

Macro-prudential instruments for New Zealand: A preliminary assessment

Yuong Ha and Bernard Hodgetts¹
Financial Markets Department, Reserve Bank of New Zealand

Paper prepared for Reserve Bank Workshop on Macro-prudential Policy, 21 March 2011

¹

We thank Ashley Dunstan for his assistance in generating the scenarios contained in Section 4 of the paper and Chris Bloor for some calculations on the Core Funding Ratio. We are also grateful for comments received from David Hargreaves, Anella Munro, Michael Reddell and Grant Spencer on an earlier draft of this paper. However, the views expressed are our own and are not necessarily those of the Reserve Bank.

Macro-prudential instruments for New Zealand:

A preliminary assessment

Yuong Ha and Bernard Hodgetts²

Financial Markets Department, Reserve Bank of New Zealand

1. Introduction

Following the Global Financial Crisis, there has been general acceptance of the need for central banks and financial regulators to adopt a greater 'macro-prudential' orientation. According to this view, *micro* prudential regulation, which focuses on the balance sheets of individual institutions, has been shown to provide no guarantee that system-wide financial risk will be contained. Policymakers must increase their focus on the resilience of the financial system as a whole and on the capacity for pro-cyclical lending behaviour to amplify the macroeconomic cycle in a destabilising manner.

To that end, there has been considerable interest in macro-prudential instruments – policy tools that might be used to promote a more stable and resilient financial system and help smooth the credit cycle. These tools would take the form of specific prudential requirements placed on the balance sheets of banks or other financial institutions, such as time-varying capital requirements, or restrictions on lending like loan-to-value caps.

Central banks including the Reserve Bank of New Zealand (RBNZ) and other international agencies have been evaluating the use of various macro-prudential tools (see, for example, Bank of England (2009), CGFS (2010), BCBS (2010a, b) and RBNZ (2010)). Recent proposals by the Basel Committee on Banking Supervision (BCBS) to strengthen global bank capital and liquidity, including the use of counter-cyclical capital requirements during periods of excessive bank credit growth, represent important steps toward wider use of macro-prudential tools. Some attention has been given to the experiences of a range of Asian economies, which have a history of using various prudential tools to assist with domestic credit stabilisation (Spencer (2010), Caruana (2010)). There have also been calls from some quarters for macro-prudential tools to be used in conjunction with traditional monetary policy, partly to deal with the problem of asset price bubbles (Blanchard et al, 2010).

The challenge for researchers of macro-prudential tools is to identify macro-prudential instruments that could improve financial or macro-economic stability. This involves careful

² We thank Ashley Dunstan for his assistance in generating the scenarios contained in Section 4 of the paper and Chris Bloor for some calculations on the Core Funding Ratio. We are also grateful for comments received from David Hargreaves, Anella Munro, Michael Reddell and Grant Spencer on an earlier draft of this paper. However, the views expressed are our own and are not necessarily those of the Reserve Bank.

analysis of what specific tools might or might not be able to achieve, the channels through which they would be expected to work, and the potential costs associated with using them. There are also numerous design issues. Would the instruments be set by rules or discretion? Would they be set once and left alone or varied over the course of the economic cycle? Or would they be deployed only in exceptional circumstances? What governance arrangements are needed? One also needs to consider the costs of using these tools. The possibility of avoidance, financial sector disintermediation, unintended consequences and financial system efficiency costs are all factors that need to be assessed.

The RBNZ has been researching the possible use of macro-prudential tools in a New Zealand context. There is particular interest in the outcome of this research in light of earlier work to examine tools that could be used to supplement the role of the monetary policy interest rate (RBNZ (2006)). This work was motivated mainly by concerns about an overheated housing sector and the impact of a high exchange rate on the tradables sector due to tight domestic monetary policy. This work looked at a range of tools that could supplement the role of the interest rate, including some that could be labelled 'macro-prudential'. While this earlier work concluded that there were no silver bullets, macro-financial stability was not the primary focus. Moreover, most of the instruments examined related specifically to the housing sector.

The purpose of this paper is to consider several macro-prudential tools that might potentially have a role to play in New Zealand. These include the Core Funding Ratio requirement for banks, introduced in April 2010, a counter-cyclical capital requirement along the lines of that proposed by the BCBS, adjustment of sectoral capital risk weights, and loan-to-value ratio requirements. For each of these instruments, we discuss how they might work, what they could be expected to achieve, their limitations and the potential pitfalls of using them.

Section 2 describes the potential role for macro-prudential tools in greater detail drawing on the recent international research. In section 3, we briefly review credit and asset cycles in New Zealand and the points in history where a macro-prudential intervention may have been warranted or contemplated. Section 4 considers several possible macro-prudential policy tools and provides some simulations of how two of these tools (the Core Funding Ratio requirement and a counter-cyclical capital requirement) might operate in the New Zealand context. Section 5 provides some thoughts on how the Reserve Bank might choose to deploy macro-prudential instruments in the future and the initial elements of a macro-prudential policy framework. Section 6 draws some preliminary conclusions.

2. The role and objectives of macro-prudential instruments

The case for a macro-prudential orientation to prudential policy has been gradually developing over the past decade, mainly through work undertaken at the Bank for International Settlements (see, for example, Borio and Lowe (2002), Borio (2003), BIS (2001, 2009), Gelati and Moessner (2010)). The topic has, however, received increased attention since the financial crisis. For example, Spencer (2010) explains how the financial crisis has highlighted the need for policymakers to consider the interaction between the financial system and the macroeconomy more explicitly than in the past.

Spencer points out that the traditional ‘micro-prudential’ approach to regulation has been focused mainly on the stability of individual bank balance sheets and the need to hold sufficient capital to guard against potential credit losses. Regulators have typically required banks to hold larger capital buffers than they would choose themselves primarily on the grounds of network externalities – the systemic contagion effects of bank failures that can cause broader economic and social costs than those faced by creditors, shareholders or bank managers. A related motivation for higher capital requirements has been the moral hazard problem under which banks choose to hold less than optimal levels of capital under the expectation that government support will be available during times of duress.

However, Spencer notes that regulators have largely ignored the externalities arising from the connections between bank lending and the broader macroeconomy. In particular, less attention has been paid to the ‘dynamic externalities’ created by pro-cyclical lending behaviour – the tendency for financial institutions, households and businesses to become over-exposed during an upswing as asset prices (and collateral values) rise, and to become excessively cautious during the subsequent downturn thereby amplifying the macroeconomic cycle. As Spencer notes, the financial crisis has demonstrated the damaging consequence of increased leverage by banks, households and businesses in many countries. This in turn has highlighted the potential role to be played by policies that attempt to reduce the risk associated with cyclical fluctuations in credit growth or credit pricing. This is often labelled the time dimension of macro-prudential policy (see Borio 2010).

Borio also describes a second dimension to macro-prudential policy – the cross-sectional dimension – which is concerned with the distribution of risk within the financial system at any point in time. It focuses on the risk exposures and interconnections between institutions. This dimension has also received increased attention since the financial crisis principally due to concerns about systemically significant institutions and the too-big-to-fail issue.

Macro-prudential instruments thus potentially include any prudential tools or interventions that could be used to promote greater stability across one or other of these two dimensions. BIS (2010a) note that the literature on specific instruments is very recent and that the list of

possible tools can be categorised in a range of ways. For example, instruments can be price or quantity based, applied using rules or discretion, preventative or reactive. Instruments could also be categorised by what they are intended to do – for example, directly targeting credit growth, limiting interconnectedness or building banks’ buffers to provide greater resilience to the effects of pro-cyclicality. In practice much of the discussion about macro-prudential instruments appears to relate to the time dimension i.e. dealing with or mitigating procyclicality and it is this dimension that is the subject of this paper.

The list of possible instruments is potentially long. Table 1 provides a list of commonly used instruments and those that appear to be under widespread consideration but the list is not exhaustive. Some tools appear to be existing micro-prudential instruments that have always been used but are now being viewed through a ‘macro’ lens (such as capital requirements applied more stringently than in the past or in a time-varying fashion).

Table 1 Examples of Macro-prudential Instruments³

Instrument	Possible Purpose(s)	Commonly used?
Loan-to-value ratio caps	Dampen housing market lending/Prudential soundness	Mainly in EMEs
Debt-to-income ratio caps	Dampen housing market lending/Prudential soundness	Mainly in EMEs
Loan growth targets	Moderate credit growth	Mainly in EMEs
Reserve requirements	Moderate credit growth/Prudential soundness	Mainly in EMEs
Limits on lending for purchases of shares	Prudential soundness/Reduction of speculative activity	Mainly in EMEs
Limits on open currency positions	Prudential soundness	Mainly in EMEs
Disallowance of interest-only loans	Dampen housing market lending/Prudential soundness	Mainly in EMEs
Limits on interbank exposures	Prudential soundness	Mainly in EMEs
Leverage ratios	Prevent excessive leverage	Proposed
Dynamic provisioning	Prudential soundness	Yes (prior to IFRS)
Core Funding or Net Stable Funding Ratios	Prudential soundness/dampen credit growth	Proposed
Countercyclical capital requirements	Build buffers during credit upswing/dampen credit growth	Proposed
Adjustments to sectoral capital risk weights	Build buffers against sectoral credit expansion/dampen sector- specific credit growth	Proposed

A survey by the BIS Committee on the Global Financial System (CGFS) of 33 central banks on the use of macro-prudential instruments found the most commonly used instruments have been measures to limit credit supply to particular markets such as caps on loan-to-value ratios for mortgage lending, debt to income restrictions for borrowers and aggregate or sectoral credit growth ceilings. Most of these measures have not been widely used in an advanced country

³ Compiled from Spencer (2010), CGFS (2010) and from a survey of EMEAP countries conducted by the RBNZ during 2010.

context in the last two decades.⁴ CGFS note that measures to target the size or composition of bank balance sheets, or to limit the risks of pro-cyclicality – such as loan to deposit ceilings, capital add-ons or time varying capital charges – have not been widely used anywhere but have been under consideration recently (CGFS (2010) p.10)).

While there do not appear to be any hard or fast rules in the literature as to what constitutes a macro-prudential instrument, we believe a dividing line needs to be drawn between tools that are sometimes promoted for macroeconomic stabilisation purposes but which do not have an obvious direct ‘prudential’ element (i.e. constraining or regulating financial institutions’ balance sheets or the terms and conditions of lending). Thus tools such as variable taxes, financial transactions taxes, interest levies or stamp duties are arguably *not* macro-prudential instruments even if they might conceivably have an effect on the credit cycle or the accumulation of risk in the financial system. Such tools may still be worthy of consideration but are not the subject of this paper.

Shin (2010) argues successful macro-prudential policy frameworks need to encompass both a system of early warning indicators that signal increased vulnerabilities to financial stability and an associated set of policy tools that can address these vulnerabilities at an early stage. This suggests that the practical success of some macro-prudential instruments could rest on the quality of the macro-prudential indicators that are used to guide their deployment. If reliable indicators cannot be developed, this may be a barrier to the use of a particular instrument, even one that looks good ‘on paper’. On the other hand, Davis and Karim (2009) have expressed pessimism about the ability of the authorities to detect financial instability arguing the need for a wider range of macro-prudential tools, particularly those that will tend to limit *ex ante* the financial system risk, in both the time series and cross sectional dimensions. Borio and Drehman (2009) also argue for reliance where possible on automatic stabilisers rather than discretion to help lessen the burden on the real-time measurement of financial stability risks. This viewpoint suggests caution may be warranted in the design of some tools (especially those that rely on discretionary or frequent adjustments during the credit cycle or that are otherwise demanding in relation to the supporting indicators).

2.1 Building resilience or dampening excessive credit growth?

BoE (2009) discusses the importance of being specific about what macro-prudential instruments are able to achieve. Some macro-prudential instruments promoted for the ‘time dimension’, such as the system of countercyclical capital requirements recently proposed by the BCBS, have been designed primarily to build the resilience of the financial system (by

⁴ Spencer (2010) notes that in the 1960s to 1980s prior to financial deregulation it was common to find credit instruments in advanced economies, such as cash and reserve ratios that were varied in an attempt to influence the supply of credit. These could be considered early versions of macro-prudential tools.

requiring banks to increase capital buffers during periods of excessive credit growth). Although the creation of these buffers is expected to smooth the credit cycle (by reducing the severity of the credit downturn when the buffers are released) it is a debatable point whether they would be effective in dampening periods of excessive credit, particularly when strong profits support capital growth. Indeed the architects of these tools have been very cautious in this regard given the limited experience with such tools (see BCBS (2010a)).

The idea that some macro-prudential tools are of limited value in directly countering strong credit growth has an element of empirical support. In a study of dynamic provisioning in the Spanish banking system, Saurina (2009) found that a system of dynamic loan loss provisions proved useful to the Spanish banks during the financial crisis by allowing them to draw-down loan loss provisions that were built up during the boom. But he also commented that dynamic provisions should *not* be viewed as a monetary policy tool – in particular, they did not appear to have been helpful in taming the Spanish lending cycle as credit growth had remained strong during their period of application. This finding has been backed up by Caprio (2010) in relation to both Spain and Colombia.

However, the experience with dynamic provisioning aside, there is a possibility that some macro-prudential tools *could* have a role to play in directly dampening the supply of credit during an upswing or stimulating it during a downturn. Such tools, if they exist, would be appealing if they could support monetary policy and help lean against credit-fuelled asset price bubbles or other debt-related imbalances. Consequently, a challenge for researchers of macro-prudential tools is to establish the extent to which various tools might have scope to lean against the credit cycle.

