



TE TAI ŌHANGA
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The Treasury's analysis and recommendations for fiscal rules

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Purpose

In New Zealand, governments are required to set out their fiscal strategy consistent with the requirements of the Public Finance Act 1989. The Public Finance Act 1989 contains enduring 'principles of responsible fiscal management' and the government sets short-term fiscal intentions and long-term fiscal objectives in accordance with those principles. It is common practice for some of these intentions and objectives to be expressed as fiscal targets, also known in the literature as 'fiscal rules'. Unlike in other countries where it is common for fiscal rules to be set in legislation, in New Zealand any fiscal rules are set by the government of the day. To support transparency, this note summarises analysis by the Treasury over late 2021 and early 2022 to support our advice to the Minister of Finance on setting new fiscal rules.

It covers:

- criteria for good fiscal rules
- the Treasury's recommendations for the indicators to target and the design of fiscal rules, and
- the Treasury's framework and analysis for the calibration of fiscal rules.

This note does not cover advice on the entire fiscal strategy for a government (such as the level of spending or taxation). Instead, it focuses on fiscal rules that would ensure the fiscal position is sustainable over time.

Recommended fiscal rules

The Treasury reviewed the indicators that are commonly used to set fiscal strategy targets in New Zealand, and advised the Government to adopt a new net debt indicator to broaden the coverage of assets and liabilities (see Box A below).

The Treasury recommended that the Government adopt two new fiscal rules:

- **An operating rule as the main fiscal rule** – to bring the operating balance before gains and losses (OBEGAL) back to surplus and then to maintain small surpluses on average over time.
- **A debt ceiling** – to maintain net debt as a share of GDP at a prudent level whilst still providing headroom to respond to shocks. We recommended a debt ceiling of 50 per cent of GDP based on the net core Crown debt measure, or 30 per cent of GDP based on the new net debt indicator including the New Zealand Superannuation Fund, advances and Crown entity borrowings. Treasury advised that this be a ceiling rather than a target level. Because a ceiling gives more fiscal space than a target, Treasury only recommended the ceiling at this level if there is a commitment to fund projects with a positive cost-benefit ratio based on rigorous business cases. If there is a high risk of projects being funded without a rigorous assessment based on sound analysis, the Treasury advised that the Government should set a lower debt ceiling.

Box A: The interaction between the net debt measure and fiscal rules

As discussed in He Puna Hao Pātiki: The Treasury's 2022 Investment Statement, the Treasury has reviewed the appropriateness of the current suite of fiscal indicators. The review recommended a shift to a new, broader net debt indicator as a better measure of New Zealand's fiscal sustainability for use in fiscal management, while being more closely aligned with the net debt measures used internationally. The existing net debt indicator is 'net core Crown debt'. This is calculated as core Crown borrowings, net of core Crown financial assets, where those assets do not include advances and New Zealand Superannuation Fund (NZSF) financial assets. The new net debt indicator includes all the liabilities and assets in the existing net debt indicator, and broadens it to include three more:

- Crown entity borrowings (mainly Kāinga Ora and Waka Kotahi borrowings).
- Advances (mainly Reserve Bank Funding for Lending loans and student loans) which will now be netted off.
- The NZSF which will also now be netted off.

The analysis in this note is based on the on the existing 'net core Crown debt' measure. This can be converted to the new net debt measure that includes the NZSF by deducting the value of the NZSF (approximately 20 percentage points of GDP) from the current debt measure. This would mean a debt ceiling of 30 per cent of GDP based on the new debt measure including the NZSF. We use a net measure (rather than a gross measure) because the financial assets and the returns associated with those assets are relevant when considering fiscal sustainability.

The review recommended keeping the OBEGAL definition unchanged.

Criteria for good fiscal rules

Sustainability and Stability – the key criteria for good fiscal rules

Fiscal rules are often developed – in New Zealand and elsewhere – in response to concerns amongst policy makers that, without them, a deficit bias may emerge in the public finances and the country's fiscal position risks becoming unsustainable.

Therefore, the primary motivator of fiscal rules is to address fiscal sustainability. Sustainability means that existing policy settings are fiscally sustainable into the foreseeable future. That is, under existing policy settings, the government's (or the Crown in the New Zealand context) fiscal position is not imposing a deteriorating debt or net worth trajectory that will at some future point force a fiscal correction.

However, a good fiscal rule should also allow fiscal policy to support stability, as reflected in the Public Finance Act requirement for governments to have regard for the interaction between fiscal policy and monetary policy. A rule that supports stability would enable the government to use the Crown balance sheet to contribute to broader economic stability through the use of fiscal policy responses that help offset, or push against, the impacts of an economic shock on the broader national economy. This can be through the use of both automatic fiscal stabilisers, such as tax revenues and welfare transfer payments that change automatically in response to changing economic fortunes, and discretionary tax and spending policy initiatives in response to an economic shock.

As a significant proportion of tax revenue, and to a lesser degree spending, is influenced by economic conditions the Crown's aggregate fiscal position fluctuates with the economic cycle. It improves when the economy is performing strongly and deteriorates when the economy is weak. This is desirable as the fiscal position acts as an automatic stabiliser, drawing additional resources from the economy when it is performing strongly (as tax revenues increase and spending falls), and adding resources when the economy is weak (as tax revenue falls and spending increases). A durable fiscal rule should allow this fluctuation in the fiscal position over the economic cycle.

An ideal fiscal rule should be strict enough that it supports fiscal sustainability, while being flexible enough to support stability by allowing the Crown balance sheet to respond to shocks. Inflexible fiscal rules risk not being durable, as they are likely to be broken in response to economic shocks. Excessively flexible fiscal rules risk being ineffective, if they do not correct unsustainable fiscal paths. Fiscal rules therefore need to effectively balance these sustainability and stability objectives.

Even without considering stability, sustainability by itself comes with challenges. There are other costs of constraining spending, such as the lost opportunity to increase an economy's productive capacity or improve living standards.

Additional criteria

In addition to sustainability and stability, Kopits and Symansky (1998) also describe the following features of good fiscal rules:¹

- **Simplicity:** The rule should be easily understood by decision makers and the public.
- **Operational guidance:** It should be possible to translate the rule into clear guidance in the annual budget process. Budget aggregates targeted by the rule should be largely under the control of the policymaker.
- **Resilience:** A rule should be in place for a sustained period to build credibility, and it should not be easily abandoned after a shock.
- **Ease of monitoring and enforcement:** Compliance with the rule should be easy to verify, and there should be costs associated with deviations from rules.

