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## Indicators of Fiscal Impulse for New Zealand

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# Indicators of Fiscal Impulse for New Zealand

Renee Philip and John Janssen

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The views expressed in this Working Paper are those of the authors and do not necessarily reflect the views of the New Zealand Treasury. The paper is presented not as policy, but with a view to inform and stimulate wider debate.

# Abstract

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This paper defines fiscal impulse as a measure of whether government fiscal policy decisions are adding to, or subtracting from, aggregate demand pressures in the economy. When assessing the effects of fiscal policy on the economy it can be useful to have an approximate estimate of fiscal impulse. Estimates of fiscal impulse range from simple indicators based on fiscal aggregates, to more complicated approaches requiring greater use of judgement and economic theory. This paper develops reasonably simple indicators based on adjusted fiscal aggregates. It also sets out some sensitivity analysis. The indicators reflect intuitive assessments about changes in New Zealand fiscal policy over the last decade and looking forward into the forecast period. Although estimates are relatively insensitive to alternative assumptions, this is likely to be the result of the relative stability of the time period under consideration. Simple indicators of fiscal impulse have limitations. At best they can only provide an indication of the first round impact of changes in discretionary fiscal policy. A more complete assessment of the effects of fiscal policy on the economy requires a full-scale macroeconomic model, perhaps complemented with time series analysis.

**JEL CLASSIFICATION** E62 - Fiscal Policy  
H60 – National Budget, Deficit and Debt: General

**KEYWORDS** Fiscal impulse; cyclical-adjustment; aggregate demand; New Zealand.

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# Indicators of Fiscal Impulse for New Zealand

## 1 Introduction

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Assessments of the influence of fiscal policy on the economy often use terminology such as a “tighter fiscal stance” or “contractionary fiscal policy”.<sup>1</sup> The actual fiscal balance may not be a good measure of changes in fiscal policy. This is largely because developments in the actual balance reflect both changes in fiscal policy as well as how changes in the economy influence tax revenue and government spending. The aim of this paper is to develop a measure of whether changes in fiscal policy are adding to, or subtracting from, aggregate demand pressures in the economy. Consistent with the terminology generally used in this literature, we define such a measure as an indicator of fiscal impulse.

Indicators of fiscal impulse can be a useful component in a fiscal analysis toolkit that also contains measures of the structural fiscal position, analysis of tax and spending trends, and longer-term fiscal projections. Indicators of fiscal impulse can enhance the *ex post* interpretation of changes in fiscal policy as well as helping to identify relatively large *ex ante* forecast changes in fiscal policy. However, we do not see impulse indicators as some sort of stop or go trigger for fiscal policy initiatives. Policy initiatives should also be assessed with reference to underlying micro-economic and public finance analysis. Ideally, fiscal impulse indicators would be augmented with assessments derived from macroeconomic and perhaps time series models. Further, while assessments of fiscal impulse may play an information role, their calculation does not imply a shift in fiscal policy away from its current medium-term focus to a more active counter-cyclical role. Indeed, the analysis in this paper constitutes a significant health warning to the unqualified use of fiscal impulse indicators.

The limited availability of fiscal information on a consistent basis restricts historical estimates of fiscal indicators for New Zealand.<sup>2</sup> The analysis in this paper covers the period from the early 1990s to the end of the 2002 Budget forecast horizon (year ending June 2006). Key features of fiscal policy over this period are, first, the shift from persistent operating deficits to consecutive operating surpluses since 1994 and a significant reduction in the ratio of public debt to gross domestic product (GDP).<sup>3</sup> Second, forecasts of the fiscal position in the mid 1990s indicated scope for a fiscal adjustment, and the then

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<sup>1</sup> Typical examples include the Economist’s assessment of fiscal policy in the United Kingdom (“The fiscal arithmetic: Luck and judgment” *The Economist*, March 25, 2000, p.66) and the International Monetary Fund (IMF) assessment of Irish fiscal policy (IMF, 2001a).

<sup>2</sup> The Crown Financial Statements (CFS) are based on generally accepted accounting practice (GAAP). They are presented on a June year basis, starting with the year ended June 1994. GAAP information required for fiscal impulse analysis is available from 1992.

<sup>3</sup> See Wells (1996) and Janssen (2001) for discussion of fiscal policy in New Zealand.

Government announced tax reductions and additional spending. Third, looking forward, the current Government is aiming to run operating surpluses.

One of the requirements of the Fiscal Responsibility Act 1994 is for the Government to set long-term fiscal objectives. The Government formulates its budget to ensure that aggregate levels of taxation and spending, including forecast new operating and capital spending, are consistent with progress towards its long-term fiscal objectives. Adjustment towards the objectives may result in changes to the fiscal balance over time. These changes are not necessarily a deliberate attempt to influence aggregate demand. Rather they are the consequence of a number of individual budget decisions and progression towards the long-term fiscal objectives.

Nonetheless, Governments may also be concerned about macroeconomic stability and therefore the potential short-term impact of fiscal policy on aggregate demand. For example, strongly pro-cyclical fiscal policy could place additional pressure on monetary policy and lead to undesirable swings in interest rates and the exchange rate. Because large changes in fiscal policy may have an impact on aggregate demand in the economy, they will need to be taken into account by the Reserve Bank of New Zealand (RBNZ), which operates to achieve an inflation target.<sup>4</sup>

The remainder of this paper is set out as follows. Section 2 sets out definitions of fiscal impulse and discusses some of the limitations of simple aggregate indicators. Section 3 outlines issues that arise in estimating indicators of fiscal impulse. Section 4 provides estimates and sensitivity analysis for New Zealand. Finally, Section 5 provides concluding remarks.

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<sup>4</sup> In New Zealand, co-ordination between monetary and fiscal authorities does not take the form of the authorities acting to pursue joint policy objectives. Rather, the frameworks rely on transparency, a medium-term focus and consultation. See the Reserve Bank of New Zealand submission to the Independent Review of the Operation of Monetary Policy, supporting document on “Fiscal and monetary coordination” ([www.rbnz.govt.nz/monpol/review](http://www.rbnz.govt.nz/monpol/review)) and Svensson (2001). Analysis of macroeconomic policy co-ordination in the United Kingdom by Bhundia and O’Donnell (2002) provides further context to the New Zealand situation.



## 2 Definitions, Limitations and Other Approaches

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### 2.1 Definitions

Wells (1995, p.76) notes that 'single-number' measures such as the fiscal balance are often used in policy discussions regarding fiscal policy. He suggests that in an IS-LM model, a definition of fiscal stimulus or contraction is given by the degree to which changes in fiscal instruments shift the IS curve. As a result, it is not the level but the change in the fiscal balance that provides an indicator of fiscal stimulus or contraction.

Wells (1995) sees two drawbacks in using the change in the fiscal balance as an indicator of fiscal policy effects. First, both changes in private-sector demand and fiscal instruments (tax rates and spending plans) can influence changes in the actual fiscal balance. The most common approach to this drawback is to estimate a cyclically adjusted or structural fiscal balance. The structural fiscal balance is an indicator of what the fiscal balance would be if the economy were operating at potential output. Second, because of inherent differences in each of the fiscal instruments, they should be weighted to reflect their initial impact on aggregate demand. This leads to the use of what is sometimes termed the weighted budget balance.

In this paper we focus on changes in discretionary policy that are likely to have an effect on aggregate demand. A focus on changes in discretionary policy implies the use of a structural fiscal balance that excludes cyclical influences. For example, consider the case of unemployment expenditure. Changes in unemployment expenditure occur through changes in unemployment numbers and/or changes in unemployment benefit rates. The effect of cyclical changes in unemployment numbers is considered non-discretionary and would be excluded from the measure of fiscal impulse. The effect of changes in unemployment benefit rates is discretionary.

Isolating discretionary policy changes is not straightforward. For example, an exogenous and non-cyclical increase in the number of hospital patients can require increased spending on healthcare. Although such exogenous factors are largely non-discretionary (for given health policy), a government will need to take them into account when making budget decisions. A government has the discretion over whether to accommodate non-discretionary changes, or to offset them with discretionary changes elsewhere in the budget.

Isolating the non-cyclical or structural component recognises the role of so-called automatic fiscal stabilisers.<sup>5</sup> For example, consider the case where forecasts indicate a significant deterioration in the overall fiscal balance. If this is due in large part to a forecast cyclical downturn, then although the change appears expansionary, it is reflecting the role of automatic stabilisers. The onset of the downturn may result in a fiscal deficit under policies that would otherwise have generated a balance or surplus.

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<sup>5</sup> Automatic stabilisers are those aspects of tax and spending systems that tend to smooth output over the economic cycle. For example, during an upswing, incomes tend to rise, resulting in higher tax receipts, while falling unemployment lowers unemployment expenditure. The strength of these stabilisers will depend on the specific features of the tax and spending systems. Often these features are the result of various policy decisions rather than any conscious decision to optimise the stabilising features of taxes and spending. See Auerbach and Feenberg (2000) for a detailed analysis of the stabilising aspects of taxes.

If the cyclical downturn does not eventuate then the extent of automatic fiscal stabilisation will have been less. The change in the actual fiscal balance would *ex post* appear less expansionary. Since we are interested in the discretionary fiscal policy, rather than the overall fiscal impact, then it is important to distinguish between a fiscal loosening that arises from cyclical effects versus one that arises from discretionary changes.

