RESERVE BANK
OF NEW ZEALAND
TE PŪTEA MATUA

CAPITAL REVIEW

Consultation Paper 4:
How much capital is enough?

Response to submissions

Contents

Background

1. In 2017 the Reserve Bank began a comprehensive review of the capital adequacy framework for locally incorporated registered banks in New Zealand, known as the 'Capital Review' (the Review).[1] The purpose of the Review has been to identify the most appropriate capital requirements for New Zealand banks, taking into account how the current framework operates and international developments in bank capital requirements.

2. Final decisions for the Review were announced by the Reserve Bank on 5 December 2019. As part of the set of decision documents we noted our intention to also publish this document, *How much capital is enough – response to submissions* (the *Response*).

3. This is the fourth response to submissions that we have released during the Capital Review. The full list of consultation papers released during the Capital Review is provided below:

    *   The first was an '***Issues Paper***' covering a high-level scope and key issues that should be included in the Review.
    *   The second was '***What should qualify as bank capital?***' which discussed the definition of regulatory capital instruments.
    *   The third consultation paper, '***Calculation of risk-weighted assets***', questioned the measurement of risk for bank exposures.
    *   The fourth and most recent consultation paper,'***How much capital is enough?***', sought views on proposed capital requirements for banks, as well as the other proposals in the Capital Review to date.

4. In response to the first three consultation papers, we published '*Responses to Submissions*', summarising the submissions we received, and announced our in-principle decisions related to those respective consultation papers.

5. In our fourth paper *'How much capital is enough?'*, we proposed setting minimum regulatory capital requirements at 16 percent for Tier 1 capital (6 percent minimum requirement plus a 10 percent prudential capital buffer), which includes a domestic systemically important bank (D-SIB) capital buffer and countercyclical capital buffer (CCyB). The paper also asked other questions on the capital framework, such as whether Tier 2 capital should remain in the framework.

6. On 1 July 2019 the Reserve Bank published its summary of submissions on the fourth consultation paper.[2] The Reserve Bank also published individual submissions where consent was provided by the submitter.

7. On 5 December 2019 the Reserve Bank announced its final decisions for its fourth consultation paper alongside the Regulatory Impact Assessment (RIA), which includes the Cost-Benefit Analysis (CBA).

---

[1] All background documents related to the Capital Review, including previous consultation papers and the Reserve Bank's responses to submissions, can be found here: https://www.rbnz.govt.nz/regulation-and-supervision/banks/consultations-and-policy-initiatives/active-policy-development/review-of-the-capital-adequacy-framework-registered-banks
[2] A summary of submissions on Paper 4 is available here: https://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/banks/capital-review/submissions/Summary-to-submissions-for-ratio-paper.pdf.

8. This *Response* document summarises the Reserve Bank's response to the points raised in those submissions. Where issues raised by submitters are already covered in published documents, such as the RIA, we cross-refer to the relevant documents.

Consultation process

9. This paper responds to the common themes and views raised in the submissions, and is not intended to be an exhaustive response to all points raised.

10. Final decisions were published on 5 December 2019, and readers are encouraged to refer to the actual submissions for further details and other points raised. A *Regulatory Impact Assessment and Cost-Benefit Analysis* was also published, which outlines in detail the Reserve Bank's considerations in making decisions on the final capital framework.[3]

11. The Reserve Bank received 161 submissions on the fourth consultation paper, bringing the total number of submissions across the four separate consultation papers to over 200.

12. In addition to the formal submissions, the Reserve Bank also engaged with a range of stakeholders. The Reserve Bank held a large number of meetings with a diverse range of stakeholders. These meetings included banks, industry groups and businesses, the rural sector, social service providers and representatives of Māori community groups.

13. Three independent expert reviewers assessed the analysis underpinning the Reserve Bank's advice during 2019.

Points to note – Response to submissions

14. This document addresses specific themes raised in the formal consultation process. The final decisions in the Capital Review included a range of changes to the fourth paper (December 2018) proposals. Many of these changes reflect feedback received during the submission process, and points raised in stakeholder meetings with a diverse range of groups.

15. The *Response* document does not respond to every point made by submitters, but does respond to the broad themes raised throughout the consultation process. In places the *Response* also refers readers to other material published by the Reserve Bank, including the *Regulatory Impact Assessment (RIA) and Cost-Benefit Analysis (CBA)* and *Decisions 2019* documents.

16. The treatment of each theme also varies in depth and approach. A more detailed explanation has generally been provided in instances where the Reserve Bank has reached a different conclusion than submitters, compared with those instances where submitter feedback was incorporated into the final decisions.

17. The approach taken to topics also varies. In instances where the document is responding to a specific point raised by submitters, the *Response* sets out the issue and the Reserve Bank's response. In instances where the *Response* is capturing a

---

[3] Details of the final decisions are available here: https://www.rbnz.govt.nz/regulation-and-supervision/banks/consultations-and-policy-initiatives/active-policy-development/review-of-the-capital-adequacy-framework-registered-banks.

broad set of issues, the document provides a more general response rather than a specific item-by-item analysis.

Defining the problem

18. Some submitters said that the Reserve Bank had not demonstrated that there is a problem with the existing level of capital in the banking system, and therefore that the current level of capital is sufficient. Some submissions cited past Reserve Bank Financial Stability Reports or stress test results to support their views that current levels of bank capital are adequate.

19. The Reserve Bank does not agree that the analysis and reporting lacked a problem definition. Concerns about the *status quo*, in a range of areas, were expressed in a variety of reports published by the Reserve Bank.

20. In particular, the December 2018 consultation paper, and earlier ones released by the Reserve Bank, outlined specific problems identified with the current definition of capital, risk weights and the level of capital. For example, the Reserve Bank expressed concerns that current capital instruments may be ineffective in recapitalising New Zealand banks, that similar risks resulted in large differences in capital requirements depending on whether a bank was an IRB bank or a Standardised bank, and the particular model an IRB bank applied, and that the current level of capital is too low given what is known about the costs of crises relative to the costs of increasing capital.

21. All of these factors informed the formal problem definition that was included in the RIA published by the Reserve Bank on 5 December.

22. The RIA takes a standard CBA form and details not only the conventional problem being addressed by bank capital requirements but also the specific problems identified by the Reserve Bank in relation to the definition of bank capital and RWA calculation.[4][5]

The process

Approach to cost-benefit analysis

23. A number of submitters express concerns regarding the consultation process, and more specifically, the absence of a cost-benefit analysis (CBA) within the Reserve Bank's most recent consultation paper. These submitters said that the Reserve Bank's usual approach of consulting on the key elements of the costs and benefits in the consultation, and completing a CBA as part of the final stages of the policy process, was not acceptable given the magnitude of changes proposed in the consultation.

---

[4] RBNZ (2017) Capital Review Paper 2: What should qualify as bank capital? Issues and Options, July 2017, https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Policy-development/Banks/Review-capital-adequacy-framework-for-registered-banks/Capital-review-paper-what-should-qualify-as-capital.pdf.
[5] RBNZ (2017) Review of the Capital Adequacy Framework for locally incorporated banks: calculation of risk weighted assets, December 2017, https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Policy-development/Banks/Review-capital-adequacy-framework-for-registered-banks/Capital%20Review%20Denominator%20Consultation%20Paper%20002191217.pdf.

These submitters stated that the absence of a CBA limited the ability of stakeholders to respond to the most recent consultation paper.

24. It is the Reserve Bank's view that the risk appetite framework set out in the consultation document and *Background Note* delivers in substance what is meant by CBA, in that it robustly contrasts the likely benefits of higher bank capital (increased resilience) against the costs (higher lending rates).[6] Moreover, when the Reserve Bank released its consultation paper, it sought specific feedback from industry to enable a more refined view on the costs and benefits of the proposals. Hence the Reserve Bank's view is that the information published by the Reserve Bank in the consultation process has informed the public about the most material costs and benefits of the 2018 capital proposal.

25. The Reserve Bank therefore does not accept the assertion that previously published material did not adequately address the costs and benefits of the proposals. The consultation document and subsequent *Background Note* included quantitative and qualitative analysis of the costs and benefits. In addition, the analytical framework was described in detail, key assumptions were described, and extensive supporting information was provided about key inputs into the modelling work that the Reserve Bank had carried out.

26. The analytical framework used in the *Regulatory Impact Assessment and Cost-Benefit Analysis*, published on 5 December 2019, was the same as published in earlier documents, with amendments for feedback and further analysis during the consultation period.

Phase 2 of Reserve Bank Act Review

27. Some submitters suggested that issues being reviewed as part of Phase 2 of the Reserve Bank Act Review, currently under way, intersect with proposals in the Capital Review. A few said that the Capital Review consultation should wait for the Phase 2 consultation process given it will cover issues such as depositor protection, the crisis management framework, and the intensity of banking supervision. It was suggested that the existence of a depositor protection framework, a strong framework for resolving failed banks, and more intense supervision could all be reasons to set capital requirements lower than proposed by the Reserve Bank.

Capital requirements and deposit insurance

28. While New Zealand's deposit insurance scheme has yet to be finalised, the objectives of bank capital requirements and deposit insurance are distinct and should not be conflated. One of the objectives of deposit insurance schemes in general is to protect depositors from loss (up to insured limits) in the event of bank failure. In the absence of a deposit insurance scheme, depositors would still be eligible to recover the value of their deposits through the liquidation process, to the extent that the failed bank recovers value from its assets; however, this is a lengthy process that normally takes several years. As such, deposit insurance can be viewed primarily as a mechanism to provide certainty of, and accelerate, depositors' recoveries in the event of a bank failure.

29. While the existence of a deposit insurance framework may alleviate the impacts of a bank's failure on that bank's insured depositors, it does not reduce the probability of

---

[6] See *Background Note*, https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Policy-development/Banks/Review-capital-adequacy-framework-for-registered-banks/Capital-Review-An-outline-of-the-analysis-supporting-the-risk-appetite-framework.pdf.

that bank failing in the first place (as capital requirements do). The existence of deposit insurance will reduce the negative impact on depositors when their bank fails, and can therefore be thought of as a loss allocation mechanism (from depositors to the deposit insurance fund). In contrast, capital requirements are aimed at avoiding bank failures in the first instance, rather than welfare impacts on depositors.

Capital requirements and crisis management

30. Phase 2 of The Reserve Bank Act Review includes a review of New Zealand's crisis management regime.[7] Once this review is complete, it is expected that the Reserve Bank's role as the resolution authority, along with its objectives as the resolution authority, will be clarified. The Reserve Bank may also be provided with additional statutory powers to effect a resolution, which could include the legislative authority to establish a 'bail-in' framework that would allow it to write down, or convert to equity, certain unsecured liabilities of the distressed bank in order to recapitalise the bank and protect taxpayers from loss.[8]

31. However, at this time, the Reserve Bank has not yet determined whether it would establish a bail-in framework in New Zealand, even if provided with the legislative authority to do so.

32. At this stage, it is not clear what the ultimate outcome of the Phase 2 review of the crisis management regime will be, nor is it clear that any of these potential changes would have an impact on the economic and social costs of banking crises in New Zealand. However, as with the arguments about the trade-off between capital and deposit insurance, the same arguments broadly apply in thinking about capital and crisis management.

33. In addition, from a practical perspective, it should be noted that:
    - The Capital Review was in progress for more than two years and it was important to provide banks with certainty by finalising the capital framework within a reasonable time frame.
    - Any legislative changes to New Zealand's crisis management regime are not likely to come into effect for several years.
    - The Reserve Bank has not yet determined whether establishing a bail-in framework would be desirable in the New Zealand context, even if provided with the legislative authority to do so.
    - Were the Reserve Bank to establish a bail-in framework, it would likely not become effective for several years after the legislative authority is provided.
    - Were a bail-in framework to exist, it should not be assumed that it would be appropriate to use it in all resolution scenarios.
    - Were a bail-in framework to exist, its effectiveness could not be evaluated until after it is executed (bail-in frameworks remain untested internationally).

Capital requirements and more intensive supervision

34. Some submitters suggested that rather than increasing capital, a more intensive supervisory approach will provide the Reserve Bank with greater assurance that banks are complying with their legislative and regulatory requirements.

---

[7] On 24 June 2019 a consultation document ('Consultation Document 2B') was released that included a chapter entitled 'What features should New Zealand's bank crisis management regime have?' (Chapter 5). Consultation Document 2B can be found here: https://treasury.govt.nz/news-and-events/reviews-consultation/reviewing-reserve-bank-act/public-consultation.
[8] More information on how a 'bail-in' framework could be structured can be found by using the Financial Stability Board's *Total Loss-Absorbing Capacity Principles and Term Sheet* as a reference.

35. Capital requirements are one, albeit important, component of the regulatory framework alongside others, such as bank supervision. However, the Reserve Bank does not consider these different components as directly substitutable. Banking supervision promotes individual banks' compliance with regulation and operates prudently, and capital requirements ensure the system as a whole is safer from higher protection against losses. The Reserve Bank, therefore, does not agree that a more intensive supervisory approach suggests that capital requirements should be less stringent.

Analytical framework and calibration

Risk appetite framework

36. The Reserve Bank used a 'risk appetite framework' to calibrate the proposed capital requirements. This framework considers both main elements of its mandate: 'soundness' and 'efficiency'. In this context, 'soundness' was defined as maintaining confidence in the banking system in the face of unexpected shocks so large as to have only a 0.5 percent probability of occurring in any given year. 'Efficiency' was defined as identifying further economic benefits from higher capital requirements after the soundness objective was met.

37. Applying the risk appetite framework requires assumptions to be made about the relationship between financial stability and expected output. The key drivers of this relationship are the impact of bank capital on the probability of bank failure, lending rates, investment, and steady-state output, and the impact of financial crises on output.

38. The Reserve Bank looked at the impact of bank capital on the probability of bank failure and output from four perspectives: findings in the international literature; risk modelling in the context of a stylised New Zealand bank; optimal capital modelling; and stress test results for New Zealand banks.

The general framework

39. Many submitters, particularly from the general public, appreciated the use of the risk appetite framework, as it presented the problem definition in a simple and transparent manner. Some noted that the articulation of the Reserve Bank's goal to protect the financial system against a 1-in-200 year event made it easier for the general public to engage in the debate regarding the costs and benefits of capital requirements.

