MEMORANDUM FOR Macro-Financial Committee
FROM Lamorna Rogers
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SUBJECT A preliminary framework for the operation of macro-prudential policy
FOR YOUR Discussion

Contents

Executive summary................................................................. 2
Background ................................................................................. 4
Introduction ............................................................................... 4
Objectives .................................................................................. 5
Decision framework for macro-prudential policy intervention ... 6
Step One: Systemic Risk Assessment........................................ 7
Step Two: Case for Macro-prudential Intervention .................. 9
  What is the source of the risk? .............................................. 9
  Is this a macro-prudential issue? .......................................... 9
  Where are we on moral suasion? ......................................... 10
  Is there a sufficient case for macro-prudential intervention? ... 11
Step Three: Instrument Selection ................................................ 12
  Identifying the objective(s) of the macro-prudential intervention 12
  Understanding the transmission mechanisms of the macro-prudential instrument set .... 12
    Adjustment of the minimum core funding ratio (CFR) ........... 13
    Application of the counter-cyclical capital buffer (CCB) ..... 15
    Application of sectoral capital requirements ..................... 16
    Application of sectoral capital requirements at subsector level (high-LVR housing lending) .............. 18
    Outright limits on high-LVR housing lending ................... 20
    Quantitative restrictions on high-LVR housing lending ....... 22
Empirical evidence on the effectiveness of MPIs ...................... 24
  Liquidity-based macro-prudential instruments (CFR) ............ 24
  Capital-based macro-prudential instruments (CCB, sectoral capital requirements including increased capital requirements on high-LVR housing lending) ................. 24
  Asset-side macro-prudential instruments (Outright LVR limits on housing lending, quantitative restrictions on high-LVR housing lending) ................................ 25
Ref# 5107940
Narrowing down the macro-prudential instrument set ........................................................ 26
Selecting the optimum mix of tools ..................................................................................... 28

Step Four: Policy Implementation ........................................................................................... 29
How should the tool(s) be applied? ..................................................................................... 29
Exit questions ....................................................................................................................... 29

Understanding the transmission mechanisms of MPI release .............................................. 31
  Lowering the minimum CFR ........................................................................................... 31
  Lowering macro-prudential capital requirements ............................................................ 32
  Removing outright LVR limits ........................................................................................ 33
  Removing quantitative restrictions on high-LVR lending ............................................... 35

References ................................................................................................................................ 37

Executive summary

1. The Bank’s mandate for macro-prudential policy stems from its legislative purpose of “promoting the maintenance of a sound and efficient financial system”. Macro-prudential policy can help to promote financial system stability through meeting two intermediate objectives – increasing the financial system’s buffers or by dampening the extremes in the financial cycle. Most macro-prudential instruments work primarily through building financial system buffers.

2. A clearly established framework for the operation of macro-prudential policy is important. Such a framework needs to emphasise the importance of defining objectives and matching these to the appropriate tool. It also needs to provide mechanisms to clearly identify the costs and benefits of instruments as part of the instrument selection process.

3. In the process of making decisions to deploy macro-prudential instruments, we see four key steps. **Step One** involves a systemic risk assessment and focuses on whether debt levels and asset price imbalances are developing and whether lending standards may be becoming overly lax. In reaching judgements about these areas a range of quantitative (statistical) and qualitative information is consulted. Work is well progressed in developing these indicators, which are now regularly considered by the Bank’s Macro-Financial Committee via the Quarterly Macro-Prudential Indicator Report.

4. **Step Two** considers whether a macro-prudential intervention is warranted or whether other economic policy responses might be appropriate. The existence of imbalances might not be best addressed through a macro-prudential response if the imbalances reflect unduly lax monetary policy, the mis-calibration of micro-prudential settings or tax distortions. In addition, it is important to ensure that the scope for using moral suasion and communications with lenders and the public has been exhausted as this may prove sufficient in changing behaviours without recourse to additional prudential measures.
5. Assuming a macro-prudential intervention is warranted, **Step Three** involves selecting an appropriate macro-prudential instrument (from the agreed toolkit). This involves, firstly, being explicit about exactly what we are seeking to achieve – for example, building greater capital or funding buffers for the financial system, reducing extremes in the credit cycle in general or to a sector in particular. In selecting the appropriate tool, a clear understanding of the effectiveness of the various tools in meeting these different objectives is essential. These judgements can be assisted by transmission maps which reflect our understanding of how various tools work.

6. Transmission maps for each of the Bank’s macro-prudential instruments have now been developed and are presented throughout this report. These maps attempt to reflect the relative effectiveness of the various tools (including the impact of expectations), along with the particular costs associated with using them (e.g., through avoidance, disintermediation, etc.). The use of transmission maps can be supplemented by empirical research into the effectiveness of various tools and the pool of such research is continuing to grow. However, the empirical evidence on most tools remains sketchy given that macro-prudential policy remains in its infancy.

7. **Step 3** does not rule out the possibility of using a mix of tools. For example, during a credit boom it might be appropriate to not only constrain the build-up of leverage in the banking system with capital-based tools (such as a CCB) but also to target high risk borrowing more directly (e.g., through the use of LVR restrictions). However, the multiple tools may create additional complexity and risks.

8. Having identified the appropriate tool(s) to use, **Step Four** is concerned with how individual tools should be applied. For example, instruments that are targeted at dampening credit growth could be adjusted gradually to provide a progressively larger counter-cyclical impact and to assist in finding the appropriate calibration on a trial and error basis. However, frequent adjustment of tools could also create uncertainty in some cases. Given the lack of experience with macro-prudential tools, we advocate a discretionary and relatively simple approach to the implementation of tools at least until more experience can be gained.

9. **Step four** is also concerned with how settings should be normalised or switched off when the various tools are no longer required. The paper contains a series of transmission maps where we attempt to set out the transmission channels for each of our tools when they are withdrawn. A key insight is that, subject to the financial system remaining adequately capitalised, the objective of mitigating extremes in the financial cycle may well take precedence over the objective of protecting financial system buffers. Expectations also play a stronger role: this reflects the volatility of market sentiment during crisis periods, and the potentially strong impact of expectations on the credit cycle. The financial system response to the removal of a tool may differ depending on economic circumstances and will be highly dependent on the behavioural response of both borrowers and lenders.
Background

10. Over the past 18 months, a number of papers have been presented to MFC which have set out the building blocks of the Bank’s macro-prudential policy framework, including the risk assessment framework and the proposed macro-prudential tools.

11. The necessarily incremental development of macro-prudential policy has meant that it has previously not been possible to present a unified, integrated view of how macro-prudential policy will operate at the Bank.

12. With the last tool – LVR restrictions – now having been explored in some depth, it is an opportune time to pull the pieces together, and develop a conceptual framework for the operationalisation of macro-prudential policy.

13. Macro-prudential policy remains in its infancy, and the framework is expected to evolve in line with experience and international practice. The proposed framework draws on both internal work on macro-prudential policy, and emerging work on frameworks for operationalising macro-prudential policy by the CGFS and other central banks (CGFS, 2012).

14. It is expected that the preliminary framework set out in this paper will serve as useful background material as we prepare for the public consultation process on macro-prudential policy over the coming months.

Introduction

15. This paper sets out a framework for the operation of macro-prudential policy, which emphasises the importance of objectives in selecting the appropriate (if any) macro-prudential response.

16. A decision framework is presented which links the four main steps in the macro-prudential policy process:
   - systemic risk assessment
   - case for macro-prudential intervention
   - instrument selection
   - policy implementation.

17. This paper explores the issues around instrument selection and sequencing in some depth, as this is a policy area that has been given relatively little attention to date. We present a common framework to trace the impact of each macro-prudential tool, thus facilitating comparison of the various instruments.

18. The instruments covered in the paper are:
   - the Countercyclical Capital Buffer
   - Sectoral Capital Requirements (and adjustments to capital requirements on high-LVR lending);
   - adjustments to the minimum Core Funding Ratio; and
   - Quantitative Restrictions on High Loan-to-Value Ratio Lending (this includes the option of restrictions on the share of high LVR lending as well as outright restrictions on such lending).
19. The framework takes monetary policy settings as a given, and does not explore the potential for a combined implementation of monetary and macro-prudential policy responses. While this may be an appropriate course in some (limited) circumstances, it is beyond the scope of this exercise.

20. The paper focuses on the operationalisation of the more technical aspects of macro-prudential policy; while governance and communication are clearly important, these areas are not addressed in detail.

Objectives

21. The Bank's mandate for macro-prudential policy stems from its legislative purpose of "promoting the maintenance of a sound and efficient financial system". This reflects the importance of a sound and efficient financial system to the process of financial intermediation.