Overall, the exclusion of cyclical influences means that we draw a distinction between the actual fiscal balance and estimates of the structural fiscal balance. We define the *change* in the structural fiscal balance as a measure of fiscal impulse. An increase (decrease) in the structural deficit (surplus) represents an expansionary fiscal impulse. Some authors describe the structural fiscal balance as a measure of fiscal stance. We emphasise the change in the structural balance for two reasons. First, given the methodologies typically used, the level of the structural balance has a degree of arbitrariness, whereas changes from year to year provide a reasonable indication of fiscal trends. Second, the change in the structural balance is a measure of whether fiscal policy is adding to, or subtracting from, aggregate demand pressures in the economy. Section 3 discusses the precise definition of which fiscal balance is relevant for the estimation of fiscal impulse indicators, and how the structural balance is derived.

## 2.2 Limitations

Cyclically-adjusted, or structural fiscal balances are one of the most common summary indicators of the effects of fiscal policy on economic activity, with increases in the structural deficit interpreted as expansionary, and decreases as contractionary (see Blanchard, 1993).

Blanchard (1993) provides an important survey of the limitations to short-term fiscal indicators.<sup>6</sup> First, Blanchard notes the original purpose of the structural, or cyclically adjusted balance (CAB) was to assess what the budget balance would be if the economy were at full employment. Blanchard questions whether the CAB is well suited to the task of assessing the effects of fiscal policy on the economy. For example, fiscal policy operates through two main channels, distortions created by the tax system and the effect of fiscal policy on aggregate demand. He argues that the CAB is only aimed at this latter channel. Second, Blanchard draws a distinction between the impact effect of fiscal policy and the final effect. The latter requires consideration of general equilibrium effects on interest rates, exchange rates and output. In Blanchard's view an indicator can only measure impact effects and even then he is doubtful about the use of the CAB in this role. For example, a measure of fiscal impact will also depend on assumptions about the future because consumption does not depend only on current income.

More recently, Chalk (2002) investigates two propositions concerning the use of structural measures as indicators of fiscal policy. The first is that the change in the primary (i.e., excluding interest payments) structural balance provides a better indicator of discretionary fiscal policy than the change in the primary balance. The second is that the change in the structural balance is a good indicator of the demand stimulus arising from changes in the fiscal position.

Interest payments are excluded from the first proposition since they are non-discretionary. The primary balance represents the fiscal position excluding the current period effects of past deficits and surpluses. In contrast, because interest payments may have an impact

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<sup>6</sup> Blanchard (1990) is the earlier version of this survey. Similar issues are discussed in Chouraqui, Hagemann and Sartor (1990).

on aggregate demand, Proposition two uses the overall structural balance rather than the primary structural balance. Japan and Germany provide the case studies for assessing the propositions. Proposition one is assessed by comparing changes in the estimated primary structural balance, and the primary balance, with qualitative evidence on the timing of fiscal policy measures and quantitative evidence on their size. Proposition two is assessed by comparing changes in the estimated structural balance with a measure of demand stimulus, where this is a weighted budget balance derived using national accounts data rather than budgetary data. Overall, Chalk concludes that, first; changes in both structural primary balances and primary balances are found to be poor descriptors of changes in discretionary fiscal policy. For Germany the structural primary balance is somewhat better than the primary balance. Second, changes in structural indicators appear to correspond poorly to the size of the demand stimulus generated by fiscal policy.<sup>7</sup> For Japan the structural balance gives a reasonable estimate of the demand impact of fiscal policy. Nonetheless, it is unable to capture the effects of compositional changes in fiscal policy.

Chalk also compares changes in the structural fiscal balance with a measure of fiscal impulse previously used by the International Monetary Fund (see Heller, Haas and Mansur, 1986) and explained in the Appendix of this paper. Chalk finds that for Japan and Germany, and for a broader sample of OECD countries, there is little difference between fiscal impulse derived from the Heller *et al.* approach and changes in the structural fiscal balance.

Although the structural fiscal balance has its drawbacks, evidence that it may not be a good indicator of aggregate demand impact arises largely when it is extended beyond its original purpose. It might be better to think of the structural balance as an indicator of the underlying fiscal position. An increasing structural balance should therefore be interpreted as a non-cyclical strengthening of the fiscal position, rather than an indication of aggregate demand impact.

Whether the Chalk results hold for New Zealand would require a more detailed qualitative and quantitative identification of discretionary policy changes together with a weighted budget balance measure. As discussed in Section 4, the indicators of fiscal impulse derived in this paper reflect the major discretionary fiscal policy changes of the 1990s. A more detailed analysis along weighted budget balance lines would introduce significantly more judgement. A summary of previous Treasury analysis along weighted budget lines is presented in the Appendix.

Finally, there are issues from theoretical and empirical perspectives as to what the short-term effects of fiscal policy actually are. In a summary of the theoretical literature, Hemming, Mahfouz and Schimmelpfennig (2002) conclude that fiscal multipliers are more likely to be positive and quite large when:

- There is excess capacity, the economy is either closed or it is open and the exchange rate is fixed, and households have limited time horizons or are liquidity constrained.
- Increased government spending does not substitute for private spending, it enhances the productivity of labour and capital, and lower taxes increase labour supply and/or investment.
- Government debt is low and the government does not face financing constraints.

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<sup>7</sup> Simple indicators implicitly assume that equal increases in both taxes and spending exert no net impact on aggregate demand. The multipliers on taxes and spending can differ. Chalk notes that the demand effect obtained from the weighted budget balance may be mis-measured given the varying evidence on the size of fiscal multipliers.

- There is an accompanying monetary expansion with limited inflationary consequences (e.g., because of wage restraint).

Fiscal multipliers are likely to be smaller, and could turn negative, when:

- There is crowding out as interest rates rise and a flexible exchange rate appreciates in response to a fiscal expansion, especially if there are rational expectations and a fiscal expansion is perceived to be permanent.
- Households are Ricardian, in which case a permanent fiscal expansion can reduce consumption, this effect being stronger if households anticipate that distortionary taxes will have to rise in the future.
- There is a debt sustainability problem and risk premia on interest rates are large, in which case a credible fiscal contraction can result in a large fall in interest rates.
- Expansionary fiscal policy increases uncertainty which leads to more cautious saving and investment decisions by households and firms.

Hemming, Mahfouz and Schimmelpfennig list the main conclusions from the empirical literature as:

- Estimates of fiscal multipliers are overwhelmingly positive but small. Short-term multipliers average around 0.5 for taxes and 1 for spending, with only modest variation across countries and models (albeit with some outliers). There are hardly any instances of negative fiscal multipliers, the exception being that they can be generated in some macroeconomic models with strong credibility effects.
- There is nevertheless evidence of non-Keynesian expansionary fiscal contractions. Expansionary fiscal contractions appear to be more likely where a fiscal contraction is large and focuses on cuts in unproductive spending; occurs against a background of high debt, together with large premia on interest rates; is accompanied or preceded by a sizable depreciation and wage restraint, and increases the credibility of fiscal policy.<sup>8</sup>
- There is little evidence of crowding out through interest rates or the exchange rate. Neither full Ricardian equivalence nor a significant partial Ricardian offset gets much support from the evidence.

## 2.3 Other approaches

Indicators of fiscal impulse will only ever be, at best a guide to the initial impact of fiscal policy. For example, an increase in government spending could add to aggregate demand pressures in the first instance. However, as firms and households react to this increase in government spending, they may change their investment and consumption behaviour. A simple indicator cannot capture these second-round effects. The final effect of fiscal policy changes on aggregate demand needs to take account of the dynamic effects through time. As Blanchard (1993) argues, to make a more complete assessment of the effects of fiscal policy on aggregate demand requires a full-scale macroeconomic model.

There are a number of papers that use macroeconomic models to examine the effect of fiscal policy on the economy. For example, Hall and Rae (1998) examine the effect of a fiscal expansion in New Zealand using the NBNZ-DEMONZ model. They consider how the results are dependent on the financial market response and the monetary policy

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<sup>8</sup> See for example, Giavazzi and Pagano (1990), Alesina and Perotti (1996) and Perotti (1999).

reaction, and the difference between a fiscal expansion achieved through tax cuts and increased spending. Modelling the effect of fiscal policy using the New Zealand Treasury Model (NZTM) is an area for further work.<sup>9</sup>

As a complement to macroeconomic models, which through their assumptions can pre-determine the effect of fiscal policy (see Blanchard, 2000), Blanchard and Perotti (1999) use a structural vector-autoregression (VAR) approach to estimate the dynamic effect of fiscal policy on US economic activity. This approach takes into account not just the initial impact on the economy, but how the impact changes through time. Blanchard and Perotti use the observation that within a quarter, there is little or no discretionary response of fiscal policy to unexpected movements in economic activity. Combining this with institutional information about the tax and transfer systems as well as the timing of tax collections allows Blanchard and Perotti to construct estimates of the automatic effects of unexpected movements in activity on fiscal variables, and, by implication, obtain estimates of exogenous fiscal policy shocks. Having identified these shocks, they then trace their dynamic effects on output. The results consistently show that positive government spending shocks have a positive effect on output, and positive tax shocks have a negative effect. The multipliers for both spending and tax shocks are typically small, often close to one.

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<sup>9</sup> The New Zealand Treasury Model is currently being refined and documented (for example, see Szeto, 2001, 2002).

