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No. 14

***Medium-Term
Fiscal Modelling:
Update Report***



**STATE SERVICES
COMMISSION**

**Te Komihana
O Ngā Tari Kāwanatanga**

This paper examines historical trends in expenditure and finds, perhaps surprisingly, that the level of government spending on goods and services has been relatively stable. This is consistent with the international literature we examine. However, projections, which update those outlined in Occasional Paper No. 4, suggest that this stability may come under pressure as governments will face substantial trade-offs between the provision of social services, and attempts to limit other government expenditure, tax, and public debt.

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Executive summary

This paper discusses trends in government expenditure utilising both a backward-looking examination of historical data and a forward-looking projection of fiscal trends. In particular, it discusses the extent to which these trends can be linked to an assessment of pressure on overall government organisational capability. It concludes that there are a range of measurement difficulties relating to outputs, prices and productivity that limit the extent to which conclusions about capability can be drawn from an examination of expenditure.

The paper also examines international literature on the size of the state and finds the New Zealand experience similar to that in other jurisdictions. Except for general trends towards the privatisation of former state trading organisations, the overall size of the state has been surprisingly resilient. There has been considerable evolution and change in the role of Government within this, however, and in particular a reduction in the role of Government as owner/provider. That is - it is not fundamentally the size of government that is altering but the things it does and how it does them.

We have examined ways of identifying core government services that distinguish these from transfer and consumption spending. In looking at historical data we have found spending on goods and services produced in the core to be very stable (as a percentage of GDP) over the past twenty years. This conclusion is found to hold true through a range of different approaches to defining core government expenditure.

The updating of the 50-year fiscal projections¹ from the work carried out in 1998 has identified only minor changes as a result of the revisions and updates to fiscal and demographic estimates. It confirms the anticipated pressure for significant increases in tax revenue to meet expected increases in the demand for services based on current settings. The required tax revenue rises to 38 percent of GDP by 2051, compared with around 33 percent currently.

We have explored the assumptions underlying these projections and present a wider range of possible outcomes. The most significant impact on the long-term fiscal outcome is the extent to which, in addition to current policy settings being applied to meet demographic pressures, the proceeds from economic growth are put towards real increases in expenditure in health, education and residual core government expenditure. Our sensitivity analysis found that using plausible alternative assumptions of fertility, mortality, labour force participation or migration did not have a significant effect on the long-term trend.

¹ The update was based on 1999 Budget night figures and does not include any subsequent announcements regarding tax cuts.

Introduction

This paper provides a summary of work carried out by the State Services Commission (SSC) that explores trends in government spending and the linkage from this to organisational capability. It looks at expenditure from both a forward-looking perspective – the fiscal modelling - and backward at historical trends. We also examine international literature on the evolving role of government and look at the extent to which these trends are consistent with the New Zealand experience.

This paper provides an updated summary of model runs on growth in government expenditure.² The work has been carried out to illustrate the nature of the strategic choices facing government over the medium to long term. As such, it is a *positive* analysis that illustrates a range of possible consequences and trade-offs. It does not address the *normative* question of the optimal level of spending, tax or debt. Such an analysis would require a different methodology and would be outside both the brief for the project and the SSC's mandate.

Because the 1998/99 year was a particularly volatile period for economic forecasting, the year's work³ (1999/2000) has undertaken to ensure the findings have remained current. In doing this we have focused on the long-term pressure on government expenditure as a whole. We have also taken this opportunity to explore the effect of varying the underlying assumptions used in the previous work.

The paper also contains three appendices, as follows:

- the first of these examines trends in the role of government from a range of perspectives – government as borrower, investor, consumer, producer and regulator;
- the second examines the sensitivity of the fiscal modelling work to variations in the assumptions used, and shows the change in the estimates from those produced in 1998; and
- the third examines a range of alternative approaches to distinguishing core government spending from transfer or consumption spending, and points to a range of methodological and empirical issues that arise.

Core government has been defined for the purposes of fiscal modelling as a residual item after social spending (health, education and welfare) and debt financing are separated out. Debt financing is treated separately because there is no way of allocating it between social and residual core spending.

² The 1998 model runs were commissioned from the New Zealand Institute of Economic Research Inc. (NZIER) and are contained in: NZ Institute of Economic Research (June 1998): *Fiscal Modelling Scenarios: Report for the State Services Commission*. The updated runs contained in this paper were carried out by the SSC with the technical guidance of The Treasury.

³ Although the update is built around the revised forecasts and estimates contained in the 1999 Budget night announcements, it does not incorporate any provision for future tax cuts.

We also compare the results from other NZ organisations using the same basic long-term fiscal model.

The evolving role of government

We have examined recent surveys of international literature on the role of the state. In particular, Treblicock and Daniels⁴ have pointed to the surprising durability of the state, despite the rhetoric of downsizing and re-inventing government. While, in general and on average, the overall role of Government as a spender has continued to increase in almost all OECD countries since 1980, the mix of what government does has shifted significantly:

- Government's role as an investor and producer has tended to decline.
- Government's role as a regulator has changed, with less economic regulation but increased health, safety and environmental regulation. Canadian and US data suggest that the overall regulatory burden has increased.

The New Zealand experience is consistent with these trends. In this paper we summarise the historical trends in government spending alongside the forward-looking projections. In Appendix 1 we take different cuts at the role of government: government as consumer, investor, producer, borrower and regulator. Government's role as an investor and producer has declined, while the change in Government as a consumer is largely driven by increasing social welfare transfer payments, and reductions in both debt-servicing costs and transfers to industry and agriculture.

Employment trends also support the picture of an evolving, although not necessarily shrinking, role for the state. While the privatisation of a number of former state trading enterprises has seen a reduction in total central government, the number employed in the non-trading (i.e. taxpayer-funded) central government sector is at its highest level in the past decade. While the number of filled jobs in the Public Service and (public) health sector has fallen, the numbers employed in Crown entities and education have risen significantly.

Looking backwards

Historical trends in expenditure

Total government expenditure fell as a percentage of GDP in each of the years between 1992/93 and 1996/97. Real expenditure (CPI deflated⁵) fell from 1993 to 1995, but Budget estimates⁶ and projections show it increasing by between 1 percent

⁴ Treblicock, M.J., and Daniels, R. "Journeys Across the Institutional Divides: Reinterpreting the Reinventing Government Movement", public lecture presented at Victoria University of Wellington, May 21, 1999.

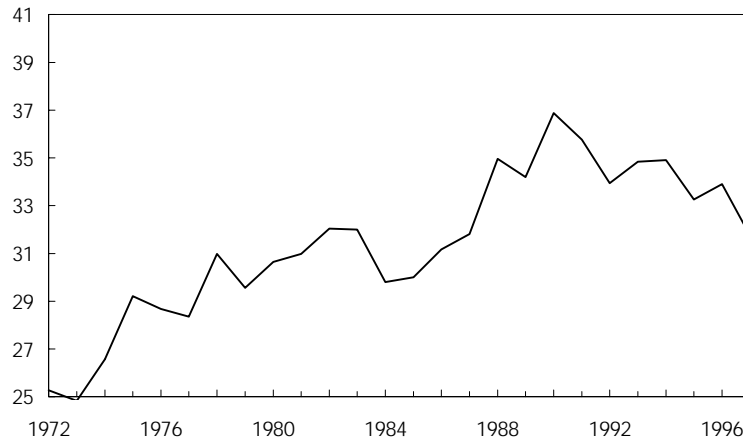
⁵ The use of a CPI deflator shows real spending in terms of the opportunity cost to taxpayers, as opposed to specifically measuring the volume of services produced.

⁶ The Treasury (1999): Budget Economic and Fiscal update

and 3 percent per year up to 2001. Figure 1 shows the overall trend in tax revenue from 1972-97.

Figure 1: Tax Revenue 1972-97

percent of GDP

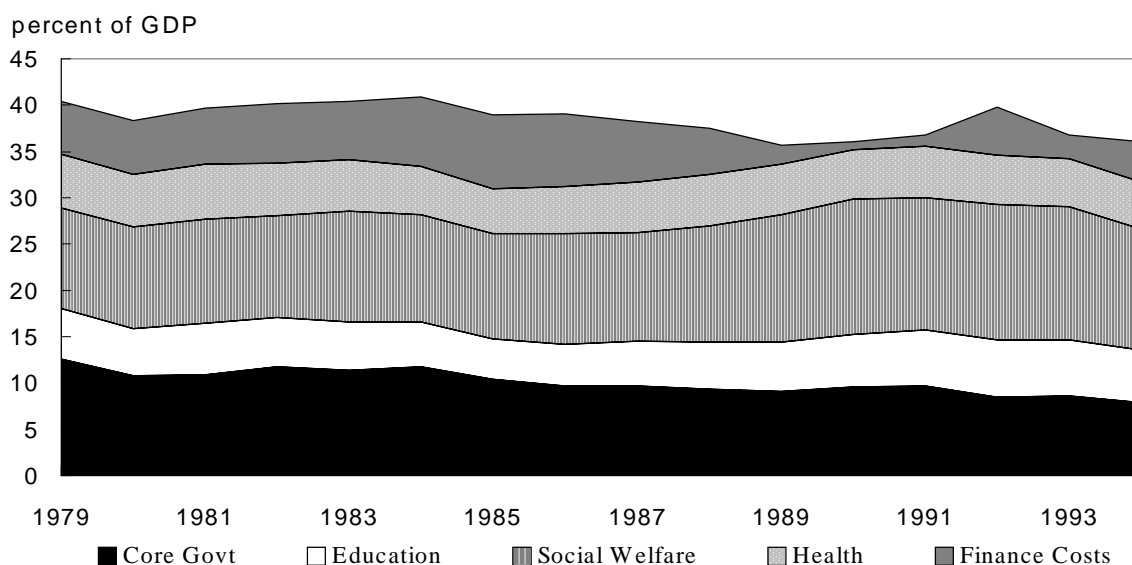


Source: Statistics NZ, Government Financial Statistics

We have examined expenditure showing health, education, welfare payments, and debt servicing separately from residual core government expenditure. Residual core government expenditure as a proportion of total government expenditure has been falling since 1975, offset by increases in welfare payments. While table 5 (in Appendix 1) shows residual core government spending falling consistently from 1979-94, this is due to the reduction in expenditure on the development of industry (essentially subsidies and transfers to industry and agriculture). If this item is removed, residual core government spending is relatively constant over this period at around seven percent of GDP. Since 1992/93 expenditure in residual core government has fallen from 8.6 percent of GDP to 6.8 percent in the 1997/98 year.

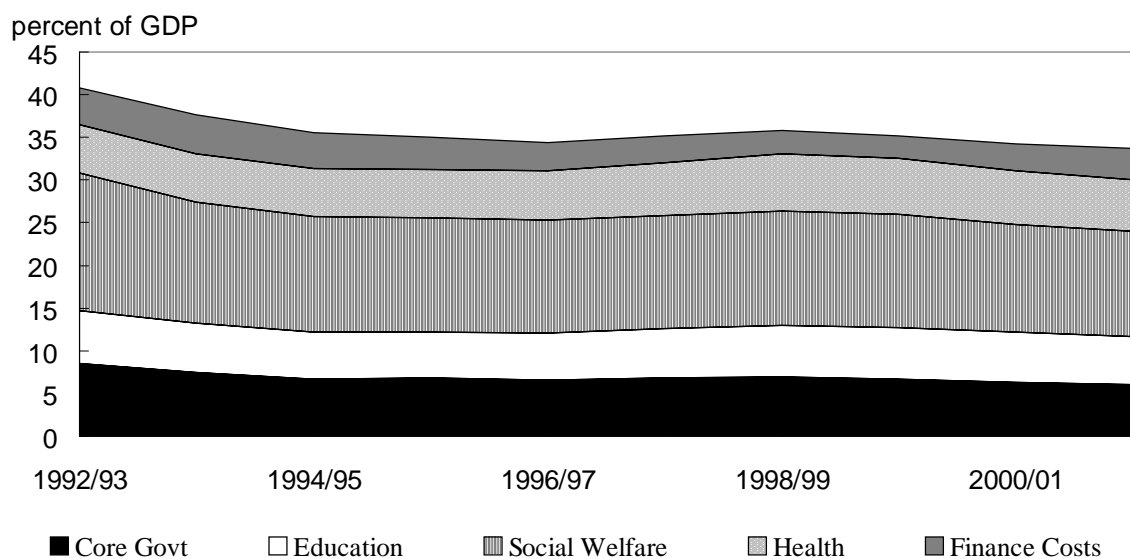
The most recent Treasury estimates forecast residual core spending to fall to 6.0 percent of GDP in 2001/02 from 8.6% in 1992/93 (see table 7 in Appendix 1). Residual Core government expenditure is also expected to fall in real terms (CPI deflated) between 1993 and 2002 (to 92 percent of the 1993 level). In contrast total government real expenditure for 2002 is projected to be 4 percent higher than its 1993 level. The graphs below illustrate the trends in government expenditure since 1979 (which has been calculated on a new basis since 1993 following financial management reform).

