Structural fiscal indicators: an overview

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The economic cycle affects a government's fiscal position. Several techniques have been developed to estimate the variation of budget aggregates arising from the economic cycle. These techniques are known as structural fiscal indicators and estimates are published semi-annually by both the IMF and the OECD, among others.

Significant assumptions about the economy's potential output level and the cyclical sensitivity of revenues are required to calculate estimates of the structural fiscal position. The arbitrariness of these assumptions limits the usefulness of structural fiscal indicators as a guide for policy in the short term. For these reasons, official estimates of the structural balance are not published by the Australian Government. However, measures produced by both the IMF and OECD suggest a structural improvement of Australia's fiscal position over the past few years.

1 The author is from Macroeconomic Policy Division, the Australian Government Treasury. This article has benefited from comments and suggestions provided by Blair Comley, Paul Fischer, David Gruen, Adam McKissack, Paul O'Mara, David Parker, Martin Parkinson and participants at a recent internal seminar. The views in this article are those of the author and not necessarily those of the Australian Government Treasury.

Introduction

The economic cycle affects the government's fiscal position. The Government's fiscal strategy, which is set over a medium-term horizon, abstracts from such cyclical variations. The primary objective of the fiscal strategy is to achieve budget balance, on average, over the course of the economic cycle.

Several techniques have been developed to measure the variation of budget aggregates arising from the economic cycle. Chief amongst these techniques is the estimation of a structural fiscal indicator that attempts to identify the impact of the economic cycle on the fiscal position and subtract this effect from the actual budget balance. These indicators are subject to a number of methodological problems that limit their usefulness as a guide for policy at a point in time.

Estimates of the structural budget balance are published for most advanced economies in the IMF's *World Economic Outlook*. Estimates of the OECD's cyclically adjusted balance are published in its *Economic Outlook*. For the purposes of this article, it is assumed that the terms 'structural' and 'cyclically adjusted' have the same meaning.

The OECD and the IMF indicators are conceptually similar, although they adjust for the cycle in slightly different ways. The two estimates should yield broadly similar results, although in practice there can be considerable differences between them.

The purpose of this paper is to provide an overview of the indicators published by these organisations and to assess the extent to which they provide useful information about Australia's fiscal position.

The influence of the economic cycle — overview

Government expenditures and revenues tend to vary with the economic cycle. When output growth is running above trend, expenditure falls and revenue rises, relative to trend. Expenditure falls as, in general, when growth is higher there is less spending on unemployment benefits and other welfare programmes, while tax revenue rises through higher company profits, wages and consumer spending. When output growth is below trend, the converse applies. The Government's fiscal strategy, which aims for balance over the cycle, abstracts from such cyclical movements.

Structural fiscal indicators aim to adjust for the effects of the real economic cycle on the budget balance by identifying the extent to which budget aggregates are affected by the cycle. Conceptually, government budget aggregates in any given year reflect the net impact of structural components and cyclical components of the budget. The structural component refers to the fiscal position that is generated under 'normal' economic conditions, usually interpreted as a situation in which the economy is

operating at its maximum feasible non-inflationary output level given existing technology and production capacity. This level is known as the economy's potential level of output. When the actual level of output varies from potential there will be a cyclical component to the budget balance. The magnitude of this cyclical component will depend on the size of the deviation of the economy from potential and the responsiveness of expenditures and revenues to this deviation.

Estimating the cyclical component of the fiscal position therefore requires quantification of the size of the deviation of actual output from potential and the cyclical sensitivity of the budget aggregates. The result of this estimation is then subtracted from the actual budget balance to obtain the structural balance measure. A key input into this estimation is the calculated output gap, which is the difference between the actual level of output and the economy's potential level of output.

The interpretation of structural fiscal indicators is fairly straightforward. When the economy is assessed to be above its potential level, the structural budget balance will be less than the 'headline' budget balance (smaller surplus or a larger deficit). That is, part of the 'headline' balance reflects the impact of the economy operating temporarily above potential rather than the result of active decisions about revenue and expenditure. The converse applies when the economy is running below potential.

