

Outcomes from a COVID-19 stress test of New Zealand banks

John Knowles, Ken Nicholls, Chris Bloor

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Reserve Bank of New Zealand
PO Box 2498
Wellington
NEW ZEALAND

www.rbnz.govt.nz

Key findings

- The Reserve Bank launched a stress test in March to determine the resilience of banks and the financial system to the risks posed by the COVID-19 pandemic.
- The COVID-19 stress test consisted of two parts. First, a desktop stress test where the Reserve Bank estimated the impact on profitability and capital for nine of New Zealand's largest banks to the impact of two severe but plausible scenarios. Second, the Reserve Bank coordinated a process in which the five largest banks used their own models to estimate the effect on their banks for the same scenarios.
- The pessimistic baseline scenario can be characterised as a one-in-50 to one-in-75 year event with the unemployment rate rising to 13.4 percent and a 37 percent fall in property prices. In the very severe scenario, the unemployment rate reaches 17.7 percent and house prices fall 50 percent. It should be noted that these scenarios are hypothetical and are significantly more severe than the Reserve Banks' baseline scenario.
- The overall conclusion from the Reserve Bank's modelling is that banks could draw on their existing capital buffers and continue lending to support lending in the economy during a downturn of the severity of the pessimistic baseline scenario. However, in the more severe scenario, banks capital fell below the regulatory minimums and would require significant mitigating actions including capital injections to continue lending. This reinforces the need for strong capital buffers to provide resilience against severe but unlikely events.
- The results of this stress test supports decisions that were made as part of the Capital Review to increase bank capital levels. The findings will help to inform Reserve Bank decisions on the timing of the implementation of the Capital Review, and any changes to current dividend restrictions.

1. Background and summary

The Reserve Bank has used stress testing to better understand the risks posed to the financial system from the COVID-19 pandemic. Stress testing as a tool is well suited to provide a forward looking view of these risks. In March, shortly before New Zealand entered Alert Level 4, the Reserve Bank launched a stress test to assess the banking system's resilience to what were seen as severe but plausible scenarios.

The Reserve Bank's key stress testing objectives, outlined in the Reserve Bank's philosophy and approach to stress testing (2018)¹, are to improve our understanding of the implications of current and emerging risks to financial stability, assess the resilience of financial institutions to severe but plausible scenarios, and improve the industry's risk management capability.

The COVID-19 stress test comprised two parts:

- The Reserve Bank conducted a desktop stress test involving nine of New Zealand's largest banks² which hold 92 percent of total bank loans. Using banks' data, the Reserve Bank modelled the effect on banks' capital of two scenarios involving a rapid decline in economic activity, increasing unemployment and falling property prices; and
- The Reserve Bank co-ordinated a process in which the five largest banks used their own models to estimate the effect on their capital under the same two scenarios. Results from the banks' modelling provided a challenge to the Reserve Bank's results.

1 <https://www.rbnz.govt.nz/research-and-publications/reserve-bank-bulletin/2018/rbb2018-81-08>

2 ANZ Bank New Zealand, Bank of New Zealand, ASB Bank, Westpac New Zealand, Kiwibank, TSB Bank, Southland Building Society, Heartland Bank and The Co-operative Bank.

The scenarios were set at different levels of severity, based on scenarios published by Treasury in April combined with different degrees of global economic stress. The pessimistic baseline scenario (PBS) can be characterised as a one-in-50 to one-in-75 year event with the unemployment rate rising to 13.4 percent and a peak-to-trough fall in house prices of 37 percent. The very severe scenario (VSS) is around a one-in-200 year event, with the unemployment rate rising to 17.7 percent and a peak-to-trough fall in property prices of 50 percent. It is important to note that these scenarios, although plausible, are hypothetical and considerably more severe than the Reserve Bank's current central forecast.

The scenario paths were specified for a range of economic variables such as the exchange rate, commodity prices and interest rates. The assumptions also included positive credit growth to test whether banks could continue to supply sufficient new lending to support the economy. If banks were to curtail lending this would induce further negative feedback effects on the economy, worsening outcomes. The scenarios also assumed a significant reduction in banks' net interest income caused by funding pressures. The Reserve Bank's modelling did not include strategic actions or capital injections which banks may undertake to mitigate the outcomes.

Banks have increased their capital buffers significantly since the Global Financial Crisis (GFC). The stress test period began at December 2019, with the nine banks in the desktop stress test having an aggregate capital buffer of \$19 billion above regulatory minimums, to absorb losses during times of stress. This stress test is one gauge of whether the current buffer is sufficient.

The Reserve Bank's modelling of the PBS resulted in a 57 percent reduction in the aggregate capital buffer by the end of year two. This translates to a reduction in aggregate Common Equity Tier 1 capital ratio from 11.4 percent of risk-weighted assets (RWA) to a trough of 7.7 percent. The decline in capital is mainly due to high loan impairment expense, which is partially offset by strong underlying earnings.