Figure 2: Components of Government Expenditure 1979-94



Source: The Treasury (table 2 series: discontinued 1994).

Figure 3: Components of Government Expenditure 1993-2001



Source: The Treasury: Budget Economic and Fiscal Update 1999 (GAAP basis)

In Appendix 3 we look at alternative ways of defining core government. While we point to a variety of conceptual and measurement difficulties in so doing, these analyses also show relatively constant core government spending and increasing transfer and consumption expenditure.

Core government capability

The SSC undertook a literature survey⁷ to examine whether continuing relatively fixed nominal baseline budget regimes in the core government could undermine capability. In brief, the survey examined the available information on government spending and productivity growth. There is very little reliable evidence on productivity in the New Zealand public sector, although there are some international estimates. These estimates suggest, in general and on average, that public productivity growth is positive but less than the economy-wide average. This may largely reflect the absence of pressure on the public sector in other jurisdictions. In New Zealand's devolved management system, however, we might expect the size of any gap between private and public sector productivity growth to be lower.

Difficulties in linking trends in expenditure to capability

The spending trends from 1992-98 do not provide any direct evidence that capability in core government is being undermined. This is consistent with the trends from 1979-94. This showed a slight reduction in core spending (using a residual core definition) over the more recent period, but relative stability (as a percentage of GDP) over the longer term.⁸

It is problematic to draw conclusions regarding capability from trends in spending on core government. The difficulties relate to both conceptual issues and measurement problems. The conceptual issues centre on the distinction between the government's purchase and ownership roles. The measurement issues relate to the interlinked problems of identifying real outputs in a volume sense and thence deriving productivity estimates and reliable deflators.

The estimates of core expenditure reported in this paper are just that. A number of difficult issues have to be addressed before any conclusions can be drawn from these estimates about the capability of state sector organisations.

Even after deflating for input price increases, the expenditure series translates into a 'story' about capability only with some difficulty. This is because of the need to control for productivity and for changes in the match between supply (the outputs state sector organisations can produce) and demand (the outputs demanded of them). The nature of public sector outputs means there are no direct measures of the volume of production, and thus no measures of productivity. The usual approach, therefore, and the one we adopt for the fiscal projections, is to make an assumption about productivity. This is more safely done at the sector-wide level. There is an on-going discussion in the OECD about ways in which public sector productivity might be better measured. At this stage there appear to have been no significant breakthroughs in method that can be preferred to input-based deflators.

⁷ *Progress Report: Strengthening Strategic Management* (8 May 1998) State Services Commission.

⁸ Once transfers and subsidies to industry and agriculture are excluded.

In the absence of such data it is difficult to conclude whether Government is revealing a preference for a lower volume of services from the core government sector (i.e. demand is falling), or it is asking for more output from fewer inputs.

Capability may be defined as having, or being able to access, the appropriate combination of resources, systems and structures necessary to deliver the organisation's outputs to customer-specified levels of performance on an on-going basis into the future.⁹ Thus, even if adequate input price and productivity indexes were available (providing insight on past trends in the volume of production), the insights on capability this allows are limited. In the absence of substantive evidence on capability in core government, on productivity changes, and of a clear understanding of output levels or demand for core government goods and services, there is a risk that continued real reductions in core government expenditure could undermine capability.

Looking forward

Background

The impetus for both last year's NZIER 50-year fiscal modelling work, and that carried out by other NZ organisations, is the extent to which looming demographic changes imply significant strategic trade-offs. These might include the trade-offs that face government in meeting the demands for both health and welfare services, while keeping debt levels and taxation rates down. A particular concern for the SSC is that capability in core departments would be eroded.

The model runs use three scenarios. Core government was defined as the residual of government expenditure once social spending (social welfare benefits, education and health) and debt servicing costs were removed. Scenario one has been updated (to include the effect of changes to economic and fiscal forecasts since the 1998 Budget, as well as more recent demographic projections). We have continued to report the NZIER findings for scenarios two and three. While these forecasts might alter slightly with updating, the overall patterns presented would be expected to remain the same.

Scenario One: tax as a residual

This baseline scenario measures the tax/GDP ratio required to fund core government and social spending at expected levels based on current policy settings, demographic change, GDP growth, and assumed real growth in spending.

Scenario Two: social spending as a residual

This scenario measures the social spending that could be undertaken while maintaining the (debt and tax/GDP) set targets, and assumed real growth in core state spending.

Scenario Three: core state spending as a residual

⁹ State Services Commission: Report on the Capability Project, Paper prepared for the Minister of State Services, 1999.

This scenario measures the funding available for the core State, given both the debt and tax/GDP targets and assumed real growth in social spending.

The debt and tax/GDP targets set for *Scenarios Two* and *Three* were net debt of zero and a tax/GDP ratio of 20 percent, with both targets being achieved by 2010. In *Scenario One* the debt target set was to maintain a constant net debt/GDP ratio from 2002. This is the same as that used by NZIER in the work for the Periodic Review Group (PRG).¹⁰

None of the scenarios allowed public debt to increase over the forecast period, nor did they consider the potential for Government to become a net saver in anticipation of later demand for services¹¹. Such an analysis would involve more sophisticated work on the effect of Government on the wider economy, and the optimal balance of tax/debt/expenditure, than is intended by this paper.

Demographic estimates

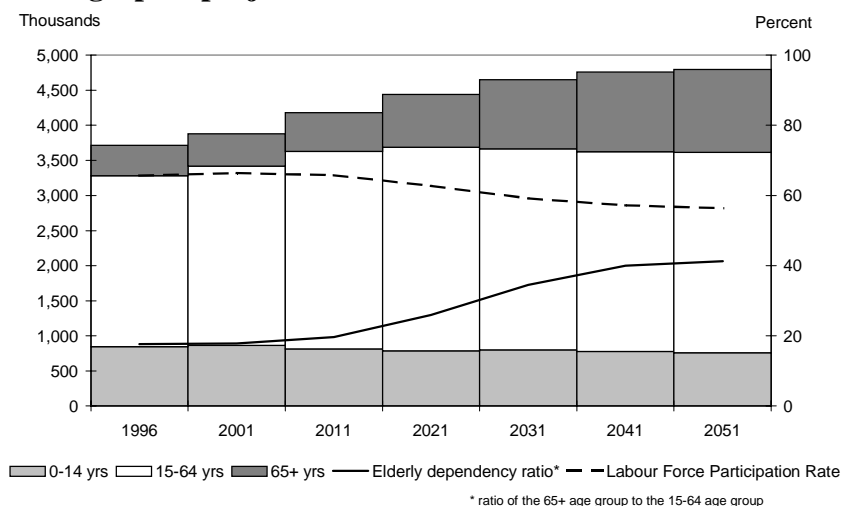
While the fact of a looming demographic bulge is without question, its size can only be projected and, the further out the projection, the greater the degree of potential error. While the various model runs have all used Statistics New Zealand's population projections based on medium levels of mortality/fertility, different assumptions will produce quite different results. These are explored in some detail in Appendix 2. Figure 4 shows Statistics New Zealand's projections¹² of New Zealand's demographic change. By the 2040s the ratio of the elderly to the working age population will have approximately doubled, from around 20 percent to just over 40 percent.

¹⁰ Cook, D. *Fiscal Modelling, Report for Periodic Review Group*, NZ Institute of Economic Research, 1997.

¹¹ Some of the effects of government investment in equities are discussed in: Huther, J., *An Application of Portfolio Theory to New Zealand's Public Sector*, Treasury Working Paper 98/4, Wellington, 1998.

¹² Statistics NZ's Projections have as a base the estimated resident population at 30 June 1996 (June 1999).

Figure 4: Demographic projections 1996 to 2051



Source: Statistics NZ population projections June 1999 (base year 1996)
Based on medium projections and 10,000 annual net migration

Table 1 shows Statistics New Zealand's population projections used in the modelling. They show an increasing elderly dependency ratio, partly offset by a reduction in the youth dependency ratio. The effect on labour force participation is that it would fall from 66 percent in 1996 to 56 percent in 2051.¹³

Table 1: Demographic projections 1996-2051

Year	Population by Age Group			Labour Force	Dependency Ratio (%)			Labour Force Participation (%)	Median Age (Years)
	0-14	15-64	65+		Youth	Elderly	Total		
	Number (000)			All age groups	0-14	65+	(0-14)+(65+)	Labour Force	
					15-64	15-64	15-64	15+	
1996	846	2,438	430	1,883	34.7	17.6	52.3	65.7	33.0
2001	865	2,556	456	2,000	33.9	17.8	51.7	66.4	34.6
2011	815	2,814	552	2,215	29.0	19.6	48.6	65.8	37.9
2021	786	2,902	752	2,293	27.1	25.9	53.0	62.7	40.1
2031	802	2,862	988	2,277	28.0	34.5	62.5	59.1	41.9
2041	776	2,846	1,139	2,279	27.3	40.0	67.3	57.2	43.9
2051	758	2,857	1,180	2,275	26.5	41.3	67.9	56.4	45.0

Series 5: Assuming medium fertility, mortality and labour force participation, and long-term annual net migration of 10,000.

Source: Statistics NZ, June 1999 projections.

The anticipated demographic change in New Zealand is less severe than that in other OECD countries. Almost none of the OECD countries examined in a recent report¹⁴ have more favourable demographic trends than New Zealand's. This appears to be

¹³ Statistics NZ's labour force projections incorporate an expectation that labour force participation among the older age groups is likely to rise in the medium term.

¹⁴ Roseveare et al. *Ageing Populations, Pension Systems and Government Budgets: Simulations for 20 OECD Countries*, Economics Department Working Paper No. 168, 1996.

because the working-age population¹⁵ in New Zealand continues to grow up to the year 2020, and shrinks slowly thereafter. In many OECD countries the working-age population is expected to shrink significantly from around the year 2010. In Italy, for example, this will produce an elderly dependency ratio of more than 100 percent in the 2030s. New Zealand would also seem to have one of the strongest rates of overall population growth up to the year 2070. In general, New Zealand's relatively favourable demographic trends are usually accounted for by a mini baby-boom in the late 1980s.

Caveats on the model

All the modelling work that is examined in this report uses the Treasury's medium-term fiscal model, in which economic growth is a function of improvements in productivity (usually estimated at 1.5 percent per year) and total hours worked. The NZIER estimates average economic growth of 1.7 percent per year over the forecast period. The labour force is projected to peak in 2019 and then gradually decline in size. As a result real economic growth falls below the average rate from around this time and is estimated at less than 1 percent per year from 2039. It is important to note that, with an assumption of constant productivity growth, all forecasts will show diminishing rates of economic growth as the ratio of dependants to the employed increases.