## 3 Issues in Estimating Indicators of Fiscal Impulse

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Notwithstanding the limitations discussed in Section 2, we consider it useful to estimate indicators of fiscal impulse. Estimating these indicators involves a number of judgements, such as the appropriate measure of the fiscal balance, the nature of capital adjustments and the approach taken to isolating discretionary fiscal policy. The following sub-sections outline these judgements in more detail.

### 3.1 Measures of the fiscal balance

The most commonly reported measure of fiscal balance in New Zealand is the operating balance from the Statement of Financial Performance. The operating balance is the difference between the government's current operating revenues and current operating expenses and so is a measure of saving. This measure differs from more traditional cash based measures where government spending typically includes current items and capital items. The operating balance is an accrual measure based on generally accepted accounting practice (GAAP) and so reflects accounting standards. It includes non-cash items such as depreciation and revaluation effects. In contrast, the OBERAC (Operating Balance Excluding Revaluations and Accounting policy Changes), excludes the following revaluation effects (unless the revaluation is the result of a policy decision):

- Net present valued liabilities such as the outstanding claims liability of the Accident Compensation Corporation (ACC) and Government Superannuation Fund (GSF) pension liability.
- Market valued financial assets and liabilities, such as tradeable marketable securities and deposits.
- Gains or losses on asset sales.

The OBERAC also excludes accounting policy changes (for example, changes around the recognition of assets and liabilities).<sup>10</sup> Revaluation and accounting policy changes are less likely to have a direct impact on aggregate demand than other income and spending items, although they may have indirect or second round effects. Two options are available for the purposes of calculating fiscal impulse. The first is to start with the OBERAC and exclude other non-cash items such as depreciation and the retained surpluses of State-owned enterprises and Crown entities. The second option is to start directly with a cash measure of the fiscal balance, that is, net cash flows from operations (NCFFO) from the Statement of Cash Flows. NCFFO is the difference between cash operating receipts and cash operating expenditures. The Statement of Cash Flows does not explicitly include depreciation. Although the path of depreciation over time is generally smooth, actual purchases of physical assets can occur in a more lumpy fashion and will include spending that increases the asset base.

Internationally, fiscal indicators are calculated from a range of sources, including budgetary accounts, the System of National Accounts (SNA) and Government Finance Statistics (GFS). Both SNA93 and revised GFS (GFS2001, see IMF, 2001b) are accrual frameworks based on statistical standards. The revised GFS framework is harmonised with SNA93 although the coverage of a particular category of transaction may differ slightly. Its primary aim is to provide a comprehensive conceptual and accounting

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<sup>10</sup> See the December Economic and Fiscal Update 2001, pp.60-61 for details of the OBERAC calculation.



framework for analysing and evaluating fiscal policy, especially the performance of the general government sector with a focus on taxes, spending, borrowing and lending (IMF, 2001b, pp.1-3). The balance in GFS and SNA that comes closest to our definition is “net lending/borrowing”. In GFS, net lending is the net operating balance less net acquisition of non-financial assets. The GFS net operating balance is “net” in the sense that it includes depreciation as an expense. In SNA, net lending is the difference between saving and investment.

Statistics New Zealand (SNZ) prepares government sector fiscal information on an SNA93 basis as part of the Institutional Sector Accounts (ISA). The government sectors (central and local) in the ISA are annual March year experimental series published with a lag (they are currently available from 1987 to 1998).<sup>11</sup> Saving of the general government in the ISA is an unofficial component of the official national saving statistic produced by SNZ. Publication by SNZ of GFS accounts in line with the revised manual is a medium-term project. To calculate fiscal impulse on an SNA (or GFS) basis for the most recent years and over the forecast period would require the detailed conversion of GAAP information.<sup>12</sup> We restrict calculations to GAAP-based indicators.

## 3.2 Measures of capital transactions

Ideally, the fiscal impulse indicator would include capital transactions that have an impact on aggregate demand. It is useful to examine how other countries adjust for capital. The United Kingdom Treasury uses cyclically-adjusted public sector net borrowing as an indicator of the short-term impact of fiscal policy on the economy, so as to include investment decisions (HM Treasury, 1999). Public sector net borrowing is defined as net investment less the surplus on current budget. The capital transactions included in public sector net borrowing are capital formation (acquisition of fixed assets, stocks and valuables net of any sales), plus net acquisition of land, and net payments of investment grants. The Australian Treasury (1997, 1999) uses net lending, which is the net operating balance less net capital investment.<sup>13</sup>

The impact on aggregate demand will depend on the nature of the capital transaction. For example, sales of existing assets represent a transfer of resources and are unlikely to have a significant effect on demand. In addition, for a small open economy like New Zealand, many large government capital items are imported, for example defence assets, and therefore will not impact on domestic demand.

## 3.3 Approaches to identifying discretionary fiscal policy

There are a number of approaches that can be used to estimate the effect of the economic cycle and so calculate the structural fiscal balance (see Giorno, Richardson, Roseveare and van den Noord, 1995; Bank of Italy, 1999; van den Noord, 2000). A

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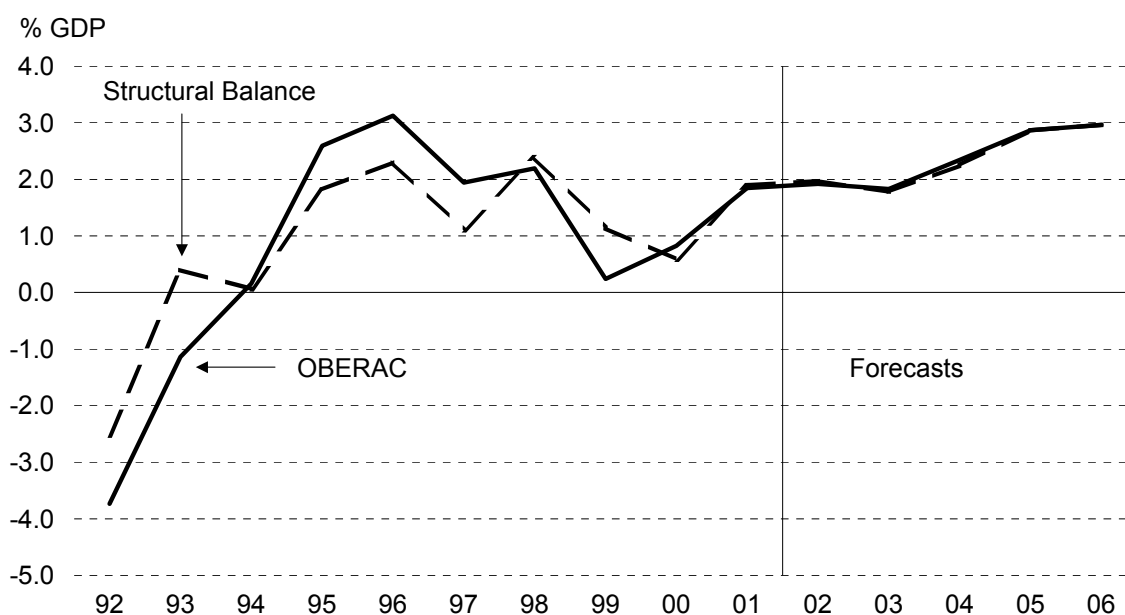
<sup>11</sup> The central government sector (3.1) comprises government departments, offices of Parliament and most Crown entities. It excludes Housing New Zealand Corporation and the RBNZ, which is included in sector 2.1 (financial intermediaries). State-owned enterprises are part of sector 1 (producer enterprises). The SNZ Crown Accounts (also from 1987) are a narrower subset of the ISA government sector and are annual June year official series published with a lag of four to five months.

<sup>12</sup> The New Zealand Treasury is currently involved in a project with SNZ that involves a detailed reconciliation of GAAP and SNA fiscal information.

<sup>13</sup> The net operating balance is a GFS concept (although not GFS2001). It differs from the operating result prepared under Australian Accounting Standards partly because it excludes valuation changes. GFS does not consider these as transactions and includes them as other economic flows that affect GFS assets and liabilities. See Budget Paper No.1, Statement 10: External reporting standards and budget concepts, [www.budget.gov.au/2002-03](http://www.budget.gov.au/2002-03).

common approach is a two-step methodology that utilises an estimate of the output gap together with a set of elasticities of tax and spending to output. The New Zealand Treasury regularly publishes a structural OBERAC estimated using this two-step method (see the Appendix). The OBERAC and estimated structural OBERAC are shown in Figure 1. Tam and Kirkham (2001) find that the calculation of the structural balance for New Zealand using the two-step method is sensitive to the output gap calculation.

**Figure 1 - OBERAC and estimated structural OBERAC**



Note: As at Budget 2002

Source: The Treasury

There are two disadvantages in using Treasury’s method as an input into the estimation of fiscal impulse. First, the current methodology does not make any adjustment for cyclical variations in interest rates and inflation. However, this problem has become less important as inflation rates have declined and become more stable. Moreover, since we are interested in discretionary policy, then net interest payments would be excluded in order to focus on the primary structural balance. Second, the current methodology is sensitive to estimates of potential output, which are uncertain, especially toward the end of the sample period and into the forecast horizon. These are the periods where discretionary policy changes and fiscal impulse may be of most interest. Blanchard (1993) points out that the CAB was not designed as an indicator of changes in discretionary fiscal policy, and it relies needlessly on the uncertain calculation of potential output.