22. In operationalising macro-prudential policy, two key intermediate objectives have been identified: increasing the resilience of the financial system to systemic shocks, and dampening extremes in the financial cycle. Increased resilience is the primary objective, reflecting the direct contribution of larger buffers to financial system soundness. A lesser emphasis on dampening the extremes of the financial cycle reflects the more indirect relationship to financial system soundness, and the uncertainty surrounding the effectiveness of macro-prudential instruments in achieving this aim.

Figure 1
23. Figure 1 illustrates the relationship between the Bank’s chosen macro-prudential tools and its policy objectives. It can be seen that the primary effect of most tools in the Bank’s toolkit is to provide additional buffers to the financial system (through changes in capital, lending and liquidity requirements) that vary with the macro-credit cycle. While they may also help dampen extremes in the credit cycle and capital market flows, there is greater uncertainty around the transmission mechanism (a subject which is explored in detail in the section on instrument selection). LVR restrictions are a tool that would be expected to have a direct impact on the financial cycle, making this a key consideration in evaluating their usefulness relative to the other instruments.

Decision framework for macro-prudential policy intervention

24. This section builds on a Board paper that used process maps to set out the macro-prudential policy process (RBNZ, 2011). The key questions at each major step of the process are identified, providing a roadmap for macro-prudential policy making (Figure 2). The remainder of the paper works through the steps in detail.
Step One: Systemic Risk Assessment

25. The quarterly Macro-prudential Indicator report is the backbone of the Bank’s risk assessment framework. It provides a quarterly assessment of the financial system, using a range of indicators to monitor three key areas of systemic risk:

- Are debt levels excessive (or becoming more excessive)?
- Are asset prices overvalued (or becoming more overvalued)?
- Are lending standards becoming overly lax?

26. The answers to these questions feed into a judgement of whether financial system risks are rising to a degree that might warrant macro-prudential policy intervention. Where the judgement is in the affirmative, the report will make a recommendation for further investigation; it does not make recommendations around the use of particular macro-prudential instruments.

27. Table 1 presents a list of indicators that have been identified for use by the Bank to date. In line with CGFS recommendations, our initial indicator selection has been guided by three broad criteria: i) relevance to the macro-prudential instrument(s) ii) ease of data availability and iii) simplicity (the ability to easily communicate and replicate). Robustness is also important. In general, a robust indicator for the build-up or activation of macro-prudential instruments will be characterised by a systematic pattern prior to the onset of crisis episodes – such as high and increasing levels for instance – thus providing a persistent signal if imbalances are building up, and no false warnings during normal times (CGFS, 2012).

| Table 1: RBNZ macro-prudential indicators and instruments (as per December 2012 MPI report) |
|-------------------------------------------------|-----------------|----------------|-----------------|----------------|
| Type of indicator                              | Indicator       | Countercyclical capital buffers | Sectoral capital requirements | Adjustment to CFR | Housing LVR restrictions |
| Macroeconomic indicators                       |                 |                             |                             |                 |                          |
| Private credit to GDP (level)                  |                 |                             |                             | x                | x                         |
| Private credit to GDP (gap)                    |                 |                             |                             | x                | x                         |
| Private credit growth                          |                 |                             |                             | x                | x                         |
| Private debt to GDP                            |                 |                             |                             |                  |                          |
| Public debt to GDP                             |                 |                             |                             |                  |                          |
| Gross govt debt to GDP                         |                 |                             |                             |                  |                          |
| Net foreign liabilities (level)                |                 |                             |                             |                  |                          |
| Household credit to household disposable income (level) |                 | x                            |                             |                  |                          |
| Household credit to household disposable income (gap) |                 |                             |                             |                  |                          |
| Household credit growth                        |                 |                             |                             |                  |                          |
| Business credit to GOS (level)                 |                 |                             |                             |                  |                          |
| Business credit to GOS (gap)                   |                 |                             |                             |                  |                          |
| Business credit growth                         |                 |                             |                             |                  |                          |
| Agricultural credit to agricultural GDP (level) |                 |                             |                             |                  |                          |
| Agricultural credit to agricultural GDP (gap)   |                 |                             |                             |                  |                          |
| Agricultural credit growth                     |                 |                             |                             |                  |                          |
| Core funding to loans and advances             |                 |                             |                             |                  |                          |
| Banking sector indicators                      | Net interest margins |                             |                             |                  |                          |
| Market-based indicators                        |                 |                             |                             |                  |                          |
| House price to household disposable income (gap) |                 | x                            |                             |                  |                          |
| Commercial property prices to GOS              |                 |                             |                             |                  | x                         |
| Commercial property prices to NZX              |                 |                             |                             |                  |                          |
| Farm prices to agricultural GDP (gap)          |                 |                             |                             |                  |                          |
| Qualitative information                        |                 |                             |                             |                  |                          |
| Bank lending standards                         |                 |                             | x                            |                  |                          |
| Bank lending standards (by sector)             |                 |                             |                             |                  |                          |
| High-LVR lending (flows)                       |                 |                             |                             |                  |                          |

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28. One of the key indicators that is advocated at the international level is the credit-to-GDP gap. Preliminary analysis of New Zealand data suggests that the credit-to-GDP gap has performed satisfactorily in signalling key periods of excessive credit growth without any false positives. Since the crisis however, most of the ‘credit gap’ indicators have become large and negative, and may well lag in signalling the need for intervention. Our approach therefore is to monitor a broad range of indicators, which is likely to vary over time, and will be supplemented by both market and supervisory intelligence, and stress tests of banking sector resilience.

29. This “guided discretion” approach reflects the difficulties in measuring systemic risk to the financial system. There is no single statistical measure to reliably capture the emergence of financial market imbalances, and the measures that we do have are calibrated on historical experience. In making decisions on macro-prudential policy intervention, we are likely to need to balance conflicting indicators, and to be wary of excessive reliance on backward-looking indicators, which may not adequately capture new types of risks.

30. Hence, qualitative information has an important role in the decision process. The CGFS provide a list of potentially useful questions during the build-up phase (Error! Reference source not found.).

<table>
<thead>
<tr>
<th>Table 2 : Potential questions to provide qualitative information about the build-up of vulnerabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there signs of speculative behaviour?</td>
</tr>
<tr>
<td>Are particular asset classes heavily advertised or discussed in the media?</td>
</tr>
<tr>
<td>Are banks taking large positions where profits continuously exceed measured risks?</td>
</tr>
<tr>
<td>Are there relatively new products with large market shares, and have they been increasing rapidly?</td>
</tr>
<tr>
<td>Are lending standards falling?</td>
</tr>
<tr>
<td>Are profit margins decreasing?</td>
</tr>
<tr>
<td>Is competition increasing from the shadow banking sector?</td>
</tr>
</tbody>
</table>

Source: CGFS

31. We have recently incorporated lending standards in the MPI framework, and will be looking to further develop our use of this type of information.
Step Two: Case for Macro-prudential Intervention

What is the source of the risk?

32. The systemic risk assessment process revolves around judgements on developments in debt, asset prices and lending standards. Risk may be observed to be evolving at the level of the system as a whole, or may emerge in particular sectors.

33. An understanding of the underlying drivers will be necessary in order to select the appropriate policy response. For example, if financial risks are rising because of the availability of cheap and easy funding that is contributing to an underpricing of risk, the response will need to take this into account. Clamping down on specific sectors where the risks first manifest themselves could just result in a waterbed effect, where the risky behaviour is displaced to other sectors.

34. Alternatively, the source of the risk could be something that in itself is not harmful, for example a supply and demand imbalance that causes asset prices to rise. But an initial fundamentals-based increase in asset prices still has the potential to result in an unhealthy self-propelling credit and asset price cycle, fuelled by speculative demand. A dynamic of this nature would require a response that targets the specific sector involved, with a particular focus on managing expectations.

35. It is also possible that the risk could be emerging due to broader policy settings:
   • easy monetary policy might be encouraging excessive risk taking on the part of lenders and borrowers;
   • mis-calibration of micro-prudential settings might see banks holding too little capital against risky activities;
   • other policy factors such as the tax system could be contributing to supply and demand imbalances, that see overly volatile movements in asset prices.

36. An evaluation of the parts of the financial system that are fuelling the risky developments is also relevant. Is the behaviour concentrated in the core banking system, or amongst other regulated participants, or is it being fuelled by non-regulated entities such as foreign lenders, capital markets, non-deposit takers etc? In the latter case, given the Reserve Bank has no powers to directly regulate these institutions or markets, the appropriate course would be to raise the issue with the supervisor or responsible arm of government, perhaps with some sort of recommendation for market regulation.

