H. and Wadhvani, S., 2003. Asset Prices in a Flexible Inflation Targeting Framework. In W.C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset*

- Price Bubbles: Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Mass., (pp. 427-444).
- Cecchetti, S. G., Genberg, H., Lipsky, J. and Wadhvani, S., 2000. *Asset Prices and Central Bank Policy*. Geneva Reports on the World Economy, No. 2, International Centre for Monetary and Banking Studies and Centre for Economic Policy Research prepared for the conference "Central Banks and Asset Prices" in Geneva on May 5.
- Cecchetti, S., and M. Kohler, 2012. When Capital Adequacy and Interest Rate Policy Are Substitutes (And When They Are Not). *BIS Working Paper* 379.
- Cecchetti, S.G., 2008. Measuring the Macroeconomic Risks Posed by Asset Price Booms. In J.Y. Campbell (ed.) *Asset Prices and Monetary Policy*, NBER Conference Report. University of Chicago Press, Chicago, pp. 9-43.
- Cecchetti, S.G., Flores-Lagunes, A. and Krause, S., 2006. Assessing the Sources of Changes in the Volatility of Real Growth. In C. Kent and D. Norman (eds.) *The Changing Nature of the Business Cycle*, Proceedings of the Research Conference of the Reserve Bank of Australia, Nov. 2005. Reserve Bank of Australia, Sydney, pp.115-138.
- Christiano, L., Ilut, C., Motto, R. and Rostagno, M., 2010. Monetary Policy and Stock Market Booms. *NBER Working Paper* 16402.
- Christiano, L.J., Eichenbaum, M. and Evans, C., 2005. Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy. *Journal of Political Economy* 113, 1-45.
- Cihák, M., 2010. Price Stability, Financial Stability, and Central Bank Independence. In Oesterreichische National-Bank (ed.) *Central Banking after the Crisis*. Oesterreichische National-Bank, Vienna.
- Collard, F., Dellas, H. Diba, B. and Loisel, O., 2012. Optimal Monetary and Prudential Policies. *Banque de France Working Paper* 413.
- Crockett, A., 2000. Marrying the Micro- and Macro-Prudential Dimensions of Financial Stability. *Remarks before the Eleventh International Conference of Banking Supervisors*, Basel, Switzerland, September 20-21.
- Cúrdia, V. and Woodford, M., 2009. Credit Frictions and Optimal Monetary Policy. *BIS Working Paper* 278.
- Cúrdia, V. and Woodford, M., 2010. Credit Spreads and Monetary Policy. *Journal of Money, Credit and Banking* 42(s1), 3-35.
- Cúrdia, V., and Woodford, M., 2011. The Central-Bank Balance Sheet as an Instrument of Monetary Policy. *Journal of Monetary Economics* 58 (1), 54-79.
- Darracq-Paris, M., Soerensen, C.K. and Palenzuela, D.R., 2010. Macroeconomic Propagation under Different Regulatory Regimes: Evidence from an Estimated DSGE Model for the Euro Area. *ECB Working Paper* 1251.
- De Bandt, O., Hartmann, P. and Peydró, J-L., 2009. Systemic Risk in Banking: An Update. In A. N. Berger, P. Molyneux, and J.O.S. Wilson (eds.) *The Oxford Handbook of Banking*. Oxford University Press, Oxford, pp. 633-672.
- De Nicolò, G., Dell'Ariccia, G., Laeven, L. and Valencia, F., 2010. Monetary Policy and Bank Risk Taking. *IMF Staff Position Note* 10/09.
- De Paoli, B. and Paustian, M., 2013. Coordinating Monetary and Macroprudential Policies. *Federal Reserve Bank of New York Staff Reports* 653.
- Delis, M.D. and Brissimis, S.N., 2010. Bank Heterogeneity and Monetary Policy Transmission. *ECB Working Paper* 1233.
- Delis, M.D. and Kouretas, G.P., 2011. Interest Rates and Bank Risk Taking. *Journal of Banking and Finance* 35 (4), 840-855.
- Delis, M.D., Hasan, I. and Mylonidis, N., 2011. The Risk-taking Channel of Monetary Policy in the USA: evidence from micro-level data. *MPRA Paper* 34084.
- Dell'Ariccia, G., Igan, D. and Laeven, L., 2008. Credit Booms and Lending Standards: evidence from the subprime mortgage market. *IMF Working Paper* 08/106.