In doing so it is likely to be important to think carefully about transmission channels, expectations, signalling and the conditions that give rise to the credit cycle. Aikman, Haldane and Nelson (2010) set out a model of the credit process in which banks' failure to coordinate lending decisions gives rise to boom-bust credit cycles. A lack of information and a failure to coordinate lending decisions sees banks collectively take on risk which generates a systematic credit boom and a subsequent bust when the risk is eventually realised. A key conclusion Aikman et al draw is that expectations are crucial for the effectiveness of macro-prudential policy instruments and that clear signalling is paramount in shifting lenders' behaviour. The authors express optimism that accurate signalling could even by-pass other transmission channels through which macro-prudential instruments might be expected to work (such as through directly raising or lowering the cost of credit provision). They cite the example of raising capital ratios for banks, where opinions differ on the extent to which higher ratios will raise the cost of credit provision (and hence act as a brake on the credit cycle). Aikman et al suggest that the instrument could still be useful in shifting lending behaviour via an expectations or signalling effect. While we agree that expectations are likely to be very important, we are not convinced that signalling of intentions alone would be sufficient to shift

lender behaviour if the instruments of policy were not believed to be fundamentally effective (i.e. capable of affecting the price or quantity of credit).

2.2 *Fixed versus variable instruments and rules versus discretion*

Macro-prudential tools could potentially be implemented in one of two ways to achieve the objective of greater financial system stability. Prudential requirements could be varied through time in response to various indicators, such as the credit cycle, with the aim of being ‘counter-cyclical’ in nature. Alternatively, they could simply be set and kept constant through time with the aim of making the financial system more resilient at all points in the cycle (G30 (2010)). For example, a significant one-off increase in capital requirements could reasonably be considered ‘macro-prudential’ if the calibration of the new ratios was designed to promote greater financial system resilience in the face of future credit shocks. It seems to us that the ‘fixed versus variable’ choice largely comes down to technical and practical issues which are likely to vary between instruments. Indeed, a crucial starting position is that we ensure that the implementation of the Basel regulatory framework does not inadvertently contribute to the risk taking behaviour that might result in excessive credit growth and build up of system wide risks.

Analogous to the early debate on monetary policy, there has been much discussion as to whether macro-prudential tools that are varied through time should be exercised using rules or discretion (see Gelati and Moessner (2010)). The use of rules is usually advocated on the grounds of transparency, accountability and time consistency. Gelati and Moessner note that some tools such as systems for loan loss provisions, capital requirements and loan-to-value ratios may lend themselves to being applied in a rules-based manner and doing so could help the tools act as automatic stabilizers. On the other hand, devising robust rules for the use of some tools, such as those designed to influence credit growth, could be extremely difficult in practice as the properties of those tools remain untested. Moreover, the indicators and triggers for such instruments are likely to require the use of judgement in much the same way that monetary policy decisions do. For example, credit may continue to grow strongly as a crisis unfolds as credit lines are drawn upon.

In the absence of mechanistic rules, it may be possible for the authorities to retain some of the advantages of rules-based decision-making by setting out clearly the principles and information used to exercise discretion. In providing guidelines to national authorities for the implementation of a system of countercyclical capital buffers, BCBS (2010) suggest that movements in the Credit/GDP ratio relative to its trend may be a useful common guide for authorities in guiding decisions about when to introduce the buffer. This reflects cross-country empirical evidence that the ratio has generally been a reliable predictor of financial crises in the past. But BCBS also note that the authorities should be “free to emphasise any other variables

and qualitative information that make sense to them for purposes of assessing the sustainability of credit growth and the level of system wide risk as well as in taking and explaining buffer decisions.” (BCBS, 2010 p 3). In essence, the argument is that the authorities should aim to explain the information used and how it has been taken into account in lieu of a purely mechanistic approach.

This suggested approach seems broadly aligned with that used for monetary policy in most jurisdictions. Although many countries clarify the monetary policy objective through the use of a formal inflation target, the actual policy decisions are exercised using considerable judgement. Most developed countries attempt to set out the basis of this judgement in their *Monetary Policy Statements* or other accountability documents. As in the case of monetary policy it seems reasonable to believe that credibility in a macro-prudential framework would be established over time as the quality of decision-making and achievement of objectives became apparent.

2.3 Existing Empirical evidence on macro-prudential tools

Galati and Moessner (2010) point out there is to date very limited empirical analysis of the effectiveness of most macro-prudential instruments that could guide the design and use of such tools in the future. There are good reasons for this. As noted earlier, some tools under current consideration have not yet being practically implemented and many have been used only in a limited number of settings. Some tools have not been widely used outside of emerging markets, where institutional details and modes of use are likely to differ considerably from what might be possible in advanced economies.

There has been a limited number of studies undertaken looking at the effectiveness of macro-prudential instruments in South East Asia. Wong and Hui (2010) consider the effectiveness of maximum loan-to-value ratios in Hong Kong using a cross country analysis of 13 economies and finds that the tool is effective in reducing systemic risk arising from the boom bust cycle in property. But they also highlight the potential drawbacks such a tool may impart (such as disadvantaging new home buyers). Chang (2010) discusses the effects of Loan-to-Value and Debt-to-Income ratio restrictions along with other restrictions on mortgage lending that have been applied in South Korea. He concludes that they can enhance financial system resilience and moderate the financial cycle when used in a countercyclical manner.

Borio and Shim (2007) attempt some preliminary regression analysis of a range of prudential measures in a cross country dataset, including reserve and liquidity requirements and credit limits, in an attempt to measure their effect on country credit booms. The authors conclude that the introduction of prudential measures, sometimes supported by monetary measures, appears to have contributed, on average, to some, at least temporary, containment of the

booms. However, they note that this conclusion is very tentative and that there is a need for further work in this area.

2.4 Efficiency and disintermediation consequences of macro-prudential tools

Two areas that appear to have received relatively little attention in the literature in the discussion of macro-prudential tools are the potential impact of those tools on financial sector efficiency and the scope for them to result in financial disintermediation (with financial activity shifting from the parts of the financial sector facing the instruments to those that do not). Since most macro-prudential instruments would operate by affecting the price or quantity of credit and other financial prices, those instruments can also affect both the cost and availability of credit and the efficiency with which the financial sector is able to allocate funds among savers and borrowers. While these efficiency costs might be deemed worth incurring in order to promote broader financial and macroeconomic stability, a complete analysis of individual tools would need to carefully assess the efficiency implications. This is particularly pertinent in instances where the impact of a particular tool is uncertain (or subject to the vagaries of broader market conditions).

Almost all of the international discussion on macro-prudential tools has been couched in terms of the banking system. However, while the banks are an important part of the financial system in most countries, including New Zealand, non bank institutions and the broader capital markets are also important dimensions and have the potential to grow in importance when regulatory conditions allow. The application of macro-prudential tools solely within the banking system could in some instances promote a shift in lending or other financial activity towards the sectors not affected by the instrument (including offshore). This might, in turn, undermine the objective of the instrument and simply shift the accumulation of risk elsewhere within the financial system.

As an example of this, New Zealand's post-war experiences with administrative and quantitative controls on the banking system resulted in a significant financial disintermediation to the non-bank sector. New Zealand's monetary policy framework over this period consisted of a range of reserve asset ratio requirements to control the flow of credit while keeping interest rates below market levels through interest rate restrictions. Prior to the 1970s, the financial sector was dominated by trading banks making it possible to exert a significant degree of control on interest rates and money and credit growth by regulating the activities of a few central financial institutions. However, the process of financial innovation – in part, spurred by the nature of regulation – and increased integration of the domestic financial sector into world markets resulted in monetary policy implementation becoming increasingly ineffective as

financial activity was re-routed through new instruments and markets outside the scope of regulatory controls.⁵

While policymakers are not contemplating the return to such heavy-handed regulation of the financial sector, the disintermediation risks associated with any tools will require careful thought. Macro-prudential instruments could in principle be applied more widely than just the banking system but would likely need to be tailored to the sector in question posing design challenges. This appears to be an area ripe for further consideration.⁶

2.5 Governance issues and monetary policy interactions

The recent focus on macro-prudential instruments has gone hand-in-hand with the debate about the role of monetary policy in leaning against asset price cycles and the accumulation of financial imbalances. The conventional view that monetary policy itself can do little to lean against these imbalances has been questioned by Borio and Drehman (2009) and others who propose that monetary policy could be used to address them more actively than in the past. This would essentially see monetary policy take on an additional financial stability role in addition to its price stability or macroeconomic focus.

An alternative view is that macro-prudential policy instruments might provide a new means to deal with these imbalances. This has been the suggestion of Blanchard et al (2010) who state that the authorities now have potentially many more instruments at their disposal than they used before the crisis. The authors state that the policy interest rate is a poor tool to deal with excess leverage, excessive risk taking, or apparent deviations of asset prices from fundamentals. They note that:

“... there are other instruments at the policymaker’s disposal—call them cyclical regulatory tools. If leverage appears excessive, regulatory capital ratios can be increased; if liquidity appears too low, regulatory liquidity ratios can be introduced and, if needed, increased; to dampen housing prices, loan-to-value ratios can be decreased; to limit stock price increases, margin requirements can be increased ... True, none of these is a magic bullet and all can be, to some extent, circumvented. Nevertheless, they are likely to have a more targeted impact than the policy rate on the variables they are trying to affect.” (Blanchard et al pp 11-12).

⁵ For example, the absence of ratio requirements on the non-institutional finance market contributed to the rapid increase in deposit and loan business being conducted by solicitors and accountants. For more information on historical developments in New Zealand financial markets, see RBNZ (1986) and Singleton (2006).

⁶ In some cases, disintermediation could occur whereby non-financial corporates choose to access capital markets directly, bypassing the banking system. This could be viewed as a desirable disintermediation, helping to rebalance the financial system away from such heavy reliance on banks and potentially contributing to a deepening in domestic capital markets.

As the earlier discussion suggested, whether these macro-prudential tools are actually suitable for leaning against the credit cycle and managing various imbalances ultimately rests on an analysis of the individual tools and experience over time – some tools could well prove to be ineffective in this regard. However, the prospect of new tools raises important governance and institutional issues. These include how decision-making about particular tools can be dovetailed with monetary policy decision-making and which institutions should be responsible for the implementation of macro-prudential tools. As reported in Gelati and Moessner, there is no consensus in the literature whether monetary policy and prudential regulation and supervision should be combined in a central bank or undertaken by separate institutions. However Blanchard et al (2010) argue there is a strong case for central banks to be macro-prudential regulators and that centralising responsibilities within the central bank would help to avoid problems of coordination.

Spencer (2010) discusses arrangements in New Zealand noting the Reserve Bank's dual responsibilities of price stability and promoting the soundness and efficiency of the financial system through its prudential powers under the Reserve Bank Act. Spencer notes that the Reserve Bank's focus when discharging its soundness and efficiency objective is inherently systemic and that the Bank has a natural interest in macro-prudential tools that might curb the extremes of pro-cyclical behaviour. If additional macro-prudential instruments were adopted with the intent of better achieving broad financial system stability, the Reserve Bank's existing powers under its Act are likely to be adequate.

Spencer notes that monetary policy and financial stability functions are likely to be well aligned in most cases, but also considers situations where the two could be in conflict (for example, when inflation pressures are strong but credit and asset markets are not). He notes that under current legislation, the use of macro-prudential policy in situations where it was not necessary for the promotion of financial system stability could be questionable. Using macro-prudential tools solely for macroeconomic stabilisation purposes might thus require the involvement of other agencies, alternative governance mechanisms or changes to current legislative arrangements.

Even if micro- and macro-prudential regulation and monetary policy are undertaken within the central bank, coordination of these functions can pose significant challenges. As set out in Spencer, in the case of New Zealand the Reserve Bank established a Macro-Financial Committee (MFC) in 2009 for the internal consideration of macro-financial issues and policies. This will complement the Reserve Bank's Monetary Policy and Financial Oversight Committees, which discuss monetary policy and micro-prudential policies respectively. The MFC currently reviews indicators of financial stability, oversees production of FSRs and considers potential new macro-prudential policy tools. If and when new policy tools are adopted, then any policy adjustments would be reviewed and recommended to the Governor by this committee. The implications of such recommendations for micro-prudential policy and for monetary policy

would be considered by the Governor and potentially referred to the other policy committees. Spencer notes that dealing with these potential policy overlaps is facilitated by having one small full-service central bank managing monetary policy and all prudential policies. However, the scope of the macro-financial stability function, as published in the Bank's *Statement of Intent*, would need to be reviewed as the function and policy instruments are developed further.

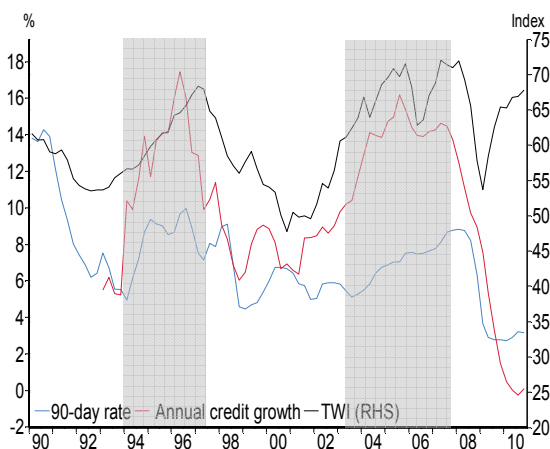
3. Credit and asset cycles in New Zealand's recent history

In this section we examine the credit and asset price cycles in New Zealand to highlight periods where macro-prudential tools might have been warranted or contemplated. Given the extensive structural reforms and financial deregulation that occurred in the mid 1980s and limited data availability, we focus mainly on the period from the early 1990s.