The Treasury's analysis of fiscal rules and the resulting recommendations for the Government reflect a view that the wellbeing of New Zealanders is enhanced by a fiscal framework that is intended to ensure that government finances are sustainable over time, and that recognises the role of the Crown balance sheet in stabilising the economy in the face of economic shocks. The analysis does not support or reflect a particular view on the optimal level of expenditure and taxation. While Treasury can and does assist with analysis of the value of government tax and spending at the margin, spending and tax decisions also reflect the outcomes of the electoral contest of competing views and choices regarding the role and size of the state. The proposed fiscal rules can accommodate a wide range of tax and spending strategies that different governments might pursue to meet their broader objectives.

In New Zealand, the Public Finance Act 1989 sets out eight 'principles of responsible fiscal management'² and requires governments to set long-term objectives for at least 10 years and short-term intentions for at least two years for total debt, total operating expenses, total operating revenue, the balance between total operating expenses and total operating revenues, and net worth that are consistent with these principles. Beyond this, the Public Finance Act allows significant flexibility for governments, recognising that 'prudent' debt levels will vary over time.

¹ George Kopits and Steven A. Symansky (1998), "Fiscal Policy Rules", IMF Occasional Paper No. 162, Washington DC: International Monetary Fund.

² See section 26G of the Public Finance Act 1989.

Designing fiscal rules for New Zealand

In designing fiscal rules that meet the sustainability and stability criteria and the Public Finance Act principles of responsible fiscal management, we focused our advice on ways to achieve the following three things:

- 1 **over time finance current spending from current revenues** – implying that the government should save (run fiscal surpluses) during the upswing of economic cycles, to allow them to run deficits in downswings³
- 2 **be able to borrow to finance high-quality capital investments** –supporting intergenerational equity by smoothing the costs over time when the benefits are also felt over time⁴
- 3 **retain the capacity to borrow to support economic stability in the event of large shocks** – to ensure debt remains prudent. This suggests aggregate government investment-related borrowing must be subject to certain limits, to retain sufficient residual capacity to borrow to support economic stability in the face of large economic shocks.

The Treasury therefore recommended that a ‘golden-rule’-style operating balance rule, alongside a debt ceiling, would achieve these three things and ensure the government meets the Public Finance Act principles. Further, the Treasury recommended capital investment proposals should be subject to rigorous value for money assessment to ensure the wellbeing benefits of the projects exceed the financing costs.

Operating balance rule

We consider that a focus on managing the operating balance is well aligned with the fiscal sustainability objective. Balancing the operating position would mean that operating expenses (which include the day-to-day consumption and transfer payments by the Crown) are paid for out of operating revenues. This approach also supports intergenerational equity and living standards. When operating expenses are paid for by operating revenue, the current generation pays for its own consumption. The government can still borrow for long-term investments where it is appropriate that the cost be spread across generations, and future generations would receive both an asset and a liability.

A well-controlled operating balance should be consistent with sustainable net debt and net worth. Given that net investment – which may be paid for by debt – grows the capital stock, any increase in debt would be matched by an increase in the asset component of net worth. Depreciation and write-downs would be paid for out of operating revenue, which ensures that the consumption of capital is paid for by the generation who consume it. As the operating balance equals the change in net worth, maintaining a focus on the operating balance supports maintaining the Crown’s net worth.

³ This is sometimes referred to as the “Golden Rule” of government financing. *“The golden rule stipulates that over the economic cycle, the government should borrow only to invest and not to fund current spending. More specifically, it requires the current budget to be in balance or surplus on average over the economic cycle.”* Keiko Honjo (2007), “The Golden Rule and the Economic Cycles”, IMF Working Papers 2007 (199), International Monetary Fund.

⁴ For example, see section 3.1 of The Treasury (2022), “He Puna Hao Pātiki: The Treasury’s 2022 Investment Statement” for a discussion of the likely need for additional investment to maximise the contribution that infrastructure makes to productivity and wellbeing outcomes and the system settings for a robust management of government investment.

This rule to some extent helps to address one of the challenges set out in Treasury's Long-term Fiscal Statement of the rising costs associated with an ageing population. It means future governments will need to make policy changes if expenditure is expected to increase in the future to make sure they can continue to meet the rule. However, the underlying challenge of increasing costs remain.

Focusing on the operating balance also provides better short-term guidance for fiscal strategy decisions than a focus on a specific point target for debt. If net debt is significantly above or below a debt target, it would be more challenging to use for short-term decision-making.

The Treasury recommends focusing on OBEGAL for use in a fiscal rule. Like the operating balance, it has broad institutional coverage as it is a total Crown measure.⁵ It is also accrual based, capturing depreciation and write-downs but not capital expenditure. The main difference to the operating balance is that OBEGAL excludes gains and losses which are volatile, making it more appropriate to use for short-term decisions. In addition, OBEGAL is the main driver of changes in net debt and is the driver under the most direct control of the government of the day.

Finally, the structure of the new rules will sharpen questions regarding what should count as an operating expense and what should count as an investment. For instance, from an economist's perspective, elements of education, conservation and health expenditure can have characteristics of an investment, in that they provide an enduring benefit into the future. We recommend that the new fiscal framework use the same principles and definitions of operating and capital spending as are used in the Crown accounts. Doing so is the option that is most consistent with the four additional criteria discussed earlier in this note (namely simplicity, operational guidance, resilience, and ease of monitoring and enforcement).

Debt rule

To ensure that a buffer is maintained in the Crown accounts to respond to shocks, we recommend a debt rule in addition to the OBEGAL rule. The debt rule would act as a backstop against a deficit bias.⁶ As such, it would help ensure that there is a sufficient fiscal buffer in place to address significant economic shocks or natural disasters. One of the downsides of an operating balance rule is – by focusing on a flow measure – previous deficits do not necessarily have to be offset by surpluses (depending on how the rule is constructed), which can risk debt 'ratcheting up' following shocks. As debt is a stock measure, a debt rule would become binding over time if a deficit bias materialised.

There are different fiscal indicators for debt – some of which are gross and some of which are net, and with different coverage of the Crown's balance sheet. The Treasury has proposed using net debt as the measure for the debt rule as this reflects the liquidity of some assets (see Box A above).

⁵ Total Crown includes the core Crown plus Crown entities and State Owned Enterprises. See glossary of terms in The Treasury (2021), "Half-Year Economic and Fiscal Update".

⁶ Deficit bias can be defined as the tendency of governments to allow deficit and public debt levels to increase. See glossary in Irish Fiscal Advisory Council (2012), "Fiscal Assessment Report".

