Should Monetary Policy Be Used to Counteract Financial Imbalances?

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- *The recent financial crisis has revived the question of whether monetary policy should and could do more to restrain a buildup of financial imbalances.*

- *Effective supervision and regulation are the first line of defence against financial imbalances. An important question is whether they should be the only one. Moreover, the interaction between such prudential policies and monetary policy could have important implications for the appropriate use of both kinds of policy.*

- *This article argues that the case for monetary policy to lean against financial imbalances depends on the sources of the shock or market failure and on the nature of the other regulatory instruments available.*

- *To the extent that financial imbalances are specific to a sector or market and that a well-targeted prudential tool is available, monetary policy may play a minor role in leaning against the imbalances. However, if the imbalances in a specific market can spill over to the entire economy and/or if the prudential tool is broad based, it is more likely that monetary policy will have a role to play. In such a case, there may be a need to coordinate the use of the two policy instruments.*

The global financial crisis of 2007–09 serves as a powerful reminder that even the most sophisticated financial systems may be subject to virulent crises that can have a huge impact on the real economy. In the recent crisis, the monetary policy response was forceful: interest rates were moved quickly to historic lows, and unconventional policies were implemented in a number of countries. Together with fiscal stimulus and direct support for financial systems in numerous countries, this response was effective in "cleaning up" after the crisis had broken— contributing to the start of an economic recovery and creating conditions for rebuilding damaged financial systems. Nonetheless, the economic costs of the recession were very large, and many of the policy measures themselves had significant costs.

This experience has renewed attention on crisis prevention. While the main focus has been on strengthening financial supervision and regulation, preventing future crises can also be relevant for monetary policy. Considering that the vulnerabilities underlying the financial crisis developed against the background of a long period of macroeconomic stability raises the question of whether a different set of macroeconomic policies could have helped to prevent the crisis. The experience also gives fresh significance to an old question: should monetary policy, through movements in the policy interest rate, seek to counteract financial imbalances such as those associated with asset-price bubbles or unsustainable credit expansion? In other words, as William White (2009) put it, "Should monetary policy lean or clean?" Should it lean against financial imbalances as they are building up, or should its role be limited to cleaning up the fallout by mitigating the macroeconomic consequences after the imbalances unwind?

As the recent crisis has demonstrated, some element of cleaning up in the wake of a crisis is unavoidable: the central bank's responsibility for price stability dictates that policy is eased in the wake of a crisis that may have powerful contractionary effects on economic activity and inflation. However, systematically easing monetary policy after crises creates a policy asymmetry that, by influencing expectations, may contribute to the buildup of financial imbalances. If investors expect monetary authorities to ease policy in the event of any crash, that expectation may, in effect, establish a floor for asset prices, which creates incentives for excessive risk taking.[1] Since the central bank cannot credibly commit not to clean, it has been argued that, to avoid such a policy asymmetry, monetary policy should act pre-emptively to lean against the buildup of financial imbalances (see White 2009 for a survey of the literature). It is therefore the *desirability* of such leaning that has been at the centre of the debate and that is the primary focus of this article.

The conventional theoretical framework used to study monetary policy—in which social welfare is maximized by achieving stable output and low inflation—provides a direct answer to the question of whether monetary policy should respond pre-emptively to financial sector developments to the extent that these developments are expected to affect output and inflation. In principle, this means that, in responding to financial imbalances, the central bank should take into account not only their direct effect on output and inflation, but also any macroeconomic effects that could materialize later on, when these imbalances unwind. There is thus no inherent inconsistency between inflation targeting and the use of monetary policy to counteract financial imbalances, provided the time horizon is long and flexible enough. From this perspective, the lesson from the recent crisis is not that we need a different policy framework, but that we need better analysis of the macroeconomic effects of financial imbalances (Svensson 2002, 2009).

In practice, however, taking account of financial imbalances in the context of inflation targeting could require changes in how we think about monetary policy. While monetary policy does include an assessment of the risks around the baseline, the primary focus is on the balance of the risks. An emphasis on financial stability, in contrast, focuses on what can be done to mitigate the various risks, including those associated with low-probability "tail events." This revised way of thinking about monetary policy requires different tools. The linear, or linearized,

models with symmetric shocks that are generally used to inform monetary policy decisions in most cases explicitly rule out the possibility of crises that may occur at an uncertain date.[2] Conversely, conducting inflation targeting in the context of a highly non-linear model that does capture the possibility of bubbles, credit booms, and other imbalances that lead to crises would be associated with a different focus for monetary policy discussions and might require another practical decision-making framework.

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The central question is whether it would be desirable to undertake this task. A general concern is that giving monetary policy explicit responsibility for financial stability would result in a lack of clarity regarding the objectives of monetary policy, and would possibly undermine the credibility of the inflation objective. Arguably, establishing a single, clear objective is critical for monetary policy, because of the importance of expectations in determining actual inflation. Policy credibility cannot be taken for granted, in view of the dynamic inconsistency of optimal monetary policy (Kydland and Prescott 1977; Barro and Gordon 1983). It could prove very challenging for a central bank with multiple objectives, but only a single instrument, to communicate credibly about how it is delivering on its responsibility for price stability.[3]

Another potentially important cost of leaning against financial imbalances stems from the difficulty of identifying them and of calibrating an appropriate response. If financial imbalances are falsely identified, responding to them through monetary policy could induce undesirable economic fluctuations (Greenspan 2002; Bernanke and Gertler 1999). Moreover, to the extent that financial imbalances are sector-specific, monetary policy may be too blunt an instrument for addressing them. The interest rate has economy-wide consequences for inflation and output; tightening monetary policy in response to the building up of persistent financial imbalances in one sector could

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[1] This type of policy asymmetry is sometimes characterized as "the Greenspan put."