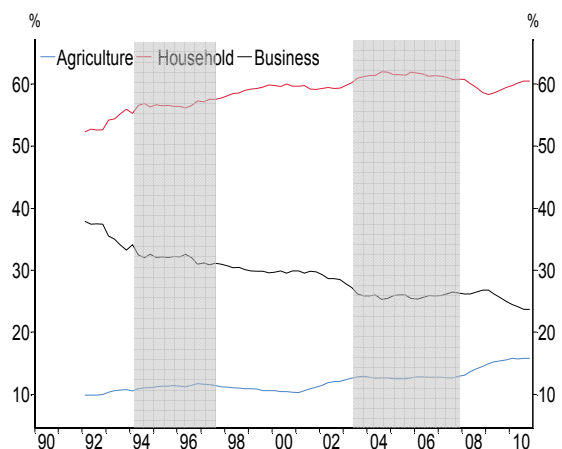
Figure 1 shows the evolution of a range of indicators for credit, asset prices, financial imbalances, financial market prices and bank capital. From panel A we can see that New Zealand has experienced two periods of rapid credit growth that have also coincided with a significant tightening in monetary policy and exchange rate appreciation (1994-97 and 2003-07). In terms of sectoral credit trends, housing credit represents the largest exposures for the financial system, though agriculture has also been growing in importance (Panel B). Panels C and D show that the sectoral credit and asset price inflation cycles have been broadly synchronised (though the agricultural cycle appears to have started a bit earlier in the early 2000s).

Figure 1: Business and credit cycle indicators

A. Credit growth and 90-day rates



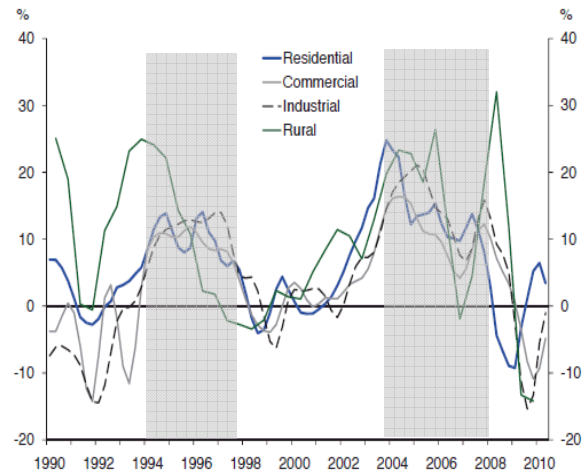
B. Sectoral credit shares (% of total credit)



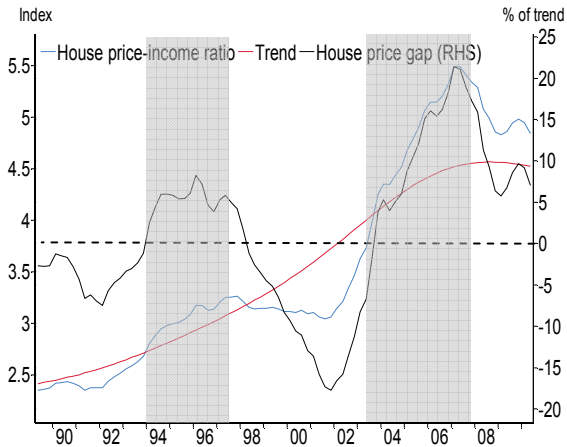
C. Sectoral credit growth



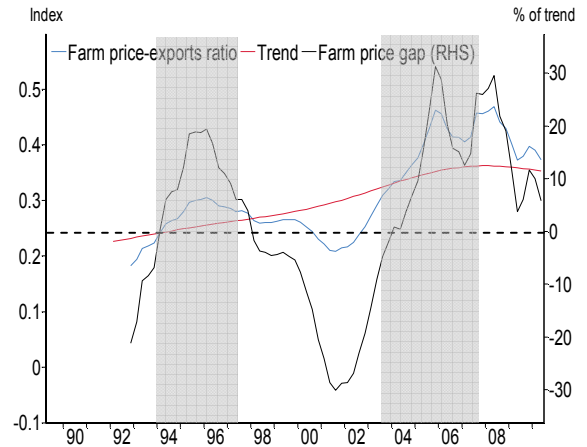
D. Property price inflation



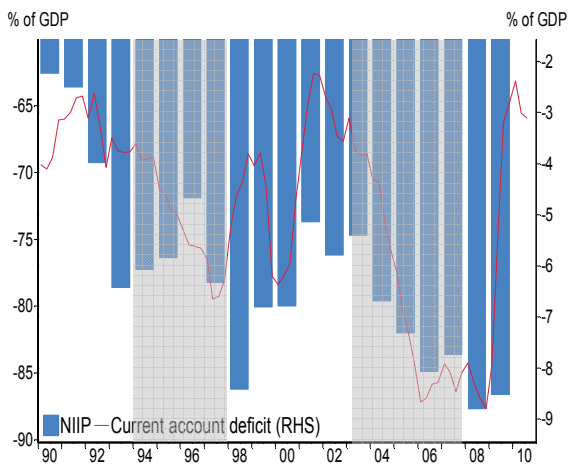
E. House price-to-income ratio



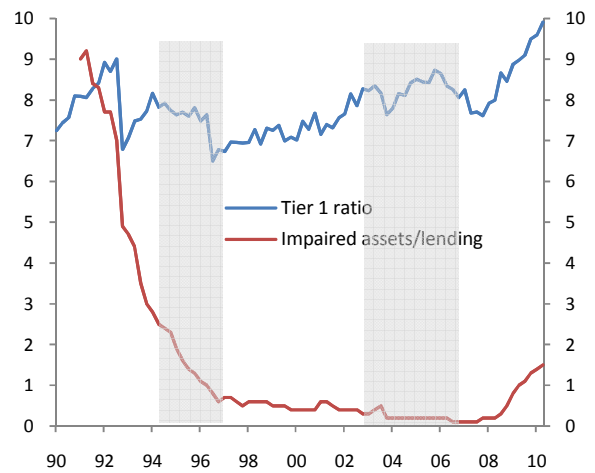
F. Farm price-to-export ratio



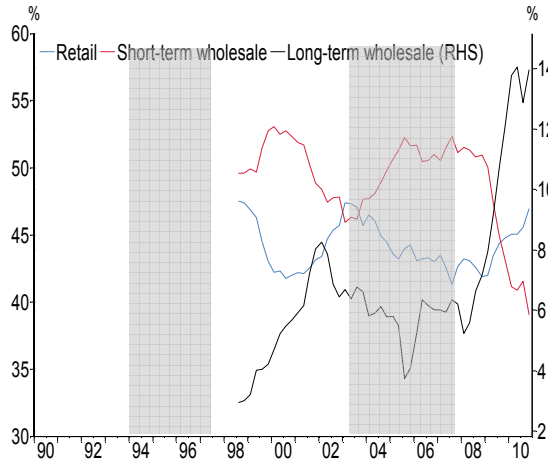
G. Net international liabilities, current account deficit



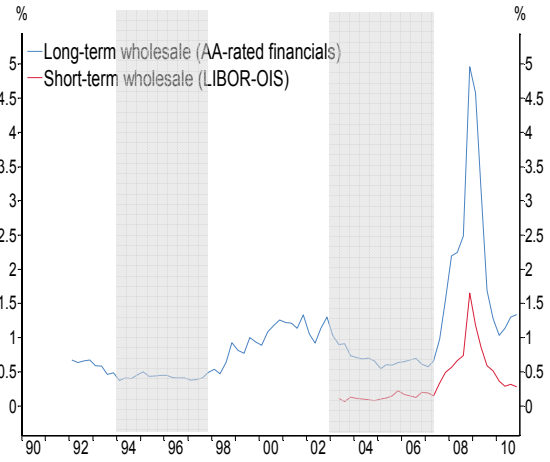
H. Bank capital ratios, non-performing loans



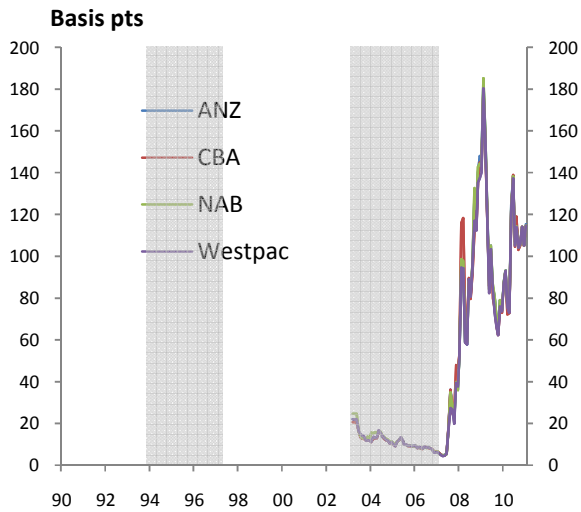
I. Sources of bank funding



J. Indicative funding spreads



K. Parent bank CDS spreads



Panels E and F indicate that the 2 periods also resulted in large deviations in house and farm prices from trend, with the gaps being much larger in the most recent cycle.⁷ Throughout these two periods there was a steady deterioration in New Zealand’s external vulnerabilities and growing financial imbalances with persistent and rising current account deficits (panel G). While together these developments suggest a build up of system risk, bank capital ratios remained at relatively robust levels while non-performing loans remained low, even in the aftermath of the GFC and cooling in domestic asset markets (panel H). Consistent with global experience, financial market pricing (CDS and funding spreads) remained relatively benign during the boom periods and tended to increase only as the crisis was unfolding (panel J and K). However, it was

⁷ The trends have been calculated as an HP filter with a lambda of 25,000 with judgemental adjustments to condition the endpoint of the filter.

noticeable that there were growing risks related to banks' funding positions given the increase in short-term wholesale debt funding, which increased banks' rollover risks (panel I).

A reasonable conclusion from this analysis is that the timing and magnitude of previous credit and asset price cycles acted to fuel the general business cycle and made the monetary policy task more difficult. These credit cycles also resulted in growing macro imbalances and institutional resilience was weakened due to the heavy reliance on short-term wholesale funding. Though bank capital positions remained robust throughout the past two decades, there were downside risks given signs that sectoral credit markets were stretched, particularly for housing and agricultural lending. Together these factors suggest that there may have been a role for macro-prudential policy, which could have been warranted on the grounds of building resilience and to dampen the credit cycle. To the extent that macro-prudential would have managed to dampen the credit cycle, there would have been less pressure on monetary policy and on the exchange rate.⁸ However, it is important to emphasise the uncertainty around the impact of macro-prudential tools on dampening the credit cycle as it depends crucially on financial market conditions prevailing at the time. In the next section, we examine the potential impact that macro-prudential tools could have on the credit cycle in the New Zealand context.

4. Potential macro-prudential tools for New Zealand

In the wake of the global financial crisis, credit growth in New Zealand has been weak, a development also seen in other countries. As a result, there appears little immediate need for the deployment of macro-prudential tools for the purposes of countering rapid credit growth. However, as section 3 showed there have certainly been periods in the country's history where strong credit growth and asset price cycles have had damaging effects on the economy and the financial system. Monetary policy alone has at times struggled to manage these cycles and we have seen the difficulties that can arise when interest rates alone are used. Thus there is a strong case to develop our macro-prudential toolkit to enhance our ability to deal with credit cycles in the future.

Over the past year, the Reserve Bank has been assessing a range of macro-prudential instruments that might have a role to play in contributing to broader financial stability in New Zealand. The instruments we consider include: a core funding ratio; a countercyclical capital buffer; risk weights applied to sectoral lending for the purposes of calculating regulatory capital; and loan-to-value ratio restrictions for housing. For each of the instruments, we discuss

⁸ Indeed, the rapid and persistent appreciation of the New Zealand dollar exchange rate during the last monetary policy cycle resulted in a Parliamentary Select Committee inquiry in 2006 to search for alternative policy instruments to target the housing market more directly and alleviate pressure on interest rates and the exchange rate. For more details, see the 2006 RBNZ report on Supplementary Stabilisation Instruments.

how they might work, what they could be expected to achieve, and any potential pitfalls of using them in the context of the New Zealand financial system.

At the outset, it is important to emphasise our belief that most of the tools considered here, if used at all in the future, would likely be deployed infrequently. In that regard, BCBS (2010) has suggested that some countries may only use the recently proposed counter-cyclical capital buffer once every 10 to 20 years when faced with exceptionally strong credit growth. We believe this is a useful perspective.

4.1 A Core Funding Ratio (CFR)

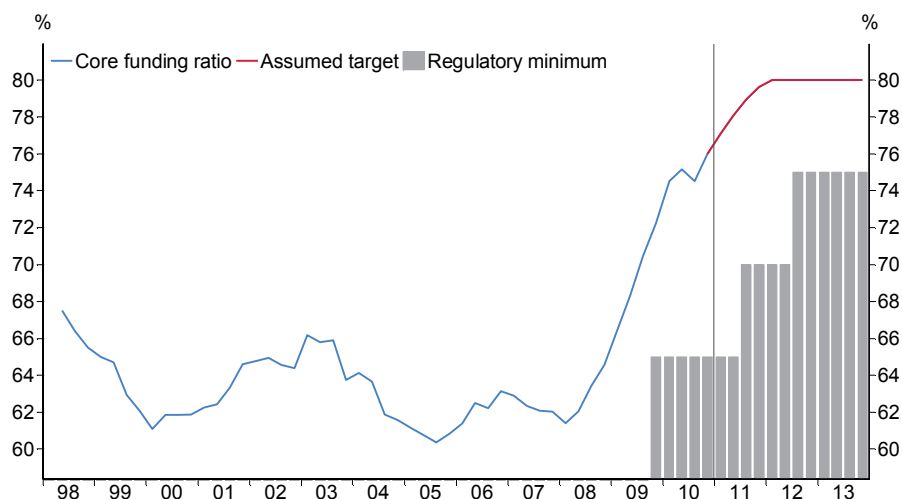
Persistent current account deficits since the 1980s have resulted in a secular increase in New Zealand's external indebtedness, with gross external debt currently around 130 percent of GDP. More than two thirds of this debt is intermediated through the banking system. In the years prior to the global financial crisis, the proportion of this debt issued for terms of less than one year appears to have steadily increased, rising to around 60 to 70 percent. At the same time, the relative use of domestic retail deposits as a source of funding fell, partly because the banks were attracted to the use of cheaper short-term external funds and partly due to low levels of saving by domestic households. The reliance on short term wholesale debt left the New Zealand financial system vulnerable to global financial market disruptions. This point was highlighted during the financial crisis when domestic banks required extensive liquidity support from the Reserve Bank when access to global capital markets was disrupted (see Steenkamp (2010) for more discussion on New Zealand's external vulnerabilities).