Is this a macro-prudential issue?

37. Where the source of the risk is found to be in policy settings belonging to other domains e.g. monetary policy, fiscal policy, a macro-prudential response may not be appropriate.

38. If easy monetary policy was judged to be the main factor leading to excessive risk taking on the part of market participants, then a cautionary tightening in monetary policy would need to be considered. This is something which would need to be discussed by MPC and OCRAG, with input from the macro-prudential policy area. The potential for a combined monetary/macro-prudential response could also be considered.
39. Similarly, if the underlying micro-prudential settings were found to be out of line with the risk profile of particular asset types, the appropriate response might well be to adjust micro-prudential settings. Not to do so would tend to significantly complicate the implementation of any macro-prudential response.

40. If broader regulatory factors such as the tax system of land supply were found to be contributing to the build-up in risk, discussion with the appropriate arms of government, perhaps backed up by recommendations might be warranted. However, it is still possible that some macro-prudential response might be required, to stem unhealthy risk-taking behaviour which has developed as a result of the initial fundamentals-based imbalance.

41. Where alternative policy responses have been considered, and there is still deemed to be a role for macro-prudential intervention, the decision process would move to the next stage.

Where are we on moral suasion?

42. The first step in any macro-prudential policy response is likely to be communication-based. Where concerns are rising about a build-up in systemic risk, even prior to a definitive judgement on the need for macro-prudential intervention, it would be expected that the Bank would intensify its discussions with the banking sector. This would give an opportunity to better understand the underlying dynamics, and to caution banking sector participants against excessive risk taking.

43. The Bank’s options include private communication with banks’ management regarding the nature of the perceived risks, and discussions as to how the banks intend to address them. Where necessary, structured action plans might be agreed. This type of engagement is typically undertaken by the supervisory area of PSD, and there would need to be an understanding of how the macro-prudential policy function would interface with this.

44. Another avenue would be engagement of bank boards, reflecting the overall strategic responsibility of boards, including for setting of risk appetite for the institution. Direct engagement with bank boards (or Bank Chairs in the first instance) would help elevate the profile of the Bank’s concerns, and allow the Bank to form a view on whether its concerns were well understood and accepted by the directors. Discussions across the table could enable directors to explore with the Bank ways in which its prudential concerns might be addressed.

45. At some point moral suasion would be expected to have a public dimension, with the Bank airing its concerns more broadly, in its six monthly Financial Stability Reports, speeches of the like. The intention would be to educate markets and the general public about the nature of the rising risks and the potential for a more formal policy response if behaviours did not change. As is outlined in the section on transmission mechanisms, effective management of expectations can play an important role in building financial system resilience, even prior to deployment of any macro-prudential instruments. This will be particularly so in the case of unsustainable asset price growth, fuelled by speculative demand based on expectations of continued price increases.

46. Moral suasion can be expected to have its limits however, particularly in the early stages when the macro-prudential policy framework is unproven. At this point, the next step would be to formally deploy a macro-prudential instrument.
Is there a sufficient case for macro-prudential intervention?

47. Any macro-prudential intervention will need to be consistent with the Bank’s mandate to promote the maintenance of a sound and efficient financial system, as specified in Section 68 of the Reserve Bank Act. Thus the estimated benefits of the intervention will need to outweigh the estimated costs.

48. Macro-prudential interventions may entail short-term costs, in particular in terms of output losses. They can also have unintended distributional and equity impacts. Overall, the broader the reach of the macro-prudential tool and the tighter its setting, the more costly its application is likely to be, favouring narrower and more targeted interventions. However, the CGFS notes that the costs of certain system-wide tools, such as higher capital requirements, may not be substantial in comparison with their likely benefits.

49. The costs will also include any regulatory burden due to implementation and monitoring. Again, this will tend to favour tools that build on the existing micro-prudential framework and do not require an elaborate infrastructure to be developed in order to be implemented and monitored.

50. Minimising the costs of intervention also favours using macro-prudential tools rarely; in principle, these should be deployed infrequently, and should be withdrawn as soon as possible.

51. Timing is an important consideration, with the costs of delayed action typically higher than a premature intervention. This reflects the CGFS finding that costs of crises are higher than the costs of intervention (efficiency, regulatory, equity). Delayed activation may mean that the intervention is less effective or even ineffective as there is insufficient time to gain traction, or could even precipitate a disorderly unwinding of imbalances.

52. Another consideration is the state of the financial cycle relative to broader economic conditions. Where the financial cycle is booming and the real economy strong, there is likely to be little conflict between macro-prudential policy objectives and monetary policy objectives. However, the potential exists for credit and asset price cycles to sometimes occur in the midst of relatively weak real economic conditions (e.g. when concentrated in a particular sector). Where this is the case, macro-prudential tightening could compound economic weakness, and loan losses might be higher than normal due to reduced resilience of borrowers at a time of weak income and employment growth. A judgement would need to be made regarding the relative risks to the financial cycle and economic outlook.

53. Alternatively, there may be times when macro-prudential policy objectives could also be supportive of monetary policy goals, potentially allowing the interest rate to be set at a lower level than would otherwise be possible. This could argue for earlier and more substantive macro-prudential tightening than would be the case on macro-prudential grounds alone.
Step Three: Instrument Selection

Identifying the objective(s) of the macro-prudential intervention

54. Having established a preliminary case for intervention, a clear understanding of objectives is required. As noted earlier, the two broad objectives of macro-prudential policy are increasing the resilience of the financial system to systemic shocks (via additional capital, funding or liquidity buffers), and dampening extremes in the financial cycle. While the former is typically expected to be the primary objective of macro-prudential policy, there may be instances where greater priority is assigned to the secondary objective.

55. IMF work on the use of macro-prudential tools has identified a suite of risks that members target when applying macro-prudential policy (Table 3). There may be situations where more granular identification of risks is helpful in selecting the appropriate policy response.

<table>
<thead>
<tr>
<th>Cross-country objectives of macro-prudential policy</th>
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<tbody>
<tr>
<td><strong>Risks related to strong credit growth and credit driven asset-price inflation</strong></td>
</tr>
<tr>
<td>Build financial system buffers</td>
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<tr>
<td>Improve credit quality</td>
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<tr>
<td>Limit banks’ exposure to real estate</td>
</tr>
<tr>
<td>Dampen credit growth</td>
</tr>
<tr>
<td>Dampen speculative activity</td>
</tr>
<tr>
<td>Curb house price inflation</td>
</tr>
<tr>
<td>Housing market stability</td>
</tr>
<tr>
<td><strong>Risks arising from excessive leverage</strong></td>
</tr>
<tr>
<td>Reduce household indebtedness</td>
</tr>
<tr>
<td><strong>Risks related to large and volatile capital flows</strong></td>
</tr>
<tr>
<td>Reduce currency risk</td>
</tr>
<tr>
<td>Support monetary policy</td>
</tr>
</tbody>
</table>

Source: IMF

56. It should also be noted that the Bank does not have the power to deploy macro-prudential tools where the sole or principal purpose is for monetary policy objectives. There must always be a strong financial stability case underlying the use of macro-prudential policy.

Understanding the transmission mechanisms of the macro-prudential instrument set

57. Selecting the appropriate macro-prudential instrument (MPI) requires an understanding of the effectiveness and efficiency of the instrument in addressing the particular vulnerability. We have adapted the “transmission maps” proposed by the CGFS to reflect our understanding of the transmission mechanisms that are likely to operate for our nominated tools (refer Box A).
Box A: Reading the transmission maps

The transmission maps track the major transmission channels through which tightening or easing of a macro-prudential instrument can affect the resilience of the financial system or mitigate extremes in the financial cycle. The primary channels are highlighted in bold, with potential policy leakages shown in red. Expectations-based implications for bank behaviour are also shown, with these expected to be key mechanisms for some instruments. Significant uncertainty around the operation of the transmission channel is denoted in dashed lines. The thickness of the line reflects relative strength of the expected impact. For the enthusiast, an appendix “The transmission channels of macro-prudential policy” steps through each of the transmission maps in detail.

Adjustment of the minimum core funding ratio (CFR)

Impact on resilience.
Increasing the minimum CFR can help build funding buffers both directly and indirectly:

- Funding buffers will be directly affected if banks choose to increase their core funding ratio, either by using a greater share of stable funding or by reducing lending. Reduced reliance on short-term funding means that banks will be better able to withstand periods of funding market stress, limiting contagion effects and negative feedback to the real economy.
- Resilience could also be increased indirectly, via the impact on the credit cycle and/or expectations, which may lead to tighter risk management standards.

