Maintaining price and financial stability by monetary and macroprudential policy – evidence from Asia and the Pacific

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Abstract

The Great Financial Crisis of 2008–09 led many central banks to adopt explicit financial stability objectives. This raises the question of how central banks deal with the policy trade-offs resulting from potential conflicts between price and financial stability objectives. This paper presents some results from ongoing research investigating this issue for inflation targeting central banks in the Asia-Pacific region (Kim and Mehrotra (2015), (2016a) and (2016b)). We show that macroprudential policies to safeguard financial stability have also had a significant impact on inflation, potentially creating challenges for policymakers given the frequency of episodes during which low inflation has coincided with buoyant credit growth.

JEL classification: E58; E61.

Keywords: multiple objectives, financial stability, price stability, macroprudential instruments, monetary policy.

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1. Introduction

The Great Financial Crisis (GFC) of 2008–09 provided a stark reminder that price stability is not sufficient to guarantee financial stability, leading many central banks to adopt explicit financial stability objectives or make changes to existing arrangements. This does not imply that financial stability objectives are new. Monetary authorities have arguably aimed at safeguarding financial stability even before they were mandated to do so by laws or statutes. In fact, a stronger focus on financial stability brought central banks closer to their 19th and 20th century roots in preventing and alleviating financial sector distress.[3] But explicit financial stability objectives raise a number of pertinent issues for policymakers, including in the areas of governance, accountability and policy objectives, as highlighted by a central bank study group chaired by Stefan Ingves (BIS (2011)).

For the 12 central banks in the Asia-Pacific region that are members of the BIS,[4] 10 have explicit financial stability objectives written in laws or statutes (Jeanneau (2014)). The adoption of financial stability objectives, coupled with the well established goal of price stability for the region's central banks (Filardo and Genberg (2010)), raises the question of how central banks would deal with policy trade-offs that may arise from a conflict between the objectives of price and financial stability. One potential trade-off results from the use of macroprudential policies to safeguard financial stability. As noted in BIS (2015), macroprudential policies can lead to a reallocation of spending over time by influencing the availability and cost of credit. Thus, it cannot be ruled out that macroprudential policies have aggregate demand effects, beyond their immediate impact on financial stability.

As part of our ongoing research programme, we examine empirically how inflation targeting central banks in the Asia-Pacific region have managed the objectives of price and financial stability (Kim and Mehrotra (2015), (2016a) and (2016b)). The focus is on identifying policy trade-offs and interactions that may have arisen over time. The analysis is done by means of structural vector autoregressions (SVARs) that identify both monetary and macroprudential policy shocks and allow for interactions between policies and the assumed target variables. The central bank's financial stability objective is defined as one of keeping credit relative to output below a "safe" threshold.

We find that, while macroprudential policies do indeed affect credit growth, they have also had an economically and statistically significant impact on inflation. Tighter macroprudential policies have contributed at times to disinflationary pressures, including in periods during which inflation has been below target. Similarly, expansionary macroprudential shocks have contributed occasionally to above-target inflation. We also find that changes in interest rates affect credit growth, and the relative responses of credit and prices to interest rate policy shocks appear to be similar to their relative response to macroprudential policy shocks.

Our results thus suggest that – ex post – there may have been short-term policy trade-offs for central banks between financial stability and price stability objectives.

[3] See Williams (2014).

[4] These 12 economies are Australia, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand.

Such trade-offs may not arise if higher inflation pressures coincide with strong credit growth, as we find that monetary policy and macroprudential policy shocks have similar impacts on credit and the price level. They may also be less of a concern if the central bank's price stability objective does not strongly focus on short-term inflation stabilisation.[5] However, greater challenges could arise if a central bank focused on stabilising short-run inflation dynamics at times when inflation was low but credit growth was strong. Recent developments bear evidence on the empirical relevance of policy trade-offs, as low inflation has frequently coincided with strong growth in credit and asset prices (BIS (2015)).[6]

A caveat worth bearing in mind is that the results we obtained are conditional on the types of policy action undertaken and the intensity of these measures in the economies under study. It is plausible that the effects of macroprudential measures on the real economy are strong only if they are used with sufficient intensity. The impact on the real economy will also depend on the types of measure undertaken.