In response to this vulnerability, the Reserve Bank introduced a new prudential liquidity policy for banks in April 2010 (see RBNZ 2010b for a full description of this policy). While there were a number of aspects to this policy, including short-term liquidity mismatch ratios, an aspect of particular interest was the establishment of a minimum core funding ratio (CFR). Under this requirement banks are now required to fund a minimum of 65 percent of their loans and advances using stable or 'core' funding sources (retail deposits and/or term wholesale debt of greater than 1 year in maturity). The RBNZ has signalled its intention to increase the minimum CFR to 70 percent in mid 2011 and to 75 percent by mid-2012.⁹ The CFR has helped to reinforce the banks' own resolve to increase the maturity and stability of their funding in the wake of the financial crisis and considerable progress has been made in increasing the proportion of core funding over the past 18 months (figure 2). As the chart shows, in practice, it is likely that the banks will choose to hold an extra buffer of core funding over and above the minimum in order

⁹ The RBNZ's core funding ratio is conceptually similar to the net stable funding ratio (NSFR) under the new Basel II standards. However, our initial analysis indicates that a minimum NSFR of 100% would translate to a higher CFR requirement than 75% under the RBNZ's prudential policy.

to avoid being ‘caught short’ of the regulatory minimum due to normal balance sheet fluctuations.

Figure 2 The core funding ratio minimum requirement and banks’ assumed target holdings (percent of loans and advances)



The primary intention of the CFR has been to build greater financial system resilience and to help ensure that this resilience is maintained during periods of rapid credit growth when banks might otherwise choose to fund lending using less stable short-term wholesale debt. By extending the maturity of the banks’ term wholesale debt and requiring greater reliance on more sticky retail deposits, the CFR should reduce rollover risk and enable the financial system to cope more effectively with the sorts of disruptions to global funding markets that were experienced during the GFC.

To illustrate these properties, Table 2 illustrates the potential effects of changes in the minimum CFR on the average maturity of the banks’ wholesale funding. The table assumes that the proportions of retail funding and tier 1 capital in core funding remain unchanged for different levels of the CFR and that banks choose a mix of 7-year bonds and 90-day Commercial Paper to fund the wholesale portion of their book, changing that mix to achieve the CFR minimum. As shown by the table, a lift in the CFR from 55 percent (its approximate level prior to the GFC) to 75 percent (the rate the Reserve Bank has planned for 2012) would increase the average maturity of wholesale funding from 0.9 quarters to 6.2 quarters.¹⁰ This increase would be of material significance in the event of offshore funding market disruptions, reducing pressure on other funding channels including the Reserve Bank’s liquidity facilities.

¹⁰ Note that we make no allowance in this table for the margin of extra core funding that banks are likely to hold in excess of the minimum CFR. The assumption that long-term wholesale funding is for terms of seven years reflects recent issuance patterns.

Table 2**Effect of Core Funding Ratio on the Maturity Structure of the banks' wholesale funding**

Core funding ratio	Proportion of wholesale funding maturing in:				Wholesale maturities as a share of total funding:				Average maturity of wholesale funding (quarters)
	1 month	3 months	6 months	12 months	1 month	3 months	6 months	12 months	
55%	33.5	100.6	100.6	100.5	17.7	53.2	53.2	53.2	0.9
65%	27.0	81.0	81.7	83.1	14.3	42.9	43.2	44.0	3.6
70%	23.8	71.3	72.3	74.5	12.6	37.7	38.3	39.4	4.9
75%	20.5	61.5	62.9	65.8	10.8	32.5	33.3	34.8	6.2
100%	4.2	12.6	15.9	22.3	2.2	6.7	8.4	11.8	12.8

How might a CFR impact the credit cycle?

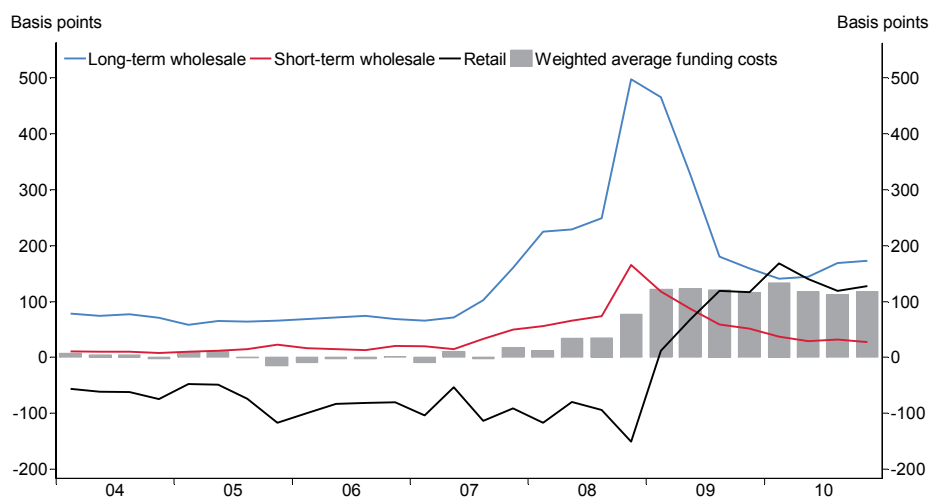
We have also been considering the role a CFR might play in helping to dampen the credit cycle. A consequence of imposing a Core Funding Ratio requirement is that it will tend to raise the cost of funding for any given policy interest rate because banks must make greater use of retail deposits and long-term wholesale debt, which are typically more expensive forms of funding. This in turn, creates a larger 'wedge' between the Official Cash Rate and the interest rates at which banks lend to households and businesses, assuming that the higher funding costs are passed on to borrowers. While in principle the Official Cash Rate could be used to achieve the same lending rates, the ability to create a larger funding cost wedge is potentially attractive in a small open economy for two reasons:

- It may help to reduce the upward pressure on the exchange rate associated with increases in the OCR (because it means the OCR can be set at a lower level keeping the wholesale interest rates accessible to foreign investors lower than otherwise); and
- It potentially reduces the scope the banks have to avoid the consequences of a higher OCR by switching to cheaper forms of funding.

Retail funding spreads (the cost of raising retail funds relative to the benchmark wholesale 90 day rate or the OCR) and long-term wholesale funding spreads (the cost of raising long-term offshore debt relative to the swap rate or the OCR) have increased sharply since the Global Financial Crisis (figure 3). These spreads are now considerably higher than the spreads for short term funds. As a result, the banks' marginal funding costs have increased considerably over this period – the funding wedge has increased from around 20 to 30 basis points above the OCR prior to the financial crisis to around 150 basis points at the time of writing. While this increase has been very significant, it would be wrong to attribute it primarily to the introduction of the

CFR. The higher spreads for long-term debt have reflected a reassessment of term risk by international investors and increased issuance of term debt by banks, corporates and governments, while the higher cost of domestic deposits has largely reflected independent efforts on the part of local banks to increase the share of retail funds (as demanded by their investors and rating agencies).

Figure 3 Estimates of bank funding spreads



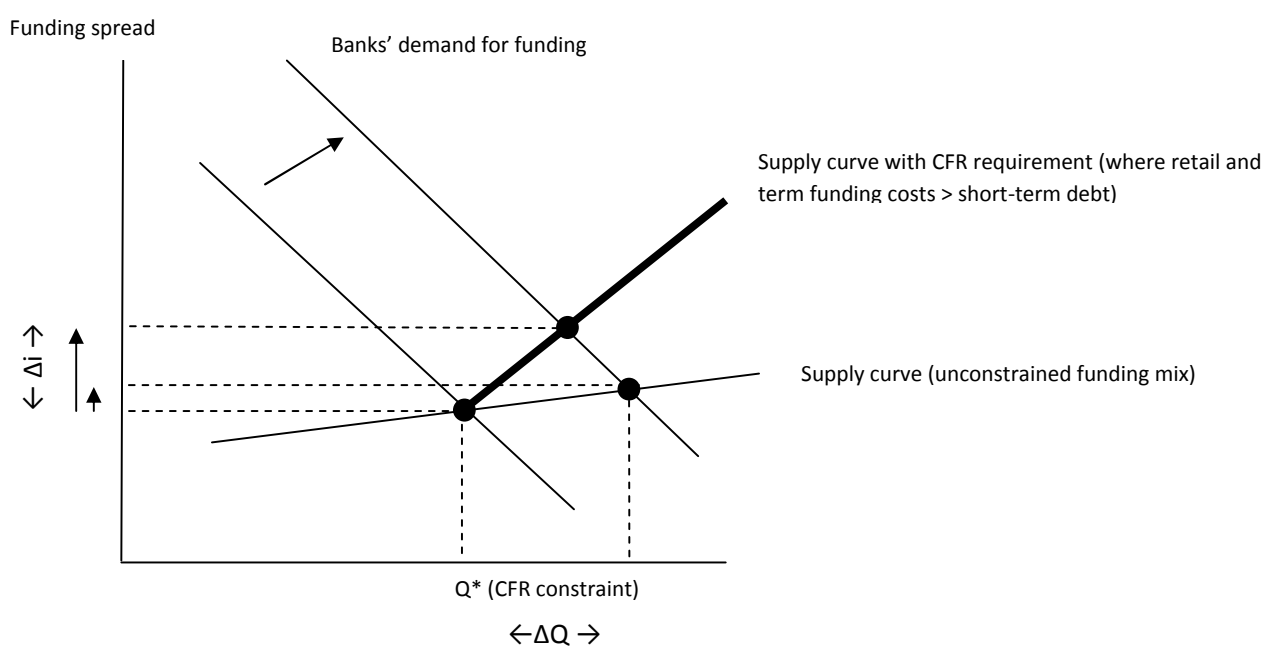
Thus in assessing the influence of the CFR we need to abstract from changes in funding market conditions that have little to do with the CFR itself. Table 3 provides an indication of how the funding cost wedge could vary under different Core Funding Ratios on the assumption that funding spreads for retail, long-term and short-term funding remained unchanged at current levels. As the table shows, higher core funding ratios would result in a higher marginal cost of funds relative to the OCR given the higher required share of more costly retail or long-term wholesale funds. Thus, for example, moving from a 65 percent CFR to a 75 percent CFR would add around 10 basis points to funding costs assuming the various funding spreads did not change.

Table 3 The Core Funding Ratio and the Marginal Cost of Bank Funding*

Core funding ratio (percentage)	Marginal cost of funds (over Official Cash Rate)
55	136
60	140
65	144
70	150
75	154
80	158
90	162

**Assumes unchanged funding spreads for short and long-term wholesale and retail funding*

However, in practice, it is highly unlikely that the funding spreads faced by the banks will be invariant to the amount of core funding they need to raise and banks are likely to face an upward sloping supply curve for core funds (figure 4). Attempts to increase the amount of retail deposits are likely to result in a lift in deposit rates in order to induce depositors to provide the extra funds rather than hold them in competing assets. Similarly, international investors in the term wholesale market are likely to demand a higher spread as banks attempt to increase their issuance of such debt. Thus the imposition of a Core Funding Ratio could have the effect of increasing funding costs in two ways – by reinforcing reliance on relatively more expensive funds and by driving up the credit spreads for core funds when balance sheets expand. The rate of balance sheet expansion is likely to have an important influence on the degree of ‘bite’ from the CFR – stronger demand for core funds is likely to put additional upward pressure on funding spreads.

Figure 4 Illustrative impact of a CFR on funding costs

Anticipating the slope of the supply curve for core funding facing banks at any one time is likely to be extremely difficult. Credit spreads in offshore funding markets tend to vary through time and can change for a variety of reasons including changes in global risk aversion and investor preferences as well as the economic cycle. These factors may shift spreads markedly through time. For example it is possible that funding spreads will contract during a boom as risk aversion declines and the supply of funds becomes more abundant as was seen in the years prior to the GFC. Similarly, the sensitivity of domestic deposit rates to higher demand from the banks will depend on factors such as the performance of other asset classes such as equities, retail bonds or houses. Consequently, predicting the pricing effects of adjustments in the Core Funding Ratio may be difficult *ex ante*.

Some simulations

In order to illustrate these propositions, we use the credit sector satellite model described in Dunstan, Ha and Hargreaves (2010). This simple model (described in the appendix) has been used to supplement the RBNZ's regular economic projections by providing 'rule-of-thumb' projections of monetary and credit aggregates. The framework provides a simple mechanism for modelling how the imposition of a CFR (and variations in its level) could affect bank funding costs over a 2-3 year horizon. At the outset, we would stress that the simulations presented here are little more than crude illustrations based on assumptions and do not purport to be projections.

As a convenient benchmark, we use the RBNZ's December economic projections to form an outlook for banking system credit growth over the next two years. Despite a moderate recovery in the rate of growth of nominal GDP, aggregate credit growth is projected to be modest at around 2-4 percent per annum. The main factors driving this modest credit growth in the model include efforts on the part of households and businesses to return leverage to more normal levels following the increases prior to the financial crisis and a relatively slow recovery in domestic spending (reflected in weak housing market, farm market, business investment) as opposed to export receipts.

Based on this credit growth outlook, our benchmark simulation (illustrated in figure 5, panels A-F) considers the effect of moving from the current CFR of 65 percent to 75 percent by 2012 under the assumption of unchanged credit spreads. Banks are currently already well above the 65 percent minimum CFR but it is reasonable to assume that they will continue to choose to maintain a buffer above the minimum CFR level assumed to be a margin of around 5 percentage points (see figure 2). As a result, the actual banking system CFR would be expected to move higher to around 80 percent by 2012. As shown by the blue line in the charts, this implies a relatively small increase in core funding, which would result in only a marginal increase in funding costs (figure 5F). This is consistent with the estimates in Table 2.