Government revenues in Australia are affected not just by swings in the real economy but also by any significant variations which might occur from time to time in the nominal economy due to, for example, swings in export commodity prices and the terms of trade. These variations affect incomes and hence the income or company tax base. However, existing structural fiscal indicators do not make any allowance for such effects, which can be quite large.

In light of the above, while the structural balance concept provides a general framework for thinking about the relationship between the economic cycle and the fiscal position, any empirical results must be treated with caution as they may give a misleading indication of the stance of policy. For this reason, the Government does not publish structural fiscal measures.

Construction of structural fiscal indicators

The structural budget balance is calculated by subtracting structural expenditures from structural revenues. Structural expenditures and revenues are obtained by subtracting their estimated cyclical components from their actual level. This process involves three main steps:

1. estimation of potential output and the output gap;

2. quantification of the cyclical component of expenditures and revenues; and

3. subtraction of the estimated cyclical components from their actual levels.

These steps are examined in more detail below.

Estimating structural fiscal indicators

The first step in estimating structural fiscal indicators is to estimate the economy's potential level of output. The predominant method of estimating potential output at the IMF and the OECD is to use a simple production function, although in recent years the IMF has used a Hodrick-Prescott filter approach to estimate potential output for Australia. The production function method models output as a function of the underlying factors of production, linking output to the capital stock, the size of the labour force and trend total factor productivity. Potential output is then calculated as the level of output consistent with an economy's stock of capital and the 'natural rate' of unemployment (which is defined here as the unemployment rate consistent with stable inflation).

The second step in estimating structural fiscal indicators is to estimate the cyclical component of observed revenues and expenditures and to subtract this from observed revenues and expenditures. Both the IMF and OECD structural fiscal measures identify the cyclical component of budget aggregates by estimating the responsiveness of actual revenue and expenditure to deviations from the economy's potential level of output. In both measures, the cyclical component of revenues is estimated using elasticities for major tax revenue items drawn from the OECD's Economic Outlook Database. These elasticities are the product of marginal and average tax rates for four tax categories: personal, corporate, indirect and social security contributions. While both measures draw on the same primary source for these elasticities, the OECD individually adjusts revenue for each major tax item whereas the IMF uses an aggregate elasticity that reflects the weighted share of each tax category in total revenue. For Australia, the IMF also adjusts actual revenues according to a weighted average of the output gap in the current and previous years. This is done to reflect lags in tax collection.

Both the IMF and OECD measures of the structural budget balance are based on the assumption that unemployment benefits are the only cyclical component of expenditures. However, the manner in which unemployment benefits affect expenditure varies between the two measures. The IMF's structural measure implicitly assumes that changes in unemployment from the natural rate lead to a proportionate change in unemployment benefit expenditures. For Australia, the IMF calculates structural expenditure by deducting net advances as well as the difference between

actual unemployment benefit spending and the estimated level of benefit spending that would result if unemployment was at the natural rate.

While the OECD also assumes a proportionate change in unemployment benefit spending when actual unemployment deviates from the natural rate, the relationship between the unemployment rate and output is econometrically estimated for each country. Therefore, in the OECD's structural fiscal framework, a change in output can lead to a change in unemployment benefit expenditures that is greater than or less than one, depending on the country.

Table 1 in Appendix 1 provides a more detailed comparison of the two organisations' structural fiscal measures.

Structural fiscal indicators in practice

A number of assumptions are required to generate estimates of the structural fiscal position. As a consequence, these estimates have a relatively wide margin of error and need to be interpreted carefully.

The major weakness of structural fiscal indicators is their use of potential output estimates, with estimation of the cyclical component of revenues and expenditures sensitive to the size of the calculated output gap. Estimation of the output gap is dependent on identifying the level of potential output. Given that potential output cannot be observed directly, estimation requires assumptions about the rate at which the economy can grow without inflationary pressures emerging. In addition, this rate of growth will differ over time as the underlying structure of the economy changes. The confidence intervals around estimates of the output gap will often span both sizeable positive and negative output gaps.