Adopting a point target for net debt that is excessively binding would reduce flexibility to respond to changing circumstances. The use of debt as a point target has meant that debt targets were frequently set at levels that could be considered well below the fiscally sustainable level. The Treasury recommended that the Government adopt a debt ceiling under which net debt stays over the long-term. While it is possible that net debt may rise above the ceiling as a result of significant shocks, the intention would be that in such cases net debt would be reduced over time back below the debt ceiling. Adopting a range for net debt can give an indication of what is considered to be a prudent, especially given the uncertainties, while also providing flexibility. A range could include an implicit or explicit requirement to target the mid-point. In addition, a range is less likely to be interpreted as a point target compared to a debt ceiling. However, it is challenging to determine the appropriate level to set the lower bound of the range and the upper bound of the range would likely be the same level as for a ceiling.

Other rules considered

We considered net worth and debt servicing as indicators to target. Compared to net worth, net debt has the advantage that it only counts liquid assets, as opposed to roads, schools and hospitals that could not be used to repay debt. It also avoids some of the asset revaluation issues which can be associated with net worth. However, maintaining a well-controlled operating balance should help ensure that net worth is also well managed, even though it is not the focus of these rules.

Debt servicing rules have been used in some countries,⁷ but come with challenges. Debt servicing costs are very sensitive to unpredictable movements in global long-term interest rates, and therefore the government has only limited control over the path of the indicator. Forecasters internationally have a poor track record of predicting movements in long-term interest rates, such as the large fall in interest rates since the Global Financial Crisis (GFC). Should interest rates unexpectedly increase, the government may be required to make large adjustments to the stock of debt to meet a binding fiscal rule.

⁷ For example, the UK introduced a fiscal rule on debt servicing in the Spring Budget 2020 but has since implemented new fiscal rules which no longer include debt servicing. The Resolution Foundation also published a report in 2019 which recommended a 'debt interest ceiling'. See Hughes et al. (2019), "Totally (net) worth it – The next generation of UK fiscal rules", Resolution Foundation.

Calibrating fiscal rules for New Zealand

Once we have determined the best indicators to target and the broad structure of fiscal rules, we needed to determine appropriate levels to set the rules. This is not a mechanical process and there is a role for judgement. While some fiscal and debt positions will be clearly incompatible with the sustainability and stability criteria, a wide range of fiscal and debt positions may be compatible with them. Choosing levels to set the rules from the range of credible policy choices involves a degree of judgement and depends in part on the risk tolerance and perspective of the government of the day.

Treasury's analysis was intended to help inform the Government in making those judgements by presenting a framework and analysis. That analysis inevitably relied on making assumptions about future economic conditions, which comes with a high degree of uncertainty. Therefore, throughout we drew on evidence and made conservative assumptions.

Calibrating an OBEGAL rule

To calibrate an OBEGAL rule, we analysed the approximate level of OBEGAL that ensures that OBEGAL does not contribute to net core Crown debt as a share of GDP over time. This ensures that the fiscal headroom would be either reserved for shocks or net capital investment – in line with the three points set out above.

We took the following approach:

- **Calculate the average operating balance required such that it does not contribute to a rise in net debt-to-GDP.** This approximates to the growth rate of nominal GDP multiplied by net debt-to-GDP. We assume a long-run growth rate of nominal GDP of 4.5 per cent and a starting net debt stock of approximately 30 per cent of GDP. This means the government could run an operating deficit each year of 1.35 per cent of GDP without those deficits leading to a rising net debt-to-GDP ratio.
- **Convert this measure into an OBEGAL balance.** Given that OBEGAL excludes gains and losses, there is a question as to whether the government should target a different level of OBEGAL than the required operating balance. Gains and losses vary but on average over an extended period of time we tend to expect gains, primarily from the NZSF. However, targeting a lower level of OBEGAL on the assumption that this will be offset by returns on the NZSF, would mean that we were effectively using those returns to pay for operating expenses, rather than saving them. This, combined with the uncertainty of gains and losses, suggests we should not make an adjustment.
- **Add in an allowance for the NZSF.** NZSF contributions are not operating expenses and are therefore not included in OBEGAL. If the government intends to contribute to the NZSF out of revenues, as opposed to out of debt – then the required OBEGAL surplus is higher. We add in 0.3 per cent of GDP to reflect an average contribution. We have not added in any further adjustment for pre-funding of long-term costs, beyond the contribution to the NZSF.

- **Add in an allowance for shocks.** This is perhaps the most uncertain variable. We assume that significant economic shocks will occur approximately every decade. The size of those shocks has varied over time, but we conservatively assume that an average shock will add approximately 15 percentage points to net debt to GDP. This requires that the operating balance be larger than it otherwise would by 1.5 percentage points of GDP per annum to ensure that, on average over an economic cycle, it does not add to net debt to GDP. This implicitly assumes that deficits resulting from economic shocks will be smaller than they otherwise would be, due to the stronger starting OBEGAL position.

The result is an OBEGAL surplus of approximately 0.5 per cent of GDP. However, this does not necessarily mean that the Government should target a specific OBEGAL surplus of 0.5 per cent every year. The OBEGAL position is subject to significant volatility outside of the Government's control, such as changes in the performance of State-Owned Enterprises and Crown Entities, valuation changes and forecast revisions. This would make it difficult to achieve a specific point target in a given year.

We recommended two options for the OBEGAL rule, with the trade-off between them being finely balanced.

- One option is to specify the target as an average value within a range, such as maintaining an average OBEGAL surplus in the range of 0-2% of GDP over the 10-year period, subject to economic and fiscal conditions. The key trade-off with a range target is making sure that the range is wide enough to provide the flexibility needed to manage cyclical and other fluctuations in OBEGAL, while not being so wide as to provide a lack of clarity about the Government's intentions.
- The other is to target "small surpluses" (once OBEGAL has returned to a surplus), subject to economic and fiscal conditions. While this option provides more flexibility through a relatively broad target, it can risk credibility by providing less clarity on the definition of small surpluses.

Overall, this approach is largely driven by a view that governments should aim for surpluses to offset future expected shocks, at which point deficits would be expected. If there were a significant economic shock, we would expect the average OBEGAL position to fall outside this range over a ten-year period.

This rule is consistent with the Public Finance Act principle that "over a reasonable period of time operating expenses do not exceed operating revenues." There are always possibilities of forecast adjustments and forecast errors – both in terms of upside and downside surprises – but we consider that aiming for a small operating surplus is a good starting point for ensuring that the operating balance is sustainable over time, after factoring in an assumption for future shocks. An implication of this rule is that net debt to GDP is expected to decline over time (as the average fiscal position is one of surplus) except when a shock is occurring, even with an increase in capital spending. This is illustrated in Figure 3 below which shows the Half Year Economic and Fiscal Update (HYEFU) 2021 fiscal projection with its associated operating and capital allowance assumptions.