This paper motivates and describes our research work on the topic. Section 2 provides a review of some of the related literature, focusing on the existing research on the various objectives of central banks. Section 3 reviews the objectives and instruments of Asia-Pacific central banks related to price and financial stability, and discusses their counterparts in our estimated model. Section 4 presents selected empirical results and Section 5 concludes.

2. Related literature

The literature on multiple central bank objectives has traditionally focused on the role of output stabilisation in monetary policy. Even as price stability has become the cornerstone of most central banks' policy frameworks, empirical evidence suggests that real economy considerations have been important in practice. One of the most explicit cases is the United States, with the Federal Reserve's mandate of maximum employment and stable prices being enshrined in the Federal Reserve Reform Act of 1977.[7] But a similar observation also holds for central banks that explicitly pursue inflation targeting. Their price stability objective is often stated as a medium-term goal, thus recognising the importance of stabilising real economic activity in the short run (Svensson (1999)).

Regarding the long-run trade-off between the levels of output and inflation, it is generally thought to be limited, at least for moderate and positive levels of inflation. If policymakers attempt to stimulate output by increasing the rate of inflation, inflation expectations and wage setting will eventually adjust in an upward direction, with no permanent decrease in the unemployment rate or upward shift in long-term

[5] While we find that macroprudential policies affect both credit growth and inflation, we do not investigate whether measures taken against the build-up of financial imbalances reduce the volatility of inflation over long horizons. Arguably, central banks also need to weigh the risks of future inflation and output volatility that could potentially arise from financial distress against the shorter-term costs of reacting to current financial imbalances. See also BIS (2015).

[6] Many central banks have highlighted the policy trade-offs involved in countering disinflationary pressures and containing increases in household indebtedness and property prices. See Bank of Korea (2015), Central Bank of Norway (2014) and Sveriges Riksbank (2014).

[7] The Federal Reserve also has an objective of moderate long-term interest rates.

growth. But policymakers may still face a choice between stabilising the variance of output and inflation in the short run. Consider a positive disturbance to inflation expectations. If policymakers react strongly to such a shock by increasing interest rates, inflation variability will be smaller but output variability will be larger around its trend (Walsh (1998)). An optimal policy frontier can be computed, representing the best attainable outcomes for the policymaker in terms of inflation and output variability (Fuhrer (1997)). In forward-looking New Keynesian models, there need not be a conflict between stabilising both the output gap and inflation, but this "divine coincidence" is dependent on various assumptions about the economy (Blanchard and Gali (2007)).

Even with the documented policy trade-offs, the primacy of price stability typically prevails in analytical frameworks. Woodford (2003) shows that when monetary policy is conducted so as to maximise the welfare of the population, output stabilisation typically obtains a small weight relative to inflation.[8] Another reason to focus on price stability stems from uncertainty regarding the degree of economic slack, especially in real time. Orphanides (2004) shows that, if estimates of the output gap at times of policy decisions are erroneous, even a forward-looking approach to monetary policy could result in macroeconomic instability. And when there is considerable uncertainty about the economy, a high weight on real economic activity can lead to poor outcomes. Welfare is improved by policies emphasising inflation control and communication about the explicit inflation target (Orphanides and Williams (2005)). Yet another factor works through the credibility of the anti-inflationary policy of the central bank. If economic agents think that the central bank cares about output stabilisation, this may lead to greater increases in wages and prices in the expectation that the central bank will accommodate such increases, worsening the inflation/output trade-off (Chari et al (1998) and Mishkin (2002)).

The GFC stimulated research incorporating financial stability objectives in macroeconomic models with monetary policy. Woodford (2012) argues for a central bank loss function that includes inflation, the output gap and a measure of financial stability. When the risk of a financial crisis is elevated, the monetary authority should tighten policy even if prices and/or output undershoot the levels that would have otherwise prevailed. Thus, policy should lean against a credit boom or other manifestations of financial imbalances.[9] Better outcomes can be achieved for both macroeconomic and financial stability if an additional instrument exists to counter financial risks. Theoretically, and in line with the Tinbergen principle, the assignment of separate policy instruments to their respective price and financial stability targets could allow for interventions in opposite directions when required to achieve both objectives (Cesa-Bianchi and Rebucci (2013)).[10]

But, in practice, complications are likely to arise due to policy interactions. Monetary and macroprudential policies can enhance or diminish each other's effectiveness (Claessens (2013)). As an example, monetary policy affects incentives for private sector risk-taking and thus financial stability (Borio and Zhu (2012)). Jordà et

[8] See, however, Debortoli et al (2015).

