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Sovereign Net Worth: An Analytical Framework

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TREASURY WORKING PAPER

99/3

Sovereign Net Worth: An Analytical Framework

Simon Bradbury, Jim Brumby & David Skilling*

ABSTRACT

The Fiscal Responsibility Act requires the Crown to articulate targets for a series of fiscal variables, including net worth. Given the dramatic improvement in the fiscal position in recent years, a critical policy question relates to how (and which) measures of Crown net worth should be targeted. This paper sets out a framework for targeting Crown net worth. It does so by supplementing the GAAP-based measure with forward-looking information about spending and tax revenue. The paper argues that targeting net worth for the Crown requires the estimation of a path, rather than a static level.

Editorial note: This paper was completed in September 1997 before the Treasury's Working Paper Series was established. It represents the state of work at that time. It has been included in the series now as a useful reference point for future policy development. Readers should be aware that some aspects of the paper have been overtaken by subsequent events, and some of the issues raised have been addressed in later work, some of which is reflected in other papers in the Working Paper Series.

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Disclaimer: The views expressed are those of the author(s) and do not necessarily reflect the views of the New Zealand Treasury. The Treasury takes no responsibility for any errors or omissions in, or for the correctness of, the information contained in these working papers.

1 INTRODUCTION

The first Crown financial statements were published by the New Zealand Government in April 1992, and covered the six-month period ended 31 December 1991. The financial statements were part of a wider suite of public sector management reforms designed to improve the efficiency of the public sector, strengthen its accountability arrangements, and improve financial management practice.

Most of the financial management reforms, including the requirement to produce biannual Crown Financial Statements, were legislated in the Public Finance Act 1989. The Act required the financial statements to be prepared in accordance with generally accepted accounting practice (GAAP) and to contain, *inter alia*, a “...statement of financial position of the Crown at the balance date”.

Given the dramatic improvement in the fiscal position in recent years, as outlined in Annex 1, a critical policy question relates to how (and which) measures of Crown net worth should be targeted. The Fiscal Responsibility Act requires the Crown to articulate targets for a series of fiscal variables, including net worth. As a minimum the Act requires the Crown to achieve and maintain levels of net worth that provide a buffer against factors that may impact adversely on net worth in the future.

This paper sets out a framework for targeting Crown net worth. It does so by supplementing the GAAP-based measure with forward-looking information about spending and tax revenue. The paper argues that targeting net worth for the Crown requires the estimation of a path, rather than a static level.

The paper is organised as follows:

- Section 2 discusses the accounting framework under which net worth is measured in the Crown financial statements.
- Section 3 introduces the intertemporal budget constraint.
- Section 4 relates the intertemporal budget constraint to the GAAP-based measure of net worth.
- Section 5 outlines a stylised model for determining long term fiscal policy settings.
- Section 6 discusses the framework for optimal fiscal policy settings.
- Section 7 draws conclusions from the analysis.
- *Annex 1* provides a descriptive analysis of the Crown’s net worth track.

2 THE GAAP MEASUREMENT SYSTEM

The New Zealand Government has prepared a set of GAAP-based financial statements since 1992, and since the 1994/95 fiscal year, all fiscal and financial forecasting and reporting has been on a GAAP basis. The predecessor to the GAAP-based reports was the Table 2 series, which was prepared on a cash basis.¹

The financial statements are for the Crown reporting entity, as defined in the Public Finance Act 1989. This comprises:

- Ministers of the Crown
- Government departments
- Offices of Parliament
- Reserve Bank of New Zealand
- State owned enterprises
- Crown entities

The GAAP series is prepared on an accruals basis and includes three principal statements:

<i>Statement</i>	<i>Financial indicator</i>
Statement of Financial Performance	Operating balance (surplus/deficit)
Statement of Financial Position	Crown balance (reported net worth)
Statement of Cash Flows	Net cash flows from operating and investing activities

New Zealand is the only sovereign to have adopted full GAAP-based reporting in place of cash-based or accrual-enhanced national accounting frameworks. This decision was primarily based on the benefits from using a measurement and reporting system which adopted a private sector framework to determine the treatment of transactions. This was seen to have a number of features which made it preferable to the former Table 2 series. These benefits included:

- clear standards of legally determined accounting policies set by an independent professional body; and
- a comprehensive set of accounts which reconcile cash, operating, and balance sheet statements.

Accordingly, GAAP was seen as providing a more credible means of information revelation, thereby allowing better financial decision making by both the government

¹ The Table 2 series was broadly similar to the GFS series.

and the population. As such, GAAP was seen as contributing to the reduction in the potential inefficiencies associated with fiscal illusion.²

The main statements of the GAAP series are all interrelated. Financial performance will affect financial position through increases and decreases in assets and liabilities. The Statement of Cash Flows records transactions that can relate either to operating items in the Statement of Financial Performance, or to movements in assets and liabilities in the Statement of Financial Position.

An algebraic representation of the Statement of Financial Performance is as follows:

$$OB_t = TR_t - (G_t + H_t + dA_{t-1} + iD_{t-1}) + P_t + V_t + \Delta GSF + (fx_t - fx_{t-1})FD_t + \Phi_t^{SOE} + \Omega_t^{SOE} \quad (1)^3$$

where:

<i>OB</i>	=	Operating balance
<i>TR</i>	=	Tax and other core Crown revenue (excluding investment income)
<i>G</i>	=	Government consumption expenses
<i>H</i>	=	Subsidies and transfer payments (other than interest charges)
<i>dA</i>	=	Depreciation of physical assets
<i>iD</i>	=	Net interest expense on net debt
Π	=	Profit/loss on disposal of assets, and asset write-downs
<i>V</i>	=	Revaluations of commercial forests
<i>DGSF</i>	=	Changes in the value of the unfunded liability in the government superannuation fund
<i>fxFD</i>	=	Net foreign exchange gains/losses on value of foreign-currency denominated debt
F^{SOE}	=	Dividends received from SOEs and Crown entities
W^{SOE}	=	Net undistributed surplus/deficit of SOEs and Crown entities

The key indicator of cash flows is the financing capability, which is equivalent to net cash flows from operations, less net purchases of physical assets less investing cash flows that do not affect net public debt. (See equations (6) & (7)).

The inclusion of a balance sheet in the GAAP series provides what is often the missing link in more traditional bases of fiscal reporting. For example, under the Table 2 series, proceeds from asset sales were included in financial net expenditure and hence increased the reported surplus and reduced the financing requirement. It was not possible however for a user to determine whether the asset had been sold at a gain or a loss. With the GAAP series, when an asset is sold:

- The proceeds are compared with the book value of the asset, and the resulting gain or loss is reported in the Statement of Financial Performance;

² Refer to Oates (1988) for a discussion of fiscal illusion.

³ t = end of period balance; $t-1$ = opening balance, or closing balance of previous period

- The asset is extinguished from the balance sheet; and,
- The cash proceeds from the sale flow through the Statement of Cash Flows, and reduce the financing requirement.

Underpinning GAAP in New Zealand are the Statement of Concepts for General Purpose Financial Reporting, Financial Reporting Standards (FRSs) and Statements of Standard Accounting Practice (SSAPs). The Statement of Concepts sets out the concepts that underlie the preparation of general purpose financial reports for external users. FRSs and SSAPs contain guidance and prescriptions concerning the accounting policies for recognition and disclosure (in general purpose financial reports) of specific items. An independent body, the Accounting Standards Review Board reviews and approves accounting standards. The accounting policies adopted under GAAP are thus independent of government.

The Statement of Concepts sets out a framework for the recognition of assets and liabilities in a Statement of Financial Position. This may be summarised as follows:

Table 2.1 ASSETS AND LIABILITIES - CHARACTERISTICS AND RECOGNITION CRITERIA	
<p>Assets</p> <p><i>Essential characteristics</i> There must be service potential or future economic benefits, over which the Crown must have control.</p> <p>The transaction or other event that gives rise to the Crown's control must have occurred.</p>	<p>Liabilities</p> <p><i>Essential characteristics</i> There must be a present obligation - the Crown must have a duty or responsibility to sacrifice service potential or future economic benefits to one or more other entities.</p> <p>The transaction or other event that gives rise to this obligation must have already occurred.</p>
<p>Recognition criteria</p> <p>It must be probable that the service potential or future economic benefit (or the sacrifice thereof, in the case of liabilities) will take place.</p> <p>The amount of the asset or liability must be capable of being measured reliably.</p>	

Reported net worth is the difference between those assets and liabilities that both have the above characteristics, and meet the recognition criteria. That is to say, reported net worth at a particular point in time is the difference between the value of recognised Crown assets and the value of recognised Crown liabilities, both measured in accordance with GAAP.

Making an assessment on whether or not particular assets or liabilities should be recognised on the balance sheet is often a matter of judgment depending on the circumstances. For instance, the estimated present value of the Government's obligations to members of the GSF scheme is recorded as a liability, but the estimated present value of the Government's obligations to pay War pensions to veterans is not. Similarly, the present value of future tax revenues is not recognised as an asset, but the service potential embodied in the State highway network is included.

A representation of the net equity position of the Crown as reflected in the GAAP based balance sheet is as follows:

$$RNW_t = A_t^{PHYS} + WC_t + A_t^{SOE} + A_t^{OTH} - FD_t - DD_t - C_t - GSF_t \quad (2)$$

where:

RNW	=	Reported net worth (Crown balance)
A^{PHYS}	=	Physical assets
A^{SOE}	=	Financial interest in SOEs and Crown entities
A^{OTH}	=	Other assets (inventories, other investments and intangibles) less other liabilities
WC	=	Working capital (current assets - other than those assets captured in net debt - less current liabilities)
FD	=	Net foreign-currency-denominated debt
DD	=	Net New Zealand dollar-denominated debt
C	=	Currency in circulation
GSF	=	Liabilities associated with the government superannuation fund

The decision as to whether or not to include assets and liabilities on the GAAP-based balance sheet is a judgement based on the relevant accounting standards, as well as an analysis of the benefits expected to be derived from providing the information and the cost of providing it.

However, although questions of measurement and inclusion/exclusion are significant, they do not mean that the Crown balance sheet merely becomes an exercise in applied accounting theory. Indeed, financial and fiscal reporting under GAAP provides a closer approximation to economic substance than other financial reporting systems.

2.1 Accounting Policy Developments

Changes in accounting policy can have a significant impact on reported net worth. While the Crown reporting entity is now stable, a number of accounting policy issues are under consideration which may impact on reported net worth:

2.1.1. *Claims Obligations of the ARCIC scheme*

The Accident Rehabilitation and Compensation Insurance Corporation (ARCIC), which operates New Zealand's no fault accident compensation scheme, has an obligation in respect of claims already accepted but which will be paid in future years. This obligation is not recorded as a liability on either its or the Crown's balance sheet.

2.1.2. Other liabilities

The general principles used to determine when liabilities should be recognised in the balance sheet are set out in the Statement of Concepts, and are summarised above. Application of these principles is however difficult in respect of certain obligations of the Crown.