Instead, Blanchard suggests the use of an indexed approach. His suggested indicator of discretionary fiscal policy has become known as the Blanchard Fiscal Impulse (BFI) (see for example, Alesina and Perotti, 1995, 1997; and various papers in Bank of Italy, 1999). The BFI is defined as the value of the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year, both as a ratio to GDP in each year (see Blanchard, 1993). Blanchard removes net interest payments as a simple way of adjusting the balance for changes in inflation and real interest rates. Fluctuations in net interest payments are also considered non-discretionary. The BFI is essentially a cyclical adjustment that eliminates from the fiscal balance changes in taxes and transfers due to changes in the unemployment rate (Alesina and Perotti, 1997).

Although the BFI approach avoids the need to estimate potential output, Kearney, McCoy, Duffy, McMahon and Smyth (2000) note that it assumes a stable relationship between changes in unemployment and economic activity, which may not be appropriate (especially during periods of structural change).

Another approach is to use a structural VAR, which takes into account any feedback between fiscal policy and the economic cycle (see Bouthevillain and Quinet, 1999; Kearney *et al.*, 2000). The structural balance estimated via the two-step method attempts to remove the effect of the economic cycle on the fiscal balance, but ignores the fact that the fiscal balance also may affect the economic cycle. Bouthevillain and Quinet (1999) and Kearney *et al.* (2000) estimate a two-variable structural VAR model that decomposes fluctuations in the deficit-to-GDP ratio into those arising from shocks to output (assumed to have permanent effects) and changes in the deficit itself (assumed to have transitory effects).

However, Kearney *et al.* suggest that the structural VAR method can be unreliable in the presence of structural change. Other disadvantages of this method are that the identifying procedure is subjective so that the estimates are sensitive to small changes in the restrictions. In addition, the structural VAR method is not simple to update when new information becomes available, making it difficult to monitor an indicator based on a structural VAR approach on a regular basis.

## 4 Estimates of Fiscal Impulse for New Zealand

This section provides estimates of fiscal impulse for New Zealand from 1992 until the end of the 2002 Budget forecast horizon (year ended June 2006). The section also examines sensitivities of a “base indicator” to some of the key judgements outlined above.

### 4.1 Fiscal balance, capital and cyclical adjustment

From the discussion in Section 3.1, the calculations are based on GAAP information. In using GAAP we still need to establish the appropriate definition of government. For example, should the measure include State-owned enterprises and Crown entities? State-owned enterprises are excluded because of the independence they have regarding operating and capital decisions. We have excluded third party revenues to Crown entities as well as their capital spending. On the operating side, because Crown entities are largely involved in delivering core Crown services (e.g., health and education), much of their income and spending is captured in the core. Table 1 provides the transactions included in the calculations, using a stylised representation of the segment notes to the GAAP financial statements. Note that total Crown consolidates the core Crown with State-owned enterprises and Crown entities on a line-by-line basis.<sup>14</sup> The table identifies those transactions relevant to the base indicator and those that are not applicable.

**Table 1 – Definition of government for base indicator of fiscal impulse**

	Core Crown	Crown entities	State-owned enterprises
Income	Yes	NA	NA
Investment income	NA	NA	NA
Current spending	Yes	NA	NA
Finance costs	NA	NA	NA
Capital spending	Yes	NA	NA

Notes: NA indicates that the transaction is not applicable to the base indicator of fiscal impulse.

Income for the Core is largely tax. Crown entities are funded from the core and third-party revenues. Income for State-owned enterprises comes from the sales of goods and services. The table ignores inter-segment eliminations.

Section 3.1 noted two options for the fiscal balance. Although the OBERAC is the more familiar concept, we start directly with a cash measure, net cash flows from operations (NCFFO). Over the period 1992 to 2001 the correlation coefficient between the annual primary NCFFO and the annual primary OBERAC (before depreciation) is 0.986. Because we are interested in a primary concept, the fiscal balance is calculated before investment income (i.e., interest income and dividend income) and finance costs. In terms of capital transactions, there are five items in the Statement of Cash Flows that are potentially relevant for the capital adjustment. Items that have the greatest impact are likely to be those that increase the demand on real resources, as opposed to transactions that simply transfer resource use from one sector to another. Table 2 lists the five items

<sup>14</sup> Details on full line-by-line consolidation can be found in the 2002 Budget Economic and Fiscal Update (pp. 97-105).

of physical and financial capital, along with a judgement about whether these are likely to impact on aggregate demand.<sup>15</sup>

**Table 2 – Capital transactions**

Capital transaction	Likely impact on aggregate demand	Reason
Net purchases of physical assets.*	Yes for most except defence purchases.	Defence assets are largely imported.
Net increases in advances (this is largely loans to students and hospitals).	Yes for student loans. Yes for loans to hospitals (excluding refinancing of existing loans). No for other advances.	Student loans largely spent on consumption. Loans to hospitals are largely for capital expenditure.
Net purchases of investments (this includes capital injections to State-owned enterprises and Crown entities, purchase and sale of existing entities).	Yes for capital expenditures. No for purchase / sale of existing entities.	Most capital injections are likely to be for capital expenditure. Purchases and sales of existing entities represent a transfer of resources.
Forecast for future new capital spending. This is an amount for capital spending included in forecasts (part of this will increase the existing physical asset base).	Yes for most. No for defence.	Some of the forecast amount will be spent on purchases of physical assets. Some will also be spent on defence, which is largely imported.
Contributions to New Zealand Superannuation Fund (involves investing in financial assets for future NZS expenses).	Unlikely.	Likely to have little direct effect. Will be invested in financial assets, and it is likely that a large portion will be invested offshore.

Note: "Net" in this table means net of sales as opposed to net of depreciation. Purchases of physical assets in the cash flow statement are not directly comparable with SNA public investment contained in Treasury's SNA economic forecasts.

Core Crown physical assets are largely in land, buildings, military equipment and state highways. Core Crown physical assets are around twice the value of Crown entity physical assets, where the latter are largely in housing, health and education. Advances and net purchases of investments (excluding asset sales/purchases) can be included in the capital adjustment as a proxy for discretionary new capital spending outside the core Crown. However, on the withdrawal side this ignores third-party revenue levied by entities outside the core. On the injections side it may not capture all capital spending. Refining the fiscal impulse indicator to better capture the role of Crown entities is an area for further investigation. This will likely utilise the more detailed information available under full line-by-line consolidation and will shift the measure to more closely reflect the first two columns in Table 1 above. Based on Table 2, the capital adjustment in our base indicator includes: net purchase of physical assets (excluding defence), the forecast of future new capital spending (excluding expected defence capital) and increases in student loans. We examine the effect of alternative capital adjustments in the sensitivity analysis of Section 4.4.

In GAAP, asset sales and purchases flow through the Statement of Cash Flows and not the Statement of Financial Performance. We follow Heller *et al.* (1986) in excluding the sale or purchase of state-owned entities from the calculations. In a traditional cash based measure of the fiscal balance, the sale of an asset is included as an item "above the line".

<sup>15</sup> This is somewhat arbitrary because we have not made similar judgements on the operating side. However, because fiscal impulse is measured as a change, the lumpy nature of capital means the adjustments will be more important on the capital side.

The sale results in a cash surplus or reduced deficit because it lowers the governments borrowing requirement. In a national accounts framework the sale is not treated as a revenue item because it is not directly related to economic activity. Rather, the government has changed the composition of its assets (see Heller *et al.*, 1986, p.28).

Finally, Treasury's two-step cyclical adjustment method is used to remove the effect of the economic cycle because it is already a method used by the Treasury, and it is reasonably simple to update. The adjustment is applied only to the operating components of the NCFFO. The capital component is not cyclically adjusted.

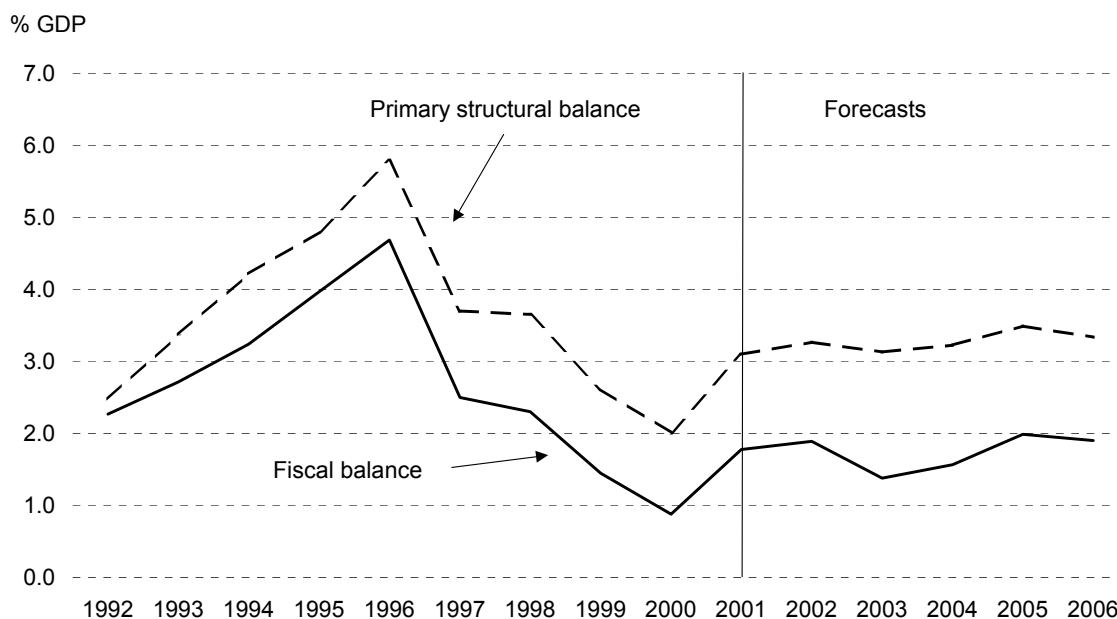
## 4.2 Base indicator

Using information from the Budget Economic and Fiscal Update 2002, Table 3 sets out the calculation of a base indicator of fiscal impulse. The fiscal balance reported in Table 3 deducts capital spending (line 'b') from primary structural net cash flows from operations (line 'a'). Primary structural net cash flows from operations are termed the primary structural balance. The fiscal balance and the primary structural balance (both relative to nominal GDP) are plotted in Figure 2. The primary structural balance is larger because it covers only operating expenditure and not the capital adjustment. Although the primary structural balance is positive through the entire period, actual net cash flows from operations were negative in 1992 and 1993. For example, there was a net cash flow deficit of \$2,021 million in 1992. The difference with respect to the primary structural balance is due to estimated cyclical factors of \$866 million (the estimated output gap was negative) and \$2,980 million of net interest payments.