- Dell'Ariccia, G., Laeven, L. and Marquez, R., 2010. Monetary Policy, Leverage, and Bank Risk-Taking. *IMF Working Paper* 10/276.
- Dell'Ariccia, G., Laeven, L. and Suarez, G., 2013. Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States. *IMF Working Paper* 13/143.

- Detken, C. and Smets, F., 2004. Asset Price Booms and Monetary Policy. *ECB Working Paper* 364.
- Detken, C., Gerdesmeier, D. and Roffia, B., 2010. Interlinkages between Money, Credit and Asset Prices and their Implications for Consumer Price Inflation: Recent Empirical Work. In L. Papademos and J. Stark (eds.) *Enhancing Monetary Analysis*. ECB, Frankfurt Am Main, pp. 307-327.
- Diamond, D.W. and Rajan, R.G., 2012. Illiquid Banks, Financial Stability, and Interest Rate Policy. *Journal of Political Economy* 120 (3), 552-591.
- Diamond, D.W. and Rajan, R.G., 2009. The Credit Crisis: conjectures about causes and remedies. *American Economic Review, Papers and Proceedings* 99 (2), 606-610.
- Drehmann, M., Borio, C. and Tsatsaronis, K., 2012. Characterising the Financial Cycle: Don't lose sight of the medium term!. *BIS Working Papers* 380.
- Duff, A. W., 2014. Central Bank Independence and Macroprudential Policy: A critical look at the U.S. financial stability framework. *Berkeley Business Law Journal* 11(4), 182-220.
- Dunstan, A., 2014. The Interaction between Monetary and Macro-prudential Policy. *Reserve Bank of New Zealand Bulletin* 77 (2).
- Dupor, B., 2005. Stabilizing Non-fundamental Asset Price Movements under Discretion and Limited Information. *Journal of Monetary Economics* 52, 727-747.
- Dynan, K.E, Elmendorf, D.W. and Sichel, D.E., 2006. Can Financial Innovation Explain the Reduced Volatility of Economic Activity? *Journal of Monetary Economics* 53(1), 123-150.
- ECB, 2005. Asset Price Bubbles and Monetary Policy. In ECB (ed.) *ECB Monthly Bulletin* 04. ECB Frankfurt Am Main, pp. 47-60.
- Eichengreen, B. and Mitchener, K., 2004. The Great Depression as a Credit Boom Gone Wrong. In *Research in Economic History (Research in Economic History, Volume 22)*. Emerald Group Publishing Limited, Bingley, pp.183-237.
- Eichengreen, B., Prasad, E. and Rajan, R., 2011. Central Banks Need a Bigger and Bolder Mandate. *Financial Times* Oct. 24.
- Ekholm, K., 2014. Role Model or Warning Example? Swedish experiences of taking indebtedness into account in monetary policy decisions. Speech delivered to the Confederation of Swedish Enterprise, March 14.
- European Systemic Risk Board, 2011. Recommendation of the ESRB of 22 December 2011 on the Macro-Prudential Mandate of National Authorities. *ESRB* 2011/2.
- Fahri, E. and Tirole, J., 2009. Leverage and the Central Banker's Put. *American Economic Review* 99 (2): 589-93.
- Fahri, E. and Tirole, J., 2012. Collective Moral Hazard, Maturity Mismatch and Systemic Bailouts. *American Economic Review* 102(1), 60-93.
- Farooq-Akram, Q., Bårdsen, G. and Lindquist, K-G., 2007. Pursuing Financial Stability under an Inflation-Targeting Regime. *Annals of Finance* 3 (special issue), 131-153.
- Filardo, A., 2003. Comments on Empirical Dimensions of Asset Price Bubbles. In W.C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Mass., pp. 291-297.
- Filardo, A. J., 2000. Monetary Policy and Asset Prices. *Federal Reserve Bank of Kansas City Economic Review* 85 (3), 11-37.
- Fisher, I., 1933. The Debt-Deflation Theory of Great Depressions. *Econometrica* 1 (Oct.), 337-357.
- Fisher, I., 1936. 100% Money and the Public Debt. *Economic Forum*, Spring Number, April-June, 406-420.
- Friedman, B., 2003. Comments on Implications of Bubbles for Monetary Policy. In W. C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Mass., pp. 459-463.
- Galati, G., and Moessner, R., 2011. Macroprudential Policy: A Literature Review. *BIS Working Paper* 337.