40. Some submitters however criticised the use of the risk appetite framework to calibrate capital requirements. A common criticism is that the use of the risk appetite framework requires an arbitrary choice of New Zealanders' risk appetite, and some submitters argued for a higher risk appetite (e.g. 1-in-100). Many submitters also argued against the sequencing of the risk appetite framework, which firstly, generates capital levels necessary to achieve a specific level of stability and secondly, assesses whether this capital level does not generate unacceptable expected output costs.

41. Some submitters suggested alternative approaches for setting capital levels, such as optimal capital modelling, stress tests (including reverse stress tests), and consideration of alternative options to achieve lower probability of bank failure (e.g. strengthening requirements relating to bank governance, risk management, culture). Some submitters also pointed out that internal Reserve Bank analysis concluded that 12-13.5 percent CET1 ratios would be sufficient for the four major New Zealand banks

to withstand severe crisis events,[9] and many also pointed to the robust results that these four banks produce in Reserve Bank/APRA regulatory stress tests.

42. The Reserve Bank considered optimal capital modelling and stress tests as part of the Capital Review.

43. In 2016 the Reserve Bank rebuilt an optimal capital model that it had previously used at the time of the adoption of Basel III. The rebuilt model estimated an optimal Tier 1 capital ratio of 18.4 percent, which is higher than the original estimate of about 13 percent.[10]

44. To deal with the sensitivity of modelling the impact of higher capital requirements on expected economic output, the RIA used Monte Carlo analysis to simultaneously vary all of the inputs to the CBA. Roughly 85 percent of the outcomes in the Monte Carlo analysis resulted in a positive net benefit, and this shows that our calculation of the net benefit is robust to the ranges of input values considered in the RIA.

45. Stress test results are sensitive to underlying assumptions. A key means by which the four large New Zealand banks pass stress tests is through maintenance of their lending rate margins during a protracted credit loss event. We have considered some submitters' suggestion that the Reserve Bank should illustrate the magnitude of shock that would be necessary to cause any systemic bank to fail. An example of such a 'reverse' stress test is illustrated in Box 4 of the RIA, along with further discussion of stress tests on page 45 of that document.

The Global Financial Crisis experience

46. Many submitters argued that the Reserve Bank should look at the Global Financial Crisis as a point of stress for the banking sector, and as evidence that the banking sector is already sufficiently well capitalised. However, the Reserve Bank considers that the recession in New Zealand during the Global Financial Crisis was not sufficiently severe, particularly compared to countries that faced bank failures, to serve as a guide for the calibration of our regulatory requirements.

Implied default probabilities from credit ratings

47. Several submitters also argued that the soundness objective could already be met with current capital outcomes. In particular they cited Standard and Poor's (S&P) credit ratings for the large banks. These submitters say the historical default rates for issuers with the same credit rating are well below 0.5 percent per annum (1-in-200 year tolerance), and therefore show that banks are already satisfying the 'soundness' objective.

48. Submitters suggest that the historic default rates imply a current default probability of between 0.07 and 0.17 percent. However, we note that credit ratings are intended to be relative measures of risk. They are to be used in comparison with other ratings (e.g. BBB vs A-), and not as exact measures of future default probability. We also note that credit ratings rely on historic default rates, which may be understated due to

---

[9] See 'Implications of stress tests for calibration of capital requirements', Memo to MFC, https://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/banks/capital-review/Capital-review-Implications-of-stress-tests-for-calibration-of-capital-requirements.pdf.
[10] See 'An updated version of the Harrison model for calculating a bank capital ratio (corrected)', Memo to FSO, https://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/banks/capital-review/Capital-review-An-updated-version-of-the-Harrison-model-for-calculating-a-bank-capital-ratio.pdf.

government interventions that help avoid bank failures, and that the chosen time horizon has an impact on such estimates. Moreover, issuer credit ratings incorporate assumptions around parental and/or government support which the Reserve Bank did not incorporate into its calibration of capital ratios.

The Asymptotic Single Risk Factor modelling

49. The Asymptotic Single Risk Factor (ASRF) model has been a key component of the Reserve Bank's risk appetite framework. This is a conditional Value-at-Risk model that estimates the capital needed, to a specified confidence level, to cover potential losses on a credit exposure given a set of inputs. These inputs relate to the underlying characteristics of the credit exposure – the probability of default (PD), the losses expected given a default (LGD), as well as the interrelationship between borrowers in a credit portfolio (the asset value correlation – R).

50. The Reserve Bank adapted the ASRF model, typically used to model capital needed for a portfolio of credit exposures, to model the capital needed to ensure the solvency of the banking system as a whole. In our modelling, we also considered other factors including the point at which a bank's capital ratio is so low that it fails (the 'Failure Threshold'). These factors are explained in more detail in the RIA.[11]

Use of the ASRF model

51. Some submitters argued that this approach to modelling is out-of-line with the literature on optimal capital, and that it is a "step backwards". Westpac argued that the particular ASRF model used is overly simplistic and not appropriate for calculating capital for an entire banking system.

52. Other high-level comments about the risk-appetite framework focused on the conservative inputs used by the Reserve Bank, with Tailrisk Economics arguing that the specific inputs the Reserve Bank used were not credible. These submitters generally said that the conservative inputs used in the ASRF model resulted in an overstatement in the amount of capital required to achieve a 1-in-200 year level of solvency. NERA also noted that the modelling is highly sensitive to the inputs used.

53. Professor David Miles also noted that some inputs (PD, LGD, R) are overly pessimistic whereas others (failure threshold) are overly optimistic. Overall though, he concluded that conservatism in the ASRF modelling, which the Reserve Bank used to assess the probability of banking crises, would likely be counter-balanced by underestimates elsewhere in the Reserve Bank's analysis, such as the cost of crises.

54. While we acknowledge the limitations on an ASRF framework, it provides a transparent and conventional framework for stakeholders to be able to comment on (particularly with regard to the 1-in-200 year crisis probability).

55. Furthermore, it is important to note that while the ASRF model was a key component of the Capital Review proposals, the Reserve Bank also referred to other sources of information. This included reviewing the relevant literature as well as the Bank's own optimal capital model, which incorporates risk aversion through a utility function.

56. The Reserve Bank accepts that certain input assumptions used in some of its analysis were conservative. However, it is important to view the underlying assumptions in a holistic manner. Firstly, there are a range of limitations in the ASRF model, which at face value likely result in an underestimation of capital requirements (see Table 2).

---

[11] See pages 93-98.

Secondly, while the Reserve Bank has made conservative assumptions for certain inputs of the model, this was accompanied by other inputs likely being understated. An example of this is in the *Background Note*: while submitters argued that the PD, LGD and R inputs were conservative, it is important to note that the failure threshold was set at 0 percent – a significant underestimate of the true failure threshold.

57. Nonetheless, the Reserve Bank acknowledges that the application of conservatism to PD, LGD, and R in some pieces of analysis may have resulted in some inputs appearing overly conservative, while leading to other inputs being overly optimistic.

58. Taking the limitations of ASRF modelling into account, the Reserve Bank is confident in the outcomes of its ASRF modelling in determining the level of capital needed to achieve the 1-in-200 year risk appetite.

Probability of default input

59. For the submissions that discussed the ASRF model, there was a large amount of specific commentary on the PD inputs assumed by the Reserve Bank. In general, these submissions argued that the PD assumptions were too conservative and not in line with historical experience for New Zealand.

60. ANZ, ASB, Westpac, and Tailrisk Economics cited the average IRB-modelled PD value (1.1 percent) as a more appropriate data point to use.

61. ANZ and Tailrisk Economics also noted that while a 2.8 percent PD value may be consistent with stress test results, the PD input for the ASRF model should be an average value over a range of economic conditions, not just stressed conditions.

62. Tailrisk Economics also questioned the underlying data sources for the Reserve Bank's PD assumptions. They noted that Non-Performing Loan (NPL) ratios reflect the number of impaired loans on a bank's balance sheet, and can remain on a bank's balance sheet for several years. They argued that this overstates the PD estimates as customers should only 'default' once, yet NPLs would be counted for every year they remain on the balance sheet. They also argued that the averaging methodology used by the Reserve Bank for some data points skews the NPL ratios by treating small banks equally to large banks. Tailrisk Economics also argued that the alternative sources cited by the Reserve Bank in the January 2019 *Explanatory Note* were also overstating the true PD values for similar reasons.[12]

63. ANZ also argued that a PD of 2.8 percent, which was the upper range of PD assumptions in the ASRF modelling, was not in line with historic experience. They noted that NPLs have historically averaged 1.5 percent.

64. On the data sources used, Westpac and Tailrisk Economics stated that the New Zealand data would be skewed to the early 1990s, and is therefore dominated by the BNZ experience of 1989-1993. Tailrisk Economics argued that overseas data should not be considered as it is not specific to New Zealand, and said that overseas data can be manipulated to demonstrate a wide range of desired outcomes.

65. The Reserve Bank used a range for all ASRF inputs. As such, it is important to keep the PD values of around 2.25 to 2.8 percent as marking the upper end of the range

---

[12] See the *Explanatory Note* at https://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/banks/capital-review/Capital-review-Explanatory-note-on-portfolio-risk-modelling-in-the-New-Zealand-context.pdf.

considered. Nonetheless, we acknowledge that these PD estimates at the upper end of the range are conservative.

66. While the Reserve Bank acknowledges particular limitations attributed to the individual data sources used, it is important to note that the Reserve Bank sought to use a wide range of sources to determine appropriate calibrations. This was due in part to the data limitations highlighted by submitters.

67. On the specific commentary relating to the PD value generated from IRB models, the Reserve Bank has two key concerns with this data point. Firstly, the average reported PD may not reflect the Reserve Bank's view of the 'true' underlying PD value appropriate for a given portfolio. These concerns have resulted in significant overlays for some IRB banks, which may not be reflected in reported PD values. Secondly, while the Reserve Bank encourages IRB banks to produce 'through-the-cycle' PD models, there will inevitably be a degree of cyclicality in bank PD estimates. As such, given the recent benign credit conditions, current IRB PD estimates are very likely to be an understatement of the long-term average PD. Taking these points together, the Reserve Bank believes that although IRB-modelled PD estimates are a source of information, they should not be the sole piece of information for setting system-wide capital requirements.

68. The Reserve Bank acknowledges that NPL ratios are not directly comparable to PD estimates. NPL ratios (a stock measure) were used as one data source as there is limited historic information on PD (a flow concept). NPLs can take several years to be resolved, meaning an NPL ratio will reflect both recently defaulted loans and loans which have defaulted some time beforehand. For this reason, the headline NPL ratio only contributed to the upper end of the input range, and half this value was used as another data point to reflect a longer implied 'workout' period for NPLs.

69. On the particular methodology used to average the NPL values, the Reserve Bank acknowledges that there are several ways in which a representative NPL ratio for the banking system can be constructed. Table 1 below compares the different ways in which an NPL ratio for New Zealand banks can be computed.

Table 1: Impaired and past-due assets as a percentage of loans and advances, September year ends, average for 1989-2017

	5 largest banks (ANZ, ASB, BNZ, National Bank, Westpac)	Other locally incorporated banks	Other branch banks	Total all registered banks
Simple mean (mean of individual banks' ratios in each year)	2.1	1.5	5.5	3.0
Weighted mean (aggregate NPLs divided by aggregate loans and advances in each year)	2.3	1.5	2.8	2.1

Source: RBNZ SSR, Disclosure statements, RBNZ estimates.

70. On the use of overseas data for PD estimates, the Reserve Bank notes that there are weaknesses with all data sources. However the international data was not used in

isolation (it was one of a range of data points used) and it was used in the context of sense checking the indicative range produced by the New Zealand data.

Loss given default input

71. ANZ, ASB and Tailrisk Economics noted that the 40 percent LGD input, used as a central estimate in the Reserve Bank's initial work, is more conservative than the stress test results (of 37 percent in 2014 and 31 percent in 2017). Westpac also notes that the lower end of the LGD range in the April 2019 Background Paper (35 percent) was higher than the 2017 stress test results.

72. ANZ, ASB, and Tailrisk Economics also note that the lower end of LGD input range was more conservative than the IRB-modelled average LGD of 29 percent.

73. ASB also noted that the upper end of the LGD range was overly weighting the specific LGD bucket for high-LVR agricultural loans (42.5 percent). Tailrisk Economics also notes that this is unreasonable as high-LVR agricultural loans only make up a small proportion of total bank lending.

74. With regards to the stress tests, the Reserve Bank has used a range of information to advise our input range.

75. Similarly, the IRB-modelled LGD provided some insight, but the Reserve Bank used a range of information sources. In addition to this, the general caveats that apply to the IRB-modelled PD average (in paragraph 67) also apply to the IRB-produced LGD. As such, the IRB outcomes for LGD are close to the lower bound of the input range of some sets of analysis.

76. On the use of a single LGD from the BS2B framework (high-LVR farm lending LGD of 42.5 percent), we acknowledge that this only makes up a small part of the portfolio and is not representative of the banking system.

The correlation factor

77. Several submitters commented on the Reserve Bank's choice of the asset value correlation factor (R) in its modelling. Comments included both criticism of the Reserve Bank's explanation of the correlation factor, suggesting the Reserve Bank had misunderstood the role of the factor in the ASRF model, and of the Reserve Bank's specific calibration. For the latter, submitters suggested that the R values the Reserve Bank used were too high compared to other benchmarks (such as the calibrations used in the Basel II framework), and did not reflect the diversification that should be present when assessing an aggregate of a bank's credit portfolio as was assumed in the Reserve Bank's modelling. Submitters also noted the high degree of sensitivity of the Reserve Bank's modelling and capital ratio calibrations to the R input.

78. The Reserve Bank acknowledges that there is a large degree of sensitivity in the model with regard to R, as well as other inputs. There was a large amount of sensitivity testing of the ASRF model to the different underlying assumptions and a range of inputs were used in informing the final capital decision for this reason.

79. While the Reserve Bank does acknowledge that some banks in New Zealand are diversified in terms of geographical and sectoral spread of their lending, it is important to put the Basel R calibrations into context. The Basel equation, and IRB modelling, was designed primarily for large internationally active banks. As such, while some larger banks in New Zealand may be relatively more diversified, the banking system in general is not as diversified as envisaged by the minimum standards of the Basel

framework. As such, we do not think that the New Zealand banking system is sufficiently diversified to warrant a 'discount' on the R input.