**Table 3 – Base indicator of fiscal impulse**

Year ended June \$ million	2001	2002	2003	2004	2005	2006
	Actual	Est. Actual	Forecast	Forecast	Forecast	Forecast
Total cash from operations	38,471	40,964	42,436	44,488	46,467	48,301
Total cash to operations	36,549	38,160	39,725	41,391	42,930	44,686
Net cash flows from operations (NCFFO)	1,922	2,804	2,711	3,097	3,537	3,615
<b>Structural NCFFO</b>	<b>1,976</b>	<b>2,861</b>	<b>2,653</b>	<b>2,974</b>	<b>3,537</b>	<b>3,615</b>
Net interest payments	1,557	1,065	1,252	1,258	1,247	1,151
<b>Primary structural NCFFO (a)</b>	<b>3,533</b>	<b>3,926</b>	<b>3,905</b>	<b>4,232</b>	<b>4,784</b>	<b>4,766</b>
Capital adjustment						
Net purchases of physical assets (excluding defence)	842	950	1,224	1,022	942	969
Net increase in advances to students	668	708	773	799	810	821
Forecast for future new capital spending (excluding expected defence)	0	0	190	360	310	260
<b>Total capital adjustment (b)</b>	<b>1,510</b>	<b>1,658</b>	<b>2,187</b>	<b>2,181</b>	<b>2,062</b>	<b>2,050</b>
Fiscal balance (= a - b)	2,023	2,268	1,718	2,051	2,722	2,716
Fiscal balance (% GDP)	1.8	1.9	1.4	1.6	2.0	1.9
<b>Fiscal impulse (change in balance, % GDP)</b>	<b>0.9</b>	<b>0.1</b>	<b>-0.5</b>	<b>0.2</b>	<b>0.4</b>	<b>-0.1</b>
<i>Memorandum items</i>						
Primary structural NCFFO (a) (% GDP)	3.1	3.3	3.1	3.2	3.5	3.3
Change in primary structural NCFFO (% GDP)	1.1	0.2	-0.1	0.1	0.3	-0.2
Depreciation	925	943	1,013	1,059	1,084	1,106
Nominal GDP	114,145	120,309	124,964	131,293	137,201	143,026

**Figure 2 – Primary structural balance and fiscal balance**

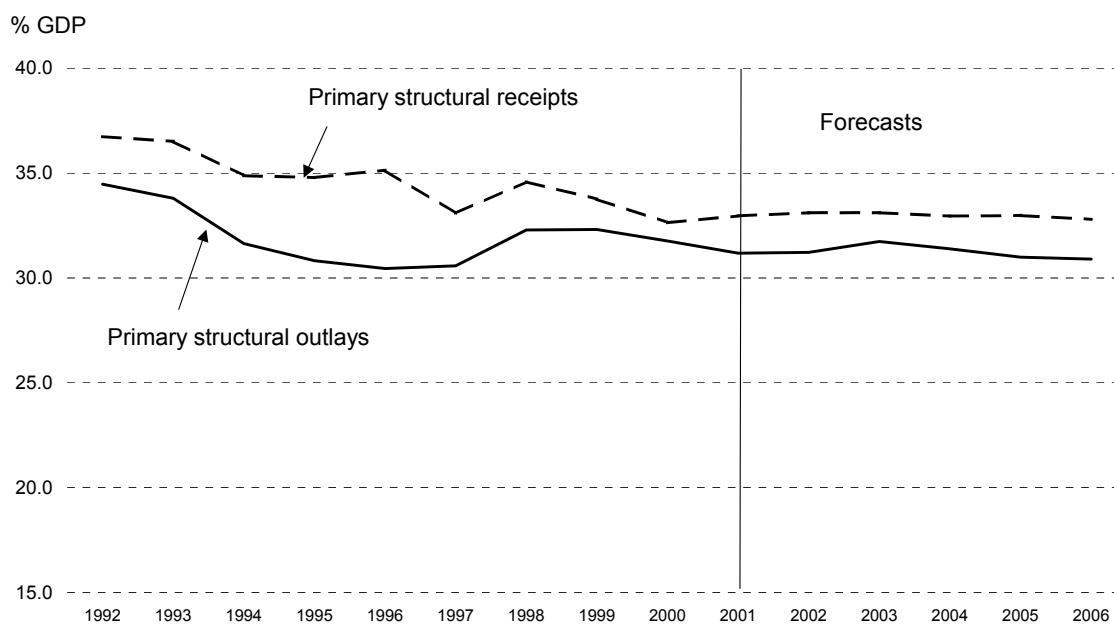


Source: The Treasury

In broad terms, changes in the balances plotted in Figure 2 suggest a tightening of fiscal policy in the early 1990s, followed by a loosening until the late-1990s. This reflects the 1996 and 1998 tax cuts (which occurred in the 1997 and 1999 fiscal years) and increases in primary expenditure. Between 1996 and 2000, both the primary structural balance and the fiscal balance declined by 3.8 percentage points of GDP. Estimated primary structural receipts decreased from 35.1% of GDP in 1996 to 32.6% in 2000. Estimated primary structural (operating) expenditures were 29.4% in 1996 and 30.6% in 2000.<sup>16</sup> In recognition of the potentially different effects of taxes and spending, Figure 3 shows the paths of primary structural receipts and primary structural outlays, where outlays are operating plus the capital adjustment.

<sup>16</sup> New Zealand's fiscal consolidation was concentrated in the early to mid-1990s, whereas OECD countries generally consolidated in the latter half of the decade. Analysis by the OECD (1999, Figure I.9, p.21) indicates that over the period 1995 to 1999, only two out of twenty OECD countries experienced a fall in their estimated structural fiscal balance, New Zealand and Japan. (In order to facilitate the cross-country comparison, the OECD use different fiscal information to that used here. But the general point of an easing still holds.)

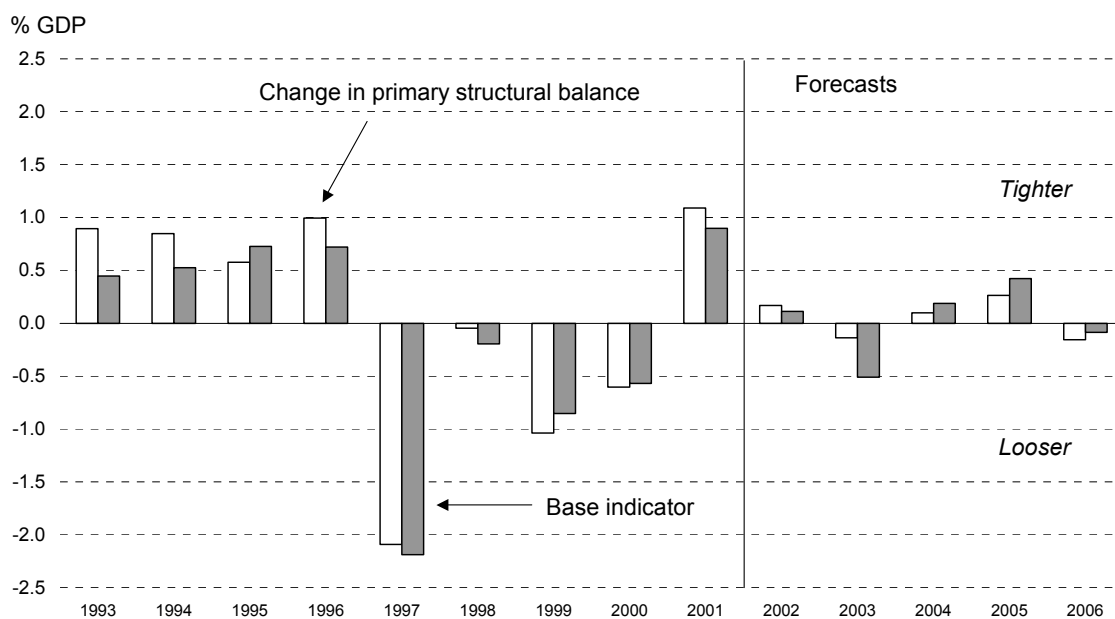
**Figure 3 – Primary structural receipts and primary structural outlays**



Source: The Treasury

For a country running structural fiscal deficits, an increase in the absolute value of the structural deficit is typically defined as expansionary. In a situation of structural surpluses, an increase in the absolute value of the structural fiscal surplus should be interpreted as a tightening of policy relative to the previous year. Note that 1992 is lost because fiscal impulse is calculated as a change. Figure 4 indicates that the inclusion of the capital adjustment has some influence on the interpretation of fiscal impulses relative to changes in the primary structural balance. For example, fiscal impulses in the early to mid-1990s differ somewhat in terms of magnitude, although across history and the forecast period impulses from both the measures are in the same direction.