The Reserve Bank's overall conclusion is that banks could draw on their capital buffers and continue lending in the PBS. However, it would be a significant challenge to rebuild buffers as the economy recovers, with some banks being more challenged than others.

The Reserve Bank's modelling of the VSS resulted in aggregate capital falling below regulatory minimums. The deficit in Total Capital reached \$7 billion in year three. The VSS illustrates that there are limits to the shocks banks would be able to withstand at their current capital positions. Provision of credit would come under considerable strain in this scenario, and capital injections would be necessary to ensure banks' survival.

In the second part of the stress test, the five banks submitted results based on their own modelling and provided mitigating actions. Overall the capital outcomes of the bank modelled submissions were similar to the desktop exercise in the PBS, but less severe in the VSS. The submissions provided a challenge to the Reserve Bank's desktop model and some of our assumptions were revised as a result.

Banks also reported on the timing, nature and magnitude of mitigating actions they would be likely to take under these scenarios. The main components of banks' mitigating actions were operating expense savings, repricing, and a reduction in credit limits which were usually enacted as capital ratios fell below management buffers. Banks need to be careful when considering mitigating actions which may make a downturn worse, such as credit rationing.

In December 2019, the Reserve Bank finalised decisions in its review of the capital adequacy framework for locally incorporated banks, including confirming the proposed increase in regulatory capital requirements from current settings. The current events underscore the importance of significant capital buffers, and banks would be in a stronger position to withstand a further deterioration in economic conditions had they been implemented prior to this downturn. The onset of the pandemic has made clear to banks and regulators the importance of considering more severe 'black swan' events in stress test scenarios.

Details of the stress test are provided in the following sections. Section 2 provides a detailed description of the COVID-19 scenarios. Section 3 presents the desktop stress test results for the PBS and VSS. A number of sensitivities are provided to illustrate the range of potential outcomes that may occur as key parameters change. Section 4 discusses the results submitted by banks and mitigating actions. Section 5 provides a summary and next steps.

2. Scenario design

The scenarios in this stress test were developed in late March and early April. At that time, the global pandemic and economic outlook were deteriorating rapidly as border closures, social distancing and lockdowns were being implemented around the world. The stress test scenarios were designed to assess the resilience of the banking system to a plausible but severe worsening in the economic outlook.

Although these scenarios are predicated on amounts of time spent at different Alert Levels, this is not the only way for shocks of this magnitude to arise. The economic outlook has improved since these scenarios were developed, but it is important to remember that things can change very quickly, and we often do not see shocks coming until they are upon us.

The pessimistic baseline scenario (PBS) features an exceptionally rapid decline in economic activity, with GDP falling 24 percent in the June quarter and 12 percent in year 1. The unemployment rate reaches 13.4 percent, and the shock to household income flows through to house prices, which fall 37 percent peak-to-trough. GDP and unemployment in the PBS are comparable to Treasury's 'scenario 5'³ for the first two years. The monetary policy response includes maintaining the official cash rate at 0.25 percent and continuing large scale asset purchases. The five year bond rate falls to 0.70 percent and remains low for the duration of the scenario. An assumed six-month closure of offshore funding markets increases funding costs for banks. It is assumed that not all of the funding cost increases are passed on to lending rates, and therefore banks' net interest income deteriorates. Despite the large decline in GDP, credit growth is assumed to be positive over the stress period in order

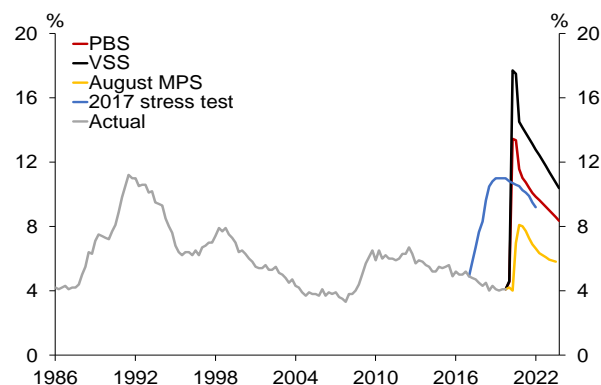
to test banks' ability to use their capital buffers to support the economy.

Tourism, aviation and retail sectors continue to be depressed in year two as lower confidence and weak demand continues. Supermarkets, healthcare and agriculture exports fare better. Lower profits and weak demand sees defaults of small businesses continuing in year two. The global pandemic is mitigated by the end of year two. New Zealand's GDP returns to pre-stress levels in year three. However, the recovery is slower than the Treasury scenario due to slower global growth and a more sustained impact on tourism.