[9] In contrast, Svensson (2010) argues that the impact of policy rates on financial stability is small but that the impact on resource utilisation and inflation is large, implying that it is costly to use policy rates to safeguard financial stability.

[10] See Angelini et al (2014), and Gelain and Ilbas (2014) for examples of DSGE models incorporating both macroprudential and monetary policies.

al (2015) use a large data set to document how loose monetary conditions have historically boosted real estate lending and house price bubbles, especially in the postwar period. Shin (2015) argues that changes to debt-to-income or loan-to-value ratios work through similar mechanisms as monetary policy, by bringing spending forward or postponing it, thus affecting credit growth and aggregate demand. Bruno et al (2015) show that monetary and macroprudential tools work as complements, with a positive correlation observed between changes in the two instruments' settings in the Asia-Pacific region. At the same time, policy interactions and effectiveness may vary over time. Hofmann and Peersman (2015) document that the impact of monetary policy shocks on credit and house prices in the United States has increased over time, making a policy of leaning against the wind now more potent than in the past.

3. Financial stability objectives and instruments

Formal objectives in the Asia-Pacific region

The GFC provided further impetus to the adoption of financial stability objectives by central banks. In some cases, it triggered changes in existing objectives. Based on a review of 114 central bank laws and statutes, 82% of central banks had explicit financial stability objectives in 2014 (Jeanneau (2014)). Table 1 lists the economies where monetary authorities have such objectives in the Asia-Pacific region.

Central banks in the region differ regarding the scope of activities that the financial stability objective applies to. For seven institutions, the objective appears to pertain to all of the central bank's activities and functions. For three others, a specific function or task is mentioned: payment system stability (Australia); settlement of funds among financial institutions and lender of last resort function (Japan); and monetary and credit policies (Korea). Yet, even within these activities, the objectives state that overall financial stability or financial system stability should be "contributed to" (Australia); "maintained" (Japan); or "paid attention to" (Korea), thus indicating rather broad objectives.

Financial stability objectives in laws or statutes in the Asia-Pacific region — Table 1

Objective appears to apply in principle to all the central bank's activities and functions			
China	Hong Kong SAR	Indonesia	Malaysia
New Zealand	Singapore	Thailand	
Objective is attached to a specific function or task			
Australia	Japan	Korea	

Sources: Jeanneau (2014); central bank websites, BIS.

The financial stability goals just discussed have been adopted alongside more conventional monetary policy objectives (Table 2). Eight out of 12 Asia-Pacific central banks are formally pursuing inflation targeting or follow a regime with an explicitly defined price stability target, whereas two base their policies on exchange rate anchors. Two central banks have no explicitly stated targeting regime, either in terms

of inflation or the exchange rate. However, even for the non-inflation targeters, price stability typically plays a major role in policy. In Singapore, the exchange rate is an intermediate target, and the primary objective of monetary policy is the promotion of price stability. Stability of the value of the currency (China) and monetary stability (Malaysia) can also be interpreted as emphasising the importance of price stability (Filardo and Genberg (2010)).

Given the existence of multiple objectives, a relevant issue for policy trade-offs relates to the ranking of the different objectives. In the case of New Zealand, for example, financial stability is explicitly subordinated to the primary objective of price stability.[11] However, for most economies the law is silent on the relative ranking of objectives. The case of Malaysia is noteworthy in that the financial stability objective ranks equally with monetary stability, with the law granting the Central Bank of Malaysia wide-ranging powers to intervene in the financial system to promote financial stability.[12]

Monetary policy frameworks in the Asia-Pacific region Table 2

Inflation targeting framework or similar	Exchange rate anchor	Other regimes[1]
Australia	Hong Kong SAR (US dollar)	China
India	Singapore (composite)	Malaysia
Indonesia		
Japan[2]		
Korea		
New Zealand		
Philippines		
Thailand		

[1] Includes countries that have no explicitly stated targeting regime either in terms of inflation or the exchange rate. [2] Japan is not formally an inflation targeter but follows a monetary policy regime with a "price stability target" of 2%.