Calibrating a debt ceiling

As set out in a speech by the Secretary of the Treasury Caralee McLiesh in June 2021⁸, assessing prudent debt relies on value judgements. It is complex and uncertain. But we can use evidence to make informed judgements about suitable estimates for key assumptions, consider how they are likely to interact, and set out judgements to support the government in making trade-offs between a prudent level of debt and a prudent level of investment.

To determine a recommended net debt ceiling the Treasury applied debt sustainability analysis. We broadly followed an approach set out by the International Monetary Fund (IMF, 2018).⁹ We first aimed to answer the question: what is the highest level of net debt to GDP that could be tolerated before we consider debt to be unsustainable? To answer this, we consider the maximum level of net debt as a share of GDP at which it is still plausible to stabilise and reduce net debt to GDP back to a level that restores the Crown's fiscal buffers. Then, given this, we need to consider where the debt ceiling should be set.

To do this, there are three key variables:

- **Identify the maximum feasible primary balance**¹⁰ – this determines the ability of the government to stabilise and reduce net debt at high levels.
- **Identify conservative but plausible debt interest rates and GDP growth rates.**
The difference between these two things – the interest rate differential or $r-g$ – determines the rate at which debt grows (or reduces) as a percentage of GDP if the primary balance is zero.
- **Estimate a required buffer for economic shocks** – the buffer determines the required net debt to GDP reduction if net debt to GDP is at the maximum – to re-establish the buffer.

Throughout, we aim to use conservative assumptions because the Public Finance Act requires debt to be prudent, and we think making conservative assumptions is a prudent approach. While we have used our best professional judgement to calibrate these variables, we recognise that these variables are not amenable to being determined unambiguously through purely technical or economic analysis. The maximum feasible primary balance is as much a political question as an economic one. It is reasonable that other commentators or future governments could come to other judgements, or apply other frameworks, to determine what is prudent.

Identifying a maximum feasible primary balance

In a situation where debt is unsustainably high, governments face difficult choices about how to consolidate and reduce debt to a sustainable level. They can reduce spending or raise tax revenue (through increasing rates or broadening the tax base). This can be both economically and politically challenging.

⁸ Caralee McLiesh (2021), "New challenges for macroeconomic stabilisation policy: The role of fiscal policy", Opening Remarks at the Joint Reserve Bank of New Zealand/Treasury Macroeconomic workshop.

⁹ Luc Eyraud et al. (2018), "How to Select Fiscal Rules – A Primer", International Monetary Fund.

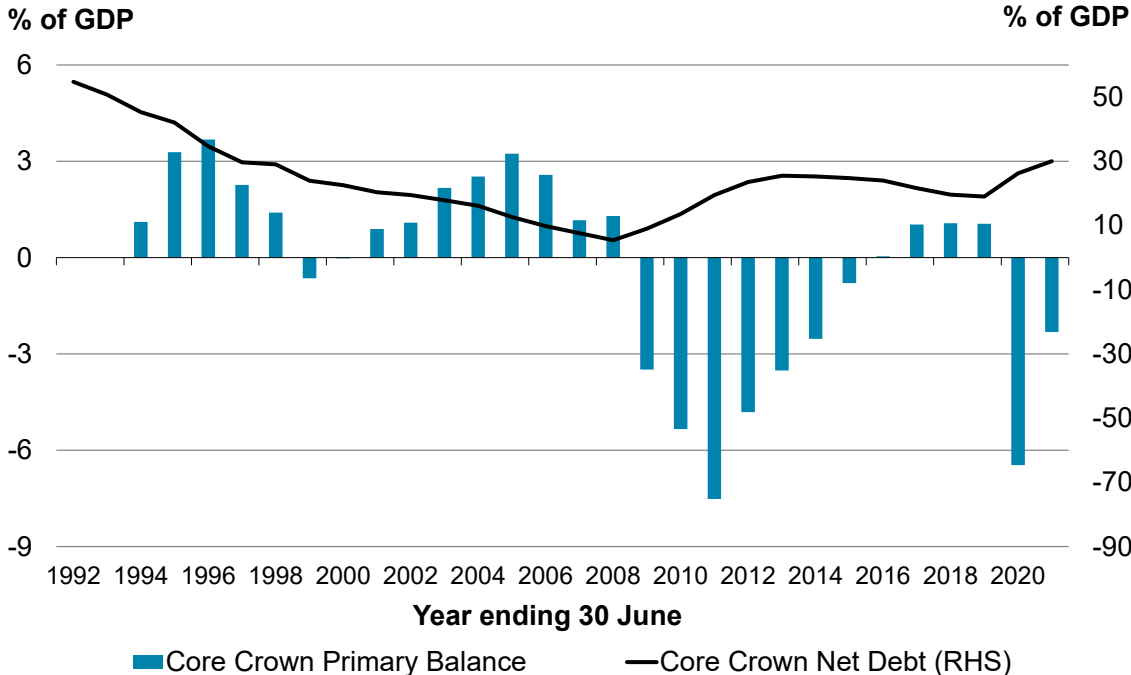
¹⁰ The primary balance is the difference between the Crown's revenue and its non-interest expenditure.

When making an assumption about what degree of consolidation could be feasible in New Zealand, we consider historical fiscal performance. **This suggests assuming that governments could achieve a primary surplus of between 1-3 per cent of GDP for a sustained period to bring down debt if they needed to.** We focus on primary balance adjustment rather than OBEFAL as it more accurately reflects the required change in non-interest expenditure and revenue to reduce debt.

Following extreme shocks, it may be possible to achieve a primary surplus greater than 3 per cent in response, or to take longer to consolidate. The IMF notes that for advanced economies, it is possible to assume a maximum feasible primary surplus of 4 per cent of GDP. However, it may be harder to achieve higher levels of primary balance for a sustained period after a crisis when the economic base is weak and debt is at high levels. This can be due to public resistance to spending cuts or the fact that additional revenue-raising measures eventually become ineffective (IMF, 2018).¹¹

On the other hand, there have been limited periods in New Zealand's history of running sustained primary balances of more than 3 per cent (see Figure 1). For example, after the GFC the primary balance only returned to around 1 per cent before returning to deficit. However, this included a reduction from a deficit of 8 per cent in 2011 – so it was a large consolidation – with net debt reducing from a peak of 25 per cent in 2013 to 19 per cent of GDP in 2020.¹²

Figure 1 – Net core Crown debt and core Crown primary balance



Source: Treasury analysis, Stats NZ

¹¹ Luc Eyraud et al. (2018), "How to Select Fiscal Rules – A Primer", International Monetary Fund.
¹² There were temporary factors at play in this period. See Treasury Working papers for a discussion of this period: Renee Philip, Dhritidyuti Bose, Richard Sullivan (2016), "Returning to Surplus: New Zealand's Post-GFC Fiscal Consolidation Experience" Treasury Working Paper Series 16/05, New Zealand Treasury; and Melissa Piscetek (2019), "Public Debt Dynamics in New Zealand", Treasury Working Paper Series 19/01, New Zealand Treasury.

