



The Requirements for Long-Run Fiscal Sustainability

Robert A Buckle and Amy A Cruickshank

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AUTHORS

Robert A Buckle
Professor, Pro-Vice Chancellor and Dean of Victoria Business
School, Victoria University of Wellington

Amy A Cruickshank
Senior Analyst, Macroeconomic and Fiscal Policy team, the
Treasury

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NZ TREASURY

New Zealand Treasury
PO Box 3724
Wellington 6008
NEW ZEALAND
Email information@treasury.govt.nz
Telephone 64-4-472 2733
Website www.treasury.govt.nz

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Abstract

New Zealand, like many other countries, is experiencing a changing demographic profile. This has implications for the government's fiscal position in the future and potentially for the sustainability of its spending programmes. This paper discusses the link between the government budget constraint and fiscal sustainability, why it's important, and how it can be measured. We also examine the Treasury's current approach to modelling the extent of fiscal adjustment required and options available to achieve this adjustment. The paper proposes criteria to evaluate potential policy changes to address these long-term fiscal challenges and suggests areas where further work could be worthwhile.

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1 Introduction

In 2004 the New Zealand Parliament passed legislation (Part 2 of the Public Finance Act 1989), requiring the Treasury to publish a statement at least every four years on the long-term fiscal position. To date the Treasury has published two statements, one in 2006 and one in 2009. This legislation was born out of concern that demographic changes in particular could have implications for the feasibility of sustaining the prevailing fiscal programme. The first two statements showed that under certain assumptions, government debt would reach historically high levels, although the time profile for government debt was sensitive to the initial conditions and the underlying modelling assumptions. These simulations suggested that the prevailing fiscal programmes would be unsustainable. Similar exercises in many other developed countries recently have reached similar conclusions (Sutherland, et. al. 2012).

Fiscal sustainability is typically defined as the government maintaining a "prudent" level of debt over time, or the affordability of the government's current spending and taxation programmes. Fiscal sustainability is often expressed with respect to the government living within its budget constraint over time (referred to in the literature as the government's "inter-temporal budget constraint").

The Public Finance Act (PFA) requires that government manage its total debt at "prudent levels". The specification of a prudent level of debt is not straightforward and depends on a number of considerations including: the size of the fiscal buffer governments deem prudent to respond to economic shocks; the implications of government debt for the risk premium on borrowing; and the role of debt in funding capital expenditure. Debt targets also need to take into account future spending pressures, such as those resulting from population ageing, which may warrant the accumulation of financial assets or a reduction of net debt to pre-fund some of these anticipated expenditure increases. New Zealand governments have significantly reduced the level of government debt since the mid-1980s and in recent years have endeavoured to reduce and maintain debt at no more than 20% of Gross Domestic Product (GDP) (as a gross debt target by 2006 and a net debt target since 2009).

The purpose of this paper is to discuss the relationship between the government budget constraint and fiscal sustainability and review reasons why fiscal sustainability matters. We then review the available measures of fiscal sustainability and what they imply about the sustainability of New Zealand's current fiscal programme. In the event fiscal policy is

not sustainable, governments are faced with a range of choices about how and when to adjust fiscal settings. We review those issues and the type of trade-offs governments may need to confront. The paper is designed to provide a non-technical guide to the issues involved in the preparation of the Treasury's third Long-term Fiscal Statement due for publication in 2013.

2 What is fiscal sustainability

2.1 The Inter-temporal budget constraint and fiscal sustainability

Inter-temporal budget constraint

Fiscal sustainability is often defined as the government maintaining “prudent” levels of debt over time, or the affordability of the government’s current spending and taxation programmes¹. Fiscal sustainability is often expressed with respect to the government’s “inter-temporal budget constraint” (IBC). A two-period IBC can be expressed in a simplified form as follows:

$$B_n = G_n - T_n + (1 + r_n)B_{n-1} \quad (1)$$

or (dividing by Y_n and substituting in $Y_n = (1 + g_n)Y_{n-1}$):

$$\frac{B_n}{Y_n} = \frac{G_n}{Y_n} - \frac{T_n}{Y_n} + \frac{1 + r_n}{1 + g_n} \frac{B_{n-1}}{Y_{n-1}} \quad (2)$$

Where B_n is the level of nominal government debt at the end of year n , G is the sum of government primary expenditure, T is government revenue, Y is economic output, r is the interest rate on outstanding government debt and g is the growth rate of output. The above configuration of the IBC is an approximation used for illustrative purposes and abstracts from a number of considerations including: the financial assets of the government, cash and accruals measures, as well as inflation. Expressions (1) and (2) are for a two-period IBC, but the IBC can also be expressed over multiple time periods.

Expression (2) shows that the evolution of government debt will depend on the interest rate, growth rate and the balance of government revenue and expenditure. Unless there is an upper bound on government debt the IBC does not impose any restrictions on government taxation or expenditure. In reality, lenders will impose limits on the cost or ability of the government to raise debt if debt reaches certain levels. However, it is not clear *ex ante* when this might occur, as it will depend on the particular circumstances. Governments will also often set themselves targets to reduce and maintain debt at particular target levels over time.

¹ The International Public Sector Accounting Standards Board (2012) in its proposed recommended practice guidance identified three dimensions of fiscal sustainability that can apply to entities, including governments: (i) fiscal capacity (the ability of an entity to meet its financial commitments e.g. servicing the repayment of debt and liabilities to creditors, without increasing tax), (ii) service capacity (the extent to which an entity can maintain services at the volume and quality provided to current recipients and meet obligations to entitlement programmes), and (iii) vulnerability (the extent to which an entity is fiscally dependent on funding from sources outside of its control and the extent to which it has powers to vary existing tax levels or other revenue sources).

If there is an upper bound on government debt at some point in the future, then that means that the discounted present value of future primary balances (government revenue less government expenditure) up until that point must be no higher than the difference between the initial debt and the present discounted value of the terminal debt. This relationship is formalised in Barker et. al. (2008) as follows:

Where there is a binding debt target in some future year N , assuming the economy starts in year $n=0$ and inherits a stock of public debt B_{-1}/Y_{-1} , by substituting forward to year N , and imposing a binding debt constraint for year N , the government IBC can be written as:

$$\frac{B_{-1}}{Y_{-1}} - \rho_N \frac{B_N}{Y_N} = \sum_{n=0}^N \rho_n \left(\frac{T_n}{Y_n} - \frac{G_n}{Y_n} \right) \quad (3)$$

where $\rho_n = \frac{1 + g_n}{1 + r_n} \rho_{n-1}$ (and $\rho_{-1} \equiv 1$)

It is important to note that the expectation that the government will not exceed a terminal debt target is itself insufficient to ensure fiscal sustainability. The path to get to the debt target is also important. For example, borrowing in early years, say for investment in infrastructure, may generate gross financial returns, if the investment generates user pays charges or indirect returns via improved economic growth and tax revenue receipts. Even if the investment would be met by future revenues sufficient to satisfy the government's future debt target, it would not be feasible if the peak level of debt in an intervening year goes above the level that creditors would be prepared to finance. This is part of the reason for New Zealand's fiscal responsibility provisions requiring "a prudent level of debt over time", rather than at some point in the future. The above example does not of course suggest that all infrastructure investment will necessarily generate financial returns sufficient to fund the investment. This will depend, amongst other things, on the nature and quality of the investment.

Another factor that must be borne in mind is that while the expected present value of the sum of future net cash flows might satisfy the terminal debt target, the future is not known with certainty and so there will be a distribution of possible outcomes so that an extra margin (a "fiscal buffer") is desirable to obtain a suitable level of assurance around fiscal sustainability. There are some quite complex measurement and modelling issues associated with examining how the government's fiscal position is likely to change in the future, especially when looking over the long term. Some factors are within policy control, such as entitlements to government spending programmes, while others are less so, such as interest rates, and some are the outcomes of long-run and well-known trends, such as demographic change. Demographic change in New Zealand, like many other OECD countries is not a "blip" caused by the post-WWII baby boom, but rather a structural change in the population from a young to a more mature age structure, caused by increased life expectancy and smaller family sizes. In this context, a policy like New Zealand Superannuation (NZS), which when introduced involved a relatively large working age population supporting a relatively small older population, will increasingly involve a relatively smaller working age population supporting a relatively large older population.

From an institutional perspective, what is important for the debt target to be met and maintained is not necessarily that current policy be projected to satisfy the IBC in the future, but rather that the policy environment enables options for policy evolution to be explored and adopted over time as needed.

Evolution of government debt

In simple terms, the evolution of government debt depends on the primary balance (government revenue less government expenditure less interest costs) plus the “snowball effect” (the interest rate, less the growth rate scaled by the outstanding stock of debt) (Llewellyn et. al., 2012). Equation (2) can be rearranged to show the relationship between the interest rate (r) and growth rate (g) and the change in the government debt ratio. If:

$$\frac{(1+r)}{(1+g)} \approx 1+r-g \quad (4)$$

Then substituting in (4) and rearranging (2) gives:

$$\frac{B_n}{Y_n} - \frac{B_{n-1}}{Y_{n-1}} = \frac{B_{n-1}}{Y_{n-1}}(r-g) + \frac{G_n}{Y_n} - \frac{T_n}{Y_n} \quad (5)$$

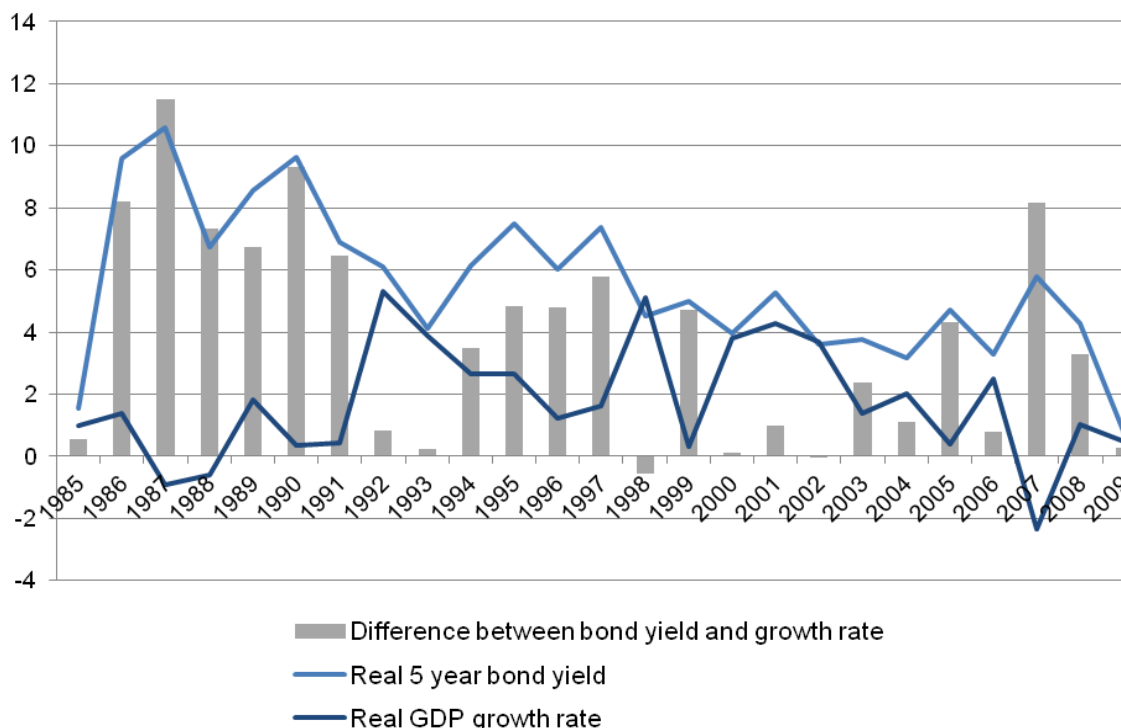
which shows that the change in the government debt ratio (the left-hand side of the equation) is equal to the difference between “snowball effect” plus the primary balance as a proportion of economic output. Therefore if $r > g$ in the future then to stabilise the debt ratio the government must be running a primary surplus; if $r < g$ in the future then to stabilise debt the government debt can run a small primary deficit and if $r = g$ in the future then to stabilise debt the government accounts must be in primary balance.