The long-term fiscal model uses an accounting approach that has the advantage of being relatively simple and transparent. The model is, however, very sensitive to the assumptions made, in terms of both economic and policy assumptions and the demographic projections. Therefore, this output should be viewed as a range of scenarios rather than a forecast. It does not consider other broader consequences, or how a particular outcome could be achieved by changes in policy. The scenarios described in the report place all the burden of addressing the anticipated problems on to one of the areas examined: tax, social spending, or spending on core government. In reality, the policy options contain a mixture of these.

Although fiscal outcomes are driven in part by economic variables, the model is not well suited to building in feedback effects from the spending levels to the economic variables. The NZIER report discussed the difficulty of estimating tax feedback and incorporated a relationship between the average tax rate and economic growth¹⁶. Some key assumptions about how taxes impact on the economy had to be made to incorporate this effect. In addition, the report did not take any account of the impact of government expenditure or debt levels on the economy. The NZIER cautioned that the results should be treated as experimental. If, as suggested in the economic literature, higher taxes have a negative effect on economic growth, the fiscal problems will be exacerbated if the policy response to an ageing population is to raise taxes significantly. In contrast, the tax feedback effects of tax/GDP targets of either 20 percent or 30 percent increase the ability to fund higher levels of social spending,

¹⁵ Defined in the OECD report as from age 20 to the scheduled retirement age for public pensions.

¹⁶ NZIER (1978) pp. 5-7.

compared with the modelling without tax feedback, due to the increase in economic growth flowing from lower taxation.

The assumptions underlying scenario one are outlined on the following page in Table 2.

Table 2: Scenario one assumptions

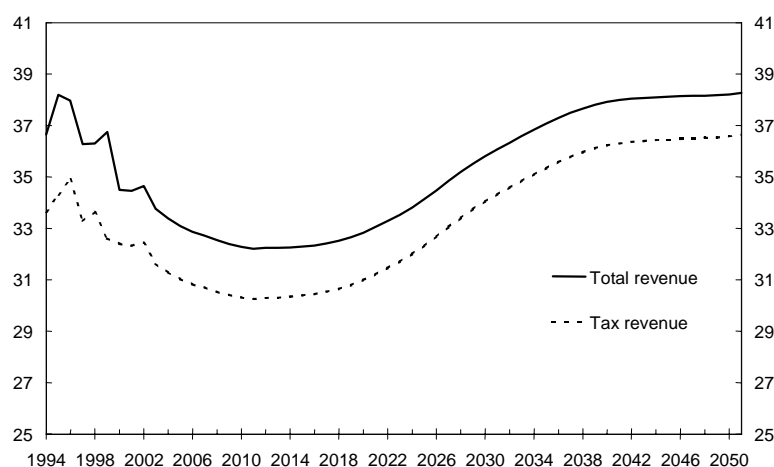
Assumption	
Population: <ul style="list-style-type: none"> • Fertility and morbidity patterns • Net immigration 	Statistics New Zealand medium scenario 10,000 per annum
Economic and fiscal assumptions out to 2002	Treasury: 1999 Budget
GDP depends on: Productivity rate Total hours worked, which depends on: <ul style="list-style-type: none"> • Working age population • Participation rates • Unemployment rate • Average weekly hours 	1.5% per annum From Statistics New Zealand projections From Statistics New Zealand projections Converges to 6% Set constant at last forecast year
Tax bases	Keep as constant percent of GDP after 2002
Prices	1.5% per annum after 2002
Interest rates: <ul style="list-style-type: none"> • 90-day and short-term foreign rates • Government stock and long-term foreign rates 	Converge to 6% per annum Converge to 6.5% per annum
Exchange rate (TWI)	Set constant at last forecast year
Student numbers	Set as percent of relevant population group Primary and secondary students converge to 100% of relevant population Tertiary students set at constant percent of 18 to 24 age group
Numbers of National Superannuation beneficiaries	Set at constant percent of over-65 population.
DPB beneficiaries	Set at constant percent of 16 to 64 age group.
Growth in per-capita social spending: <ul style="list-style-type: none"> • Real • Price 	Set at productivity growth rate CPI deflator
Growth in residual core state spending: <ul style="list-style-type: none"> • Real growth • Price growth 	Population growth rate GDP deflator
Capital spending: <ul style="list-style-type: none"> • Real growth • Price growth 	Set at a level which maintains the real value of government's physical assets at their 2001 level GDP deflator

Summary of the fiscal modelling

In summary, an analysis of the modelling work reveals that there is a significant increase required in tax revenue to meet anticipated increases in demand for services, based on current policy settings. Figure 5 shows the results of the baseline scenario (scenario one). It shows that tax revenue would have to fall from 32.3 percent of GDP in 2001 to 30.2 percent in 2011. From that point tax revenue would need to increase to match growing social spending, reaching 36.6 percent of GDP in 2051, while maintaining a constant net debt/GDP ratio from 2002.

Figure 5: Revenue needed to balance the budget from 2001/02 (Scenario One)

Percent of GDP



From the modelling, superannuation expenditure falls as a percentage of GDP up to 2001 and then is relatively stable until around 2010. From that point superannuation expenditure is projected to increase sharply until the 2040s when it begins to level out. Health expenditure shows a more constant rate of increase. The breakdown of the various components of expenditure is shown in Table 3 on the following page.

Table 3: Updating Scenario One

	Percentage of GDP		
	2001	2025	2051
Tax revenue	32.3	32.3	36.6
Total revenue	34.5	34.1	38.2
Residual core state spending	6.9	5.0	3.6
<i>Health</i>	6.5	8.1	11.1
Debt servicing	2.3	0.9	0.4
Education:			
Primary	1.7	1.3	1.3
Secondary	1.2	1.0	1.0
Tertiary	1.4	1.3	1.3
Other	1.8	1.5	1.4
<i>Total</i>	6.1	5.1	5.0
Social welfare:			
National superannuation	4.6	6.9	9.7
Unemployment benefit	1.8	1.8	1.8
Domestic purposes benefit	1.4	1.4	1.4
Other social welfare	4.8	4.7	5.1
<i>Total</i>	12.6	14.9	18.0
Education	6.1	5.1	5.0
Health	6.5	8.1	11.1
Social welfare	12.6	14.9	18.0
Total social spending	25.2	28.0	34.1

An important feature of the modelling is the assumption that the demand for core government services will be relatively constant compared with social spending (rising only in proportion to overall population growth). This was on the basis that some elements of core government spending (such as policing) are linked to overall demographic change, but otherwise there is no reason to assume that economic growth would increase the demand for such services. This has the effect of reducing projected residual core expenditure by 3.3 percent of GDP by 2051, compared with linking expenditure growth to economic growth. In revising the modelling work we have reconsidered some of the key assumptions. In the section below we posit an alternative outcome.

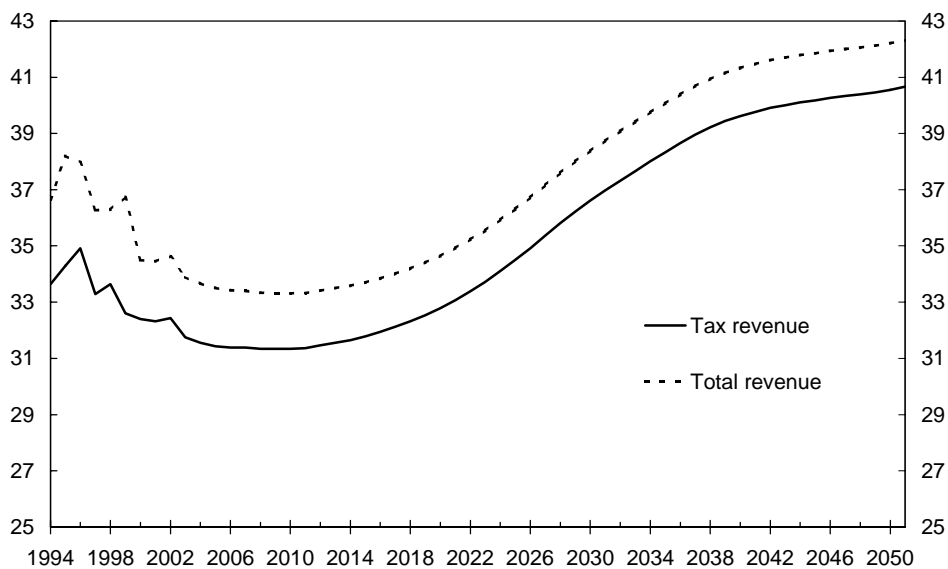
Revising the assumptions

In re-examining the historical data it has become clear that the trend of declining residual core expenditure over the last twenty years is somewhat illusory. When transfers to industry and agriculture are excluded, the level of goods and services produced in the residual core has been relatively constant as a percentage of GDP. For this reason it may be more consistent with historical trends to assume residual core expenditure will grow at the rate of economic growth. Similarly, the assumed rate of annual net migration (10,000 per year) was based on current levels at the time, which have since seen a significant reversal. A figure of 5,000 per year might be more consistent with the long-run historical average. If these assumptions are used, the following projections emerge.

Under these new assumptions, tax revenue rises to 40.7 percent of GDP by 2051, and total revenue to 42.3 percent.

Figure 6: Revising the assumptions*

Percent of GDP



* Based on 5,000 annual net migration and residual core expenditure linked to economic growth. Note altered vertical scale.

The general sensitivity of the model to variations in the assumptions used is summarised in Table 4 on the following page.

Table 4: Sensitivity analysis

	Total Revenue		
	Percent of GDP		
	1999	2025	2051
Technical adjustment*			
growing labour force participation rates (1999)	36.7	34.2	38.5
constant labour force participation rates (1998)	36.7	34.8	38.9
Basic update			
1998	34.9	34.3	38.8
1999	36.7	34.1	38.2
Participation rate variations			
high participation	36.7	33.8	37.9
medium participation	36.7	34.1	38.2
low participation	36.7	34.4	38.5
Migration variations			
0 net migration	36.7	34.9	40.2
5,000 net migration	36.7	34.5	39.1
10,000 net migration	36.7	34.1	38.2
Natural growth variations**			
series 1	36.7	34.0	40.5
series 4M	36.7	34.2	38.5
series 8	36.7	34.3	36.6
Real expenditure growth rate variations			
economic growth rate	36.7	37.7	43.5
productivity growth rate	36.7	35.2	40.7
zero real growth	36.7	29.6	29.3

* Because the labour force participation rates are applied to a slightly different projection series than that used for scenario one, the results for the growing participation rates series are slightly different from those for the basic update. They are shown here to indicate the size of the technical adjustment.

** Series 1: Assuming Low Fertility, Medium Mortality, and Long-Term Net Annual Migration Level of 5000
Series 4M: Assuming Medium Fertility, Medium Mortality, and Long-Term Annual Migration Level of 5000
Series 8: Assuming High Fertility, Medium Mortality, and Long-Term Net Annual Migration Level of 5000

Effect of reducing tax/GDP: summary of the NZIER results

The scenarios used for the purposes of analysis were based on comparing the results of a baseline case with those where either social spending or core government spending were constrained by a tax/GDP target of 20 percent. These results have not

been updated from those produced in 1998. The core government scenario is discussed below. Where the constraint was affected by cutting social spending, the tax target of 20 percent implied reducing social spending to 18 percent of GDP by 2051, from the current level of around 25 percent. This was compared to social spending of 35 percent (with no tax feedback), thereby implying an effective cut in per-capita social spending of more than half. The NZIER also ran this scenario with a 30 percent tax/GDP target. Under this assumption social spending reached 28 percent of GDP by 2051.

Neither of the scenarios, which showed either social spending or core government spending as the residual, allowed for increasing debt above the target of effective net debt equalling zero. While this constraint made some of the reductions required under the tax/GDP targets appear more dramatic, it did not have a significant effect on the result at the end of the forecast period.