The appropriate treatment of various obligations is currently under consideration. These include: promissory notes issued in favour of the IMF, the International Bank for Reconstruction and Development, and the Asian Development Bank (which total around \$1.2 billion); Overseas Development Aid commitments; and obligations for welfare benefits. The outcome of this work may result in the recognition of liabilities that are not currently on the balance sheet.

3 INTERTEMPORAL BUDGET CONSTRAINT

3.1 Introduction

This section introduces the concept of an intertemporal budget constraint (IBC). This construct will then be applied in a GAAP framework in section 4.

3.2 Discussion

The paper introduces the IBC as it applies to the central government sector as a basis for expanding the notion to cover the wider Crown concept applied in New Zealand. Further, consistent with mainstream public finance literature which overwhelmingly concerns itself with cash concepts, we begin by applying the IBC to cash measures. We then apply this construct to the specific institutions associated with the organisation of government in New Zealand - specifically across the Crown on a GAAP basis.

Much of the recent literature in public finance addresses the question of financial sustainability in terms of the relationship between the budgetary aggregates, and whether the projected cash outflows can be financed by the projected cash inflows under current policy settings.⁴ If this is not the case, then from an *ex ante* point of view the financial or fiscal settings are not sustainable.

This is not to say that the entity will be unable to meet its commitments at any particular point - that will depend on its ability to access funds at that point - but it does signal that a change in aggregate budgetary policy will be required at some stage.

There are many arithmetic depictions of the solvency identity (refer Blanchard (1990, 1993), Buiters (1990), Bohn (1995)), which differ primarily on the degree of disaggregation that is applied in stylising the relationship.

In any given period the budget identity - limited to all operating receipts and payments - is as follows:

$$\Delta D_t = G_t - (TR_t - H_t) + iD_{t-1} \quad (3)$$

This equation shows changes in the debt stock (ie. borrowings) finance government consumption, transfers and interest payments, net of tax and other receipts.

The goods and services spending, transfers (other than interest charges) and tax items in the equation are sometimes referred to as the primary balance (at this stage we have not introduced capital transactions). Via substitution, the budget identity for any time becomes:

$$\Delta D = -P + iD \quad (4)$$

⁴ With this in mind, note that the variables in Equations 3 - 6 are expressed in cash, as opposed to accrual, terms. This notation therefore has a different meaning from that intended elsewhere in the paper.

where

$$P = \text{primary surplus (deficit)} = TR - (G + H)$$

This equation shows that the change in debt is determined by the amount of any primary budget surplus less interest costs in servicing the debt.

The primary balance measures only core or general government - it does not include the cash-flows generated in the non-general government sector, such as in commercially operated Government businesses, which may neither place any call on government debt nor rely directly on taxation. The depiction also fails to reflect any stocks other than debt.

3.3 Estimating budgetary position through time

An alternate way to express this relationship which is especially helpful when comparing positions with respect to time and between jurisdictions is in terms of ratio to GDP. With the decapitalised letters representing ratios to GDP, the relationship becomes:

$$\frac{dd}{dt} = g + h - tr + (i_r - q)d = p + (i_r - q)d \quad (5)$$

where:

q = real growth rate in GDP
 t = time
 i_r = real rate of interest

This equation shows that with respect to time, debt will change by the amount of government consumption and transfers minus tax receipts and the differential between the interest rate and the growth rate as it applies to the stock of debt.

Through time, budgetary policy seeks to establish a sequence of amounts for transfers, taxes, consumption spending and debt servicing payments. These impact on the level of debt. If through time the real level of debt does not increase as quickly as the real interest rate or the ratio of real debt to GDP does not grow faster than the excess of the real interest rate over the growth rate, then the budgetary settings will be sustainable. So-called Ponzi games can develop in instances where the real growth rate exceeds the real interest rate - in these cases the budget is unbounded by a solvency constraint.⁵

If this constraint does not hold, then some policy action has to be taken at some time for the solvency constraint to be met *ex post*.

⁵ For a discussion of Ponzi games, see Buiter (1990).

In order to provide greater meaning to the measure, indexes have been developed which capture the degree of sustainability. Buiter develops measures of a permanent income deficit and constant net worth deficit (1990, p 68), while writers associated with the OECD have developed an index related to the policy change required in the tax rate taken to meet the sustainability constraint. In this approach, the intertemporal budget constraint is solved for a tax rate, tr^* .⁶

An index can then be developed on the basis of the difference between the required tax rate and the actual tax rate. Where the required tax rate is larger than the current tax rate, insolvency ‘threatens’.

While this measure is not intended to imply that the actual course of action should be to change the tax rate to meet the solvency constraint, this is one option for government to pursue. Clearly a reduction in the levels of consumption spending or transfer payments would also reduce any subsequent required adjustment. Another approach to estimating the difference between current settings and those required to meet the intertemporal budget constraint has been suggested in Wells (1996). This provides a measure of the difference between the desired debt ratio and the forecast debt ratio under existing policy settings.

These measures hold no information with respect to the impact of fiscal policy on aggregate demand or the general operation of the economy - they provide insights for evaluating the mutual consistency of spending and revenue projections and debt objectives.

3.3.1. Short, medium and long term indicators of solvency

Solvency is the ability to meet all financial commitments. This distinguishes it from liquidity which is the ability to meet immediate commitments. A true test of solvency requires a relevant time horizon of the entire lifespan of the entity under consideration. For the Crown, this implies an unbounded lifespan, as the Crown endures permanently. This is a reasonable starting point for the Crown, especially given several strong related arguments, such as:

- the slowly evolving nature of some pressures on government, such as emerging demographics; and
- the nature of the deadweight losses created by changing tax rates over short periods.

This suggests that whatever sustainability indicators are used to describe the solvency of the short term settings, these should be supported by longer settings - over at least one

⁶ Blanchard (1990) characterises it thus:

$$tr^* = (i_r - q) \left[\int_0^{\infty} (g + h) e^{-(i_r - q)t} dt \right] + d_0$$

This equation shows the generation of a tax rate which will provide sufficient revenue to meet the requirements of the intertemporal budget constraint as being equal to the annuity value of spending plus transfers plus interest net of growth times the initial level of debt.

business cycle, and perhaps over one life cycle. These shorter term forms of solvency provide consistency checks for policy settings being sustainable.

The generational accounting approach adopted by Auerbach, Gokhale, and Kotlikoff (1994), for instance, develops the equivalent of an intertemporal budget constraint for each age cohort of the population. While this is useful in assessing the nature of the likely inter-cohort transfers and other related transition issues, it does little to assist the budget setting decision, except insofar as it highlights the intergenerational implications of fiscal policy decisions.

Blanchard (1990) suggests the use of three sets of indicators - for one, three and 40 years. The argument is that three years takes into account the more predictable cyclical movements in the ratios and that 40 years will take into account the major demographic shifts. The operationalisation of this suggests the estimation of the net flows into and out of the government's accounts for the respective periods. To relate those net flows to today's dollars requires discounting those flows. A negative net present value indicates that the present value of the income flows will be insufficient to exceed the present value of the outflows.

Buiter's Permanent Deficit (1985) and his 'solvency gap' are also examples of similar approaches.

3.4 Relating the solvency constraint to New Zealand's central government institutions

The treatment to date of the solvency constraint been simplified to demonstrate the key dynamics. The exclusion of stocks other than debt, such as physical assets and other forms of liabilities, restricts the budget constraint to a partial one. Similarly, as previously discussed, the Crown includes organisations outside of the general government sector. If our interest relates to the wealth effects through time of different budgetary settings, then the cash constraint is likely to be insufficient.⁷

The equivalent short term measure to the financing identity for a particular time is the GAAP financing capability.⁸ This is depicted as follows:

$$FC_t = P_t - iD_{t-1} \quad (6)$$

where FC is the financing capability (cash available or cash required), and P is the primary surplus of the consolidated Crown reporting entity:

$$P_t = TR_t - G_t - H_t - I_t + \Phi_t^{SOE} - (WC_t - WC_{t-1}) + \Pi_t + S_t \quad (7)$$

⁷ It should be noted however that the longer the time period the closer the financing effects move to the wealth effects, as in the very long term all stocks become flows.

⁸ Equivalent to net cash flows from operations, less net purchases of physical assets, less investing cash flows that do not affect net public debt.

I = Government investment (net of proceeds of assets sold)
 S_t = Circulating currency issued during the period

These equations adjust the operating balance (equation 1) so as to exclude all non-cash items - depreciation, undistributed profits of SOEs and Crown entities, net foreign exchange gains and changes in working capital - and to include net purchases of physical assets, plus the issue of currency in circulation. Equivalently, it states that the amount available for debt repayment is cash receipts less all cash disbursements, plus currency issued. Note that equation (7) is in substance no different from equation (4).

The GAAP financing capability relates directly to the change in debt as in the following relationship:

$$(D_t - D_{t-1}) = \Delta D = -FC_t - (fx_t - fx_{t-1})FD_t \quad (8)$$

This equation shows that a positive change in debt is equal to a negative financing capability less foreign currency gains or losses associated with the stock of foreign currency denominated debt.⁹

The relationship also shows (indirectly) the dangers of an undue focus on net debt for the targeting of fiscal policy. Unless double entry measures of recording are used, a focus on net debt can have distortionary effects on decision making. Net debt targeting is a one-sided approach in that it does not take into account the transaction that results from or provides the debt financing. It is possible to hit a range of net debt targets, by distorting individual decisions; net debt is easily manipulable and can be “window-dressed”.

Rather than concentrate on movements in net debt as the key indicator of shifts in government solvency, the GAAP framework suggests that reported net worth is a preferable measure. Changes in reported net worth from one period to another will show how wealth has been transferred between periods. The double entry method associated with GAAP, means that reported net worth is not susceptible to manipulation through contrived cash-flow management. For instance, it is conceivable that a reduction in net debt can be associated with little or no change in reported net worth - this would occur if the cash proceeds from an asset sale yielded close to the book value of the asset.

At any particular time the level of reported net worth will reflect the GAAP based estimate of the residual of the balance sheet, reflecting the transactions that have to that date gone to make up that balance sheet. This may be illustrated algebraically as follows:

$$(RNW_t - RNW_{t-1}) = \Delta RNW = OB_t + R_t^{PHYS} \quad (9)$$

⁹ The Crown’s accounting policy provides that changes in the value of foreign currency denominated debt (due to exchange rate movements) are accounted for every period. The debt stock is not however ‘marked to market’ with respect to interest rate movements. However when the debt is redeemed, any difference between book value and market value will be transferred to the Operating Balance.

where

R^{PHYS} = Revaluations of physical assets

By substitution, Equation (9) may be expressed as follows:

$$RNW_t = RNW_{t-1} + TR_t - (G_t + H_t + iD_{t-1}) + (fx_t - fx_{t-1})FD_t - \Delta GSF_t + R_t^{PHYS} - dA_{t-1} + \Pi_t + V_t + \Phi_t^{SOE} + \Omega_t^{SOE} \quad (10)$$

This shows that the value of reported net worth in the current period equals the value of reported net worth in the previous period plus the sum of all the transactions that occur in the current period.