Source: Central bank websites.

Of course, even when no explicit objective is mentioned in law, central banks can have financial stability as an implicit objective and may even have in place a formal financial stability policy framework. Ravalo (2013) mentions that, while financial stability is not explicitly mentioned in the charter of Bangko Sentral ng Pilipinas, the Financial Stability Committee was created as an internal body to address the potential build-up of systemic pressures.

[11] The Reserve Bank of New Zealand Act 1989 states that "The primary function of the Bank is to formulate and implement monetary policy directed to the economic objective of achieving and maintaining stability in the general level of prices" and that "In formulating and implementing monetary policy the Bank shall have regard to the efficiency and soundness of the financial system" (Sections 1A and 10, respectively).

[12] The Central Bank of Malaysia Act 2009 states that "The principal objects of the Bank shall be to promote monetary stability and financial stability conducive to the sustainable growth of the Malaysian economy" (Section 5). See also Caruana (2014).

Financial stability objectives and instruments in the model

In Kim and Mehrotra (2015) and (2016b), we use a leverage-based measure of financial stability, constructed using the total amount of credit extended to the private sector. In particular, we use a measure of the total credit-to-GDP gap that captures the deviation of total credit-to-GDP from its long-run trend. Previous research has demonstrated the favourable performance of the credit-to-GDP gap as an early warning indicator of banking system distress (see Borio and Lowe (2002), and Borio and Drehmann (2009)).[13] It has been adopted as a reference point for the use of countercyclical capital buffers under the Basel III framework (BCBS (2010), and Drehmann and Tsatsaronis (2014)).

We include macroprudential policies in our model as the primary tool for achieving financial stability. This reflects their widespread adoption to mitigate systemic financial risks. As a source of data for macroprudential policy measures, we use the database for policy actions on housing markets set up by Shim et al (2013), which includes both non-interest rate monetary policy measures and prudential tools. The monetary policy measures – ie reserve requirements, credit growth limits and liquidity requirements – affect the amount of funds that are available for lending to the private sector. The prudential tools – ie maximum loan-to-value ratio, maximum debt-service-to-income ratio, risk weights on housing loans and loan-loss provisioning on housing loans – are used by the authorities to target credit to housing.

Measures of macroprudential policy actions are included in our estimated model as an index, accumulated over time. Thus, a macroprudential policy tightening (loosening), regardless of the type of measure undertaken or its intensity, will increase (decrease) the level of the index by one unit, with the new value maintained until another policy action is taken. Owing to such a definition of the index, the effects of policies in our empirical framework should be interpreted as average responses to the various policy actions, acknowledging that there may be considerable uncertainty with respect to the impact of individual measures. However, as shown in Kim and Mehrotra (2015) and (2016a), we also experiment with an alternative macroprudential index using a different source of macroprudential policies[14] (while applying an identical methodology to construct the index) and find that the results are similar.

4. Empirical evidence

The model

In Kim and Mehrotra (2015), (2016a) and (2016b), we construct an SVAR model to identify monetary and macroprudential policy actions, analyse interactions between

[13] In emerging market economies undergoing rapid transformation, credit gaps may be affected by structural changes such as financial deepening. Although evidence suggests that credit gaps are relevant indicators for such economies as well (Drehmann and Tsatsaronis (2014)), it is also argued that vulnerabilities should not be assessed by relying solely on a mechanical rule.

[14] Our alternative source of macroprudential policies is Lim et al (2013).

policies and policy trade-offs, and examine the effects of interest rate and macroprudential policy actions on price and financial stability.