The very severe scenario (VSS), a more severe stress than the PBS, is designed to assess resilience to a large shock to the banking system. The peak stress in GDP and unemployment aligns with the Treasury's 'scenario 2'. GDP falls 37 percent in the June quarter and 18 percent in year 1. The unemployment rate reaches 17.7 percent, with an additional 9 percent of the workforce underemployed. Property prices fall 50 percent peak-to-trough. The impacts on funding costs and net interest income are slightly more severe than the PBS.

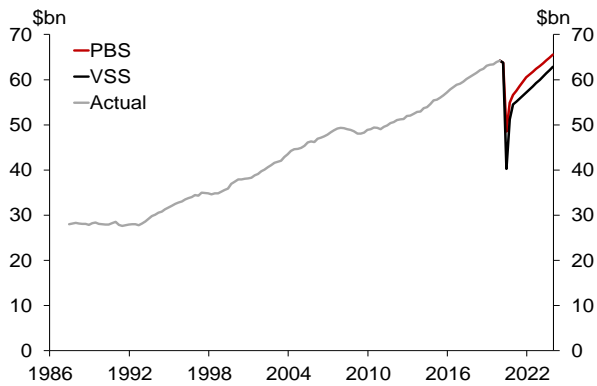
The global pandemic is mitigated by the end of year two. The global recovery is slower than in the PBS. New Zealand's GDP returns to pre-stress levels by mid-year four, with unemployment still above 10 percent. As in the PBS, the VSS assumes that banks do not undertake credit rationing.

Figure 2.1: Unemployment rate (source: Stats NZ)



3 For Treasury's scenarios, see: <https://treasury.govt.nz/publications/tr/treasury-report-t2020-973-economic-scenarios-13-april-2020>

Figure 2.2: Quarterly GDP (source: Stats NZ)



Both scenarios incorporate the effect of government assistance and Reserve Bank policies announced up to but not after 17 April, in particular the wage

subsidy, six months of mortgage deferrals, dividend restrictions and the delay of the new capital framework.⁴

The Reserve Bank has been running industry stress tests periodically since the GFC. This stress test was unique, in that it was being conducted in the midst of an economic shock. The PBS is comparable in overall severity to past stress tests. However, the economic shock sets in much more rapidly under the COVID-19 scenarios. The VSS is more severe than previous stress tests and comparable to the experience of Ireland in the GFC (table 1). The probability of these scenarios eventuating has reduced somewhat since they were originally developed. However, a series of further adverse shocks would see them quickly return within the range of plausible outcomes.

Table 1: Key macroeconomic variables in recent stress tests and historical episodes

Stress scenarios	Unemployment		Real GDP	Residential property price index (nominal)	Commercial property price index (nominal)
	Peak level (%)	Increase (ppt.)	Peak-to-trough decline (%)		
Stress tests					
PBS (2020)	13.4	9.3	12.2	37	37
VSS (2020)	17.7	13.6	17.7	50	50
RBNZ (2017)	11.0	6.1	3.6	35	39
RBNZ (2014 Scenario A)	13.2	7.6	5.5	40	35
IMF (2016 NZ FSAP)	10.2	4.9	3.4	35	30
Bank of England (2019)	9.2	5.2	4.7	33	41
FOMC (U-Shaped COVID)	15.6	12.1	13.8	28	35
Historical episodes					
Finland 1990 – 1995	16.7	13.5	9.7	37	n.a.
Ireland 2007 – 2012	14.7	10.0	8.4	55	70
Sweden 1990 – 1995	11.2	8.9	3.9	20	53
NZ 1987 – 1992	11.2	7.1	2.2	3	60
NZ 2007 – 2011	6.7	3.4	2.6	10	28

Sources: RBNZ; Bank of England; US Federal Open Market Committee; International Monetary Fund; Woods and O’Connell (2012), ‘Ireland’s financial crisis: a comparative context’, Quarterly Bulletin, Central Bank of Ireland.

4 Further scenario details can be found in the attachment.

3. COVID-19 stress test desktop results

Stress tests assess how banks' loan impairments, net interest income, other income, operating expense and risk-weighted assets are likely to behave, and ultimately feed into capital outcomes, under stressed scenarios.

Banks' resilience in stress tests is generally assessed against three minimum capital requirements; Common Equity Tier 1 Capital (CET1), Tier 1 Capital; and Total Capital⁵. All three forms of capital are available to absorb losses in times of stress, with CET1 being used first, then Tier 1 capital and finally Tier 2 capital in the event of resolution.