This will be particularly the case when the economy is going through a period of structural change, such as that experienced in Australia over the past two decades. For example, reforms to the labour market are likely to have reduced the 'natural rate' of unemployment since the first half of the 1990s, and this has significant implications for the rate at which the economy is able to grow without facing inflationary pressures.

In addition to the confidence interval associated with output gap estimates, different techniques will generate different estimates of the size of the gap, with the range of commonly used techniques generating output gap estimates that often differ by a few percentage points of potential GDP.

In general, the sensitivity of the cyclical component to the size of the calculated output gap means that errors in the estimation of potential output can have significant effects on the estimated structural balance. A second limitation relates to assumptions made

about the cyclical sensitivity of revenue and expenditure. For example, unemployment benefits are not the only cyclically sensitive expenditure item. In addition, as outlined above, movements in commodity export prices, the terms of trade and overall nominal economic activity which affect the budget balance are not picked up in estimates of the output gap as these estimates are predicated on a real output framework. Further, the use of average and marginal tax rates to generate revenue elasticities can increase the risk of misleading results if the economy has been through a recent period of structural change, including changes to the tax system.

Looking at IMF and OECD estimates of Australia's output gap in each of the last six years, there has been some disagreement on the sign and magnitude of the gap in recent years (Table 1).

Table 1: Estimated output gaps for Australia[(a)]

Per cent of potential GDP

	2000	2001	2002	2003	2004	2005
OECD	1.4	-0.8	-0.5	-1.0	0.6	-1.0
IMF	-0.1	-0.6	-0.2	-1.0	-0.1	-0.3

(a) IMF and OECD data are estimates as at year of publication.

Source: IMF World Economic Outlook Database September 2000, October 2001, September 2002, October 2003, September 2004 and April 2005; OECD Economic Outlook 68, 70, 72, 74, 76 and Preliminary Edition 77.

Conceptually, a negative (positive) output gap[2] should result in a structural fiscal measure that is larger (smaller) than the estimated 'headline' balance. For example, a negative output gap would result in an estimated structural balance that represented either a larger surplus or a smaller deficit than suggested by the 'headline' measure. Looking at the estimated structural fiscal positions for the same year this pattern generally holds, with a negative output gap resulting in an estimated structural fiscal position that is larger than the estimated headline balance (Table 2).

2 A positive output gap refers to actual output greater than potential and a negative output gap refers to actual output lower than potential.

Table 2: Comparison of estimated headline and structural Australian budget balances[(a)]

Consolidated general government financial balance as a per cent of GDP[(b)]

	2000	2001	2002	2003	2004	2005	Average 2000 to 2005
OECD							
Actual	0.9	0.1	0.1	0.8	0.7	0.9	0.6
Structural	0.6	0.1	0.3	1.1	0.5	1.2	0.6
IMF							
Actual	0.8	0.5	0.1	0.4	0.7	0.5	0.5
Structural	0.9	0.6	0.2	0.7	0.8	0.9	0.7

(a) All data are based on the consolidated general government sector. OECD and IMF Australian general government budget data presented on a calendar year basis. All data points are estimates as at year of publication. Actual is as measured at the time of publication.

(b) Structural fiscal measures expressed as a per cent of potential GDP.

Source: IMF World Economic Outlook Database September 2000, October 2001, September 2002, October 2003, September 2004 and April 2005; OECD Economic Outlook 68, 70, 72, 74, 76 and Preliminary Edition 77.