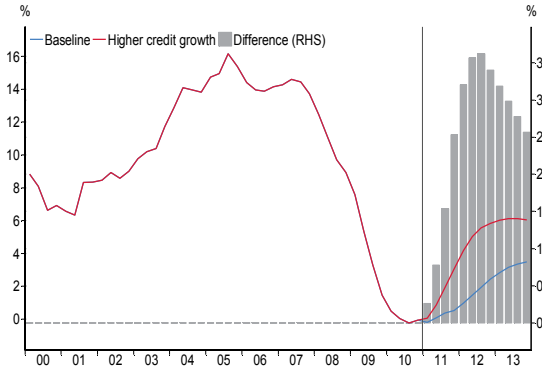
The assumption of unchanged credit spreads is plausible under the benchmark scenario, because muted credit growth implies the CFR requirement may be met with relatively little additional issuance of core funding. We also consider two alternative scenarios that feature stronger credit growth, with annual credit growth assumed to be around 3 percent per annum higher than the baseline (figure 5A). In order to meet the CFR requirement, banks are required to raise an extra \$22 billion of core funding over the next three years, compared to the benchmark scenario (figure 5B). The bulk of this increase would need to be met by issuance of long-term wholesale debt, given the relatively limited pool of retail deposits available in New Zealand (figure 5C).

As noted above, the response of credit spreads to an increase in the demand for core funds (i.e. the slope of the supply curve for core funds) is highly uncertain. Reflecting this, we consider two possible scenarios with alternative assumptions about the behaviour of funding spreads (shown in figure 5, panels D-F). The first scenario assumes that the transition to the higher CFR is made in the context of an upward sloping supply curve for core funding. Specifically, we assume that the additional demand for core funding in combination with a relatively inelastic supply of funds results in retail spreads increasing by a further 50 basis points and that long-term wholesale spreads increase by a further 25 basis points as banks attempt to raise extra core funds. These are pure assumptions and a weaker or stronger price response is certainly plausible depending on market conditions. The assumptions result in aggregate funding costs rising by 30 basis points (red line, panel F). The additional upward pressure on the cost of funds would likely have some dampening impact on the demand for credit by domestic borrowers and/or would provide scope for the Official Cash Rate to be set slightly lower than otherwise. Thus the scenario illustrates the potential stabilising properties of the CFR (albeit in the context of relatively modest credit growth by historical standards).

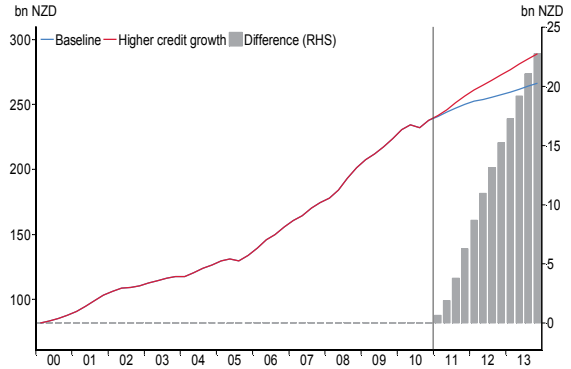
The second scenario is intended to illustrate the deleterious effects of a contraction in credit spreads on the stabilisation properties of the CFR. During booms, credit spreads tend to narrow as risk aversion falls. The narrowing in funding spreads could serve to undermine any countercyclical properties in the CFR, even in the context of a sizeable increase in the banks' demand for core funding. This is shown in the black projected lines in panels D - F, under the assumption that retail and long-term wholesale spreads decline by 25 and 50 basis points respectively. These reductions completely offset the effect of the move to a higher CFR on the cost of funds and marginal funding costs actually decline by around 20 basis points. In these circumstances, the CFR would be ineffective in dampening the credit cycle through the cost of credit channel, though it would still be expected to improve the resilience of the financial system as banks increased their holding on more stable funding sources.

Figure 5 Core Funding Ratio Simulations

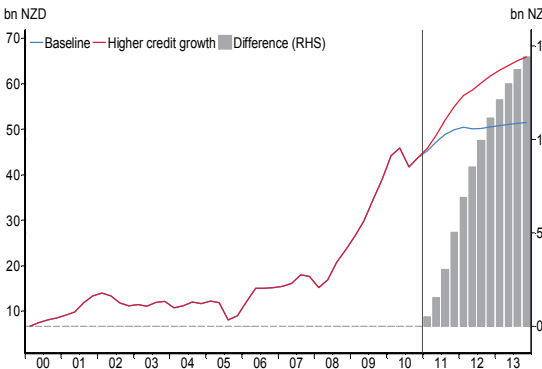
A Credit growth



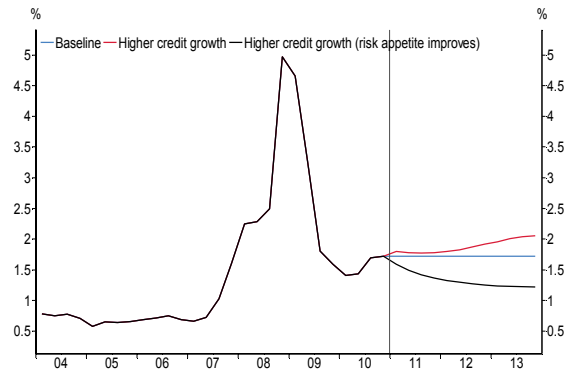
B Core funding



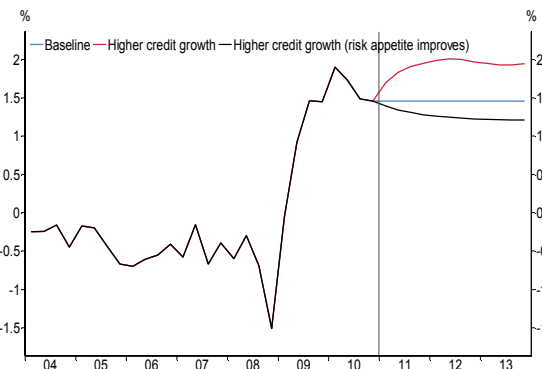
C Long-term wholesale funding



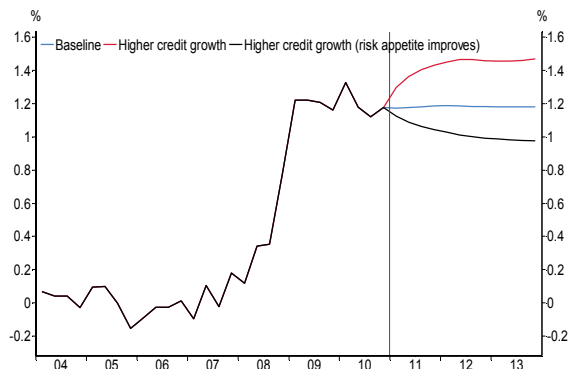
D Long-term wholesale funding spread



E Retail funding spread



F Weighted average funding costs



While the two scenarios have been constructed in the context of the planned transition to the higher CFR over the next two years, they also illustrate how discretionary adjustments to the CFR might (or might not) help to counter stronger credit growth and/or reduce the monetary

policy burden. In the first scenario increases in the CFR could help to dampen credit growth at the margin by increasing the funding cost 'wedge'. In the second scenario, the same upward adjustment to the CFR fails to gain any traction because of the narrowing in spreads.

Other issues

The analysis shows that the impact of a CFR on the cost of credit is uncertain and depends on a range of factors. In some circumstances a CFR may contribute usefully to the stabilisation of the credit cycle via a pricing effect; at other times it could be quite ineffective. However, there are other 'soft' channels through which a CFR requirement might help to moderate the credit cycle.

The presence of a CFR (and/or the potential for discretionary adjustments by the central bank) could help to induce more conservative behaviour by banks in relation to their balance sheet expansion strategies. Raising core funds is inherently a more challenging funding route for the banks than tapping short-term wholesale funding markets to finance lending. For example, if a bank decides it wishes to raise an extra \$500 million in retail deposits it would need to do so within the context of a competitive market, where it will face uncertainties about the price elasticity of deposit supply and the actions of its competitors. A bank might discover that competitive pressures are so intense that it cannot increase its deposits by the planned amount without driving the price of its deposits to uneconomic levels. Issuing long-term wholesale debt also involves significant challenges. Placements of debt need to be planned ahead and marketed, the pool of investors is typically more limited and, at times, the banks selling debt abroad can encounter market saturation effects, which increase the difficulty of raising funds or in hedging the foreign currency funding back to NZD (widening basis swap spreads). Periods of heightened risk aversion can also limit the banks' windows of opportunity to obtain long-term offshore funding. This situation contrasts with the experience prior to the GFC, where New Zealand banks were able to keep pace with, and fuel, the strong demand for credit in the face of strong house/rural land price inflation by issuing (and rolling over) short-term debt (mainly USD commercial paper), at relatively low cost.

We would be careful not to overstate the impact of these effects on bank behaviour. For instance, the more recent conservative approach to balance sheet expansion by banks may reflect typical behaviour during an economic downturn and the overhang of the GFC. Moreover, as the scale and presence of the banks' issuance of term debt increases in offshore markets and liquidity in the market increases, raising long-term debt is likely to become easier.

Another important issue relates to the management of the CFR requirement in the midst of a global and domestic downturn – could the presence of a CFR hinder the flow of credit at some point in the future? Faced with a cyclical downturn, credit spreads could widen significantly, making bank funding more expensive. This in turn would act as a brake on credit growth at a time when policymakers were wishing to stimulate it. As noted above, credit spreads have widened significantly in the wake of the GFC. To a large extent, monetary policy has been able

to offset the higher funding costs through the maintenance of a lower Official Cash Rate than would otherwise be the case (see RBNZ 2010b p9). However, in some instances a reduction in the CFR (or forbearance in relation to meeting CFR requirements) might be required in order to avoid undue pressure on the flow of credit.

Section 2 highlighted the ever present risk of financial sector disintermediation that could occur through the use of macro-prudential tools. The prospect of disintermediation arising from the application of a CFR to the banking system could arise if it created incentives for other institutions to fund credit more cheaply than the banks (including entities that might opt to raise debt directly rather than accessing it through the banks). While it is difficult to assess the degree of risk, a preliminary view would be that such risks are not likely to be large in the New Zealand context given the dominant role played by the banks in the credit process. As suggested above, the effect of the CFR on funding costs appears likely to be 'at the margin'. Moreover, many non-banks are unlikely to be able to raise retail and wholesale funding on a large enough scale and at a lower cost than the major AA-rated banks in current market conditions. However, as noted in section 2, we are mindful that the financial sector can evolve quickly and grow in importance as regulatory conditions allow.

4.2 A Countercyclical Capital Buffer (CCB)

A CCB is part of the new Basel III standards aimed at improving the resilience of the financial system by requiring banks to hold additional capital buffers (up to 2.5 percent of common equity or other fully loss absorbing capital) during periods of excessive credit growth with the aim of protecting the flow of credit during the subsequent downturn.¹¹ While the CCB's stated aim is improving the robustness of the financial system, there is interest in whether the CCB might also have potential to dampen the credit cycle (i.e. help prevent excessive credit growth). The discussion of the CCB's impact on the cost of credit thus closely mirrors that of the CFR, where banks are required to resort to more expensive forms of funding – in this case, new capital – relative to a situation where the funding mix is unconstrained. There has, however, been considerable international debate about the extent to which banks would actually face additional funding costs in moving to a higher share of equity capital relative to debt (see RBNZ (2010)).

The impact of a CCB in New Zealand

In its published guidelines for authorities using a system of countercyclical capital buffers, BCBS (2010b) suggest that the construction of a credit-to-GDP gap may provide a useful metric for

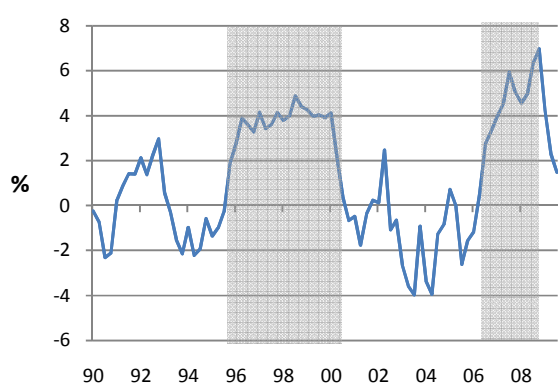
¹¹ For a full discussion on calculation and implementation of a counter-cyclical capital buffer, see BCBS 2010.

determining when and whether credit growth has become excessive. This metric may be backed up with a range of other indicators.

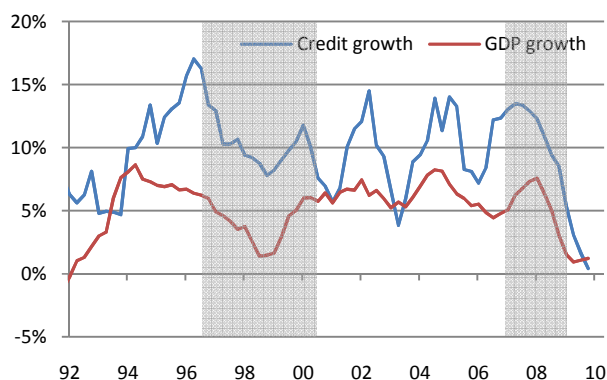
Following the BCBS guidelines, we construct a credit-GDP ratio and an estimate of the credit 'gap' for New Zealand covering the period from 1990 to 2010.¹² From figure 6 below, we can see that there would have been 2 occasions (1996-2000 and 2006-2008) in the past 20 years where the credit gap would have breached the 2 percent threshold that might have triggered the application of a CCB under the proposed BCBS methodology.¹³

Figure 6

A. Credit Gap estimate



B. Credit and GDP growth



The potential impact of the CCB on the cost of credit is shown in table 4 below. For illustrative purposes, we assume that an initial buffer of 0.25% is imposed when the credit gap reaches 2.5% (having a slightly higher threshold than the 2% suggested by BCBS would reduce the risk of false signals). The buffer is then adjusted in increments of 0.15% for each 0.5% increase in the credit gap so that the buffer reaches its maximum of 2.5% when the credit gap hits 10%. Given the difficulty in deriving estimates of the cost of raising new capital, we show the impact under three different assumptions of 3%, 8% and 13% for the net cost of raising new bank capital (as banks switch from debt to equity funding).