Interpretation of the confidence interval

80. Tailrisk Economics and ANZ noted that the Reserve Bank had used a 1-in-333 year risk-appetite, not 1-in-200 year, in one piece of analysis. This submitter argued that the Reserve Bank had done this in order to justify a 16 percent Tier 1 capital ratio with less conservative model inputs.

81. The January 2019 *Explanatory Note* sought to explain the ASRF model, as well as the model limitations, to a technical audience. The example that the submitter is referencing was included to illustrate the limitations of the normal distribution assumption of the model, which can impact the interpretation of the confidence interval. As was explicitly explained in the paper, a confidence level of 0.5 percent at face value likely resulted in a crisis probability of less than once in every 200 years given this assumption. As such the 99.7 percent confidence level used did not represent a once in every 333 year event, but rather a more likely confidence level required to attain a once in every 200 year crisis probability if less conservative inputs were used elsewhere (such as in the PD input).

Table 2: Summary of ASRF inputs and limitations

Input	Description	Data / model limitations
PD	The likelihood that a credit exposure will default averaged over a range of economic conditions. Expressed as an annual rate.	There is limited downturn loss data for New Zealand banks to provide empirical estimates. Furthermore, data sources that are accessible tend to relate to the number of defaults in the 'stock' of loans, not the number of defaults that have occurred in the past year (the 'flow').
LGD	The proportion of a loan exposure expected to be lost following default, calibrated to economic downturn conditions.	There is limited downturn loss data for New Zealand banks to provide empirical estimates. However, there are stress tests that provide useful insight into expected downturn losses.
R	The degree to which the default of a credit exposure is related to the systematic risk factor in the model. This represents how strongly linked defaults are to each other across borrowers.	R is a difficult variable to measure. While some empirical estimates have been undertaken, these are reliant on assumptions around the distribution and independence of individual obligors. While the Basel framework provides a basis for asset-class specific R-values, the Basel calibration is based on large internationally active banks. As such, it implicitly assumes a degree of and geographic diversification that is unlikely to be present in banks with narrower business model focusses, such as those operating in New Zealand.
Confidence Interval	The probability that, over a one-year horizon, losses for a bank will not exceed their amount of capital. For the Capital Review, this was set to 99.5 percent, representing a 1-in-200 year failure probability.	The Basel equation made a number of simplifying assumptions (such as the normal distribution of economic variables) to make it tractable for banks and supervisors. As such, model uncertainty means that in practice the Basel equation is likely to deliver a lower level of solvency than implied by the notional 99.5 percent confidence level. This could be addressed through either a more conservative confidence level representing 1-in-200, or more conservative inputs elsewhere.
Failure Threshold	This is the level of Tier 1 capital ratio that a bank 'fails' at. This could represent an accounting concept of insolvency, or the point at which a bank can no longer conduct its operations or access capital markets.	The point where a bank fails can be difficult to determine. For modelling, one clear option is to adopt the accounting concept of insolvency (0 percent equity remaining). In reality though, banks often 'fail', in the sense that they can no longer provide banking functions, before this point. Determining at which Tier 1 ratio this occurs at does, however, depend on a degree of judgement and only limited historical experience.

Use of historical New Zealand data

82. Westpac and Tailrisk Economics also note that the data sources used are skewed to the early 1990s, and is therefore dominated by the BNZ experience of 1989-1993. These submitters generally viewed these experiences as less relevant to the current context as bank lending portfolios have changed over time.

83. In general, banks portfolios today have proportionately more mortgage lending and less business lending than they did 20 to 30 years ago. However, the mix of business lending appears to have changed as well, with more focus on agricultural lending, and construction and property lending. As such, it is not apparent that the changes in the sectoral lending have necessarily led to an overall decrease in banks' credit risk. While the historic data provided useful information for determining indicative ranges of inputs for the ASRF model, the overall outcome of the modelling was not tied to any specific dataset.

Figure 1: NZD Claims by sector, all registered banks
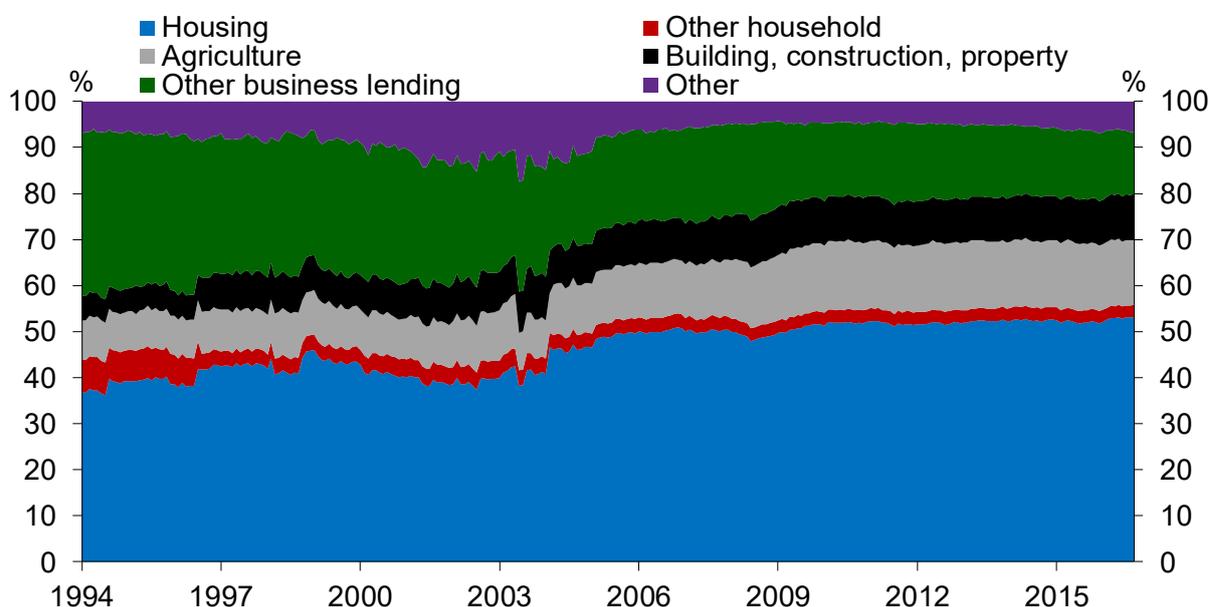
Source: RBNZ SSR, RBNZ estimates.

84. Although the BNZ experience from 1989 to 1993 was not fully captured in all data sources leveraged in the Reserve Bank's analysis, some sources did at least partially capture this information. However, the Reserve Bank is not concerned that this has unduly biased the data as the information is averaged over the entire observed period and no additional weighting is provided to these years.

85. Though it is true that the current portfolio mix of New Zealand banks may not necessarily represent the future portfolio allocation of the banking system, the risk weight framework should capture any differences in portfolio riskiness.

86. Some submitters also argued that New Zealand banks' historical performance may not be relevant anymore, considering that there have been substantial changes to the New Zealand regulatory regime. In particular, submitters noted that the Reserve Bank now has more intensive oversight of banks, and has introduced several policies aimed at mitigating banks' risk-taking.

87. Though it is true that New Zealand's supervisory regime has intensified over the last decades, the 2016 IMF FSAP Assessment of New Zealand recommended that the approach of the Reserve Bank to supervision should be strengthened. In particular, the IMF recommended that the Reserve Bank should increase supervisory resources for all financial sectors, review the enforcement regime and initiate on-site programs targeted at areas of high risk.

88. We also note that we needed to use historical New Zealand data in our modelling of the risk appetite framework, but we supplemented this by reviewing international literature.

Cost of crises

89. Some submitters argued that the Reserve Bank's base case cost of crisis, 63 percent of GDP, appears to be overstated. Some argued that most studies on the cost of a banking crisis do not differentiate between the downturn that results from a banking crisis and the downturn that results from the misallocation of resources that resulted in a banking crisis.

90. We agree with submitters' views that there is a high degree of uncertainty around the cost of a crisis, and this is discussed extensively in the RIA (see section 2.2 of Part 1). In particular, the cost of crisis estimate depends on the assumption about whether the output effects of a crisis are permanent or temporary, the discount rate used, and assumptions about pre-crisis growth rate. To deal with the uncertainty, we have used a range of cost of crisis estimates for the Monte Carlo analysis of net benefits, ranging from 19 percent (no permanent effect on GDP) to 158 percent (large permanent effect). This range was based on the BCBS long-term economic impact study (LEI), which summarises a range of modelling outcomes for higher capital requirements.[13]

91. We also note Professor Miles' comments that we have likely underestimated the cost of crisis, citing the UK's slow recovery from the Global Financial Crisis. He noted that if you assume that half of the shortfall in the UK's expected GDP since 2008 was due to the banking crisis, and if you assumed that this is permanent, then this would amount to a cost of 330 percent of GDP (assuming a real discount rate of 3 percent). His view is that the Reserve Bank's central estimate of cost of crisis (63 percent) is a serious underestimate.

92. We also note that misallocation of resources, which results in extreme boom-bust cycles in the financial system, is due to mispricing of risk. If banks lend at a cheaper rate than they would have, if there was no expectation that they would receive government support if they suffer significant losses, then this would result in under-pricing of risk and higher credit allocation to riskier portfolios.

Literature on the probability of banking crises

93. Some submitters criticised our interpretation of international literature, noting that if we accounted for cross-country differences and focused on countries that are more relevant for New Zealand, then New Zealand banks' current capital ratios would be within the range of optimal capital ratios. In particular, submitters observed that:

   a. Some of the studies that we chose are likely to be less relevant for New Zealand. In particular, some of the stress events that we referenced are less likely to occur in New Zealand, given that these countries often had structural differences (e.g.

---

[13] See https://www.bis.org/bcbs/publ/wp37.pdf.

fixed exchange rates), and their banks had very different risk profiles compared to our 'vanilla' New Zealand banks.[14] Professor Levine also suggested that we place more emphasis on studies that are more relevant to New Zealand.

    b. We did not adjust for cross-country differences in risk weights to estimate the relationship between capital and the probability of a banking crisis. Submitters noted that if we accounted for New Zealand banks' relatively conservative risk weights compared to international peers, then the implied current probability of a banking crisis in New Zealand would be lower than 1-in-200 years.

    c. In interpreting studies' cost of financial crises, we did not adjust for the differences in discount factor used. Most of the studies we referenced had a discount rate that is less than Treasury's recommended discount rate of 6 percent, which means that if we used Treasury's discount rate of 6 percent, then the present value of the cost of crises (i.e. the benefits of higher capital requirements) would be lower.

94. It is true that many banking crises have idiosyncratic circumstances that may not be currently relevant to the New Zealand financial system. New Zealand has a flexible exchange rate, sound institutional arrangements, and good fiscal health, which could make it more resilient to shocks. However, New Zealand's economy and financial system is less diversified than other peer countries', which increases the risk of contagion and potential cost of crisis.

95. Professor Miles concluded that excluding international evidence would limit our analysis in estimating the cost of crisis for New Zealand, given the lack of crisis episodes in New Zealand. He noted that if we only selected the experience of all countries with similar levels of per capital income as New Zealand, then the banking sector losses that we used in our analysis do not seem pessimistic at all. Overall, Professor Miles concluded that other banking systems do not seem to be so different as to be irrelevant.

96. While New Zealand banks do have relatively simple operating models, this does not make them immune to a banking crisis. As Professor Miles noted, it is unclear whether New Zealand's performance during the 2007-2008 period illustrates an enduring level of above average banking sector stability, or a period of above average luck. Furthermore, exuberant credit booms often arise because inadequate risk pricing leads to resource misallocation, and more capital can help mitigate this issue.

97. Some submitters have criticised our interpretation of certain 'optimal capital' studies, noting that if we accounted for cross-country differences in risk weights, international literature would support capital ratios close to where they are now. This criticism seems reasonable with regard to a few studies (e.g. the Bank of England paper, Brooke et. al (2015)).[15]

---

[14] In particular, submitters noted that the following crises are not relevant to New Zealand: South Korea (1997), Iceland (2008), Ireland (2008), Greece (2008), and Cyprus (2011).

[15] In this paper the authors estimated the empirical relationship between capital levels and the probability of individual and systemic banking crises. In the "top down" approach, the authors estimated the probability of a systemic crisis at a given leverage ratio (defined as tangible common equity to tangible assets). The authors calculated a probability of systemic crisis of 0.4% at a TCE/TA ratio of 6.6%. New Zealand banks' TCE/TA ratio was 7.2% in September 2019. On average across the authors' "top-down" and "bottom-up" models, a mid-cycle probability of systemic crisis of 0.3% can be expected with a Tier 1 leverage ratio of 6% (we estimate New Zealand banks' Tier 1 leverage ratio would be around 7% as at September 2019). The authors then converted their leverage ratio-based estimates, to risk-based estimates using the average risk weight of UK banks (37%). Our interpretation of the study was on the basis of these post-adjustment, UK-specific risk-based ratios, whereas arguably we should have used the unadjusted leverage ratio-based estimates

98. Some submitters also criticised our interpretation of the Federal Reserve paper, Firestone et. al (2017). This defined a crisis as occurring when the Tier 1 capital ratio falls below 4.7 percent, and this threshold was chosen so that the average probability of a crisis is 3.8 percent, which coincides with the historical frequency of crises in advanced economies from 1988 to 2014 (Laeven and Valencia, 2012). However, the conclusions change if we use a longer time period from the updated Laeven and Valencia database (1980 to 2017), and expand the list of advanced economies (include Singapore and Hong Kong). In this case, the probability of a crisis falls to 2.4 percent (and the implied current probability of a crisis falls, as well as the level of capital needed to reduce the probability to 0.5 percent). However, it is unclear how much the implied probability of a crisis would fall if we adjust for the country and time period selection. As a general point, this illustrates how sensitive estimates of the probability of a crisis are to study methodologies.

99. As Professor Miles pointed out, while we may have been conservative in some of our estimates, this was likely balanced out by the lack of conservatism in some inputs. He noted that we are likely underestimating the cost of crisis by using a higher discount rate (63 percent cost of crisis estimate uses a 5 percent discount rate) and by assuming that the effects of a banking crisis are only moderately permanent. He pointed out that if we used a real discount rate of 3 percent a year and that the cost of a crisis is 10 percent of annual incomes, then this generates a cost of crisis of 330 percent of GDP. Professor Miles further demonstrated that our analysis was robust to input changes, given conservatism in some estimates.

Output multiple

100. As the cost of credit increases due to higher bank capital requirements, households and firms are less likely to invest and this is expected to result in a small reduction in economic activity. The relationship between higher cost of credit and expected output is referred to as the 'output multiple'. The Reserve Bank assumed that the output multiple is equal to 1.