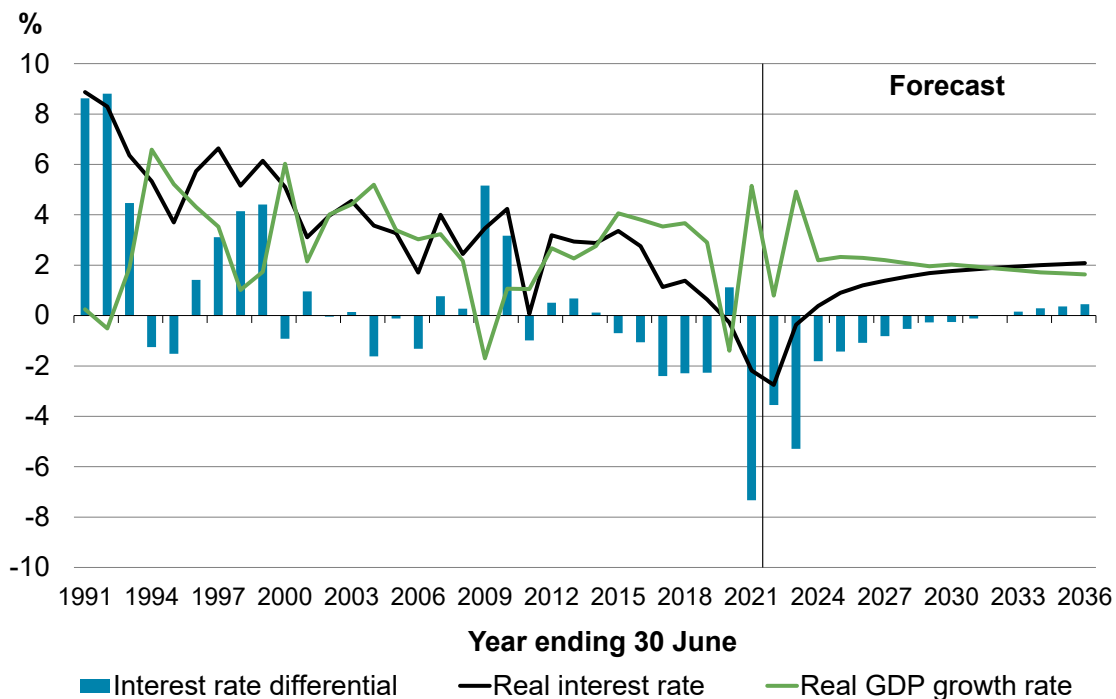
Identifying a plausible but conservative interest rate differential

A key relationship for determining whether a given level of debt is sustainable or not is the relationship between the real interest rate paid on government debt (r) and the growth rate (g). The interest rate differential, $r-g$, determines the rate which debt grows as a percentage of GDP.¹³

Based upon New Zealand’s historic experience, we think **an assumption of a sustained interest rate differential of 3 per cent is conservative**. Whilst there have been brief periods where interest rates have exceeded GDP growth rates by more than this, recent experience suggests that extreme interest rate differentials are short-lived. The average interest rate differential over the last thirty years in New Zealand was 0.8 per cent, and in recent years it has been negative, which suggests net debt could fall even with a primary deficit (Figure 2).

A 3 per cent interest rate differential could be considered a tail risk scenario, but to ensure fiscal rules are robust to extreme outcomes, we have used this conservative assumption (as well as presenting a less conservative assumption of 1 per cent). We want to ensure the fiscal rules are robust to more extreme scenarios – for example where a large shock hits New Zealand and not the rest of the world, increasing our risk premium. Recommending a higher level of debt as prudent on the basis of recent low or negative interest rate differentials could create risks in the future if this dynamic reversed.

Figure 2 – Real interest rate, real growth rate and the interest rate differential



Source: Treasury analysis

Note: The real interest rate is the 10-year bond rate adjusted for inflation. The forecast period is based on HYEUFU 2021 forecasts, and the projections are from the Fiscal Strategy Model published at HYEUFU 2021.

¹³ For further discussion, see Oscar Parkyn, John Janssen, Matthew Bell (2021), “Background Paper for the 2021 Statement on the Long-term Fiscal Position: Long-term projections of the New Zealand Government’s interest rate”, New Zealand Treasury.

Table 1 sets out the maximum sustainable debt level associated with different primary balance positions, for a given interest rate differential. This is based on the following debt dynamics equation¹⁴, which relates the debt-to-GDP ratio (d) to the real interest rate (r), GDP growth rate (g) and primary balance (p):

$$\Delta d_{t+1} = (r - g)/(1 + g) * d_t - p_{t+1}$$

This can be rearranged to obtain the steady-state level of debt for constant values of the interest rate, growth, and the primary balance:

$$\text{Maximum sustainable debt level} = p * \frac{1+g}{r-g}$$

The higher the primary balance a country can sustain, the lower the interest rates it faces, and the higher the growth rate it can maintain, the higher the steady-state level of debt that this country can maintain.

This illustrates how important the assumption of the interest rate differential is – with a differential of 1 per cent, debt can be stabilised at around 100 per cent of GDP with a primary balance of just 1 per cent of GDP - whereas with an interest rate differential of 3 per cent, a primary balance of 3 per cent would be needed.

Table 1 – Interest rate differential and debt stabilising primary balance

Interest rate differential	Real interest rate	Real growth rate	Interest rate differential (r-g)	Primary balance	Maximum sustainable debt level
Baseline interest rate differential ¹⁵	2%	1.5%	0.5%	1%	203%
				2%	406%
				3%	609%
Moderate interest rate differential	3%	2%	1%	1%	102%
				2%	204%
				3%	306%
Large interest rate differential	4%	1%	3%	1%	34%
				2%	67%
				3%	101%

Source: Treasury analysis

¹⁴ Piscetek (2019) and Annex 6, International Monetary Fund (2013), “Staff Guidance Note for Public Debt Sustainability Analysis in Market-Access Countries”, International Monetary Fund.

¹⁵ The baseline scenario is based on the differential in real interest rate and growth rate at the end of the projection period in HYEPU 2021.