Accordingly, for the current period the opening wealth endowment is the reported net worth amount at the close of the previous period. Therefore, the shift in reported net worth from period to period will depict the contribution to wealth of budgetary settings for that period. If the sum of all changes to reported net worth are negative into the future and these aggregate in discounted terms to an amount greater than the opening level of reported net worth, then the budgetary settings are unsustainable on an *ex ante* basis.

Although it is possible to forecast levels of reported net worth into the future, at no time is it an accurate depiction of the future value of the Crown from that point on, unless all asset and liability valuations rely on discounted cash flow techniques.¹⁰

¹⁰ Clearly it is not possible to represent a pure GAAP measure such as RNW in discounted terms as it is not possible to discount accrued amounts, given their inconsistency between reporting periods.

4. COMPREHENSIVE NET WORTH

4.1 Introduction

Accounting frameworks rely on a number of important principles, one of which is reliability in measurement. This requires that the most reliable means of measuring transactions should be applied. However, this requirement for reliability in measurement does not necessarily correspond to the wider needs of decision makers who may need to take account of transactions that would not be recorded in financial statements on this basis.

Such transactions may be very important in making quality economic and financial decisions. For instance, reported net worth does not recognise a value associated with the future tax stream, nor does it bring to account the liability associated with future pension payments. Further, many of the items on the balance sheet are not recorded on a discounted cashflows basis and the balance sheet includes assets in respect of which the financial benefit is unclear (for example, the National Archives).

Accordingly, the Crown's reported net worth is not a complete measure of expected future cash flows. Notwithstanding the Crown balance sheet's role as a valuable accountability tool in recording the financial effect of transactions in a transparent manner, its value in the decision making process is less clear.

Thus, although GAAP provides a closer approximation to economic substance than cash-based alternatives, it should be possible to improve the usefulness of reported net worth for decision making.¹¹ This can be achieved by supplementing the accounting measure with the effects of future transactions expected under current or proposed policy settings. This would make the net worth measure more comprehensive and closer to an economic rather than an accounting measure. This paper calls this measure comprehensive net worth.

4.2 Reported net worth and Comprehensive net worth

The two net worth measures (reported net worth and comprehensive net worth) focus on different things and have different implications for decision making. Reported net worth (RNW) is a backward looking measure of the accounting value of assets less the value represented by liabilities - it records the financial effects of transactions that have occurred up until the reporting date and which satisfy the reliability criteria. Comprehensive net worth (CNW) is a forward looking measure, which includes RNW as an opening balance (after adjustment for asset realisability), but which also takes into account future cashflows under current policy settings, and therefore captures Crown wealth in a more satisfactory manner.

¹¹ It should be noted that current New Zealand accounting standards are closer to economic substance in valuation practices than standards in many other jurisdictions.

4.3 The CNW model

Algebraically, the relationship can be expressed at the most aggregate level in the following way:

$$CNW_t = RNW_{t-1} + \sum_{t=1}^{\infty} \left(\frac{(P_t - iD_{t-1}) \pm a_t}{(1+i)^t} \right) \quad (11)$$

where:

CNW = Comprehensive net worth
 a = sundry adjustment term

Note: if the IBC is satisfied exactly then $CNW = 0$

This shows that the present value of the Crown is equal to the opening level of reported net worth (with the total assets adjusted for a realisation factor) and the discounted value of all subsequent cashflows into and out of the Crown (adjusted for double-counting).

To the degree that CNW is not equal to zero, a gap emerges between meeting the solvency constraint and current policy settings. When CNW is greater than zero, this means that government has a positive solvency balance or buffer which could provide a funding basis for policy shifts, without recourse to increased taxation. On the other hand, a negative CNW value requires corrective policy action for the Crown to meet its obligations.

Equation 11 is designed to measure whether, on current policy settings, the Crown can meet its obligations (ie whether the present value of cash inflows is sufficient to meet the present value of cash outflows). Some of these cashflows are capitalised on the Crown balance sheet and are incorporated into the measurement of RNW, although often in an imperfect manner.

Where the value is not recorded on a discounted cashflows (DCF) basis on the balance sheet, an adjustment needs to be made to reflect the difference between the recorded value and the DCF value. For example, if an SOE is valued using historical cost accounting and its DCF value is higher, a positive adjustment should be made.

The second adjustment in equation 11 is made to avoid 'double counting'. Thus, in estimating the stream of future cash flows it is necessary to exclude those cash flows that are already captured in asset and liability valuations included in the opening balance of RNW. The double-counting is exact when assets and liabilities are valued on a discounted cash flow basis (eg commercial forests and the actuarially-assessed unfunded liability of the government superannuation fund), and less so when other valuation methods are used. The adjustment term removes the double counting such that the sum of RNW and the adjusted cashflows provide the DCF value.

The problem of double-counting arises because of the partial use of discounted cashflow valuations in balance sheets prepared under GAAP, where the cashflows are sufficiently reliable to warrant inclusion. If there were no overlap or a complete overlap the problem would be eliminated.

Another adjustment that may need to be made is in respect of *de facto* Crown liabilities which are not currently recognised on the Crown balance sheet, such as the outstanding claims of the no-fault accident compensation scheme. To the extent that it looks likely that these liabilities will be assumed by the Crown in the future, an adjustment should be made as otherwise the Crown's total exposure will not be reflected. It should be noted that the application of accounting standards to such liabilities is still emerging. But the goal of CNW is to depict the total impost on the population for the maintenance of a set of spending policies. This adjustment can be made by either adjusting the opening stock of liabilities or by changing the stream of future cashflows to reflect the payments associated with this obligation.

4.3.1 Realisability

Some of the assets on the balance sheet are non-realisable as, *under current policy settings*, the government has committed not to sell them (for example, the government has declared five SOEs as 'strategic assets' and has committed not to sell these companies). These assets have a positive value on the Crown balance sheet. Similarly, it is appropriate that these non-realisable assets be measured on a DCF basis for the purposes of the CNW formula. This is because the Crown continues to derive revenue from these assets as long as it continues to hold them (eg through a stream of dividends).

However, there will be some type of assets which are recorded at positive value on the Crown balance sheet, yet which the government will not trade and which do not generate a revenue stream (for example, heritage assets and national parks). For these assets, it may be appropriate that the recognised value be removed from the RNW measure through the non-realisation factor. This will ensure that the CNW measure provides an accurate picture of the Crown's financial sustainability under current policy settings.

For this reason, the asset component of the opening RNW balance is discounted by a 'realisation factor' which applies to these non-commercial assets. The value of this factor can range between zero and one; it assumes a value of zero when all non-commercial assets are realisable in full, and assumes a value of one when none of these assets will be realised under current policy settings.¹² This realisation factor is calculated on the basis of policy settings at the beginning of the period in question.

$$CNW_t = [RNW_{t-1} - (NCA_{t-1} * R_{t-1})] + \sum_{t=1}^{\infty} \left(\frac{(P_t - iD_{t-1}) \pm a_t}{(1+i)^t} \right) \quad (11A)$$

¹² It is assumed that all the liabilities on the balance sheet represent genuine liabilities that will cause the Crown to make payment, and that the Crown will not repudiate these obligations.

NCA = Non-commercial Crown assets
 R = (Non) Realisation factor

This equations shows that financial sustainability of the Crown as measured by CNW can be reduced if current policy requires the Crown not to trade in certain assets.

4.3.2 Applicable discount rates

The discount rate used in calculating the present value of the future stream of flows is the market rate at which these future flows will be invested. In the first instance this will be the risk free rate (ie the rate at which the government borrows), but to the extent that the government adopts a different investment strategy a higher discount rate will be appropriate. This paper does not propose a social rate of time preference as the discount rate for policy setting purposes. The CNW framework is a financing identity only; accordingly only market rates should be used.

4.4 An alternative formulation

As clear from the above, the calculation of CNW requires both forecasts of the GAAP based numbers and forecasts of accounting adjustments to line up these GAAP numbers with cash. An alternative formulation should result in an equivalent measure of CNW, but with some calculation advantages.¹³ The formulation is as follows:

$$CNW_t = RNW_t + \sum_{t=1}^{\infty} \frac{1}{(1+i)^t} E_t[ROB_{t+t}] \quad (12)$$

where:

$E_t[.]$ = the expectation operator conditional on information at time, t .

ROB_t = Residual Operating Balance at time t , defined as:

$$ROB_t = OB_t + R_t^{PHYS} - i \cdot RNW_{t-1} \quad (12A)$$

There are a number of advantages for empirical estimation of CNW using this approach derive from the accrual nature of accounting numbers anticipating at least some future cashflows. The summation term in the accounting term would be expected to converge to the limit more quickly than the cash term. Accordingly, adequate estimation of CNW could be made over a shorter period. Secondly, we would expect that the aggregate accounting numbers - being smoother - would be easier to forecast accurately. Thirdly, there is now no need for adjustment to deal with specific accounting policies.

¹³ This alternative formulation comes from Brian McCulloch, "Crown Net Worth: A residual operating balance formulation."(1997)

As shown by Edwards and Bell (1961) in respect of firm valuation, and extended by Ohlson (1995), such a formulation can be expected to be relatively assumption free with respect to accounting policies as long as there is a clean relation between operating balance and changes in RNW.

4.5 Summary

This section has argued that in order to facilitate superior decision making, the RNW measure should be adjusted and supplemented with expected future cash flows to provide a measure of CNW. The CNW formula shows how an IBC construct can be operationalised within an environment of GAAP-based financial reporting. There are two ways to do this - via adjustment of accounting numbers and Equation 11, or via the direct of accrual accounting numbers in Equation 12.

5 A STYLISTED CNW FRAMEWORK

5.1 Introduction

The CNW framework does not create the decision rules for determining the appropriate CNW and RNW targets. Rather it only outlines the relevant relationships. The policy question is to determine the optimal level of CNW and the optimal path for RNW. This section creates a simple stylised model which highlights how the different variables within the CNW framework interact. This stylised framework will provide the basis for determining optimal fiscal policy settings, by providing an analytical starting point.

5.2 Analytical framework

In order to determine the optimal level of CNW and optimal path of RNW it is necessary to specify an objective function for the Crown's management of the balance sheet. At a normative level, the objective of the Crown is to maximise a social welfare function. In shorthand, the Crown exists to maximise the welfare of the relevant population.

The Crown makes a series of policy decisions based on its specification of a welfare function. The Crown Financial Statements reflect the financial effects of these decisions. In terms of managing the Crown's financial position once these policy decisions have been made, adopting an economic efficiency maximand is argued to maximise welfare as this allows these policy decisions to be implemented at least cost.¹⁴

Inherent in this argument is the critical assumption that policy ends can be separated from the means by which these ends are achieved (ie an independence of ends and means). This framework is consistent with standard welfare economic arguments, which separate out objectives and means (refer Barr (1987)).¹⁵ Although divorcing ends and means may not always be a realistic assumption, this paper argues that the separation is a useful working assumption in the current context. In addition, abstracting from the possibility of interdependence between ends and means greatly enhances analytical tractability.