[2] For instance, the dynamic stochastic general-equilibrium models prevalent in macroeconomic analysis incorporate transversality conditions that rule out unsustainable movements in prices and other variables, such as asset-price bubbles and debt crises.

[3] See Bank of England Discussion Paper (November 2009) for a recent summary of this case.

force inflation to persistently undershoot its target (Kohn 2008; Bean 2009; Dale 2009; and Carney 2009).

As well, any possible role for monetary policy in restraining the buildup of financial imbalances needs to be considered in relation to other available policy instruments—in particular, to prudential policies, that is, the supervision and regulation of the financial system. While such policies have traditionally focused on ensuring the soundness of individual financial institutions and market infrastructure and on the integrity of markets, there has recently been greater emphasis on a system-wide approach that would focus on the stability of the whole financial system. Under this approach, supervision and regulation would aim to make the financial system more robust and would lean against the financial cycle. In the aftermath of the recent crisis, promising initiatives have been launched to develop a framework for system-wide supervision and regulation and to upgrade this toolkit. If these initiatives are successful, they could obviate, or substantially reduce, the need for monetary policy to counteract financial imbalances.

It has thus been argued that system-wide supervision should be the first line of defence against financial instability (Carney 2009; Bernanke 2010; and Kohn 2010). But designing and implementing this new toolkit is a formidable challenge, and there is considerable uncertainty about what will realistically be feasible. While there are many promising proposals on the table (Basel Committee on Banking Supervision 2009)—indeed, this is at the core of the G-20's agenda—much remains to be done.

Granted that appropriate supervision and regulation are the *first* line of defence against financial imbalances, the key question is whether they should be the *only* one. In this context, developing a view on whether monetary policy should lean against financial imbalances requires that we first examine the interaction between the effects of prudential tools and those of monetary policy on financial imbalances that stem from various sources.

In this article, we present two illustrations of these interactions. To do so, we explore the role of monetary policy in two models in which financial imbalances stem from different sources, for which different prudential tools are available. It is important to note that these two examples should be seen merely as useful illustrations and by no means as the final word on the relationship between monetary policy and financial imbalances. In particular, the models used examine financial shocks in the context of linear models and

do not explicitly incorporate the possibility of bubbles driven by self-fulfilling expectations, which are often alluded to in the "lean or clean" debate. Nonetheless, these models serve to illustrate a few initial principles that are of broader relevance.

Appropriate supervision and regulation are the first *line of defence against financial imbalances, the key question is whether they should be the* only *one.*

Both examples illustrate that the effectiveness of monetary policy in countering financial imbalances depends on the nature of the shocks, the influence of monetary policy and prudential tools on these imbalances, and the interactions between them. In particular, where financial imbalances reflect specific market failures and regulatory policies can be targeted directly to such failures, monetary policy is less likely to play a useful role. Monetary policy will more likely have a role to play when financial imbalances stem from economy-wide factors.

Of course, in practice, financial imbalances in the economy may well be associated with a combination of factors, and exuberance that is initially contained within specific sectors could spread more broadly through the economy. That was almost certainly the case in the run-up to the 2007–09 crisis, which reflected the complex interplay of imbalances among mortgage markets in the United States and other countries, securitized lending markets, credit default swaps and other derivatives markets, and the banking systems of the United States and some other countries. Thus, the examples presented here, while relevant, should be seen as individual building blocks for analyzing the interaction between monetary and prudential policies.

The rest of this article is organized as follows. First, the two examples are discussed in detail. Then, more general lessons are drawn by comparing these examples and highlighting the likely implications of two features that are absent from them, i.e., the risk-taking channel and the fact that financial imbalances are not easily detectable. The final section ends with some conclusions.

Exuberance in the Housing Sector

A credit-fuelled housing bubble is a particularly relevant example of a financial imbalance. This section considers the case of over-exuberance in the housing sector, represented as a temporary increase in the perceived value of housing that results in a short-term surge in mortgage credit.[4] This example is calibrated to produce housing-market dynamics that are roughly similar to those of the housing market in the United States in the run-up to the recent crisis. Specifically, the size of the shock is set at 5 per cent of the value of housing collateral; this leads to an average increase in mortgage debt in the first year of about 16 per cent, comparable with the average annual growth rate of mortgage debt over the 2003–06 period.

We evaluate the relative merits of using monetary policy to contain this imbalance and compare it with a well-targeted prudential instrument—namely, an adjustment in the mortgage loan-to-value (LTV) ratio. In the policy discussion of counter-cyclical system-wide prudential tools, several indicators of financial imbalances have been suggested, such as debt growth, the debt gap (debt relative to trend), the ratio of debt to GDP, and asset prices. In this example, the LTV ratio can be varied counter-cyclically as a function of the aggregate size of debt relative to trend.

The economic environment used, from Christensen and Meh (2010) and based on Iacoviello (2005), is a standard New Keynesian model with heterogeneous agents, where housing equity influences the borrowing capacity of households. This class of models is widely used in the academic literature and in many policy institutions. See, for example, the *World Economic Outlook* for October (International Monetary Fund 2009). This model implies that house prices have macroeconomic effects through the influence of the borrowing constraints on consumption.

Intuitively, the financial sector in this model works as follows. The amount that households can borrow is constrained by the collateral they can pledge, which is tied to housing values. A rise in house prices increases the value of the collateral held by households and improves the state of household balance sheets. This improvement increases the amount that households can borrow for current consumption and for housing investment.