¹² The gap is derived using an HP filter with a lambda value of 400,000 and is calculated on a 'real-time' basis from 1996 onwards. A lambda of 1,600 was also tried and produced broadly similar results.

¹³ Of course, one can debate the particulars of each individual episode. One could potentially discount the likelihood of a CCB being imposed during 1996-2000 as figure 5 shows that the 'excessive' credit gap was due to the credit growth cycle lagging behind the GDP cycle, and importantly, that the growth cycle had largely peaked around 1996. Thus, it would have been an unusual decision to impose additional capital requirements during the downswing of the economic cycle. In contrast, imposing a CCB may have been a sensible strategy during the 2006-2008 period when both credit and GDP growth were rising sharply, which may have then helped cushion the subsequent sharp slowdown in credit growth over the past two years.

Table 4 Impact of a counter-cyclical capital buffer on the cost of credit

		Net cost of new bank capital		
		3%	8%	13%
Credit gap (%)	Required buffer (%)	Additional cost (basis points)		
< = 2	0	0.0	0.0	0.0
2.5	0.25	0.8	2.0	3.3
3	0.40	1.2	3.2	5.2
4	0.70	2.1	5.6	9.1
5	1.00	3.0	8.0	13.0
6	1.30	3.9	10.4	16.9
7	1.60	4.8	12.8	20.8
8	1.90	5.7	15.2	24.7
9	2.20	6.6	17.6	28.6
10	2.50	7.5	20.0	32.5

During the 2006-2008 period, the estimated credit gap reached a peak of 7 percent which would have translated to an additional buffer of 1.6 percent and raised the overall cost of funds by between 5-20 basis points. Consistent with Ng (2008), a reasonable conclusion is that the capital buffer (at least on its own) is unlikely to have had a major braking effect on credit growth, however desirable its properties in building greater system resilience when the credit boom subsequently turned to bust. Moreover, Ng notes that the impact on the cost of credit from additional capital requirements is not precise given the complicated and indirect relationship between the credit supply curve and regulatory capital requirements. For instance, large lenders in New Zealand hold capital well in excess of regulatory minima typically to maintain high credit ratings for the purposes of marketing and access to international capital markets. Tier 1 capital ratios for the large New Zealand banks have averaged around 8% of risk weighted assets over a number of years (and have increased to around 9% recently) compared to the 4% regulatory minimum, which would be more than enough to absorb the CCB. The large New Zealand banks may also be able to source additional capital cheaply from their parent banks.

It remains to be seen whether banks continue to voluntarily maintain capital ratios that are higher than the new Basel III standards, but these new standards will absorb most of the banks' current excess tier 1 capital.¹⁴ While the analysis above suggests that the potential for a CCB to

¹⁴ Under Basel III, the Tier 1 minimum is raised from 4% to 6%, and the additional conservation buffer of 2.5% of common equity could effectively lift the de-facto regulatory tier 1 minimum ratio to 8.5%.

increase the cost of credit might only be modest, the CCB could impact the credit cycle through other channels, including:

- Through moral suasion and in conditioning bank and market behaviour against excessive domestic credit growth.
- Obtaining additional capital, even if it is easy to get during a boom time, dilutes existing shareholders, which may impact bank managements' behaviour.
- A CCB could also affect rating agencies' perception of risk and, in turn, trigger a response in bank behaviour given the importance of credit ratings in banks' ability to access offshore funding.

As with the CFR, a CCB casts a wide regulatory perimeter, which should minimise disintermediation risks. Non-regulated financial institutions are unlikely to have a cost advantage in raising sufficient funding to compete against the large retail lenders.

Releasing the capital buffer

Quite apart from the question of the extent to which countercyclical capital buffers would help to constrain rapid credit growth, another key issue relates to the 'release' of the buffer when the credit upswing eventually turns (i.e. the point at which the required buffer is reset to zero). The BCBS (2010b) guidelines promote the prompt release of the buffer in times of emerging stress in order to reduce the risk that the supply of credit is constrained during the downturn. When the buffer is turned off, banks would be free to use the released capital to absorb losses or to protect themselves against problems elsewhere in the financial system.

As the BCBS paper notes, timely release of the buffer would be important. Releasing it too early could see banks run down the capital (through distributions) only to face loan losses further down the track. Releasing the buffer too late could prevent it from performing its intended objective i.e. providing loss absorbency and preventing a credit crunch. While BCBS (2010a and b) highlight a range of variables¹⁵ that could be used to help guide the release of the buffer, most indicators examined appear to provide mixed signals at best. An inescapable conclusion is that considerable judgement is likely to be required in order to decide when to release the buffer.

A complicating factor here is that credit upswings – even those that have involved 'excessive' credit - are not necessarily automatically followed by the immediate realisation of the risks for which the buffer has been imposed. Not all booms necessarily end in busts. An economy could continue to face accumulated imbalances built up over several credit cycles that could pose risks for the financial system for a considerable period into the future. One school of thought would hold that the accumulated capital buffer should thus be retained until such time as these

¹⁵ Such as non-performing loans, asset prices, CDS spreads and indicators of credit conditions.

risks are realised, possibly many years ahead. Of course, maintaining the CCB in the face of a soft-landing is likely to meet with considerable resistance on the part of financial institutions, who might well argue that the authorities have miscalculated the risks and are unfairly penalising them.

4.3 Sectoral risk weighting/capital buffers

The broad coverage of the CCB could, in principle, affect all lending. However, periods of rapid credit growth may not occur evenly across all sectors and banks that were not lending to the problem sectors nor contributing to the excessive credit growth would be required to hold more capital, which could impose some efficiency costs and impact on lending to sectors where credit growth was more moderate. In these circumstances, other prudential tools such as limits on loan-to-value (LVR) ratios and sectoral capital buffers could be deployed instead.

With regards to sectoral capital buffers, the RBNZ could impose higher capital requirements on lending to overheated sectors. However, this approach needs to be put into context and should be considered an extension of the RBNZ's existing approach under the Basel II framework. Under the RBNZ's approach, banks are required to adopt through-the-cycle estimates of risk, which are calibrated to economic downturn conditions. To illustrate, the major banks in New Zealand now hold capital based on Basel II requirements using their own risk measurement models. In relation to agricultural lending, the early version of these models tended to treat farm lending as unrealistically safe during upswings and had the potential to constrain it significantly during downturns. The Reserve Bank has thus proposed changes that should, in the future, result in assessments of rural lending that are more 'through the cycle' in nature potentially helping to dampen major cyclical swings in agricultural lending. Therefore, to a large extent, the RBNZ's current regulatory requirements are already set at a conservative level that should partly address pro-cyclicality.¹⁶

The tables below illustrate the potential impact of increasing the risk weighting on residential mortgage lending at a system wide level. Currently, housing credit comprises around 56% of total assets (171,010/303,092), but only around 37% of risk weighted assets (51,303/137,736) due to its relatively low risk weight of 30%. If this risk weight was increased to 40%, 50%, and 60%, then banks would be required to raise additional capital equivalent to 0.5%, 0.9%, and 1.4% respectively of the existing stock of assets. If we use the same assumptions for the net cost of raising new capital as for the counter-cyclical capital buffer (3%, 8%, 13%), then the potential impact from a doubling in the housing risk weight would be around 18 basis points if

¹⁶ In addition to through-the-cycle risk estimates, the Bank has, on occasions, imposed Pillar 2 capital overlays where banks' internal models are judged to have inadequately accounted for sectoral credit risks. In principle, these Pillar 2 add-ons could also be used for macro-prudential purposes. See Hoskin and Irvine (2010) for more details on the RBNZ's approach to Basel II.

the additional cost was applied to all sectors, or up to 30 basis points if this cost was instead allocated only to the housing sector.¹⁷

Table 5 Impact of adjustments to housing risk weights on the cost of credit

Sector credit as at Nov 2010	Assets	Risk weights	Risk weighted assets	Capital @ 8%
Agriculture	48,030	0.85	40826	3266
Business	72,113	0.5	36057	2885
Housing	171,010	0.3	51303	4104
Consumer	11,939	0.8	9551	764
Totals	303,092		137,736	11019
			capital ratio	8%

Housing credit as at Nov 2010	171,010			
Baseline risk weighted assets (RWA)	137,736			
Baseline total assets	303,092	Scenarios		
Housing risk weights	0.3	0.4	0.5	0.6
Regulatory minimum capital for housing @ 8% (\$m)	4104	5472	6840	8208
New capital to raise (\$m)	-	1368	2736	4104
Additional capital as % of baseline RWA	-	1.0%	2.0%	3.0%
Additional capital as % of baseline total assets		0.5%	0.9%	1.4%
Assumed net cost of raising new capital		Basis point impact on average cost of funds		
3.0%	-	1.4	2.7	4.1
8.0%	-	3.6	7.2	10.8
13.0%	-	5.9	11.7	17.6
Assumed net cost of raising new capital		Basis point impact on average and marginal housing lending costs		
3.0%		2.4	4.8	7.2
8.0%		6.4	12.8	19.2
13.0%		10.4	20.8	31.2

As with the counter-cyclical capital buffer, the use of sectoral capital buffers suggest that it would only have a modest impact on the cost of credit. In principle, larger changes in risk

¹⁷ The impact on marginal housing costs could be higher than shown in table 4 given that a significant portion of the housing loan portfolio is on fixed rate mortgages and unable to be re-priced immediately. Therefore, the increase in cost of capital could be translated into disproportionately larger increases in lending rates for floating rate loans and new fixed rate mortgages.

weights would generate greater impacts on the cost of credit, but there needs to be an element of caution with 'extreme' settings. Shifting risks weights too far away from reasonable estimates of credit risk would distort the original purposes of the risk-based capital framework, particularly given the regulatory minimums established by the RBNZ have been set at conservative levels. If adjustments to risk weights are deemed excessive from a prudential perspective, the basis for such policy actions under the RBNZ's existing legislative mandate might be called into question. Furthermore, large discrepancies in the housing risk weight could see lending being re-classified into the lower risk sectors as a way of circumventing regulation (for example, housing loans being deemed as corporate loans), or result in lending occurring outside the banking system.

4.4 Limits on loan-to-value ratios and debt servicing ratios

Like sectoral capital buffers, imposing limits on loan-to-value ratios (LVRs) may be useful in responding to overheating in specific sectors where there is evidence of a loosening in banks' lending standards. LVR restrictions serve the purpose of reducing the risk assumed by lenders due to high LVR lending and may thus make a direct contribution to reducing the accumulation of financial system risk. They could also play a role in moderating the credit cycle to the extent high LVR lending becomes a significant component of credit growth during the upswing. The use of a quantitative LVR restriction could be preferred in circumstances when funding costs have become compressed as a result of a global boom, reducing the effectiveness of liquidity or capital requirements in moderating the credit cycle.

Discussion of LVRs (and virtually all examples of real world application) generally relate to housing (where lending arrangements tend to be straightforward and relatively homogeneous across borrowers). LVR restrictions could, in principle, be extended to other types of secured lending although this would become practically challenging for many types of commercial lending given the complexities of individual loan arrangements.

An LVR cap for housing could combat the self-reinforcing dynamic that developed during the US housing boom when an upward drift or bias in property appraisals allowed households to increase borrowing, which were then used as higher 'comparable sale' data points to generate even higher appraisals, creating a vicious cycle.¹⁸ The extent of this 'appraisal drift' dynamic may be less pervasive in a market such as New Zealand's where lenders tend to retain credit exposures in lieu of securitisation as this helps to preserve incentives to control and monitor the credit risks being generated. Nevertheless, although banks in New Zealand did not relax credit standards during the recent housing boom to the same degree as US lenders, there is

¹⁸ Similar circuit-breaking effects could have arisen from well-enforced constraints on debt service to income ratios.

always a risk that lending standards become eroded during a housing credit boom as risk aversion falls.¹⁹ Thus formal limits on LVRs or debt-servicing ratios could, at times, have a practical role to play in a market like New Zealand.²⁰

While LVRs may be imposed primarily to limit the accumulation of risk, an LVR limit could affect the flow of lending in two ways – some lending will simply not occur, but the presence of an LVR could also act to increase effective borrowing costs by driving some borrowers towards unsecured lending. For instance, Soultanaeva and Nordberg (2010) note that the 85 percent LVR limit imposed recently in Sweden could significantly increase the cost of borrowing for households if they choose to borrow a portion of funds on unsecured terms above the LVR limit.

We have conducted similar analysis for New Zealand where we assume the imposition of an 80 percent LVR and calculate the effective interest rate for housing borrowers who obtain unsecured finance for amounts in excess of the LVR. The analysis is based on current margins between mortgage borrowing and unsecured lending as proxied by banks' personal term loan rates. The extra costs range between 54 basis points for those wishing to borrow the equivalent of an 85 percent LVR up to 215 basis points for those wishing to borrow the equivalent of 100 percent.²¹ This analysis assumes that banks would be prepared to make the extra (unsecured) lending available although it is quite possible that some households could simply choose to borrow it covertly using their existing credit facilities (eg by running up their credit card balances).