Impact on financial cycle. Banks can increase their CFR by increasing their share of stable funding or reducing lending. A reduction in lending will weigh on credit

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growth, helping mitigate extremes in the financial cycle. Alternatively, banks could increase their CFR by using a greater share of stable funding. Should the higher cost of funding (at least in the short run) be passed through to borrowers in the form of increased lending costs, this would weigh on credit demand and credit growth.

60. **Expectations-based effects.** The impact on expectations is a key transmission mechanism for macro-prudential policy (refer Box B). Announcement of an increase in the CFR can be expected to condition the behaviour of both banks and market participants, with the potential to bring forward increases in funding buffers ahead of regulatory deadlines. Expectations of higher funding costs and consequently slower credit growth could also weigh on expectations of asset price growth, helping to contain the credit boom. As well, banks might be induced to tighten liquidity risk management practices, in response to the strong signal of rising risk on the part of the Bank. Effective communication strategies would be key to maximising the influence of this channel.

61. **Leakages and potential unintended consequences.** A CFR increase may not be effective if it is absorbed by a reduction of pre-existing voluntary buffers or circumvented. Given that New Zealand banks typically have large voluntary funding buffers, there is a real possibility of leakage due to banks opting to reduce their voluntary buffers (RBNZ, 2012b).

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**Box B: Expectations-based effects (excerpt from CGFS paper)**

62. Expectations are central to banks' capital planning, risk management and lending decisions as well as to those of other market participants. As in the case of the monetary policy transmission mechanism, expectations are therefore likely to be a key part of the transmission mechanism for MPIs.

63. One factor that is likely to influence the power of any expectations-based effect is the strength of the policy signal. As the activation of MPIs is costly in comparison with financial stability policies that predominantly rely on communication and moral suasion, credibility is enhanced. Such a signal should thus have broader effects on lending standards and risk management practices, which will in turn increase the resilience of the system.

64. Another factor determining the impact of MPI activation is whether market participants understand the policymaker’s reaction function and interpret it correctly. If policy is predictable in this way, banks may change their behaviour in anticipation of policy actions – for example, by reducing exposures to sectors showing signs of overheating. These expectational effects may become stronger once a history of macro-prudential policymaking has been established. This suggests that it may be useful to employ a small set of instruments rather than a larger range of little-known tools that are similar, yet different and may be infrequently used. In addition, this underscores the importance of appropriate communication strategies.
65. **Impact on resilience.** Applying the CCB can help build resilience both directly and indirectly:

- Resilience will be directly affected if banks choose to increase their loss absorbency capacity, either by increasing capital or by reducing lending. Higher capital ratios provide the banking system with an extra cushion to absorb losses or sharp increases in risk-weighted assets that are associated with periods of financial distress. This means that banks are able to weather losses of a greater magnitude before their solvency is called into question, thus reducing the likelihood of a costly disruption to the supply of credit and other financial intermediation services. However, there may be a lag before the CCB bites, reflecting the notice period given to the banks, normally 12 months. This lag may be reduced in practice if banks respond to earlier moral suasion by the Bank, by pre-positioning themselves to raise capital.

- Resilience could also be increased indirectly, via the impact on the credit cycle and/or expectations. The immediate announcement effect of the CCB could see these indirect effects play a stronger role initially than the direct effects.

66. **Impact on financial cycle.** Banks can meet the increased capital requirement by increasing capital (the first three options) or reducing asset holdings, particularly for asset classes with higher risk weightings. Where banks re-price lending to reflect the higher cost of funding, this will weigh on credit demand. Where banks respond to the CCB by rationing credit, this could be either across the board or targeted to higher risk-weighted asset classes. This would be a desirable effect as long as the deleveraging was orderly.
67. **Expectations-based effects.** Given that the CCB would not take effect until the end of the notice period, the first impact could be realised through the effect on expectations. Appropriate communication strategies will be key to maximising this effect. Where imposition of the CCB has a strong effect on expectations of banks and markets participants, banks might tighten lending standards (unwinding some of the customary easing seen in a credit boom), and markets and rating agencies could well exert pressure on banks to meet the new capital requirements earlier than later. The expectation of slower credit growth could see asset price expectations revised prior to the CCB coming into effect, helping contain the credit boom.

68. **Leakages and potential unintended consequences.** Application of the CCB may not be effective if it is absorbed by a reduction of voluntary buffers or circumvented:

- Given that New Zealand banks typically have large voluntary capital buffers, there is a real possibility of leakage due to banks opting to reduce their voluntary buffers. This is particularly likely in the case of mutual and cooperatives, whose ownership structures constrain them from easily raising capital, and who hold high voluntary buffers for this reason (RBNZ, 2012a).
- Banks might try to circumvent the CCB by gaming internal models to lower risk-weighted assets; monitoring would be required to identify subtle trends or abnormal patterns in banks’ financial reporting.
- It is also possible that non-bank intermediaries or foreign bank branches that are not subject to the CCB requirement expand lending to fill any gaps left by domestic lenders; this would reduce the impact of the CCB on the financial cycle, but might have less effect on financial system resilience, given that these lenders fall outside the core banking system.

Application of sectoral capital requirements
69. **Impact on resilience.** Applying sectoral capital requirements can help build resilience both directly and indirectly:

- Higher capital ratios provide the banking system with an extra cushion to absorb losses or sharp increases in risk-weighted assets that are associated with periods of financial distress. Thus, resilience will be directly affected if banks choose to increase their loss absorbency capacity, either by increasing capital or by reducing lending. However, there may be a lag before the extra capital is raised reflecting the likely use of a notice period. Given the smaller task faced by banks (which would need to raise capital on only part of their loan book), this lag is likely to be shorter than with the CCB. Again, this lag could be less if banks have responded to earlier moral suasion by the Bank, be pre-positioning themselves to raise capital.

- Compared to the CCB, banks may be less able to raise external equity, given that it would be funding lending to a sector that has singled out as risky by the regulator.

- Resilience could be increased indirectly, via the impact on the credit cycle and/or expectations. The immediate announcement effect of the sectoral capital requirement might be stronger than with a CCB – again reflecting the singling out of the sector by the authorities - and could see indirect effects play a stronger role initially than direct effects.

70. **Impact on financial cycle.** Banks can meet the increased capital requirement by increasing capital (the first three options) or reducing asset holdings, particularly for asset classes with higher risk weightings. Where banks re-price lending to reflect the higher cost of funding, this will weigh on credit demand. Where banks respond by rationing credit, this could be either to the sector or across the board. A slowdown in lending to the risky sector would be desirable as long as it was orderly.

71. **Expectations-based effects.** Given that sectoral capital requirements will be implemented with a notice period, the first impact would be likely to be realised through the effect on expectations. The singling out of a single sector as risky could see a stronger effect on expectations than broader measures such as the CCB. Again, appropriate communication strategies will be key to maximising this channel. A strong effect on expectations could see banks tightening lending standards to the sector, and markets exerting pressure on banks to reduce exposures to the risky sector. The expectation of slower credit growth could see asset price expectations in the sector revised prior to the sectoral capital requirement coming into effect, helping contain the excessive credit growth in the sector.

72. **Leakages and potential unintended consequences.** Application of the sectoral capital requirement may not be effective if it is absorbed by a reduction of voluntary buffers or circumvented by arbitrage:

- Given that New Zealand banks typically have large voluntary funding buffers, there is a real possibility of leakage due to banks opting to reduce their voluntary buffers. This is particularly likely in the case of mutual and cooperatives, whose ownership structures constrain them from easily raising capital, and who hold high voluntary buffers for this reason.

- Banks might try to circumvent the sectoral capital requirement by gaming internal models to lower risk-weighted assets or reclassifying lending; monitoring would be required to identify subtle trends or abnormal patterns in banks’ financial reporting.

- Non-bank intermediaries or foreign bank branches that are not subject to the sectoral capital requirement could expand lending to fill any gaps left by
domestic lenders; this would reduce the impact of the sectoral capital requirement on the financial cycle, but have less effect on financial system resilience, given that these lenders fall outside the core banking system.

Application of sectoral capital requirements at subsector level (high-LVR housing lending)

73. **Impact on resilience.** Applying higher capital requirements (on either the stock or flow of lending) can help build resilience both directly and indirectly:

- Higher capital ratios provide the banking system with an extra cushion to absorb losses or sharp increases in risk-weighted assets that are associated with periods of financial distress. Resilience will be directly affected if banks choose to increase their loss absorbency capacity, either by increasing capital or by reducing lending.