The model captures an important feedback loop that amplifies the mechanism just described: as house prices rise and balance sheets improve, the increased demand for housing raises house prices even higher. The rise in house prices causes additional improvements in balance sheets, which fuel further increases in consumption and housing investment. Any shock hitting the economy is thus amplified through this mechanism.

A similar model, estimated using post-1980 Canadian aggregate data, captures the relative standard deviations of macroeconomic variables relative to GDP (Christensen et al. 2009). An important feature of this model is that it captures the correlations between consumption and GDP and between consumption and house prices that are produced by a reduced-form vector autoregression. The steady-state level of the LTV ratio is set to 0.8.

The model is used to examine the effect of a financial imbalance—characterized as a significant and sustained deviation of asset prices or financial indicators from longer-run trends—and the appropriate policy response.

Two policy tools are available in this model: monetary policy and prudential policy. Monetary policy is conducted mainly by following a *Taylor rule* with interest rate smoothing. Such a rule stipulates that the monetary authority adjusts the policy rate in response to deviations of the inflation rate from a target and output from potential (the output gap). When conducting policy experiments, an *augmented Taylor rule* is also considered, where the Taylor rule responds to indicators of financial imbalances (such as a divergence of actual household debt from its trend value) in addition to inflation and the output gap.

The model also allows for the possibility of using the prudential instrument, the LTV ratio, in a counter-cyclical manner. The maximum LTV ratio can be lowered when credit rises above its trend value, and raised when credit falls below its trend.

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4   A similar strategy is followed by Gertler and Karadi (2010) and Gertler and Kiyotaki (2010).

Financial regulation can be more effective than monetary policy in addressing financial imbalances

The model is used to highlight the relative merits of prudential policy and monetary policy in dealing with financial imbalances. Three main points emerge from this policy experiment and are illustrated in **Chart 1** and **Chart 2**.

The first point is that if exuberance in the housing market is not addressed directly through either policy instrument, it does not have a significant impact on inflation and output, but does have a large impact on household debt. For example, **Chart 1** illustrates that after a 5 per cent shock to collateral, inflation and output barely change, even though mortgage debt

increases substantially—at a rate in the first year that is comparable with the trend rate in the United States during the mid-2000s. The effects of this shock on output and inflation are small because the shock affects only a small set of the population (credit-constrained borrower households).

The second point is that if, in addition to inflation and the output gap, the monetary authority reacts explicitly to credit conditions, a sharp increase in interest rates is required to stem the buildup of credit, and this increase will result in a significant drop in inflation and output. The high levels of indebtedness and interest rates generate a stronger drop in consumption because of the higher cost of servicing the debt. Since debt contracts are nominal, this effect is also compounded by the debt-deflation effect,
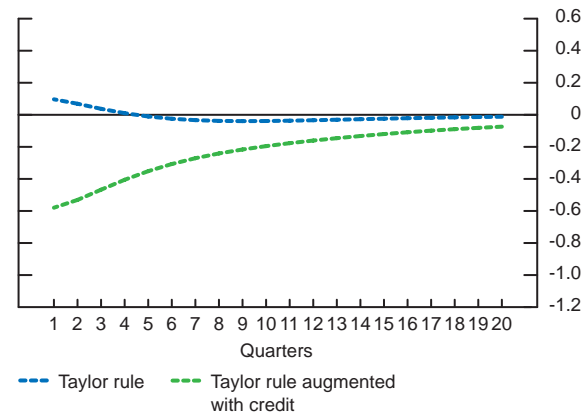

Chart 1: Effects of a positive 5 per cent shock to housing collateral with no counter-cyclical LTV ratio

Percentage deviation from steady state
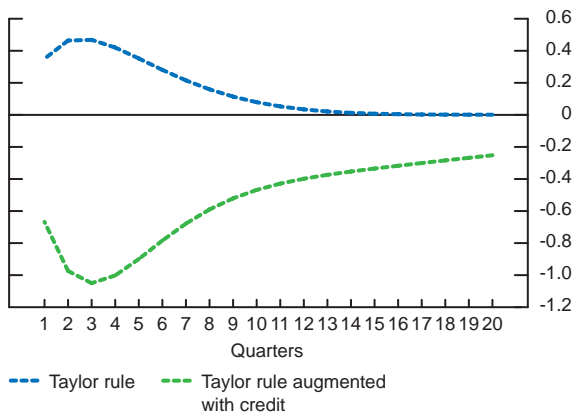
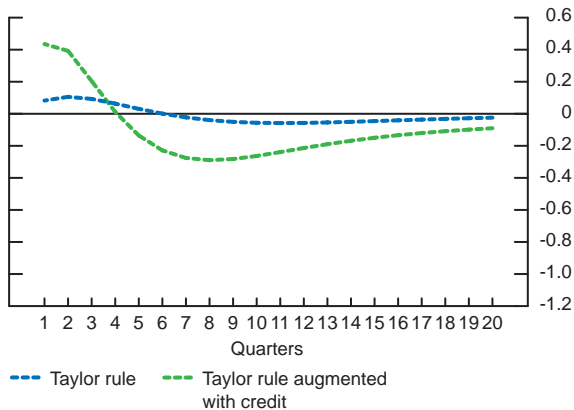a. GDP