Expenditure in core government

One of the findings of the NZIER report was that core government expenditure has already been reduced to such a level that attempts to make use of further cuts in this area would produce almost negligible gains in reducing the overall tax requirement. The NZIER report projected that, if other expenditure followed the assumed growth path and core government spending was constrained within an overall tax/GDP target of 30 percent, core government spending would fall below zero by 2032. When a tax/GDP target of 20 percent was used, core government spending was negative from 2006. The main conclusion regarding core government expenditure is that, while restraining expenditure growth in this area can have a significant effect on the long-term tax requirement, making expenditure cuts will have little effect.

The modelling showed that, if growth in real core government spending can be limited to the rate of overall population growth, then this expenditure will fall as a percentage of GDP from 6.5 percent in 2001 to 3.4 percent in 2051. This fall contributes directly to a lower tax requirement. It also shows that continued pressure on nominal baselines in core government has only limited potential to contribute to off-setting demographic pressure on social spending. The pressure on core government is also indicated by downward pressure on wages in the Public Service. From December 1992 to March 1999 salaries and wages in the Public Service moved by a total of 6.7 percent, as measured by Statistics New Zealand's Labour Cost Index. This compares with a 10.8 percent movement for the economy as a whole.

Analysis of other model runs

The authors also examined three other sources of long-term modelling of government expenditure. These were reports from:

- the Investment Savings and Insurance Association¹⁷ (ISI) (which presented the findings of modelling it commissioned from Infometrics);

¹⁷ Investment Savings and Insurance Association of New Zealand Inc. (1998) *The ISI Report on Retirement Savings: A Wake-up Call*, ISI.

- the World Bank;¹⁸ and
- the PRG report¹⁹ (based on modelling by the NZIER, which was updated in its report to SSC).

While some of the assumptions used in these reports differ slightly, the findings are similar. The Infometrics and PRG reports both estimated that government spending (or total revenue) would have to rise to just over 41 percent of GDP by 2050/51, under a baseline scenario. The World Bank report estimated this figure at just over 42 percent based on a higher assumption of growth in per capita education and health spending. For the baseline scenario (scenario one), we estimated that total revenue (and expenses, under the balanced budget approach) would increase to 38.2 percent of GDP. The main explanation for the difference is that Infometrics, PRG and World Bank modelling assumed that core government spending would increase at the rate of economic growth.

Summary of the trade-offs

The results of the fiscal projections work imply that there is insufficient expenditure in the core government area to enable cuts in this expenditure to have any effect on the long-term fiscal position. This left the scenarios of increasing tax to meet the anticipated increase in demand, or making changes to social spending. The NZIER also noted²⁰ that, while it is difficult to estimate the size of feedback effects from taxation on the rest of the economy, the literature suggests that dealing with the ageing population by putting up tax rates has a negative effect on economic growth.

Based on an assumption that the relative levels of service and income that are currently provided are continued, and therefore that the trade-offs are between alternative means of provision, the model runs suggest the following broad trade-offs:

- Government could gradually increase taxes to 37 percent of GDP by the 2040s, after allowing tax revenue to fall to 30 percent in around 2011;
- Government could reduce the tax/GDP ratio to 30 percent by 2010 and gradually transfer around 20 percent of social expenditure (equivalent to 7 percent of GDP) from public to private financing by 2051, and hold real growth in core government spending to the rate of population growth; and

¹⁸ op cit.

¹⁹ op cit.

²⁰ op cit. pp 5-7.

- Government could reduce the tax/GDP ratio to 20 percent by 2010 and transfer around 48 percent of social spending (equivalent to 17 percent of GDP) from public to private financing by 2051, and hold real growth in core government spending to the rate of overall population growth.

Appendix 1: Government facts at a glance

There are many ways of looking at the impact of Government on the economy. The following tables and graphs present a picture of Government's various roles from a historical perspective.

These various perspectives are all consistent with the trends identified in the international literature. Government has exited from a range of market transactions via its privatisation programme, and this is reflected in considerable reductions in the overall level of government expenditure. However, the remaining "amount" of government (which can generally be categorised as that which is taxpayer funded) has been relatively constant. There have been considerable changes to the composition of government expenditure, however.

During the past twenty years there has been a huge rise, followed by an equally dramatic fall, in public debt and associated finance costs. The steady rise in social welfare payments from the mid-1980s to the early 1990s was halted by a combination of falling unemployment and policy changes to eligibility for national superannuation. Residual core government expenditure fell by a third from 1979 to 1994 due to the reduction in subsidies to industry and agriculture.

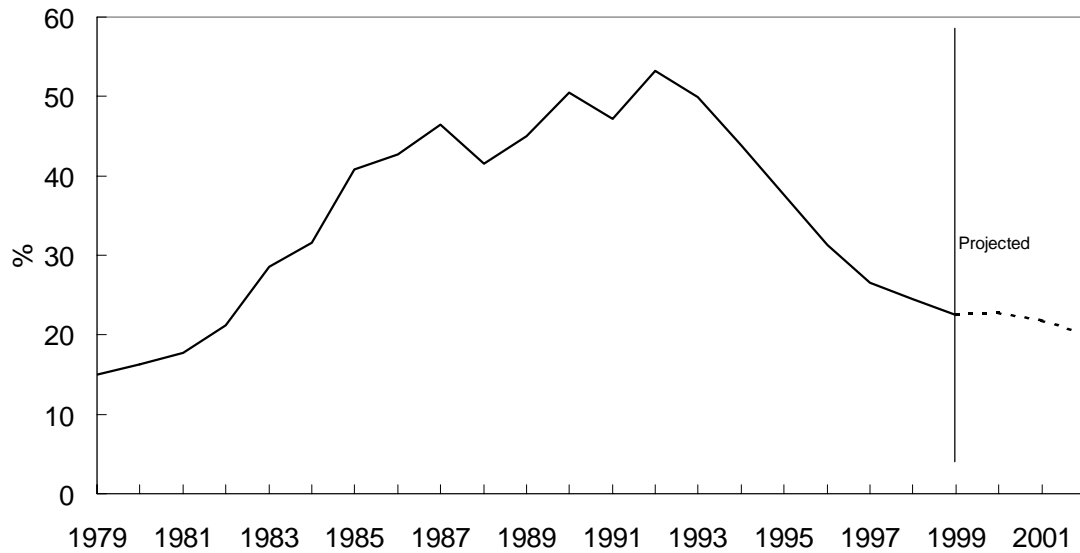
The tables and graphs draw on data from both The Treasury and Statistics New Zealand's National Accounts (SNB) series.

The National Accounts figures are broken down into market and non-market sectors. That is, between those goods and services paid for by Government and those goods and services produced by government-owned organisations (such as SOEs) that are traded in a market. All the National Accounts measures shown exclude transfer payments, GST and financial transactions (such as debt servicing). They include indirect taxes, such as excise duties and road user charges.

Government as a borrower

Figure 7: Net Crown debt

Percent of GDP

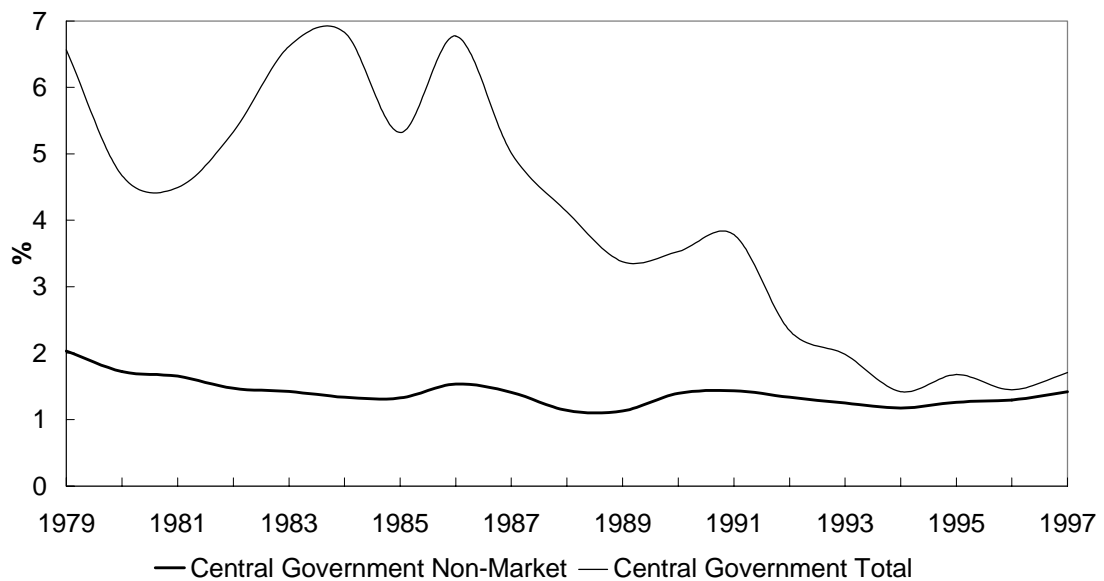


Source: The Treasury

Government as an investor

Figure 8: Central Government gross fixed capital formation

Percent of GDP

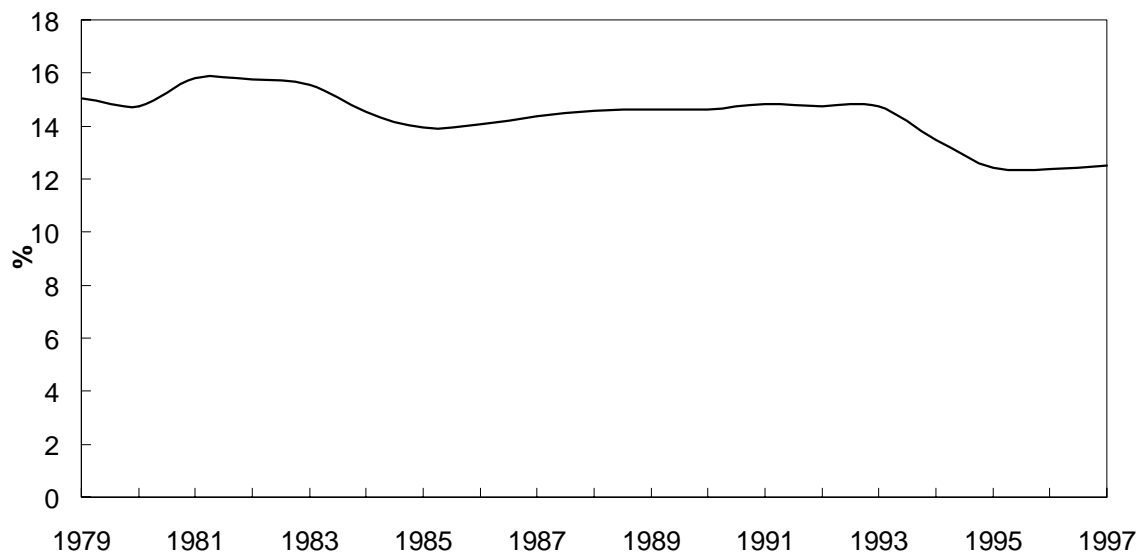


Source: Statistics NZ (National Accounts)

Government as a consumer

Figure 9: Central Government final consumption expenditure

Percent of GDP



Source: Statistics NZ (National Accounts)