Capital requirements for banks are based on the riskiness of their loans. This is done by applying risk-weights to banks' assets. The current minimum is 4.5 percent of risk-weighted assets (RWA) for CET1, 6 percent for Tier 1 and 8 percent for Total Capital. In 2019, the Reserve Bank reviewed banks' capital requirements with the aim of making banks resilient to a 1-in-200 year event. COVID-19 has delayed the implementation of the Capital Review, and the results of this stress test have been assessed against the current requirements.

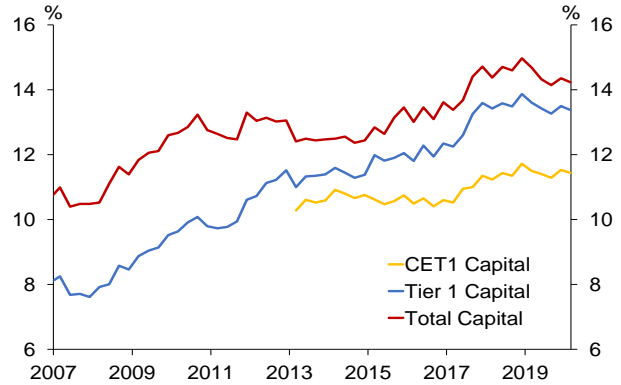
Banks have significantly increased their capital ratios since the GFC (figure 3.1). The nine banks in this stress test had a CET1 ratio of 11.4 percent at the start of the stress test, providing a \$19 billion buffer above the minimum requirements.

3.1 Pessimistic Baseline Scenario

Reserve Bank desktop results for the PBS

The aggregate CET1 ratio declines 3.7 percentage points to a trough of 7.7 percent in year two (figure 3.2). Despite the large fall in capital, all banks remain above regulatory minimums while continuing to meet the demand for credit. However, some banks come close to the minimum total capital ratio.

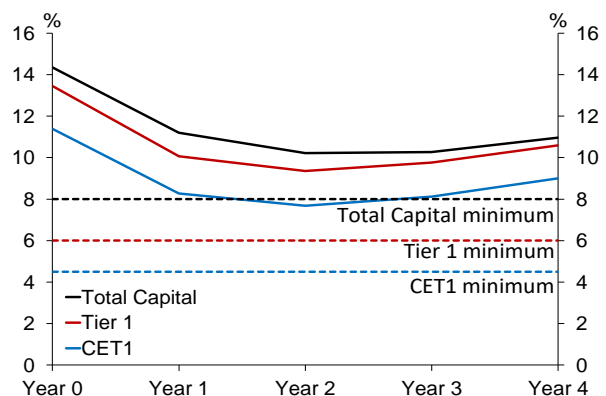
Figure 3.1: Capital ratios of locally incorporated banks (% of RWA)



Sources: Banks' General Disclosure Statements, RBNZ Capital Satellite Survey

Most of the capital deterioration occurs in year one (3.1 percentage points) due to the rapid deterioration in economic conditions. This is much faster than the decline in previous stress tests and makes the COVID-19 shock difficult for banks to prepare for and mitigate. Aggregate capital ratios improve slowly after the second year due to an improvement in profitability, but finish well below pre-stress levels. It would take banks considerable time to rebuild capital buffers and banks would be exposed to further shocks.

Figure 3.2: Aggregate CET1 capital ratios (% of RWA)



⁵ Tier 1 capital is the sum of CET1 and Additional Tier 1 (AT1) capital; Total Capital is the sum of Tier 1 and Tier 2 capital. AT1 and Tier 2 capital have elements of debt and equity, and rank above CET1 in a resolution.

Although there would be sufficient capital in aggregate, some banks came close to the minimum capital ratios. The range of outcomes depends on each bank's starting capital buffer, their underlying profitability and the composition of their portfolios (figure 3.3)⁶.

Aggregate profit falls from \$4.8 billion in 2019 to a loss of \$2.8 billion in year one of the stress and a small loss in year two. Positive aggregate profit returns in year three (figure 3.4). Some banks only return to positive profit in year four.

Figure 3.3: Buffer above minimum capital ratios (% of RWA)