- Gambacorta, L., 2009. Monetary Policy and the Risk-Taking Channel. *BIS Quarterly Review* (Dec.), 43-53.
- Gambacorta, L. and Signoretti, F.M., 2014. Should Monetary Policy Lean Against the Wind? An Analysis Based on a DSGE Model with Banking. *Journal of Economic Dynamics & Control* 43, 146-174.
- Gelain, P., Lansing, K. and Mendicino, C., 2012. House Prices, Credit Growth, and Excess Volatility: Implications for Monetary and Macroprudential Policy. *Norges Bank Working Paper* 2012/08.
- Gerali, A., Neri, S., Sessa, L. and Signoretti, F.M., 2010. Credit and Banking in a DSGE model of the Euro Area. *Journal of Money, Credit and Banking* 42 (6), 44-70.
- Gerlach, S., 2010. Asset Prices and Monetary Policy: Some Sceptical Observations. In M. Balling, J. M. Berk, and M. O. Strauss-Kahn (eds.) *The Quest for Stability: The Macro View*. SUERF, Vienna, pp. 45-60.
- Gertler, M., 1988. Financial Structure and Aggregate Activity: An Overview. *Journal of Money, Credit and Banking* 20 (3), Part 2, 559-588.
- Gertler, M. and Gilchrist, S., 1993. The Role of the Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence. *Scandinavian Journal of Economics* 95 (1), 43-64.
- Gertler, M. and Karadi, P., 2011. A Model of Unconventional Monetary Policy. *Journal of Monetary Economics* 58, 17-34.
- Gertler, M. and Kiyotaki, N., 2010. Financial Intermediation and Credit Policy in Business Cycle Dynamics. In B. Friedman and M. Woodford (eds.) *The Handbook of Monetary Economics*, vol. 3. Elsevier, Amsterdam.
- Giavazzi, F. and Mishkin, F.S., 2006. An Evaluation of Swedish Monetary Policy between 1995 and 2005. *Report* published by the Riksdag (Swedish parliament) Committee on Finance; ref. Sveriges Riskbank (2006), "Assessment of Monetary Policy", press release, Nov. 28. Available online: www.riksbank.com/templates/Page.aspx?id=23320.
- Gilchrist, S. and Zakrajsek, 2015. Customer Markets and Financial Frictions: Implications for Inflation Dynamics. *Proceedings of the Federal Reserve Bank of Kansas City Jackson Hole Economic Policy Symposium*, August 27-29.
- Gilchrist, S., and Leahy, J.V., 2002. Monetary Policy and Asset Prices. *Journal of Monetary Economics* 49(1), 75-97.
- Goodfriend, M., 2003. Interest Rate Policy Should not React Directly to Asset Prices. In C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge, Mass., pp. 445-457.
- Goodhart, C., 1995. Price Stability and Financial Fragility. In: K. Sawamoto, Z. Nakajima, and H. Taguchi (eds.) *Financial Stability in a Changing Environment*. Bank of Japan, St. Martin's Press., London, pp. 439-497.
- Goodhart, C. and Tsomocos, D., 2011. The Mayekawa Lecture: The Role of Default in Macroeconomics. *Bank of Japan IMES Monetary and Economic Studies* 29, 49-71.
- Greenspan, A., 1996. Federal Open Market Committee Transcript, September 24th, 1996.
- Greenspan, A., 1999. Untitled Remarks. In *New Challenges to Monetary Policy*. Kansas City, MO: Federal Reserve Bank of Kansas City.
- Greenspan, A., 2002. Opening Remarks. In Federal Reserve Bank of Kansas City (ed.) *Rethinking Stabilization Policy*. Kansas City, MO: Kansas City Fed., pp. 1-10.
- Greenspan, A., 2009. We Need a Better Cushion against Risk. *The Financial Times*, March 26.
- Greenwald, B., Stiglitz, J.E. and Weiss, A., 1984. Informational Imperfections in the Capital Market and Macroeconomic Fluctuations. *American Economic Review (Papers and Proceedings)* 74, 194-199.
- Gruen, D., Plumb, M. and Stone, A., 2005. How Should Monetary Policy Respond to Asset Price Bubbles? *International Journal of Central Banking* 1, 1-31.
- Hahm, J.H., Mishkin, F.S., Shin, H.S. and Shin, K., 2012. Macroprudential Policies in Open Emerging Economies. *NBER Working Paper* 17780.