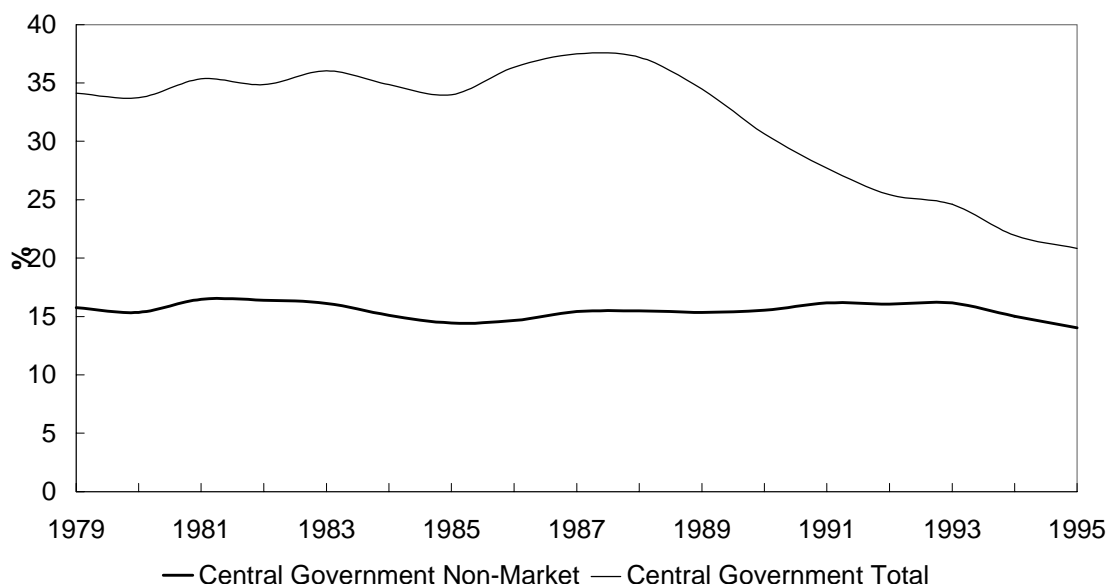
Final Consumption Expenditure measures the value of goods and services consumed by Government. It includes intermediate consumption (goods and services purchased from outside central government) and compensation of employees and indirect taxes, and excludes market transactions (third-party revenue). It also excludes transfer payments to individuals (which in 1997 came to \$13.8 billion) and financial transactions (\$3.4 billion). While the largest transfers were in social welfare (\$10.9 billion), a further \$2.9 billion of transfers were from other areas of Government. Eighty percent of these were in health.²¹

²¹ Statistics NZ: Crown Accounts.

Government as a producer

Figure 10: Central Government gross output

Percent of GDP



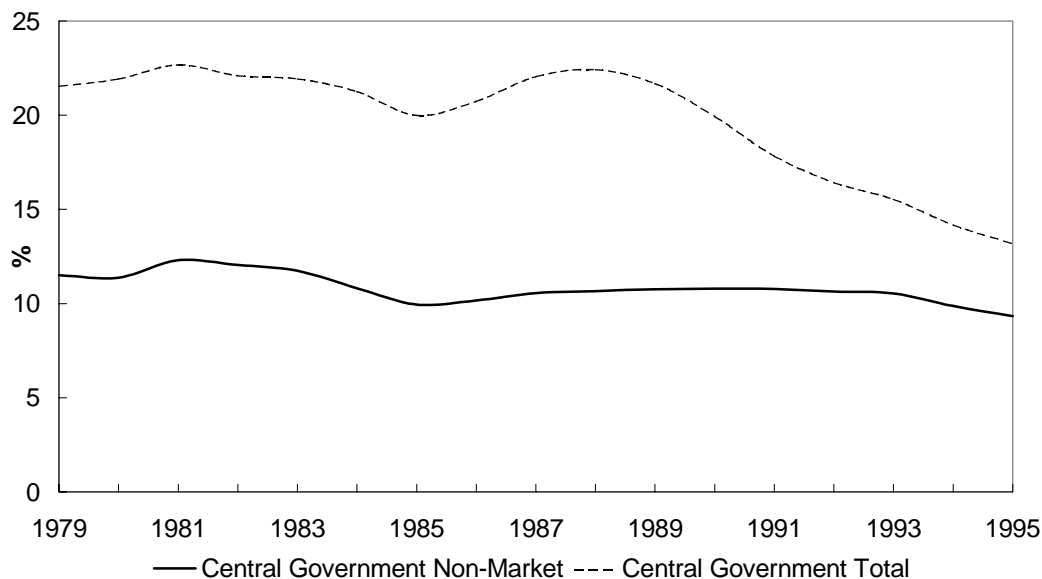
Source Statistics NZ (National Accounts)

Gross Output broadly measures the value of goods and services produced by government-owned organisations. It includes consumption expenditure and market transactions. It does not include transfers to individuals or financial transactions (such as debt servicing). In the central government market sector the value of gross output is equal to total revenue (less the cost of financial transactions). It includes an operating surplus (profit) as well as the cost of intermediate and direct inputs.

In the central government non-market sector, total outlays are the sum of inputs, and there is neither an operating surplus nor are there market transactions. For historical reasons, non-market output does not include any depreciation of capital. This will change when the new system of national accounts (SNA 93) is introduced.

Figure 11: Central Government total value added

Percent of GDP



Source: Statistics NZ (System of National Accounts), GDP by Production Group

The value-added measure of GDP (GDP by production group) excludes intermediate consumption from the Gross Output. As a result it comprises almost entirely compensation of employees and follows a similar path to employment trends (which showed central government non-market employment has stayed at a relatively constant level through the 1990s).

Government as a regulator

Although no New Zealand figures are available, international estimates have placed the cost of regulation at between 4²² and 10 percent²³ of GDP. The following two tables support the preceding graphs. The figures shown refer to total Central Government (market and non-market).

²² Report to Congress on Cost and Benefits of Federal Regulations, Office of Management and Budget, Washington D.C., September 30 1997.

²³ OECD, *Competition and Regulation*, Competition and Regulatory Quality and Public Sector Reform Project, Working Paper No. 2, 1997

The following two tables support the preceding graphs. The figures shown refer to total Central Government (market and non-market)

Table 5: Government spending 1979-97.

Year	Government as a Producer ¹		Government as an Investor ¹		Government Revenue ²		Government as a Consumer ¹		Government as a Borrower ²	
	Value Added	Gross Output	Gross Fixed Capital Formation (GFCF)		Tax Revenue	Total Revenue	Final Consumption Expenditure (FCE)		Net Crown Debt	
	% of Total Value Added	% of GDP	% of GDP	% of Total GFCF	% of GDP	% of GDP	% of GDP	% of Total FCE	% of GDP	
1979	21.8	21.5	34.1	28.7	6.6	29.4	31.9	19.3	15.0	15.0
1980	22.2	21.9	33.7	22.7	4.7	30.4	33.1	19.0	14.7	16.3
1981	22.9	22.7	35.3	21.7	4.5	30.7	33.1	19.9	15.8	17.7
1982	22.4	22.1	34.9	22.5	5.3	31.5	33.6	20.3	15.8	21.2
1983	22.2	21.9	36.0	26.7	6.6	32.1	33.5	19.9	15.6	28.5
1984	21.5	21.2	34.9	27.6	6.8	29.9	32.0	19.1	14.5	31.7
1985	20.3	20.0	34.0	20.9	5.3	30.3	31.9	18.3	13.9	40.8
1986	21.0	20.7	36.3	25.6	6.8	31.4	34.9	18.1	14.1	42.7
1987	23.0	22.0	37.5	22.2	5.0	31.8	34.7	18.8	14.4	46.4
1988	24.1	22.4	37.2	19.0	4.1	34.9	38.3	18.9	14.6	41.5
1989	23.1	21.7	34.5	17.4	3.4	34.4	38.3	18.9	14.6	45.0
1990	21.5	19.9	30.7	17.5	3.5	37.0	40.1	18.7	14.6	50.5
1991	19.3	17.8	27.7	19.8	3.8	35.7	40.2	18.5	14.8	47.2
1992	17.7	16.4	25.4	14.7	2.3	34.4	38.2	18.4	14.8	53.1
1993	16.8	15.5	24.6	12.0	2.0	34.8	37.0	18.5	14.7	49.9
1994	15.3	14.2	21.9	7.8	1.4	34.9	36.6	17.7	13.5	43.8
1995	14.3	13.2	20.8	8.2	1.7	33.3	38.0	16.4	12.4	37.6
1996				6.9	1.5	34.0	37.1	16.2	12.4	31.3
1997				8.1	1.7	32.0	35.0	16.2	12.5	26.6

Note 1: Statistics NZ, National Accounts. Value-added information (GDP by production group) is not yet available for 1996 or 1997.

Note 2: 1979-94, The Treasury, Historical Table 2 series; 1995-97, Statistics NZ, Government Financial Statistics. While total revenue includes income from SOEs and other trading organisations, it does not include the total revenue of those organisations.

Table 6: Government spending 1979-94

Year	Government as a Spender ¹						Government as a	
	Core Govt	Total Core Govt	Education	Social Welfare	Health	Finance Costs	Manager ¹	
	excluding devt of industry						Operating Balance	
	% of GDP						% of GDP	% of GDP
1979	7.5	12.5	5.5	10.9	5.8	5.7	36.0	-8.5
1980	7.1	10.7	5.1	11.0	5.7	5.8	35.2	-5.2
1981	7.4	10.8	5.6	11.3	5.9	6.1	37.0	-6.6
1982	7.5	11.8	5.4	10.9	5.7	6.4	37.3	-6.5
1983	6.8	11.4	5.2	11.9	5.6	6.2	38.1	-6.9
1984	6.3	11.7	4.8	11.6	5.2	7.6	38.5	-8.9
1985	6.1	10.4	4.4	11.3	4.9	7.9	36.9	-7.1
1986	7.0	9.7	4.4	12.0	5.1	7.8	37.5	-4.1
1987	7.0	9.7	4.7	11.8	5.4	6.6	38.1	-9.7
1988	7.1	9.3	5.1	12.6	5.5	5.0	40.4	-1.0
1989	7.2	9.1	5.4	13.7	5.5	2.1	39.8	0.0
1990	7.9	9.5	5.7	14.6	5.3	0.9	41.4	1.7
1991	7.7	9.6	6.1	14.3	5.5	1.3	41.9	2.4
1992	7.2	8.4	6.2	14.7	5.3	5.2	40.4	-1.7
1993	7.2	8.6	6.0	14.3	5.2	2.5	39.4	0.0
1994	6.6	7.9	5.7	13.0	5.1	4.4	36.1	0.8

Note 1: The Treasury, Table 2 historical series (discontinued 1994); core government includes administration, foreign relations, development of industry, and transport and communications. The decline in this item is almost entirely due to reduced spending on the development of industry.

Note 2: Financial Net Expenditure subtracts (total lending minus repayments from total net expenditure) and provides a more robust estimate of total expenditure over time.