b. Inflation

c. Policy rate

d. Mortgage debt

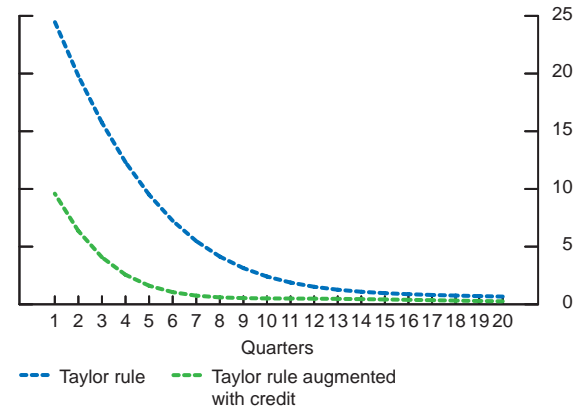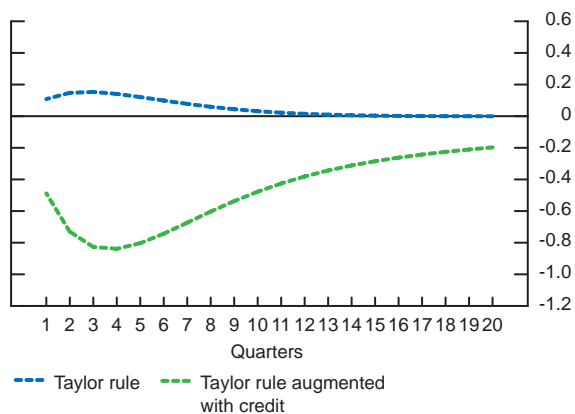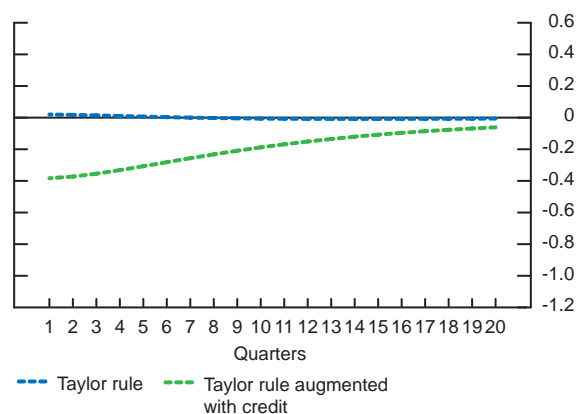--- Taylor rule   --- Taylor rule augmented with credit

Chart 2: Effects of a positive 5 per cent shock to housing collateral with a counter-cyclical LTV ratio present
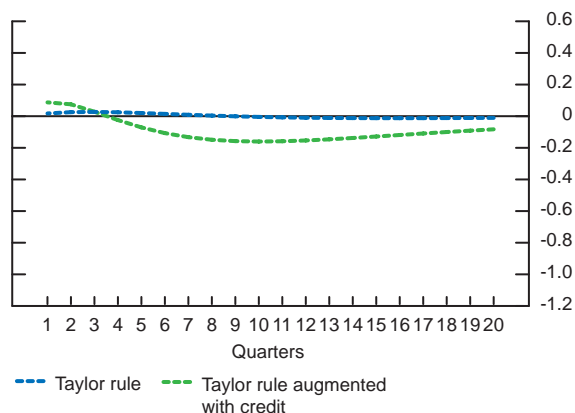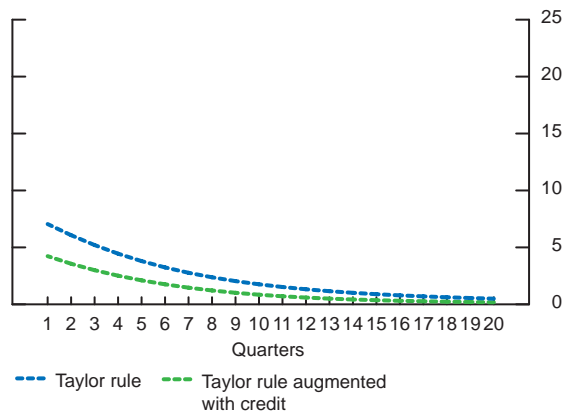
Percentage deviation from steady state

a. GDP

Taylor rule

Taylor rule augmented
with credit

b. Inflation

Taylor rule

Taylor rule augmented
with credit

c. Policy rate

Taylor rule

Taylor rule augmented
with credit

d. Mortgage debt

Taylor rule

Taylor rule augmented
with credit

because inflation unexpectedly falls below target. This can be seen in **Chart 1**, where the LTV ratio is assumed to be fixed, whereas monetary policy reacts explicitly to deviations of credit from its trend value. In this illustration, dampening the expansion of mortgage debt to 10 per cent above trend comes at the cost of a decrease in output and inflation of up to 1.3 per cent and 0.5 per cent, respectively. This illustrates the idea that monetary policy might be too blunt a tool to stem financial imbalances emerging in a specific sector (as stressed, for instance, in Bank of England 2009).

The third point is that a prudential policy in the form of a counter-cyclical LTV ratio is effective in addressing financial imbalances in the housing market without resulting in larger, and persistent, undershooting of the inflation target, and with less impact on economic

activity. This can be seen in **Chart 2**, where there is a counter-cyclical regulatory policy, and monetary policy follows the simple Taylor rule. As the chart illustrates, compared with a monetary policy targeted to achieve a specific financial-stability objective, a counter-cyclical LTV ratio on its own achieves the same dampening of mortgage debt, with fewer adverse effects on inflation and output. The decrease in the LTV ratio in this scenario is up to 2 per cent, suggesting that the greater the adjustment to the LTV, the less monetary policy needs to raise the interest rate and the less inflation will undershoot the target.

