Some issues affecting the macroeconomic environment for the agricultural and resource sectors: the case of fiscal policy[†]

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The impact of structural changes in fiscal policy on macroeconomic stability in Australia and other developed economies since the mid-1970s is assessed. The evidence points to a destabilising influence from fiscal policy from the mid-1970s to the mid-1980s, with a more stabilising influence since then. Within Australia, there is some evidence that structural changes to fiscal policy may have helped to stabilise interest rates and the real exchange rate over the period since the mid-1980s. However, this stabilising influence on the real exchange rate may have reduced the extent to which real exchange rate movements have countervailed world commodity price changes in Australian dollar terms.

1. Introduction

In the 1950s and 1960s, there was widespread use of monetary and fiscal policy amongst industrial economies to attempt to at least partly offset short-term fluctuations in output and employment. However, the co-existence of high unemployment and high inflation in the 1970s led to some questioning of the effectiveness of such so-called counter-cyclical policies. In more recent years, policy-makers in some major industrial economies have largely eschewed the use of counter-cyclical macroeconomic policy, particularly fiscal policy. This reflects the perceived relatively poor performance of counter-cyclical fiscal policy during the 1970s, difficulties in forming accurate macroeconomic forecasts on which to base policy changes

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and reduced flexibility in the setting of fiscal policy because of large public sector deficits and high public debt. These countries now tend to focus on medium-term objectives for fiscal policy, such as reducing the public sector deficits and debt which have resulted from past policy decisions.

Even in countries, such as Australia, that have made some recent use of counter-cyclical fiscal policy, there is an increasing focus on the need for fiscal policy to be set within a medium-term framework and for counter-cyclical policies to be designed to complement, rather than compromise, medium-term objectives.

The purpose of this article is to review and assess the impact of fiscal policy in Australia and other OECD economies in stabilising or destabilising economic activity over the period since the early 1970s, and hence stabilising or destabilising the demand for primary commodities in major markets. In Australia's case, an attempt is also made to assess the impact of variations in fiscal policy on interest rates and the real exchange rate, given that these two variables are likely to have a pervasive influence on the financial performance of many commodity industries, given their capital-intensive nature and export orientation.

The article is organised as follows. The key arguments for and against the attempted use of short-term macroeconomic stabilisation policies are outlined in section 2. A schematic outline of issues surrounding the definition and measurement of the counter-cyclical effect of fiscal policy is presented in section 3. Section 4 contains an empirical assessment of the counter-cyclical impact of fiscal policy in Australia and a range of OECD countries over the period since the mid-1970s. A more detailed empirical analysis for Australia over the period since the mid-1980s is presented in section 5. The key results are summarised in section 6.

2. Some issues in the analysis of counter-cyclical policy

In this section, consideration is given to reasons for using stabilisation policies and to situations in which stabilisation may reduce welfare.

2.1 Why implement stabilisation policies?

A key argument for attempting to reduce volatility in the economy is that individuals and businesses are likely to have a strong preference for stability. For example, given a choice between a stable growth rate in output (and therefore incomes) of 3 per cent each year, or a growth rate that fluctuated between 1 and 5 per cent each year (or indeed was negative in some periods), but averaged 3 per cent each year, individuals and businesses may prefer the stable growth rate. If individuals and businesses are, in fact, risk averse

in this way and if the government could, at minimal cost, undertake a policy that reduced the fluctuations in output, then such a policy would be likely to lead to a welfare improvement.

If such a preference for stability is the justification for a stabilisation policy, then some attention must be paid to the choice of the variable or variables that the policy-maker is attempting to stabilise. The focus will often be on output or employment, or some combination of the two, but may also include variables such as the inflation rate or the level of investment. It will sometimes be possible to set macroeconomic policy instruments so as to reduce the volatility in several target variables at the same time. However, on some occasions these outcomes will be in conflict. For example, it may be the case that reductions in unemployment below some key level will lead to increased inflation. Hence, it may be necessary to trade off outcomes for each target variable. Alternatively, there may be a perceived conflict between a long-term fiscal policy objective, such as stabilising public debt or reducing the current account deficit by raising national saving, and a short-term fiscal objective of providing a stimulus to the economy in times of recession. Furthermore, a rise in unemployment may be due to an excessive increase in real wages rather than general weakness in spending and overall economic activity. In each case, policy-makers need to take a balanced view in reconciling the various objectives of policy.