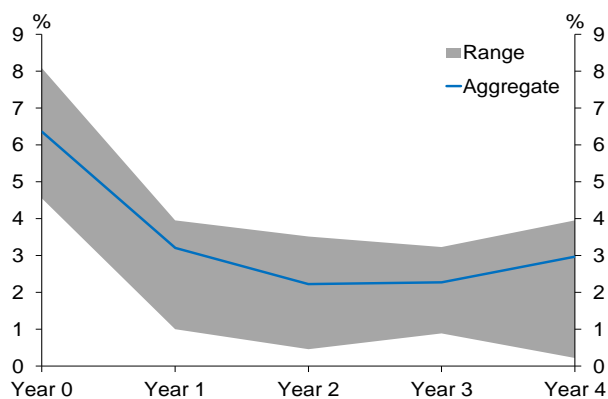
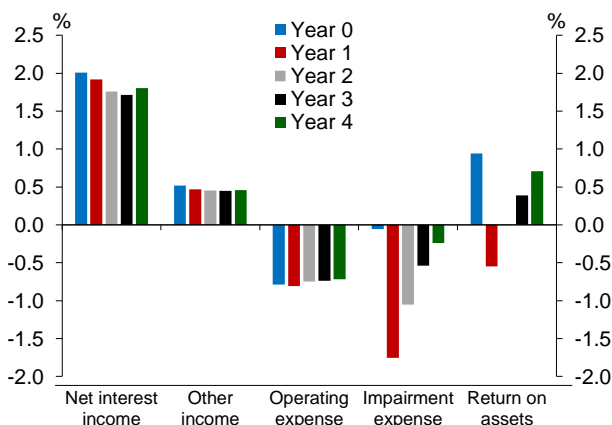


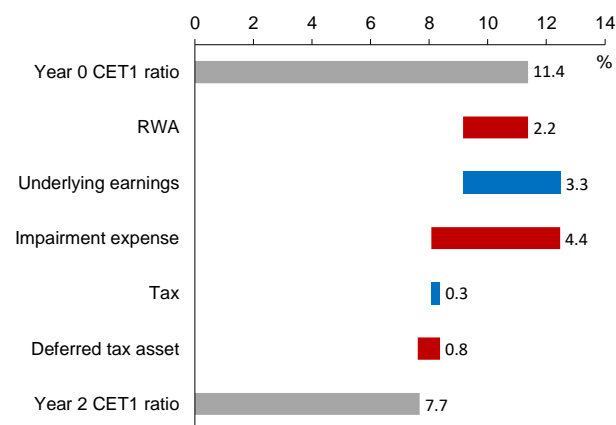
Figure 3.4: Decomposition of banks' profitability (% of assets)



Loan impairment expense

Loan impairment expense leads to a 4.4 percentage point reduction in the aggregate CET1 ratio (figure 3.5).

Figure 3.5: Decomposition of changes in aggregate CET1 ratio by year two – (% of RWA)



Loan impairment expense has been modelled using four components for each lending portfolio;

- Portfolio exposure amounts, which includes total lending amounts and a portion of off balance sheet amounts, such as an undrawn credit card limits. The modelling used December 2019 as the start point and applied the scenario growth rates as set out for housing, consumer and business lending.
- Default rates by portfolio are calculated with reference to the 2017 stress test, allowing for differences in the magnitude and timing of changes in GDP and the unemployment rate, and for benefits of policy initiatives. The total default rate was equivalent to 12.3 percent of the opening exposures compared to 13.8 percent in the 2017 stress test (table 2). Default rates were also benchmarked against outcomes modelled by the five largest banks.

⁶ The buffer ratio represents the excess CET1 capital the bank has above its minimum capital requirements. A bank with a buffer ratio below zero would be in breach of one of its minimum capital requirements and hence its conditions of registration.

Table 2: Loan default and total loss rates by lending class, PBS and VSS vs 2017 test

Portfolio	Exposure (\$bn Dec-19)	Cumulative default rate (%) [1]			Cumulative loss rate (%) [2]		
		2017 test	PBS	VSS	2017 test	PBS	VSS
Residential mortgage	296.6	12.0	11.3	16.4	2.2	2.1	4.4
Corporate (large)	63.0	7.6	9.4	12.9	4.2	4.8	6.4
SME corporate ('middle business')	35.7	19.7	24.4	32.8	7.7	9.2	13.5
Commercial property	37.3	27.2	27.5	33.8	7.5	8.0	13.8
Farm lending	53.5	25.1	12.4	17.8	8.7	3.1	5.5
Financial institutions & Sovereign	63.3	4.8	1.2	1.7	2.8	0.6	0.9
Credit cards	14.4	14.0	13.4	19.2	11.4	11.7	17.0
Other consumer	6.1	27.1	27.2	39.3	23.8	20.5	29.8
SME retail ('small business')	12.9	19.8	20.5	27.9	4.7	5.6	10.7
Other	5.8	6.4	11.2	14.0	2.3	4.8	7.1
Total	588.5	13.8	12.3	17.2	4.3	3.6	6.2

[1] The default rate equals the cumulative defaulted exposures over the stress period (4 years for PBS/VSS and 5 years for 2017) as a proportion of the opening exposures

[2] The loss rate equals the cumulative impairment expense over the stress period (4 years for PBS/VSS and 5 years for 2017) as a proportion of the opening exposure

[3] The 2017 stress test covered the four IRB banks that account for over 85 percent of total bank loans.