On the assumption that ends and means can be separated, economic efficiency becomes the objective function for Crown balance sheet management in much the same way that shareholder wealth maximisation is the objective function for the management of a corporate. Thus the Crown should concentrate on managing its balance sheet in the most efficient manner possible.

In the current context, optimal balance sheet management may be seen as including efficient management and efficient financing. Efficient management involves managing the Crown's asset and liability portfolio in a way which imposes the least cost on the

¹⁴ These arguments are made in more detail in Skilling (1996, 1997).

¹⁵ For example, the second theorem of welfare economics separates distributive and efficiency considerations in arriving at Pareto-efficient resource allocations (although note Stiglitz (1995)).

economy as a whole (ie maximises economic efficiency, in allocative, productive, and dynamic forms). Similarly, the efficient financing principles states that the Crown should finance its activities and operations in a way which imposes least (efficiency) cost on the economy as a whole.

Economic efficiency is adopted as the appropriate criterion for assessing optimality of CNW. Under this approach, solving for the optimal level of CNW and the optimal path of RNW becomes a matter of solving for the most efficient Crown financing decision (the choice between debt financing and tax financing through time) for any given level of Crown outgoings.

5.3 The relationship between CNW and RNW

The CNW formula (equation 11) can provide an alternative way of expressing the IBC, which is the overall solvency constraint on the Crown. CNW provides a superior measure of the financial sustainability of the Crown under given policy settings, and has a greater information content than RNW, because it incorporates future flows in an explicit manner. Accordingly, CNW is the primary policy target and, in the first instance, should dominate the policy decision making process.

In a deterministic world, and following an economic efficiency maximand, the Crown would aim to satisfy the IBC exactly by setting the CNW target equal to zero. Such a policy would satisfy the solvency requirement at least cost, as the tax rate would be as low as it can be while satisfying the IBC.

Once the CNW target has been set and the opening RNW position specified, the Crown has to decide how to finance the exogenously determined levels of Crown outgoings through time. Specifically, based on the objective function outlined above, the Crown should finance itself in the most efficient method possible.

Levying non-lump sum taxes is distortionary, as the coerced nature of the tax distorts the incentives of economic agents to earn, save, and invest. This distortion is known as the deadweight loss of taxation. The Crown, in seeking to finance itself in an efficient manner, should therefore aim to design a time profile of tax rates such that the present value of deadweight losses is minimised.¹⁶ Following, among others, Barro (1979) and Lucas & Stokey (1983) a policy of tax smoothing can be expected to minimise the present value of these losses because of the convexity of the deadweight loss function.¹⁷ This result relies on a number of assumptions, discussed in more detail in section 6. Tax smoothing will yield a tax rate which, levied through time, will generate the required present value of revenue to satisfy the CNW target.

¹⁶ Strictly speaking, the Crown should aim to minimise the sum of the deadweight losses from seigniorage and distortionary taxation (Mankiw (1987)).

¹⁷ Empirical evidence suggests that the magnitude of these deadweight losses may be significant. For New Zealand-based empirical estimates, refer to Diewert & Lawrence (1994) and McKeown & Woodfield (1995).

The path of RNW therefore becomes the residual variable, after the higher-order policy decisions with respect to the target level of CNW and the path of the tax rate have been made (refer CS First Boston (1995)). This analysis suggests that whereas CNW has an optimal level, RNW has an optimal path through time. Thus, just as satisfying the IBC does not require the budget to be balanced in any particular period, satisfying the CNW target does not require RNW to be positive in any particular period.

Adopting such a policy suggests that, absent balanced growth in expenses and revenues, there are likely to be periods of primary surplus and periods of primary deficit. These surpluses and deficits will be driven by the track in the expenditure path, given stability in the tax rate levied through the period. For example, when the demographic cycle is such that there is a negative NPV from net cashflows RNW will need to be sufficiently positive to at least offset this. Conversely when the present value of revenue is forecast to exceed the present value of expenses (for example, at the top of the demographic cycle), the Crown could run a negative RNW at the same time as satisfying the CNW condition.

This discussion has implications for the interpretation of the Fiscal Responsibility Act and the targeting of fiscal variables. The reference to net worth in the Fiscal Responsibility Act targets has hitherto been read as referring to RNW. The argument in this section is that the level of RNW is, in the first instance, a residual and that CNW is the important policy variable. Thus CNW should become the primary policy target, with the RNW target becoming a second-order consideration.

The above analysis also has implications for the hierarchy of fiscal policy targets. Once the expenditure stream has been specified, the policy issue collapses to the specification of the CNW target and the intertemporal profile of the tax rate. In the first instance, all of the other variables (such as RNW, net public debt, and the operating balance) become residuals.

5.4 Summary

This section has outlined an objective function for fiscal policy setting, in which an economic efficiency maximand is argued to be the criteria for assessing policy optimality. A simple stylised model was then established in which it is optimal to set the CNW target equal to zero, to smooth the tax rate through time, and in which the RNW path is a residual of these higher order policy decisions.

6 OPTIMAL POLICY SETTINGS

6.1 Introduction

The stylised model outlined in section 5, however, relies on a number of simplifying assumptions. For example, the analysis has assumed, *inter alia*, certainty, efficient capital markets, the ability of government to credibly commit to policy settings, that there are no agency costs, and that the financing and operating decisions are strictly separable. To the extent that these simplifying assumptions are not robust to the real-world policy environment, the initial policy conclusions generated in this stylised model may not be optimal.

This section relaxes some of these assumptions and examines the policy implications. The economic efficiency maximand is argued to be robust as the objective function and will be used in the remainder of this paper.

6.2 Separation of operating and financing decisions

In the stylised model, the level of CNW was the primary policy target and the path of RNW through time was a residual of higher order policy decisions based on an economic efficiency maximand (the expenditure track, the time profile of the tax rate, and the CNW target). The efficiency maximising policy settings were argued to be a zero CNW target and a policy of tax smoothing.

However, the optimality of a tax smoothing approach rests on a number of key assumptions. One crucial simplifying assumption is that there is a strict separation between the Crown's operating and financing decisions. This assumption requires the process of determining the expenditure stream to be entirely independent of the decision as to how to finance these expenditures. Such an assumption is consistent with the standard separation between operating and financing decisions (eg the Fisher Separation Principle and the Modigliani Miller Irrelevance Proposition).

Intuitively, however, such a strict separation does not appear plausible. The efficiency of the Crown's operating decisions is often thought to be affected by its financial position. For example, spending is more likely to increase in an environment of surpluses and high RNW relative to an environment of fiscal deficits and negative RNW.

This section attempts to formalise the notion that the Crown's financing decision may affect operating decisions. Skilling (1996) has previously argued that the set of Crown operating decisions are endogenous to the financing decision, and that the structure of the Crown balance sheet is important to economic efficiency for similar reasons that the structure of a private company's balance sheet is important to the value of that company. To the extent that this is the case, then RNW, and the structure of the Crown balance sheet more generally, can no longer be regarded as mere residuals; rather balance sheet variables are likely to affect the way that taxes are levied through time.

Although this dependence will not affect the target level of CNW, the intertemporal profile of the tax rate will be affected. Specifically, tax smoothing is unlikely to be the optimal policy setting. This can also be characterised as a break down in one of the key assumptions underlying tax smoothing; *viz.*, that the discount rate equals the market rate.¹⁸ The interdependence of the financing and operating decisions is likely to lead to an increase in the social discount rate relative to the market interest rate, and to this extent will cause a movement towards a balanced budget tax rate approach as the optimal policy setting (an approach which emphasises financing expenditure in near periods).¹⁹

This suggests that placing constraints on balance sheet variables should enhance economic efficiency. These constraints on the path of RNW and other balance sheet variables through time will influence the intertemporal profile of the tax rate. Specifically, these constraints are designed to minimise the sum of the inefficiencies created by deviating from a tax smoothing position and the inefficiencies in the operating decisions created by certain balance sheet positions.²⁰

6.2.1 Agency costs

The first balance sheet constraint is a response to the agency costs associated with Crown management of assets. The agency problem arises because of the incentive misalignment between Crown management (the decision makers) and the Crown's owners. The incentives of politicians and bureaucrats are well documented in the public choice literature (refer Mueller (1989) and Horn (1995)) and are not always consistent with welfare maximisation. To the extent that incentives are not aligned, poor spending and investment decisions are likely to be made.

The following analysis draws on the free cash flow model developed by Jensen (1986). In Jensen's model, company shareholders and management have incentives which are misaligned (refer Jensen & Meckling (1976) for the classic statement of this proposition). The costs associated with this agency relationship are exacerbated where company management have surplus funds available for discretionary investment after all positive NPV projects have been financed. The solution to this problem is to reduce the amount of free cash flow.

This model can also yield insights with respect to the Crown. The Crown can be expected to behave in an inefficient manner when there are surplus, liquid, resources available to it.²¹ If CNW is targeted, and a tax smoothing policy adopted, the composition of the balance sheet is likely to change significantly through time where

¹⁸ Thanks to Peter Gorringer for highlighting the link between this analysis and the optimality of tax smoothing.

¹⁹ The relationship between the financing and operating decisions is likely to lead to an increase in the social discount rate (the social rate of time preference) applied to fiscal variables, because of the potential for inefficient use of resources by the government. This reflects the greater value that agents place on near period outcomes relative to future period projections which are discounted more heavily.

²⁰ This relationship should lend itself to greater formalisation.

²¹ Free cash flow in the Crown context is cash flow in excess of that required to finance all spending and investment which it is efficient for the Crown to undertake (Skilling (1996)).

the growth paths in revenues and expenditures are not balanced.²² Much of this change in the balance sheet is likely to take the form of a changed holding of financial assets. There need not be major movements in physical assets and investments in SOEs and Crown entities.

The agency costs can be expected to arise, in large part, from the negative impact on the efficiency of decision making generated as a result of the existence of a portfolio of financial assets. The existence of these liquid resources, which are surplus to current-period financing requirements, is likely to reduce the pressure for efficient spending and investment decisions to be made. Indeed, historical evidence suggests that the level of inefficient Crown spending and investment rises when the Crown's finances are healthy.²³

Due to the fungibility of financial assets, an increased incidence of inefficient spending and investment decisions will have the same effect as a direct appropriation by the government of parts of the financial asset portfolio for reasons other than those originally intended. In both instances, the government uses the asset portfolio for current period spending, instead of using it on the items included in the original expenditure stream (this is symptomatic of a short decision making horizon and the time inconsistency of tax smoothing to an IBC). Alchian & Woodward (1987, 1988) identify such fungibility as an important consideration in assessing the potential for moral hazard in asset management.

The agency costs may also be caused by requiring the funds to be invested in certain ways which are not consistent with maximising efficiency. Accordingly, additional revenue needs to be raised in future periods to finance this expenditure. To the extent that this additional current-period spending is not optimal, such a policy will be inefficient.