- There may be a lag before the extra capital is raised reflecting the likely use of a notice period. Given the smaller task faced by banks (which would need to raise capital on only the high-LVR lending part of their loan book), this lag is likely to be shorter than with the CCB or a sectoral capital requirement.

- Compared to the CCB, banks may be less able to raise external equity, given that it would be for funding of lending that has been identified as being particularly risky. Banks might also not to choose to raise capital for such a targeted part of their loan book.

- The effectiveness of this instrument will also depend on the calibration of the underlying micro-prudential risk weights – if these are too loose, then a very large increase in the capital requirement will be needed to have an effect.

- Resilience could be increased indirectly, via the impact on the credit cycle and/or expectations. The immediate announcement effect could see indirect effects play a stronger role initially than direct effects.
74. **Impact on financial cycle.** Banks can meet the increased capital requirement by increasing capital (the first three options) or reducing asset holdings, particularly for asset classes with higher risk weightings. Where banks re-price lending to reflect the higher cost of funding, this will weigh on credit demand. Where banks respond by rationing credit, this could be either to the sector or across the board. A slowdown in high-LVR lending would be desirable as long as it was orderly.

75. **Expectations-based effects.** Given that higher capital requirements on high-LVR lending would be implemented with a notice period, the first impact would be likely to be realised through the effect on expectations. The singling out of high-LVR lending as excessively risky could heighten the expectations effect; against this however would be the more opaque nature of this type of measure compared to outright LVR limits. Again, appropriate communication strategies will be key to maximising this channel. A strong effect on expectations could see banks tightening lending standards for high-LVR loans, perhaps reinforce by market pressure. The expectation of slower credit growth could see house price expectations revised prior to the increased capital requirement coming into effect, helping contain excessive credit growth in the sector.

76. **Leakages and potential unintended consequences.** Application of higher capital requirements on high-LVR lending may not be effective if it is absorbed by a reduction of voluntary buffers or circumvented:
   - Given that New Zealand banks typically have large voluntary capital buffers, there is a real possibility of leakage due to banks opting to reduce their voluntary buffers. This is particularly likely in the case of mutual and cooperatives, whose ownership structures constrain them from easily raising capital, and who hold high voluntary buffers for this reason.
   - Banks might try to circumvent the higher capital requirement by gaming internal models or reclassifying lending; monitoring would be required to identify subtle trends or abnormal patterns in banks’ financial reporting.
   - Non-bank intermediaries or foreign bank branches that are not subject to the higher capital requirement could expand lending to fill any gaps left by domestic lenders; this would reduce the impact of the capital requirement on the financial cycle, but have less effect on financial system resilience, given that these lenders fall outside the core banking system.
   - There is a risk that households might respond to the tightening by bringing forward borrowing, seeing house price growth accelerate, at least temporarily. The notice period requirement would make this difficult to avoid through speedy implementation.
77. **Impact on resilience.** Outright LVR limits increase the resilience of the banking system directly through decreasing both the probability of default (PD) and loss-given-default (LGD) of loans. First, LVR limits reduce PDs, as borrowers have higher buffers to withstand negative shocks. Second, by restricting the amount that can be borrowed against the given value of a property, limits on LVR ratios restrict leverage and, in doing so, decrease LGD. Resilience is also increased indirectly via the impact on the credit cycle or expectations, which in turn, may lead to a tightening of banks’ risk management standards.

78. **Impact on the credit cycle.** Tighter LVR caps restrict the quantity of credit by limiting the funding available for certain borrowers (particularly first-home buyers and low-income), reducing housing demand and increasing savings. In principle, house prices will tend to ease, reducing households’ ability to obtain credit and withdraw equity more generally. The demand for credit is therefore likely to fall more broadly. The strength of these transmission channels may be moderated by the fact that LVR limits do not directly affect the cost of borrowing – they simply restrict the ability of a specific group to borrow. While this may constrain some households, it is also possible that the demand from others with sufficient wealth might continue to drive house price growth.

The ultimate impact (including second-round effects) of any change in LVR caps may be quite sensitive to its initial impact on house prices, in particular when house price growth is disconnected from fundamentals. If LVR tightening is followed by an initial house price decline, LVR ratios will increase, reducing the scope for equity withdrawals and GDP growth, which may trigger further declines in house prices. If, by contrast, house prices continue to rise after the LVR cap is tightened, aggregate demand may continue to be supported by equity withdrawals as LVR ratios fall. Both
amplification channels might be stronger when house price changes are due to speculative demand.

79. **Expectations-based effects.** LVR limits represent a costly signal by the macro-prudential authority and, as such, can help alter market expectations and risk management practices, thereby increasing resilience. However, there is a risk of expectations playing a destabilising role under some circumstances. If caps are expected to be tightened, households might respond by bringing forward borrowing. House price growth might then accelerate, at least temporarily. These effects can be avoided by implementing limits over a short period of time.

80. **Leakages and potential unintended consequences.** There are likely to be three distinct channels for leakages to occur. First, there may be leakages to the unregulated sector and foreign banks. Second, arbitrage through non-mortgage (unsecured) top-up loans is a possibility. Third, if households are constrained by LVR limits, the structure of the housing market could evolve in ways countering the intended effect (e.g., via the emergence of part-purchase, part-rent models of home ownership). In such a scenario, underlying demand for housing would remain unaffected and, hence, house prices would be unlikely to react to changes in LVR limits. This suggests that the use of LVR limits would have to be accompanied by tight market surveillance.

Another potential downside to LVR limits is that they will tend to directly impede some viable borrowers’ access to home ownership. They may also have broader distributional effects, which could pose difficulties from a political economy perspective and may have to be managed via mitigating policy measures (such as mortgage insurance). In addition, changing LVR limits may affect the number of housing transactions. While this may be beneficial when turnover is high and the market shows signs of overheating, the decline in the number of transactions may have unintended effects in the form of increased price volatility, given that price discovery in the housing market is generally poor to begin with.
Quantitative restrictions on high-LVR housing lending

81. **Impact on resilience.** Quantitative restrictions will increase the resilience of individual banks for which the restriction is binding, as these banks will reduce their share of high-LVR lending, resulting in lower LGDs and PDs. If the overall share of high-LVR lending falls, this will increase the resilience at a system level also. A system-wide fall in the share of high-LVR lending will depend on whether other banks step in to take up the high-LVR lending vacated by the former group. Resilience could also increase indirectly via the impact on the credit cycle or expectations, which in turn, may lead to a tightening of banks’ risk management standards.

82. **Impact on the credit cycle.** Should other banks not compensate by increasing their share of high-LVR lending, some borrowers will be screened out of the housing market (particularly first-home buyers and low-income), reducing housing demand and increasing savings. In principle, house prices will tend to ease, reducing households’ ability to obtain credit and withdraw equity more generally. The demand for credit is therefore likely to fall more broadly.

The strength of these transmission channels may be moderated by the fact that LVR limits do not directly affect the cost of borrowing – they simply restrict the ability of a specific group to borrow. While this may constrain some households, it is also possible that the demand from others with sufficient wealth might continue to drive house price growth.

Again, the ultimate impact of any change in LVR caps may be quite sensitive to its initial impact on house prices, in particular when house price growth is disconnected from fundamentals. If LVR tightening is followed by an initial house price decline,
LVR ratios will increase, reducing the scope for equity withdrawals and GDP growth, which may trigger further declines in house prices. If, by contrast, house prices continue to rise after the LVR cap is tightened, aggregate demand may continue to be supported by equity withdrawals as LVR ratios fall. Both amplification channels might be stronger when house price changes are due to speculative demand. Given the lower signalling impact of this type of measure compared to outright limits, it can be expected that the impact on house prices will be smaller than outright LVR limits.

83. **Expectations-based effects.** Quantitative restrictions are likely to provide a weaker signal than outright LVR limits, but could still help alter market expectations and risk management practices, thereby increasing resilience. The risk of households bringing forward borrowing is still present, but likely to be less than in the case of outright limits given the likely lower profile of this measure.

84. **Leakages and potential unintended consequences.** There are likely to be two distinct channels for leakages to occur. First, there may be leakages to the unregulated sector and foreign banks; however, given that there will still be some high-LVR lending happening in the core system, the incentives for third parties to enter the market will be lower. Second, avoidance through unsecured top-up loans is a possibility.