- Impairment expense for defaulted loans is calculated with reference to the 2017 stress test, allowing for differences in property prices, and benchmarked against the large bank submissions and historical experience such as Ireland during the GFC.
- Impairment expense on loans not yet defaulted is also modelled to reflect provisioning behaviour under the relevant accounting standards.

Banks incur \$21 billion of loan impairment expense over the stress period. This is equivalent to 3.6 percent of opening exposures, which is less than the 2017 stress test (4.3 percent). However, impairment expense is incurred much more quickly in this stress test, with almost 80 percent in the first two years compared to 55 percent in the 2017 stress test.

The timing difference is due to the faster decline in economic activity in this stress test, and the application of new accounting standards requiring a more forward-looking approach to provisioning. The early onset of impairment expense in the PBS compared to the 2017 stress test leaves less time for banks to generate offsetting income and leads to a greater peak-to-trough fall in capital.

The main contributions to loan impairment expense is;

- **Mortgages** contributed 28 percent of total impairments reducing the CET1 ratio by 1.2 percentage points. Mortgages comprise half of aggregate credit exposures. However, the loss rate is low relative to other portfolios. Customers tend to continue making mortgage payments for as long as possible in times of stress, which reduces the default rate. Relatively low loan-to-value ratios following years of house price increases has reduced losses for banks on defaulting loans.
- **Consumer lending**, including credit cards and other personal loans, made up only 4 percent of exposures but contributed 14 percent of impairments since most of this lending is unsecured.
- **Business lending** contributed approximately half of the impairment expense. Loans to smaller business suffered relatively large losses reflecting that many of these businesses are in more affected sectors such as hospitality and retail.
- **Farm lending** losses are lower than previous stress tests due to an assumption of a relatively favourable outlook for agriculture exports.

Figure 3.6: Share of impairment expense over four years

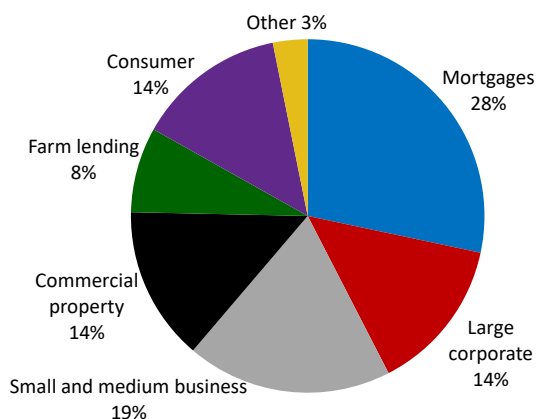
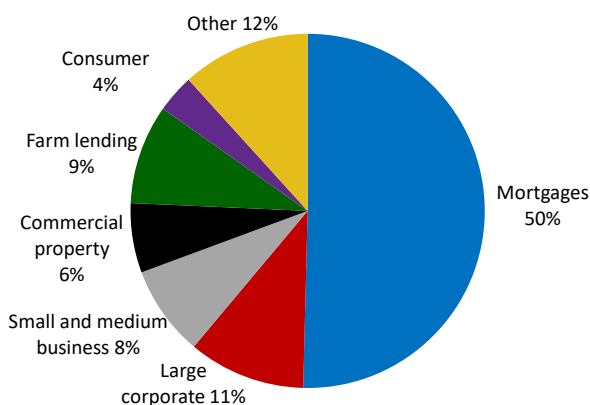


Figure 3.7: Opening exposure share



Underlying earnings

Underlying earnings is comprised of net interest income and other operating income less operating expenses. Underlying earnings declined during the scenario, but remained positive and provided a benefit to the CET1 ratio of 3.3 percentage points in the first two years.

Net interest income declined due to rising wholesale funding costs, reflecting lenders requiring a higher risk premium, which could not be fully passed on to loan pricing. Other income, such as fees, trading and transaction related income declined as transaction and new business fell. The estimated fall in income was benchmarked against GFC experience, the large bank submissions and previous stress tests.

Operating expense grew at the inflation rate, after adjusting for one-off expenses in the base year. Additional expenses have been included in year one to allow for potential COVID-19 related costs, including workspace reconfigurations, lost productivity, cyber risk costs and the management of loan defaults.

Risk-weighted assets

Risk-weighted assets (RWA) serve as the denominator of banks' capital requirements. RWAs are primarily determined by the riskiness and size of banks' lending and are calculated by applying risk-weights to assets⁷. As RWAs increase, banks are required to maintain more capital to achieve the same capital ratio. In a downturn, the riskiness of loans increases, leading to an increase in RWA, and the amount of capital banks must hold.

Increase in RWAs reduces the CET1 ratio by 2.2 percentage points in the first two years of the PBS. The impact is much greater for the four largest banks than the smaller banks.