In New Zealand, banks typically charge a one-off low equity premium fee to recover the expected cost of the increased risk associated with high LVR lending (a form of self insurance) and may sometimes then insure the risk with a third party. These fees typically range between 0.5 percent and 1.25 percent of the total loan amount (see table 6). Consequently it is worth noting that high LVR borrowers effectively already face a higher interest rate than their low LVR counterparts although the low equity fee is generally a one-off charge made only at the establishment of the loan. Reliance on unsecured lending to make up a loan shortfall would generally result in higher effective interest rates for most borrowers even once this low equity premium is allowed for. One assumes this would go some way to dampening the total demand for such borrowing.

¹⁹ See Craigie and Munro (2010) for analysis on the financial sector amplification channel in New Zealand.

²⁰ It is worth noting that the RBNZ was sufficiently concerned during 2007 to request additional data from banks on the loans being originated and to warn against the risks of very high LVR lending. This appeared to have some impact on banks' behaviour, which meant that formal limits were not ultimately considered.

²¹ In conducting this simple analysis, we have made no adjustments for the typically shorter tenor of unsecured lending versus home mortgages.

**Table 6 Hypothetical Impact of an 80 percent LVR on Borrowing Costs
(Assuming unsecured borrowing of the shortfall)**

LVR Equivalent	Implied effective interest rate (basis points above the floating mortgage rate)*	<i>Typical low housing equity premium fees (as a percentage of loan amount)</i>
>=80%	0	0
85	54	0.5
90	108	0.9
95	161	1
100	215	1.25

*Calculated using the difference between the variable mortgage rate and personal term lending rate

Commenting recently on the Swedish experience, Ingves (2011) has recently suggested that if the existing 85 percent LVR limit proves insufficient to rein in credit growth, the authorities could contemplate a binding maximum LVR that would be applied to a household's total borrowings, not just their mortgage. While this would in theory serve to prevent recourse to unsecured (or lesser secured) borrowing to make up any shortfall in the desired loan amount, we suspect monitoring and enforcing such a restriction would be extremely difficult in most countries given the range of lending products available to households, the existence of multiple banking relationships and so forth.

The use of LVR limits was examined in detail as part of the RBNZ's SSI Report (2006) which noted that such an instrument could plausibly have been imposed between two and four times in the last 40 years. The Report noted that given the difficulty in identifying overheating and imbalances in advance, an LVR limit is likely to be imposed relatively late in the cycle. The SSI work also concluded that such a tool could have a material impact on the (housing) credit cycle. However, as with most forms of quantitative or administrative restrictions, there are greater risks of disintermediation, along with efficiency and long-term enforcement issues. Furthermore, an LVR limit may not be well targeted against typical late-cycle speculative behaviour. For instance, property investors or existing home owners trading up may have material equity in existing properties which could be used to circumvent the impact of the LVR restriction. Similarly, an LVR limit could be circumvented by having properties re-appraised at the time of refinancing loans to capture the increase in collateral value. Together, these factors suggest that the effective impact of an LVR limit on borrowing costs could be materially lower than indicated in table 5 above.

The fact that many Asian countries that have imposed LVR limits have continued to experience large property cycles suggests caution in regard to the countercyclical properties of LVR limits.²² LVR limits are likely to impinge more directly on low-income and first-home buyers, who typically have higher LVR mortgages. On this score, Wong and Hui (2010) note that the use of LVR caps can generate significant social equity concerns, though presumably this is partly an issue of how aggressively the LVR limits are calibrated. Some cost in terms of social equity might be judged as worth incurring if the housing and credit markets have become overheated posing a risk to financial stability. Alternatively, LVR limits could be applied selectively to high-value or 'luxury' property transactions (as has been the case in Hong Kong) but this may be less feasible in a setting such as New Zealand which does not have a large luxury market. All things considered, it seems likely that the political economy of LVRs is likely to be challenging in practice.

5. Elements of a Macro-Prudential Framework for New Zealand

An important issue for consideration is how the Reserve Bank might choose to deploy macro-prudential instruments in the future. As noted in section 2.5, under existing legislation the Bank has the ability to use macro-prudential tools for achieving broad financial system stability. In order to make the case for deploying these instruments, we would therefore need to be convinced that macro-financial imbalances (stretched asset prices, household and company balance sheets) warrant additional measures to bolster financial sector resilience or moderate the credit cycle. Consistency with the Reserve Bank's financial stability objective would therefore require us to show:

- i. That there was a clear case for the need to bolster financial system resilience (eg by building capital or liquidity buffers) or taking other measures to mitigate risk;
- ii. that asset prices and/or balance sheets were stretched in one or more sectors; and/or
- iii. that abnormal credit growth (particularly on the upside) was contributing or facilitating imbalances, or was likely to do so in the future.

If we were unable to demonstrate point (i) we believe it would be difficult to make the case for a macro-prudential policy intervention. Evidence that asset prices or balance sheets were stretched (ii) and of excessive credit growth (iii) would further strengthen the case for macro-

²² However, there is evidence that an LTV limit has been successful at safeguarding the financial system from the boom-bust cycle. For example, see Wong and Hui (2010) for analysis on the favourable impact of LTV caps on mortgage delinquency ratios in Hong Kong.

prudential intervention. While evidence of excessive credit growth would ideally warrant interventions to try and dampen the imbalances, it would also strengthen the case for interventions that would build financial system buffers. Reaching judgments on (i), (ii), and (iii), would require a well developed set of indicators to signal the build-up of imbalances.

The second question of policy consistency relates to monetary policy. Setting aside for the moment the issue of policy effectiveness, we would need to reach a view whether a macro-prudential intervention aimed at moderating perceived macro-financial imbalances would be consistent with the current monetary policy stance.

In the majority of cases we would expect a 'yes' on financial stability consistency to imply a 'yes' on monetary policy consistency (particularly if the influence of most tools on the credit cycle was expected to be modest). In some cases, we might expect a particular measure to have little or no implication for monetary policy (eg situations where core funding is very cheap). However, in the rare event of inconsistency with monetary policy, we should either drop the idea of a macro-prudential intervention, or proceed with considerable caution. An example of this might be in a severe downturn where, on financial stability grounds we want to keep a capital or liquidity buffer in place for longer than usual. This might be viewed as inconsistent with monetary policy if economic activity and credit growth were weak and we were attempting to stimulate the economy by reducing interest rates.

Figure 7 sketches out, at a high level, how we might go about selecting macro-prudential tools during an upswing. The process would begin by establishing that asset market imbalances had become exceptional and unsustainable, as reflected in asset prices and/or that credit growth had become excessive, and that this was likely to contribute to macro imbalances in the future. Doing so would require a well established range of indicators of credit, asset markets and macro-financial imbalances. This would establish a potential case for a macro-prudential overlay on the grounds of section 68 of the Reserve Bank Act (i.e. financial soundness and efficiency grounds). Next we would assess whether a macro-prudential overlay would support monetary policy (or at least not work against it) consistent with section 8 of the Act.

The nature of the imbalances would then guide the selection of the appropriate tool. Generalised credit growth and broad-based accumulation of banking system risk would usually prompt consideration of tools that are broad-brushed in effect, such as the Core Funding Ratio, or an aggregate Capital Buffer. Pressures emanating specifically from housing or other sectors could suggest more targeted tools such as LVR restrictions or adjustments to capital risk weights for the implicated sectors.

Note that in some circumstances, adjustments to the policy interest rate could be considered as part of the macro-prudential toolkit. In addition to the medium-term inflation outlook, the Bank might need to consider whether the level of the OCR is appropriate in the context of broader credit conditions and is conducive to promoting macro-financial stability over the longer term.

Having selected possible tools, we would then go on to assess the potential effectiveness of them given economic and financial conditions at the time (figure 8). This is likely to involve multiple tests for particular instruments. For example, the potential effectiveness of additional capital buffers would rest partly on the margin of spare capital being carried by the banks (a s.68 consideration) and the current cost and availability of capital (which would have a bearing on the extent to which the buffer might dampen credit growth). These tests would guide an on-balance judgment whether to deploy the instrument.

The decisions set out in figures 7 and 8 are not exhaustive and further work is needed to elaborate on them. However, we feel the approach of clarifying the selection and decision-making process for various macro-prudential tools would help to bring some order to this difficult area and help manage expectations about what might be achieved. It would also assist with external communications.

Next steps would include:

- The construction and regular consideration of a comprehensive set of indicators of financial system risk, the credit cycle, asset markets and imbalances, which may guide the deployment of macro-prudential instruments.
- The development of decision trees for the implementation of the various tools. This would include steps such as our internal decision-making process, engagement with Government or Treasury and public consultation before employing particular tools; and
- Calibration issues, including clarifying decisions on the timing of the introduction and release of the various instruments and the possible 'size' of interventions. We would expect the decision framework for calibrating policy interventions to be based on lists of "factors to consider" rather than precise rules.

Figure 7 Decision tree for macro-prudential instruments

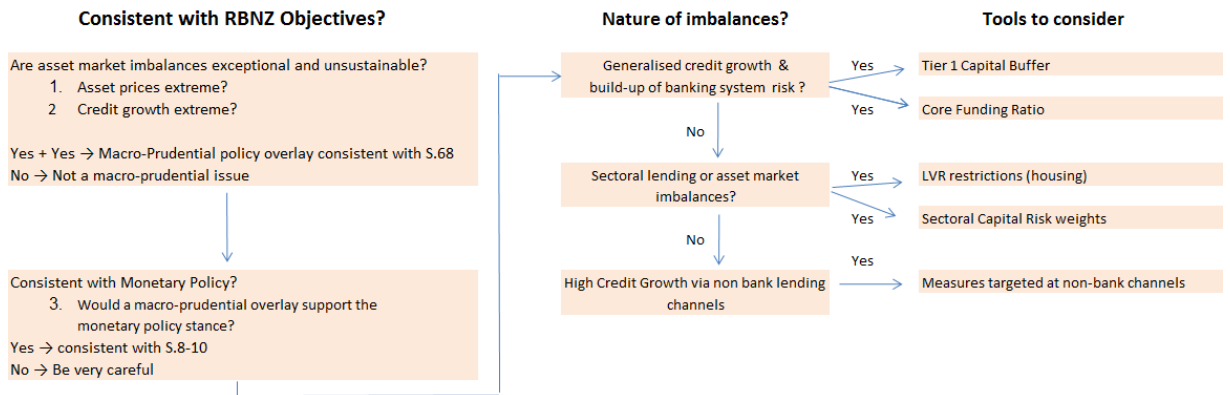
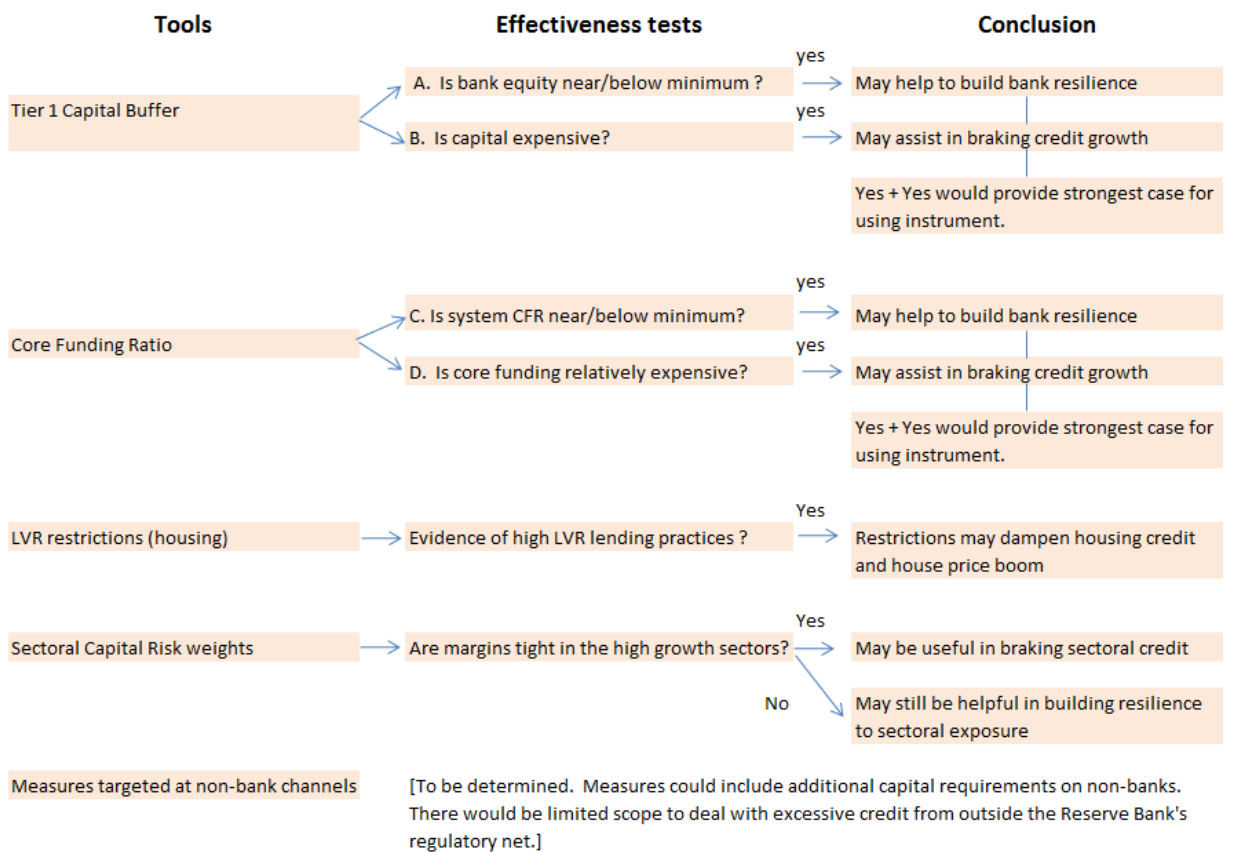


Figure 8 Determining instrument effectiveness



6. Some Tentative Conclusions

Section 2 of this paper briefly reviewed the case for macro-prudential instruments. It argued that the case for these instruments rests mainly on their scope to build greater financial system resilience to the risks associated with the extremes of the credit cycle. In addition, some tools may have the ability to directly dampen the credit cycle. It was noted that some tools are potentially more effective in achieving the first of these objectives than the second. While a range of instruments is being viewed enthusiastically by some researchers, we argued that the case for any particular instrument needs to be informed by careful analysis of its likely effectiveness in a real world setting along with the associated costs of deploying it.