Table 7: Government fiscal outlook – percent of GDP

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Forecast</i>	<i>Projected</i>	<i>Projected</i>	<i>Projected</i>
Social security and welfare	16.2	14.2	13.5	13.3	13.2	13.3	13.5	13.2	12.6	12.2
Health	5.6	5.7	5.6	5.7	5.9	6.1	6.6	6.6	6.3	6.1
Education	6.1	5.7	5.5	5.4	5.6	5.8	6.0	6.0	5.8	5.7
Finance costs	5.3	4.7	4.3	4.0	3.2	2.9	2.5	2.2	2.3	2.2
Core Government comprising	8.6	7.5	6.7	6.8	6.6	6.8	7.0	6.7	6.3	6.0
Core Government services	2.0	2.1	1.5	1.7	1.7	1.6	1.7	1.6	1.5	1.4
Law & order	1.4	1.4	1.4	1.3	1.3	1.4	1.5	1.4	1.3	1.3
Defence	1.6	1.3	1.2	1.1	1.0	1.1	1.0	1.1	1.0	0.9
Transport & communications	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
Economic & industrial services	1.0	0.9	0.8	1.1	0.8	0.9	0.9	0.8	0.7	0.7
Primary services	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3
Heritage, culture & recreation	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3
Housing & community development	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.3	0.0	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.1
Net foreign exchange losses/(gains)	0.4	(1.1)	(0.6)	(0.7)	0.0					
Provision for future initiatives						0.0	0.0	0.2	0.8	1.4
Contingency expense provision						0.0	0.0	0.1	0.1	0.1
Total Expenses	42.1	36.7	35.1	34.6	34.3	34.9	35.5	35.1	34.3	33.8
Less										
Foreign exchange (losses)/gains	(0.4)	1.1	0.6	0.7	(0.0)	(0.0)				
Unfunded GSF liability revaluation	(0.9)	(0.1)	(0.2)	(0.2)	0.0	0.2	0.2	0.0	0.1	0.1
NPF guarantee revaluation			0.0	0.0						
Adjusted Total Expenses	40.9	37.7	35.6	35.0	34.3	35.1	35.8	35.1	34.3	33.8
Total Revenue	40.0	37.4	38.9	38.2	36.5	35.8	35.3	33.8	32.2	30.8
Total Revenue less Total Expenses	(2.1)	0.7	3.8	3.6	2.2	0.9	(0.2)	(1.3)	(2.1)	(3.0)
SOEs and Crown Entities	1.0	0.3	(0.6)	0.1	1.0	1.6	1.4	0.8	0.8	0.8
Dividends & other distributions	0.0	0.0	0.0	0.0	0.9	0.4	0.5	0.3	0.3	0.2
Operating Balance	(1.1)	0.9	3.1	3.6	2.0	2.6	2.2	(0.0)	0.7	1.3
Total Assets less Total Liabilities	(10.3)	(7.0)	(3.6)	3.6	7.8	10.1	5.5	5.2	5.7	6.8
Net Crown Debt	49.9	43.8	37.6	31.2	26.4	24.6	22.5	22.8	21.8	20.2

Source: The Treasury 1999, Budget Fiscal and Economic Update (GAAP basis)

Table 8: Government fiscal outlook - \$ million

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Actual</i>	<i>Forecast</i>	<i>Projected</i>	<i>Projected</i>	<i>Projected</i>
Social security and welfare	12,071	11,479	11,724	12,240	12,620	13,003	13,367	13,681	13,736	13,949
Health	4,168	4,602	4,886	5,228	5,626	6,001	6,577	6,822	6,866	6,952
Education	4,539	4,627	4,803	4,949	5,335	5,714	5,910	6,238	6,371	6,498
Finance costs	3,961	3,788	3,757	3,703	3,072	2,804	2,520	2,294	2,454	2,512
Core Government comprising	6,394	6,041	5,781	6,226	6,288	6,676	6,933	6,973	6,918	6,872
Core Govt services	1,464	1,723	1,340	1,565	1,667	1,562	1,714	1,682	1,672	1,635
Law & order	1,054	1,150	1,190	1,234	1,281	1,345	1,527	1,448	1,422	1,431
Defence	1,173	1,049	1,013	970	946	1,065	1,031	1,135	1,113	1,076
Transport & communications	781	815	796	821	888	948	1,018	1,027	1,056	1,083
Economic & industrial services	744	711	673	997	763	840	898	809	773	771
Primary services	372	299	309	304	351	423	342	300	300	302
Heritage, culture & recreation	310	241	233	247	277	297	328	375	391	389
Housing & community development	260	39	46	40	47	29	45	48	45	40
Other	236	14	181	48	68	167	30	149	146	145
Net foreign exchange losses/(gains)	296	-898	-551	-603	12	13	-51			
Provision for future initiatives								250	900	1,580
Contingency expense provision								100	100	100
Total Expenses	31,429	29,639	30,400	31,743	32,953	34,211	35,256	36,358	37,345	38,463
Less										
Foreign exchange (losses)/gains	-296	898	551	603	-12	-13	51			
Unfunded GSF liability revaluation	-664	-111	-155	-226	4	233	217	13	55	74
NPF guarantee revaluation			40	15		5	28			
Adjusted Total Expenses	30,469	30,426	30,836	32,135	32,945	34,436	35,552	36,371	37,400	38,537
Total Revenue	29,838	30,183	33,648	35,059	35,059	35,059	35,059	35,059	35,059	35,059
Total Revenue less Total Expenses	-1,591	544	3,248	3,316	2,106	848	-197	-1,299	-2,286	-3,404
SOEs and Crown Entities	775	211	-553	98	988	1,560	1,433	861	901	912
Dividends & other distributions					905	396	475	280	325	283
Operating Balance	-819	755	2,695	3,314	1,908	2,534	2,164	-36	790	1,504
Total Assets less Total Liabilities	-7,695	-5,628	-3,159	3,344	7,470	9,921	5,456	5,420	6,210	7,714
Net Crown Debt	37,196	35,423	32,581	28,637	25,324	24,069	22,369	23,607	23,756	22,990

Source: The Treasury 1998, Budget Fiscal and Economic Update (GAAP basis)

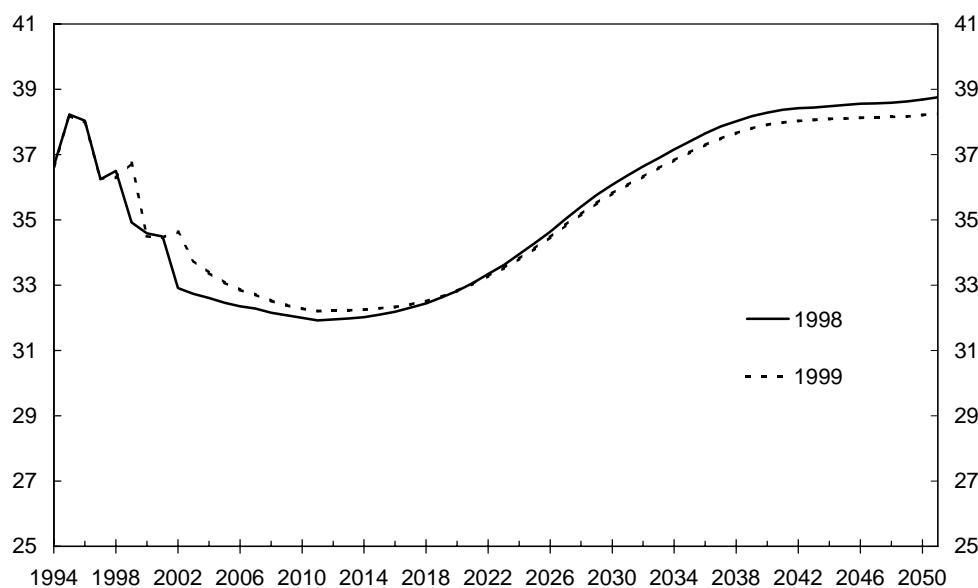
Appendix 2: Sensitivity analysis

Introduction

This appendix looks at the effect on fiscal projections that would arise if different assumptions were to be employed. It also shows the sensitivity of the projections to changes in the shorter term estimates, by updating the work which has taken into account revisions and new forecasts in the 1999 Budget, as well as more recent population and labour-force projections from Statistics New Zealand (SNZ).

The updated modelling confirms that while, in the short run, the scope for expenditure reductions has lessened, the longer term picture is substantially unchanged. In last year's work the total revenue required to balance the budget in 2051 was 38.8% of GDP. The updated projection is 38.2%. This adjustment is almost entirely explained by a technical adjustment to the way in which labour-force participation rates are calculated. The adjustment between the 1998 and 1999 projections is shown in Figure 12 below.

Figure 12: Total revenue required to balance the budget
Percent of GDP



We have examined some alternative assumptions to those used in last year's work, to give a broader picture of the range of plausible outcomes. These include variations in demographic assumptions (migration trends, fertility/mortality patterns and labour force participation) and assumptions of real expenditure growth. The modelling shows that, while varying the demographic assumptions has some effect on the outcome, the overall pattern of increasing pressure on spending is unchanged.

We have also examined some of the assumptions in the long-term fiscal model. In particular, a significant impact comes from our assumptions about whether (and how much) future governments will increase real per-capita expenditure on health and education, and real total expenditure on residual core items. In our base scenario we have linked these to productivity growth (for per-capita social spending) and

population growth (for residual core spending). However, the empirical evidence for these (or indeed any other) linkages is weak. The apparent precision of the projections is somewhat blurred when alternative linkages are examined. Scenarios presented in the paper project a range of total revenue requirements in 2051 of 29-43% of GDP depending on the linkage between economic growth and real expenditure growth. Essentially, the limitation of the projections is that they assume constancy of the pattern of expenditure growth and aggregate demand for goods and services from government, when the essence of the problem is one of change.

Base assumptions

The following results begin with an update of the Scenario One approach used in last year's work. The assumptions underlying Scenario One are detailed in Table 2. Broadly, they assume medium fertility, mortality and labour force participation, annual net migration of 10,000 per year, residual core state spending linked to population growth, and per-capita social spending linked to productivity growth (assumed at 1.5% per year).

Throughout this work the reference to per-capita social spending relates to spending per beneficiary (in health education and welfare) and incorporates adjustments for demographic and economic change. Thus, for example, per-capita health expenditure takes into account the different structure of health costs with an older population.

Updated results

The following graphs and tables show that updating the modelling work has produced a minor change in the long-term projection of government spending. Figure 13 shows that there has been some reduction in the scope for reducing expenditure out to 2020 due to the reduction in economic growth forecasts to 2002. However, this can be almost entirely attributed to a technical adjustment that is discussed on the following page.

Figure 13: Total revenue required to balance the budget
Percent of GDP

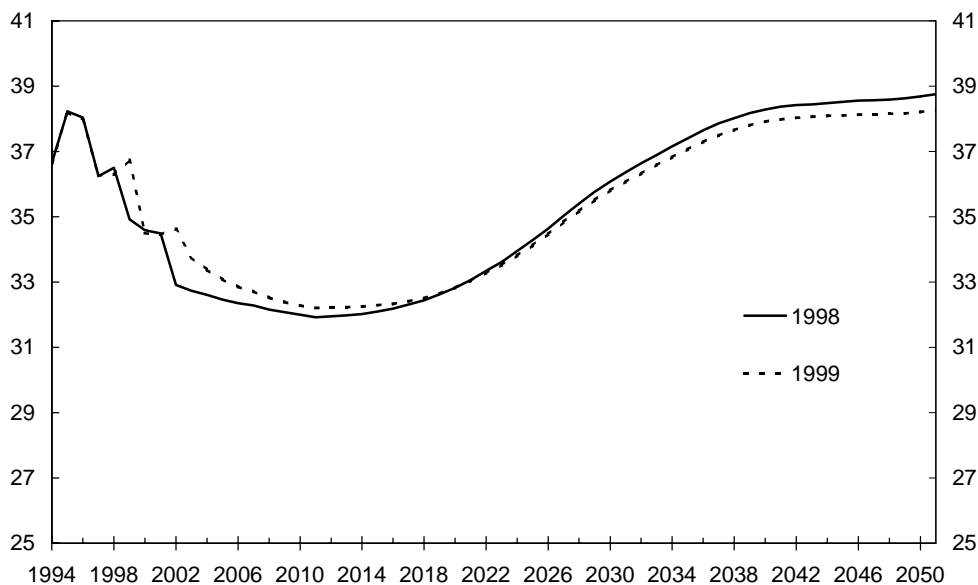
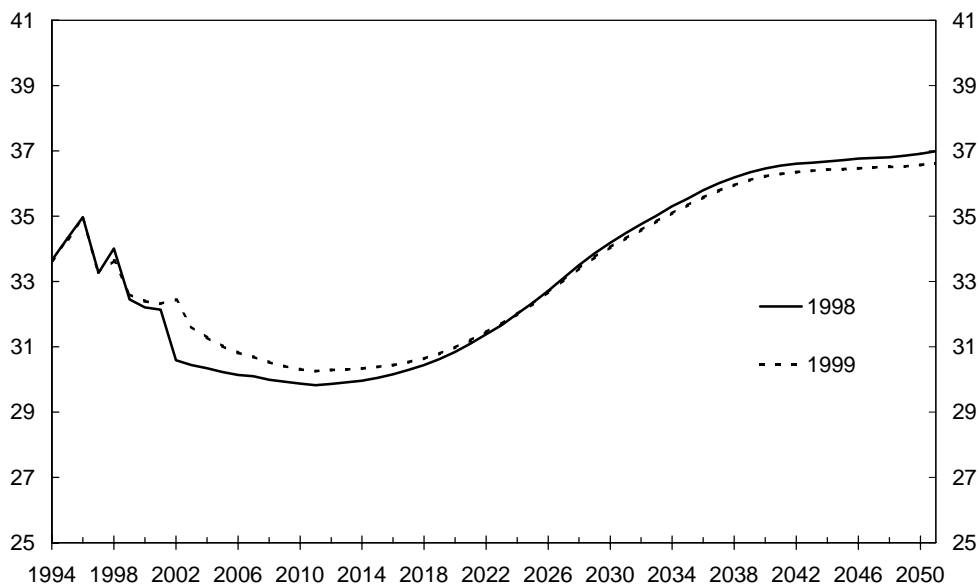