Figure 1 shows how the government’s cost of borrowing has compared to the economic growth rate in New Zealand since the mid-1980s. The government’s cost of borrowing is approximated by the real average annual five year government bond yield. A more comprehensive measure would take into account the composition of the government’s borrowing portfolio and the yields on its different components.

The government’s cost of borrowing has generally been above the economic growth rate since the mid-1980s. This is consistent with most developed countries if one looks on average over sufficiently long periods of time (Escolano, 2010). The difference between the cost of borrowing and the economic growth rate has decreased on average since the 1990s. This could be at least in part due to the reduction in government debt over this period. This is shown in Figure 2 later in the paper.

To reduce debt (as governments have tended to do since the mid-1980s) the government would have had to run larger primary surpluses than would have been necessary to stabilise debt. If this trend of $r > g$ continues into the future then this would tend to suggest that the government will have had to be running a primary surplus to reduce and stabilise debt.

Figure 1 - Government cost of borrowing and economic growth, 1985-2009 (%)



Source: Statistics New Zealand, Infoshare; Reserve Bank of New Zealand

Notes: The real 5 year bond yield is defined as the average annual 5 year bond yield less the annual change in the consumer price index. The real GDP growth rate is the annual average change in the production GDP measure, in constant prices, seasonally adjusted

Fiscal gap measure

The IBC can also be rearranged to define the change in the primary balance required to achieve a debt target. This “fiscal gap” measure shows the change in the primary balance (via changes in taxes and/or spending) from some specific point in time (today or in the future) to reach a specified debt target at some point in the future, relative to where debt would be if the primary balance was determined by unchanged policy. This relationship is formalised in Barker et. al. (2008) as follows:

Expression (3) can be rearranged to define the fiscal gap (FG) in the current year as:

$$FG_0 = \left(\frac{B_{-1}}{Y_{-1}} - \rho_N \frac{B_N}{Y_N} \right) - \sum_{n=0}^N \rho_N \left(\frac{T_n}{Y_n} - \frac{G_n}{Y_n} \right) \tag{6}$$

If the fiscal gap is positive, then that implies the need for the government to reduce future government expenditure or increase taxes to achieve the target debt ratio. If the fiscal gap is negative, then that implies the government is able to increase future government expenditure or reduce taxes and still achieve the target debt ratio. The fiscal gap measure will tend to be sensitive to the starting point that is chosen and where the economy is in the economic cycle.

2.2 Debt targets and the Public Finance Act 1989

Public Finance Act 1989 requirements

Gross government debt in New Zealand surpassed 70% of GDP in the 1980s, but since the early 1990s, reducing and maintaining prudent levels of government debt has been a goal pursued by New Zealand governments. This has been due to a greater acknowledgement of the importance of fiscal sustainability with this being formalised in the Public Finance Act (PFA) 1989.

The PFA requires the government to manage total debt at prudent levels. Along with a greater focus on the sustainability of the government's finances, governments also wanted to reduce the high costs of debt servicing. Wells (1987, 1996), Janssen (2001), Wilkinson (2004), Mears et. al. (2010) and Brook (2011) discuss in more detail fiscal policy reform in New Zealand.

In terms of the government's IBC, the focus in the past was on ways to reduce debt servicing costs, due to high debt and high interest costs, i.e. high $B_{t-1}/Y_{t-1}(r-g)$, whereas the current debate around fiscal sustainability has tended to have a longer-term focus on potential future paths of government taxation and expenditure, i.e. $G_t/Y_t - T_t/Y_t$. However, if the government's fiscal position is not well-managed then debt servicing costs could again become a more acute issue.

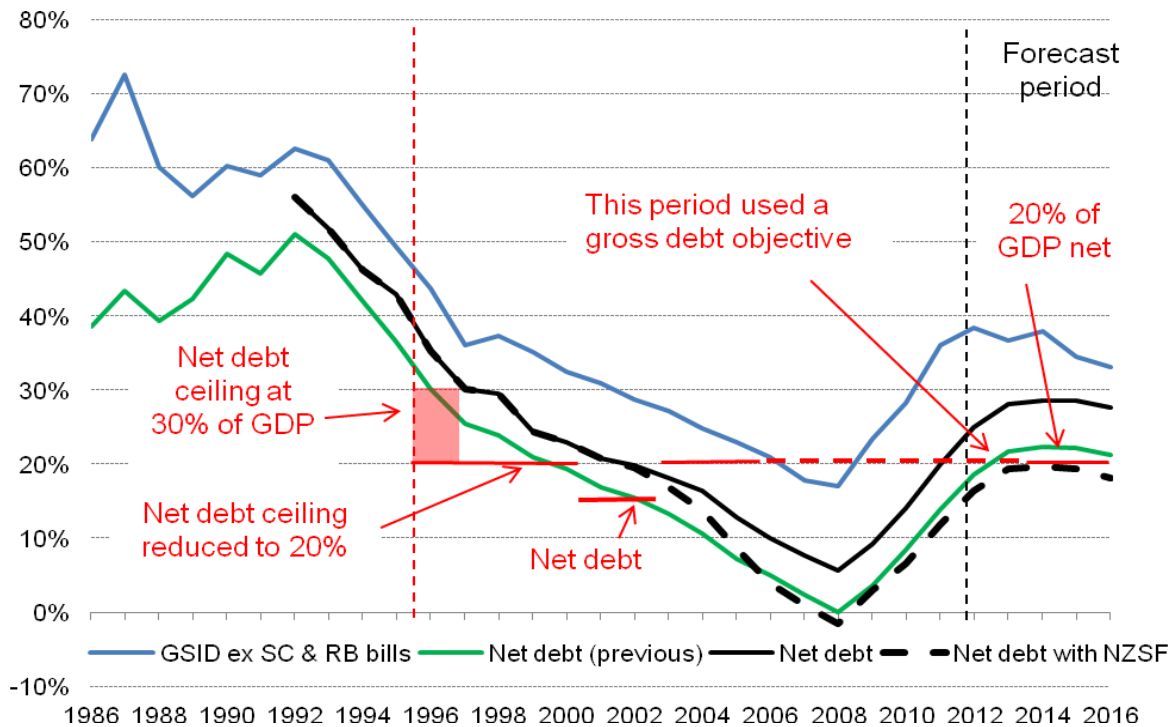
The government's fiscal position generally improved after the 1980s until 2008. The level of government debt has risen in recent years as the result of New Zealand's domestic recession beginning in early 2008, the effects of the Global Financial Crisis (GFC), the Canterbury earthquakes all impacting on tax revenue growth and government expenditure, as well as other fiscal policy decisions. The government's initial fiscal position is less favourable now than it was when the first Long-Term Fiscal Statement was published in 2006.

Figure 2 shows government debt ratios as well as the targets governments have set for debt from 1986 to 2011. The current National-led government has a target to bring net debt down to no higher than 20% of GDP by 2020 (Fiscal Strategy Report, 2012).

The government debt target was changed from a gross to net debt target in 2009. Gross government debt is currently defined as debt issued by the government, less settlement cash and bills held by the Reserve Bank. Net debt is defined as gross debt less government financial assets (excluding New Zealand Superannuation Fund assets and advances)². The reasons for the switch from a gross to a net debt target in 2009 and the new gross and net debt definitions are explained in more detail in the Fiscal Strategy Report (2009).

² New Zealand Superannuation Fund assets are not included as financial assets for the purpose of this measure because NZSF assets are held for specific policy reasons. Advances, which include student loans, are also not included as financial assets because they are substantially less liquid than other government financial assets and are not held for purposes associated with government finances (Fiscal Strategy Report, 2009).

Figure 2 – Government debt ratios and debt objectives, 1986-2016



Notes: (1) The life of each debt objective is approximate as objectives sometimes changed in Budget Policy Statements. (2) Years 2012-2016 are based on Budget Economic and Fiscal Update (BEFU) 2012 forecasts. (3) GSID = Gross sovereign issued debt; SC = Reserve Bank settlement cash; RB = Reserve Bank bills. (4) The new net debt indicator excludes advances, such as student loans as well as NZ Superannuation Fund (NZSF) assets. (5) The current net debt measure is not available prior to 1992.

Many governments around the world target debt as an anchor for fiscal policy. However, debt is not the only possible target. Governments may also choose to target some measure of the fiscal balance (such as a maximum deficit-to-GDP ratio) or the components of the government’s inter-temporal budget constraint, such as tax or expenditure.

A debt targeting approach focuses governments’ attention on ensuring debt is kept at prudent levels, while giving discretion around the composition of tax and expenditure (referred to in Barker et. al. (2008) as the “fiscal structure”). Government debt as an anchor of fiscal policy can be seen as more ideologically neutral than other potential fiscal anchors, such as tax or spending anchors, because it does not imply anything about the optimal size and role of government. Or put another way, a debt anchor provides governments with a high degree of flexibility about the level and mix of spending and taxation they use in order to achieve the debt anchor.

Debt targets have been criticised for providing weak disciplines on government spending prioritisation especially during periods of strong revenue growth. Some countries have introduced spending limits to provide greater discipline to government spending decisions. Spending limits generally involve limits on total, primary or current spending, either in absolute terms, growth rates or as a share of GDP (Mears et. al., 2010).

Hong Kong has a general principle that over time the growth rate of government expenditure should not exceed that of the economy (i.e. an expenditure-to-GDP limit).

Sweden introduced a spending cap in 1997. The spending cap is decided each year by Parliament on a rolling three yearly basis.

Other jurisdictions have had more stringent spending and taxation limits. The state of Colorado in the United States amended its constitution in 1992 to limit per capita spending to the rate of inflation and decrease the amount of revenue the state could keep and spend if revenue fell during a recession. The Colorado spending limit can only be changed by voters. The Colorado experience is that the spending limit, combined with other constitutional provisions that required the government to increase spending in some areas, such as education and transportation, meant the government was required to make sharp cuts to expenditure in other areas. Voters in the 2000s have approved increases in the spending limit to allow greater spending in certain areas, such as education and transport (Wilkinson, 2004).