Importantly, higher primary surpluses would be required to reduce debt from these levels. To ensure debt sustainably in the long-term, governments need to not only be able to stabilise debt, but also get it back on downward trajectory.

Estimating a conservative fiscal buffer required for economic shocks

Macroeconomic shocks experienced in New Zealand from the early 1970s to 2019 increased net debt by an average of 10 per cent of GDP each, and have occurred every nine years on average. The increase in debt following the Covid-19 pandemic was larger than average, but its precise size will not be known until after debt peaks. At times, debt has increased sharply (such as the 23.5 per cent of GDP increase in debt in the five years following the 1982 downturn), and at other times it has fallen (such as the 10 per cent of GDP fall in debt in the strong recovery that followed the 1997/98 downturn). The modelling in the 2021 Long-term Fiscal Statement found a range of hypothetical shocks with fiscal impacts of this magnitude.¹⁶

International experiences appear to have been similar to New Zealand's over recent decades. New Zealand's increase in debt to GDP after the GFC was around the median of advanced economies. However, some countries had larger increases (for example, 40 per cent of GDP increases in the US and UK, and increases of 50 per cent of GDP or more in peripheral Europe and Japan).

Overall, we recommend a fiscal buffer of 40 per cent of GDP. We consider this adequate to absorb a range of shocks, from an average sized shock of 10 per cent of GDP, which is likely over a decade, to a large shock of 40 per cent of GDP, which has a low likelihood of materialising in any given decade. This buffer assumes a high degree of risk aversion and allows for the larger end of possible shocks, or multiple shocks in a short space of time. However, a large buffer supports the Public Finance Act principles of keeping debt at a prudent level.

Bringing it all together: identifying the maximum debt limit and a net debt ceiling

Our analysis suggests that, depending on a government's willingness to run primary surpluses in response to large shocks, a maximum net debt limit in the range of 80-100 per cent of GDP is feasible (this is represented by the three scenarios in Table 2). **We recommend a maximum limit of 90 per cent of GDP** assuming a moderate-to-high willingness of the government to run primary surpluses in response to large shocks. **This, combined with a fiscal buffer for shocks, suggests a net debt ceiling of 40-60 per cent of GDP, with the Treasury's central recommendation being 50 per cent of GDP.**

To reach this judgement, we took two approaches:

- assessed the size of primary balance needed to reduce net debt from 80 per cent, 90 per cent and 100 per cent of GDP to a net debt ceiling level of 40 per cent, 50 per cent and 60 per cent of GDP respectively); and
- used fan chart analysis to test the probability of breaching the maximum limit on debt at different debt ceilings.

¹⁶ The 2021 Long-term Fiscal Statement (page 28-30, [He Tirohanga Mokopuna, 2021](#)) models a range of shock scenarios to show their impact on net debt. In the recession scenario, each recession is expected to increase net debt by around 10 percentage points of GDP. The earthquake scenario and government's fiscal response modelled are shown to increase net debt by approximately 12 percentage points of GDP.

Primary balance approach

Starting from a net debt level of 50 per cent of GDP, if a shock increases net debt to 90 per cent of GDP, net debt can be reduced back to 50 per cent of GDP by running a 4.2 per cent primary surplus over a two-decade period assuming a large interest rate differential of 3 per cent to proxy borrowing conditions in an extreme scenario. This primary surplus roughly corresponds to an increase in the long-term tax-to-GDP ratio by 3 percentage points. Though this primary surplus would be challenging to maintain, it is based on very conservative assumptions – on both the size of the shock and the interest rate differential. If the shock were 20 per cent of GDP and the interest rate differential were 1 per cent, the required primary surplus would be 1.6 per cent per annum for 20 years. Nonetheless, as noted above, running sustained primary surpluses will become more challenging given the rising costs associated with an ageing population.

Table 2 – Primary surplus required to stabilise and reduce net debt as percent of GDP

Scenario	Primary surplus required to stabilise and reduce debt (assuming a conservative interest rate differential of 3 per cent and a shock of 40 per cent of GDP unless otherwise stated)
Ceiling of 60 per cent of GDP, maximum net debt limit of 100 per cent of GDP	<p>Net debt can be stabilised at 100 per cent of GDP with a primary surplus of 3 per cent of GDP. To reduce net debt from this level to 60 per cent of GDP, an average primary surplus of ~4.5 per cent of GDP over a 20-year period would be needed.</p> <p>With an interest rate differential of 1 per cent, the required primary surplus to reduce net debt to 60 per cent of GDP would be ~2.8 per cent per year for 20 years. With a smaller shock of 20 per cent of GDP (that increases net debt to 80 per cent of GDP), and an interest rate differential of 1 per cent, the required primary surplus to reduce net debt to 60 per cent of GDP would be ~1.7 per cent per year for 20 years.</p>
Ceiling of 50 per cent of GDP, maximum net debt limit of 90 per cent of GDP	<p>Net debt can be stabilised at 90 per cent of GDP with a primary surplus of 2.7 per cent of GDP. To reduce net debt from this level to 50 per cent of GDP, an average primary surplus of ~4.2 per cent of GDP over a 20-year period would be needed.</p> <p>With an interest rate differential of 1 per cent, the required primary surplus to reduce net debt to 50 per cent of GDP would be ~2.7 per cent per annum for 20 years. If the shock were 20 per cent of GDP (that increases net debt to 70 per cent), and the interest rate differential was 1 per cent, the required primary surplus to reduce net debt to 50 per cent of GDP would be ~1.6 per cent per annum for 20 years.</p>
Ceiling of 40 per cent of GDP, maximum net debt limit of 80 per cent of GDP	<p>Net debt can be stabilised at 80 per cent of GDP with a primary surplus of approximately 2.4 per cent of GDP. To reduce net debt from this level to 40 per cent of GDP, an average primary surplus of 3.9 per cent of GDP over a 20-year period would be needed.</p> <p>With an interest rate differential of 1 per cent, the required primary surplus to reduce net debt to 40 per cent of GDP would be ~2.6 per cent per annum for 20 years. If the shock were 20 per cent of GDP (that increases net debt to 60 per cent) and the interest rate differential was 1 per cent, the required primary surplus would be ~1.5 per cent per annum for 20 years.</p>