101. Sapere noted in their submission that the Reserve Bank underestimated the output multiple. Following the approach of Miles et al. (2012), they estimate that, in the context of the New Zealand economy, for every basis point increase in lending rates, steady-state output decreases by 2.1 to 4.9 basis points (or a range of output multiple of 2.1 to 4.9).[16]

102. The Reserve Bank notes that the calculations used in the Sapere estimates are sensitive to the underlying assumptions. If different inputs are used, the estimated output multiple is closer to the assumed value of 1 used by the Reserve Bank.[17]

---

which simply represent the empirical relationship between capital and failure probability, although this may not fully account for the risk profile of New Zealand banks.

[16] See Miles, Yang and Marcheggiano, 2012, *Optimal Bank Capital*, Economic Journal.

[17] For example, if a business weighted-average cost of capital (WACC) of 8 percent is used, a 21 percent bank lending share of business financing, and updated interest rate impact (to reflect changes in the reforms from the initial proposals), and adjustments for tax shields, then an output multiple of between 0.7 to 1.7 can be inferred. Using a WACC for private businesses that diverges from the discount rate is consistent with the Miles et al (2012) approach, which used a business cost of capital of 10% and a discount rate of 2.5%. A lower share of financing by bank debt (rather than general debt funding) could also be justified, as the reforms are only directly impacting one sector of the financial system. The total value of bank lending to businesses (RBNZ table C5) divided by total business assets (Statistics NZ Annual Balance Sheets (2008-2017) implies that 14% of business

103. Furthermore, though the research used by Sapere to calibrate estimates is useful for understanding the relationship between capital and labour in New Zealand, the paper notes that "Data constraints make it impossible to estimate of productivity and factor substitutability of the aggregate economy over a long period of time for New Zealand" (p33, Steenkamp, 2016).

104. As such, given the overall sensitivity of the methodology used by Sapere, and the data limitations for the elasticity of capital to labour in the New Zealand context, the Reserve Bank has opted to rely on international literature. We do note, however, that an output multiple of 1 would not be inconsistent with the methodology used by Sapere if different assumptions are used and interest rate costs are updated.

105. Furthermore, as referenced in the RIA (see Table 34), the Reserve Bank reviewed international literature on the estimated output multiple. In particular, we reviewed a recent paper from BCBS (2019), which collated international literature regarding optimal capital. BCBS (2019) noted that the range for the potential output multiple is wide, ranging from 0.1 to 7. This likely reflects country-specific differences, particularly on how much investment is funded by bank credit.

106. We note that seven out of eight studies considered in BCBS (2019) had output multiple that is less than 2.3, and that the median of the eight studies is roughly equal to 1. We also note that Sapere's estimates of output multiple is at the high end of literature findings.

Welfare loss to households and wealth transfer costs

107. Sapere argued that there is a direct welfare loss imposed on borrowers by higher bank capital (higher capital can lead to higher lending rates and this affects borrowers). Sapere inferred that the Reserve Bank must have considered the impact of higher interest rates to be a transfer and therefore able to be ignored when estimating net benefits. They explained that they did not consider the direct impact of higher interest costs to be a transfer, but instead a welfare loss which should be included as a direct cost. This was because, in Sapere's view, the higher lending rates are justified by the increased risk borne by bank owners. Sapere argued that the welfare loss would be equal to the expected increase in lending rates multiplied by the current level of total lending in the economy.

108. The issue of higher interest expenses potentially being a transfer came up in the context of another submission, from Tailrisk Economics. This submitter's view was that higher lending rates lead to higher interest expenses and this increase is a transfer from borrowers to lenders. To the extent that the transfer is from New Zealand borrowers to non-New Zealanders (for example, shareholders of banks), this should be counted as a net welfare loss to New Zealand.

109. The Reserve Bank does not agree with the Sapere view that the full increase in interest expense faced by borrowers should count as a cost in assessing the net benefit for New Zealand from the changes. Though it is acknowledged that there is a welfare loss for this group of New Zealanders from higher borrowing rates, the Reserve Bank's assessment focused on the net benefit to New Zealand as a whole,

---

financing is from bank lending, however this may be an understatement as there may be intra-group lending within businesses. The purpose of this example is not to produce precise estimates using this methodology but to note that it is very sensitive to the underlying assumptions, and that an output multiple of 1 is consistent with alternative sets of inputs.

not on particular segments of New Zealand. The Reserve Bank's preferred approach to assessing this potential welfare loss aligns more closely with the interpretation submitted by Tailrisk Economics.

110. Though such a transfer would normally not be considered relevant in a CBA (there is no loss of resources involved), because the beneficiaries in this case are located abroad the transfer should be considered a cost of the proposal to the extent that the beneficiaries of the extra interest expense are non-New Zealanders. This cost was estimated by multiplying the outstanding value of current loans by the expected increase in lending rates, adjusted for the foreign ownership share of New Zealand banks.[18]

111. Though the Reserve Bank acknowledges there are different views on the issue of wealth transfers, the decision was made to include the increased revenue flow to banks from higher lending rates as a cost. This was done in the interests of being conservative when estimating net benefits of the reforms.

112. It is important to note, though, that reasonable arguments can be made against including this item at all. Nonetheless, the way the Reserve Bank treated this impact as a wealth transfer out of New Zealand in effect acts as a proxy for potential welfare losses to New Zealanders.

Concluding comments

113. The preceding sections have discussed a range of points raised by submitters about the modelling of the costs and benefits of higher capital.

114. The Reserve Bank considered these issues when finalising the *Regulatory Impact Assessment (RIA) and Cost-Benefit Analysis (CBA)*, which was published alongside the final decisions for the Capital Review. The modelling was used to help inform the assessment of the probability of a crisis in the RIA/CBA, which is an important determinant of the benefits of higher capital.

115. The RIA document covers these issues in depth, and includes a detailed assessment of each of the inputs (see the Annexes of the *RIA*).

116. The discussion in this *Response* document highlights the range of issues that that the Reserve Bank needed to consider for each of the key inputs. The *RIA* also discusses this process and notes that some submitters considered the judgments for these variables to be biased in favour of higher capital, by overstating the probability of a crisis. Some inputs are higher than often used in New Zealand large bank IRB models, and in IRB models overseas. However, the Reserve Bank rejects the criticism that the overall modelling inputs were excessively conservative. The Reserve Bank used a range of input values and did not rely solely on single point estimates.

117. As noted in this *Response* document, some submitters would have preferred lower estimates for some of the inputs, especially PD, LGD and R, which they consider to be too high. These submitters did not generally comment on other aspects of the modelling, which in themselves are conservative and have tended to underestimate the probability of a crisis in the modelling exercise. These are summarised below and described in more detail in the RIA:

---

[18] See pages 80-81 of the *RIA* for the calculation of this cost.

- Failure threshold: this is the level of Tier 1 capital that a bank 'fails' at. A threshold of 0 percent is used in the RIA but in reality, banks often fail sooner as they can no longer provide basic banking functions.
- Expected losses: these are the loan losses expected in an average year. In the RIA, this has been set equal to provisions (PD multiplied by LGD). However, this understates the probability of a crisis as banks' actual provisions and expected loss deductions are lower than the expected losses assumed in the RIA analysis.
- Confidence interval: the probability that (over a one-year horizon) unexpected losses will not exceed the amount of capital. The Basel equation used in the *RIA* is likely to deliver a lower level of solvency than implied by the notional level of the interval (e.g. 99.5 percent for 1-in-200 years).

118. To test the sensitivity of the estimated probability of a crisis to alternative specifications, the *RIA* also considers modelling results when different specifications are used. This is discussed on page 66 of the RIA and demonstrates that the modelling shows a similar probability of a crisis in the 'cross-check', which incorporated lower measures of PD, LGD and R, and also a higher failure threshold and an alternative expected loss adjustment.

119. In addition, it should also be noted that the modelling was not the only input to the assessment of the probability of a crisis. As discussed in the RIA, significant weight was also given to the international literature, which showed that the assessment of the probability of a crisis in the 'status quo' was comfortably within the range suggested in the international research. The Reserve Bank considers its final assessment of the probability of a crisis that was used in the RIA to be both credible and likely.

International context

120. Submissions from banks suggest that the Reserve Bank's capital requirements should better align with those of the Australian Prudential Regulation Authority (APRA), as this would help promote financial system efficiency. Some banks also note that the ability of their Australian owners to issue more equity funding to the New Zealand subsidiary bank may be constrained by APRA's rules on related party exposures (APS 222).

121. Some submissions also touch on how changes to the IRB framework will affect overseas investment in banks with New Zealand subsidiaries. They note that these changes will make New Zealand bank capital ratios less comparable to overseas banks. In particular, these submissions note that the proposed increase in the scalar (from 1.06 to 1.20) would add additional conservatism to the New Zealand framework, and erode comparability.

122. The focus of the Capital Review has been to set the appropriate capital framework for banks based on New Zealand's circumstances. We acknowledge that jurisdictions modify their capital frameworks to deal with their own circumstances, and in many cases they may not be directly comparable.

123. We also recognise that there are, at times, complex interactions between New Zealand and Australia's capital frameworks. We maintain dialogue with APRA on these interactions.

124. In regards to APRA's related parties limits (APS 222), we note that New Zealand banks can meet higher capital requirements by retaining more earnings, and this would not have an impact on the Level 1 capital ratio or on the APS 222 exposure.

125. The Reserve Bank notes that proposed changes to APRA's prudential standard APS 111 would require equity exposures and other capital support provided to financial institutions (e.g. New Zealand subsidiaries) in excess of 10 percent of Level 1 CET1 capital to be deducted from Level 1 CET1 capital. As amounts deducted from capital do not count towards the exposure amount in the calculation of the APS 222 limit, the proposed APS 111 changes mean APS 222 would not constrain the extent to which a parent bank wishes to invest equity in its New Zealand subsidiary.

Composition of capital requirements

126. In-principle decisions relevant for AT1 and Tier 2 capital were announced in December 2017. These decisions were to:
    • not recognise instruments with contractual conversion or write-off ('contractual bail-in');
    • include non-redeemable perpetual preference shares as AT1; and
    • include redeemable preference shares and subordinated debt as Tier 2.

127. There were around 30 submissions on capital instruments, included banks, Sapere, INFINZ, law firms (Russell McVeagh, Chapman Tripp and Buddle Findlay), and financial services groups (Forsyth Barr and Harbour Asset Management). An earlier consultation, held in 2017 specifically about the definition of capital, elicited 15 submissions.

128. In addition to this feedback, several meetings were held with banks. This engagement included looking at possible terms and conditions for redeemable perpetual preference shares and redeemable perpetual bonds.

129. The External Experts commented on capital instruments, focusing on contractual bail-in. All three Experts support the Reserve Bank's in-principle decision to not recognise instruments with contractual bail-in, with Dr Cummings suggesting we revisit the decision if/when large local banks list some of their ordinary shares.

General comments

130. The majority of submitters argued for the *status quo* for AT1 which in practice, means advocating for three instrument features – contractual bail-in for AT1 instruments; legal form debt as well as preference shares for AT1 capital; and redeemable instruments as AT1 capital.

131. Submitters did not necessarily express a view on each of these features explicitly, but such a taxonomy provides a useful means of describing and explaining the views expressed and providing responses to those views.

132. In some cases, views about contractual bail-in were expressed in terms of the TLAC framework published by the Financial Stability Board. As TLAC was only the vehicle by which views were expressed about contractual bail-in, we have focused our commentary here on those views, not TLAC per se. Moreover, TLAC-compliant funding departs from Basel III regulatory bank capital in several ways – for example, in terms of minimum maturity. As the focus here is on bank capital, we have not included discussions about aspects of TLAC other than contractual bail-in.

The role of contractual bail-in

133. The December 2017 in-principle decision to recognise only non-contingent instruments reflected four concerns: contingent instruments introduce complexity to the regime, which makes the regime costly to comply with, and administer, and vulnerable to arbitrage; there is limited international evidence that suggests contractual bail-in cannot be relied on to deliver going concern capital, and this is potentially hindered further by the trans-Tasman structure, and unlisted nature, of systemic banks; inclusion of contractual bail-in thus makes some choices of corporate form less advantageous than others (for example, mutual structures); and the resolution of a bank does not require contractual bail-in when statutory powers exist, as is the case in New Zealand.

Funding costs

134. A common theme among those who support contractual bail-in is that the *status quo* provides Tier 1 capital that is cheaper for banks to issue than ordinary shares, and by retaining the status quo, the economic impacts of raising Tier 1 capital can be lessened.

135. The 2019 final decisions include an AT1 instrument without contractual bail-in (redeemable perpetual preference shares) that will provide funding that is likely to be of a similar cost to what is currently accepted as AT1 capital. That is, we can deliver on lower cost AT1 capital without accepting the complexity, uncertainty, unintended consequences and redundancy that accompanies contractual bail-in. The feedback we have received is that redeemability, not contractual bail-in, drives investor-required returns from AT1 capital

International evidence on bail-in

136. One submission from Associate Professor Lubberink focused on debt instruments that have contractual bail-in. The submission claims that instruments with contractual bail-in have been seen internationally to be "loss absorbing", in that banks have increased their reported CET1. As regulatory value of CET1 reflects balance sheet values for debt capital, not market values, if the market value of debt capital is less than its book value, banks that buy back their own below-par debt capital will benefit. This is because retained earnings will increase by the difference in the price paid to purchase the debt and the value of debt on the balance sheet (and thus CET1 will go up). In other words, as a result of repurchasing its own ailing debt capital instruments, a struggling bank can achieve a one-off boost to reported CET1 capital, at the expense of its liquidity and total capital.

137. The Reserve Bank does not find these arguments persuasive. In fact, we think it is a mischaracterisation of the concept of recapitalisation. This sort of 'recapitalisation' could arguably be achieved by a bank repurchasing any of its debt that is trading below face value – it is not unique to debt with contractual bail-in. One could argue that a prudential concern arises when banks use their liquid assets to buy back (at a premium) what is otherwise perpetual funding, as using the instrument to 'recapitalise' the bank has in fact weakened the financial position of the bank.[19]

---

[19] For example, Lubberink and Renders (*Are Banks' Below Par Own Debt Repurchases a Cause for Prudential Concern?*, Journal of Accounting, Auditing & Finance, 2018) argue that banks' repurchases of below-par debt instruments, as a means of deleveraging, are a cause for prudential concern, given the associated reduction in liquidity and total regulatory capital.