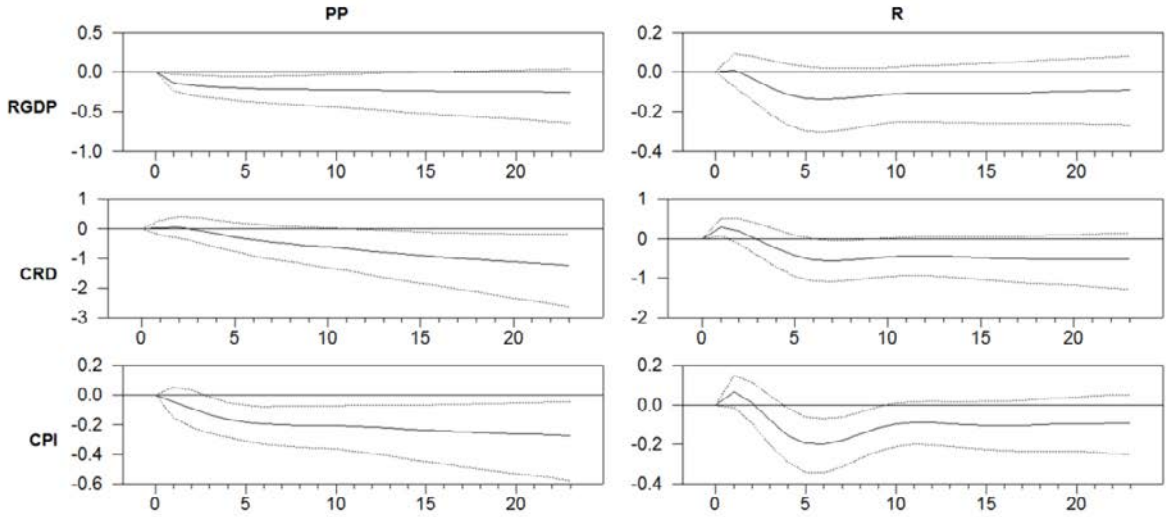
The model comprises five endogenous variables, including two policy instruments: the interest rate (*R*) and the measure of macroprudential policy (*PP*) from Shim et al (2013). The consumer price index (*CPI*) is used as the target variable for monetary policy and total credit to the private sector (*CRD*) as the target for macroprudential policy. Real GDP (*RGDP*) captures economic activity. Following Sims (1980), a recursive structure on contemporaneous structural parameters is assumed. The three macroeconomic variables (*CPI*, *RGDP* and *CRD*) are contemporaneously exogenous to the two policy instruments. Most of our results are based on panel VAR models (Kim and Mehrotra (2015) and (2016a)) but we also estimate VAR models for individual economies (Kim and Mehrotra (2015)).

Our sample includes Australia, Indonesia, Korea and Thailand. The estimations are performed using quarterly data.[15]

Selected results from SVARs

Selected impulse responses from the panel SVAR are shown in Graph 1. The first column shows the responses of real GDP, credit growth and consumer prices to a macroprudential policy shock while the second one shows the responses of the same variables to an interest rate shock. Both policy shocks are contractionary and result in

Selected impulse responses from panel SVAR model — Graph 1



Note: The column headings denote the relevant shocks and the row headings the responses of the indicated variable to each shock. *RGDP* = real GDP, *CRD* = total credit, *CPI* = consumer price index, *PP* = macroprudential policy measure and *R* = policy interest rate. For example, the impulse response in the first row, second column, shows the response of real GDP to an interest rate shock.

Source: Authors' calculations.

[15] See Kim and Mehrotra (2015) for details on the estimation.

a statistically significant fall in prices and credit.[16] The response to macroprudential policies is notable. A tightening in such policies also has a significantly negative impact on real GDP. In Kim and Mehrotra (2015), we document how periods of inflation below or within the central bank's target have often coincided with buoyant credit, as measured by the credit-to-GDP gap, in inflation targeting economies of the Asia-Pacific region. Tighter macroprudential policies to stem credit growth during such periods could then risk pushing inflation (further) below target.

We apply an historical decomposition to investigate the role of policy shocks in explaining the dynamics of the target variables at different points in time (Kim and Mehrotra (2015) and (2016b)). We are particularly interested in finding episodes where monetary policy shocks may have added to financial stability risks – defined here as excessive growth in credit – or when macroprudential policy actions may have negatively affected price stability in the short run – so that inflation was pushed away from target. For instance, in the second case, we identify the quarters during which inflation was off-target and analyse the historical decomposition of consumer prices to infer how macroprudential shocks contributed to price dynamics during those periods. Doing so, we unveil some episodes where macroprudential policy shocks indeed contributed to the deviation of inflation from the target.