If a key motivation behind the adoption of stabilisation policies is that individuals tend to be risk averse, and thus prefer a relatively stable economic environment, it may be appropriate to put some focus on stabilising employment and the unemployment rate. This is because, for most individuals of working age, the risk of unemployment is likely to be the source of most uncertainty with respect to their future income. Achieving a reasonable degree of stability in employment and unemployment may also be consistent with achieving other social objectives such as alleviating poverty, given that unemployment tends to be a major cause of relative poverty in the community. On the other hand, fluctuations in the inflation rate and interest rates are likely to be a more important source of uncertainty with respect to the incomes of those individuals who have retired from the workforce and for much of the business sector, including the agricultural and resource sectors.

A second possible motivation for stabilisation policy is that macro-economic stability could be conducive to higher rates of economic growth for extended periods of time. This point is somewhat similar to, and complements, the aforementioned preference for stability. In particular, a reduced level of volatility in the economy may reduce the uncertainty about future economic developments as perceived by investors. To the extent that investors are risk averse, reduced uncertainty could translate into a higher

level of investment, and therefore growth, in the economy for an extended period. Of course, this is only one of several channels through which government expenditure and taxation policies can influence economic growth over the medium term. For example, the nature of corporate taxation arrangements can influence private sector investment spending, while personal income tax and social security arrangements can influence the incentives facing individuals to actively seek or remain in employment.

A third argument in favour of the use of policies to stabilise the economy is that market rigidities may slow the return of the growth rate of output and the unemployment rate to their long-term trend values following a recession. In particular, factors such as the bargaining arrangements in the labour market may prohibit the free movement of labour between industries and, hence, contribute to the unemployment rate remaining above its long-term level and the growth rate in output remaining below its long-term trend level for extended periods. These issues are best addressed by reforming arrangements in the labour market. The use of macroeconomic stabilisation policies to prevent or moderate the initial deviation from long-term trend values and so moderate the cost of these market rigidities is very much a second-best solution. These issues are surveyed in, for example, Mankiw (1990) and Wells (1995).

2.2 Circumstances under which stabilisation policy may reduce welfare

A key reason given in opposition to the operation of any stabilisation policy is that, due to lags associated with operating the policy, in practice it is not possible to successfully operate a stabilisation policy. Problems associated with determining the appropriate size and timing of any change in the stance of policy may lead to an outcome where the policy measures actually increase the volatility in the economy rather than reduce it. In other words, the aggregate lag associated with recognising the need for a change in policy, then implementing the change in policy, and finally the policy taking effect, may be such that when the policy actually takes effect it is no longer appropriate. For example, policy-makers may assess that the economy is experiencing a period of excess demand and seek to implement a cut in government spending in order to reduce the inflationary pressures associated with this excess demand. However, by the time the size of the cut in spending is determined, implemented and actually takes effect, the inflationary pressures may have abated, with the economy moving into a slow growth period. If this is the case, the cut in government spending may exacerbate the slowdown.

The first of these three lags is commonly referred to as a 'recognition' lag. This is the lag associated with determining that, for example, the

economy is experiencing a downturn and so an expansionary policy may be appropriate. There is also a degree of imprecision in forecasts of macro-economic developments, particularly in the early stages of upturns or down-turns. Nevertheless, recognising these turning points in the economic cycle is critical to the effective implementation of stabilisation policies.