- Hartmann, P., Hubrich, K., Kremer, M. and Tetlow, R., 2013. Melting Down: Systemic Financial Instability and the Macroeconomy. *Mimeo*, European Central Bank.
- Hetzl, R., 2007. Rules vs. Discretion: Lessons from the Volcker-Greenspan Era. Federal Reserve Bank of Richmond.
- Hoerova, M., Monet, C. and Temzelides, T., 2009. Money talks. *Federal Reserve Bank of Philadelphia Working Paper Series* 18.
- Holmström, B., and J. Tirole, 1998. Private and Public Supply of Liquidity. *Journal of Political Economy* 106 (1), 1-40.
- Hubbard, R. G., 1995. Is There a 'Credit Channel' for Monetary Policy?. Federal Reserve Bank of St. Louis *Review* 77 (May/June), 63-74.
- Hubrich, K., and R. Tetlow, 2012. Financial Stress and Economic Dynamics: The Transmission of Crises. *FEDS Paper* No. 2012-82, Board of Governors of the Federal Reserve System (April).
- Iacoviello, M., 2005. House Prices, Borrowing Constraints and Monetary Policy in the Business Cycle. *American Economic Review* 95(3), 739-764.
- Igan, D. and H. Kang, 2011. Do loan-to-value and debt-to-income limits work? Evidence from Korea, *IMF Working paper* 297.
- International Monetary Fund, 2011. Macroprudential Policy: an organizing framework. *Background Paper*.
- International Monetary Fund, 2013. The Interaction of Monetary and Macroprudential Policies. *Background Paper*
- Ioannidou, V., Ongena, S. and Peydro, J.L., 2009. Monetary Policy, Risk Taking and Pricing: evidence from a quasi-natural experiment. *European Banking Center Discussion Paper* 2009-04S.
- Issing, O., 2003. Monetary and Financial Stability: Is there a Trade-off. In BIS (ed.) *Monetary Stability, Financial Stability and the Business cycle: five views*. *BIS Papers* No 18, Monetary and Economic Department.
- Issing, O., 2003a Introductory Statement. European Central Bank (ed.) *Proceedings of the ECB Workshop 'Asset Prices and Monetary Policy'*, 11 December.
- Jimenez, G., Ongena, S., Peydro-Alcalde, J.L. and Saurina, J., 2007. Hazardous Times for Monetary Policy: what do twenty-three million bank loans say about the effects of monetary policy on credit risk? *CEPR Discussion Paper Series* 6514, Centre for Economic Policy Research.
- Kamber, G., Karagedikli, O. and Smith, C., 2015. Applying an Inflation Targeting Lens to Macroprudential Policy 'Institutions'. *Federal Reserve Bank of New Zealand Discussion Paper* DP2015/04.
- Kannan, P., Rabanal, P. and Scott, A., 2012. Monetary and Macroprudential Policy Rules in a Model with House Price Booms. *B.E. Journal of Macroeconomics*, Contributions, 12(1).
- Kashyap, A. K. and Stein, J.C., 1994. Monetary Policy and Bank Lending. In N. G. Mankiw (ed.) *Monetary Policy*. Chicago: University of Chicago Press, for NBER.
- Kashyap, A. K. and Stein, J.C., 1997. What do a Million Banks Have to Say about the Transmission of Monetary Policy? *NBER Working Paper* 6056.
- Kent, C., and Lowe, P., 1997. Asset-Price Bubbles and Monetary Policy. *Reserve Bank of Australia, Research Discussion Paper* 97-09.
- Kindleberger, C. P., 1978. *Manias, Panics, and Crashes: A History of Financial Crises*. New York: Basic Books.
- Kindleberger, C. P., 2000. *Manias, Panics, and Crashes: A History of Financial Crises*. 2nd ed. New York: Wiley.
- King, M., 2004a. *Remarks*. Panel discussion on Alan Greenspan's speech on Risk and Uncertainty in Monetary Policy delivered at the American Economic Association Annual Meeting in San Diego, 3 January.
- King, M., 2004b. *Speech* delivered to the CBI Scotland Diner at the Glasgow Hilton Hotel, 14 June.
- Knight, M.D., 2006. Marrying the Micro- and Macroprudential Dimensions of Financial Stability: six years on. *Speech* at the 14th International Conference of Banking Supervisors, Mérida, 4-5 October.