Under the Reserve Bank's capital framework, the four large banks' RWAs are calculated according to the 'internal ratings based' (IRB) approach, which uses these banks' own risk models, while the smaller banks use the 'standardised' approach. RWAs increase more quickly under the IRB framework than the standardised framework. Given the complication and idiosyncratic nature of the IRB RWA models, the Reserve Bank's desktop results relied heavily on bank submissions.

Deferred tax asset

Deferred tax asset (DTA) accumulates on the balance sheet due to the lag ('timing difference') between when a loan impairment expense is reported under the accounting standards and when losses can be recognised under the tax rules. The DTA accumulated is required to be deducted from CET1 because it is unlikely to be available for distribution to creditors in the event of a bank resolution.

⁷ This describes credit risk-weighted assets, which make up approximately 90 percent of RWAs. Total RWAs also include operational and market RWAs which are determined by different factors and have been held constant for this stress test.

The aggregate DTA deduction is 0.8 percentage points from the CET1 ratio in year two of the PBS.

The DTA deduction peaks in year two as loan impairment expense builds up more quickly than the tax benefit can be realised. DTA begins to decline for most banks after year two as new loan impairment expense is less than the tax benefit realised. However, some banks with low profitability take longer to recognise the tax benefit and DTA remains a significant deduction from capital in year four.

Sensitivities for the PBS

The COVID-19 scenarios proved challenging to model because of the extreme movement in economic variables. Therefore, it is important to test the sensitivity of the PBS results to changes in underlying assumptions. Table 3 below shows the sensitivity of the capital results to changes in key modelling parameters. For example, if net interest income is 20 percent lower than the PBS, the CET1 ratio falls to a trough of 6.9 percent compared to 7.7 percent in the PBS.

Table 3: Sensitivities impact on CET1 by year two

Key parameters	% change	Impact on CET1 (ppt)	CET1 trough (%)
No change (PBS)	-	-	7.7
Net interest income	-20	-0.80	6.9
Other income	-20	-0.20	7.5
Operating expense	-20	+0.45	8.1
Impairment expense	-20	+0.90	8.6
RWA growth	-20	+0.30	8.0

Sensitivities can also be run changing more than one variable at a time. Net interest income has come under pressure recently as the official cash rate has fallen to record low levels. A sensitivity involving lower net interest income and lower provisioning could produce the same profit and capital outcome as the PBS but may now have a higher probability of occurrence.

Conclusion of the PBS

The Reserve Bank's overall assessment of the PBS is that the New Zealand banking system can absorb such a downturn and continue lending to support the economy. All banks maintain their capital ratios above regulatory minimums. Banks will have much lower capital levels at the end of the scenario and will require time to rebuild buffers. Banks may consider applying timely mitigating actions, not modelled in the desktop, to lessen this task.

3.2 Very Severe Scenario (VSS)

Reserve Bank desktop results for the VSS

Aggregate Tier 1 and Total Capital fall below the regulatory minimum in the VSS. The shortfall in total capital is \$7 billion. All banks' Total Capital ratios fall below the minimum regulatory requirement. Banks would require significant mitigating actions, including capital injections, to remain above the regulatory minimum.

The aggregate CET1 ratio falls to 5.8 percent by the second year, after 1.6 percentage points of AT1 conversions (figure 4). When a bank's CET1 capital ratio falls below 5.125 percent, AT1 capital automatically converts to CET1. These conversions are enough to prevent the aggregate CET1 ratio falling below the regulatory minimum.

The fall in profit is much larger than the PBS. In the first two years aggregate losses are \$12bn. There is a small loss in year three before returning to positive returns in year four at half the pre-stress level. Banks with weaker underlying earnings continue to make near zero profit or a loss in year four.

Figure 3.8: Aggregate capital ratios (CET1 before the conversion of AT1 instruments - % of RWA)

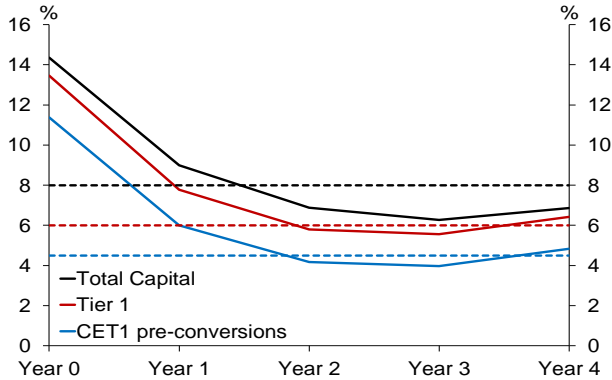
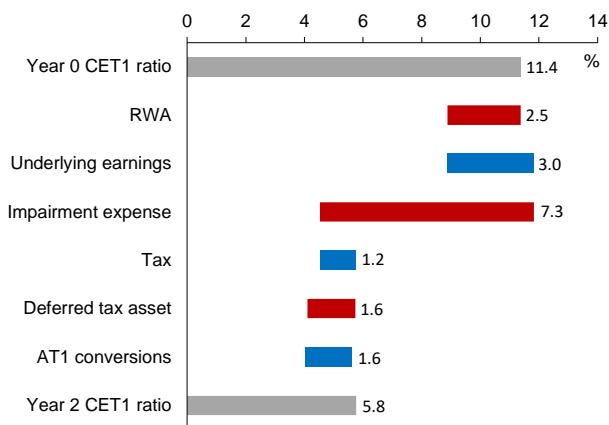