The potential for such behaviour suggests that new institutional arrangements would be needed to ensure that the effects on the efficiency of decision making of a significant financial asset portfolio are minimised.²⁴

The agency costs arising from inefficiencies in decision making are thought to be more significant than those resulting from Crown management of the financial asset portfolio. Although the Crown can be expected to manage assets in a relatively inefficient manner, there are grounds to believe that the Crown is likely to be less inefficient at managing a portfolio of financial assets than it is in managing physical or commercial assets. Institutional arrangements for managing financial assets can be more effective than for managing physical and commercial assets, in large part because of the clarity of

²² RNW is projected to rise to \$15.4 billion by 2000. Furthermore, the emerging demographic pressures and associated increased government spending mean that, in order to achieve any given CNW, a large RNW needs to be built up over the short to medium term. Initial CNW modelling projects net financial assets rising to 60% of GDP by about 2030, to achieve a CNW=0 target (Bagrie (1997)).

²³ For empirical analysis of these arguments refer to Alesina & Perotti (1995) and Bohn (1991).

²⁴ Work in progress is currently examining the 'Governance of Crown Savings' in an attempt to derive the nature of the optimal set of institutional arrangements to surround these financial assets.

performance measurement and the strong market in contestable financial management services.

Further, there are other arguments against tax smoothing and building up a high level of financial (and other) assets (refer Skilling (1996)). In the presence of informational asymmetries, a low tax rate and a constraint on the accumulation of financial assets may represent a credible commitment to efficient decision making in future periods. In an environment with heterogeneous agents, the tax rate represents a strategic variable in political 'gaming' and may be used to constrain inefficiencies in the operating decisions of future-period governments. In addition, opportunistic migration may place a limit on the level of intertemporal transfers of wealth, in situations where other jurisdictions have similar expenditure profiles but adopt a balanced budget tax rate strategy (similar to the arguments of Tiebout (1956)).

The general thrust of these arguments is that, *ceteris paribus*, a relatively low tax rate will enhance economic efficiency. This suggests that a movement from a tax smoothing approach towards a balanced budget tax rate policy may be justified on economic efficiency grounds.

The above discussion has argued that the Crown's financing and operating decision are related. Accordingly, the policy of tax smoothing which was optimal in the simple stylised model is unlikely to remain optimal, to the extent that this policy results in an increased incidence of inefficient spending and investment decisions. The efficiency benefits of smoothing the tax rate in a manner consistent with the optimal level of CNW identified above, may dissipate to the extent that these agency problems are prevalent.

The policy response is to reduce the level of agency costs expected by placing constraints on the paths of key assets on the balance sheet. It seems that the level of gross financial assets is the crucial variable that affects the incidence of agency costs. Constraints may then be imposed which restrict the path of gross financial assets to within certain bounds, either in absolute terms or as a proportion of GDP.

The specification of this constraint is determined by equating the marginal efficiency costs and benefits associated with different financing decisions and different balance sheet positions, in order to minimise the sum of the efficiency losses. In the current context, this will involve assessing the costs of deviating from a smooth tax rate through time and the effects on the efficiency of government decision making associated with the existence of a significant financial asset portfolio on the Crown balance sheet.

6.2.2 Financial distress costs

In the stylised model, a high level of debt (or a significantly negative RNW) is not a matter for concern to the extent that there is an offsetting positive present value of expected future cashflows attributable to future primary surpluses. To the extent that the Crown can credibly commit to such sustainable policy settings, financial distress costs should not be experienced.

However the Crown faces significant difficulties in credibly committing to any given policy, especially to the extent that this commitment is seen as time inconsistent. Where financial distress costs are incurred as a result of this inability to commit credibly in advance to satisfy the IBC continuously, it may be efficient to impose bounds or constraints on the path of net debt through time and, by extension, on the path of RNW.²⁵

Direct financial distress costs result from a worsened credit standing and a higher cost of capital on public borrowing, as RNW becomes negative and the stock of net public debt increases. However the Crown also has to consider the impact of its balance sheet on the rest of the economy. A reduced sovereign credit rating will increase the cost of capital faced by agents in the private sector, as the sovereign credit rating represents a floor for credit ratings of domestic corporates. This is likely to depress the level of economic activity, both in the current period and in future periods.

Furthermore, there are likely to be more widespread effects. If the worsened Crown financial position leads to reduced confidence in the economy, interest rates are likely to rise and the exchange rate is likely to depreciate. A reduction in foreign investment is also possible, again depressing the level of economic activity. The Crown must take these factors into consideration when considering the structure of its balance sheet.

As above, the specification of the constraint should be assessed by minimising the sum of the inefficiencies from deviating from a tax smoothing position and the inefficiencies from having a balance sheet position which incurs financial distress costs.

The relevant variable that should be targeted is the stock of net public debt; it is net rather than gross public debt that should be the focus of policy attention. It is the stock of net public debt that the financial markets are likely to be interested in, although the stock of realisable assets will also be relevant. Financial markets become uncomfortable with levels of net public debt above certain levels, and this will influence the level at which bounds should be imposed.²⁶

6.2.3 Implications of bounding balance sheet variables

These constraints on balance sheet variables will affect the intertemporal profile of the tax rate, but will have no effect on the present value of tax revenue required to be raised.²⁷ For example, as the path of financial assets moves towards its bound the tax rate will be decreased so as to avoid breaching the constraint. This tax reduction,

²⁵ In addition to an inability to credibly commit *ex ante* to sustainable policy settings, financial distress costs may be incurred for other reasons. For example, economic agents may have different interpretations of the financial information and therefore different opinions on the sustainability of particular policy settings. Alternatively, agents in the financial markets may be more risk averse than Crown decision makers. These would give rise to unwarranted financial distress costs, which would also justify moving from a tax smoothing policy to reduce the stock of net debt.

²⁶ The legislative requirement in the Fiscal Responsibility Act to maintain prudent level of debt also needs to be incorporated into this analysis.

²⁷ Except to the extent that changing the intertemporal profile of the tax rate generates efficiencies and reduces the present value of the expenditure stream (as this paper argues is plausible).

relative to the tax smoothing rate, can be seen as a downward shift in the RNW path at every subsequent point in time (*ceteris paribus*) and will mean that the IBC will not be satisfied under this policy setting. This means that tax rates levied in the future will have to be increased such that the initial present value of revenue requirement is achieved. The tax rate will also have to be raised subsequently in order to prevent the level of net public debt exceeding its bound.

Accordingly, although the level constraints mean that the tax rate must be changed at different points in time so as to avoid breaching the constraints, there are no necessary implications of this bounding on the targeted level of CNW. The broader these constraints are, the less the impact on the setting of the tax rate. Although this framework paper makes no judgement on the location of these bounds it is likely that these bounds may be quite strict. This in turn suggests a significant movement from a tax smoothing policy to something closer to a balanced budget tax rate approach.

In this analysis, the structure of the balance sheet and the RNW path is no longer the mere residual of the prior CNW decision. The causality now runs in both directions, and there is no policy target that completely dominates the other.

6.3 Incorporating Risk and Uncertainty

6.3.1 Introduction

The stylised model constructed above assumed that future flows could be forecast with certainty. In such a deterministic world, the optimal policy setting is to set the tax rate in a smooth manner so as to achieve a CNW target of zero. However, the real world contains a deal of uncertainty. This means variables which affect the Crown's current and future financial position cannot be forecast with complete accuracy, for example;

- changes in policy settings;
- growth rates and movements in other economic variables (eg unemployment);
- future shocks (eg large movements in the terms of trade);
- forecasting errors;
- the magnitude of the 'realisation factor'; and
- unexpected movements in the market value of assets and liabilities.²⁸

These shocks and the emergence of new information can be expected to occur in a random fashion through time; any systematic bias should be incorporated into the initial estimates. Thus, 'reoptimising' the tax rate to solve for the CNW target in every period (or, at the limit, in a continuous fashion) will lead to a random walk in the path of the required tax rate through time. Indeed, this is the standard result in the tax smoothing literature (Barro (1979), Blanchard and Fischer (1990)).

Such random movements in the tax rate create inefficiencies relative to maintaining a constant tax rate through time, because of the convexity of the deadweight loss

²⁸ To some extent these shocks can be factored into the expected flows (eg where the projected stream of cash flows are the result of sensitivity analyses rather than just a central estimate).

function.²⁹ This convexity means that changing the tax rate in a random manner through time will create a deadweight loss, even where the average value of the changes is zero (Jensen's Inequality). To the extent that such regular and random movements are inconsistent with an economic efficiency maximand, optimal policy settings should be designed to ensure that random shocks do not require frequent tax rate changes (ie that the tax rate can be smoothed over a number of periods even in an environment of uncertainty).

The framework for assessing the optimal policy response to this latent risk and uncertainty is based on the economic efficiency maximand. The objective remains to minimise the present value of the deadweight loss from taxation, at least within any constraints imposed by the establishment of bounds on the path of balance sheet variables. This will involve consideration of both the level of the tax rate and the volatility in the level of the tax rate.

The discussion that follows discusses the nature of optimal policy setting under uncertainty, first in an environment where the balance sheet is a residual of higher level decisions, and then in a policy environment where constraints are imposed on certain balance sheet variables following the analysis in the previous section. This two-step discussion highlights the relevant arguments more clearly.

6.3.2 No balance sheet constraints

The introduction of uncertainty into the analysis means that policy targets are converted into expected values; optimal policy settings are those which are expected to generate the CNW target from an *ex ante* perspective. The policy issue is how the financial impact of random shocks should be incorporated. Shocks can cause either changed holdings of financial assets, changed values in assets and liabilities which affect the realisable value of RNW but do not have a current period cash effect, or changes in the present value of expected cash flows.

6.3.2.1 Policy approaches

As a general statement, there are two possible policy responses to the existence of uncertainty. The first is for the Crown to levy an additional 'precautionary' amount of taxation to create a buffer of liquid assets on the balance sheet, which is *ex ante* expected to ensure that the tax rate will not need to increase to finance these random shocks. The creation of this buffer will create a positive bias in the CNW target, of a magnitude such that the lower bound of CNW is expected to be zero.

The second approach is for the tax rate to be set to satisfy an expected CNW target of zero, with shocks absorbed into the balance sheet. This results in a situation where the expected value of CNW is zero, but where CNW may assume a negative or positive

²⁹ Regular and random movements in the tax rate will also increase the level of uncertainty among agents in the economy, which can be expected to have adverse economic effects. For example, this increased uncertainty can be expected to raise the option value of waiting and thereby depress the level of economic activity (refer Dixit & Pindyck (1994)).

value with equal likelihood. Discriminating between these two policy alternatives will be based on the economic efficiency maximand.

The argument for a precautionary buffer rests on the assumption that it is efficient for precautionary tax to be levied so that CNW is not expected to assume a negative value because of a shock, as any negative value requires an immediate increase in the tax rate. The size of the buffer would be based on an estimation of the expected present value of the shocks, and the efficiency costs that would be incurred by raising the tax rate as a response to the shocks.³⁰ The precautionary tax rate would be set so as to achieve this buffer, and ensure that *ex ante* policy sustainability is expected to be maintained continuously without increased tax rates. Such an approach means that there is a higher tax rate in the current period, which causes efficiency losses, with an expectation that the tax rate will not be required to increase in future periods (which will generate efficiencies in future periods).