The 2008 Treasury Briefing to the Incoming Government recommended the government adopt an additional fiscal anchor in the form of a medium term expenditure or revenue constraint as a share of GDP. The OECD (2009) have also recommended New Zealand consider a spending cap. Mears et. al. (2010) put forward a possible spending cap designed for New Zealand. The proposed spending cap would be a nominal dollar figure for core Crown expenses (excluding unemployment benefits, debt financing costs, re-measurements losses and debt impairment). The cap would be set for three years with the third year updated annually on a rolling basis. The cap would be set by the government and not bind future governments. The government decided not to introduce a spending cap in the 2010 budget, because while it was thought to have some benefits, its complexity in particular presented some risks.

The 2011 confidence and supply agreement between the National and ACT parties in New Zealand includes an agreement to introduce a legislative spending limit to “better constrain excessive future increases in government spending”. The spending limit restricts expenditure (core Crown operating expenditure, excluding finance costs, unemployment benefits, asset impairments and spending on natural disasters) to grow no faster than the rate of population growth and inflation. Given that GDP has tended to grow more quickly than inflation, if left unadjusted, such a spending limit would see government spending decrease as a proportion of the economy over time. For a further discussion of spending limits, see Mears et. al. (2010) or Wilkinson (2004).

The PFA, while specifying debt as the primary fiscal anchor, also requires government tax and spending policies to be consistent with a reasonable degree of certainty and predictability of tax rates in the future. The National government has announced that it will be making changes to the fiscal responsibility provisions of the PFA to extend the principles beyond the current focus on reducing and maintaining prudent levels of government debt. The proposed changes will require governments to:

- Consider the impact of their fiscal strategy on the broader economy, in particular interest rates and exchange rates.
- Set out their priorities for revenue, spending and the balance sheet.
- Take into account the impact of fiscal policy decisions on future generations.
- Report on successes and failures of past fiscal policy (English, 2012)

The report on successes and failures of past fiscal policy would be a government self-review, rather than an independent review mechanism, such as an Independent Fiscal Council, that has been used in some other countries.

These changes reflect the fact that the PFA has been very successful in focusing governments on reducing debt, but less so in taking into account the impact of fiscal policy on the economic cycle. The requirement to take into account impacts on future generations provides a link in the fiscal responsibility provisions to the requirement in the PFA for the Treasury to produce four-yearly statements on the long-term (40+ year) fiscal position.

Considerations when setting debt targets

While in recent years New Zealand governments have set themselves debt targets, there is no simple rule for how to set such a target. Governments may set themselves a target to reach a certain debt level and then maintain it overtime. Alternatively they may set themselves a debt target to cycle around over time or a debt-to-GDP range to operate within. Determining the proportion of the debt ratio that is structural versus that which is the result of the economic cycle is a challenge with any of these measures.

It is beyond the scope of this paper to come to a view about an appropriate government debt target for New Zealand. Rather, this paper outlines the range of judgements that should be brought to bear when determining a debt target, and discusses the implications of different debt targets for fiscal adjustment requirements.

Rather than being calculated using a simple rule, debt targets are an “on-balance” judgement that takes into account a wide range of factors. These include: the size of the fiscal buffer needed to respond to economic shocks; the implications of government debt for the risk premium on borrowing; and the role of debt in funding capital expenditure. Debt targets will also take into account future spending pressures, such as those resulting from population ageing, which may warrant the accumulation of financial assets or a reduction of net debt to pre-fund some of these anticipated expenditure increases.

Fiscal buffers allow governments to continue to fund expenditure programmes during economic downturns through borrowing and/or selling financial assets rather than by increasing taxes. This allows “tax smoothing” over time, which may be beneficial for the economy as the dead weight cost of taxes increase more than proportionally with any increase in tax rates. Fiscal buffers are also beneficial from a fiscal stabilisation point-of-view as they avoid the need for governments to raise taxes to fund expenditure during economic downturns.

Consideration of the appropriate fiscal buffer should also take into account the wider set of vulnerabilities facing the economy, including contingent liabilities, such as explicit or implicit guarantees of the financial sector, the risk and likely impact of natural disaster events, as well as the level of private sector debt. A number of these vulnerabilities, and particularly New Zealand’s high level of external indebtedness, has been mentioned as a weakness in recent sovereign credit rating assessments of New Zealand. This is reflected in the following excerpts:

“NZ’s household saving rate, though improving, remains negative. NZ’s national savings/investment imbalance is the key structural weakness”. (Fitch, 2011)

“... These strengths are moderated by New Zealand's very high external imbalances, which are accompanied by high household and agriculture sector debt, dependence on commodity income, and emerging fiscal pressures associated with its ageing population”. (Standard and Poor's, 2011)

Llewellyn et. al. (2012) develops a “misery index” and an “overall balance index” as an early warning of potential vulnerabilities facing the economy, particularly in relation to government and other external debt. The indices are simply constructed and comprised of the following measures: the government budget balance (no more than -4% of GDP), current account balance (no more than -4% of GDP) and gross public debt (no more than 60% of GDP). They note that the indices are not definitive and the level of risk also depends on other factors, such as the inflation rate, unemployment rate and size of the banking sector relative to the overall economy.

In 2011 New Zealand's gross government debt and the current account deficit are within the prescribed thresholds (at 36.2% of GDP and -3.6% of GDP respectively to the year ended 30 June), but the government budget balance is outside of the threshold (at -6.7% of GDP). By 2016, gross government debt is forecast to remain within the threshold (at 33.2% of GDP) and the budget balance is forecast to move back within the threshold (to a surplus of 1.9% of GDP), while the current account deficit is forecast to move outside of the threshold (to -6.7% of GDP) (Budget Economic and Fiscal Update, 2012)

Consideration of the appropriate fiscal buffer will also take into account the liquidity of the government's balance sheet, as this also influences the ability of the government's finances to withstand shocks. A more liquid balance sheet improves the ability of the government to meet liquidity demands if access to credit markets is restricted.

An approach the Treasury has taken to testing the appropriate fiscal buffer is to analyse the implications of a future shock on the fiscal position. Fookes (2011) analyses the impact of fiscal and economic shocks on the government's fiscal position using shocks that have occurred in countries with similar characteristics to New Zealand (i.e. countries with high external indebtedness and relatively low government debt). The two scenarios that are examined are: an earthquake and an economic shock of the magnitude that hit Ireland and Spain during the GFC. Compared with previous fiscal consolidations, the earthquake scenario is considered manageable, whereas the most severe scenario based on the economic and financial shock that hit Ireland over the 2008 to 2010 period is considered just manageable, assuming uninterrupted access to funding markets. The work shows that having a starting level of net debt below 20% of GDP is an important condition for ensuring these shocks would be manageable. This modelling illustrates the importance of debt providing a “buffer” against economic shocks.

An alternative methodology could be to take a stochastic approach by examining the probability and impact of a range of shocks to the fiscal position, based on historical information. This information could be used to examine the desirable level of government debt. As far as we are aware, such an approach has not been taken to examine the future stock of government debt in the New Zealand context.

Stochastic approaches have been taken to examining fiscal balances in New Zealand. Buckle et. al. (2002) uses a structural vector autoregressive (SVAR) model to examine the impact of different shocks to the government's short-term budget balance. The paper then uses these results to estimate the level of budget balance necessary to withstand a number of possible future shocks. The modelling finds that to avoid a budget deficit at a 95% level of confidence over a one-year planning horizon requires an increase in the

surplus from just under 1% of GDP to about 3.5% of GDP. Over a two-year horizon the figure is 4.5% of GDP, and for a five-year time horizon the figure is 6.5% of GDP. As the above results indicate, the level of budget balance will depend on the time horizon of fiscal planning. The longer the time horizon, the more risk there is of an adverse shock and therefore the higher the *ex ante* budget balance will need to be. The result will also depend on how certain policy makers want to be that shocks will be able to be absorbed (the above scenario is based on a 95% confidence interval) and at what level the desired *ex post* cash budget balance is set (the above scenario is to avoid a budget deficit).

Stochastic approaches have been taken to population projections in New Zealand (see Creedy and Scobie, 2002; Dunstan, 2011). Stochastic population projections were used in the 2006 Long-Term Fiscal Statement.

Stochastic approaches have not tended to be used in the Treasury's long-term fiscal modelling in the past because over long time periods there is so much variability around demographic, economic and fiscal variables that this approach would generate extremely large confidence intervals. The results in Buckle et. al. (2002) illustrate that even increasing the time horizon out from one to five years (let alone forty years) has a big impact on the confidence interval around the estimates. While the uncertainty of the future fiscal position is an important communications message, and may inform decisions about whether to act now, or delay and act later once more information is available, large probability distributions may provide a justification for inaction. The OECD (2009) point out that while sensitivity analysis can be used to highlight the uncertainty that projections are subject to, too much sensitivity analysis can over-emphasise uncertainty and undermine the impact of projections (presumably encouraging delay in taking difficult decisions). An attempt by Sutherland et. al. (2012) to run simulations of the impact of shocks on the government debt position is discussed at the end of this section.

Increasing government debt may be costly if large injections of debt-financed government spending crowd out private sector spending by driving up the real interest rate and exchange rate. Hall et. al. (1998) develops a small open economy model which shows the impact of the fiscal balance on the interest rate premium. The scenario of a rise in the debt-to-GDP ratio of 2% over a two year period is found to be initially expansionary, but then neutral over the long term. The expansion comes from increased consumption and investment expenditure. The crowding out of private sector expenditure, including investment, is less than full. Key transmission mechanisms are the interest rate risk premia and real interest rates and an appreciation of the exchange rate. Baumol (1967) suggests that crowding out of private sector investment will be costly to the economy as a whole if the government is less productive than the private sector. High levels of government debt may be costly for the economy if government debt pushes up the risk premium on borrowing for private individuals as well as the government.

Another consideration that the government may have when setting debt targets is that they may want to borrow to fund capital investment, especially in long-lived assets, rather than funding investment through current taxation. Raising debt may allow governments to fund potentially growth-enhancing investments such as roads and schools more efficiently than through raising taxes. This is the basis of the "golden rule of public finance" which states that over the economic cycle, the government will borrow only to invest and not to fund current spending. Or put another way, over the economic cycle the government budget (excluding investment) must balance or be in surplus. This rule has been formalised in some countries' fiscal legislation. The golden rule was one of several fiscal principles set out in the United Kingdom's 1998 Public Finance Act. The rule was

subsequently abandoned in 2009. The golden rule may be considered less transparent than a debt target, as it depends on where the economy is in the economic cycle.

It may also be desirable to pre-fund government expenditure associated with population ageing. This may be justified on efficiency or on equity grounds. It may be more efficient for governments to pre-fund New Zealand Superannuation (NZS) for example, as long as the returns to investing in capital have tended to be higher than the growth in wages (see Coleman, 2011). It may also be more equitable to tax current generations to fund their future entitlements. However, in moving to more pre-funding there is always the issue of the transitional generation that needs to pay twice by continuing to fund entitlements of the current elderly, as well as pre-funding its own entitlements. This has both efficiency and equity implications.

Most of the above discussion has concerned setting upper limits for net or gross government debt. When considering whether there is a minimum level of gross debt that governments should hold, some considerations will include the benefits of maintaining a liquid market for government bonds, as well as the role of debt in funding capital expenditure, especially for long-lived assets (discussed above). Reinhart et. al. (2000) examines the economic implications of declining government debt in the United States. The paper suggests that if one of the reasons market participants buy US Treasury Bonds is because of their liquidity, reduced liquidity could result in the emergence of a new benchmark financial product with greater liquidity. As a result, the liquidity premium that market participants are willing to pay for Treasury bonds could be reduced. The Australian government established a “Future Fund” in 2006 to invest government budget surpluses, rather than using the surpluses to repay government debt. One of the motivations for this was that the government wanted to maintain a market for government bonds (Emmerson et. al., 2006).