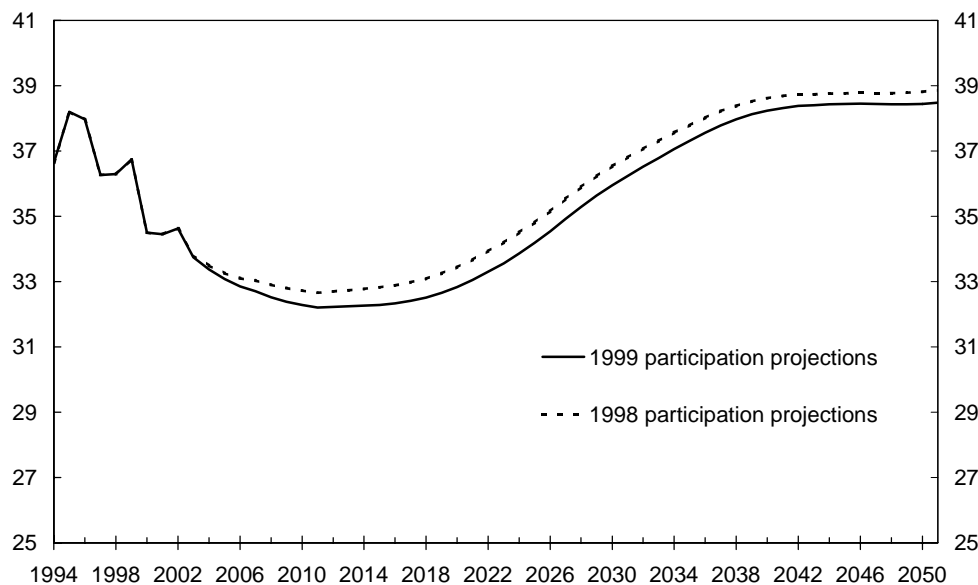
Figure 14: Tax revenue required to balance the budget
Percent of GDP



Technical change

The long-term reduction in the revenue requirement is largely a function of revised labour force projections. In last year's modelling it was assumed that labour force participation rates would remain constant for each age group (although aggregate participation rates would fall as a result of the ageing population). For the current version of the model we have followed The Treasury's lead and included Statistics New Zealand's medium labour-force projection. This incorporates a slight expectation that participation rates for older workers will increase over this period.

Figure 15: Effect of Technical Adjustment to Participation Rates on Total Revenue Required to Balance the Budget
Percent of GDP



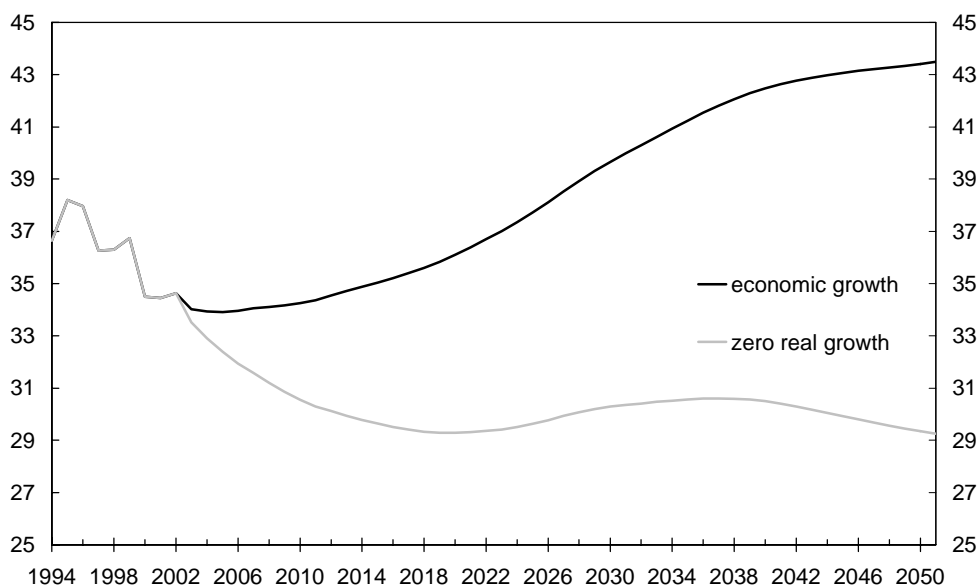
Alternative drivers of expenditure

The following graphs indicate that the importance of the rate at which we project the various expenditure items will grow in real terms. With social welfare payments this is relatively straightforward, as there is a clear policy prescription in place. For example, New Zealand Superannuation expenditure will remain constant in real terms until 2005 when it reaches the lower limit of 60% of the ordinary after-tax wage. From then on it will increase in real terms by 1.5% per year (the assumed rate of productivity increase which is linked to the average wage rate).

In other areas of social spending there are no such explicit links between expenditure and economic growth. In the absence of a clear policy framework it is difficult to make assumptions about the rate of growth in real expenditure. An analysis of real expenditure growth over the 1992-2002 period showed a relatively strong correlation between economic growth and expenditure growth for education and health, but very little correlation for the residual core (as we have defined it). It was for this reason that residual core expenditure was linked to the (lower) rate of population growth, but this might be similarly arbitrary. In addition, health expenditure increased at more than twice the rate of education expenditure. Alternative drivers of expenditure growth that have been modelled include increasing residual core spending and per-capita social spending (excluding social welfare benefits) by the rate of economic growth, and also showing the effect of zero real growth in these items.

Figure 16: Total revenue: alternative linkages between economic growth and real spending

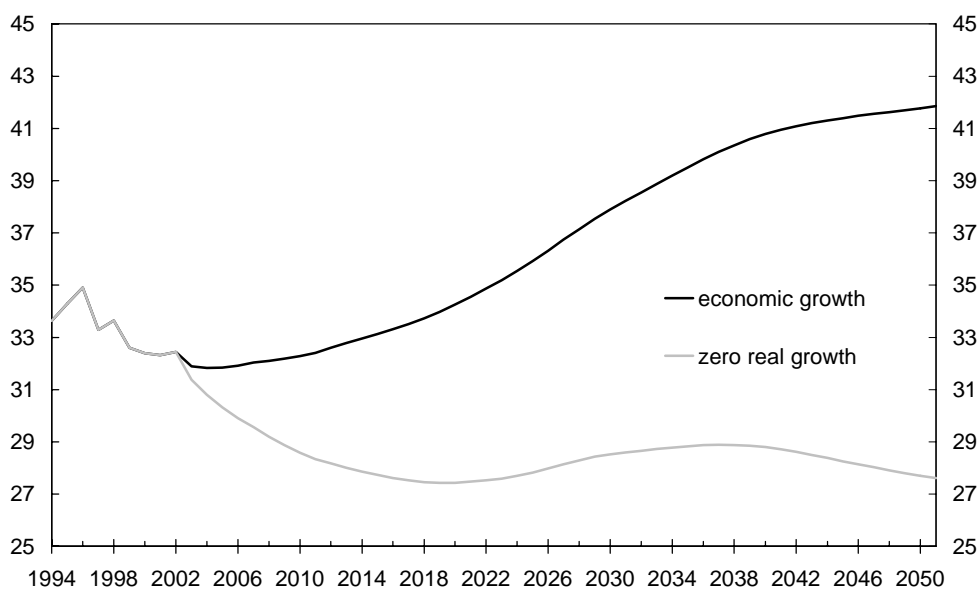
Percent of GDP



Note: This uses Scenario One demographic assumptions. In each case social welfare benefits grow by the productivity rate, while other social and residual core spending varies.

Figure 17: Tax revenue: alternative linkages between economic growth and real spending

Percent of GDP



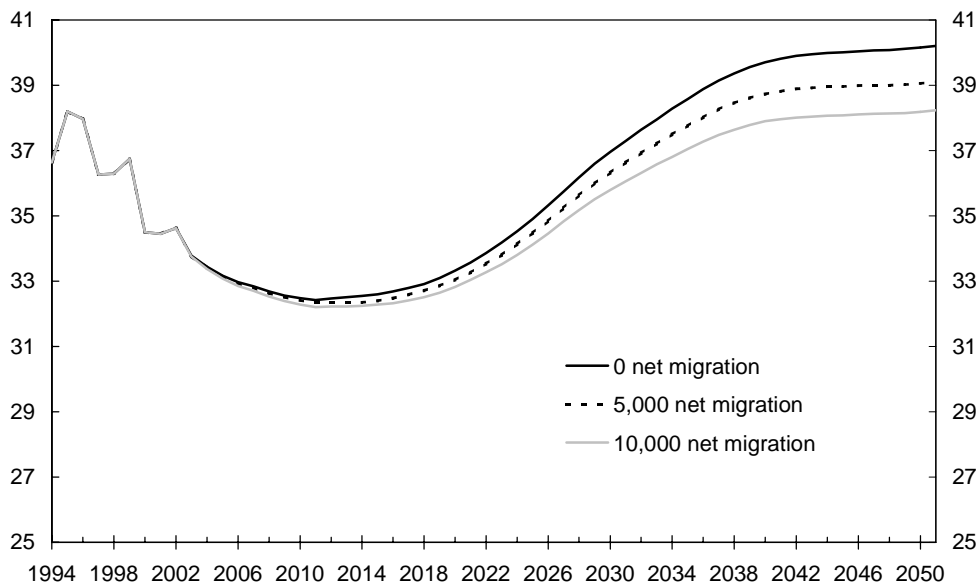
Note: This uses Scenario One demographic assumptions. In each case social welfare benefits grow by the productivity rate, while other social and residual core spending varies.

The nature of the demographic pressure that will occur on expenditure is such that it implies, at a macro-level, a fundamental re-examination of the balance between government and non-government spending. If per-capita social spending and residual core spending increase at the projected rate of economic growth, taxpayers will have to agree to fund a substantial re-balancing towards government spending. The graphs above indicate how fundamental the linkage between expenditure growth and economic growth is, with total revenue required at 2051 ranging from 29-43% of GDP under the various assumptions.

Alternative migration assumptions

In Scenario One we have assumed that annual net migration would average 10,000 per year. This was based on current policy settings rather than historical trends. The past year has seen net migration levels fall dramatically in response to policy changes. As a result, reverting to the long-run historical average of around 5,000 per annum may be more appropriate. The relatively small effects of the different migration scenarios are shown in the figures below.