Another potential downside to LVR restrictions is that they may have broader distributional effects, which could pose difficulties from a political economy perspective and may have to be managed via mitigating policy measures (such as mortgage insurance). In addition, changing LVR restrictions may affect the number of housing transactions. While this may be beneficial when turnover is high and the market shows signs of overheating, the decline in the number of transactions may have unintended effects in the form of increased price volatility, given that price discovery in the housing market is generally poor to begin with.
Empirical evidence on the effectiveness of MPIs

Evidence regarding the effectiveness of macro-prudential instruments is scant, reflecting the newness of many of the instruments. It should also be borne in mind that until recently macro-prudential instruments have mostly been used in emerging market economies, with quite different financial systems and institutional frameworks from New Zealand. As such, the experiences and lessons learnt in those economies are not necessarily transferable.

Liquidity-based macro-prudential instruments (CFR)

85. There is little empirical evidence on the transmission channels and effects of liquidity-based MPIs. Basel Committee studies and internal RBNZ work provide some guidance on estimated impacts.

86. **Impact on resilience.** The LEI estimates that the introduction of the NSFR (akin to the CFR) decreases the likelihood of systemic crises by 10–20% (BCBS, 2010).

87. **Impact on the credit cycle.** There is evidence that liquidity-based MPIs could be effective in curbing the credit cycle, yet the uncertainty is large, given the scarcity of information. Studies assessing the impact of Basel III, as envisaged in 2010, suggest that the introduction of the NSFR could trigger a 14–25 basis point increase in lending spreads. Internal RBNZ work finds a steady state effect on the average cost of funds of about 25 basis points (Bloor et al, 2012).

88. **Impact on output.** With respect to the potential efficiency of liquidity-based MPIs, cost estimates by the LEI suggest that meeting the NSFR reduces steady-state GDP levels by 0.08 percentage points, when the positive impact on the reduction of the frequency and severity of banking crises is not taken into account. The LEI estimates that the net benefit of introducing the NSFR is an increase in steady-state output by 0.68%.

Capital-based macro-prudential instruments (CCB, sectoral capital requirements including increased capital requirements on high-LVR housing lending)

89. **Impact on resilience.** Several studies find that higher levels of capital increase the resilience of the financial system. For example, based on a range of models, the Long-term Economic Impact Assessment (LEI, Basel Committee (2010a)) estimates that a 1 percentage point rise in capital requirements leads to a 20–50% reduction in the likelihood of systemic crises. In absolute terms, however, marginal benefits of higher capital ratios decrease with higher initial capital levels.

90. **Impact on the credit cycle.** Evidence on the impact of capital-based MPIs is mixed. The CGFS finds that capital-based MPIs are effective in affecting (i) the price and (ii) the quantity of credit, even though the uncertainty about precise magnitudes is relatively large.

- First, several studies suggest that lending spreads could increase between 2 and 20 basis points in response to a 1 percentage point increase in capital ratios, depending on whether funding costs change in response to greater equity cushions due to their effect on the likelihood of failure.

- Second, tightening capital-based MPIs seems to decrease the volume of credit in the economy. There is evidence that, in the short run, banks seem to respond to an increase in target capital ratios by making about a half to three quarters of the
required change through an increase in capital and the remainder through a reduction of risk-weighted assets (RWA), of which in turn only half is in the form of reduced lending. The Macroeconomic Assessment Group (MAG (2010)) estimates that the median impact of increasing capital ratios by 1 percentage point is a reduction in lending by 1–2 percentage points.

- The overall effectiveness of capital-based MPIs likely to be reduced by leakages in the form of increases in lending by unaffected banks and other lenders, and the very large tightening required to have an impact on a credit boom, when it is not uncommon for real credit to grow by 15–25%.

91. IMF cross-country studies are less positive, finding little relationship between capital-based measures and slower credit growth or house price appreciation (IMF, 2010a; IMF 2010b).

92. Our own work also suggests that the relationship between capital requirements and the price and quantity of lending is not straightforward. This reflects the large voluntary buffers typically held by New Zealand banks, questions over the influence of regulatory requirements on banks’ internal pricing models, funding and competitiveness considerations (RBNZ, 2012f).

93. **Impact on output.** The Macroeconomic Assessment Group finds that, in the short to medium run, the median impact of a 1 percentage point increase in capital requirements decreases annual GDP growth by 0.04 percentage points (MAG, 2010). In the long run, the LEI estimates that such an increase lowers long-run output by 0.09%, when the positive impact on the reduction of the frequency and severity of banking crisis.

94. **Impact on resilience.** There is evidence that asset-side MPIs increase the resilience of banks by increasing the resilience of borrowers. Specifically, several studies find that tighter LVR caps reduce the sensitivity of households to income and property price shocks. Although IMF cross-country studies did not find LVR limits to be effective in addressing the risks arising from excessive leverage, Hong Kong provides an example of an economy that imposed LVR caps and was able to withstand substantial falls in housing prices with only modest loan losses for banks (Wong et al, 2011).

95. **Impact on the credit cycle.** The impact on the credit cycle is less well documented, as relatively few countries have instituted LVR caps in a macro-prudential fashion. The available evidence suggests that imposing LVR caps during booms slows down real credit growth and house price appreciation. One recent study finds, for instance, that tightening LVRs tends to reduce real credit growth by 1–2 percentage points and real house price appreciation by 2–5 percentage points. The latter effect on property prices is, however, not as clear-cut in other studies.

96. **Impact on output.** An overall efficiency assessment is hampered by the fact that there is no empirical evidence on the costs of asset-side MPIs to the broader economy. In comparison with other MPIs, costs could be more limited, as these tools only affect a specific proportion of borrowers. In addition, costs to these borrowers may be mainly in non-monetary terms, as they may not be allowed to obtain the housing they desire.
Narrowing down the macro-prudential instrument set

97. Table 4 summarises some of the key issues to be considered when selecting the appropriate macro-prudential response. A more detailed discussion follows.

Table 4: Considerations in the selection of the macro-prudential response

<table>
<thead>
<tr>
<th>Core funding ratio</th>
<th>Countercyclical capital buffer</th>
<th>Sectoral capital requirements</th>
<th>Housing LVR limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Build funding buffers</td>
<td>Build capital buffers</td>
<td>Build capital buffers</td>
</tr>
<tr>
<td>Costs</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Timing</td>
<td>Notice period required; risk that funding conditions could abruptly change</td>
<td>Notice period required; risk of long lag between announcement and impact</td>
<td>Notice period required; risk of lag between announcement and impact</td>
</tr>
<tr>
<td>Type of risk</td>
<td>Maturity mismatch</td>
<td>Generalised imbalances in credit markets</td>
<td>Sectoral imbalances in credit markets</td>
</tr>
<tr>
<td>Source of risk</td>
<td>Funding markets</td>
<td>Credit markets</td>
<td>?</td>
</tr>
<tr>
<td>Uncertainty regarding source of risk</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Pre-requisites</td>
<td>Appropriate calibration of micro-prudential settings</td>
<td>Appropriate calibration of micro-prudential settings</td>
<td>Appropriate calibration of micro-prudential settings</td>
</tr>
</tbody>
</table>

98. The effectiveness of the instrument in addressing the policy objective(s) will be important. The transmission maps can be used to help think through the various impacts of the tool, including effectiveness and the potential for leakages.

99. Costs also need to be considered. The expected net benefits of the particular tool will need to be assessed, taking into account efficiency, equity and regulatory costs.

100. Timing is a further important consideration. As noted in the transmission map section, delayed implementation due to notice periods may mean that the first effects are felt via the expectations channel rather than the direct impact of the measure. At times, a need for early intervention might also favour the use of tools with short notice periods over tools with long notice periods. Where there is a risk of households bringing forward activity (such as with LVR limits), speedy implementation will be important.
101. Assessments of aggregate and sectoral risks to the financial system (part of the Macro-prudential Indicator report) will be key inputs to the process.

102. Where imbalances are generalised, an appropriate response could be to adjust the CFR and/or apply the CCB. Adjustment of the CFR would be recommended in cases where funding is cheap and abundant, and perceived to be contributing to a build-up in risk. Relevant indicators would include market funding conditions, including access and price, and the current level of the CFR.

103. The decision to apply the CCB would typically be guided by aggregate indicators such as credit-to-GDP measures. It might also be recommended in cases where there is a clear sense of building vulnerabilities but large uncertainty over the source of the exuberance.

104. Where imbalances emerge in specific sectors, a system-wide response such as the CCB could still be appropriate, if the underlying source is unrelated to the sector (as in a housing boom fuelled by cheap funding). However, if imbalances have become entrenched in the dynamics of those sectors, a sectoral response may also be warranted.