**Figure 4 – Base indicator of fiscal impulse and change in primary structural balance**



Source: The Treasury

Heller *et al.* (1986) caution that fiscal impulse at best “...provides a measure of the magnitude of the initial stimulus to aggregate demand arising from the net effects of fiscal policy in a given period” (p.4). Whether a particular fiscal impulse actually has an expansionary or contractionary effect depends on some of the issues and limitations raised in Section 2 (i.e., levels of government debt, expectations surrounding the permanence of the change, monetary policy conditions and the mix of tax and spending changes behind the fiscal impulse). For these reasons it is inappropriate to compare fiscal impulses of approximately equal magnitude (e.g., the base indicator in 1993 and 2005) as having equal effects on aggregate demand.

Some of the relevant judgments to consider when assessing whether a contractionary fiscal impulse will actually have a contractionary impact on the economy include the composition of the change in fiscal policy (e.g., between changes in taxes, transfer payments, public sector employment and wages, and investment). Expectations and assumptions about the degree of foresight of consumers may also be relevant. For example, New Zealand’s longer-term bias towards structural tightening (at least in the initial stages of partially pre-funding future New Zealand Superannuation expenses) could mean that an increasing structural fiscal surplus is less contractionary on the economy than in the absence of such a pre-signalled bias.

Alesina and Perotti (1995) use a classification system to identify significant fiscal expansions and contractions.<sup>17</sup> Measurement of fiscal impulse is uncertain, and it is useful to identify how large the change in fiscal policy should be before it is considered “expansionary” or “contractionary”.

<sup>17</sup> The classification system uses the Blanchard Fiscal Impulse (BFI) measure as the relevant fiscal indicator.

Re-writing the Alesina and Perotti definition for the budget balance instead of the budget deficit, fiscal impulses are:

	<b>...when the fiscal indicator is:</b>
Very loose	less than minus 1.5 % of GDP
Loose	between minus 0.5 and minus 1.5 % of GDP
Neutral	between minus 0.5 and 0.5 % of GDP
Tight	between 0.5 and 1.5 % of GDP
Very tight	more than 1.5 % of GDP

Using this system, historical fiscal impulses from the base indicator in Figure 4 were reasonably “tight” in the years from 1993 to 1996, and 2001 and “loose” in 1997, 1999 and 2000. Only one of the historical impulses, in 1997, exceeds the very tight/loose boundaries.

Although the fiscal balance generally follows the primary structural balance in Figure 2, there are occasions where the nature of the capital adjustment creates a divergence. This divergence feeds through into the fiscal impulses in Figure 4. The year ending June 2001, which is the last actual observation, shows a tightening compared to 2000. The change in the capital adjustment between these two years is modest and the tightening reflects an increase in the primary structural balance (refer Figure 2).

Looking forward, primary structural balances are forecast to average just over 3% of GDP. These balances are lower after the capital adjustment is made (although note that the capital adjustment in the forecast period is on average larger than in the historical period). The base indicator fiscal impulses are on average closer to neutral over the forecast horizon as the impulses are in the minus 0.5 to +0.5 range. Estimates of fiscal impulse over the forecast horizon should be treated more cautiously than the historical estimates for two reasons. First, estimates of potential output are more uncertain toward the end of the historical sample period and into the forecast horizon. Second, the indicator is based on *ex ante* spending intentions. Delays in the implementation of spending plans, especially on the capital side will mean a change in the timing of the actual demand impact.

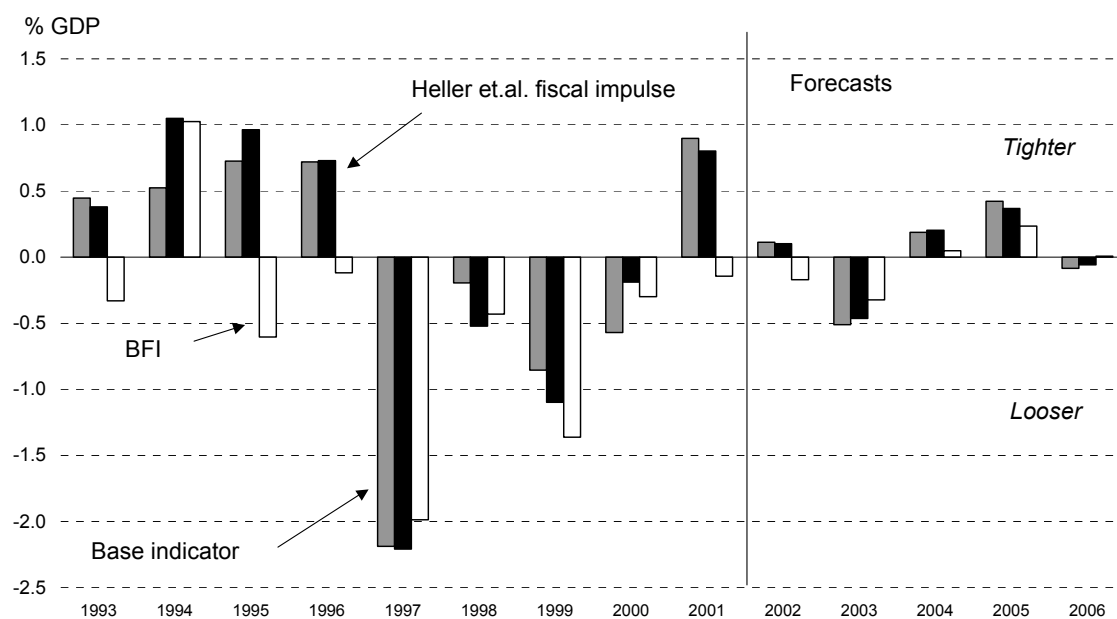
### 4.3 Approach to identifying discretionary policy

This section compares the two-step method of cyclical adjustment with the Heller *et al.* method and the Blanchard Fiscal Impulse (see the Appendix). Note that the same capital component is included in each method.

Figure 5 shows that in all years the Heller *et al.* measure of fiscal impulse is the same sign as the base indicator and of a broadly similar magnitude. This stems largely from the fact that developments in potential output are central to both indicators. The Heller *et al.* method does not adjust for the elasticity of taxes with respect to output (see Appendix). However, this does not create a divergence because the assumed elasticity is close to unity.



**Figure 5 – Comparisons of discretionary measures**



Source: The Treasury

The similarity between these two methods endorses the findings of Chalk (2002) noted in Section 2.2 above. In contrast, the BFI differs in direction from the base indicator in a number of years. Like the other two measures, the BFI picks up the easing of 1997. Yet in 2001 the BFI suggests a close to neutral fiscal impulse, whereas the other indicators suggest a tightening. Unlike the two other methods, the BFI relies on developments in unemployment. Changes in unemployment need not track closely with developments in the output gap (e.g., there may be a lag). All three indicators tell a similar story over the forecast period. However, it is likely that the similarity reflects the relatively small economic cycle and stable unemployment rates over the forecast period compared to history, so that there is less difference between the different methods of adjusting for the cycle.

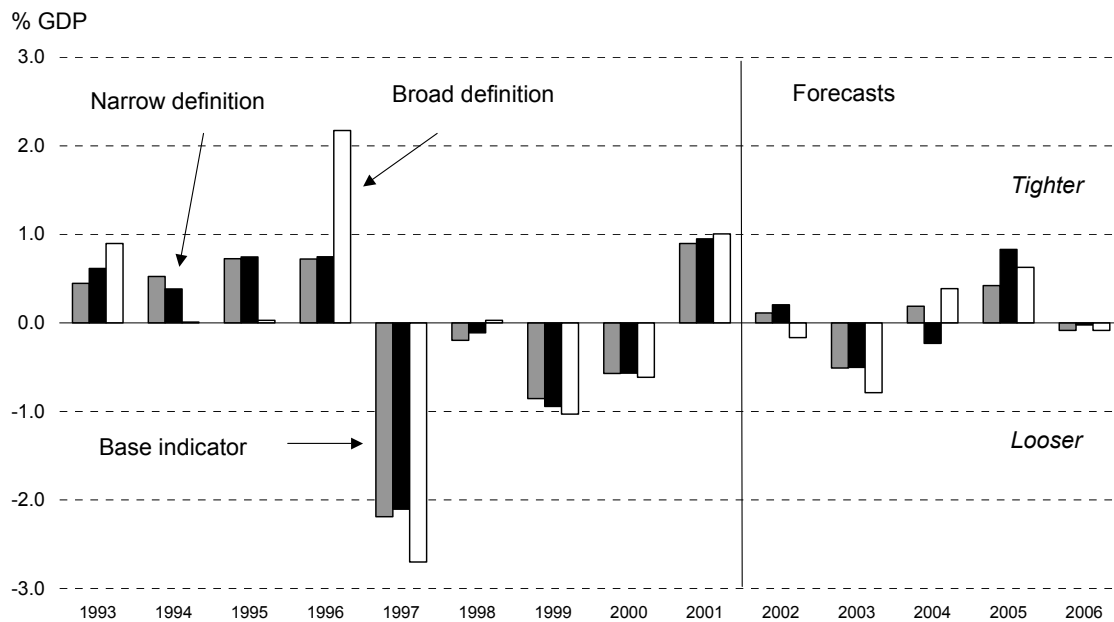
#### 4.4 Capital adjustments

The capital adjustment requires judgements about which capital items to include. Because the trend in the two balances in Figure 2 is broadly similar over time the fiscal impulses tell a reasonably similar story. The years where there are differences between the indicators reflect changes in capital spending. For example, in 2003 the increase in forecast capital spending means that the base indicator shows fiscal policy is loosening, while the primary structural balance shows that fiscal policy is closer to neutral.