Legal certainty

138. Legal firms expressed the view that the contractual bail-in instruments issued currently are legally certain. However, our concern is not with a lack of legal certainty around conversion *per se* (although we think their arguments about legal certainty are slightly outdated), but rather with the lack of certainty about the economic outcomes of what appear to be largely certain legal terms.

139. Our concern about the economic outcomes relates to the recapitalisation of foreign-owned subsidiaries. Given the terms and conditions of the instruments the Australasian banks have sought to issue under Basel III, there is uncertainty as to whether new shares will be issued in the New Zealand subsidiary when the contingent instruments are triggered. This uncertainty reflects several factors, including a lack of any firm basis for the price needed to convert debt into equity (a problem generated in part by the absence of listed share prices for New Zealand's systemically important banks).

140. There is also one area of legal uncertainty, and that relates to the current requirement to 'write off' AT1 preference shares if conversion to ordinary shares fails. The means to give effect to 'write off' of a preference share (mandatory redemption for zero consideration) have, to the best of our knowledge, not been tested in the courts in New Zealand. As such, we are not convinced that there is complete legal certainty.

Alignment with APRA

141. At some point, all of the Australian-owned banks have called for contractual bail-in, claiming benefits from aligning with APRA's definition of AT1 and Tier 2. The banks have said that aligning with APRA means they can issue capital to third parties and have it recognised by APRA as group capital, and that this optionality is of value to them. In particular, the banks have said alignment offers the following potential benefits:
   - a more diverse source of funding for the Australasian group as a whole during business as usual times;
   - to the extent the New Zealand subsidiary uses the funding optionality, the subsidiary develops a capability for issuing in wholesale markets and a marketing presence among global investors; and
   - in the event that the parent is unable to fund itself offshore, the New Zealand subsidiary could issue capital that is globally acceptable under its own name.

142. We do not find these arguments persuasive:
   - the first of the banks' arguments presumes the New Zealand subsidiary has access to investors not available to the parent, but this seems unlikely in most situations (there may be cost advantages in using the subsidiary rather than the parent to access the local market, but we would expect these to be relatively modest);
   - if the local subsidiary is already sourcing non-capital funding from third parties offshore – as the large four do – the enhancement of capability and marketing presence is at the margin. Also, this enhancement will occur if subsidiaries issue any globally accepted instrument, the benefit is not dependent on contractual bail-in being included. The feedback we have received from BNZ and NAB is that instruments that omit contractual bail-in, such as redeemable preference shares, are marketable offshore; and
   - it is not necessary to offer contractual bail-in in order to attract funding to the subsidiary when the parent has lost market access. The AT1 and Tier 2 instruments we are proposing are conventional in some markets and well

understood globally, and are therefore in our view able to deliver standalone funding from diverse sources.

The role of legal-form debt

143. The domestic and large banks pointed to the cost advantages of perpetual debt over preference shares when sold offshore, and the potentially wider investor base. If sold locally, it seems likely that preference shares will cost banks the same as perpetual debt. However, preference shares will be more expensive than perpetual debt if sold to offshore investors who ascribe no value to the imputation credits that accompany preference shares (the cost difference is due to the imputation credit having to be augmented by an equivalent cash payment to offshore investors).

144. In responding to banks' views, it is helpful to consider why Tier 1 alternatives to common equity are being contemplated at all. Perpetual preference shares and perpetual debt offer the prospect of cheaper Tier 1 funding than common equity (although this is dependent on the instruments being redeemable, a feature which is discussed in detail in the next section). Allowing alternative instruments to count as Tier 1 capital thus lowers the potential lending rate impact of increasing Tier 1 capital requirements.

145. A further benefit of allowing some alternative instruments in Tier 1 is that permitting wholly-owned subsidiaries of foreign banks to tap into local and/or international capital markets offers the prospect of these banks being able to raise capital independently of their parents (which is potentially of value if the parents lose access to markets).[20]

146. The in-principle decision to only include preference shares reflected concerns about potential barriers to loss absorption on a going concern basis being greater for legal form debt than preference shares.

147. In theory, both perpetual preference shares and perpetual debt can be structured to absorb losses on a going concern basis. They achieve this by having fully discretionary and non-cumulative dividend or coupon payments, and the issuer having no obligation to redeem on an optional call date. However, neither instrument absorbs losses on a going concern basis with certainty.

148. Failing to pay dividends or coupons, or redeeming on the pre-announced call date, can signal bank distress to depositors and senior creditors, potentially prompting a loss of confidence in the bank. Thus at the very point they act to absorb losses, preference shares and debt have the potential to exacerbate stress, rather than alleviate it.

149. Presented with this 'signalling' risk, banks have an incentive to pay dividends and coupons, or redeem, when the financial condition of the bank (which may be known only to management) dictates otherwise. Hence, in practice these instruments may not be as loss-absorbing on a going concern basis as they first appear.

150. In our view, signalling risk is greater with legal form debt than preference shares. This is because preference shares are accounted for as equity on bank balance sheets,

---

[20] Feedback we have received from BNZ and NAB is that appropriately structured perpetual preference shares are marketable offshore (ANZ has a very different view, saying they are strictly a domestic product). Our own research indicates that perpetual preference shares issued by foreign banks can be listed in the US market, for example, and globally there are exchange traded perpetual preference share funds (for example some managed funds offered by Invesco).

rather than a liability and, as a result, are more typically understood to be at risk of loss. Related to this point, we believe there is potentially more residual fiscal risk with perpetual debt than preference shares, to the extent AT1 capital is able to be sold to local retail investors.

151. There is also some potential for added complexity in the event that losses are imposed on holders of perpetual debt. It is possible, depending on the ownership structure of the bank and whether the investor is related or not, that the loss may be deemed taxable income to the issuer. This creates uncertainty about the loss absorbing value, in practice, of debt capital. In contrast, there is no prospect that investor losses on preference shares (accounted for as equity in the accounts) could give risk to an IRD claim.

152. It is also important to note that, providing statutory powers exist, perpetual preference shares can be Basel III AT1 compliant without the need for complexity in the capital framework. Perpetual preference shares do not require contractual bail-in in order to comply.[21] In contrast, in order to be Basel III compliant, perpetual debt would need to have contractual bail-in when the CET1 ratio fell below 5.125 percent.

153. Views among banks vary as to the marketability of preference shares. Some banks say there is existing demand offshore for appropriately structured (redeemable) perpetual preference shares. Some banks are of the view that preference shares are strictly a local product. All banks agree that there is strong local wholesale and retail demand for higher yielding bank funding instruments.

The role of redeemable preference shares

154. An in-principle decision made in December 2017 was to recognise only non-redeemable perpetual preference shares as AT1 capital. The rationale was that redeemability introduces two risks: the risk that perpetual funding will be repaid (in order to avoid signalling bad news) when the financial condition of the bank suggests the funding should be retained; and related to this, the risk that bad news will be exacerbated by a loss of confidence in the bank when the option to extend the term beyond the optional call date is exercised ('signalling' risk). The in-principle decision was, in effect, to reject any instruments that absorb losses on a going concern basis with uncertainty.

155. The feedback we received from a wide variety of sources, both in submissions and through further discussion with industry, is that redeemability lowers the cost of funding considerably compared to non-redeemable preference shares and ordinary shares. Some submitters stated that non-redeemable preference shares would be priced similar to equity and would not be marketable.

156. This led the Reserve Bank to reconsider the previous in-principle decision to only include non-redeemable preference shares as AT1. Given we are interested in the lending rate impacts of higher capital, we have an interest in lower cost alternatives to common equity and thus considered including redeemability.[22] In doing so, we weighed up the risks that come with redeemability and considered the potential mitigating measures we might introduce to keep these risks at tolerable levels.

---

[21] Refer Basel Committee on Banking Supervision Press Release 13 January 2011 "Final elements of the reforms to raise the quality of regulatory capital issued by the Basel Committee", https://www.bis.org/press/p110113.htm.

[22] When there is an optional redemption date, the implied price volatility for the instrument, which is a key driver of an investor's required return, is based on the optional redemption date. The further the date, the higher the implied volatility and required return.

157. In terms of mitigating the risk of inappropriate repayment, there are several options available:
- We could require the capital position to be no worse after redemption than it was before. This would imply requiring banks to issue replacement capital of the same or better quality in advance of (or simultaneously with) redemption. This approach would be consistent with allowing banks to use the conservation buffers for periods of time, and not penalising them for being in the buffer.
- Alternatively, we could aim for the capital position to be above regulatory requirements after redemption. Banks could be required to produce reliable forward capital projections showing adequate capital after redemption for example (note, projections provide no guarantee of future capital positions). This approach would penalise banks for entering the conservation buffer (they would not be able to redeem the preference shares) and thus reflects a stricter approach to the minimum requirements than above.
- In practice, if bank boards have zero tolerance for entering the conservation buffer, they will voluntarily issue replacement capital in advance of redemption if there is any risk the buffer will be breached.

158. These mitigating measures are similar in principle to the protections that exist in the current regime (under BS16, banks cannot redeem a capital instrument without Reserve Bank approval). However, currently what the Reserve Bank would consider in making its decision is not always stated explicitly. To overcome this problem, for example, the term sheets for redeemable perpetual preference shares could state these requirements explicitly. In our discussions with banks, there was general agreement that mitigating measures such as those outlined above would be appropriate and acceptable.

159. Note that the mitigating measures outlined above would potentially have implications for dividend payments from preference shares, not just redemption. This, in turn, would have implications for dividends payable on ordinary shares. Preference share dividends would only be able to be paid if the bank is likely to have capital above regulatory minimums afterwards. If the preference share dividends cannot be paid, neither can ordinary share dividends (this is one sense in which preference shares are 'preferred'). Hence ordinary share dividends cannot be paid if doing so would leave the capital position below regulatory requirements. This is similar to the present situation where dividends on ordinary shares cannot be paid if distributions have not been paid on AT1 instruments. This tying of ordinary share dividends to minimum capital requirements, via the proposed preference share, would need to be reflected in the Escalating Supervisory Response (which applies to all banks, not just those that have issued AT1 capital).

160. In terms of mitigating signalling risk, one option would be to aim for well-functioning secondary markets in bank funding instruments. In well-functioning markets, investors collect, analyse and act on news about issuers in a timely and efficient way, thereby informing (through prices emerging from trades) all stakeholders in banks (including depositors and other creditors). In this way the implications of adverse news would not 'sneak up' on creditors and depositors – they would be alerted to it by capital instrument pricing movements - and the risk of surprise from non-redemption for creditors and depositors, and a disorderly loss of confidence, would be mitigated.

161. Tools to help foster well-functioning markets have not been included in the capital review consultations and are not being proposed at this stage, but for completeness here include having mandatory listing of AT1 and/or Tier 2 capital and potentially

extending the current cap on related party holdings of AT1 and Tier 2 capital to parents.

162. Banks have indicated that in all cases, any perpetual redeemable preference shares issued locally would be listed. This reflects strong local investor preferences for liquid, and thus listed, instruments. Some submitters indicated support for the listing of capital instruments as a means to mitigate signalling risk. Others supported listing for reasons of local capital market development and instilling discipline among banks.[23]

Changes to the calculation of RWA

163. The December 2018 Consultation Paper proposed several changes to the internal ratings-based (IRB) approach to credit risk, used by the four largest banks (ANZ, ASB, BNZ and Westpac). The proposed changes aimed to reduce the average difference in RWA outcomes between the IRB approach and the Standardised approach, used by all other locally incorporated banks, while retaining the risk differentiation benefits of the IRB approach.

164. To achieve this, the 'IRB scalar' would increase from 1.06 to 1.2 and all credit risk RWA calculated using the IRB approach (including the 1.2 scalar) would be subject to a 'floor' of 85 percent of the corresponding RWA calculated using the Standardised approach.[24]

165. The Reserve Bank also proposed to standardise all sovereign and bank exposures, meaning that banks could not use IRB models to calculate capital requirements for these exposures. In addition to this, the Reserve Bank proposed to adopt the Basel Standardised Measurement Approach for operational risk for all banks.

Narrowing the gap between IRB and Standardised banks

166. There were differing views on the appropriate relative calibration of the IRB and Standardised approaches.

167. In general, the four IRB banks (ANZ, ASB, BNZ and Westpac) did not agree with the Reserve Bank's proposed 'levelling of the playing field' through the recalibration of the IRB approach, or the calibration of the floor to Standardised. In support of this view, submissions cited:
- The current benign economic environment overstates the through-the-cycle average difference between the two approaches, as current IRB outcomes reflect low overall levels of stress in banks' portfolios.
- There are operational costs involved in operating IRB models which Standardised banks do not face.
- The Standardised outcome is an incorrect benchmark as by design it is a conservative, one-size-fits-all approach that is less precise in measuring risk. With accredited IRB models, IRB banks are better able to understand and measure their credit risk, and this improved understanding of risk can justify a lower safety margin in terms of regulatory capital.

---

[23] For example, refer to the submission from INFINZ.
[24] The IRB scalar is a multiplier that is applied to IRB banks' credit risk RWA. For example, if an IRB bank calculated an RWA outcome for a credit exposure of 100, the scalar would increase this amount to 120 (100 x 1.2). The output floor is a minimum RWA amount that IRB banks must use for calculating capital requirements for credit risk. It is calculated for the aggregate RWA amount for all credit risk exposures (using the Standardised approach).

- By diverging from the calibrations in the final Basel III Framework, published in 2017, the Reserve Bank's proposed means of adjusting the IRB approach would make New Zealand IRB banks' RWA figures even less comparable to those of overseas peers.

168. Non-IRB banks, and a number of other submitters, commented that there shouldn't be a large, or any, difference in RWA outcomes between the two approaches. Reasons for this include:
    - A view that portfolios with equal underlying risk characteristics should receive the same regulatory capital requirement.
    - Comparisons of bank-level data which submitters considered show that non-IRB banks have had better performing residential mortgage portfolios over time, yet are currently subject to materially higher regulatory capital requirements.
    - Research, both overseas and in New Zealand, has shown that the IRB approach has led to excess variability in regulatory capital requirements, unexplained by variation in underlying risk.
    - Recent shortcomings in New Zealand IRB banks' processes, and resulting breaches of their regulatory requirements, reduce the case for allowing a regulatory capital 'benefit' from the use of IRB models.