105. Sectoral capital requirements can increase the resilience of the system by directly building financial buffers. A pre-requisite for effective use of this instrument is that the underlying risk weights/capital requirements are appropriately calibrated.

106. In addition to sectoral capital requirements, emerging risks in the housing market can be targeted by dedicated LVR-based tools. A pre-requisite for selection of these tools would be that banks (in aggregate) are engaging in excessive high-LVR lending, reflecting an undue relaxation of lending standards.

- Outright LVR limits and quantitative restrictions on high-LVR lending directly limit banks’ capacity to engage in high-LVR lending, and might be preferred where there are doubts around the underlying risk calibration. Empirical evidence also suggests that if the primary objective of the intervention is to rein in a credit boom, these would be a more effective tool. Furthermore, these measures send a stronger signal than capital-based requirements, and as such could be particularly useful when combatting housing booms that are fuelled by expectations of continued house price appreciation.
  - Outright LVR limits are the blunter tool, restraining all banks from engaging in high-LVR lending, including those that may not have been excessively exposed to such lending. This makes them more powerful where the aim is to dampen credit growth; however, if the aim is to lean against excessive risk taking, quantitative restrictions might be better.
  - Quantitative restrictions on high-LVR lending would allow banks that have been less engaged in high-LVR lending to maintain the flow of lending while reining in those that have been excessively involved. The efficiency costs of this tool would be less, as there would still be some high-LVR lending available to approved borrowers, rather than an outright prohibition.
- Where underlying risk weights are appropriate calibrated, increased capital requirements on high-LVR lending would provide another channel for reining in high-LVR lending.
Selecting the optimum mix of tools

107. In some cases, the macro-prudential intervention might be best achieved by deployment of more than one tool.

108. This could reflect a need to address different types of vulnerabilities. For example, during periods of extreme exuberance, it could be prudent to not only constrain the buildup of leverage in the banking sector with capital-based tools, but also target borrowers more directly by activating LVR limits. If excessive maturity transformation is also judged to be an issue, adjustment of the CFR might be warranted. This could also help guard against regulatory arbitrage and waterbed effects that might otherwise drive exuberance into areas not directly targeted by an individual macro-prudential instrument.

109. Using a mix of tools might also reflect a need to be able to layer the solution, so that both generalised underlying risks and sector-specific risks are addressed. An example would be deployment of the CCB in combination with sectoral capital requirements.

110. A combination of tools could also provide a sequenced approach whereby policy is gradually tightened. A trial by error approach could be useful in addressing the uncertainty around the effectiveness due to lack of experience in using macro-prudential tools. This approach might also be taken to minimise efficiency costs – initial deployment of the lower-cost tool in the hope that works, with the more intrusive tool only deployed if absolutely necessary. An example would be an initial increase in capital requirements on high-LVR lending, followed by outright restrictions if the desired slowdown is not seen.

111. When deploying a combination of macro-prudential tools, the following risks need to be managed:

- Uncoordinated application has the potential to be welfare-reducing because tools can interact in unanticipated ways (Goodhart et al, 2012).
- Highly targeted tools should be used with care, given risk of falling into the trap of trying to fine tune the economy, or fuelling such expectations on the part of others,
- Complexity and communication challenges can be amplified if too many tools are used that are similar, yet different, and infrequently used,
- Overlapping tools that target similar vulnerabilities but have different reaches may be subject to pressure to deploy the least politically costly tool.

112. It is also possible that the macro-prudential tools might be deployed in combination with some other type of policy tool, for example interest rates.
Step Four: Policy Implementation

How should the tool(s) be applied?

113. **Broad-based vs. targeted.** The ability to target specific risks by differentiating types of transactions makes instruments more precise and potentially more effective. It can also reduce efficiency costs and unintended consequences. An example is targeted use of LVR limits to particular segments (e.g. investors), or the introduction of LVR limits accompanied by an exception for mortgage insurance.

114. **Fixed vs. time-varying.** Instruments that are targeted at dampening credit growth (e.g. LVR limits) could be adjusted to provide a progressively larger countercyclical impact; a gradual application could also help in finding the appropriate calibration on a trial and error basis. On the other hand, a “big-bang” approach might at times be appropriate, so as to maximise the impact on expectations.

115. **Discretion vs. rules.** Rules-based adjustments have clear advantages in terms of transparency and predictability but can be difficult to design. In fact, countries have typically used judgement when designing and calibrating MPIs, in a learning-by-doing process. Given the lack of experience with these tools, it is expected that a similar approach will be followed here, at least initially.

Exit questions

116. In the release phase, there will typically be a shift in policy objectives. Whereas the focus in the upswing of the financial cycle is primarily on building extra resilience into the financial system, in the downswing buffers are expected to be used to support the flow of lending to the system and/or to absorb actual losses. The objective of mitigating extremes in the credit cycle takes precedence over that of maintaining financial system buffers.

117. The role of expectations also gains in prominence, reflecting the crucial role of trust and confidence in recovering from crisis events. A mishandled release could exacerbate the crisis if market participants see it as confirming the severity of the situation; on the other hand, it could have a calming effect if market participants see it as signalling that there will be lower pressure for asset fire sales and deleveraging.

118. As a general principle, capital and liquidity buffers should be relaxed in a downswing of the financial cycle to prevent prudential regulation from being procyclical. By removing the need for banks to deleverage for regulatory reasons, the release of countercyclical capital buffers may help banks to weather losses while maintaining the flow of new lending.

119. The stage of the financial cycle is a key determinant of release timing. During the release phase, deactivating MPIs too early may give market participants a wrong signal, whilst releasing them too late may amplify procyclical effects, as banks may have to deleverage more to satisfy macro-prudential buffers.

120. It is important to differentiate whether the downswing of the financial cycle coincides with a financial crisis or not.

121. In a crisis context, capital-based MPIs (such as the CCB or sectoral capital requirements) may need to be released promptly to avoid excessive deleveraging. This would be the case when the banking system is unable to raise capital on
reasonable terms, and this is judged to be crowding out otherwise appropriate lending. Prompt release of capital-based MPIs would have the objective of supporting lending; appropriate measures may be needed to ensure that there is no leakage via distributions to shareholders (RBNZ, 2012d).

122. Where lending is not judged to be crowded out, it may be better to delay the release of the CCB so that the buffer is available to absorb losses as they come through.

123. Alternatively, to resolve some crises, it may be necessary to increase the overall level of capital and liquidity in the system to restore market confidence. The effectiveness of releasing MPIs in such situations depends critically on several factors, such as the appropriate timing and the impact on market expectations.

124. Where the downswing does not lead to crisis, releasing previously tightened MPIs may be warranted to soften the impact of the downturn and avoid the asset disposals and bank deleveraging that might otherwise be necessary if MPI settings were to be held fixed. In such a case, a gradual release might be advisable, that is potentially timed to coincide with losses, or increases in average risk weights.

125. A further scenario is when the real economy is booming but the financial cycle has turned or is about to do so. On the one hand, a release in this situation may help to absorb part of the impact of the turning financial cycle, thereby reducing the severity of the crisis. On the other hand, it may send the wrong signal to markets, delaying the appropriate responses by banks and other market participants. The balance of these risks will be highly situation-dependent. In a more benign situation, the economy could expand whilst the financial cycle is in a downswing, as systemic risk subsides smoothly. This would be the ideal outcome, if macro-prudential policies are successful in leaning against the cycle. In this case, a gradual release seems appropriate.

126. The Macro-prudential Indicator report includes some contemporaneous stress indicators that could be used to guide the release phase (Table 5). The work on buffer release is less advanced than the work on systemic risk assessment, and the list of stress indicators will be expanded as our understanding of this area develops.

<table>
<thead>
<tr>
<th>Type of indicator</th>
<th>Stress indicator</th>
<th>Countercyclical capital buffers</th>
<th>Sectoral capital requirements</th>
<th>Adjustment to CFR</th>
<th>Housing LVR restrictions</th>
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<td>Non-performing loans to gross lending</td>
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<td>Impaired assets to gross lending</td>
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<td>Non-performing loans to gross lending (by sector)</td>
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<td>Sectoral watchlist loans</td>
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<td>Market-based indicators</td>
<td>FX market volatility</td>
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<td>Equity market volatility</td>
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<td>Headline stress indices</td>
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Understanding the transmission mechanisms of MPI release

Lowering the minimum CFR

127. The objective would typically be to allow banks to use a greater share of short-term wholesale funding, at a time when funding conditions in long-term wholesale markets are judged to be onerous and/or spreads at excessively high levels. Assuring access to funding on reasonable terms would help support the flow of lending to the economy. In a crisis event, wholesale funding markets could be frozen (as during the GFC). In this case, the Bank might also announce the temporary provision of liquidity facilities, for short-term and/or long-term funding.