Figure 6 looks at the sensitivity of fiscal impulses to different capital adjustments. The base indicator of fiscal impulse is compared with two alternative capital definitions. The first alternative is a "narrow" capital definition that includes net purchases of physical assets and forecast future new capital spending. In contrast to the base indicator this definition includes all actual and expected defence capital purchases. This narrow definition is similar to the measures used by the United Kingdom and Australian Treasuries. It is arguably a better proxy of direct resource claims and brings the fiscal balance closer to a GFS/SNA net lending concept. The second alternative is a "broad"

capital definition that covers the base indicator (i.e., with defence excluded) and a wider range of financial transactions from Table 1. This definition includes advances to hospitals (excluding refinancing of existing loans) and net purchase of investments, excluding the sale of Contact Energy, Auckland and Wellington airports, Forestry Corporation, “At work” insurance, Radio spectrum sales, and excluding the purchase of Air New Zealand.<sup>18</sup>

**Figure 6 – Fiscal impulse under alternative capital adjustments**



Source: The Treasury

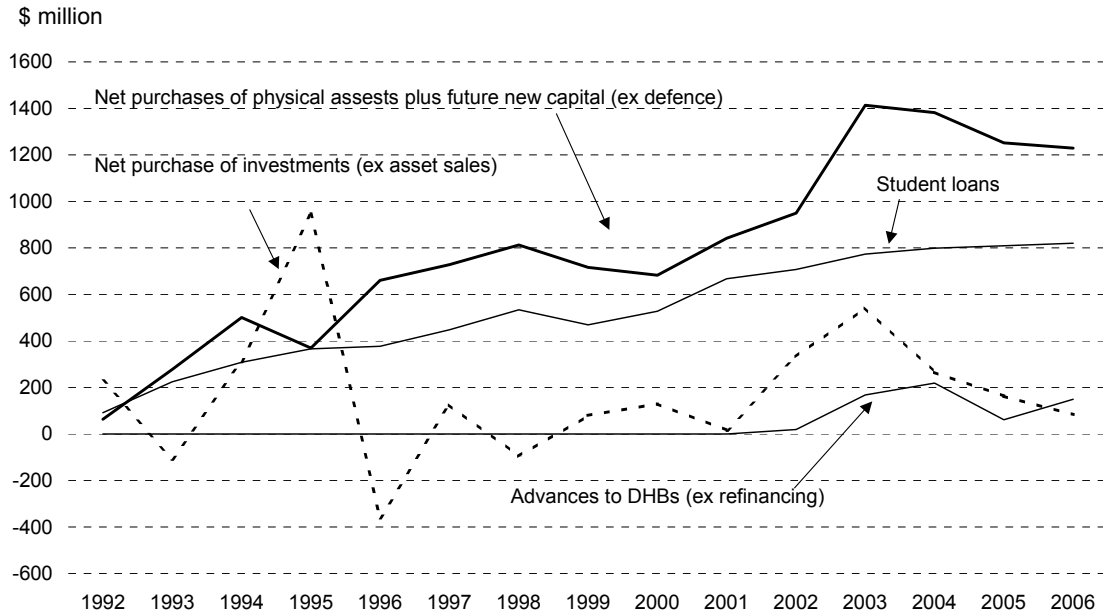
The alternative capital definitions generate some differences in the indicators of fiscal impulse. In particular, under the broad definition there is a relatively large capital adjustment in 1995, followed by a smaller adjustment in 1996. The primary structural surplus increases smoothly over these years. As a result, differences in the size of the capital adjustment are the key reason behind the differences in the fiscal impulses in 1996, where the broad definition shows a marked spike. Although most components of capital evolve relatively smoothly through time, net purchases of investments are reasonably volatile, with a large positive value in 1995 and a large negative in 1996 (see Figure 7). These changes reflect capital flows associated with reforms to the electricity sector and balance sheet restructuring in the health sector and Housing New Zealand.

With the exception of one year (the 2004 forecast), the base indicator and narrow capital definition yield fiscal impulses of the same sign and similar magnitude. Factors that would cause the base indicator to diverge from the broad capital definition include large changes in advances and net purchases of investments. Given our initial focus on the core Crown we exclude advances (other than student loans) and net purchases of investments from the base indicator. As noted in Section 4.1, these items are proxies for discretionary

<sup>18</sup> Hospital deficit funding occurs through equity injections, and is recorded as an increase in investments. The funding for the deficit generally occurs in the year after the actual deficit took place. A more accurate assessment would move deficit funding to the actual year that the deficit occurred. However, because this funding has occurred every year, this adjustment is judged immaterial in assessing the fiscal impulse given that it is calculated as a change.

capital spending outside the core Crown. Refining the indicator to better capture the role of Crown entities will increase its robustness to major changes in capital spending.

**Figure 7 – Components of the capital adjustment**



Source: The Treasury

## 5 Concluding Remarks

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An indicator of fiscal impulse attempts to measure whether the government's overall fiscal policy decisions are adding to, or subtracting from, aggregate demand pressures in the economy. This paper has outlined the conceptual issues in measuring fiscal impulse and developed indicators for New Zealand. Although the general approach of governments has been to allow automatic fiscal stabilisers to operate, for macroeconomic stability reasons government may be interested in the effects of changes in fiscal policies on aggregate demand. It is useful to have an indicator of fiscal impulse as a first round approximation of these effects.

There is no generally accepted indicator of fiscal impulse. This paper has outlined some key decisions that need to be made in calculating an indicator and made some judgements on these decisions.

Indicators of fiscal impulse can enhance the *ex post* interpretation of fiscal policy as well as help to identify relatively large *ex ante* forecast changes. The base indicator calculated in this paper reflects intuitive judgements about changes in discretionary fiscal policy over the last decade and looking forward. Using an alternative method of isolating the discretionary component of fiscal policy, but one that still relies on potential output generates fiscal impulses similar to the base indicator. However, the use of the Blanchard fiscal impulse method, which does not use potential output, creates some differences in both the sign and magnitude of fiscal impulses. The broad similarity of alternative discretionary decomposition techniques over the forecast horizon reflects the small economic cycle and stable unemployment rates in the 2002 Budget forecasts. In addition, the fiscal indicators are based on *ex ante* spending intentions. Delays in the implementation of spending plans, especially on the capital side will mean a change in the timing of the actual demand impact. On the capital side, a broader definition of capital presents a somewhat different picture of fiscal impulses. This suggests future refinements in terms of defining the definition of the government sector.

As with any indicator, the indicator of fiscal impulse has limitations. At best it provides only an indication of the first round impact of fiscal policy on aggregate demand. There are other factors that need to be taken into account when assessing the full impact of changes in fiscal policy on the economy, for example, the composition of the change in fiscal policy. Analysis based on a full-scale macroeconomic model, perhaps complemented with time series analysis can help provide a complete assessment of the impact of fiscal policy on the economy.

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# Appendix

## 1. The structural fiscal balance

The structural fiscal balance provides an estimate of what the fiscal balance would be if the economy were at potential output. The Treasury's approach to estimating the structural fiscal balance is outlined in more detail in Tam and Kirkham (2001). The approach utilises the estimated output gap and the sensitivity of tax receipts and unemployment expenditures to output.<sup>19</sup> The output gap is measured as:

$$gap_t = (Y_t - Y_t^*) / Y_t^* \quad (1.1)$$

where  $Y_t$  is actual real GDP in year  $t$  and  $Y_t^*$  is potential real GDP in year  $t$ . A positive (negative) value for  $gap_t$  indicates that actual real GDP is above (below) potential real GDP. For the calculation of the structural balance, the Treasury estimates the output gap using the Hodrick-Prescott (HP) filter.<sup>20</sup> The structural balance is calculated using cyclically adjusted receipts, cyclically adjusted unemployment expenditure, and other operating expenditures.

The responsiveness of receipts to output depends on two effects, the responsiveness of the tax type to a change in its base ( $e_{T,B}$ ) and the responsiveness of the tax base to a change in output ( $e_{B,Y}$ ). Cyclically-adjusted receipts are calculated as:

$$R_{i,t}^* = R_{i,t} (1 + e_{i,T,Y} \times (-gap_t)) \quad (1.2)$$

where:  $R_{i,t}^*$  = cyclically adjusted nominal receipts item  $i$  in year  $t$   
 $R_{i,t}$  = actual nominal receipt item  $i$  in year  $t$   
 $gap_t$  = output gap in year  $t$   
 $e_{i,T,Y} = e_{i,T,B} \times e_{i,B,Y}$  for each receipts item  $i$ .