169. The Reserve Bank weighed the merits of these arguments in support of both a lower and higher calibration of the IRB approach, relative to the Standardised approach. The Reserve Bank decided that the 90 percent target (from an IRB scalar of 1.2, and a floor at 85 percent) that it had proposed in the December 2018 Consultation Paper would achieve an appropriate balance between its objectives.

Basel Standardised risk-weights

170. Several submitters, including many of the banks, suggested that rather than adjust the current New Zealand IRB approach to bring its calibration closer to that of the current New Zealand Standardised approach (based on Basel II), the Reserve Bank should consider adopting the new Basel III Standardised approach to credit risk, released in 2017. This could also be aligned with APRA's proposed implementation of Basel III.

171. The new Basel III Standardised approach to credit risk introduces more differentiated asset classes for lending secured by residential and commercial property, as well as some SME and other retail lending. The Reserve Bank estimates that for the typical New Zealand bank currently using the Standardised approach (BS2A), the Basel III changes could lead to a 15-20 percent decline in average RWAs. In this way, adoption of the new Basel III approach could provide an alternative in helping to reduce the RWA differences between New Zealand IRB and Standardised banks.

172. The Reserve Bank's view is that potential adoption of the Basel III Standardised approach in New Zealand would be primarily motivated by the enhanced risk sensitivity that the framework offers, which is a separable issue to the overall capital outcomes that were the focus of the December 2018 proposals.

173. As stated in the response to submissions on Capital Review Consultation Paper 3, the Reserve Bank considers that the current Standardised approach (BS2A) is fit for purpose at present, as it already incorporates additional risk sensitivity compared to the Basel II Standardised approach. However, the Reserve Bank will consider adopting the Basel III Standardised approach in due course.

174. The overall capital outcomes of the Basel III approach would be evaluated as part of assessing its adoption in New Zealand. That is, the Reserve Bank would look at

whether it would be necessary to adjust the calibration of the new Standardised framework's outcomes even if the enhanced risk sensitivity was introduced.

Use of the D-SIB buffer to levelling the playing field

175.   An alternative suggestion from submitters was to use the D-SIB buffer framework to narrow differences in regulatory capital outcomes between the four IRB banks and other banks, given the four IRB banks are all likely to be designated as D-SIBs.

176.   While the D-SIB buffer does increase capital requirements for IRB banks, who are all designated D-SIBs, the objective of the D-SIB buffer is to reduce the likelihood of the failure of a systemically important bank. As such, the additional capital required for D-SIBs is commensurate with the additional risks posed to the system by such institutions.

177.   Furthermore, as there is the potential for a bank that uses the Standardised approach to be designated a D-SIB, the Reserve Bank does not think that the D-SIB buffer and efforts to close the gap between the IRB and Standardised approach should be conflated.

Granularity of the output floor

178.   Some of the domestic banks (Kiwibank, TSB, SBS, and Co-op) suggested that the Reserve Bank apply one of these more granular output floor options, for example, applying floors on RWAs at an asset class level (e.g. residential mortgages or farm lending). As many of the Standardised banks compete with IRB banks in only a few types of lending, this approach would in their view result in a more equitable outcome than applying the proposed 'total exposure' output floor. The 'total exposure' floor allows IRB banks' asset classes to offset one-another (i.e. asset classes with relatively low RWA compared to the Standardised approach would be offset by asset classes with relatively high RWA). As such these banks argued that the Reserve Bank's proposed floor would not ensure a 'levelling of the playing field' in key markets such as residential mortgage lending.

179.   Using data submitted by the IRB banks, the Reserve Bank assessed the outcomes of the proposed output floor and adjustment to the IRB scalar for each IRB asset class. That analysis suggested that for residential mortgage lending the changes would result in IRB banks having RWA equal to 90 percent of the Standardised outcome, on average (this figure does not include the effect of the 2 percent additional capital required due to the D-SIB buffer).[25]

180.   As a result, the Reserve Bank decided to proceed with the 'total exposure' approach to an output floor, as proposed in the Consultation Paper.

Constraining risk sensitivity of internal models

181.   Some submissions noted that the proposed changes could result in a less risk-sensitive capital allocation at IRB banks by imposing a tightly constraining floor to the Standardised approach.

182.   The Reserve Bank was conscious of this potential consequence of its proposals, which is why it took the approach of using both the IRB scalar and an output floor to

---

[25] These calculations also include recent substantial adjustments made to ANZ's residential mortgage RWA. This information was publicly not available until after submissions had been received.

achieve its objective of narrowing the RWA differences between the IRB and Standardised approaches.

183. As calibrated, the Reserve Bank considers that the IRB scalar will be the binding constraint for RWA outcomes determined by the IRB approach (once the scalar increases from 1.06 to 1.2, the 85 percent output floor is not expected to bind). Since the IRB scalar applies equally to all credit exposures, increases to the level of the scalar do not alter IRB banks' relative regulatory capital allocation between or within asset classes. The role of the output floor is to put in place a meaningful backstop into the IRB framework which, while not expected to be binding, will prevent a situation where declining IRB RWA outcomes significantly reduce an IRB bank's regulatory capital compared to what they would require if using the Standardised approach.

Cyclicality of IRB models

184. While IRB models are in theory meant to produce RWA outcomes that represent a 'through-the-cycle' view of credit risk, in practice banks' models and RWA outcomes can tend to reflect cyclical aspects of credit risk.

185. Submissions noted that this procyclical behaviour could, under the Reserve Bank's proposals, result in IRB RWA overshooting Standardised RWA outcomes during an economic downturn. This is because the IRB scalar adjustment is being calibrated based on data that relates to a relatively benign point in the credit cycle (March 2018).

186. While as calibrated, the changes are expected to result in IRB RWA increasing to approximately 90 percent of the Standardised outcome, this percentage could foreseeably increase to 100 or more percent during an economic downturn if IRB banks' RWA calculations are sensitive to cyclical risks. As a result, it was suggested that the Reserve Bank should make its calibration (the proposed 1.2) based on a cycle average view of the relative outcomes of IRB models and the Standardised approach. Alternatively, a 'ceiling' on IRB RWA could be applied to ensure that IRB RWA does not exceed the Standardised outcome by a certain percentage, as an analogue of the 85 percent floor.

187. In theory, well-built IRB models will produce RWAs that do not respond to cyclical changes in borrowers' financial circumstances. The Reserve Bank has encouraged (and in some cases mandated) IRB banks to build models that take such a through-the-cycle view of credit risk. However, the limited evidence the Reserve Bank has of the performance of banks' IRB models during actual downturn events suggests that New Zealand banks' IRB RWA will still be somewhat procyclical in some portfolios.

188. The Reserve Bank looked at the performance of banks' IRB models in both recent stress test exercises, and in specific portfolio stress events (for example, farm lending model outcomes over the course of the 2015-2016 decline in milk prices). Based on this analysis, the Reserve Bank expects a moderate-to-severe economic downturn event could result in IRB RWAs increasing from around 90 percent of Standardised RWA to around 105 percent.

189. Where an IRB banks' model is performing materially outside of the expected range of outcomes during a downturn event the Reserve Bank would respond on a case-by-case basis. However, the Reserve Bank considers the absence of a ceiling on IRB RWA to be beneficial as it reinforces the incentives for IRB banks to develop better-quality regulatory capital models that focus on through-the-cycle risk identification, instead of indicators of borrowers' short-term credit risk (e.g. payment behaviour) which often drive procyclical RWA outcomes.

Timeframe for implementation

190. Some submissions noted that the proposed implementation timeline, which would have seen the higher IRB scalar and output floor imposed relatively early in the proposed five-year transition, could exacerbate potential credit rationing and/or other transitional costs associated with the increase in capital levels.

191. For a given quantum of capital, an increase in the scalar lowers IRB banks' capital ratios. If the increase occurs too soon into the transition period, before IRB banks are able to build their capital levels, some banks could find that the decline in their capital ratios leads to them breaching their Board or management capital buffers, necessitating a tightening of credit availability to their customers in order to reduce their RWAs.

192. The Reserve Bank accepts that the increase in the IRB scalar will create somewhat of a 'cliff effect' for IRB banks' reported capital ratios when implemented. However, given the time IRB banks have to prepare for the increase (the 1.2 scalar applies from 1 October 2020, which is later than originally proposed), the magnitude of the increase (an approximately 1-1.2 percent decrease in capital ratios), and that the change will be well anticipated and reasons for it understood by Boards and management, the Reserve Bank views the likelihood of consequential credit tightening as low.

The Countercyclical Capital Buffer ('CCyB')

General comments

193. Submitters who commented on the CCyB were mostly supportive of its inclusion, with some noting that it would encourage credit growth during downturns.

194. However, others noted that there is a lack of international evidence around the use of CCyBs. That is, though a cut in the CCyB would allow banks additional headroom to expand balance sheets as part of the response to a financial crisis, the efficacy of the CCyB as a broader macro stabilisation tool is untested internationally.

195. The Reserve Bank notes that policymakers have given the CCyB two objectives: building resilience and dampening the financial cycle. Resilience is generally viewed as the primary CCyB objective, while the scope for the CCyB to mitigate the upswing of a cycle is generally seen as a secondary benefit.

196. Although the CCyB is untested, the Reserve Bank perceives the benefits of including a CCyB as outweighing the costs. The particular risks associated with a CCyB are discussed later in this section.

'Early-set' or 'late-set' CCyB

197. Some of the submitters who supported a CCyB wanted it to be set above zero only when risk conditions were elevated (late-set), while others support the idea of setting the CCyB above zero in normal conditions (early-set) with the possibility of lowering it in economic downturns or crises as well as increasing above zero if risks are elevated.

198. Some submitters suggested the early-set CCyB would be inconsistent with the original design of the CCyB, where it would be set to zero in normal conditions and only increased when risks are elevated in the system (i.e. during periods of excessive credit growth).

199. In the Reserve Bank's view, the benefit of having a CCyB is to give the flexibility to reduce capital requirements should there be an economic downturn or crisis. To that end, the Reserve Bank views an early-set CCyB as being better placed to achieve this objective, whereas other tools may be better at stemming the impact of credit growth (e.g. LVR restrictions, sectoral capital requirements). The Reserve Bank notes that some other regulators, who are Basel members, have also adopted variants of an early CCyB for these reasons.

200. The idea of the early-set CCyB is that it is built up sufficiently early in the cycle to maximise the likelihood that a buffer is available if and when required. This approach accounts for the time lag in implementing a CCyB and can be seen as being prudent, given the inherent uncertainty involved in assessing the level and potential materialisation of cyclical systemic risks. In addition, by moving early in the cycle, the CCyB could be raised more gradually than the late set CCyB, with a view to minimising potential (unwanted) impacts on the real economy.

Size of the CCyB

201. Some submitters asked for a larger amount of the proposed capital buffer to be attributed to the CCyB. Kiwibank noted that moving to higher capital ratios gives the Reserve Bank the opportunity to put in place a larger CCyB than proposed, suggesting 2.5 of the capital buffers should be allocated to the CCyB. They note that this may encourage credit growth in a recession when banks might otherwise be concerned about the track of future capital ratios. They also suggest that during a severe crisis, stress modelling suggests banks typically lose 300-400bps of capital. It was also suggested there could be merit in having a flexible CCyB of 0-3 percent, set at 1.5 percent as a baseline, and adjusted up or down as needed.

202. The Reserve Bank, as noted in the December 2018 consultation, believes that the 1.5 percentage point calibration of the early-set CCyB balances the macroprudential objective of supporting lending, against the risk that capital buffers will need to be drawn on to absorb subsequent further losses.

Practical considerations

203. Some practical concerns over the general operation of the CCyB were raised, considering the two phases of a systemic crisis. These concerns focus on the risks related to reducing the CCyB during a crisis, after a crisis, and more generally about knowing which state of the world the economy is in (i.e. whether the crisis is over and risks have sufficiently abated).

204. The Reserve Bank recognises the concerns of effectively operationalising the CCyB, and intends to further consult on operationalisation in 2021.

205. As the CCyB (both early- and late-set) is a relatively untested tool internationally, the Reserve Bank will need to exercise the precautionary principle when deciding whether to lower, or raise, the CCyB. We will need to develop a set of indicators that will guide the CCyB's release or build-up, and exercise judgment on its release depending on the type of shock that is faced.

Interaction with other macro-prudential tools

206. Some submitters note that in the past, the Reserve Bank has used other macroprudential tools and sector-specific RWA overlays to reduce New Zealand bank balance sheet risks. These tools potentially have resulted in a more targeted de-

risking of banking sector exposures than otherwise would have been achieved via implementing a CCyB.

207. Other submitters noted that given the relatively low level of the Official Cash Rate (OCR) compared to historical levels, the ability to lower prudential capital requirements by adjusting the CCyB would improve the Reserve Bank's ability to stimulate the economy during a recession.

208. The Reserve Bank recognises there are other, perhaps better, tools that may stem the impact of credit growth rather than a CCyB (e.g. LVR restrictions, sectoral capital requirements), which partially led to the decision to have an early-set CCyB. Another possible benefit is the ability to coordinate the setting of the CCyB with the setting of monetary policy, in situations where coordination may be valuable and objectives align.

Reciprocity with other jurisdictions

209. Banks with parent banks in other countries note that reciprocity may apply to both an early- or late-set CCyB, resulting in higher capital requirements at Group level in proportion to the percentage of the Group's credit exposure to New Zealand. Submitters argued that this would increase the cost of capital for the parent banks, resulting in higher required returns on their New Zealand exposures, and one submitter argued that reciprocity should not apply.

210. The Reserve Bank notes that the Basel Committee's 'reciprocity' principle does not result in 'doubling-up' of capital. Capital that the New Zealand subsidiary has to meet its CCyB requirement in New Zealand is also recognised in the Group capital position, in order to meet the reciprocated New Zealand CCyB. As such, reciprocity of the CCyB does not impose a capital burden on the Group.

211. Reciprocity is ultimately a call for the home regulator of the banks operating in New Zealand. We intend to work with these regulators in order to understand any unintended consequences of having an early-set CCyB on Group capital requirements.

Publication of indicators for the CCyB

212. Kiwibank noted that it would be useful for the banking sector if the Reserve Bank established a transparent metric that would prompt explicit consideration of increasing or decreasing the CCyB, noting that APRA already communicates on the indicators it assesses around deploying the CCyB.