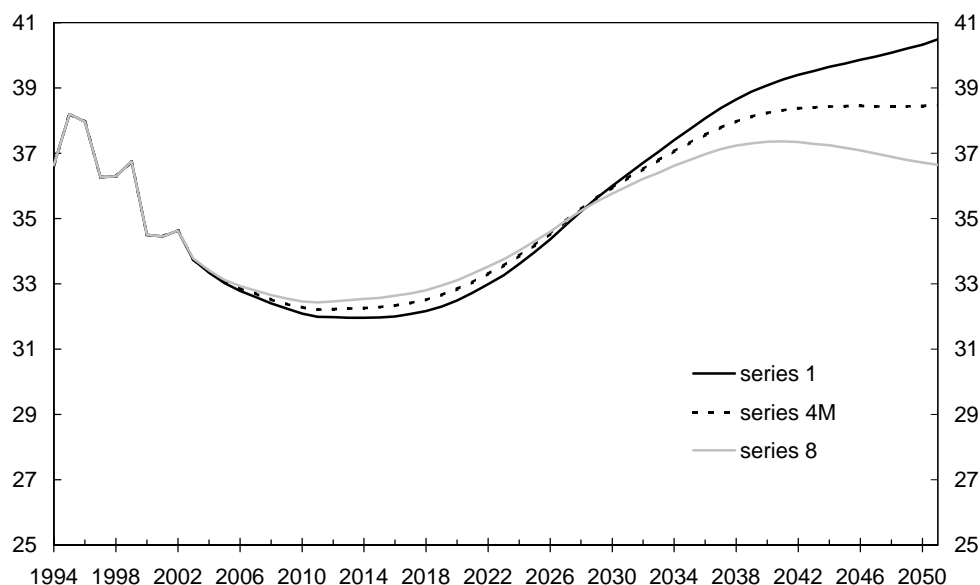
Figure 18: Total Revenue: Alternative Migration Scenarios
Percent of GDP



Alternative fertility and mortality assumptions

The following graph shows the effect of varying the assumptions of fertility and mortality. To do this, we have compared Statistics New Zealand’s extreme population projections with their medium projection. The impact of these is relatively small until around 2035, at which point they start to diverge significantly.

Figure 19: Total Revenue: Alternative Fertility/Mortality Assumptions
Percent of GDP



Source: Statistics NZ Population Projections

Series 1 : Assuming Low Fertility, Medium Mortality, and Long-Term Net Annual Migration Level of 5000
 Series 4M : Assuming Medium Fertility, Medium Mortality, and Long-Term Net Annual Migration Level of 5000
 Series 8 : Assuming High Fertility, Medium Mortality, and Long-Term Net Annual Migration Level of 5000

Conclusion

The updating of the fiscal modelling work has confirmed the picture painted last year. While there has been considerable volatility in short-term economic forecasts over the past year, these have not had a substantial effect on the long-term projections. This Appendix has explored the sensitivity of the modelling to variations in the underlying assumptions. Although these have not exposed a wide range of plausible demographic outcomes, they have shown the sensitivity of the model to the choices that future Governments will make, in terms of choosing between real increases in government spending and keeping tax rates close to current levels.

Appendix 3: Core versus transfer and consumption expenditure

Purpose

The medium-term fiscal modelling took an aggregate approach which (with one exception) classified government spending vote-by-vote, either as transfer expenditure or residually as “core expenditure”. In effect, this finessed the issue of what constitutes “core Government”. This report scopes how to undertake a more finely-segmented separation of “core” and “consumption” expenditure.

Introduction

In our fiscal modelling work we defined core expenditure by Government as the residual, after subtracting social spending and debt servicing from total expenditure. This highly-aggregated approach was taken because the alternative approaches involved fundamentally normative judgements about what was core expenditure and what was not.

This appendix examines the linkage between trends in ‘core expenditure’ and the debate about the ‘capability’ of state sector organisations. Capability may be defined as having, or being able to access, the appropriate combination of resources, systems and structures necessary to deliver the organisation’s outputs to customer-specified levels of performance on an on-going basis into the future.²⁴

This quantitative work is in response to a perceived need for better information on the extent to which downward pressure is being put on “core expenditure” and, as a result, on the capability of Crown-owned organisations to produce “core services”. (Throughout we use ‘services’ as shorthand for ‘goods and services’.) However, the quantitative work does not say anything about changes in the capability of Crown-owned organisations unless we were also to measure (at least) changes in factor productivity and factor prices.

The link between expenditure and capability remains a difficult area. We discuss some of the conceptual and measurement problems that limit the extent to which pressures on capability can be identified from expenditure trends.

Alternative approaches to defining core expenditure

The discussion above points out the difficulty of making judgements that distinguish core from non-core, without clear decision rules. Neither the “constitutional” approach nor the “efficiency” approach yield an “off-the-shelf” method.

In considering alternatives to this aggregated approach we have identified two which appear to have some merit, and which existing data sources appear to allow us to pursue more or less thoroughly. Both approaches imply more detailed analysis than that undertaken in our earlier fiscal modelling work.

²⁴ State Services Commission: *Report on the Capability Project*, Paper prepared for the Minister of State Services, 1999.

Option One: A public goods approach

One approach to defining core expenditure would be to define it only as central government expenditure on public goods. The strict economic criteria for pure public goods are: non-rivalry in consumption (use by one person does not deny others use of the good); and non-excludability (the benefits of use cannot be limited to any one group). Private goods, by comparison, are both rival and excludable. In between is a spectrum of mixed private and public goods, some publicly provided, some privately provided.

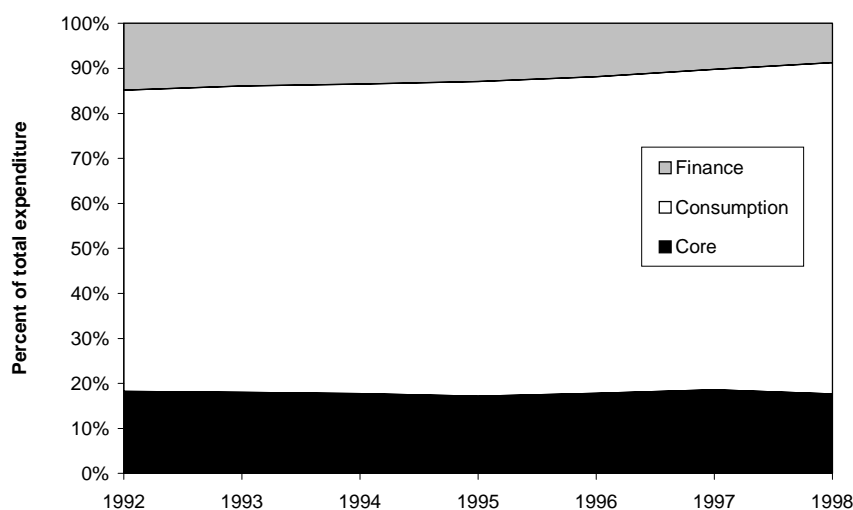
Some goods funded by governments are often identified as meeting the strict criteria for a public good, such as defence, law and order, and public health. Expenditure by Governments on other goods, such as education, is often rationalised in terms of the public benefits resulting from their use. Because of the public benefits, these goods do not meet the excludability criterion for a private good. Nor do they meet the strict criteria for a public good, but there may be a case for including at least part of government expenditure on these goods as ‘core expenditure’, especially where the public benefits are large.

The empirical challenge in these cases is to establish the private/public split of these so-called ‘mixed goods’. This split should be made on the basis of benefits but, as these are difficult, if not impossible, to estimate, we must resort to costs as the basis for the split.

The public goods approach must address some difficult conceptual and empirical issues. In addition, it must be acknowledged that this approach is neutral as to the identity of the suppliers of public goods (or goods which generate substantial public benefits). Thus, this approach offers only a weak link to the debate about the capability of state sector organisations.

Using the empirical approach to identifying public goods contained in Appendix 2, the spending trends from 1991/92 are as follows.

Figure 20: Identifying core government using a public goods framework



Source: Statistics NZ: The Crown Accounts

Table 9: Trends in real expenditure using a public goods framework \$1991/92*

	Core		Consumption		Finance	
	\$M	% of GDP	\$M	% of GDP	\$M	% of GDP
1992	5,194	7.1	19,101	26.1	4,239	5.8
1993	5,139	6.7	19,449	25.5	3,992	5.2
1994	4,992	6.1	19,399	23.5	3,809	4.6
1995	4,947	5.7	20,103	23.0	3,726	4.3
1996	5,148	5.8	20,311	22.9	3,428	3.9
1997	5,599	6.1	21,435	23.5	3,072	3.4
1998	5,255	5.8	21,899	24.1	2,600	2.9

*Converted to real terms using the implicit deflator for general government final consumption expenditure

Source: Statistics NZ: The Crown Accounts

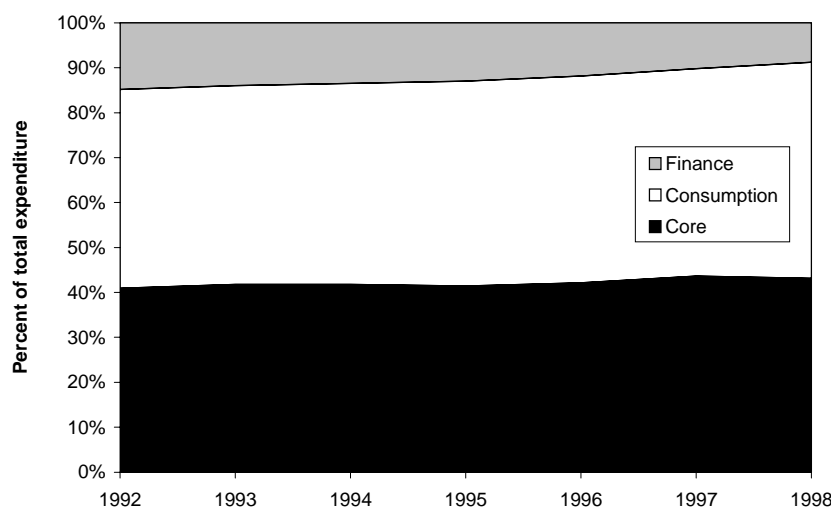
Option Two: Spending on state sector organisations

The alternative approach to estimating the size of ‘core expenditure’ is to define it as government expenditure on goods and services provided by state-owned organisations. We have taken the current scope of state sector production as given rather than ask the question “What goods and services should be produced by State sector organisations?”

This state sector spending approach provides a more direct link to the debate about the level of government expenditure and the capability of state sector organisations. However, significant difficulties in drawing conclusions about capability from expenditure trends still have to be acknowledged. These are discussed below.

Using the empirical approach to identifying expenditure on state sector organisations contained in Appendix 2 the spending trends from 1992 are as follows:

Figure 21: Identifying core government by expenditure on state sector organisations



Source: Statistics NZ: The Crown Accounts

Table 10: Trends in real expenditure in state sector organisations \$1991/92*

	Core		Consumption		Finance	
	\$M	% of GDP	\$M	% of GDP	\$M	% of GDP
1992	11,689	16.0	12,605	17.2	4,239	5.8
1993	11,949	15.6	12,639	16.6	3,992	5.2
1994	11,799	14.3	12,592	15.3	3,809	4.6
1995	11,917	13.7	13,133	15.1	3,726	4.3
1996	12,178	13.7	13,280	15.0	3,428	3.9
1997	13,145	14.4	13,889	15.2	3,072	3.4
1998	12,840	14.1	14,314	15.8	2,600	2.9

* Implicit deflator for general government final consumption expenditure

Source: Statistics NZ: The Crown Accounts

Analysis of spending trends

What is most striking about the expenditure trends, using both methods, is the relative stability of core expenditure. The real expenditure is calculated using the implicit deflator for general government final consumption expenditure, which is input based. Arguably input price indexes for government as a whole are too aggregated. It would be possible to generate sector-specific deflators (e.g. for the education and health sectors). Because this deflator is input based, it assumes zero productivity growth. In our work on Strengthening Strategic Management last year, we examined the international literature on public sector productivity and concluded that we would generally expect productivity growth to be positive, although less than the economy-wide average.

We could go further, by commissioning sub-sector runs of data from Statistics NZ, but there is nothing to suggest that the broad trends would be altered, just the absolute levels.

Conclusion

This Appendix has pointed to the difficulty of establishing a coherent and consistent methodology for identifying core expenditure. We have examined the available data sources against two alternative methods for identifying core expenditure. This examination has confirmed that core spending has been stable, in both real terms and as a percentage of total expenditure, since 1991/92.