- Kohn, D., 2006. Monetary Policy and Asset Prices. *Speech* delivered at “Monetary Policy: A Journey from Theory to Practice”, ECB Colloquium held in honour of Otmar Issing, Frankfurt, 16 March.
- Kroszner, R., 2003. Asset Price Bubbles, Information, and Public Policy. In C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: Implications for Monetary, Regulatory, and International Policies* Cambridge. MIT Press, Cambridge, Mass., pp. 3-13.
- Lambertini, C., Mendicino, M. and Punzi, T., 2011. Leaning Against Boom-Bust Cycles in Credit and Housing Prices. *Banco de Portugal Working Paper* 8.
- Levine, R., 1997. Financial Development and Economic growth: Views and agenda. *Journal of Economic Literature* 35(2), 688-726.
- Lim, C. H., Krzmar, I., Lipinsky, F., Otani, A. and Wu, X., 2013. The Macroprudential Framework: Policy Responsiveness and Institutional Arrangements. *IMF Working Papers* 166.
- Ljungqvist, L., 2008. Lucas Critique. In N. Durlauf and L. E. Blume (eds.) *New Palgrave Dictionary*, 2nd ed. Available online: http://www.dictionaryofeconomics.com/article?id=pde2008_L000159.
- Loisel, O., Pommeret, A. and Portier, F., 2012. Monetary Policy and Herd Behavior: leaning against bubbles. *Banque de France Working Paper* 412.
- Maddaloni, A. and Peydro, J.L., 2011. Bank Risk-Taking, Securitization, Supervision, and Low Interest-Rates: evidence from the Euro Area and US lending standards. *Review of Financial Studies* 24, 2121-2165.
- McCallum, B. T., 2001. Analysis of the Monetary Transmission Mechanism: Methodological Issues. In Deutsche Bundesbank (ed.) *The Monetary Transmission Process: Recent Developments and Lessons for Europe*. Basingstoke, Palgrave, pp. 11-43.
- Meh, C. and Moran, K., 2010. The Role of Bank Capital in the Propagation of Shocks. *Journal of Economic Dynamics and Control* 34, 555-576.
- Minsky, H., 1982. *Can “It” Happen Again? Essays on Instability and Finance*. M.E. Sharpe Inc., New York.
- Mishkin, F. S., 2008. How Should we Respond to Asset Price Bubbles? *Speech* at the Wharton Financial Institutions Centre and Oliver Wyman Institute’s Annual Financial Risk Roundtable, Philadelphia, Penn., May 15.
- Mishkin, F. S., 2009. Why all Regulatory Roads Lead to the Fed. *Financial Times*, June 22.
- Mishkin, F. S. and White, E.N., 2003. U.S. Stock Market Crashes and Their Aftermath: Implications for Monetary Policy. In Hunter, W., G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*. MIT Press. Cambridge Mass., pp. 53-79.
- Mishkin, F.S., 1991. Asymmetric Information and Financial Crises: A Historical Perspective. In R. G. Hubbard (ed.) *Financial Markets and Financial Crises*. Chicago University Press, Chicago, pp. 69-108.
- Mishkin, F.S., 1996. Understanding Financial Crises: A Developing Country Perspective. In M. Bruno and B. Pleskovic (eds.) *Annual World Bank Conference on Development Economics 1996*. World Bank. Washington, pp. 29-62.
- Mishkin, F.S., 2001a. The Transmission Mechanism and the Role of Asset Prices in Monetary Policy. In Osterreichische Nationalbank (ed.) *Aspects of the Transmission Mechanism of Monetary Policy, Focus on Austria 3-4/2001*. Osterreichische Nationalbank, Vienna, pp. 58-71.
- Mishkin, F.S., 2001b. Issues in Inflation Targeting. Bank of Canada (ed.) *Price Stability and the Long-Run Target for Monetary Policy*. Bank of Canada, Ottawa, pp. 203-222.
- Mishkin, F.S., 2007. Housing and the Monetary Transmission Mechanism. *Finance and Economics Discussion Series*, No. 2007-40, Board of Governors of the Federal Reserve System, Washington, September.
- Mishkin, F.S., 2011. Monetary Policy Strategy: Lessons from the Crisis. In Jarociński, M., F. Smets and C. Thimann (eds.) *Approaches to Monetary Policy Revisited: Lessons from the Crisis*. ECB, Frankfurt Am Main, pp. 67-118.

- Mussa, M., 2003. Asset Prices and Monetary Policy. In W. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory, and International Policies*. MIT Press, Cambridge Mass., pp. 41-50.