In section 4, we considered several macro-prudential instruments that the Reserve Bank has been analysing in a New Zealand context undertaking some simulations and other calculations to help establish their likely effectiveness. While this work is ongoing, we would offer the following preliminary conclusions:

Core Funding Ratio

The CFR is a tool that can help promote greater financial system resilience by requiring banks to fund credit using more stable (and longer term) sources than they might choose in the absence of the requirement. This discipline is particularly desirable during periods of excessive credit growth when recourse to short-term wholesale funding is likely.

As a tool to actively lean against excessive credit growth, our simulations suggest that the CFR could, in some circumstances, play a useful supplementary role as an automatic stabiliser of the credit cycle by requiring banks to raise core funding which is typically more expensive than shorter-term wholesale funding. However, this effect is likely to operate 'at the margin'. Moreover, we noted that the vagaries of market pricing for funds means that the effectiveness of the CFR may not be stable through time. In the context of a global boom (when funding spreads become compressed) the CFR could become quite ineffective in braking credit growth.

Countercyclical Capital buffers

Like the CFR, a CCB is largely a tool for building resilience in the face of excessive credit growth. Our calculations suggest it would have only a small dampening effect on the upswing of the credit cycle through its effect on the cost of funds (unless one makes extreme assumptions about the size of the required buffer or the market cost of capital).

Sectoral Risk Weight Adjustments

Sectoral risk weights could be adjusted to boost capital requirements for lending to a particular sector over and above that calculated under the Basel II framework. While sectoral capital buffers would offer scope to more closely target those sectors subject to rapid credit growth, we found that the use of such buffers is likely to have only a modest effect on the pricing of

credit for the affected sectors absent dramatic adjustments. Sectoral capital risk weights that are supported by Basel II through-the-cycle models of risk should already properly reflect the risks of lending to the sector and the models should, in principle, be self adjusting for any increase in risk to the institution associated with rapid credit growth. An additional buffer might be warranted on the grounds of macroeconomic externalities that might arise when a sectoral credit bubble bursts.

Loan to Value Restrictions

LVR restrictions have been used by a number of countries in response to excessive credit growth and overheated housing markets and on balance appear to have met with some success. Such a tool could be particularly useful in circumstances when funding costs move counter-cyclically, which would reduce the effectiveness of liquidity and capital requirements in braking credit growth during the boom. Another advantage would be that an LVR restriction could be imposed and enforced relatively swiftly given that banks would require longer operational lead times to meet higher liquidity and capital requirements. However, the use of non-price or administrative restrictions is subject to greater long-term enforcement and disintermediation risks. Moreover, we are not aware of any instances where LVR restrictions have been applied to sectors other than housing.

Moral Suasion

The potency of each of the tools considered in this paper as instruments to affect the credit cycle could be enhanced by a 'moral suasion' effect in addition to any impact on the cost of funds or credit supply effects. This means that the simulations and calculations presented in this paper might understate their effectiveness as tools to influence the credit cycle, particularly as moral suasion could prove more effective in small markets like New Zealand. The deployment of any tool would send an important signal to financial institutions, investors, rating agencies and the general public about the central bank's unease about rapid credit growth and/or the risks accumulating in the financial system. It could thus help to reinforce a change in lending and borrowing behaviour. That said, we are cautious about the strength of the moral suasion effect in the context of a credit boom (when risk aversion may be low) particularly if the instruments themselves were not widely considered by institutions to have 'bite'.

While most of the tools considered in this paper could usefully contribute to building financial system resilience, we believe caution is warranted about their scope to dampen the credit cycle: it would be an unreasonable expectation that any one of these the tools would have materially dampened the double-digit credit and asset price cycles in New Zealand's recent history when their marginal impact on funding costs (at best) is perhaps in the order of 25 to 50 basis points – the equivalent of perhaps an additional one to two increases in the Official Cash Rate.

It may be the case that such tools could be employed more effectively to influence the credit by adoption of a multi-pronged approach where several such tools are employed in tandem. For example, faced with evidence of excessive credit growth, counter-cyclical capital requirements and/or LVR restrictions could be used alongside increases in the core funding ratio. This might represent a more even handed approach to focusing on either one alone given our analysis suggests that. None of these instruments, on their own, appear to be a silver bullet in terms of the credit cycle and should not be viewed as an alternative to a soundly-based and properly calibrated regulatory framework for banks and other financial institutions.

References

Aikman D, A Haldane and B Nelson (2010), *Curbing the credit cycle*, Speech at the Columbia University Center on Capitalism and Society Annual Conference, New York, 20 November.

Bank of England (2009), *The Role of Macroprudential Policy*, Discussion Paper, November.

Committee on the Global Financial System (2010), *Macroprudential instruments and frameworks: a stocktaking of issues and experiences*, Bank for International Settlements paper no.38, May.

BCBS (2010a), *Countercyclical capital buffer proposal - consultative document*, BCBS, Bank for International Settlements June 2010.

BCBS (2010b), *Guidance for national authorities operating the countercyclical capital buffer*, BCBS, Bank for International Settlements, December 2010.

BIS (2001), *71st Annual Report*, Basel

BIS (2009), *Strengthening the resilience of the banking sector – consultative document*, December

Blanchard, O, G Dell’Ariccia, and P Mauro (2010), *Rethinking Macroeconomic Policy*, IMF Staff Position Note 10/03, IMF, February.

Borio, C (2003), *Towards a macroprudential framework for financial supervision and regulation?* BIS working paper no. 158.

Borio C, and P Lowe (2002), *Asset prices, financial and monetary stability: exploring the nexus*, BIS working paper no. 114.

Borio, C and I Shim (2007), *What can (macro-)prudential policy do to support monetary policy?*, BIS working paper no.242.

Borio, C and M Drehman (2009), *Towards an Operational Framework for Financial Stability: 'fuzzy measurement and its consequences*, BIS working paper no.127.

Borio, C (2010), *Implementing a macroprudential framework: Blending boldness and realism*, keynote address for the BIS-HKMA research conference on "Financial Stability: Towards a Macroprudential Approach", Honk Kong SAR, 5-6 July 2010.

Caprio, G (2010), *Safe and Sound Banking: A role for Countercyclical Regulatory requirements?*, Policy Research Working Paper 5198, World Bank.

Caruana, J (2010), *Macroprudential policy: what we have learned and where we are going*, speech to Second Financial Stability Conference of the *International Journal of Central Banking* Bank of Spain, Madrid, 17 June 2010.

Chang, S (2010), *Mortgage Lending in Korea – An example of a Countercyclical Macroprudential Approach*, Policy Research Working Paper 5505, World Bank.

Craigie, R and A Munro (2010), *Financial sector amplification and credit cycles in New Zealand*, RBNZ Bulletin, Vol. 73, No. 2.

Davis, E and D Karim (2009), *Macroprudential Regulation- The Missing Policy Pillar*, Keynote address to the 6th Euroframe Conference on Economic Policy Issues in the European Union, 12th June 2009.

Dunstan, A, Y Ha and D Hargreaves (2010), *Macro-financial developments in the MPS forecasts*, RBNZ internal memo.

G30 (2010), *Enhancing Financial Stability and Resilience – Macroprudential Policy, Tools and Systems for the Future*, Report of the G30 Countries, October.

Galati, G and R Moessner (2010), *Macroprudential policy - a literature review*, De Nederlandsche Bank NV Working Paper No. 267, November.

Hanson, S, A Kashap and J Stein (2010), *A Macroprudential Approach to Financial Regulation*, Paper prepared for Journal of Economic Perspectives, July 2010.

Hoskin, K and S Irvine (2009), *Quality of bank capital in New Zealand*, RBNZ Bulletin, Vol. 72, No. 3.

Ingves, S (2011), *Challenges for the design and conduct of macroprudential policy*, Speech to BOK-BIS Conference, Seoul, Korea, Sveriges Riksbank.

Ng, T (2008), '*Automatic' cycle-stabilising capital requirements: what can be achieved?*, Reserve Bank of New Zealand Discussion Paper 2008/04.

RBNZ (1986), *Financial Policy Reform*, Reserve Bank of New Zealand, Wellington.

RBNZ (2006), *Supplementary Stabilisation Instruments*, Joint Report of the Reserve Bank of New Zealand and the Treasury, February, available at www.rbnz.govt.nz

RBNZ (2010), *Financial Stability Report*, Reserve Bank of New Zealand November, available at www.rbnz.govt.nz.

RBNZ (2010b), *Monetary Policy Statement*, Reserve Bank of New Zealand September, available at www.rbnz.govt.nz.

Saurina, J (2009), *Dynamic Provisioning: The experience of Spain*, Crisis Response Note No.7, The World Bank.

Shin, H S (2010) *Macro-prudential policies beyond Basel III*, Policy memo, Princeton University, 22 November.

Singleton, J (2006), *Innovation and Independence: The Reserve Bank of New Zealand 1976-2002*, Auckland University Press, Auckland.

Soultanaeva, A and A Nordberg (2010), *The impact of a maximum loan-to-value ratio on the borrowers' expenditure*, Sveriges Riksbank Economic Commentaries No.5.

Spencer, G (2010), *The Reserve Bank and Macro-financial Stability*, Reserve Bank of New Zealand Bulletin, 73(2).

Steenkamp, D (2010), *New Zealand's imbalances in a cross-country context*, Reserve Bank of New Zealand Bulletin 73(4).

Wong, E and C Hui (2010), *Loan-to-Value Ratio as a Macro-Prudential Tool – Hong Kong Experiences*, Research Department, Hong Kong Monetary Authority, 18 November.

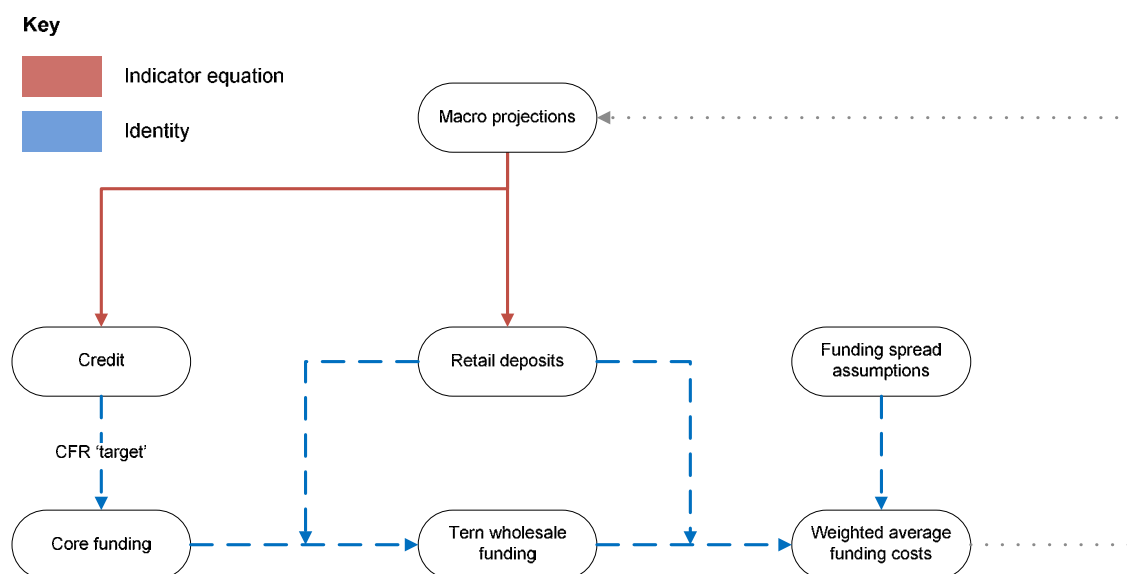
Appendix: An overview of the credit sector satellite model

Dunstan, Ha and Hargreaves (2010) have recently developed a satellite model for forecasting financial sector developments. These models are used to supplement the first-pass macroeconomic projections by providing 'rule-of-thumb' projections for credit growth, the composition of bank balance sheets and the cost of bank funding. The models are 'satellites' in the sense that the financial sector projections are produced taking the macroeconomic projections as given.

The satellite model is summarised in figure A1. As shown in the figure, the model forecasts are constructed in two steps:

1. A set of indicator equations directly link the macroeconomic projections with projections for household, business and agricultural credit; and household deposits. These indicator equations are discussed in more detail below.
2. Identities are used to project the other variables in the model. The credit projections and the assumed CFR 'target' together result in a projection for core funding. As the household deposit forecast is pinned down by its indicator equation, the core funding forecast can be used to back out long-term wholesale funding. Finally, the projections for retail and long-term wholesale funding are used as weights for the funding spread assumptions, resulting in the weighted average funding cost projection.

Figure A1 Overview of the credit sector satellite model



As noted above, indicator equations for credit and the composition of bank funding form a crucial part of the satellite model. Table A1 below shows the indicators that are used to project

each of these variables.²³ The indicator equations aim to pick up on linkages which have proven relatively robust over history. To this end, the equations are estimated over a period from 1992 to the most recent data point. A key focus was finding equations that performed relatively across the whole sample, including the recent crisis period.

Table A1: Indicators in the credit sector satellite model

	MPS projection	Other
Household credit	Unemployment rate Working age population	House sales Debt to gross wealth
Agricultural credit	Agricultural export earnings NZD commodity prices	Farm sales Debt to farm price
Business credit	Business capital stock	Debt to stock price Retail funding spread
Retail funding	Labour income 90-day interest rate	Credit growth Retail funding spread

²³ Some of the variables used in the indicator equation do not form part of the macroeconomic projections (such as the value of house sales), and 'sub' indicator equations are used to forecast these variables.