In terms of the path to get to the chosen debt target the implications of fiscal adjustment on short-term growth will also need to be taken into account. Research into the growth effects of components of government expenditure and taxes suggest that the growth effects of changes in fiscal policy vary by the types of taxes and types of government spending. If for instance, the government had to reduce some investment due to it breaching its debt targets then that could have adverse long-run growth implications (see for instance Kneller et. a, 1999). Also, while New Zealand is thought to have small fiscal multipliers as a small open economy, fiscal consolidation is likely to have some short-term growth effects. It will also impact differently on different sectors of the economy.

Debt targets and fiscal adjustment

Recent work by Sutherland et. al. (2012) presents long-term simulations to demonstrate the implications of different terminal debt targets for the extent of fiscal adjustment needed across OECD countries. The measure used to determine the extent of fiscal adjustment needed is the “fiscal gap” measure, which is defined as the immediate and permanent change in the government’s primary balance required to ensure that debt meets a target at a certain point in time.

If a fiscal gap is positive (in that either government spending would need to be reduced or taxes increased to reach the debt target), then the paper shows that a lower (higher) terminal debt target increases (decreases) the amount of fiscal adjustment required to reach the debt target. However, the increase may be smaller than one might initially think, given that small policy changes add up over long time periods. The paper finds that the fiscal gap for New Zealand is 5.1 for a target of 25% net financial liabilities to GDP by 2050, and 5.7 for a target of 0% net financial liabilities to GDP by 2050. Once the debt

target is reached, maintaining debt at that level is a matter of balancing revenue and expenditure. This is the case regardless of where the target is set, although debt servicing costs will be higher and/or revenues from financial assets lower for a higher net debt target³.

Sutherland et. al. (2012) run simulations to demonstrate the effect of shocks to government debt on the degree of fiscal adjustment required. The paper calculates the additional fiscal tightening (or in some cases loosening) for governments to have a 75% chance of reaching the terminal debt target (of 50% gross debt by 2050) when government debt is hit by shocks (both positive and negative). The paper runs simulations based on shocks to debt reflecting each country's own historical distribution of shocks as well as the distribution for the OECD as a whole. The paper finds that under these scenarios the additional fiscal tightening needed to have a 75% chance of meeting the debt target is not substantial. For New Zealand, the required fiscal adjustment is 6.0 rather than 5.5 for both New Zealand-specific and cross-OECD shocks. The paper notes that because of the highly skewed distribution of shocks, setting a higher probability threshold for meeting the debt target (e.g. a 90% chance rather than 75% chance of meeting the debt target) raises the fiscal adjustment requirement further.

3 Why fiscal sustainability matters

3.1 Fiscal sustainability and economic growth

Linkages between government debt and economic growth

The sustainability of the government's finances can influence economic conditions and performance in several ways. The sustainability of the government's fiscal position influences the cost of capital. If the government's fiscal position is seen as unsustainable then it will be more likely to come up against borrowing constraints. It will also increase the likelihood of a higher country risk premium being added to the cost of borrowing faced by both the government and private agents.

Sustainable fiscal policy can be important to anchor inflation expectations. As Sargent and Wallace (1985) have demonstrated, if it is believed the government is unlikely to be able to continue issuing government bonds to finance spending, then the outstanding debt may be financed by increasing the money stock and hence lead to higher future inflation. If there are expectations of increased inflation in the future, then that would lead to higher inflation in the present period.

Sustainable government finances allow the government the flexibility to borrow in response to a temporary shock without needing to cut spending programmes or raise tax rates. This "smoothing" of tax rates over time minimises the cost of raising tax revenue. Having certainty around spending programmes also assists individuals to make investment decisions. For example, certainty around government tertiary education programmes will assist individuals in deciding whether to invest in tertiary education (Barker et. al., 2008).

³A reason the OECD calculations suggest a larger consolidation for New Zealand than the LTFM is because the OECD calculations are based on an earlier base year which picks up the effects of the economic recession and Canterbury Earthquake expenditure. The LTFM projections begin off a later base year and assume planned fiscal consolidation [over the next five years] is implemented.

Low government debt allows fiscal policy to play more of a stabilising role during economic downturns and dampen, or at least not exacerbate, economic cycles. The deviation of demand and output from equilibrium can influence long-term GDP if for example negative deviations have a permanent impact on the capital stock or investment in skills (Barker et. al., 2008). Fiscal policy can have a stabilising role through the operation of “automatic stabilisers”, such as unemployment benefits which provide automatic fiscal expansion during downturns without requiring specific government policy decisions. Having a sustainable fiscal position also allows the government more flexibility to use discretionary fiscal expansion during economic downturns. However, for a small, open country like New Zealand, the evidence is that discretionary fiscal policy tends to only have a small impact on aggregate demand, due to “leakage” to increased demand for imports, and the reaction of monetary policy (as discussed in Brook, 2011). Lags in the design and implementation of discretionary fiscal policy may also mean that the fiscal stimulus is not delivered when it is needed. In the New Zealand context, the government has let automatic stabilisers operate during the current economic downturn. Discretionary policy decisions, such as the 2008 and 2009 tax cuts have also been expansionary, however the government did not implement a substantive expenditure-based stimulus package. Fiscal impulse measures suggest that fiscal policy in New Zealand has been expansionary from 2009-2011 (Treasury, 2011c).⁴ Since 2008 government net debt has increased from less than 10% of GDP to over 30% of GDP.

Perhaps unsurprisingly, a focus on fiscal sustainability will not ensure fiscal policy is stabilising during economic upturns. This is because of the political pressures to increase discretionary spending when the government is running large surpluses (especially when debt targets have already been met), and also because of the technical difficulties in determining whether surpluses are structural or cyclical. It may also be a challenge to communicate to the public that although operating surpluses may be large, due to the revaluation of government assets for example, cash surpluses may be a lot smaller. Fiscal impulse measures indicate fiscal policy was pro-cyclical over the 2006-2008 period, and added to pressures on interest rate and exchange rate cycles and reduce output in the tradable sector (Brook, 2011). The 2006-2008 episode is one of the reasons why the PFA changes mentioned in the previous section were designed to place more emphasis on avoiding pro-cyclical fiscal policy.

Empirical evidence of links between government debt levels and economic growth

As mentioned earlier, there is no simple rule for determining the optimal level of government debt. However, high levels of government debt can affect economic activity through various channels. Sutherland et. al. (2012) summarises the recent empirical evidence of the effects of high levels of government debt on economic growth. Previous studies suggest a threshold of around 75% gross debt to GDP beyond which government debt has a negative effect on economic growth.⁵ Sutherland et. al. (2012) also maintains that prudent debt targets should be set substantially below this level to allow the

⁴ The fiscal impulse measure attempts to measure whether the net effects of government revenue and expenditures in any one year add to, or subtracts from, aggregate demand in the economy.

⁵ Reinhart and Rogoff (2010) find that for both developed and developing countries, growth rates of countries where public debt exceeds 90% of GDP are about 1% lower than less indebted countries. Caner et. al. (2010) find threshold effects on growth rates at 77% of GDP. Kumar and Woo (2010) find a 10% point increase in debt/ GDP reduces annual real GDP per capita growth by 0.2% points per year, with a smaller effect for advanced countries and a non-linear relationship beyond a debt: GDP ratio of 90%. Other recent papers on this topic, which are not summarised here are: Baum, Checherita-Westphal and Rother (2012); Cecchetti, Mohanty and Zampolli (2011); Kumar and Woo (2012); Ostry, Ghosh and Kim (2010); Reinhart, Reinhart and Rogoff (2012).

government the “fiscal space” to cope with future shocks, including the potential costs of meeting future contingent liabilities, such as the costs of banking crises.

Lane (2011) maintains that the appropriate target government debt ratio may be lower than was thought prior to the GFC because of lessons from the GFC about how quickly government debt can climb as the result of financial crises. Lane argues that maintaining low government debt is especially important for countries with substantial external liabilities (such as New Zealand). Llewellyn et. al. (2012) maintains that because economies tend to become progressively more fragile as government debt approaches the threshold level, it is advisable to stay well below it. Llewellyn suggests a threshold level of gross government debt of 60% of GDP for an average economy.

New Zealand currently has a low level of government debt relative to a number of other developed countries (IMF, 2012a). However, other countries, such as Australia, have lower levels of government debt than New Zealand, on both a gross and net basis. The prudent level of government debt for the New Zealand also is likely to be lower than for other developed countries because of New Zealand’s relatively high levels of household and business debt.

3.2 Fiscal sustainability and inter-generational equity

From an inter-generational point-of-view, government debt can be seen as an obligation passed from one generation of taxpayers to the next. The government’s inter-temporal budget constraint, shown in (1) and (2), illustrates that for any terminal debt target a higher level of debt now will mean either higher taxation, or reduced government expenditure for future generations. Therefore, in the absence of offsetting behaviour by private agents, a higher level of government debt may imply a greater obligation passed from current to future generations (Auerbach, 2008). However this analysis is complicated by several factors.

If pure Ricardian equivalence was to hold and each generation was to take the well-being of future generations fully into account in their saving and bequest decisions, the level of government debt would not have an impact on intergenerational equity as private savings and bequests would be fully adjusted to offset changes in government debt. However, pure Ricardian equivalence has been found to fail to hold in reality. Also, if future generations benefit from current government expenditure, e.g. expenditure on long-lived assets such as infrastructure, or productivity-enhancing spending on education and skill development, then one might expect them to help fund it. Aiming to fund all such expenditure out of current taxation would in essence force current generations of taxpayers to subsidise government expenditure that’s for the benefit of future taxpayers. Government debt allows those costs to be shifted to the generations of taxpayers that will benefit from the expenditure.

Another aspect to bear in mind is that the optimal level of government debt across generations cannot be assessed on the basis of economic analysis alone, as it also involves value judgements about how to weigh up the welfare of different individuals over time (Auerbach, 2008). If the government has an objective of ensuring a more equal distribution of resources between generations, then if incomes are increasing over time there may be a case to transfer resources from the young to the old. Increasing government debt may be one way of doing that. However, if the old are seen as being able to get less utility out of any unit of consumption as compared to the young, then that

might suggest that less resources should be transferred to the old than is needed to equalise welfare across age groups (McDonald, 2005).

The Treasury intends to extend the previous work undertaken on how taxation payments, government transfers and certain forms of government expenditure are distributed by income decile (Aziz et. al. 2011) to show this breakdown by age, and how it has changed through time. Other forms of inter-generational analysis, such as the work by Coleman (2011) can also provide information to the government and the public about the nature and extent of generational transfers associated with particular fiscal programmes, such as NZS.