Figure 3.9: Decomposition of changes in aggregate CET1 ratio by year two (% of RWA)



Loan impairment expense

Impairment expense leads to a 7.3 percentage point reduction in the aggregate CET1 ratio and is the largest driver of the difference between the scenarios.

The higher unemployment rate and greater fall in GDP leads to significantly higher defaults in the VSS. The aggregate default rate in the VSS is equivalent to 17.3 percent of exposures, compared to 12.3 percent in the PBS (table 2). The higher default rates and larger property price falls increase the loss rate in the VSS, equivalent to 6.3 percent of exposures, compared to 3.6 percent in the PBS.

Other factors contribute to lower capital outcomes than the PBS

- Underlying earnings are slightly lower than the PBS due to higher funding costs, which reduce net interest income further.
- RWAs grow by more in the VSS, reflecting the more severe economic scenario, offset slightly by lower growth in lending.
- The greater increase in DTAs is driven by the higher level of loan impairment expenses.

Conclusion for the VSS

The Reserve Bank's overall assessment in the VSS is that the banking system would come under pressure to stay above regulatory minimum capital requirements. Significant mitigating actions, including raising new capital, would be necessary for banks to avoid breaching regulatory minimums under this scenario.

4. Large bank modelling in this stress test

The Reserve Bank requested the five largest banks to conduct their own modelling to assess their capital outcomes under the same two COVID-19 scenarios. The submissions provided a challenge to the Reserve Bank's desktop model and some assumptions were revised as a result. Banks also reported on the timing, nature and magnitude of mitigating actions they would be likely to take under these scenarios.

As part of the stress test, the Reserve Bank held a series of meetings with banks to discuss their submissions and provide feedback. These meetings were designed to exchange ideas and improve stress test capability across the industry.

Overall the capital outcomes of the bank modelled submissions were similar to the desktop exercise in the PBS, but less severe in the VSS. Within the overall results there was a wide range of outcomes which mainly reflected differences in modelling approaches. This partly reflects the difficulty in modelling the rapid changes in economic parameters, especially for the VSS, which are beyond the range of historical experience used to calibrate risk models. As a result banks required greater reliance on expert judgement overlays than previous stress tests.

The main components of banks' mitigating actions were operating expense savings, repricing, and a reduction in credit limits, which were usually enacted as capital ratios fell below management buffers. Banks need to be careful when considering mitigating actions which may make a downturn worse, such as credit rationing. When assessing the implications of stress test results, the Reserve Bank primarily focuses on results before mitigating actions, given the additional uncertainty and complexity involved in judging how achievable some mitigating actions would be.

Banks are considering additional scenarios, beyond those provided by the Reserve Bank. These are more targeted at banks' individual business models. Given the uncertainty in the economic outlook, these should be updated as circumstances change.

5. Lessons and next steps

The results of this stress test show the New Zealand banking system has a good level of resilience, and is well positioned to continue lending to support the economy. In the PBS, all banks are able to meet minimum capital requirements. However, capital is projected to fall significantly, requiring plans to restore capital over time. Furthermore, banks are not invincible, and the VSS is an example of a more severe, albeit less likely, scenario in which banks would fall below their regulatory minimum capital requirements without significant mitigating actions, including capital injections.

The Capital Review sought to ensure banks could withstand a one-in-200 year event. The COVID-19 pandemic has demonstrated that large shocks can occur with very little warning. Indeed, the VSS was seen as quite plausible six months ago. This reinforces the need for strong capital buffers to provide resilience against severe but unlikely events. If a banking crisis were to occur on top of an existing economic crisis, the economy's ability to recover would be seriously compromised, and outcomes would become significantly worse.

Banks incorporated their modelled results of the PBS and VSS into the annual capital management process. This process tests the banks' capital management buffers and mitigating actions. Some banks are reviewing models to better cope with scenarios which could result from COVID-19 type shocks previously not considered.

The results of this stress test supports decisions that were made as part of the Capital Review to increase bank capital levels. The findings will help to inform Reserve Bank decisions on the timing of the implementation of the Capital Review, and any changes to current dividend restrictions.