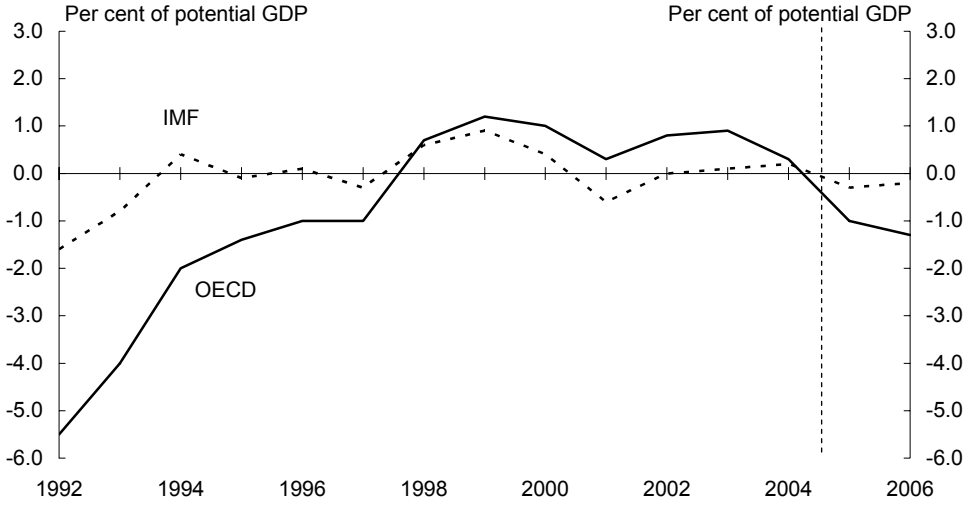
In addition, despite the disagreement about the sign and magnitude of the output gap, both organisations' contemporaneous estimates of the structural fiscal position suggest that Australia was in structural surplus in each of the last six years. Over these six years, the average estimated structural surplus was 0.6 per cent of GDP for the OECD measure and 0.7 per cent of GDP for the IMF measure (Table 2).

As more historical information becomes available on the underlying structure of the economy, it should be possible to produce better informed backward-looking estimates of the output gap than those which can be produced contemporaneously. This suggests that ex-post estimates of the structural balance may be more reliable than those based on the current or forecast budget position.[3] In each of their semi-annual economic publications, the IMF and the OECD revise their output gap and structural fiscal estimates for prior years. Ex-post measures of the output gap are set out in Chart 1.

The IMF's revised output gap estimates suggest that since 1992, Australia has been close to potential except for a period below potential in the early 1990s and above potential in 1998, 1999 and 2000. The OECD's revised estimates for the same period imply output considerably below potential in the early 1990s and above potential output in most of the latter part of the period.

3 However, it is worth noting that differences in the organisations' forecasts do not necessarily only reflect uncertainties in estimating the cyclical component of the budget. They could also reflect different assessments of the short-term outlook.

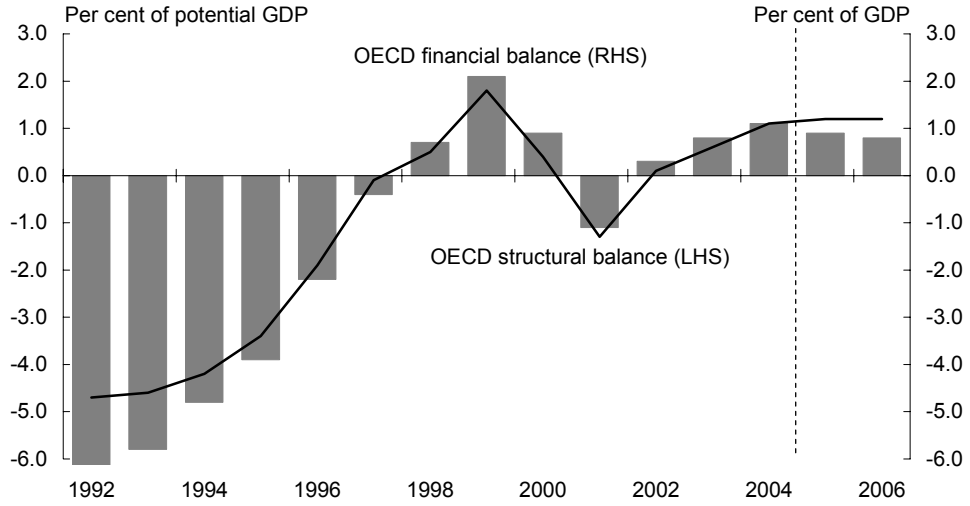
Chart 1: Revised IMF and OECD output gap estimates for Australia[(a)]



(a) OECD and IMF data are presented on a calendar year basis.
Source: OECD Economic Outlook, 76, Annex Table 10, December 2004 and Preliminary Edition 77, May 2005; IMF World Economic Outlook Database, April 2005.