4 Fiscal sustainability measures

4.1 Fiscal sustainability measures and indicators

Long-term fiscal statements

Many governments around the world have begun to prepare projections of government finances over increasingly long periods of time. The PFA was amended in 2004 to require the Treasury to produce statements on the long-term fiscal position that look out at least forty years into the future. While traditional government financial statements provide information about past cash flows and assets and liabilities they do not include information about the long-term financial implications of many government policies, including:

- Revenue that is expected to be realised in the future, but that is not recognised as assets (e.g. expected future tax revenue).
- Expected future obligations that are not recognised as liabilities (e.g. expected future spending on entitlements, social services, infrastructure etc.) (IPSBSB, 2012).

Long-term fiscal information can be used to complement the government's core financial statements to indicate whether government policies are sustainable over the long term, or whether governments will have to tax or spend more or less to meet fiscal sustainability targets. One of the motivations of long-term fiscal statements has been to demonstrate the implications of demographic change on the economy and government fiscal position.

In order to determine whether the current path of fiscal policy is sustainable, one needs to define the current path. This is often difficult as policy is rarely clearly defined over the long-term and future economic performance and demography are not known with any certainty. The Treasury Long-Term Fiscal Model (LTFM) converts information from the government's accounts into forward-looking projections based on assumptions about the economy, demographics, government spending, transfers, taxation, assets, liabilities and interest rates.

In addition to being used for government planning, long-term fiscal information will also be built into the decisions of other actors. For example, credit rating agencies will consider this information when assessing New Zealand's sovereign credit risk, and individuals, to some extent, when they form their expectations about what services the government is

likely to provide in the future, and therefore how much they might need to save themselves or insure themselves now.

Various measures can be used to assess the sustainability of the government's fiscal position into the future. Some measures are based on the projected trend in fiscal aggregates, such as the operating balance, primary balance, gross debt, net debt or net worth. Other methods condense fiscal aggregates into single indicators, such as the inter-temporal budget gap. For all of these indicators, uncertainty in the projections tends to increase as the projection horizon increases. Table 2 summarises how these measures are defined, what they best measure, as well as their limitations.⁶

Table 1 - Measures and indicators of fiscal sustainability

Measure	Definition	Best measures	Limitations
Operating balance	Core Crown operating balance: Projected core Crown revenues less projected core Crown expenses (plus projected surpluses from Crown entities)	Size and time profile of fiscal imbalances, including debt financing costs	Underlying revenue and expenditure imbalance may be exaggerated by compounding financing costs
Primary balance	Core Crown primary balance: Projected core Crown operating balance less projected net interest costs and unrealised gains/losses on financial assets	Size and time profile of fiscal imbalances, excluding debt financing costs and gains/losses	
Gross debt	Core Crown gross debt: Projected core Crown debt issued by the sovereign less settlement cash held by the RBNZ		Does not take into account financial assets that could be used to offset debt
Net debt	Core Crown net debt: Projected core Crown gross debt less projected core Crown financial assets (excluding advances and the NZSF which is held for policy purposes)	Sustainability of government finances over the long-term if current policies are maintained Presents reduction as a % of GDP in the terminal year	This measure introduces an additional uncertainty over the future value of government financial assets.
Net worth	Core Crown net worth: Projected core Crown net worth (assets and liabilities of the core Crown) based on Generally Accepted Accounting Principles (GAAP)		
Fiscal gap ⁷	Fiscal gap: Projected permanent spending decrease or revenue increase necessary to meet a debt target at a particular point in time	Extent of adjustment required in a single indicator Different adjustment scenarios (adjust now versus later) and extent of adjustment required across countries	Requires a debt target and time period to be specified. Doesn't indicate the time profile of fiscal imbalances.

⁶ Since net debt is a cash concept it is ultimately driven by cash receipts and cash expenditures, including capital spending, whereas the operating and primary balances are accruals measures. In recent years the Economic and Fiscal Updates published by the Treasury have included a table that reconciles the government operating balance to changes in net government debt (for example, see Table 2.2 on page 26 of the 2012 Budget Economic and Fiscal Update).

⁷ See Janssen (2002) for a further discussion about the inter-temporal budget gap indicator.

Generational accounts can also be used to assess the effects on different generations of alternative ways of satisfying the government's inter-temporal budget constraint. Generational accounts calculate the net lifetime taxes faced by newborns born in different years. A set of generational accounts was prepared for New Zealand in 1997 (Auerbach et al, 1997). Generational accounts have not been widely used because they can be difficult to calculate, interpret and communicate. The lack of up-to-date generational accounts from other countries (Netherlands and Norway are the only countries now that prepare regular generational accounts) limits international comparability of generational accounts. The policy relevance of generational accounts is limited, as without some sort of backward extrapolation, they can only be used to compare net lifetime taxes of future cohorts, but not cohorts already alive today (OECD, 2009).

New Zealand long-term fiscal projection model

As mentioned above, The LTFM converts information from the government's accounts into forward-looking projections. The central scenario in the 2009 long-term fiscal statement (called the "cost pressure scenario" or "historic trends scenario") assumed:

- The projections begin after the end of the five-year forecast period derived from the short-term New Zealand Treasury Model (NZTM).
- Price inflation is 2% per annum (the mid-point of the target range in the RBNZ Policy Targets Agreement).
- Economic output (Y and g) is determined by: population, labour force, and labour force participation projections (from Statistics New Zealand), exogenously-given hours worked (assumed to be 38.4 hours per week), unemployment rate (assumed to be 4.5%) and exogenously-given economy-wide labour productivity growth (assumed to be 1.5% per annum).
- Nominal interest rate on government debt (r) is constant and assumed to be 6% during the projection period.
- Nominal public service expenditure (G) grows with: inflation (assumed to be 2%), real input price growth (assumed to be 1.2%), public sector productivity growth (assumed to be 0.3%), and demographically and non-demographically-driven volume growth (based on the particular spending area). Spending on benefits is projected to grow with the projected recipient population as well as the indexation regime (e.g. real wages for New Zealand Superannuation and the Consumer Price Index for working age benefits).
- Assets and non-debt liabilities of the government are assumed to grow in line with either nominal GDP, CPI-measured inflation or from generated tracks produced by satellite models e.g. the Government Superannuation Fund (GSF) Model. Core Crown gross debt is the residual of the LTFM.
- Government revenue (T) is assumed to be around 29% of Gross Domestic Product (GDP) after the end of the forecast and transition period and/or once "fiscal drag" has been "turned off"⁸.

⁸Fiscal drag is where increasing nominal incomes over time drag more and more people into higher personal income tax brackets. If fiscal drag is allowed to carry on throughout the projection period then tax: GDP would reach levels that are unrealistic historically, and very low income workers would be projected to be paying the highest personal marginal tax rates.

Whether a debt target is met is influenced by the level and growth of economic output (Y and g), government revenue and expenditure decisions (T and G) as well as the government's cost of borrowing (r). These are the components of expression (5), the inter-temporal budget constraint derived in section 2.1. Population demographics influence several components of the government's inter-temporal budget constraint. Demographics influence the level and growth of economic output (Y and g) by influencing the size and growth of the labour force and labour force participation rates. Demographics also influence age-related government spending programmes (G), such as expenditure on education, New Zealand Superannuation (NZS) payments and health services.

Previous long-term fiscal statements have assumed that tax revenue as a proportion of GDP is independent of the age structure of the population. Statements have also assumed that the proportion of public health expenditure that goes to each age group in the past will continue into the future. The Treasury is currently reconsidering how tax and health expenditure are affected by demographic change and how this could be incorporated into the LTFM. This is discussed more fully in Rodway (2012).

Previous statements have also shown the sensitivity of the projections to the different assumptions, e.g. to the productivity assumptions, labour force participation, migration and so on. The IMF (2012b) have recently reported the tendency for countries to consistently underestimate increases in life expectancy by assuming increases in life expectancy in the past will tail off in the future. Scenarios can be run using the LTFM to show the sensitivity of the projections to the life expectancy assumptions.

As well as defining the path of fiscal aggregates based on the cost pressure scenario, previous long-term statements have also shown the budgetary changes that would be required to stabilise debt at a particular level. A net debt limit of 20% of GDP was used in the 2009 Statement to show the fiscal adjustment that would be required to stabilise net debt at this ratio. The 2009 Statement assumed that in this scenario spending on benefits continues to grow with the projected recipient population as well as the relevant indexation regime; government revenue to GDP stabilises at its long-term average; and other spending areas (such as health, education, justice etc.) are restricted in order to reach the debt target. The way this spending is restricted is to set allowances for new operating spending that stabilise net debt at 20% of GDP and then allocate the operating allowances to the key spending areas in line with their historic averages, e.g. health receives 40% of the operating allowance, because that is broadly what health has received in the past.

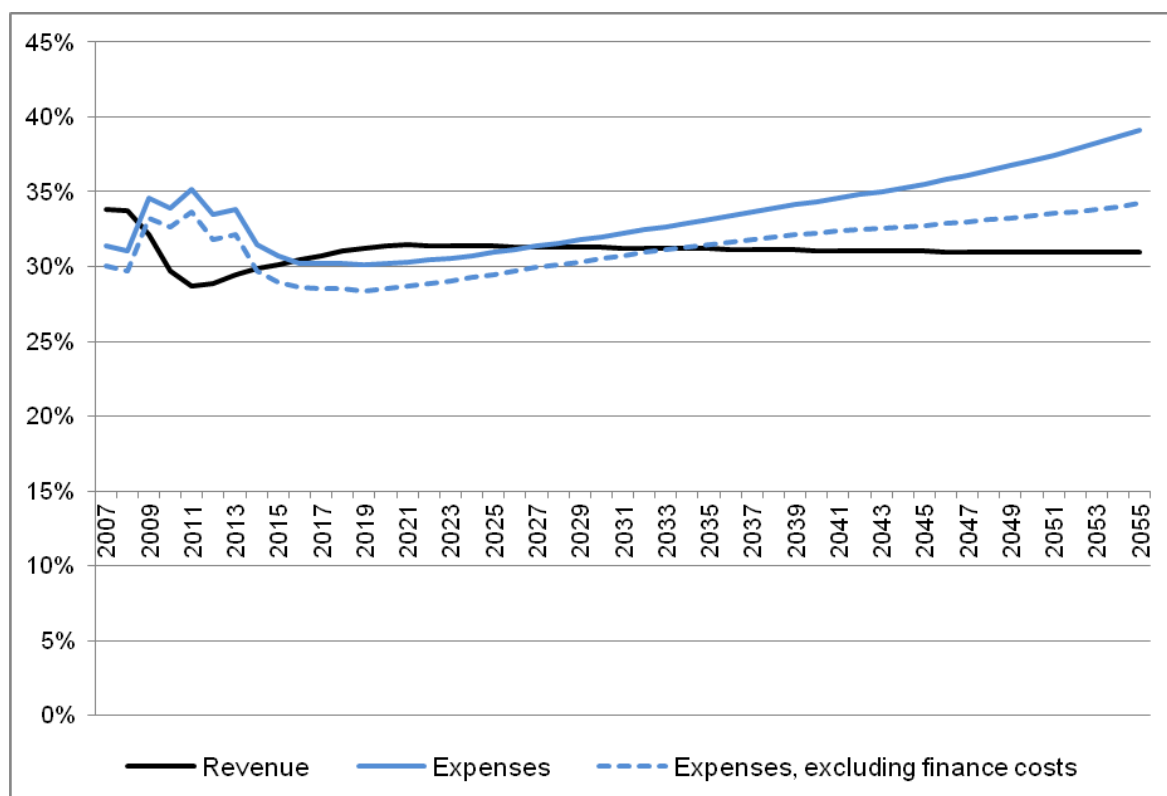
An additional scenario has been run in recent Fiscal Strategy Reports, called the "current policy scenario". The scenario is one where it is assumed that allowances for new operating spending are set at \$1.19 billion, growing at 2% per annum, until 2025. Operating allowances are used to fund all new government spending, excluding welfare benefits (which are assumed to grow with the recipient population and indexation regime) and debt servicing costs. Between 2025 and 2050 spending is assumed to grow in line with cost pressures. Under this scenario the government eventually generates sufficient ongoing surpluses that net debt is eliminated, and the Crown becomes a large net owner of financial assets (Fiscal Strategy Report, 2011).