Impact on resilience. Relaxing the minimum CFR could allow banks to continue lending by running down funding buffers, both directly and indirectly. Funding buffers will be directly affected if banks chose to lower their core funding ratio, either by using a lower share of stable funding or by increasing lending. However, there is a real possibility of leakage due to banks opting to preserve their buffers. The UK experience suggests that strong communication around the systemic reasons for relaxing buffer requirements can help offset this risk.

Impact on credit cycle. It is possible that CFR release could see banks increasing lending, but arguably unlikely. The more probable outcome is that it would help mitigate any downswing in the credit cycle, with funding pressures not forcing banks into a disorderly deleveraging.

Expectations-based effects. A key challenge will be to manage expectations. A balance needs to be found between a relaxation of the minimum CFR requirement that allows banks the room to eat into liquidity buffers but does not
undermine the credibility of the liquidity framework. It needs to be clear that the provision of liquidity facilities is a response to extreme systemic conditions that banks could not reasonably be expected to factor into their own self-insurance plans, and that use of the facilities should therefore not be interpreted as a sign of weakness. At the same time, it also needs to be clear that these are temporary measures, and that banks will be expected to quickly transition back to market funding once the crisis passes.

131. **Leakages and potential unintended consequences.** Lowering the minimum CFR may not be effective if banks feel unable to reduce funding buffers due to market pressure, or because of uncertainty regarding the outlook for funding conditions or the credibility of the authorities’ response. Alternatively, where short- and/or long-term funding markets are frozen and the RBNZ has activated temporary liquidity facilities in this case, banks could be reluctant to access these if this was seen as a sign of weakness by markets.

**Lowering macro-prudential capital requirements**

132. The objectives of a CCB release will differ according to whether it occurs in the context of a crisis.

- In a crisis situation, the focus would either be on supporting lending (requiring prompt release) or absorbing losses (where a more gradual release may be appropriate). Banks would be strongly discouraged (perhaps even restrained) from distributing the freed-up capital to shareholders.
- In a non-crisis situation, where credit is slowing in an orderly manner without dramatic financial losses, banks would be encouraged to continue prudent
lending, while preserving adequate capital to absorb future losses. However, they would not be constrained from using the freed-up capital for other purposes, such as distributions to shareholders.

133. **Impact on resilience.** Releasing the CCB allows banks to lend more for a given amount of capital. Where banks are close to their regulatory minima, an increase in lending could see a fall in capital buffers. Alternatively, banks might choose to hold lending steady and reduce capital. There would be no direct impact on resilience if banks opt to preserve their capital buffers. However, there could be an indirect impact if banks interpreted the release as a signal to ease lending standards.

134. **Impact on credit cycle.** It is possible that CCB release could see banks increasing lending, but arguably unlikely. The more probable outcome is that it would help mitigate any downswing in the credit cycle, with capital pressures not forcing banks into a disorderly deleveraging.

135. **Expectations-based effects.** A key challenge will be to manage expectations, particularly in the context of a crisis. Releasing the CCB signals to banks and markets that the authorities do not see the need for banks to hold additional capital buffers. However, the Bank will need to make clear whether this is intended to support lending or absorb losses, or because risks are judged to have receded sufficiently that these additional buffers are now not expected to be needed. Where release of the CCB sends a credible signal that the authorities believe that the worst of the crisis is over, this could help support expectations and thus asset prices. However, if asset prices have risen to excessive levels during the boom cycle, releasing the CCB too early could create unrealistic expectations around the outlook for credit growth and see asset price inflation take up from where it left off.

136. **Leakages and potential unintended consequences.** Releasing the CCB will not be effective if banks feel unable to reduce funding buffers due to market pressure, uncertainty regarding future losses or doubts around the likely path of macro-prudential policy. The authorities may need to provide a credible commitment to keeping the CCB “off”, for banks to be comfortable that they can run down the CCB buffer without risking having to raise it again under stressful conditions. There is also the possibility that banks might want to distribute the excess capital to shareholders; this could require supervisory intervention or temporary restrictions on distributions.

137. **Relaxing sectoral capital requirements (at sector or subsector level).** Channels will be similar to removal of the CCB. However, the impact on loss absorbency is likely to be smaller given the more targeted scope of the tool. As with the application of the tool, the possibility of banks rebalancing lending across their portfolios means there is also greater uncertainty regarding the ultimate effect on the credit cycle. It is difficult to say whether expectations would play a significant role in the overall transmission; this will in part depend on the extent to which the application of the tool was “high profile”, and perceptions of effectiveness of the tool in achieving its goals. Again, timing will be important in ensuring that revised expectations do not result in excessive exuberance in credit markets and fresh imbalances.

**Removing outright LVR limits**

138. The objective of removing LVR limits would be to counter the downswing in the credit cycle. LVR limits have the potential to act directly on the supply and
demand for lending. In the context of significant pent-up demand for high-LVR lending, it is possible that the release could have an immediate impact on the credit cycle. However, if the housing market is significantly depressed (perhaps in the aftermath of large falls in house prices) there might be little discernible impact.

Transmission map of removing housing LVR limits

139. **Impact on resilience.** Removing LVR limits could directly affect resilience in two ways: firstly, where it results in a higher share of high-LVR lending, the average collateral will fall, increasing loan losses in the event of default and also the probability of default. Secondly, if the removal of restrictions is taken as a signal to ease lending standards, this could also reduce resilience. However, to the extent that the removal of LVR limits helps mitigate the systemic risk of a disorderly deleveraging and asset price deflation, there should be an offsetting, longer term positive effect on financial system resilience.

140. **Impact on credit cycle.** Removing LVR limits can increase lending, by providing access to lending markets for marginal borrowers (who have little or no deposit), and increasing the supply of lending by banks, who are no longer constrained regarding deposit requirements. The interaction of increased supply and/or demand for credit could help counter the cyclical downswing, with the effect likely to vary according to the prevailing economic conditions. Expectations of housing market growth and/or easier credit standards could see house price expectations revised upwards, with the normal mutually reinforcing feedback loop to housing lending.
141. **Expectations-based effects.** The high-profile of LVR limits as a tool means that signalling effects are potentially strong. Removing limits could see additional demand from not only previously constrained borrowers, but also vendors who interpret it as presaging greater demand.

142. **Leakages and potential unintended consequences.** Key risks around removal of LVR limits is that banks unduly relax their lending standards in a rush to take advantage of new lending opportunities, and that premature removal of the limits results in the housing market picking up where it left off, with the downswing quickly transitioning to a boom. Where household indebtedness is already high, the risks of households becoming overly extended could quickly rise, wiping out any gains from a temporary dampening.

**Removing quantitative restrictions on high-LVR lending**

143. The primary objective of removing quantitative restrictions would be to counter the downswing in the credit cycle. As with outright LVR limits, there is the potential to act directly on the supply and demand for lending, but the strength of the effect will depend on prevailing economic conditions and market sentiment.

144. **Impact on resilience.** The effect on resilience is similar to removing outright LVR limits. An increase in the share of high-LVR lending or easing of lending standards increases would both reduce resilience. Again, smoothing of the credit cycle could provide some mitigating longer-term effects.
145. **Impact on credit cycle.** Similar channels will play out as outright limits but the strength can be expected to be more muted, given the less binding effect of this instrument. If previously constrained banks increase high-LVR lending seeing an overall increase in the flow of lending, there will be a positive effect on lending. Demand may also rise if the re-entry of these banks sees them willing to lend to borrowers that were previously screened out. An increase in lending could also place upwards pressure on house prices. However, this will depend significantly on sentiment. A housing market that has seen sharp price falls could weigh heavily on this channel.

146. **Leakages and potential unintended consequences.** The same key risks apply as for outright limits: if banks unduly relax their lending standards in a rush to take advantage of new lending opportunities, and premature removal of the limits results in the housing market picking up where it left off, the correction of the downswing could overshoot and become a boom. Where household indebtedness is already high, the risks of households becoming overly extended could quickly rise, wiping out any gains from a temporary dampening.
References


Bloor, C, Craigie, R and Munro, A “The macroeconomic effects of a stable funding requirement” RBNZ Discussion Paper 2012/05, August 2012


Macroeconomic Assessment Group (2010) *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements*.


RBNZ (2012e) “Retail to the Rescue? The role of retail funding in determining the effect of global funding conditions on New Zealand”, MFC Information Paper, 26 October 2012


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