We also consider the behaviour of inflation expectations during such episodes (Kim and Mehrotra (2015)). Arguably, deviations of inflation from target may be less worrisome if inflation is expected to move back to target quickly. In such a case, even if inflation was currently away from target, the central bank may have been able to use monetary tools to counter financial imbalances. Alternatively, it could let regulatory authorities undertake prudential measures without a counteracting interest rate response, as long as expected inflation remains on target. Using Consensus Forecasts, we show that macroprudential policy actions have at times pushed inflation further away from the target when near-term inflation expectations were also deviating from the target. Finally, we show results related to the contribution of monetary policy shocks to credit growth during periods when the credit gap is signalling risks to financial stability.

5. Conclusion

Central banks have increasingly adopted explicit financial stability objectives, often in the context of well-established price stability mandates. In ongoing work (Kim and Mehrotra (2015), (2016a) and (2016b)), we analyse the trade-offs and interactions between price and financial stability policies in the Asia-Pacific region, where the authorities of many economies have used macroprudential instruments with the aim of safeguarding financial stability. The empirical analysis is done by means of structural vector autoregressions that identify both interest rate and macroprudential policy shocks. The financial stability objective for the central bank is assumed to be one of containing credit within "safe" thresholds, drawing on the literature on early warning indicators of banking system distress.

[16] See Zdzienicka et al (2015) for a recent analytical comparison of the impact of monetary and macroprudential policies on financial conditions in the United States.

We find that, while macroprudential policies do indeed affect credit growth, they have also had an economically and statistically significant impact on inflation, with tighter macroprudential policies contributing to disinflationary pressures. The estimated model dynamics suggest that macroprudential and monetary policies work through related channels, affecting aggregate demand. The results could also indicate potential policy challenges when low inflation coincides with buoyant credit growth.

Our ongoing research should be seen as one of the first steps in a broader research agenda to quantify the macroeconomic effects of macroprudential policy and investigate its interaction with monetary policy. Future research on the interaction between macroprudential and monetary policies may usefully consider differentiating between the various measures of macroprudential policy; analysing a larger sample of economies; and shedding more light on the systematic part of macroprudential policy.

References

Angelini, P, S Neri and F Panetta (2014): "The interaction between capital requirements and monetary policy", *Journal of Money, Credit and Banking*, vol 46, no 6, pp 1073–112.

Bank for International Settlements (2011): *Central bank governance and financial stability*, a report from a Study Group of the Central Bank Governance Group.

——— (2015): *85th Annual Report*.

Bank of Korea (2015): *Monetary Policy Report*, April.

Basel Committee on Banking Supervision (2010): *Guidance for national authorities operating the countercyclical capital buffer*, December.

Blanchard, O and J Gali (2007): "Real wage rigidities and the New Keynesian model", *Journal of Money, Credit and Banking*, vol 39, no 1, pp 35–65.

Borio, C and M Drehmann (2009): "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp 29–46.

Borio, C and P Lowe (2002): "Assessing the risk of banking crises", *BIS Quarterly Review*, December, pp 43–54.

Borio, C and H Zhu (2012): "Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?", *Journal of Financial Stability*, vol 8, no 4, pp 236–51.

Bruno, V, I Shim and H S Shin (2015): "Comparative assessment of macroprudential policies", *BIS Working Papers*, no 502.

Caruana, J (2014): "Redesigning the central bank for financial stability responsibilities", Speech at the 135th Anniversary Conference of the Bulgarian National Bank, Sofia, 6 June.

Central Bank of Norway (2014): *Monetary Policy Report*, no 1/14.

Cesa-Bianchi, A and A Rebucci (2013): "Does easing monetary policy increase financial instability", *IADB Working Paper Series,* no IADB-WP-387.

Chari, V, L Christiano and M Eichenbaum (1998): "Expectation traps and discretion", *Journal of Economic Theory*, vol 81, no 2, pp 462–92.

Claessens, S (2013): "Interactions between monetary and macroprudential policies in an interconnected world", paper prepared for the Bank of Thailand-IMF conference on Monetary Policy in an Interconnected World, Bangkok, 31 October–2 November 2013.