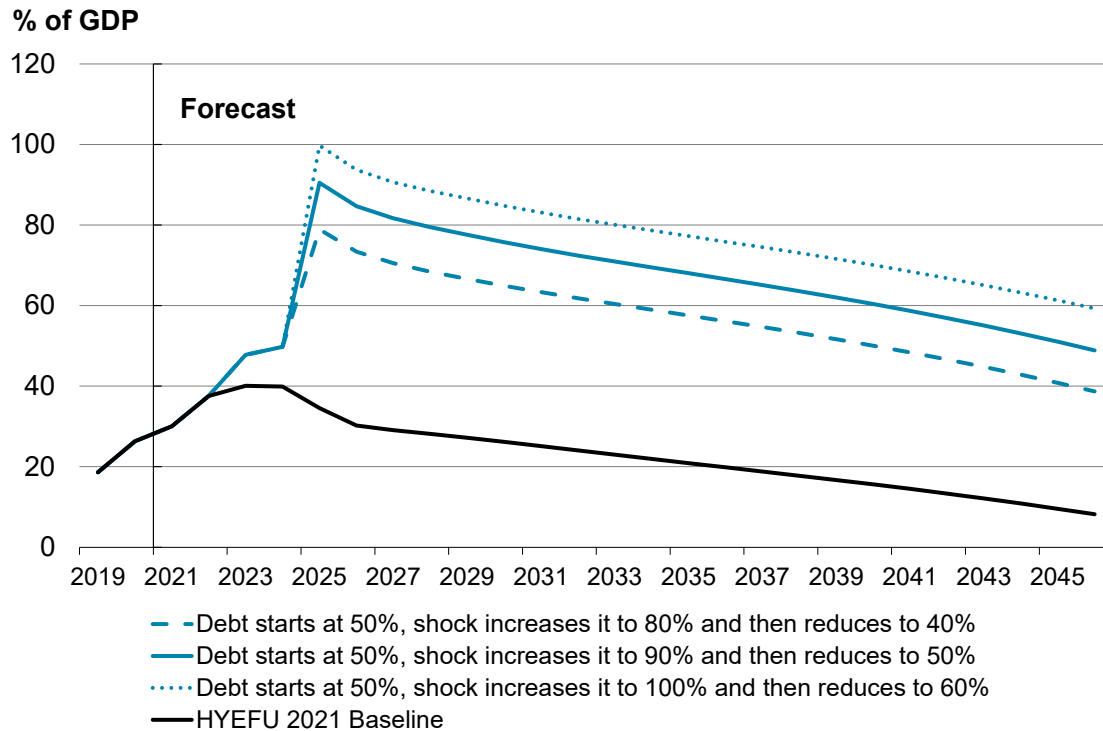
To calculate the size of the primary balance needed to reduce net debt from the maximum to the ceiling (as set out in Table 2 above), we used two different methods and cross-checked their results:

- we modelled these scenarios using the HYEFU 2021 Fiscal Strategy Model to calculate the size of primary balance needed to reduce net debt (based on the current net debt measure) using detailed fiscal projections over a 20-year period (as shown in Figure 3), and

- we used equation 22 outlined in the IMF’s technical note (Escolano, 2010)¹⁷. This calculates a constant primary balance needed to reduce debt from an initial level to a given debt ratio over a 20-year period.

These methods lead to comparable results, giving us confidence in the approach.

Figure 3 – Net core Crown debt for scenarios outlined in Table 2



Source: Treasury, Stats NZ

Note: The HYEFU 2021 baseline assumes an annual increment of \$8 billion per year in capital allowance and annual increment of \$2.75 billion in operating allowance in the first year of the projection period in 2026, which increases by 2 per cent per year in subsequent projection years. The interest rate differential in the HYEFU 2021 baseline is based on the HYEFU 2021 projection track, with an average interest rate differential of 0.3% from 2026/27 to 2045/46. To model the scenarios outlined in Table 3 in the fiscal strategy model (FSM), we assume an average interest rate differential of 3% over a 20 year projection period. In these scenarios, the capital allowance is increased in 2023 and 2024 to model a higher starting level of net debt at 50% of GDP. To proxy the impact of discretionary fiscal policy in response to significant shocks, we assume high operating allowances in 2025 and 2026. This shows net debt peaking at 80%,90% and 100% respectively in 2025. To reduce net debt back down, we model higher primary balance surpluses through an increase in the long-term tax to GDP ratio by 2.5 to 3.2 percentage points and a lower capital allowance assumption of \$2 billion per year in the projection period. This brings net debt back to the respective starting levels by 2046. The operating allowances in the projection period are as per the baseline.

¹⁷ Given an initial debt ratio (d_o), and a target debt ratio (d_N) to be achieved in N periods, the constant primary balance (p) that reaches the target debt ratio if maintained constant during periods $t = 1, \dots, N$ is given by:

$$p = \frac{\lambda}{((1+\lambda)^{-N}-1)} * ((1 + \lambda)^{-N} d_N - d_o)$$

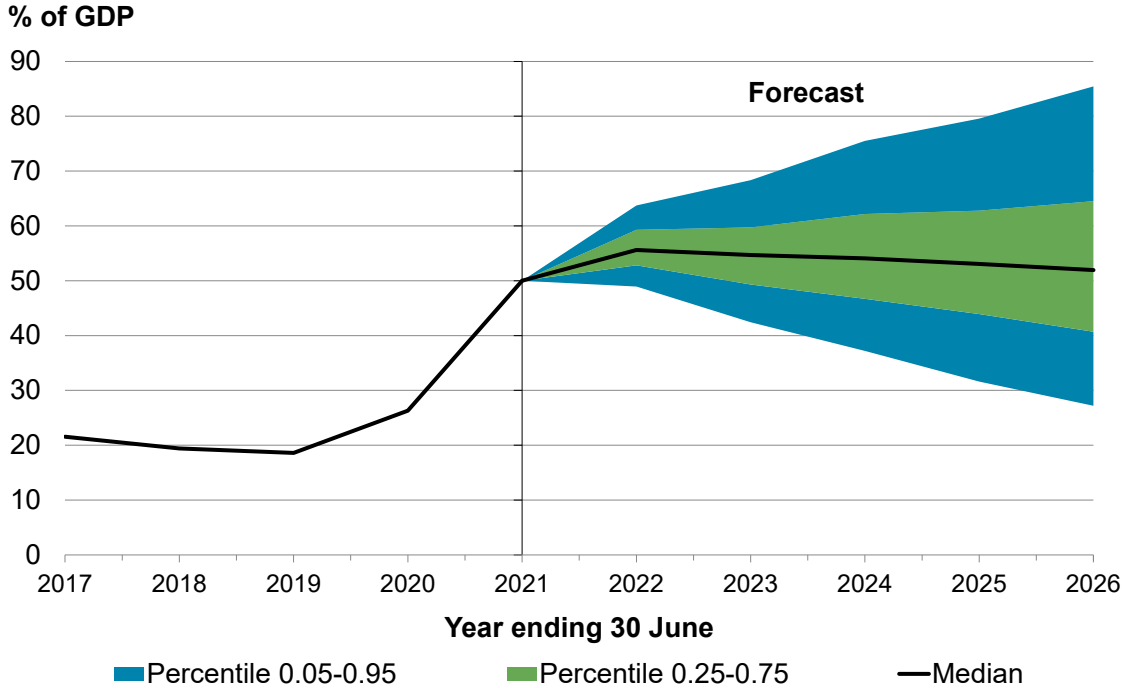
Where $\lambda = \frac{r-g}{1+g}$

Fan chart analysis

Because there is significant uncertainty about the underlying variables, from the primary balance to the growth rate of the economy, we calibrated fan charts to illustrate the uncertainty surrounding the trajectory of net debt in the medium-term.