This example suggests that when financial imbalances come from a specific sector (e.g., housing), regulation targeted to that sector can be effective, while leaning with monetary policy would generate

unnecessary economic fluctuations. Specifically, responding to exuberance in the housing market, or in any sector, may come at the cost of the stability of economic activity and inflation. An important limitation of this analysis is that while it models a buildup of mortgage debt, it does not capture the possibility that such a buildup could later unwind in ways that cause damage to the financial system and the economy— i.e., a "boom-bust cycle." It therefore understates the benefits of restraining this type of buildup.

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Exuberance in the Banking Sector

This section presents a contrasting illustration where, at least in principle, monetary policy could play a useful role in dealing with financial imbalances, even when a prudential instrument is also available. In the example presented, financial imbalances emanate from the banking sector, and the available prudential tool is a *broad-based,* counter-cyclical capital requirement that reacts to deviations of actual aggregate bank credit from its trend value. The example is also relevant to analyzing one element of the recent crisis, the importance of excessive banking system leverage in transmitting financial stress during the crisis.

In the model used, from Meh and Moran (2010), the condition of bank balance sheets is determined endogenously and has important economic implications. The key innovation of this model is in capturing the role of bank capital in the amplification and propagation of shocks. The model incorporates several nominal and real frictions, in the spirit of state-of-the-art New Keynesian models.

At the heart of the model is an optimal configuration of financial contracts under asymmetric information, building on the seminal work of Holmström and Tirole (1997). Banks intermediate funds between dispersed investors, who are the ultimate lenders, and firms, who are the ultimate borrowers and producers of capital goods. A key function of banks is to monitor

firms on behalf of dispersed investors. The intermediation process is complicated by two sources of moral hazard. The first affects the relationship between banks and firms and arises because firms may not exert an optimal level of effort, since effort is costly and not publicly observable. To mitigate this problem, banks can monitor the behaviour of firms and require that they invest their own funds in projects.

The second source of moral hazard pertains to the relationship between banks and investors and stems from the fact that banks (to which dispersed investors delegate the monitoring of firms) may not monitor with optimal intensity, since monitoring is costly and is not publicly observable. In response, investors will provide loanable funds only to banks that are well capitalized. All things being equal, a higher level of bank capital lessens the moral-hazard problem between banks and investors and increases the ability of banks to attract loanable funds.

In the model, banks hold capital both to mitigate these agency problems and to satisfy a regulatory capital requirement (see Christensen, Meh, and Moran 2010). This capital requirement can be time varying and adjusted counter-cyclically with bank-credit conditions. Raising new bank capital is costly, however, and this implies that, in the short run, bank capital is determined mainly by earnings. In the model, the overall effects of shocks depend on the relative amount of bank capital and on the net worth of firms.

Monetary policy is conducted following a Taylor-type rule, as in the previous example. But the financial variable to which monetary policy could react is related to a persistent deviation from the trend of bank business credit. An exogenous monetary policy, where the nominal interest rate is held constant in the face of the temporary shock to the banking sector, is also considered.
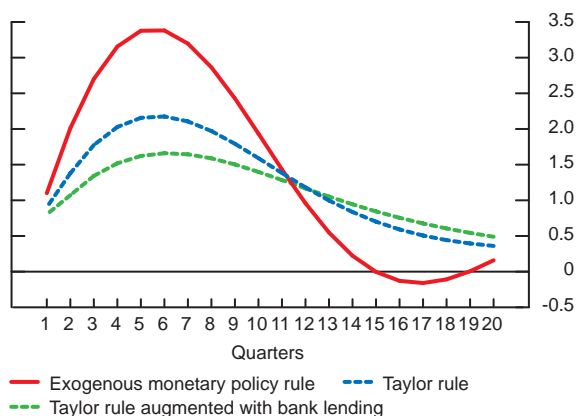
Financial imbalances are represented by an increase in the perceived quality of the assets of financial intermediaries (see Gertler and Kiyotaki 2010). Referred to as bank-capital shocks, these lead to an increase in the capital positions of banks, which, in turn, generate a rise in bank lending and a fall in credit spreads (such as occurred in the mid-2000s). The size of the shock is set at a 5 per cent rise in bank capital to replicate the magnitude of lending and credit spreads during the mid-2000s.

Three findings arise from this example. The first is that exuberance in the banking sector, in the absence of a policy response, can have major effects on output
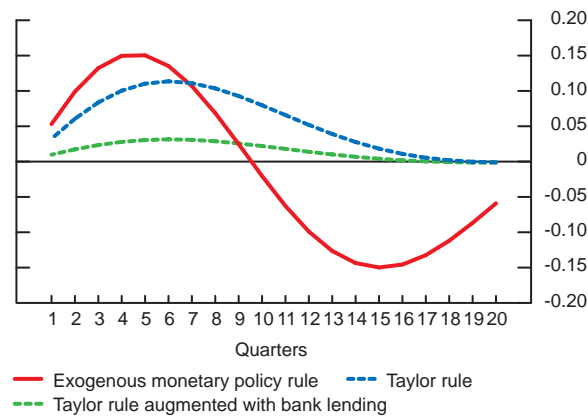
Chart 3: Effects of a positive 5 per cent shock to bank capital with no counter-cyclical capital requirement
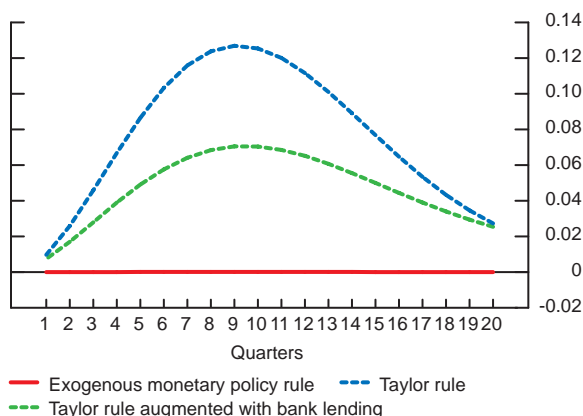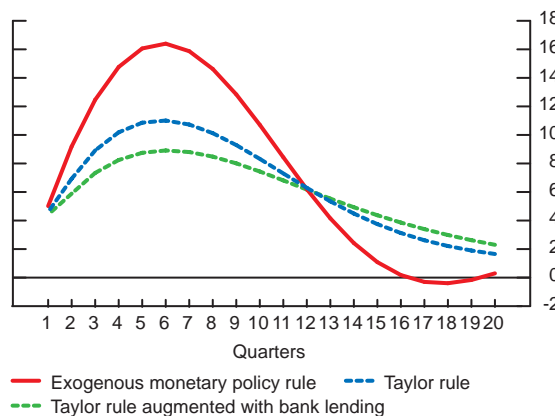
Percentage deviation from steady state