4.2 New Zealand's long-term fiscal position

Fiscal sustainability measures for New Zealand

This section shows the fiscal sustainability measures outlined in Table 1 for New Zealand. The projections are generated by the LTFM using Budget 2012 data. Figure 3 shows the projected tracks of government revenue and expenses (with and without financing costs). Government revenue falls from 2007 to 2013 before rising again and then stabilising at around 31% of GDP. Government expenses increase from 2008 to 2011 before falling through to 2019 (due to restrictions on new operating allowances, which are assumed to hold until 2016) and then increasing again in line with underlying cost pressures. The wedge between government expenses with and without finance costs shows the proportion of government expenditure that is attributable to interest on government borrowing. As gross debt begins increasing from the late 2020s interest costs become a larger share of government expenditure. Revenue exceeds expenses from 2014 before revenue drops below expenditure from the late 2020s.

Figure 3 - Revenue and expenses as a percentage of GDP, 2007-2055

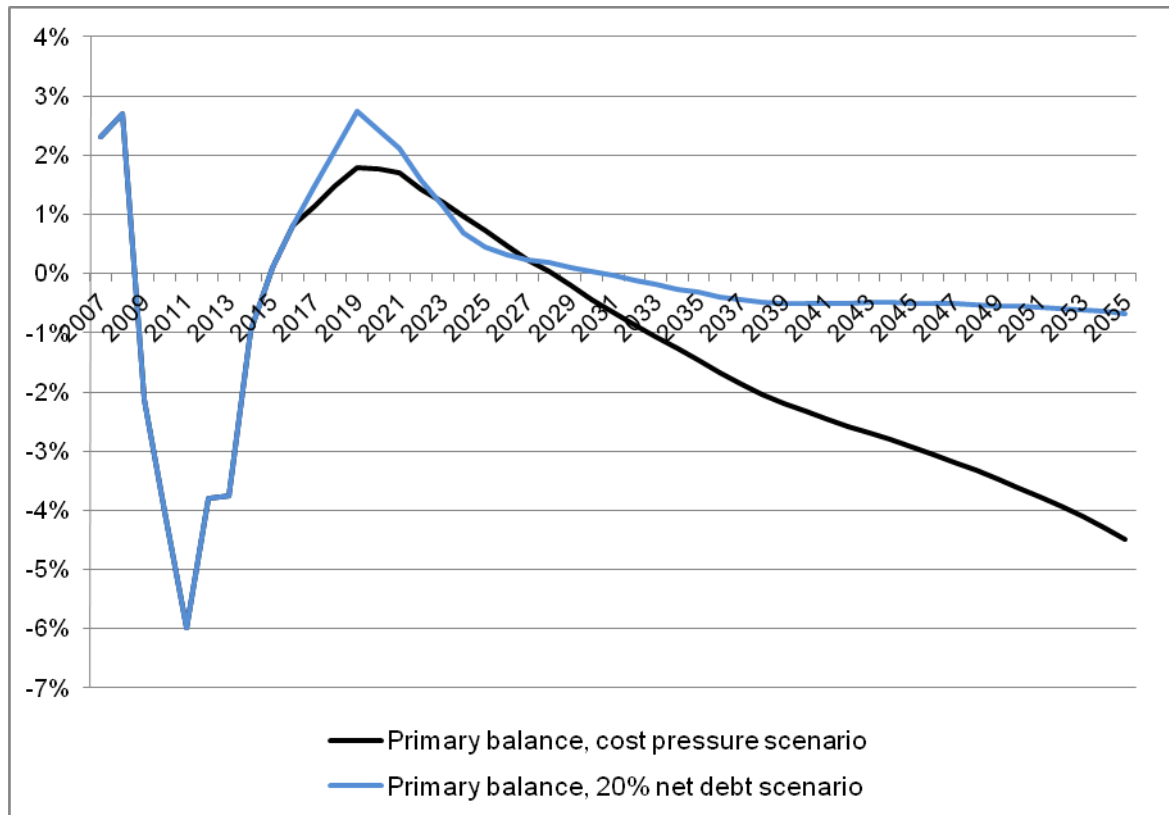


Notes: (1) revenue is the core Crown revenue excluding gains; (2) expenses are core Crown expenses excluding losses; (3) expenses excluding finance costs are core Crown expenses excluding losses and finance costs; (4) the projections are based on Budget 2012 forecasts

Figure 4 shows projections of the government's annual primary balance as a percentage of GDP until 2055. The projections assume the current government's fiscal strategy is implemented until 2016. Under the cost pressure scenario the primary balance will return to surplus in 2015 and then fall back into deficit from the late 2020s. In order to stabilise net debt at 20% of GDP the government will need to run small primary deficits of around

half a percent of GDP.⁹ The reason the government can run small primary deficits and still stabilise debt is because of the income projected to be earned from financial assets. The 20% net debt track diverges from the cost pressure track from the late 2020s.

Figure 4 – Primary balance as a percentage of GDP, 2007-2055



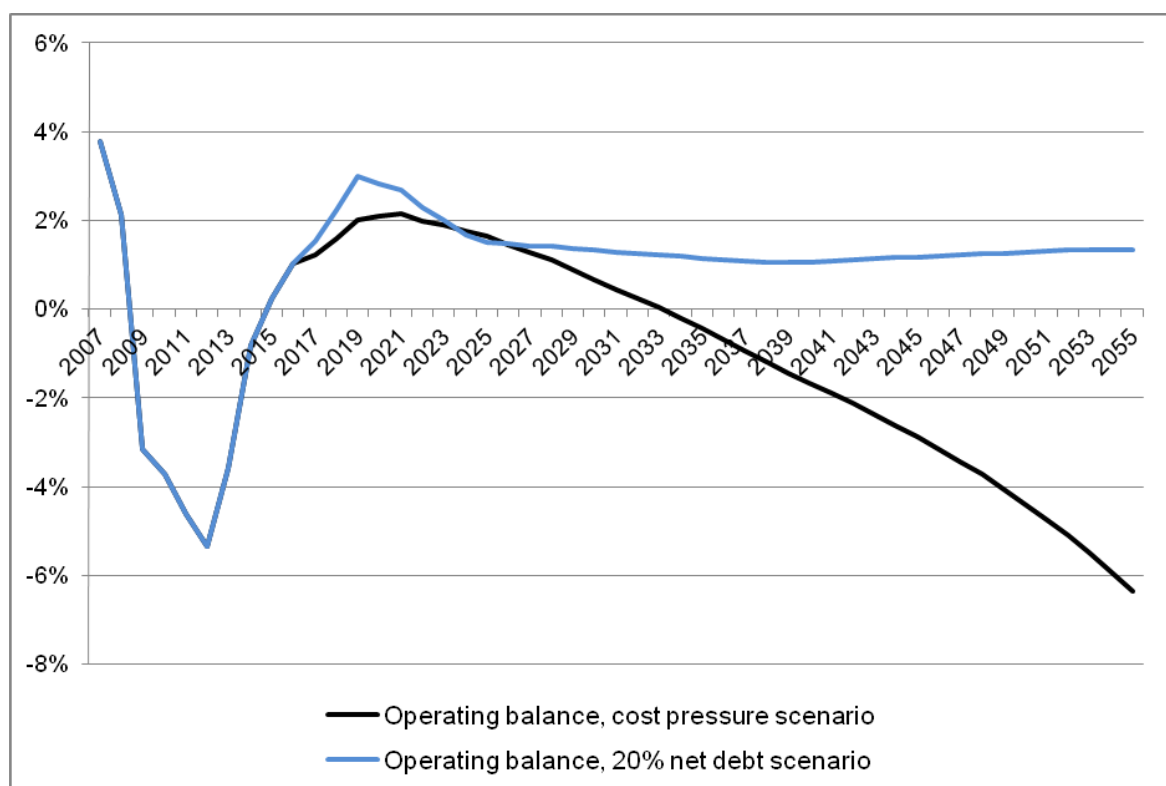
Notes: (1) the primary balance is the core Crown operating balance excluding gains and losses, investment income and finance costs; (2) the projections are based on Budget 2012 forecasts

Figure 5 shows projections of the government’s annual operating balance as a percentage of GDP until 2055. Under the cost pressure scenario the operating balance will return to surplus in 2015 and fall back into deficit from the early 2030s. The Treasury’s projections show that in order to stabilise net debt at 20% of GDP, the government would need to sustain an operating surplus of close to 1.5% of GDP over the long run. The 20% net debt track diverges from the cost pressure track from the late 2020s. Stabilising net debt at 20% of GDP requires a cumulative fiscal savings in nominal dollar terms of around \$860 billion relative to the cost pressure scenario (between 2028 and 2055). A significant portion of that represents the difference in debt financing costs between the two scenarios.

⁹ In the LTFM assumes $r > g$. According to (5) this would suggest that the primary balance would need to be positive in order for the government to stabilise debt. The apparent difference in results between (5) and the LTFM projections is because (5) only takes into account interest payments on debt, but unlike the LTFM does not take into account interest earned on financial assets, or unrealised gains or losses on financial assets. Using the definition of primary balance in (5) we can replicate the result that where $r > g$ then the primary balance needs to be positive to stabilise debt. The other difference between (5) and the LTFM scenario examines what would be required to stabilise net debt, whereas (5) examines what would be required to stabilise gross debt.

The difference between the primary balance and operating balance under the 20% net debt scenario reflects that over the projection period, interest and unrealised gains on financial assets exceed debt servicing costs and unrealised losses on financial assets.¹⁰

Figure 5 – Operating balance as a percentage of GDP, 2007-2055



Notes: (1) The operating balance is the Core Crown revenue less expenses plus gains and losses from associates and joint ventures; (2) the projections are based on Budget 2012 forecasts

Figure 6 shows projections of the government’s gross debt, net debt and net worth as a percentage of GDP until 2055 under the cost pressure scenario. Gross debt is government gross issued debt less government financial assets. Gross debt peaks at just under 40% of GDP in 2014 before reaching a trough of just over 20% of GDP in the late 2020s and increasing thereafter.