213. The Reserve Bank intends to develop the strategy for releasing and building up the CCyB, including the set of indicators used to release and build up the buffer. Consultation on operationalising the early-set CCyB is scheduled for 2021.

The Domestic-Systemically Important Bank (D-SIB) buffer

Size of the D-SIB buffer

214. There were a range of views, particularly among banks, for how large this D-SIB buffer should be. There was not a large amount of technical engagement on this calibration, however.

215. All of the banks identified as D-SIBs (ANZ, ASB, BNZ and WNZL) agreed with the proposed D-SIB buffer of 1 percent, noting that this calibration aligns with APRA's

approach. BNZ also argued that the D-SIB buffer should be able to be met with Tier 1 capital rather than CET1 capital. BNZ argued that this would allow D-SIBs to take advantage of benefits associated with AT1 capital.

216. The domestic banks (Kiwibank, TSB, SBS, and Co-op) argued that the New Zealand banking system is much more concentrated than in other jurisdictions, with larger markets. As such, they argued the proposed D-SIB buffer of 1 percent did not adequately reflect the economic impact of a systemically important bank failure compared to a small bank failure. Overall, the domestic banks recommend increasing the D-SIB buffer to no less than 2 percent, but their calibrations varied.

217. In their country report for New Zealand, the IMF also suggested a larger D-SIB buffer of 2 percent would be appropriate for New Zealand, noting that much of the structural systemic financial risks identified in the New Zealand FSAP arise from the D-SIB institutions.[26]

218. The Reserve Bank believed it was important to take a first-principles approach when analysing the appropriate difference in capital requirements between banks identified as D-SIBs and non-D-SIB banks. To do so, the Reserve Bank leveraged approaches used by other regulators, the Basel Committee, and the IMF. The consideration identified as the most relevant for New Zealand was the relative impact of a large bank failure compared to that of a small bank.

219. Overall, the Reserve Bank determined that a more appropriate D-SIB buffer for the New Zealand context would be 2 percent. This is on the basis that D-SIBs in New Zealand are relatively more systemic than they would be overseas, largely due to the high level of concentration in the banking sector.

Graduated D-SIB framework

220. Kiwibank argued for a graduated approach to setting D-SIB capital requirements, ranging from 0 percent for non-D-SIBs to 6 percent for the most systemically important banks. Kiwibank also argued that the calibration should depend on the Standardised RWA of each bank.

221. The Reserve Bank acknowledges that the dichotomy of 'D-SIB' and 'non-D-SIB' may not accurately reflect the distribution of banks in the sector at a granular level. However, from a practical perspective, the Reserve Bank sees the difference between these two groups as being sufficiently narrow to justify a more graduated D-SIB framework. If there are significant changes in the market structure in the future, the Reserve Bank could revisit this particular issue.

D-SIB buffers as a tool to enhance competition

222. Some submitters also supported a D-SIB buffer as a means of improving competition within the banking system. Heartland Bank stated that they support the D-SIB buffer as a means of 'levelling the playing field' between large and small banks.

223. With regards to commentary on enhancing banking competition, the Reserve Bank did not see the D-SIB as the appropriate tool for enhancing competition. In particular, given the changes in the measurement of RWA for IRB banks, much of the existing difference between large and small banks capital requirements is already being

---

[26] The IMF report can be found here: https://www.imf.org/en/Publications/CR/Issues/2019/09/20/New-Zealand-2019-Article-IV-Consultation-Press-Release-and-Staff-Report-48694.

reduced. Furthermore, there are legitimate reasons for D-SIBs having lower cost structures, such as a larger scale and more access to international markets. As such, competitive impacts were not a driver of the final D-SIB buffer calibration. The Reserve Bank will, however, monitor the impacts of competition from the overall proposals as part of its annual reviews.

Leverage ratio

224. There was little support for imposing leverage ratio requirements. Banks generally noted that they would create additional compliance costs and one noted that the lack of reported leverage ratios has not negatively affected their offshore funding.

225. The Reserve Bank sought views on whether a minimum leverage ratio requirement (or possibly only a disclosure requirement) should be included in the capital framework. The leverage ratio – a non-risk-weighted capital measure – would act as a backstop to existing 'risk-weighted' capital requirements.

226. A leverage ratio requirement could be beneficial to banks from an international comparability perspective, as the leverage ratio is a regulatory requirement in many other jurisdictions. However, the Reserve Bank acknowledges that benefits of greater comparability in this case are small. The Reserve Bank also notes that introduction of a leverage ratio would also impose additional compliance costs on banks (e.g. internal audit and attestation).

227. Furthermore, given the relatively high average risk-weights used by banks in New Zealand, the new 16 percent Tier 1 capital requirement, the implementation of an 85 percent capital floor for IRB banks, and the dual reporting requirement, the Reserve Bank accepts that the additional benefits of introducing a leverage ratio to be relatively low.

228. In light of submitter views, particularly on the compliance costs and lack of benefits for bank funding, the Reserve Bank has therefore decided not to introduce a leverage ratio (or leverage ratio disclosure requirements) into the capital framework.

Transitional impacts

General comments

229. Overall, submitters were in favour of extending the transition period, suggesting that a transition period of between seven to 11 years should be sufficient for banks to meet the requirements through profit retention, and to develop the market for the new AT1 instrument. Submitters noted that if a recession occurs within the next five years, then this will impact the ability of banks to organically generate capital through profit retention.

230. Many submitters, particularly from the rural sector, requested a longer transition period than 5 years to give them sufficient time to respond to other regulatory changes (e.g. changes to water quality requirements, carbon pricing) and to improve their financial position. Submitters from the rural sector also highlighted that they have already experienced a tightening in credit availability, despite the fact that capital requirements have not increased. The reasons for the tightening in credit availability is further addressed in the 'Sectoral Impacts' section of this *Response*.

231. The Reserve Bank believes it is important to weigh up the potential impact of transitional costs with the objectives of the Capital Review. To do so, the general approach taken has been to determine the transitional arrangements that allow enough time to mitigate the impact of any potential credit rationing (which may occur through a shorter transition time). Taking into account the changes in capital requirements for non-D-SIBs, and the changes to the quantum and definition of AT1, the Reserve Bank believes that a seven-year transition period will achieve this. The first changes resulting from the Capital Review will come into effect on 1 July 2020 and the last on 1 July 2027.

Monitoring transitional impacts

232. Some submitters suggested that the transition should be delayed until the Reserve Bank has finalised all policy proposals, including technical changes to the capital framework (e.g. dual reporting). Some submitters asked for the same transition period to be applied to all banks, for the Reserve Bank to adopt a longer transition period for the change in the IRB scalar and output floor, and for the grandparenting of contingent capital instruments.

233. Some submitters also asked for a comprehensive post-implementation review, with some recommending that this is undertaken during the transition period (e.g. during years 2-4), and some recommending that this is undertaken once changes to the capital framework have been fully adopted.

234. The Reserve Bank recognises that there is further consultation work that needs to be completed following these decisions, such as adopting the Basel Standardised Measurement Approach for operational risk. However, we do not believe that decisions on ratio requirements and IRB RWA calculations are dependent on these further consultations.

235. The seven-year transition period allows a longer timeframe to meet new capital requirements. Given that the nominal capital increase for large banks from the IRB scalar increase will not change by the end of the transition, the Reserve Bank decided to implement the change in IRB scalar from 1 October 2020 and output floor from 1 January 2021. This ensures that the playing field between IRB and Standardised banks is levelled sooner rather than later.

236. Regarding the timeframe for the grandparenting of contingent capital instruments, this has been extended to seven years to align with the overall transition period. The Reserve Bank believes this balances the need for loss-absorbing capital with the cost for banks having to replace their current capital instruments.
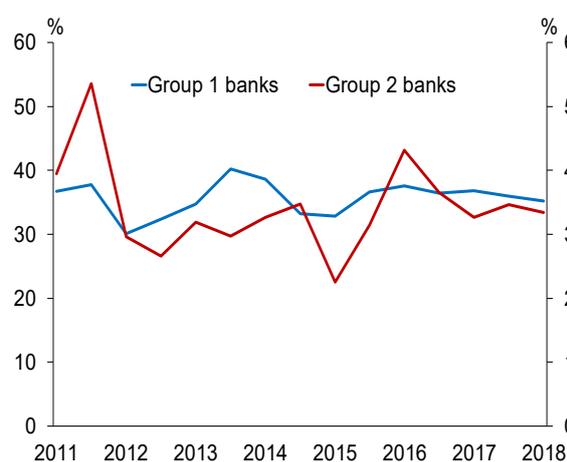
237. With regards to the concept of a post-implementation review, the Reserve Bank will be monitoring the impact of the proposals, as outlined in the RIA. These will be discussed publicly once a year.

Transitional costs

238. ANZ, NERA, and an individual submitter said that there was a lack of analysis on transitional costs. ANZ estimated that during the transition period, lending spreads could be 45-75 bps higher and that as a result, cumulative GDP growth over the next decade could be 1-3 percentage points lower. Both ANZ and NERA cited research indicating that banks respond to higher capital requirements by targeting a reduction in RWA or by reducing credit availability to high risk-weight sectors.

239. The Reserve Bank acknowledges that there can be costs from imposing higher capital requirements relating to the transition period that are independent of the 'steady-state' costs. Generally, this in the form of credit rationing, which limits business' ability to borrow for investment and household consumption, dampening economic growth. For example, Jacobs and Rayner (2012) from the RBA estimated that in Australia, a one standard deviation credit supply shock (measured by a 5.5 percentage point increase in the balance of firms reporting greater difficulty obtaining finance) lowered Australian GDP by 33 bps one year after the initial shock and started to gradually increase back to its baseline level.[27]

240. However, it is difficult to estimate the potential impact that capital requirements could have on the economy during the transition. This is due to the different overseas experiences cited, the different forms of capital used overseas, and the potential behavioural responses of banks. As such, the approach of the Reserve Bank has been to mitigate any potential transitional costs. This was done using scenario analysis, using evidence from international experience, banks' financial statement data, and other bank-specific information (such as capital allocation strategies and growth plans).

241. To calibrate the scenarios, the Reserve Bank first looked at the recently published results from its Basel III monitoring exercise, based on data as of 31 December 2018.[28] Figure 2 shows that dividend payout ratios have remained relatively stable at around 30 percent to 40 percent for both larger Group 1 banks and smaller Group 2 banks. At the same time, Figure 3 shows that Group 1 and Group 2 banks' common equity capital have increased by 91 percent and 71 percent respectively, compared to the level in June 2011. In the New Zealand context, over the same time horizon, banks in New Zealand would need to increase CET1 by around 94 percent. This estimate assumes that capital is retained for banks to continue to grow their lending books, which accounts for about half of the increase.

Figure 2: Dividend pay-out ratios   *Figure 3: Cumulative CET1 increase*

Source: BCBS (2019)
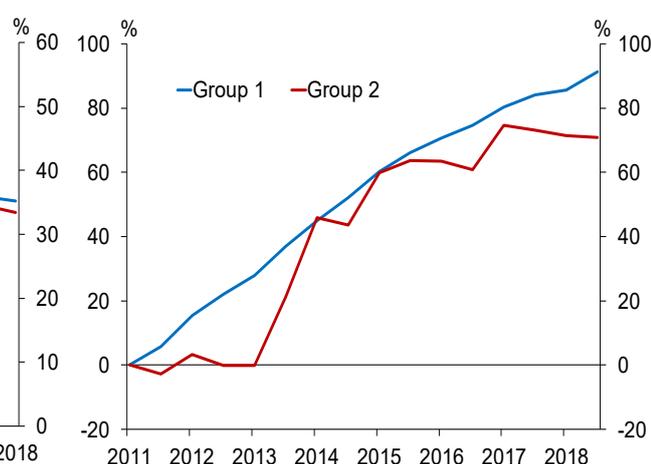
242. Cohen (2013) also suggests that banks that are more profitable tend to experience stronger credit growth during transition periods, noting that:

---

[27] See Jacobs and Rayner (2012), *The Role of Credit Supply in the Australian Economy,* RBA Discussion Paper, https://rba.gov.au/publications/rdp/2012/pdf/rdp2012-02.pdf.
[28] The full results are available on the Bank for International Settlements website, available at https://www.bis.org/bcbs/publ/d477.htm.

"Banks in aggregate do not appear to have cut back sharply on asset or lending growth as a consequence of stronger capital standards. However, banks that had high capital ratios at the start of the process or strong profitability in the post-crisis years did tend to grow more than other banks. This points to the importance of solid bank balance sheets in supporting lending." (p38) [29]

243. This is particularly relevant to the New Zealand context, as the large New Zealand banks have strong balance sheets and profitability. This means there is likely to be capacity for some banks to absorb otherwise unmet credit demand due to other banks limiting their lending growth.

244. To further calibrate the scenarios, the Reserve Bank also reviewed banks' internal reports and strategies to assess banks' appetite for forgoing lending growth in favour of dividend payouts. This was a contributing factor in assessing potential behavioural responses.

245. With these factors, the Reserve Bank assessed the impact of the final reforms on system credit growth over five years, and again over seven years. This was based on scenarios with plausible assumptions on bank behaviour, based on the overseas experience and bank reports. Assumptions on other inputs were generally conservative (e.g. no reductions in operating expense, no monetary response).[30]

246. On this basis, a seven-year transition period did not have a material impact on credit growth, whereas a five-year transition period under the Reserve Bank's assumptions was determined to potentially reduce annual credit growth by around 70 basis points. Considering this, and the likely capacity for banks in New Zealand to absorb unmet credit demand of their competitors, the Reserve Bank is comfortable that potential transitional costs are sufficiently mitigated. On this basis, we do not consider that there would be a material impact on system credit growth from the reforms.[31]

Sectoral impacts

Repricing across sectors

247. Around a quarter of submitters noted that the December 2018 proposals could disproportionately affect some sectors of the economy, in particular agricultural, commercial property, and SMEs. Some submitters also noted that banks could respond by lowering deposit rates, which would negatively affect some superannuitants who rely on bank deposits.

248. Many of the submissions focused on agricultural lending, noting that the agricultural sector is already facing significant pressures to deleverage and respond to other regulatory changes (e.g. changes to water quality requirements, inclusion of the agriculture sector in the Emissions Trading Scheme, and changes to the Overseas Investment Act), and that higher borrowing costs would increase financial stress.

---

[29] See Cohen (2013), *How have banks adjusted to higher capital requirements?*, BIS Quarterly Review September 2013, https://www.bis.org/publ/qtrpdf/r_qt1309e.pdf.