a. GDP

Quarters

— Exogenous monetary policy rule --- Taylor rule
--- Taylor rule augmented with bank lending

b. Inflation

Quarters

— Exogenous monetary policy rule --- Taylor rule
--- Taylor rule augmented with bank lending

c. Policy rate

Quarters

— Exogenous monetary policy rule --- Taylor rule
--- Taylor rule augmented with bank lending

d. Bank lending

Quarters

— Exogenous monetary policy rule --- Taylor rule
--- Taylor rule augmented with bank lending

and inflation, as well as on bank lending. In particular, it leads to important fluctuations in inflation and output. This can be seen in the case where monetary policy is exogenous and the capital requirement is constant. As illustrated in **Chart 3**, the exuberance in the banking sector leads to increases of up to 16 per cent in lending, 3 per cent in output, and 0.2 per cent in inflation. Nominal wage rigidities induce inertia in inflation and thus limit the increase in inflation.[5] Developments in the banking sector spill over to the whole economy because of the banking sector's important role in financing the production of the investment good in the model economy. Thus, a rise in the availability of bank credit increases the amount

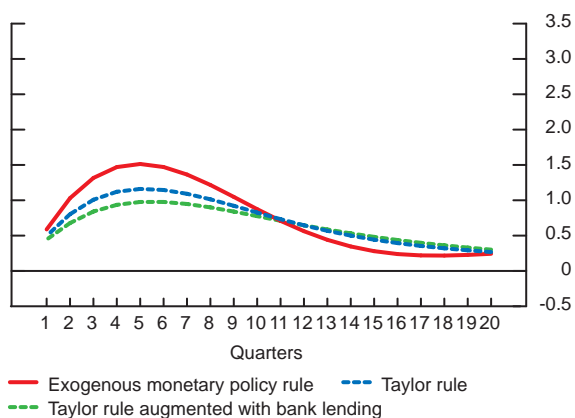of capital goods, and this has important implications for the entire economy.

The second result is that monetary policy can be used not only to stabilize inflation and output, but also to mitigate the effects of financial imbalances on bank lending. This can be seen in **Chart 3**, when monetary policy is adjusted to counter such imbalances, but regulation is not. When monetary policy reacts to both inflation and the output gap, bank lending is dampened by up to 10 per cent, and monetary policy is able to reduce the fluctuations in inflation and output. When the policy rate also reacts explicitly to credit, the increase in bank lending that results from the exuberance in the banking sector is even smaller, and inflation and output are further stabilized. Thus, in this example, monetary policy can help to dampen the

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5 The real side of the model is based on Christiano, Eichenbaum, and Evans (2005).
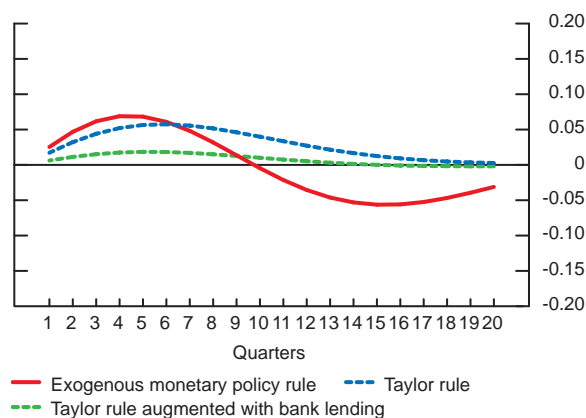
Chart 4: Effects of a positive 5 per cent shock to bank capital with a counter-cyclical capital requirement present
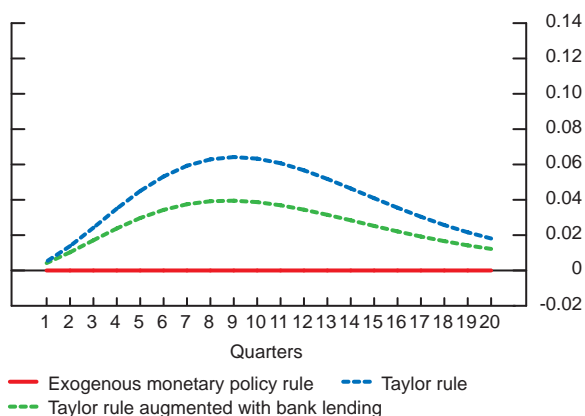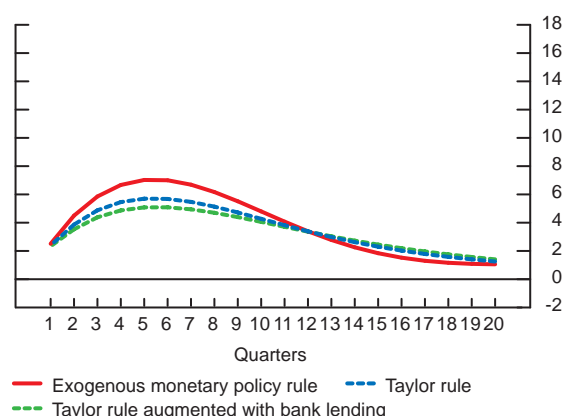
Percentage deviation from steady state