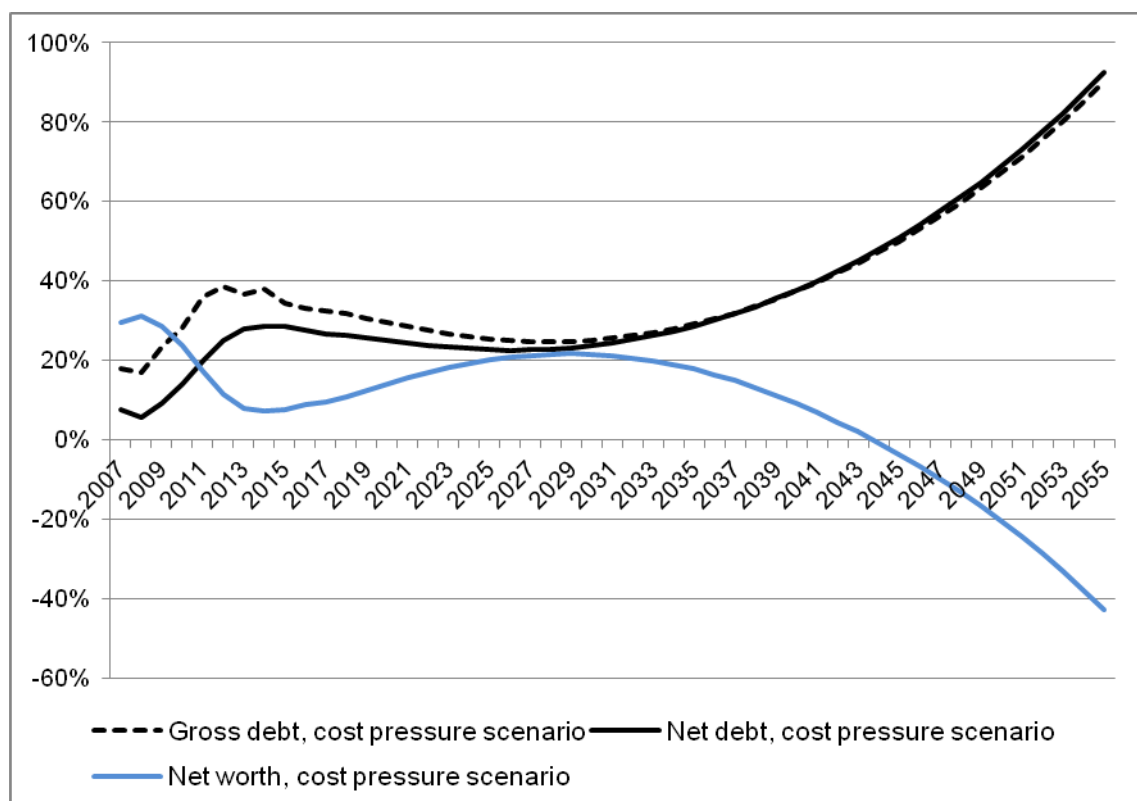
Net debt is government gross issued debt less government financial assets. This excludes advances and assets held in the New Zealand Superannuation Fund, which are held for a specific policy purpose (prefunding part of future NZS costs).¹¹ Net debt peaks at just under 30% of GDP in 2014 before reaching a trough of just over 20% of GDP in the late 2020s and increasing thereafter. Both gross debt and net debt reach similar levels by 2055 because financial assets (which exclude advances and NZSF assets) are projected to be close to zero by 2055.

Net worth reflects the assets and liabilities of the government. Net worth falls to under 10% of GDP in 2013 before reaching a peak of just over 20% of GDP in the late 2020s and decreasing thereafter.

¹⁰ In a simplified form, the operating balance = revenue – expenditure; and the primary balance = [revenue – (interest + gains)] – [expenditure – (debt financing costs + losses)]; so the operating balance exceeds the primary balance if interest + gains > debt servicing costs + losses.

¹¹ NZSF financial assets are projected to reach approximately 26% of GDP by 2055, so if NZSF financial assets were included in the net debt measure then net government debt would reach approximately 66% of GDP by 2055 rather than 93% of GDP.

Figure 6 – Core Crown gross debt, net debt and net worth as a percentage of GDP, 2007-2055



Notes: (1) Gross debt is Core Crown Gross Sovereign Issued Debt excluding RBNZ settlement cash; (2) Net debt is Core Crown Net Debt excluding New Zealand Superannuation Fund and advances; (3) Net worth is Core Crown Net Worth; (4) the projections are based on Budget 2012 forecasts

The Treasury has previously calculated the fiscal gap for New Zealand (Janssen, 2002). This has not been done for this paper, but may be done as part of the work in the lead up to the 2013 long-term fiscal statement.

Bell (2012) uses the Treasury LTFM to show the sensitivity of the projections to different modelling assumptions. A further extension of this work that may be done in the lead up to the 2013 statement is to explore scenarios where New Zealand is hit by another shock similar to the recent Global Financial Crisis (GFC); and where the government sets different net debt targets (of 10%, 20% and 30% of GDP).

Based on the above projections, it appears that policy change will be needed at some point in the future to ensure the government finances are sustainable over the longer term. Governments are faced with a range of choices about how and when to adjust its fiscal programme. We review those issues and the type of trade-offs governments will need to consider in section 5.

5 Fiscal adjustment strategies

5.1 Criteria for evaluating policy reform options

Current analysis suggests demographic change is structural and without policy change will push the government's finances beyond a point that is fiscally sustainable. Governments will need to make choices about the types of fiscal programmes they will fund and how they will be funded. If governments continue to manage to a net government debt target, they can achieve that target by adjusting the level or mix of taxation, adjusting expenditure programmes or government assets and liabilities. Good quality policy analysis can inform decisions about how to weigh up these alternative policy options.

Governments ultimately decide on which considerations are important in weighing up options for achieving long-term fiscal sustainability, but we suggest the following are likely to be prominent:

- The extent to which the policy contributes to achieving fiscal sustainability.
- Implications for economic growth and efficiency.
- Implications for the resilience of the economy and fiscal position.
- Distributional implications, including within and between generations.
- Other considerations, such as environmental or other social considerations.

These criteria were developed drawing on, amongst other things, the Treasury's Living Standards Framework (Gleisner, et. al., 2011). Fiscal sustainability, the key focus of the Treasury Long-Term Fiscal Statement, is affected by pressures for increased government expenditure that come from demographic change affecting health and NZS in particular. Public health expenditure is also affected by increasing costs resulting from technology change as well as increasing expectations of the public about the level and range of public health services that should be made available.

Fiscal policy decisions, in relation to the level and mix of expenditure and taxation also have implications for economic growth. Cook et. al. (2011) examines evidence regarding the size of government and economic performance. The paper concludes that the impact of the size of government on economic growth will depend on the type and quality of expenditure and the mix of taxes used to finance it.

Large governments could undermine economic growth due to the economic costs of raising taxation to finance expenditure. There is strong evidence taxes reduce growth by negatively impacting incentives to work, save and invest. However, government expenditure may contribute to economic growth, e.g. by lifting investment in physical capital, knowledge, human capital, research and development or public infrastructure. Some taxes will also be more damaging for growth than others. The Tax Working Group (2010) summarises the range of estimates of the impact of different types of tax, deficits and different types of expenditure on economic growth drawing on literature such as Kneller et. al. (1999), Johansson et. al. (2008) and other studies. The Tax Working Group find that corporate and personal taxes tend to be relatively more damaging for growth, whereas consumption and property taxes tend to be relatively less damaging.

Infrastructure and education expenditure tend to be more positive for growth than health and social welfare expenditure.

Along with the expected level and growth of economic output, governments will also be concerned about economic vulnerability. Achieving sustainable public debt helps to reduce those vulnerabilities as would policies that increase overall national savings by increasing savings of households and businesses.

Distributional considerations, such as who will “win” or “lose” from particular policy changes, both within and across generations will be an important consideration when assessing policy options. Governments may also have other environmental or social considerations they take into account when assessing possible policy changes.

Policy options for achieving fiscal sustainability may involve a trade-off between some of the abovementioned criteria. In these circumstances, decisions by governments will inevitably involve value judgements and the weight they attach to different objectives may vary. Policy advisors have a role in providing transparent analysis of the impacts of the various policy options. We can illustrate this approach by showing how it could be applied to different policy options. Tax reform is included as an example below.

A similar approach was taken by Tax Working Group (2010) where alternative options for reforming the New Zealand tax system were assessed against the principles of a good taxation system, an approach described by Creedy (2010) as an example of rational policy analysis.

Illustrative application of criteria to tax policy

This section illustrates how the approach described above can be applied to a tax example. This example is intended to be illustrative and is not intended to pre-empt analysis of tax options as part of the LTF project. Other policy areas the LTF project will be exploring are: health, retirement income, working age welfare, justice, education, natural resources and government asset and liability management.

As discussed above, in the Treasury’s current approach to modelling the long-term effects of the government fiscal programmes, the LTFM treats tax rates as exogenous and invariant to changes in the level of national income, the demographic structure and to possible changes in private savings. However, given that if individual incomes vary over their lifecycle, we might expect that the tax base will be affected by demographic change. This argument suggests that even without a change to the taxation system and even without fiscal drag, the average income tax rate may change and the distribution of the source of taxation would change even for an unchanged tax structure. Also, if an increasing proportion of people are shifting into retirement, we might expect this to influence the level of taxation revenue obtained.

Creedy, Enright, Gemmell, and Mellish (2010) have investigated some of these issues by simulating future incomes, consumption and taxation flows based on age-specific survey data. They find that New Zealand government taxation revenues are likely to be broadly maintained over time. A principal reason is that current age-earnings profiles indicate an earnings peak in the 45 to 54 age group, and this group will become larger relative to younger age groups over the next 20 years. This effect will broadly counteract the declining aggregate taxable income due to increased numbers of older individuals and increased numbers in retirement. The study also shows that future tax incomes will themselves be a function of choices made on the expenditure side of government

accounts. For instance, because NZ Superannuation payments are taxed, decisions on NZS payments will affect income taxation and, through expenditure decisions, GST receipts. Hence, as a consequence of these two forces, the pure ageing effect may not change income tax revenue, but GST receipts could rise.

While population ageing can therefore be expected to influence the level and distribution of taxation revenue, governments nevertheless may still need to weigh up whether they need to raise tax rates and broaden the tax base. Options for changing tax rates and broadening the tax base, and the growth, efficiency, sustainability and distribution implications of these options were reviewed by the Tax Working Group (2010).

While the focus of the Tax Working Group (TWG) was to improve the tax system in a revenue neutral way, there are nevertheless insights from that work that help illustrate the trade-offs that future governments could face if they choose to increase tax revenue to satisfy a debt target. For example, increasing GST is deemed to be less damaging to efficiency and economic growth than increasing income taxes. Assessing the distributional effects of these options is complex and will depend on labour supply effects (including migration) and the extent to which the tax system can be tightened to avoid income sheltering. It will also depend on whether governments are concerned with the effects of taxes on current or lifetime incomes. For example, a common concern is that those on lower incomes pay a higher average percentage of their disposable income in GST than those on higher incomes. However, this difference is evidently largely accounted for by differences in savings and dis-savings across income levels and when measured in terms of lifetime incomes, differences in the proportion of GST paid across income groups tend to be much smaller.