The fan chart in Figure 4 indicates that the **likelihood of net debt exceeding a maximum limit of 90 per cent of GDP is less than 5 per cent** with a starting point of 50 per cent of GDP. We calibrated the fan chart using conservative assumptions – with the starting net debt level of 50 per cent of GDP (significantly above the peak expected in the HYEPU 2021 forecast of 40 per cent) and an average interest rate differential of 3 per cent over the forecast period. In the 500 alternative scenarios created with shocks to the interest rate, the growth rate and the primary balance, net debt exceeded 90 per cent of GDP in less than 5 per cent of cases. This suggests that a net debt ceiling of 50 per cent is prudent from a debt sustainability approach.

Figure 4 – Fan chart for net debt with 3% interest rate differential and initial net debt level at 50 per cent of GDP



Source: Treasury analysis

Note: This analysis uses actual data until 2020 for the GDP growth rate, interest rate, CPI, core Crown primary balance, and net core Crown debt. For the forecast period, we use HYEPU 2021 forecast as the baseline track, but modify the net debt track to model an increase in the initial level of net debt to 50% of GDP in 2021 and an interest rate differential of 3% on average over 2022-26 to proxy a scenario of a reversal of favourable debt dynamics. The alternative debt series in the fan chart are produced by creating independent shocks derived from a normal distribution. These shocks are added to the baseline values of the growth rate, interest rate, and primary balance, and then plugged into the debt dynamic equation to produce the alternative debt series. The values of standard deviations of the shocks are adjusted to reflect the deviations in the historical data for those variables. We also assume some degree of persistence of shocks through serial correlation based on the historical data.

How Treasury analysis on prudent debt has evolved over time

Treasury advice in 2019 on a prudent level of net debt (using the existing measure) broadly concluded:¹⁸

- an upper limit on net core Crown debt should be 50-60 per cent of GDP
- a buffer of at least 20 per cent of GDP should provide a safety margin below that, and
- taken together, that would suggest a prudent net debt limit of around 30 per cent of GDP.

Our latest analysis uses a slightly different framework and is based on further evidence gathered over the last few years.

The previous analysis identified net debt of 50-60 per cent of GDP as being the upper limit, on the basis that the marginal costs of additional debt would likely exceed the marginal benefits beyond this point. Our more recent analysis puts more weight on fiscal sustainability analysis and identifies a maximum debt limit beyond which it may be difficult to stabilise and reduce net debt of 90 per cent of GDP. The shift in the approach suggests that governments will need to make the trade-off between higher debt and additional projects on a case-by-case basis, as the costs and benefits of higher debt and investment will constantly change as net debt changes.

In the previous analysis, the net debt limit of 50-60 per cent of GDP could be breached if it was deemed wellbeing-enhancing, for example in response to a major shock like COVID-19 or if there is the need for a significant increase in investment – because the limit was set well below a level where we could expect to lose market access. In the updated framework, since the maximum debt limit is based on a debt sustainability approach, there is a lower risk tolerance for breaching the limit in response to shocks. To enable this shift in our framework, as well to account for the uncertainty in future interest rates and greater use of fiscal policy in downturns, we built a larger net debt buffer of 40 per cent of GDP compared to the 20-30 per cent in the 2019 analysis.

Since 2019, the COVID-19 pandemic and the associated fiscal policy response has led to higher debt. At HYEUFU 2021, net core Crown debt was expected to peak at around 40 per cent of GDP. Further, our assessment of the amount of public investment needed in the medium-to-long-term is higher than in 2019.¹⁹ Therefore, a 30 per cent net debt target – as recommended in 2019 – would now be likely to overly constrain capital investment in a way that could reduce wellbeing. The higher debt ceiling – of 50 per cent of GDP based on the current net debt indicator – does not mean that all the fiscal headroom created should be used to fund investment now, or that it will all be, by definition, welfare enhancing. There will still need to be good comprehensive cost-benefit analysis to determine the benefits of any particular capital spending – however the framework used here suggests that should be done from ‘bottom-up’ project assessments, rather than building in an assessment in a ‘top-down’ manner.

¹⁸ Gabriel Makhlouf (2019), “What is prudent debt?”, lecture delivered to the Treasury’s Economic Forum.

¹⁹ See The Treasury (2022), “He Puna Hao Pātiki: The Treasury’s 2022 Investment Statement” for a discussion of the Treasury’s view of New Zealand’s infrastructure deficit.

Conclusion

The Treasury considered the criteria for good fiscal rules and recommended an OBEGAL rule following a 'golden rule' approach so that across the economic cycle operational spending is not funded by debt. Capital spending can be funded by debt, subject to rigorous value for money assessment to ensure the wellbeing benefits of the projects exceed the financing costs.

This framework (operational spending paying its own way and only borrowing to fund capital expenditure or for economic stability reasons during periods of weak phases of economic cycles) is inherently conservative. In addition, the Treasury's analysis combines a range of conservative judgments in our advice on how to calibrate these rules. In particular, we built in conservative assumptions by:

- calibrating the OBEGAL surplus rule so that it should offset a shock of 15 per cent of GDP increase in net debt every 10 years, higher than the average of historical debt shocks experienced in New Zealand (around 10 per cent every 9 years)
- as well as building in this buffer to the OBEGAL rule, we include a buffer of 40 per cent of GDP when setting the debt ceiling, big enough for multiple, large shocks
- determined the level of maximum sustainable debt – from which the buffer is subtracted to calculate the debt ceiling – that is robust to a significant deterioration in debt dynamics, by assuming the differential between interest rates and GDP growth is 3 per cent (compared to the average of around 0.8 per cent seen on average over the last thirty years).

We consider that the new framework's design, together with its calibration, represents a relatively conservative or risk-averse approach to fiscal rule-making. We consider that a conservative approach is appropriate to ensure governments meet the requirement in the Public Finance Act that debt should be maintained at 'prudent' levels.

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