a. GDP

Quarters

——— Exogenous monetary policy rule   - - - Taylor rule
- - - Taylor rule augmented with bank lending

b. Inflation

Quarters

——— Exogenous monetary policy rule   - - - Taylor rule
- - - Taylor rule augmented with bank lending

c. Policy rate

Quarters

——— Exogenous monetary policy rule   - - - Taylor rule
- - - Taylor rule augmented with bank lending

d. Bank lending

Quarters

——— Exogenous monetary policy rule   - - - Taylor rule
- - - Taylor rule augmented with bank lending

effects of financial imbalances without diluting the price-stability objective or creating large losses in output. This is consistent with the standard result that monetary policy should respond pre-emptively to developments that affect output and inflation.

The third finding is that regulation in the form of a counter-cyclical capital requirement contributes to further attenuate the fluctuations in inflation and output **(Chart 4)**; alone, it is not as effective as monetary policy. In fact, when dealing with these types of financial imbalances, a counter-cyclical capital requirement and monetary policy complement each other. For instance, in the presence of a counter-cyclical capital regulation, a smaller increase in the interest rate relative to the case with no counter-cyclical capital requirement is needed to stabilize

inflation and output, following the development of such financial imbalances. Note also that, in the model economy, forward-looking and rational agents are aware that the central bank will increase the policy rate in the wake of exuberance in the banking sector; as a result, they limit their borrowing and this, in turn, leads to a smaller increase in interest rates (the expectations channel). Moreover, for this example, the steady-state level of the capital requirement is equal to 0.10, and the counter-cyclical capital requirement changes over a range of plus or minus 2 percentage points around this steady state.

In this example, financial imbalances have significant aggregate effects on the economy, and the available prudential policy is relatively *broad based*. In such a case, prudential policy may not be sufficient, and

monetary policy has an important role to play in leaning against these financial imbalances. Prudential policy and monetary policy are therefore complementary tools to stabilize economic activity and reduce the effects of the financial imbalances.

When Should Monetary Policy Lean against Financial Imbalances?

The two examples just discussed, while quite simplified, serve to illustrate the point that the appropriate response of monetary policy to financial imbalances depends on the nature of the imbalances, as well as on the alternative policy instruments available. By comparing the distinguishing features of the two examples, it is possible to go further to identify some factors that influence whether monetary policy should play such a role in practice.

Is the blunt nature of monetary policy a definitive argument against leaning?

As mentioned in the introduction, one argument against using monetary policy to lean against financial imbalances is that it is too blunt an instrument. The logic behind this argument can be seen in the first example, where financial imbalances are contained within a specific sector and do not have a significant short-run impact on the aggregate economy. Responding with monetary policy will generate a material reduction in output and inflation. In that sense, monetary policy is a blunt tool.

But the second case provides a counter-example. It suggests that if the imbalance has a material aggregate economic impact, monetary policy may be effective in countering it. Moreover, if the alternative prudential tool is broad based in nature, it could be equally blunt. In that case, the bluntness argument applies to both monetary policy and prudential policy, and therefore bluntness may not be a strong argument against using monetary policy to lean against financial imbalances.

An interesting case arises when the financial imbalances are such that they have a negligible impact on the aggregate economy in the short run, as in the first example, and when the only available prudential tool is broad based (and, hence, not well targeted to the sources of the imbalances). This is a case in which both monetary policy and the prudential tool are blunt instruments, and their use to counter financial

imbalances would cause inflation to deviate from the target for some time and could undermine the credibility of the inflation objective.

This does not necessarily mean that monetary policy should not be used. But a trade-off arises: inflation rises above the target in the short run even if one tool does a better job of hitting the inflation target in the long run. Because of modelling challenges, the simple models considered in this article ignore the crisis dynamics that could result from a persistent buildup of imbalances in one sector. As the recent crisis made clear, however, imbalances in one sector can indeed eventually crash and spill over into the entire economy. Responding to sector-specific imbalances can (and should) be justified by a desire to stabilize the aggregate economy. Whether the resulting reduction in output and inflation is acceptable would depend on the success of such an action in helping to prevent a crisis down the road.

But a trade-off arises: inflation rises above the target in the short run even if one tool does a better job of hitting the inflation target in the long run.

Does a well-targeted prudential tool obviate the need for monetary policy action?

One critical determinant of the appropriate monetary policy response to financial imbalances, evident in the first example, is the availability of alternative prudential policy instruments that can address such market failures at their root. It is thus important to ask how effective targeted prudential policies are likely to be.