Looking at the most recent estimates for Australia, the OECD structural balance measures suggest that the large deficits observed in the early 1990s were primarily structural. Similarly, they suggest that the run of surpluses from the late 1990s also has a substantial structural component (Chart 2).

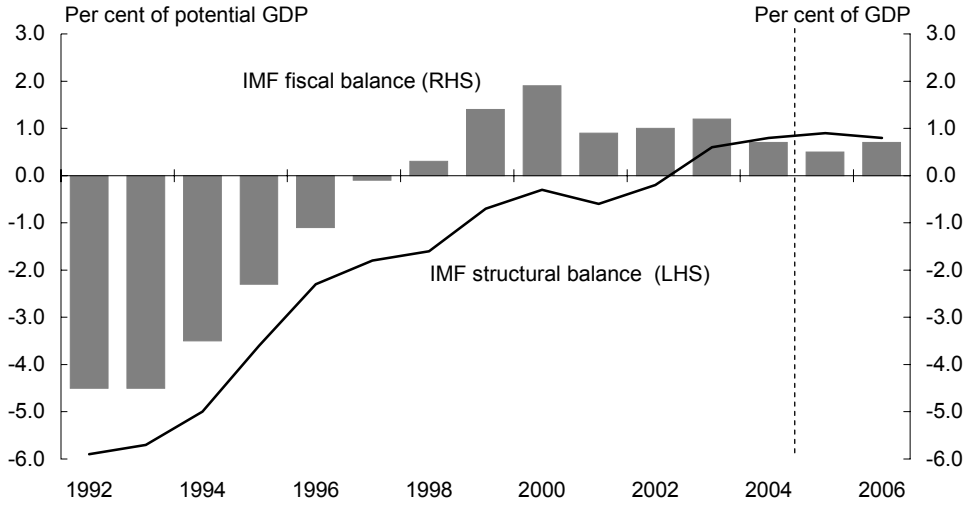
Chart 2: Revised OECD fiscal estimates for Australia[(a)]



(a) All data are based on the consolidated general government sector as constructed by the OECD.
Source: OECD Economic Outlook, 76, Annex Table 27 and 28, December 2004 and Preliminary Edition 77, May 2005.

In contrast, the IMF measure suggests that the budget was in large structural deficit in the early 1990s, before moving sharply to levels close to balance in the later part of the decade, and then into a modest structural surplus over the past few years (Chart 3).

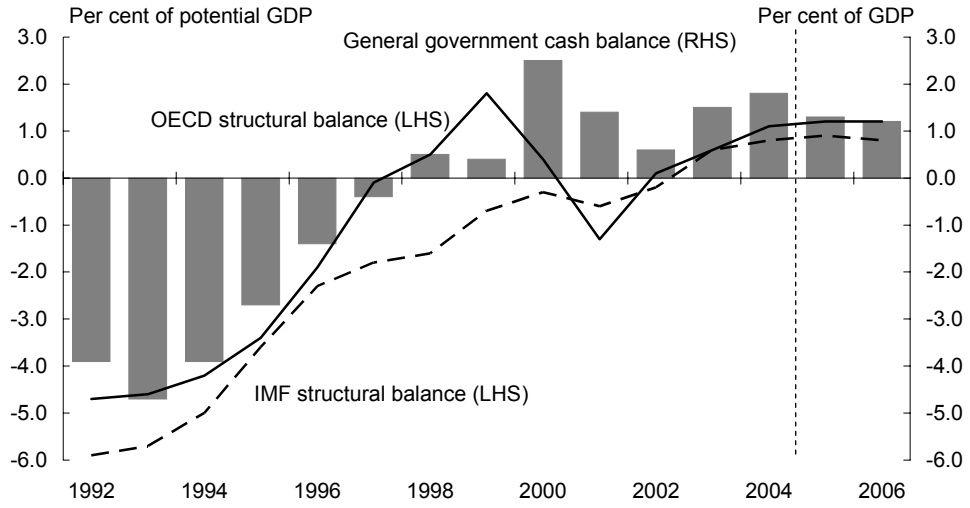
Chart 3: Revised IMF fiscal estimates for Australia[(a)]