- Myers, S.C. and Majluf, N.S., 1984. Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have. *Journal of Financial Economics* 13, 187-221.
- Nier, E. W., Osiński, J., Jácome, L.I. and Madrid, P., 2011. Towards Effective Macroprudential Policy Frameworks: An assessment of stylized institutions. *International Monetary Fund Working Paper* 250.
- Oda, N. and Okina, K., 2001. Further Monetary Easing Policies under the Non-Negativity Constraints of Nominal Interest Rates: Summary of the Discussion Based on Japan's Experience. Bank of Japan, Institute of Monetary and Economic Studies *Monetary and Economic Studies* (Special Edition) 19 (S-1), 323-360.
- Orphanides, A., 2014. Are Rules and Boundaries Sufficient to Limit Harmful Central Bank Discretion? Lessons from Europe. *Journal of Economic Dynamics and Control* 49, 121-125.
- Orphanides, A. and van Norden, S., 2004. The Reliability of Inflation Forecasts Based on Output Gap Estimates in Real Time. *Finance and Economics Discussion Series*. Washington, D.C.: Federal Reserve Board.
- Orphanides, A. and Williams, J.C., 2004. The Decline of Activist Stabilisation Policy: Natural Rate Misperceptions, Learning, and Expectations. *ECB Working Paper* 337.
- Paligorova, T. and Santos, J., 2012. When is it Less Costly for Risky Firms to Borrow? Evidence from the bank risk-taking channel of monetary policy. *Bank of Canada Working Paper* 2012-10.
- Papademos, L., 2008. Financial Market Excesses and Corrections: a central banker's perspective. *Speech* presented at the International Research Forum on Monetary Policy, Frankfurt.
- Pill, H., 2013. Central Banking after the Crisis: Challenges for the ECB. In *Is Inflation Targeting Dead?* R. Baldwin and L. Reichlin (ed.). VoxEU e-book.
- Poole, W., 1970. Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model. *Quarterly Journal of Economics* 88: 197-216.
- Posen, A., 2003. It Takes More than a Bubble to Become Japan. In A. Richards and T. Robinson (eds.) *Asset Prices and Monetary Policy* (pp. 203-49) Conference Proceedings. Economic Group, Reserve Bank of Australia.
- Quint, D. and Rabanal, P., 2014. Monetary and Macroprudential Policy in an Estimated DSGE Model of the Euro Area. *International Journal of Central Banking* 10 (2), 169-236.
- Rajan, R., 2005. Has Financial Development Made the World Riskier? In *The Greenspan Era: Lessons for the Future*. Proceedings of the Federal Reserve Bank of Kansas City Economic Symposium, Jackson Hole, Wyoming, August 25-27.
- Ramey, V., 1993. How Important is the Credit Channel in the Transmission of Monetary Policy? *Carnegie-Rochester Conference Series on Public Policy* 39, 1-45.
- Richards, A., 2003. Introduction. In Richards, A. and Robinson, T. (eds.) *Asset Prices and Monetary Policy*. Proceedings of the Research Conference of the Reserve Bank of Australia. Reserve Bank of Australia, Sydney, pp. 2-7.
- Rogoff, K., 1985. The Optimal Degree of Commitment to an Intermediate Monetary Target. *Quarterly Journal of Economics* 100 (4), 1169-1189.
- Rosenberg, I., 2006. Monetary Policy in Sweden. *Speech* delivered at the Riksbank, 18 September.
- Santos, M.S. and Woodford, M., 1997. Rational Asset Pricing Bubbles. *Econometrica* 65(1), 19-58.
- Schinasi, G. and Hargraves, M., 1993. Boom and Bust. In *Asset Markets in the 1980s: Causes and Consequences*. Staff Studies for the World Economic Outlook. Washington, D.C.: International Monetary Fund.
- Schwartz, A.J., 1995. Why Financial Stability Depends on Price Stability. *Economic Affairs* 15 (4), 21-25.

- Schwartz, A.J., 2002. Asset Price Inflation and Monetary Policy. *NBER Working Paper* 9321.
- Selody, J. and Wilkins, C., 2004. Asset Prices and Monetary Policy: A Canadian Perspective on the Issues. *Bank of Canada Review* (Autumn), 3-14.
- Shiratsuka, S., 1999. Asset Price Fluctuation and Price Indices. *Monetary and Economic Studies*, Institute for Monetary and Economic Studies, Bank of Japan, 17 (3), 103-128.