Since imbalances can potentially arise in many areas of the financial system, not one, but a whole array of prudential tools may be required to target them. The effectiveness of such tools can change over time: given the ability of financial markets to adapt quickly to a changing environment (including by circumventing existing regulation), the tools would themselves need to adapt. Moreover, the authorities responsible for supervision and regulation would require the scope to adjust the parameters of their policies to target emerging financial imbalances. In practice, such use of prudential policies may be constrained by the need to maintain a stable regulatory environment for financial institutions and markets; the desire to create

a level playing field; and uncertainty with regard to the effectiveness of regulation in achieving system-wide objectives. These are important challenges, and the configuration of prudential tools that are used will necessarily reflect various compromises. In most cases, the goal of keeping things sufficiently straightforward and manageable will likely lead to a set of simple and stable tools. Moreover, because the objective is to smooth the financial cycle as a whole, the prudential instruments would need to be applied broadly to financial intermediaries and markets across the whole financial system. There will also be a range of instruments and policies, some directed at financial institutions (such as capital requirements) and others at markets (such as haircuts). Despite this diversity, it is unlikely that these instruments can be fine-tuned to fully address imbalances emerging in particular financial sectors and markets.

Prudential tools are a very important addition to the policy toolkit, and policy-makers must devote the energy required to developing them. Yet, although prudential tools will be always helpful to prevent and address financial imbalances, they might not be sufficient in every case. The extent to which monetary policy will play a role in mitigating financial imbalances is not clear yet, but it should be an important part of the discussions concerning potential improvements to monetary policy frameworks.

Features Absent from the Models: What Are the Likely Implications?

The two examples discussed here are instructive, but they do not include all the features that might be important to the question under discussion. Some of the missing features, such as the absence of boom-bust dynamics in asset prices and financial variables, were discussed in the previous section. Two additional important elements should be highlighted: (i) the risk-taking channel of monetary policy and (ii) the possibility that financial imbalances may not be detected in time.

The risk-taking channel of monetary policy

It is possible that small changes in the policy rate might have a much larger effect than assumed in the examples considered. This is particularly the case when the risk-taking channel of monetary policy is present. It has been argued that the stance of monetary policy may itself lead to excessive risk taking

by economic agents, which, in turn, can lead to financial instability. In particular, some observers (such as White 2006, 2009) have argued that interest rates that were kept too low for too long were an important factor in setting the stage for the 2007–09 crisis.

Specifically, monetary policy could influence the degree of risk that financial institutions decide to bear by influencing their perception and pricing of risk (Adrian and Shin 2009; Borio and Zhu 2008). This can take place through three broad types of mechanisms: (i) the perceived predictability of monetary policy, (ii) the search for yield, and (iii) the insurance effect of monetary policy. The first two mechanisms incite more risk taking in a low-interest-rate environment, while the third provides incentives for financial institutions to take more risks through the moral hazard created by the authorities' perceived reaction function. These three mechanisms can lead financial institutions and economic agents to take on too much leverage and the associated maturity mismatches, which, in turn, can generate financial imbalances. While there is some empirical evidence suggesting that such effects may have been at play prior to the recent crisis, the quantitative importance of the risk-taking channel remains largely unclear. Nevertheless, to the extent that the risk-taking channel is operative, it implies that the stance of monetary policy may contribute to excessive risk-taking behaviour and to the buildup of financial imbalances. This would strengthen the case for leaning against financial imbalances with monetary policy.

Monetary policy could influence the degree of risk that financial institutions decide to bear by influencing their perception and pricing of risk.

What if financial imbalances cannot be detected?

As mentioned in the introduction, one important argument against using monetary policy as a tool in these situations is that financial imbalances cannot be detected with certainty. This uncertainty applies not only to monetary policy, but also to prudential policy, and should play a role in determining how forcefully to react to the prospect of building financial imbalances.

Recent research at the Bank for International Settlements shows that our ability to detect imbalances may have improved. In any case, because we

are confronted with irreducible, or Knightian, uncertainty (Lo and Muller 2010) does not mean that such a prospect should be ignored. If we were interested in conducting monetary policy in a robust fashion—that is, trying to avoid worst-case outcomes rather than achieving the optimum—the probability, even if unquantifiable, of a financial imbalance building would call for some monetary policy response.[6] This response could also be justified in a risk-management framework.

Conclusion

In this article, we have argued that the case for monetary policy to lean against financial imbalances depends on the sources of the shock or market failure and on the nature of the other regulatory instruments available. To the extent that financial imbalances are specific to a sector and that a well-targeted prudential tool is available, monetary policy would play a minor role in leaning against the imbalances. However, if the imbalances in a specific market can spill over to the entire economy and if the prudential tool is broad based, monetary policy will likely have a role to play. In this case, there may be a need to coordinate the use of the two policy instruments.

As stressed in this article, a monetary policy that leans against the buildup of financial imbalances is not inherently inconsistent with a flexible inflation-targeting regime.[7] Such flexibility can be expressed in terms of a longer target horizon (Basant Roi and Mendes 2007; Selody and Wilkins 2007). In practice, however, exercising this flexibility could be challenging (Carney 2008, 2009). The examples presented in this article—and the subsequent discussion of some of the factors that are *not* included in them—highlight the complexities involved in characterizing the appropriate role of monetary policy in a setting where such imbalances may arise.

Much more work will be needed to bring our understanding of these issues to the level required to clarify the implications for the monetary policy framework. This will include further conceptual work on the types of imbalances that may emerge, the crises that may occur when the imbalances unravel, and the influence of monetary and prudential policies on the probability and severity of such crises. It will also include empirical work on the importance of various shocks and on the strength of the relevant macroeconomic linkages. Finally, there will also be a need to work through the operational implications of implementing such a monetary policy.

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[6] The literature on "robust control" may provide some valuable insights in this regard (Hansen and Sargent 2001, 2008).

[7] See Bank of Canada (2006) for the background document on the 2006 renewal of the inflation-control target.

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