(a) All data are based on the consolidated general government sector as constructed by the IMF.
Source: IMF World Economic Outlook Database, April 2005.

It is interesting to note that both estimates of the structural fiscal position are converging on the actual general government cash surplus as consensus emerges that the Australian economy is operating around potential (Chart 4). Moreover, both measures show a structural improvement in Australia's fiscal position over the past few years, despite differences in the estimated path to achieving that improvement.

Chart 4: Actual and structural balances for Australia[(a)]



(a) All data are based on the consolidated general government sector. Australian data based on financial years but presented annually. For example, 1998 represents the 1997-98 financial year.
Source: OECD Economic Outlook, 76, Annex Table 28, December 2004 and Preliminary Edition 77, May 2005; IMF World Economic Outlook Database, April 2005; 2005-06 Budget, Statement 12.

Conclusion

While fiscal policy is focused on the medium term, the economic cycle has short-term effects on the government's fiscal position. The Australian Government does not publish estimates of the structural fiscal balance because significant assumptions about the economy's potential output level and the cyclical sensitivity of revenues are required. Estimates are published by the OECD and IMF, and it is important to understand how such measures should be interpreted. Movements in structural balance estimates from year to year have been difficult to interpret in recent times, as these estimates are highly sensitive to assumptions about the output gap. This is particularly true given the structural changes in the economy over the past two decades. However, the medium-term picture that emerges from OECD and IMF estimates of the structural balance supports the view that there has been a significant structural improvement in Australia's fiscal position over the past few years.

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Appendix 1

Table 1: Summary of main structural fiscal indicators

Feature	International Monetary Fund (IMF)	Organisation for Economic Cooperation and Development (OECD)
Output gap	Two-factor Cobb-Douglas production function predominates, particularly for industrialised countries. Hodrick-Prescott de-trending of certain variables.	Two factor Cobb-Douglas production function. CES function for Japan.
Expenditure	Primary (excluding capital spending), based on natural rate of unemployment. Natural rate of unemployment estimated using Okun coefficient to adjust actual rate of unemployment in proportion to the output gap. Implicitly assumes a proportionate relationship between unemployment benefit spending and deviations from the natural rate.	Primary (excludes capital spending), based on unemployment elasticity. Unemployment elasticity is the product of the reciprocal of Okun coefficient and the elasticity of unemployment benefit spending with respect to unemployment. This provides an estimate of the elasticity of unemployment benefit spending with respect to output. Elasticity of unemployment benefit spending with respect to output can be greater than or less than one.
Coverage	Consolidated general government (includes the States and Territories).	Consolidated general government (includes the States and Territories).
Revenue elasticities	Product of marginal and average tax rates. Tax categories are: corporate, personal, indirect and social security. Obtained from OECD Economic Outlook Database. Uses an aggregate elasticity which reflects weighed share of four tax categories in total revenue. Lagged aggregate elasticity included to reflect lags in corporate tax payments.	Product of marginal and average tax rates. Tax categories are: corporate, personal, indirect and social security. Obtained from OECD Economic Outlook Database. Revenue for major tax items adjusted individually for each of the four tax categories and summed.
Published	Semi-annually in IMF *World Economic Outlook*, April and September.	Semi-annually in *OECD Economic Outlook*, May and December.