The second approach is to levy a tax rate which will satisfy a CNW target with an expected value of zero, and respond to shocks by absorbing them within the balance sheet rather than changing the tax rate. The corollary of this failure to reoptimise the tax rate is that the policy settings are unlikely to satisfy the IBC in a continuous fashion from an *ex ante* perspective; in some periods CNW will be negative and in some periods it will be positive.³¹ If the deviation from the CNW target becomes too large, it will be efficient to raise the tax rate to a level where policy settings become sustainable. However this approach does not accept that there is an efficiency-based obligation to satisfy the IBC continuously from an *ex ante* perspective (and therefore that there is no *a priori* reason to raise the tax rate when a negative shock occurs).

Where the Crown is not bound to satisfy the IBC continuously, efficient policy responses to negative shocks may include raising debt on the capital markets or through running down an existing portfolio of financial assets.³² The absorption of shocks by the balance sheet without a precautionary buffer allows the current period tax rate to be lower. This generates efficiency gains, as the present value of deadweight losses is reduced. The next issue is to determine how costly it is to finance these shocks by using an existing stock of financial assets or by raising debt.

This immediately suggests that the existence and size of the optimal precautionary buffer is directly related to the Crown's overall financial position. Negative shocks will be more costly to finance when the Crown's financial position is weak. For example, if there is a high level of net debt, and low levels of realisable assets, it is likely to be more costly to finance the effects of a shock by raising further debt. In such a case, establishing a precautionary buffer in advance may represent an efficient way of dealing with uncertainty (refer also Dehejia & Rowe (1995)). This argument also suggests that

³⁰ However the precautionary buffer is a response to both risk (which can be quantified as an expected value) and uncertainty (which is not amenable to measurement by a metric). This complicates the calculation of an optimal level of precautionary taxation.

³¹ This approach recognises more explicitly that positive shocks are as equally likely to occur as negative shocks.

³² Alternatively, the Crown may elect to change the level of spending and investment.

the Crown should be more concerned about negative shocks with a cash impact in the current period or near-periods.

It is, however, difficult to see the efficiency gains associated with levying precautionary tax when there are already large amounts of financial assets on the balance sheet, and the costs of financing a shock are relatively low. Further, levying precautionary taxation at such times is likely to exacerbate the agency costs associated with Crown management of financial assets.

It is therefore not strictly necessary, from an economic efficiency perspective, to have liquid reserves on the balance sheet in the form of a precautionary buffer at all times. In summary, the argument is that the size of the optimal precautionary buffer is determined by the structure of the balance sheet. As a general statement the structure of the balance sheet determines the optimal precautionary buffer and thereby the optimal level of CNW.

This policy conclusion effectively represents a synthesis of the two broad approaches. Levying a precautionary amount of taxation can only be justified when the balance sheet assumes certain positions, notably with respect to the net debt position. For all other positions, no precautionary taxation can be justified. However, at some stage a deviation from the CNW target caused by shocks (perhaps over a number of periods) will require a change in the tax rate to ensure that sustainability is achieved. The point at which this occurs will be determined by an efficiency calculus.

To the extent that precautionary tax is levied to establish a buffer, the buffer should comprise liquid assets to enable shocks to be readily financed. Although the overall CNW framework relates to solvency considerations, the buffer component of CNW is concerned with liquidity. It is important that an appropriate set of institutional arrangements surround this precautionary buffer to ensure that the entire amount is available when needed.³³

6.3.2.2 *Other arguments*

There is no normative argument for levying precautionary taxation to enhance 'prudence' where this is inconsistent with an economic efficiency maximand. Skilling (1997) argues that the Crown has no independent risk preference and should not act in a risk averse manner except to the extent that this can be demonstrated to be efficiency enhancing (in general, minimising the present value of the deadweight losses from levying tax). There is no apparent argument for levying precautionary taxation as a response to uncertainty unless a net efficiency benefit from doing so can be clearly identified.³⁴

³³ More generally, the duration of the assets and liabilities on the balance sheet should be such that the expenditure stream can be financed as required.

³⁴ Note that the existence of uncertainty may increase the social discount rate, which may tilt the tax rate policy away from tax smoothing towards a balanced budget tax rate approach. This does not represent an argument for a precautionary buffer, given the current set of fiscal projections in New Zealand.

CS First Boston (1995) have previously argued that uncertainty creates a rationale for levying an amount of precautionary tax and incorporating a ‘precautionary’ buffer into the target CNW level, where there is a negative correlation between the tax rate and average consumption. There will be such a negative correlation for most plausible shocks. A precautionary buffer (tilting the collection of tax revenue towards near periods) is thought to better enable consumers to smooth their consumption stream as the government is better able to smooth the tax rate.³⁵

This analysis however does not represent a compelling argument for levying precautionary taxation. The discussion above with respect to either absorbing shocks into the balance sheet or levying some precautionary taxation conditional on certain balance sheet conditions seem to provide an adequate basis for tax smoothing without relying on this negative correlation.

6.3.2.3 *Policy targets*

This normative analysis should be reconciled with the statutory environment, in particular the Fiscal Responsibility Act. This Act requires that the government achieve and maintain “levels of Crown net worth that provide a buffer against factors that may impact adversely on the Crown’s net worth in the future” (section 4(2)(c)). This paper has argued that there is no need to factor expected adverse events, like the emerging demographic pressures, into the target CNW buffer, as it is factored into the expected value of the cashflows on which CNW is based. Rather, only the expectation of adverse and unexpected events, in the context of the balance sheet structure, should influence the size of the CNW buffer.

For the most part, the optimal CNW buffer will be zero, with the buffer taking the form of financial assets and a borrowing capacity. However, a CNW buffer may be required when the levels of debt on the balance sheet preclude further debt financing in an efficient manner.

To the extent that a precautionary CNW buffer exists to allow the Crown to absorb adverse events in an efficient manner, it seems that the target should be measured in terms of likely magnitude of shocks. To the extent that these shocks have an effect which is approximately proportionate to the size of the economy, CNW as a proportion of GDP may be an appropriate target.

³⁵ The assumption is that the utility functions of consumers are convex, and that smoothing consumption through time is welfare maximising.

6.3.2.4 Summary

This section has argued that the existence of a precautionary buffer is not a general result, and can only be justified under certain balance sheet conditions. This is where it is necessary to have built up a buffer in advance so as to be able to finance shocks without raising the tax rate (or cutting efficient spending and investment). To the extent that it exists, the precautionary buffer is designed to minimise the present value of the sum of deadweight loss from tax rate level and volatility.

The response to shocks is either through having sufficient liquid assets on the balance sheet (which may in some circumstances be built up by levying precautionary taxation) or by having immediate access to sufficient lines of credit. The buffer is therefore effectively contained within the balance sheet, rather than within the CNW target.

6.3.3 **The impact of the balance sheet constraints**

The analysis is complicated by the establishment of constraints on the path of RNW and other balance sheet variables. These constraints are likely to mean that the Crown will not be satisfying the IBC in a continuous manner from an *ex ante* perspective. Further, these deviations from *ex ante* satisfaction of the IBC have the potential to be significant.

This suggests that the major function of a precautionary buffer will change, although the objective of levying precautionary taxation would remain the same. This objective is to minimise the present value of any deadweight losses from taxation, which may arise from changing the tax rate in response to a shock. The precautionary buffer is no longer designed to ensure that the IBC is satisfied *ex ante*, because the existence of the balance sheet constraints means that this will not be happening anyway. Rather, the precautionary buffer should be aimed to minimise the sum of the efficiency costs from any further deviation from tax smoothing than that caused by the balance sheet constraints, and the possibility of a shock causing a breach of the specified balance sheet constraints.

These two effects will be offsetting in large part. Thus, there is not a strong efficiency-based case for levying precautionary taxation. Note however, that the efficiency benefits from levying such precautionary tax are an increasing function of the proximity of the relevant balance sheet variables to the specified constraint, as the expected costs increase as the constraint approaches. To this extent, the case for the buffer is entirely contingent on the structure of the balance sheet.

In this argument the type of shock matters, because the focus of policy attention is on certain balance sheet variables (gross financial assets and net public debt) rather than the CNW target *per se*. This means that the relevant shocks are those which affect these variables; ie current period cash shocks. Thus an unexpected revaluation of an asset has a significantly different impact than an unexpected increase in benefit payments.

6.3.4 Summary

This section has summarised the implications of the introduction of risk and uncertainty into the fiscal policy decision making process. The analysis suggests that a precautionary buffer should be incorporated into the CNW target when certain balance sheet conditions prevail. However, these policy conclusions may not be robust to an environment when explicit balance sheet constraints have been imposed on fiscal policy decision making.

6.4 Intergenerational equity

In assessing the optimality of long-term fiscal policy settings, the impact on intergenerational equity of a fiscal policy planning horizon which spans generations should be considered.³⁶ If such policy settings result in intergenerational transfers, the efficiency-based policy recommendations may be inconsistent with notions of intergenerational equity. For the purposes of this paper, intergenerational equity is defined as the state where, within appropriately defined age cohorts, there is fiscal balance (ie for each cohort, the aggregate tax paid is equal to the value of publicly provided goods and services).³⁷

These intergenerational equity considerations are relevant to this analysis to the extent that they have an impact on economic efficiency. According to the objective function defined above, the Crown in making fiscal policy decisions should concentrate solely on an economic efficiency maximand. Intuitively, it can be argued that a fiscal policy which leads to intergenerational transfers is unlikely to be efficient. For example, if the age cohort population which benefits from a policy is not the same population which finances the policy, then distortions and inefficiencies may be expected (as agents in aggregate respond to a changed set of incentives). For example, if the effective price facing a population is less than the true economic cost the population can be expected to over-consume relative to efficient levels of consumption.

To maximise efficiency therefore the Crown will be aiming to match costs and benefits within appropriately defined age cohorts. The pursuit of economic efficiency should therefore prevent large intergenerational transfers of wealth. The generational accounting framework may be useful in terms of assessing the impact of different policy settings on different age cohorts and generations (refer to Auerbach, Gokhale, and Kotlikoff (1994)).

A priori a policy which smooths taxes to satisfy the IBC seems to be intergenerationally equitable. Consumption of government services can be expected to occur in peaks - when young and when elderly. At a simple level, smoothing taxes across a life cycle (at

³⁶ The relevance of these intergenerational equity arguments, which is contingent on the finite nature of the horizons of economic agents, rests on the assumptions that the Ricardian Equivalence Theorem does not hold and that agents are not linked via bequests over an infinite time horizon (refer Barro (1974)).

³⁷ Refer also to Modigliani (1961), who defined equity as the state where those agents who benefit from fiscal policy are the same agents who bear the associated fiscal burden.

least) can be expected to be relatively equitable. This should hold irrespective of the shape of the demographic cycle or the primary balance profile.