- Shiratsuka, S., 2001. Asset Prices, Financial Stability, and Monetary Policy: Based on Japan's Experience of the Asset Price Bubble. *BIS Papers* 1.
- Smaghi, L.B., 2009. Monetary Policy and Asset Prices. *Opening Address*, University of Freiburg, Freiburg, Germany, 14 October.
- Smets, F., 1997. Financial Asset Prices and Monetary Policy: Theory and Evidence. *BIS Working Paper* 47.
- Smets, F., 2014. Financial Stability and Monetary Policy Stability: How Closely Interlinked? *International Journal of Central Banking* 10 (2), 263-300.
- Smets, F. and R. Wouters, 2003. An Estimated Stochastic General Equilibrium Model of the Euro Area. *Journal of the European Economic Association* 1, 1123-1175.
- Stark, J., 2009. Monetary Policy Before, During and After the Financial Crisis. *Speech* at the University of Tübingen.
- Stein, J., 2012. Monetary Policy as Financial Stability Regulation. *Quarterly Journal of Economics* 127 (1): 57-95.
- Stevens, G.R., 2004. Recent Issues in the Conduct of Monetary Policy. *Reserve Bank of Australia Bulletin*, Vol. 2004 March.
- Svensson, L.E.O., 1999. Inflation Targeting as a Monetary Policy Rule. *Journal of Monetary Economics* 43: 607-54.
- Svensson, L.E.O., 2012. The Relation between Monetary Policy and Financial Stability Policy. *International Journal of Central Banking* 8 (S1): 293- 95.
- Svensson, L.E.O., 2013. Some Lessons from Six Years of Practical Inflation Targeting. *Proceedings Riksbank Conference 'Two Decades of Inflation Targeting: Main Lessons and Remaining Challenges'*, Stockholm, June 3.
- Svensson, L.E.O., 2015. Forward Guidance. *International Journal of Central Banking* 11(S1), 19-64.
- Tirole, J., 1985. Asset Bubbles and Overlapping Generations. *Econometrica* 53(6), 1499-1528.
- Trichet, J.C., 2003. Asset Price Bubbles and Their Implications for Monetary Policy and Financial Stability. In C. Hunter, G. Kaufman and M. Pomerleano (eds.) *Asset Price Bubbles: The Implications for Monetary, Regulatory and International Policies*. MIT Press, Cambridge Mass., pp. 15-22.
- Trichet, J.C., 2005. Asset Price Bubbles and Monetary Policy. *MAS lecture* Singapore, 8 June.
- Trichet, J.C., 2009. Credible Alertness Revisited. In FRB of Kansas City (ed.) *Financial Stability and Macroeconomic Policy Proceedings* FRB of Kansas City symposium, Jackson Hole, August.
- Trichet, J.C., 2011. Reflections on the Nature of Monetary Policy Non-Standard Measures and Finance Theory. In Jarociński, M., F. Smets and C. Thimann (eds.) *Approaches to Monetary Policy Revisited: Lessons from the Crisis*. ECB, Frankfurt Am Main, pp. 12-22.
- Ueda, K., and Valencia, F., 2012. Central Bank Independence and Macro-prudential Regulation. *IMF Working Paper* 12/101.
- Whelan, K., 2013. A Broader Mandate: Why Inflation Targeting Is Inadequate. In *Is Inflation Targeting Dead?* R. Baldwin and L. Reichlin (ed.). VoxEU e-book.
- White, E.N., 2004. Bubbles and Busts: The 1990s in the Mirror of the 1920s. *Proceedings Duke University and the University of North Carolina conference, Understanding the 1990s: The Long-run Perspective*, Durham, North Carolina, March, 26-27, 2004.
- White, W.R., 2010. The Mayekawa Lecture: Some Alternative Perspectives on Macroeconomic Theory and Some Policy Implications. *Bank of Japan IMES Monetary and Economic Studies* (Nov.).

- Woodford, M., 2011. Financial Intermediation and Macroeconomic Analysis. *Journal of Economic Perspectives* 24(4), 21-44.
- Woodford, M., 2011a. Monetary Policy and Financial Stability. *Columbia University Working Paper* presented at the 2011 NBER Summer Institute, Cambridge, Mass.
- Woodford, M., 2012. Inflation Targeting and Financial Stability. *Economic Review* (Sveriges Riksbank) 1, 7-32.