The TWG also considered options for broadening the tax base by, for example, a low-rate land tax and/or extending capital gains taxation. In New Zealand there is currently a relatively low use of recurring land and property taxes. Drawing on the work of Coleman and Grimes (2010) and Bengtsson (2010), the TWG examined the efficiency and distributional effects of a low rate land tax. The TWG concluded that provided the tax was imposed at a single rate across all types of land, the efficiency consequences would be less damaging than some other base-broadening options. In terms of distributional consequences, the burden of land taxes would be borne by the land owners at the time the tax is announced and cannot be passed on. This generates desirable efficiency properties, but it also generates significant wealth redistribution. A land tax would be expected to cause an initial fall in the value of land by up to the present value of the expected future land tax liabilities, depending on the rate of tax and the expected fall in net-of-tax real returns from the land. However, a land tax only taxes one form of wealth and would significantly affect the wealth of existing land owners and those who have invested directly or indirectly in land, relative to those holding other forms of wealth. For this reason, governments may prefer to rely on generating higher taxes from tax bases that use broader measures of wealth, income or consumption.

The purpose of this discussion is to illustrate the type of issues governments will need to address if they wish to include taxation in their portfolio of options for managing the level of public debt, rather than canvas the full range of taxation options. But governments will need to have a better understanding of the impact of demographic change on future government tax revenue growth in order to inform that process. They will also need to have a good understanding of the efficiency, financial resilience, income and wealth distribution effects of alternative ways of raising (or lowering) taxes if future governments are to be able to weigh-up the options for maintaining fiscal sustainability in an informed way.

5.2 Timing of fiscal adjustment

When considering fiscal adjustment strategies, the timing and pace of fiscal adjustment needs to be taken into account. On the one hand delaying fiscal consolidation increases the amount of adjustment required. Sutherland (2012) estimates that for New Zealand a two year delay in fiscal adjustment increases the fiscal gap by more than one-third of a percentage point of GDP. Delaying adjustment in certain areas may make reform more difficult from a political-economy point-of-view. For example, it may be more difficult to reform retirement income policy as the age of the median voter increases. Adjustment sooner allows for more gradual adjustment and greater tax and expenditure smoothing over time and also helps to build a buffer more quickly to respond to future shocks. Reducing debt servicing costs also provides more flexibility for expenditure increases or tax reductions in the future as governments will be spending less tax revenue on debt servicing costs.

The advantages of adjusting sooner need to be traded off against any short-term growth effects. In an environment of uncertainty there may also be benefits of waiting for further information before making decisions. The time preference of society also needs to be taken into account, that is the willingness of society to put up with more “pain” today in return for less “pain” later; also relevant is how society values the well-being of current versus future generations.

The current New Zealand government has a target of bringing net government debt down to no higher than 20% of GDP by 2020. Therefore one can think of the timing of fiscal adjustment in at least two stages: adjustment over the medium-term to reach the 2020s debt target, and then adjustment required to stabilise debt beyond that point in time.

Expenditure control or revenue increases will be necessary for the government to reach the target of 20% net government debt to GDP by 2020. The government’s fiscal strategy involves government expenditure as a percentage of GDP being reduced from just under 34% of GDP in 2011 (which includes approximately 0.75% GDP Canterbury earthquake related costs) to 28.5% of GDP in 2016. Scenarios in Bell (2012) show the implications of not implementing the fiscal strategy on the potential path of government net debt.

These scenarios show that net debt is projected to increase to rise from the late 2020s. While the second phase of adjustment may seem a long time away, many of the policy changes that governments may consider in the second phase of adjustment, such as changes to NZS, could benefit from long implementation timeframes. The Retirement Commission (for example, in its 2010 report) recommend increasing the age of eligibility for NZS from 65 to 67 years two months a year starting in 2020, which would mean that change would not be fully implemented by 2033 (Retirement Commission, 2010).

5.3 Lessons from previous fiscal adjustments

Sutherland et. al. (2012) summarises the evidence about the factors that have assisted with fiscal consolidations in the past. The paper concludes that stronger economic growth can assist with fiscal consolidation, but that consolidation will largely come from improvements in the primary balance. The same conclusion is provided by the New Zealand Treasury’s previous Long-Term Fiscal Statements (Treasury, 2006; 2009).

International experience is that consolidations from government expenditure reductions have tended to be more durable than those from revenue increases. However, revenue

reform has been part of many consolidations and most large consolidations have involved both expenditure reductions and tax increases. Some reforms make both direct and indirect contributions to fiscal consolidation. For example, pension reform could directly reduce the costs of pension programmes and by incentivising increased labour force participation also indirectly assist by increasing tax revenue. Public sector efficiency improvements (e.g. improving the efficiency of public health services) can achieve fiscal savings without reducing the provision of social services.

The IMF (Mauro, 2011) uses case study analysis of governments that have embarked on large fiscal adjustment plans to compare *ex ante* reform plans with the *ex post* outcomes¹². The study finds that the motivation for reforms has differed across countries, and included a desire to reduce deficits, tackle current account imbalances, reduce rising interest costs, and more recently, medium-term and long-term concerns about fiscal sustainability, associated with an ageing population.

All of the government budget plans studied encountered significant surprises, especially to economic growth, which had sizable impacts on plans. The IMF maintain that government budget plans need to be sufficiently flexible to accommodate shocks, but resilient enough to preserve medium term objectives. They also conclude that communication of the budget strategy and explaining how the government would respond under unforeseen circumstances can be helpful.

In terms of the factors that were important for the success of reform programmes, economic growth was the key factor in determining whether planned fiscal adjustments were attained. Other factors that were important included: public support; the initial deficit; government priorities; and programme design. Public support is evidently more important for the success of reforms than political factors such as the size of the government's majority in Parliament. Reforms are more successful where the public understand why fiscal adjustment is needed, and where there is public support for debt or deficit reduction and measures for it to be achieved.

Most fiscal adjustment plans included in the IMF case study focused on expenditure reductions. While only one-third of plans included intentions to increase revenue, the proportion that turned out to increase revenue-to-GDP was much higher. Expenditure cuts were on average not as large as planned (0.3% point structural primary spending cuts compared to planned cuts of 1.8% points). Revenues exceeded expectations by over 1% of GDP, often due to revenue measures being introduced due to problems implementing spending cuts, or temporary factors such as stronger than expected economic growth. The study concludes that fiscal reforms need to tackle health and pension policy, and that reform on the revenue side need to be designed in the event of expenditure over-runs.

Sanz (2011) examines the impact of fiscal consolidations on the composition of government expenditure drawing on a sample of 25 OECD countries over the period 1970-2007. This study finds that during fiscal consolidations there is a systematic pattern to expenditure decisions by governments. They find that governments tend to protect expenditure that is likely to enhance productivity and economic growth, such as education, transport and communications expenditure. During fiscal consolidations, governments tend to increase the share of these types of expenditure. On the other hand, governments are more likely to cut back on social security (welfare) payments as

¹² The book uses case studies of the following G7 countries: United States, United Kingdom, Canada, France, Germany, Italy and Japan.

well as spending on defence, housing, and cultural affairs. Health, public services and environmental protection tend to hold their own during fiscal consolidations. This contrasts somewhat with the New Zealand experience where government expenditure on economic activities (including transportation and communications) was reduced relative to other areas from the mid-1980s and public health expenditure has tended to be protected during fiscal adjustments.

The Sanz study controls for the age structure of the population, and finds that the elderly population tends to increase the demand for health and social security as well as defence and security-related expenditure. The young population tends to increase demand for both education and health expenditure. As the age structure of the population changes, this is likely to affect the composition of government expenditure.

6 Concluding remarks

Designing government fiscal programmes to ensure they are sustainable has important economic benefits. Fiscal sustainability contributes to lower interest rates, reduces the costs of sustaining low inflation, enhances the ability of governments to be able to mitigate the recessionary effects of adverse shocks, reduces volatility of government expenditure and tax rates, and reduces the risk of sudden reversals of foreign lending and exchange rates.

In acknowledgement of these benefits, New Zealand has adopted a legislative framework that requires that government manage its total debt at "prudent levels". This legislation has also increased transparency associated with the management of government debt by requiring that the Treasury publish a statement at least every four years on the long-term fiscal position. Although there are alternative fiscal anchors that could be used to ensure sustainability, New Zealand has tended to adopt a target level of government debt as its anchor. This is a more politically neutral fiscal anchor than those provided by tax and expenditure growth limits and it provides successive governments with some flexibility to manage the mix of expenditure and taxation differently, within a prudent government debt limit.

Consistent with this, successive New Zealand governments have steadily reduced the level of New Zealand's government debt since the mid-1980s. Although the consequences of the recent recession, the Global Financial Crisis and Canterbury earthquakes have triggered a rise in the level of government debt, it is currently low compared to government debt levels in many developed economies and well within what is typically regarded as a prudent range.

Nevertheless, New Zealand, like many other countries, is experiencing a changing demographic profile which will have implications for the government's fiscal position in the future and potentially the sustainability of its spending programmes. This was the message highlighted by the Treasury's first two Long Term Fiscal Statements published in 2006 and in 2009, and it is a fiscal theme that applies to many other developed countries that are experiencing a structural shift in their demographic profile.

Although the success of the past 25 years in reducing the level of government debt suggests that New Zealand governments have a good history of reducing fiscal vulnerability and managing to a prudent debt level, the underlying forces impacting on government expenditure in the future will be different and therefore the economic and political tradeoffs and challenges will be different. For most of the 25 year period after the

mid-1980s New Zealand governments benefitted from strong global economic growth and domestic productivity and labour force participation growth that underpinned strong taxation revenue growth. At the same time, global interest rates and therefore interest rates on government debt were falling. The gap between economic growth and interest rates on government debt therefore generally narrowed during this period and the size of the primary balance required to reduce the real stock of government debt became more manageable.

While there is considerable uncertainty over future interest rates and economic growth, it would seem that the implications of population ageing (as well as the income effects on demand for health care), will pose a more significant fiscal challenge in the future. Current Treasury LTFM projections suggest that under the current fiscal programme (which involves government expenditure as a percentage of GDP being reduced from just under 34% of GDP in 2011 to 28.5% of GDP by 2016), net government debt falls from just under 30% of GDP in the next few years before stabilising at around 20% of GDP by the late 2020s. This is within what is currently regarded as a prudent range. Thereafter the level of government debt is projected to rise monotonically and, by the 2050s, to reach levels beyond what is currently regarded as prudent. The Treasury's projections show that in order to stabilise net debt at 20% of GDP, the government would need to sustain an operating surplus of close to 1.5% of GDP on average over the long run. Stabilising net debt at 20% of GDP requires a cumulative fiscal savings in nominal dollar terms of \$860billion relative to the cost pressure scenario (between 2028 and 2055).

Although there is uncertainty around these fiscal projections, it is difficult to avoid the conclusion that there are considerable economic risks associated with policy inertia, particularly if projections of life-expectancy prove to be conservative. There are also economic and political costs associated with delays in making the adjustments required to ensure that public debt remains within a prudent range. Although previous Long Term Fiscal Statements have touched on these issues and provided illustrative adjustment scenarios, we suggest a stronger focus needs to be given to assessing the options and tradeoffs associated with fiscal adjustments to government expenditure programmes (including pension and health programmes), to taxation revenue-raising options, and to the timing of policy adjustments. We have suggested a set of criteria against which fiscal adjustment options could be assessed in a manner that facilitates rational policy analysis. It is beyond the scope of this paper to delve into these options and tradeoffs in any detail. But greater attention needs to be placed on these issues to ensure a more informed public debate and more informed policy choices. This is the purpose of the process designed to assist the Treasury during the preparation of its third Long-Term Fiscal Statement.

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