Note however that productivity and average standards of living have increased steadily through time. This trend is expected to continue. This may provide a case for transferring the fiscal burden from current to future generations, as future generations will be better able to service this obligation. This would suggest that the tax rate should be tilted, such that it is lower in the current period and higher in future periods.

To the extent that a policy of tax smoothing is not adopted, and a policy closer to a balanced budget tax rate approach is pursued, there may be implications for intergenerational equity. It is important that the resultant efficiency effects be incorporated into the efficiency calculus performed to establish the bounds on balance sheet variables.

6.5 Summary

This section has argued that it is appropriate, on efficiency grounds, to place constraints on the path of gross financial assets and net debt (and by extension on the path of RNW). This is the outcome of an efficiency calculus which attempts to minimise the sum of the inefficiencies caused by deviating from a tax smoothing policy and the costs associated with extreme balance sheet positions (either significant levels of financial assets or of net debt).

This section therefore argues that tax smoothing should not be seen as the optimal policy setting, in an environment where the balance sheet impacts on the efficiency of Crown decision making and where the Crown cannot credibly commit to sustainable policy settings. It may be more efficient to move some distance towards a balanced budget tax rate approach. The important insight is that the decision to move to a policy position between balancing the budget in every period and satisfying the IBC continuously is no longer an arbitrary setting, but rather is based on an economic efficiency maximand. This section has highlighted the relevant factors and variables.

It is therefore important to treat the CNW framework with care in the context of policy setting. The approach of tax smoothing to satisfy an IBC is an indicative benchmark for long term fiscal policy setting only; this paper explicitly does not recommend that this approach to policy be used in a deterministic fashion.

7 SUMMARY

This paper has outlined a new framework for targeting Crown net worth. The approach adopted is the use of the intertemporal budget constraint (IBC), modified for application in an environment with financial reporting on a GAAP basis. In this framework, adjusted RNW is supplemented with expected future cashflows, to provide a measure of CNW. This CNW measure is argued to possess greater informational content about the Crown's financial sustainability than the RNW measure, and accordingly is argued to be a superior policy target.

Once the CNW target has been set, the Crown should set the tax rate in such a way as to generate the necessary amount of revenue. Under a set of strict simplifying assumptions, the most efficient way for the Crown to levy tax is in a smooth manner through time. The path of RNW is then the residual variable, in the sense that the path through time is determined by these prior decisions.

However when these simplifying assumptions are relaxed, tax smoothing is no longer seen to be the optimal policy setting and the structure of the balance sheet is argued to influence the way in which the tax rate should be set through time. Specifically, the introduction of a relationship between the Crown's operating and financing decisions suggests that the tax rate should be changed through time such that certain balance sheet variables (notably gross financial assets and net debt) do not exceed specified levels. The efficiency impacts of uncertainty and intergenerational equity may also affect the location of these bounds. The ultimate policy settings should be aimed at maximising economic efficiency.

The policy implications of this framework relate to the choice of net worth target that the Crown adopts. This paper argues that the current policy focus on the level of RNW should be supplemented by a focus on the level of CNW.

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ANNEX 1

REPORTED NET WORTH - A HISTORY

The Crown balance was first reported (as at 1 July 1991) in the December 1991 Crown Financial Statements. The July 1991 Crown balance was -\$10.4 billion. However, the early financial statements differed in three fundamental respects from more recent versions:

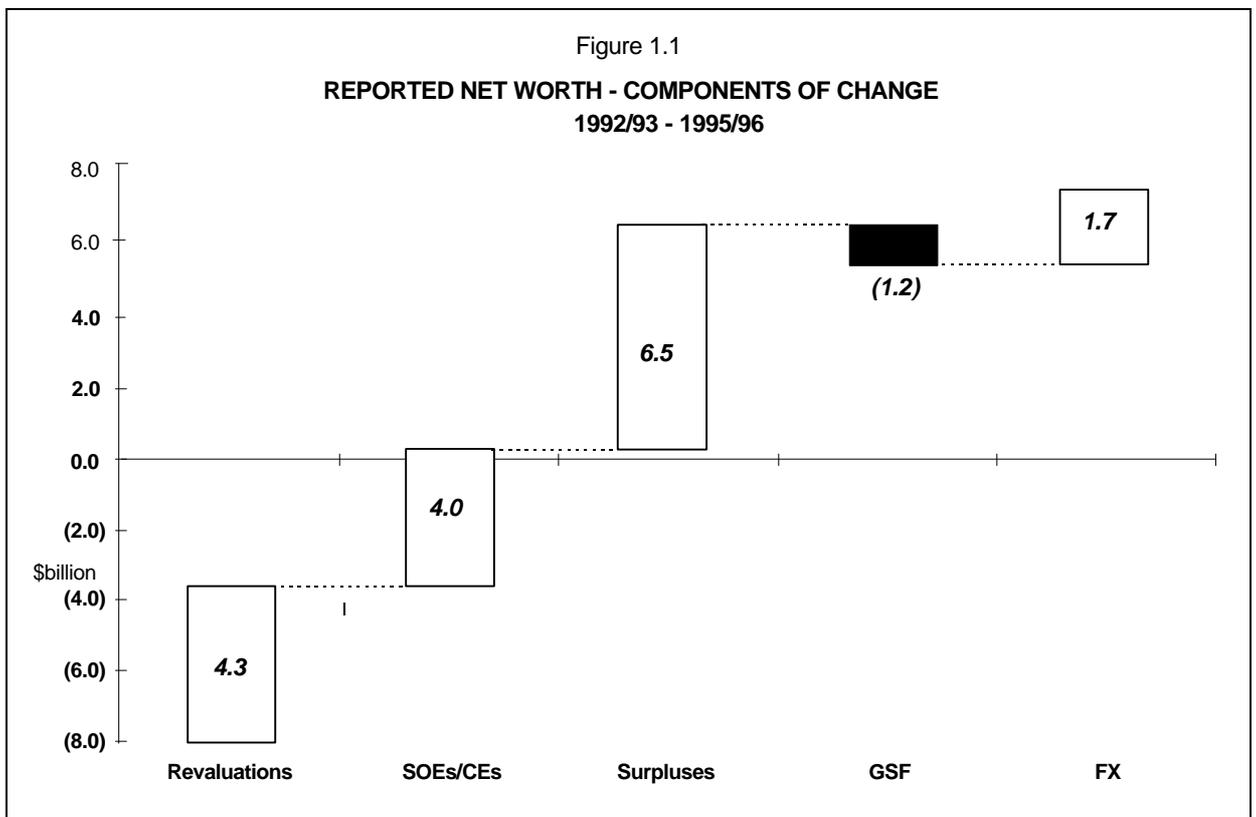
- The Crown's investment in SOEs and those Crown entities that had share capital was recorded at the lower of cost and net current value, as opposed to net equity value;
- Crown entities that did not have share capital were not recorded; and
- The Reserve Bank was accounted for as an equity investment, whereas it is now fully consolidated.

These factors mean that earlier measures of net worth are not comparable with the more recent series. The starting point of a consistent data series for reported net worth is 1 July 1992. The Crown balance at that date was -\$7.9 billion; changes since then are shown in Table 1.1 (for illustration, the equivalent figures using a 1 July 1991 starting point are also shown):

Table 1.1 MOVEMENTS IN THE CROWN BALANCE		
	<i>From 1/7/1992 \$million</i>	<i>From 1/7/1991 \$million</i>
Opening Crown balance	(7,902)	(10,355)
Change in reporting entity	-	7,178
Revaluations		
Physical asset revaluations	4,003	4,427
Revaluations of commercial forests	274	289
Accumulated operating balance		
Revenue less expenses - excluding SOEs/Crown entities	6,473	3,493
Increases in the GSF liability	(1,152)	(1,572)
Net FX gains	1,744	(20)
Changes in the value of SOEs and Crown entities	4,030	4,030
Crown balance at 30 June 1996	7,470	7,470

The analysis in this paper concentrates exclusively on the movement in reported net worth from 1 July 1992, so as to abstract from inconsistencies in

the composition of the reporting entity. Movements in reported net worth since 1 July 1992 are illustrated in Figure 1.1:



The main components of the change in reported net worth are considered below.

Asset revaluations

The Crown's accounting policies require most assets (other than working capital) to be recorded at net current value, or some approximation thereof (for example, depreciated replacement cost). Moreover, no physical asset may be recorded at a valuation that is more than three years old. All physical assets that are recorded at a current valuation will therefore have been revalued at least once since 1 July 1992. This has improved net worth by \$4.3 billion. The main components of this are:

- Land and buildings \$2.0 billion
- Heritage assets \$0.9 billion
- Commercial forests \$0.3 billion
- State highways \$1.0 billion

Accumulated surpluses

Since July 1992, accumulated surpluses (excluding valuation changes and the undistributed profits of SOEs and Crown entities) have contributed \$6.5 billion to the improvement in reported net worth. Valuation changes (fluctuations in the GSF liability and net foreign exchange gains) contributed a further net \$592 million.

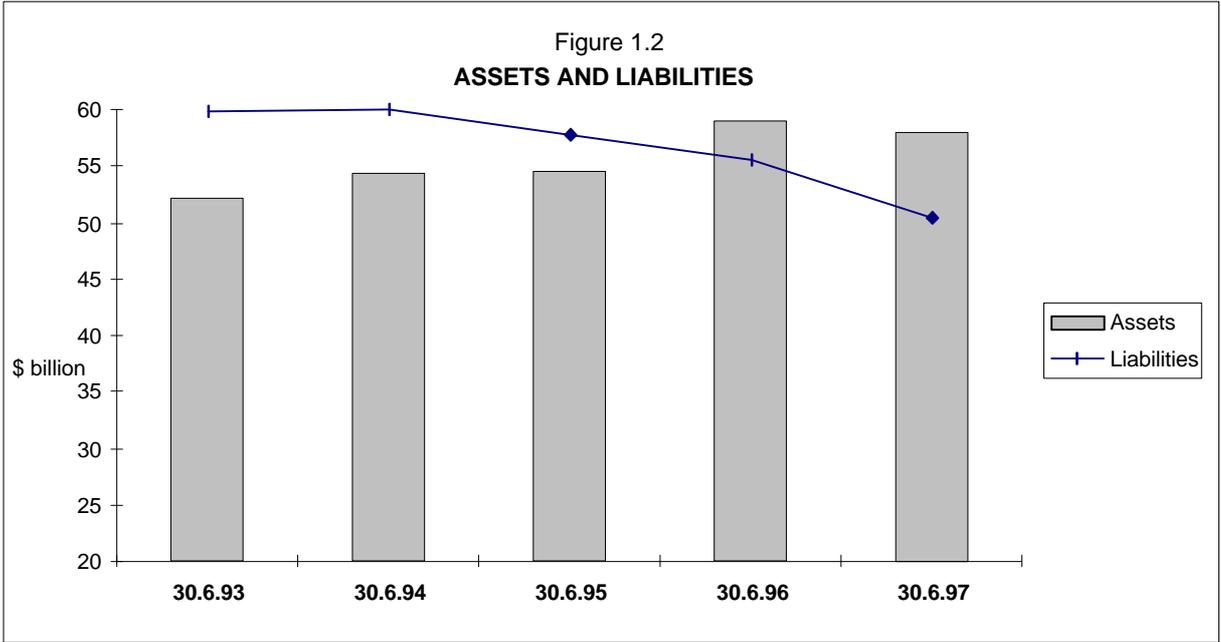
SOEs and Crown entities

The value of the Crown's investment in SOEs and Crown entities changes as a result of profits and losses earned by those entities (less any dividends paid to the Crown), and asset revaluations. Since the Crown balance sheet was established in its current form, the equity investment in SOEs and Crown entities has increased by \$2.6 billion. The main components of this have been as follows:

- Asset revaluations (including commercial forests) \$4.6 billion
- Asset write-downs \$0.9 billion
- Accumulated profits \$3.6 billion
- Distributions to the Crown \$4.1 billion
- Asset sales \$1.9 billion

SOEs and Crown entities are required to report according to the Crown accounting policies, and are thus subject to the same asset revaluation cycle as outlined above. The most significant single item within the overall asset revaluations of \$4.6 billion is the December 1995 revaluation of Housing New Zealand, totalling \$2.1 billion.