[30] As these scenarios generally use conservative assumptions, it could be seen as a 'worst case' for system credit growth if banks want to maintain dividend payouts that are consistent with international experience and take no other mitigating actions.

[31] There could be reductions in credit availability due to other factors unrelated to the Capital Review, such as bank's own risk-appetites and general economic conditions.

Some submitters noted that banks have already tightened their lending standards and increased interest rates for agricultural sector, with banks referencing the proposed changes to capital requirements as the reason for tighter credit conditions for agricultural sector.

249. Submitters provided a range of estimates of how much additional margin might be charged to certain sectors, with some banks noting that they need to increase lending rates for the rural sector by at least a percentage point to achieve their desired return on equity (notwithstanding the reduced risk of failure shareholders will now face).

250. Many submitters argue that sectors with higher risk weights are likely to experience higher repricing than sectors with lower risk weights. Some submitters also note that banks may have hurdle rates, or a minimum required return on equity, for each business unit or sector. Given that certain sectors require more capital (for example, the agricultural, SME, or commercial property sectors), then to meet banks' return aspirations these sectors will need to earn more interest revenue.

251. It is important to note that none of the Capital Review reforms change the relative risk weights applied to different exposures. While the level of capital will increase due to the changes to the IRB banks' modelling outcomes and changes to capital ratio requirements, none of these changes affect the relative return on capital from different sectors. Decisions on how to allocate credit across the sectors are therefore up to banks to make – that is, we need to distinguish sectoral repricing that results from a change in banks' risk appetite, from any Capital Review effects.

252. As previously mentioned, we have estimated that once the financial system and economy have fully adjusted to the capital reforms, lending rate spreads will be, on average, 20.5 basis points higher than the counterfactual. We note that this estimated increase in lending spread is averaged across all portfolios, and that there is considerable uncertainty in this estimate.

253. We acknowledge that some sectors may experience higher repricing than other sectors. This may occur for two reasons:
   a. Sectors with lower returns relative to other sectors are likely to experience higher repricing, although this relates to banks' commercial decisions and should not be attributed to the reforms, for the reasons outlined earlier.
   b. Banks are also likely to be able to pass on higher costs to sectors where there is less competition.

Potential credit rationing

254. Some submitters argued that banks may reduce credit availability for certain sectors to help meet higher capital requirements, as well as repricing. Some of these submitters were concerned that the reduction in credit availability for certain sectors would have a greater impact on the economy, compared to higher repricing. Some noted that the large corporate segment and commercial property sector could become more reliant on offshore banks for funding that may be more likely to withdraw or restrict lending during periods of stress. Many submitters were also concerned about the lack of alternative sources of funding available for the agricultural sector, especially since the dairy sector is already heavily indebted and since most dairy farms are too small to be able to access capital markets.

255. In particular, some submitters point to international evidence which show that banks transition to higher capital requirements by shifting towards lower risk weight sectors. For example, Cohen (2013) found that banks in advanced economies increased their

capital ratios partly by reducing the ratio of risk-weighted to total assets, however they did not find a significant relationship between the reduction in risk-weighted assets and increase in capital ratio. The research also found that banks with strong initial capital ratios and high profitability during the transition period grew their assets more than their peers.

256. Given that New Zealand banks are highly profitable, meaning banks generate significant capital organically, we expect a reduction in risk-weighted assets to total assets to be more modest than what is observed in other advanced economies, especially compared to banks who are less profitable and more capital constrained.

257. Atkin and Cheung (2017) observed that Australian banks adjusted to higher capital requirements by changing their portfolio composition and reducing the average risk weight of their assets, and that this resulted lower impact on Australian banks' return on equity. The researchers noted that Australian banks have shifted towards more housing lending compared to business lending, after the GFC. However, they also note that low interest rates appear to have encouraged demand for housing investment, while businesses have been reluctant to invest. As such, it is difficult to establish how much of the Australian banks' shift towards housing is due to higher loan demand for housing and how much of it is due to the banks' higher appetite for housing lending.[32]

258. We acknowledge however that there is significant uncertainty in estimating sectoral repricing and changes to sectoral credit availability. Ultimately, the competitive process will determine how banks allocate credit and how they respond to the capital reforms. We will monitor the impacts of the capital reforms, including impacts on certain sectors.

259. However, it is important to note that the capital reforms are not the only factor that could result in credit rationing. There are a range of factors, such as banks changing their risk appetite and other regulatory changes, which can contribute to banks reducing their credit supply to certain sectors.

Impact on financial system dynamics and competition

260. Several banks as well as other submitters raised concerns that higher capital requirements could incentivise alternative lenders to compete with New Zealand banks, which could risk lending migrating to unregulated sectors of the financial system.

261. Westpac Banking Corporation noted that though they are open to competition, the proposals would reduce their ability to compete with banking alternatives that are outside the regulated system. Westpac Banking Corporation also said that these unregulated, and less capitalised, entities have in the past weakened the stability of the whole financial system. ASB also argued that new foreign banks entering the New Zealand market may not be committed to supporting lending throughout economic cycles, unlike Australian banks who have historically supported lending in New Zealand in times of stress. Infratil also noted that a potential impact of the proposals could be more reliance on less secure alternative funding, which could lead to a less secure system overall.

---

[32] See Atkin and Cheung (2017), *How Have Australian Banks Responded to Tighter Capital and Liquidity Requirements?*, RBA Bulletin https://www.rba.gov.au/publications/bulletin/2017/jun/bu-0617-5a.html.

262. Several submissions from members of the public saw potential benefits from the proposals in encouraging competition within the banking sector. Domestic banks also generally supported the 'levelling of the playing field' as a means of improving competition across banks.

263. ANZ New Zealand however noted that such structural changes to the financial system could take a long time. They cited the lack of response from non-banks to macro-prudential policies and the shallow nature of New Zealand capital markets. ASB also noted that it would be a challenge for non-bank institutions and smaller banks to become more active as they do not have the scale or the same access to capital funding markets as the large banks in New Zealand. Harbour Asset Management also said that funds management community is not currently well placed to provide significant support for lending to replace potential bank credit rationing, and that the likely near-term competition would be from foreign banks who tend to withdraw in times of stress.

264. The Reserve Bank's analysis to determine capital requirements was primarily focused on the resilience of the banking system in the face of a diversity of shocks and the economic impacts arising from higher lending rates (higher lending rates being a consequence of higher capital). However consideration was also given to the indirect effects of capital reforms on banks, the financial system as a whole and the wider economy. The Reserve Bank considered, for example, whether it is possible to reduce the uneven competitive impact on banks of the current capital regime, the wider financial system implications of different capital instruments, and the importance of deep and liquid financial markets for the economy.

265. The dynamic response to the 2019 reforms from non-banks is inherently uncertain. For example when faced with more highly-capitalised banks, non-bank deposit-takers ('NBDTs'), peer-to-peer lenders, branches of foreign banks and managed funds (for example) may step up, reduce or alter the nature of their activities in New Zealand. Their response will depend on many factors.

266. The operations of these entities are typically covered by regulation of some sort, which will constrain what they can do (for example, non-bank deposit-takers are subject to capital regulation set by the Reserve Bank, the branches of foreign banks can be subject to activity caps and the Financial Market Conduct Act 2013 dictates what entities must disclose). Beyond that there are differences in funding models, access to capital, technological capability and other factors to consider.

267. As such, it is difficult to assess any potential costs, or benefits, from potential competition effects from non-banks. However, the Reserve Bank will monitor the development of competitive pressures and market dynamics from non-bank institutions.

268. In contrast to uncertainty about the likely direction of the non-bank response, the 2019 reforms have the effect of increasing the potential for non-systemic banks to compete with the four systemic banks. This is because the 2019 reforms have fewer unintended, uneven, competitive impacts on locally incorporated banks than the current capital framework.

269. The Reserve Bank acknowledges that there are factors that can be expected to moderate these competitive impacts. For example, banking can be 'sticky', with depositors and borrowers being insensitive to interest rate movements and placing more weight on non-price factors (for example, they may value the long-standing relationship they have with the bank and perceive high costs in shifting accounts).

However, on balance, the Reserve Bank views the reforms as enhancing competition between banks.

270. On balance, the Reserve Bank is of the view that impacts of the 2019 reforms on competition are likely to be beneficial but ongoing monitoring is warranted. The Reserve Bank will monitor and report annually on key developments in areas that are likely to be impacted by the 2019 reforms.

Appendix 1 – Glossary

AT1 capital	Additional Tier 1 capital. AT1 capital, which includes perpetual preference shares, is the second highest quality of capital behind CET1.
Capital	Part of a bank's funding that allows it to absorb financial losses while remaining solvent. Includes the investment of the bank's shareholders (e.g. ordinary shares and retained earnings).
Capital ratio	A bank's capital divided by its RWA. A capital ratio is a key indicator of the financial strength of a bank, measuring the losses it can withstand relative to the risk of its business.
CET1 capital	Common Equity Tier 1 capital. CET1 is the highest quality of capital as it is permanently available to absorb a bank's financial losses. CET1 includes shareholders' investment (ordinary shares) and the bank's retained earnings.
Conservation buffer	A type of prudential capital buffer that applies to all banks. The conservation buffer promotes capital resilience by requiring banks to maintain capital levels above the minimum requirement.
Countercyclical capital buffer	A type of prudential capital buffer that the Reserve Bank may increase or decrease over the financial cycle. Increasing the countercyclical capital buffer aims to build banks' capital resilience and guard against financial stability risks. Lowering the countercyclical capital buffer enables banks to operate at lower capital levels during periods of financial system stress, to promote their ability to continue lending to support the economy.
D-SIB buffer	Domestic-Systemically Important Bank capital buffer. A type of prudential capital buffer that applies to banks that are deemed systemically important and whose failure would have a significant impact on the economy and the rest of the financial system. A D-SIB buffer promotes higher capital strength of banks and lowers their probability of failure.
IRB approach	Internal ratings-based approach to credit risk. One of the two methodologies available to calculate RWA for banks' credit risks, IRB involves the use of inputs from credit models developed internally by the bank to a formula specified by the Reserve Bank. The Reserve Bank must accredit a bank to use the IRB approach, and approve the models it uses in its RWA calculation.
IRB scalar	A parameter in the IRB approach to credit risk set by the Reserve Bank. The IRB scalar adjusts the level of conservatism in the IRB approach's calibration.
Leverage ratio	A measure of a bank's financial strength that does not attempt to adjust for risk. A leverage ratio measures a bank's capital levels relative to a non-risk based measure of its financial position, such as the accounting value of its assets. While both a leverage ratio and the risk-based capital ratio use the same definition of capital, they contrast in what they measure this capital against (e.g. assets (accounting definition) versus RWA respectively).

Minimum capital requirements	A minimum capital ratio requirement. If a bank has a capital ratio below the minimum requirement, it is likely to be in financial distress from a prudential perspective, and the Reserve Bank would likely seek to place it in a resolution.
Non-performing loans	Generally speaking, non-performing loans are loans that are at risk of not being fully repaid, or where interest on the loan may not be fully paid by the borrower.
Output floor	A limit on the IRB approach. An output floor means that, when determining its capital ratio, the RWA a bank calculates using the IRB approach cannot go below a certain proportion of the RWA that it would calculate under the Standardised approach.
Prudential capital buffer	An amount of capital above the minimum capital requirement. A bank that operates with a capital ratio within the prudential capital buffer applying to it would not be in breach of its Conditions of Registration, but it may have restrictions placed on it and be required to rebuild its capital levels over time.
Risk appetite framework	A risk appetite framework enables decisions about the right balance of risk and return. In the context of this Consultation Paper, the Reserve Bank has developed a risk appetite framework to determine settings for its capital framework that strike a balance in its outcomes on financial stability, economic activity and societal welfare.
Risk-weighted assets (RWA)	Risk-weighted assets (RWA) is an adjusted picture of a bank's financial position (e.g. its loan portfolios and other investments, and its operational and market trading activities) that takes into account the risk profile of that financial position.
Standardised approach	Standardised approach to credit risk. One of the two methodologies available to calculate RWA for banks' credit risks, the Standardised approach requires banks to use Reserve Bank-specified tables to determine the risk weights to apply to different types of loans and other assets.
Tier 1 capital	Tier 1 capital consists of CET1 capital and Additional Tier 1 (AT1) capital.
Tier 2 capital	Tier 2 capital, which includes some subordinated debt, is capital that can generally only absorb losses once a bank has already entered into financial difficulty. It is therefore considered of lower quality than Tier 1.

Appendix 2 – Capital Review implementation timeline

April – May 2020	• Consultation on exposure drafts of revised Banking Supervision Handbook, including revised definition of capital instruments and dual reporting
June 2020	• Revised Banking Supervision Handbook issued
1 July 2020[33]	• Banks can apply for recognition of new qualifying AT1 and Tier 2 capital instruments • Derecognition of non-qualifying AT1 and Tier 2 instruments begins • D-SIB buffer set at 1%
1 October 2020	• IRB scalar increases from 1.06 to 1.2

2020	• Consultation on:
	    ◦ IRB model change process
	    ◦ Escalating Supervisory Response
	    ◦ Standardised Measurement Approach for Operational Risk

1 January 2021	• IRB banks required to report IRB and Standardised capital calculations (dual reporting) • Output floor on IRB exposures set at 85% • For IRB banks, Sovereign and Bank exposures move to Standardised approach
1 July 2021	• D-SIB buffer increases from 1% to 2%
2021	• Consultation on the operational framework for the countercyclical capital buffer
1 July 2022	• Minimum Tier 1 capital requirement increases from 6% to 7% • Minimum Total capital requirement increases from 8% to 9%
1 July 2023	• Conservation buffer increases from 2.5% to 3.5%
1 July 2024	• Conservation buffer increases from 3.5% to 4.5%
1 July 2025	• Conservation buffer increases from 4.5% to 5.5%
1 July 2026	• Countercyclical capital buffer set at 1%
1 July 2027	• Countercyclical capital buffer increases from 1% to 1.5% • Non-qualifying AT1 and Tier 2 instruments fully derecognised

---

[33] Changes take effect from this date, meaning the 1% D-SIB buffer would be reflected in D-SIB banks' reporting, e.g. on the RBNZ Dashboard, for 30 September 2020 (not 30 June 2020). This logic also applies to the IRB scalar and other capital ratio changes.