Debortoli, D, J Kim, J Lindé and R Nunes (2015): "Designing a simple loss function for the Fed: does the dual mandate make sense", *Federal Reserve Bank of Boston Working Papers*, no 15-3.

Drehmann, M and K Tsatsaronis (2014): "The credit-to-GDP gap and countercyclical capital buffers: questions and answers", *BIS Quarterly Review*, March, pp 55–73.

Filardo, A and H Genberg (2010): "Targeting inflation in Asia and the Pacific: lessons from the recent past", *BIS Papers*, no 52, pp 251–73.

Fuhrer, J (1997): "Inflation/output variance trade-offs and optimal monetary policy", *Journal of Money, Credit and Banking*, vol 29, no 2, pp 214–34.

Gelain, P and P Ilbas (2014): "Monetary and macroprudential policies in an estimated model with financial intermediation", *National Bank of Belgium Working Paper*, no 258.

Hofmann, B and G Peersman (2015): "Revisiting the US monetary transmission mechanism", mimeo.

Jeanneau, S (2014): "Financial stability objectives and arrangements – what's new?", *BIS Papers*, no 76, pp 47–58.

Jordà, O, M Schularick and A Taylor (2015): "Betting the house", *Journal of International Economics*, forthcoming.

Kim, S and A Mehrotra (2015): "Managing price and financial stability objectives – what can we learn from the Asia-Pacific region?", *BIS Working Papers*, no 533.

——— (2016a): "Effects of monetary and macroprudential policies – evidence from four inflation targeting economies", mimeo.

——— (2016b): "Managing price and financial stability objectives in inflation targeting economies in Asia and the Pacific", mimeo.

Lim, C, I Krznar, F Lipinsky, A Otani and X Wu (2013): "The macroprudential framework: policy responsiveness and institutional arrangements", *IMF Working Papers*, no WP/13/166.

Mishkin, F (2002): "The role of output stabilization in the conduct of monetary policy", *International Finance*, vol 5, no 2, pp 213–27.

Orphanides, A (2004): "Monetary policy rules, macroeconomic stability, and inflation: a view from the trenches", *Journal of Money, Credit and Banking*, vol 36, no 2, pp 151-75.

Orphanides, A and J Williams (2005): "Imperfect knowledge, inflation expectations and monetary policy", in B Bernanke and M Woodford (eds), *The Inflation Targeting Debate*, pp 201–34.

Ravalo, J (2013): "Challenges of executing a financial stability policy objective at the Central Bank of the Philippines", in *Macroprudential Frameworks in Asia*, edited by R Maino and S Barnett, pp 6–16.

Shim, I, B Bogdanova, J Shek and A Subelyte (2013): "Database for policy actions on housing markets", *BIS Quarterly Review*, September, pp 83–95.

Shin, H S (2015): "Macroprudential tools, their limits and their connection with monetary policy", panel remarks at IMF Spring Meeting: Rethinking macro policy III: progress or confusion?, Washington DC, 15 April.

Sims, C (1980): "Macroeconomics and reality", *Econometrica*, vol 48, no 1, pp 1–48.

Svensson, L (1999): "Inflation targeting: some extensions", *Scandinavian Journal of Economics*, vol 101, no 3, pp 337–61.

Svensson, L (2010): "Inflation targeting" in B Friedman and M Woodford (eds), *Handbook of Monetary Economics*, vol 3, pp 1237–302.

Sveriges Riksbank (2014): "Repo rate cut by half a percentage point to 0.25 per cent", press release, 3 July.

Walsh, C (1998): "The new output-inflation trade-off", *FRBSF Economic Letters*, no 04, 6 February.

Williams, J (2014): "Financial stability and monetary policy: happy marriage or untenable union?", presentation to the Deutsche Bundesbank Conference on Housing Markets and the Macroeconomy: Challenges for Monetary Policy and Financial Stability, Eltville am Rhein, 5 June.

Woodford, M (2003): *Interest and prices*.

——— (2012): "Inflation targeting and financial stability", *NBER Working Papers*, no 17967.

Zdzienicka, A, S Chen, F Diaz Kalan, S Laseen and K Svirydzenka (2015): "Effects of monetary and macroprudential policies on financial conditions: evidence from the United States", *IMF Working Papers*, no 15/288.