The impact of the above factors on the components of reported net worth is illustrated by the path of assets and liabilities over the period:



The book value of total assets has increased from \$52.2 billion at 30 June 1993 to \$58.0 billion at 30 June 1997. Total liabilities have fallen from \$59.9 billion to \$50.5 billion. In broad terms this reflects the impact of revaluations on the asset base, together with the application of (cash) surpluses towards debt repayment.

Changes in the composition of the balance sheet

The categories of assets and liabilities on the balance sheet may be summarised as follows:

(\$million)	30 June 1993	%	30 June 1994	30 June 1995	30 June 1996	30 June 1997	%
Receivables	4,322	10.3	4,606	4,453	4,782	5,091	10.8
SOEs and Crown entities	15,929	38.1	16,569	16,420	18,487	18,483	39.1
Physical assets	12,553	30.0	13,080	13,432	13,925	14,502	30.6
Commercial forests	1,001	2.4	712	646	551	505	1.1
State highways	7,058	16.9	7,856	7,454	7,759	8,210	17.3
Other assets	977	2.3	590	567	554	529	1.1
	41,840	100.0	43,413	42,972	46,058	47,320	100.0
							0
Net public debt	37,111	74.9	35,423	32,581	28,637	25,324	
GSF liability	7,840	15.8	7,951	8,106	8,332	8,328	63.5
Currency in circulation	1,400	2.8	1,529	1,620	1,675	1,741	20.9
Payables and provisions	3,184	6.5	4,138	3,824	4,070	4,457	4.4
	49,535	100.0	49,041	46,131	42,714	39,850	11.2
							100.0
Crown balance	(7,695)		(5,628)	(3,159)	3,344	7,470	0

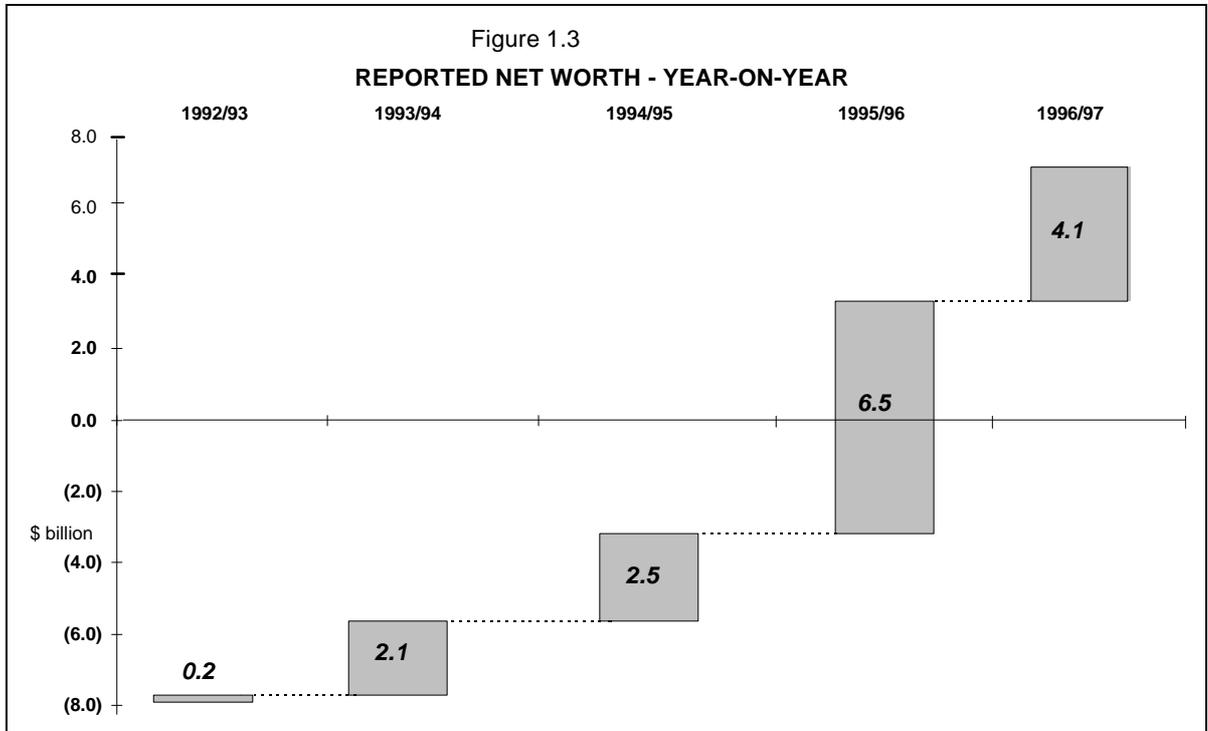
(Note: in the table, financial assets are netted against gross borrowings to show net public debt. In the Financial Statements, these assets and liabilities are shown gross; this presentation therefore differs from figure 1.2).

Non-financial assets have grown by 13.1% over the period, while liabilities have fallen by 19.6%. With the notable exception of the significant reduction in net public debt, the balance sheet has been relatively stable until the substantial increase in the investment in SOEs and Crown entities due to the revaluation of Housing New Zealand in 1995/96.

The major projected changes in the Crown balance sheet between 1996/97 and 1999/2000 are a decrease in the levels of financial assets and liabilities, an increase in net worth, and a significant change in the composition of advances (moving towards student loans away from advances to SOEs and Crown entities). Total Crown assets are projected to decrease marginally, while total liabilities are forecast to drop significantly as net debt is reduced.

Trends in Reported Net Worth

Figure 1.3 highlights the progressive improvements in reported net worth since July 1992:



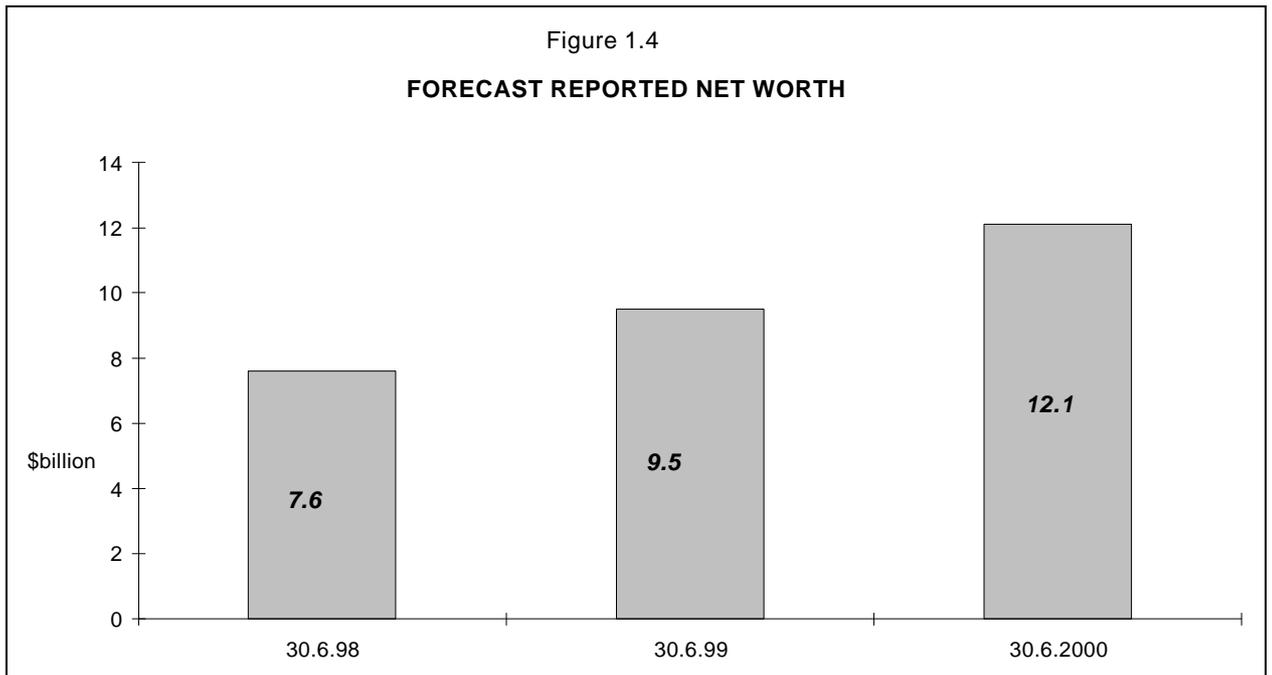
In 1993/94 the strengthening New Zealand dollar generated net foreign exchange gains of \$0.9 billion. Asset revaluations totalled \$1.4 billion, including State highways (\$0.8 billion) and specialist military equipment (\$0.2 billion).

In 1994/95 the operating surplus was \$2.7 billion, which included net foreign exchange gains of \$0.5 billion.

At 30 June 1995 reported net worth was -\$3.2 billion. The transition to positive net worth over the year to 30 June 1996 was largely due to two factors, the operating surplus for the period of \$3.3 billion and the revaluation of Housing New Zealand, which increased the value of the Crown's investment by more than \$2.0 billion

Reported net worth increased by \$4.1 billion between 30 June 1996 and 30 June 1997 due to the operating surplus of \$1.9 billion and net revaluations of \$2.2 billion.

Net worth is projected to continue increasing over the next few years. Based on the most recent fiscal forecasts, net worth is forecast to increase to \$12.1 billion by 30 June 2000, as illustrated in Figure 1.4:



The forecast trend in reported net worth assumes no change in foreign currency exchange rates, and no valuation changes. It is therefore likely that the actual net worth position will fluctuate around the forecast trend.

Indeed, the effect of asset revaluations on net worth may continue to be large. Some, like those in foreign exchange, are shaped by market movements that cannot be predicted with confidence. Similarly, future movements in the unfunded Government Superannuation Fund liability are hard to predict. Short-term revaluations of SOE equity are more predictable. Such revaluation changes reflect changing economic value and should not be regarded as merely technical accounting revisions.