The elasticities for the different receipt items, with respect to output, are as follows:

Receipt item	Elasticity
Individual income tax	1.12
Company tax	1.10
Withholding tax/Other direct tax	1.10
GST	1.10
Excise duties	1.00
Other indirect tax	1.00
Interest, profits and dividends	0.00
Other receipts	1.00

Source: The Treasury

<sup>19</sup> When the approach is applied to cash measures, as is the case for the indicators in this paper, receipts and expenditure are the appropriate terms.

<sup>20</sup> Tam and Kirkham (2001) use a structural time series model (STAMP) to estimate potential output. They examine the sensitivity of the estimated structural balance to alternative methods of calculating potential output.



The cyclically adjusted unemployment rate is derived using the output gap and an Okun coefficient  $\beta$ , which is assumed to be 0.5.<sup>21</sup>

$$U_t^* = U_t - \beta(-gap_t) \quad (1.3)$$

where  $U_t$  is the actual unemployment rate in year  $t$  and  $U_t^*$  is benchmark unemployment rate in year  $t$ . Cyclically adjusted unemployment expenditure is assumed to move proportionally to the ratio of unemployment to benchmark unemployment.

$$UE_t^* = average\ benefit_t \times beneficiaries_t \times \left(\frac{U_t^*}{U_t}\right) \times 52 \quad (1.4)$$

where:  $UE_t^*$  = cyclically adjusted nominal unemployment expenditure in year  $t$   
*average.benefit<sub>t</sub>* = average weekly benefit in year  $t$   
*beneficiaries<sub>t</sub>* = number of unemployment beneficiaries in year  $t$ .

## 2. Heller, Haas and Mansur (1986) measure of fiscal impulse

Start with the following definition of the fiscal balance (where notation has been changed to match that used elsewhere in this paper and the measures are on a primary basis):

$$FB_t = (R_t - G_t) \quad (2.1)$$

where  $FB_t$  is the primary fiscal balance in year  $t$ ,  $R_t$  denotes primary government nominal receipts in year  $t$  and  $G_t$  is primary government nominal expenditure in year  $t$ . The fiscal balance is decomposed as follows:

$$FB_t = (r_0 Y_t^* - g_0 Y_t^*) - [r_0 (Y_t^* - Y_t)] - FS_t \quad (2.2)$$

where:  $r_0 = R_0 / Y_0$  base year primary nominal receipts-to-nominal GDP  
 $g_0 = G_0 / Y_0$  base year primary nominal expenditure-to-nominal GDP  
 $Y_t$  = actual GDP in nominal prices in year  $t$   
 $Y_t^*$  = potential GDP in nominal prices in year  $t$   
 $R_t$  = as defined above  
 $G_t$  = as defined above  
 $FS_t$  = measure of the fiscal stance in year  $t$ .

The base year (denoted by the subscript 0) is a year in which actual and potential real GDP are approximately equal (i.e., zero output gap). In our calculations, 1994 has the smallest estimated output gap. The first right-hand-side term in equation (2.2) is the “base year surplus”. The second term is the cyclical component. Equation (2.2) can be re-written as:

$$FB_t = (r_0 Y_t - g_0 Y_t^*) - FS_t \quad (2.3)$$

Fiscal stance can be expressed as:

$$FS_t = (r_0 Y_t - R_t) - (g_0 Y_t^* - G_t) \quad (2.4)$$

<sup>21</sup> See Tam and Kirkham (2001) for details.

This is the formulation presented in Chalk (2002, Table 1). Note that unlike the structural balance method, fiscal stance here assumes that nominal taxes are unit elastic with respect to output. Government expenditures are assumed to be unit elastic with respect to potential output in nominal prices. So:

- Government receipts are cyclically neutral if they increase proportionately with increases in nominal actual GDP. A more than proportionate increase is contractionary regardless of the source (i.e., from either discretionary policy or a progressive tax structure).
- Government expenditures are cyclically neutral if they increase proportionately with increases in nominal potential GDP. A more than proportionate increase is expansionary regardless of the source (i.e., from either discretionary policy or inflation).

Although the measure makes a cyclical adjustment, it includes changes generated by elasticities of taxes and spending with respect to output that differ from unity.<sup>22</sup> Defining the cyclically neutral terms in this way allocates the contribution of automatic fiscal stabilisers that arise from non-unit elasticities to the measure of fiscal impulse. The first difference of equation (2.4) gives a measure of fiscal impulse (FI):

$$FI_t = \Delta FS_t = (\Delta G_t - g_0 \Delta Y_t^*) - (\Delta R_t - r_0 \Delta Y_t) \quad (2.5a)$$

$$= -\Delta FB_t - g_0 \Delta Y_t^* + r_0 \Delta Y_t \quad (2.5b)$$

Heller *et al.* use  $\Delta(FS/Y)$  as a measure of fiscal impulse relative to output. The ratio of fiscal stance to GDP in a particular year indicates how the fiscal policy stance has changed relative to the base year (where by definition, fiscal stance is neutral). Fiscal impulse in a given year reflects the change in stance. If  $FS/Y$  is unchanged between two periods (i.e.,  $\Delta(FS/Y) = 0$ ) then no additional impulse has occurred. A positive (negative) value for fiscal impulse indicates that fiscal policy is more expansionary (contractionary) relative to the previous year. To ensure consistency with the other measures in this paper, we reverse the sign of the impulse measure so that a positive (negative) indicates a tightening (loosening) with respect to the previous year.

### 3. Blanchard fiscal impulse

The Blanchard Fiscal Impulse (BFI) is an indicator of discretionary fiscal policy, and is defined as the value of the primary surplus which would have prevailed, were unemployment at the same value as in the previous year, minus the value of the primary surplus in the previous year, both as a ratio to GDP in each year.

$$BFI_t = (r_t(U_{t-1}) - g_t(U_{t-1})) - (r_{t-1} - g_{t-1}) \quad (3.1)$$

where  $r$  denotes primary government receipts (% GDP) in each year,  $g$  is primary government expenditure (% GDP) in each year and  $U$  is the unemployment rate. The BFI has been calculated using the equations, elasticities and Okun coefficient from the Treasury's structural adjustment approach. The Okun relationship provides the link from output to unemployment. The Okun relationship in this case is specified as:

<sup>22</sup> That is, the output gap still has an influence that needs to be adjusted for even if there is a unit elasticity. Elasticities above unity imply that the cycle has a more than one-for-one effect.

$$\frac{Y_t - Y_{t-1}}{Y_{t-1}} = \frac{1}{\beta}(U_{t-1} - U_t) \quad (3.2)$$

Now convert (1.2) into changes in output from the previous year, rather than deviation in output from potential:

$$R_{i,t}(Y_{t-1}) = R_{i,t} \left( 1 + e_{i,T,Y} \frac{Y_{t-1} - Y_t}{Y_{t-1}} \right) \quad (3.3)$$

Convert (3.3) into changes in unemployment from the previous year by substituting in the Okun relationship (3.2) above. Convert (1.4) into the relationship between current and lagged unemployment, rather than current and benchmark unemployment. This gives an equation for each receipt item, and an equation for unemployment expenditure:

$$R_{i,t}(U_{t-1}) = R_{i,t} \left[ 1 + e_{i,T,Y} \frac{1}{\beta}(U_t - U_{t-1}) \right] \quad (3.4)$$

$$UE_t(U_{t-1}) = \text{average benefit}_t \times \text{beneficiaries}_t \times \left( \frac{U_{t-1}}{U_t} \right) \times 52 \quad (3.5)$$

$R_{i,t}(U_{t-1})$  is a measure of a receipt item in year  $t$  had the unemployment rate of the previous period prevailed. Similarly,  $UE_t(U_{t-1})$  is unemployment expenditure in year  $t$  had the unemployment rate of the previous period prevailed.  $R_t(U_{t-1})$  is total receipts in year  $t$  at the previous years unemployment rate, and is derived by aggregating the adjusted receipt items (i.e., from equation 3.4).  $G_t(U_{t-1})$  is derived by combining adjusted unemployment expenditure (from equation 3.5) with other operating expenditure. The BFI can be calculated by substituting  $R_t(U_{t-1})$  and  $G_t(U_{t-1})$  into the equation for the BFI (3.1) above, and converting to % of GDP.

#### 4. The New Zealand Treasury's EFI

The New Zealand Treasury developed an *Economic and Fiscal Indicator* (see Treasury's Briefing to the Incoming Government 1996, p.61), which showed whether fiscal policy is tighter or looser in one year relative to another year. The key difference between the EFI and other indicators of fiscal impulse is that the EFI attempts to take into account the composition of government expenditure and taxes. The approach taken was to consider how a change in fiscal policy affects the components of aggregate demand (consumption, investment, government spending, and net exports), including the feed through parameters and elasticities. The indicator is the sum of the effect of the change in fiscal policy on each of these components.

The key benefit of the EFI is that it takes into account the composition of fiscal policy, so that it may provide additional information in the case of a balanced budget change in fiscal policy. It also accounts for different reactions by different households, by assuming that some households are liquidity constrained while others are not.

The key disadvantages of the EFI are that the calculation is subjective and relies on judgements around economic theory and parameters such as elasticities, it is not cyclically adjusted and it is not internationally comparable. In addition, changes in the operating balance were found to proxy reasonably well any changes in the EFI under a variety of scenarios. The multiplier effects in the EFI and the inclusion of some capital transactions do not appear to cause substantial differences to the story being told. Even

the EFI could not provide a complete assessment of the impact of fiscal policy on the economy because it is only a partial model. For example, it does not contain a supply side, or a monetary policy reaction function.