Once the need for a change in the policy stance has been recognised, there is a second lag before the policy change is put into place, often referred to as the 'implementation' lag. In the case of changes to fiscal policy this can be significant, as expenditure and taxation changes require legislative approval. The implementation lag for fiscal policy changes in Australia will usually be at least three months and often longer, given the need to develop policies and obtain Cabinet agreement prior to the legislation being presented in Parliament. Further, the majority of fiscal policy changes are made only once a year, as part of the Commonwealth Budget, though changes to fiscal policy can be made outside the budget process.

Once legislative approval has been granted for a particular policy, there is an additional lag before the policy change impacts on the economy, commonly referred to as the 'impact' lag. The length of this lag will tend to vary, depending on the nature of the policy change. The impact of second round or multiplier effects will also take time to work through the economy.

Policy-makers face a trade-off in their choice of policy instrument. Some policy instruments, such as a tax cut, may be useful for stabilisation purposes as they have a short implementation lag. Others, such as changing the level of government consumption spending, may be useful as they have large multiplier effects. An additional compelling issue is the extent to which any particular fiscal measure, particularly decisions to bring forward, cancel or delay public investment, can be justified on conventional benefit cost criteria.

Some critics of stabilisation policy have also argued that the successful operation of a stabilisation policy may lead to lower levels of efficiency in the economy. In particular, it is suggested that cycles in the economy are due mainly to random fluctuations in technological change. In response to these changes, some industries will decline as changes in technology make them unprofitable, while other sectors will boom. Thus, cycles in the economy are a natural and efficient response to these changes in production technology. If this is the case, then any stabilisation policy which reduces these fluctuations may lead to a less efficient allocation of resources by slowing the process of adjustment in the economy. In essence, it is argued that, if fluctuations in the economy are not caused by any particular breakdown in the free market system, then there is no appropriate role for the government to play in reducing these fluctuations, and any such intervention by the

government will reduce the efficient functioning of the economy. A survey of this argument is presented in Mankiw (1990). However, as noted by Mankiw, there is little empirical evidence to suggest that fluctuations in the rate of technological progress are sufficiently large to account for the fluctuations in economic growth rates which are typically observed over the course of a business cycle.

A specific argument against the use of fiscal policy to meet stabilisation objectives is that it may lead to overall increases in the level of public debt over time. The essence of this argument is that, as policy is conducted in a political framework, it is difficult to operate a symmetrical fiscal policy over the economic cycle. Expansionary policies, that is tax cuts or spending increases, tend to be politically popular, while contractionary policies, that is tax increases or spending cuts, tend to be politically unpopular. The temptation may therefore be present for governments elected for a relatively short period of office to undertake expansionary activities partly in order to stabilise the economy, but also to enhance their political popularity. Conversely, during booms governments may be reluctant to undertake the appropriate contractionary policy in terms of meeting stabilisation objectives, if such a policy is politically unpopular, or they may undertake such adjustment at a slower pace than necessary in the belief that the cycle will be of longer duration than turns out to be the case. If this happens, the result will be a gradual emergence of sustained budget deficits and an increase in the level of public debt. The existence of a binding medium-term target or anchor for fiscal policy may help to overcome this problem in that it imposes some additional discipline on the use of fiscal policy in a counter-cyclical role, helping to ensure that expansionary policies are at least approximately matched by contractionary policies over a period. These issues are discussed in more detail in O'Mara *et al.* (1998).

3. What is counter-cyclical fiscal policy?

While the discussion of stabilisation policies in the previous section referred in general terms to fluctuations and volatility, in practice the fluctuations in any economy tend to follow a cyclical pattern. Hence, a reasonable objective for a stabilisation policy is to at least reduce the magnitude of cyclical fluctuations around the trend growth path of the economy. If fiscal policy succeeds in reducing these fluctuations, it can be said to have been operated, or at least to have acted, in a counter-cyclical fashion.

In figure 1 a stylised graph of the fluctuations in GDP is presented. The line labelled GDP can be thought of as representing the actual level of GDP as it fluctuates over time. The line labelled 'trend GDP' represents the underlying trend level of GDP or, in other words, the underlying path which
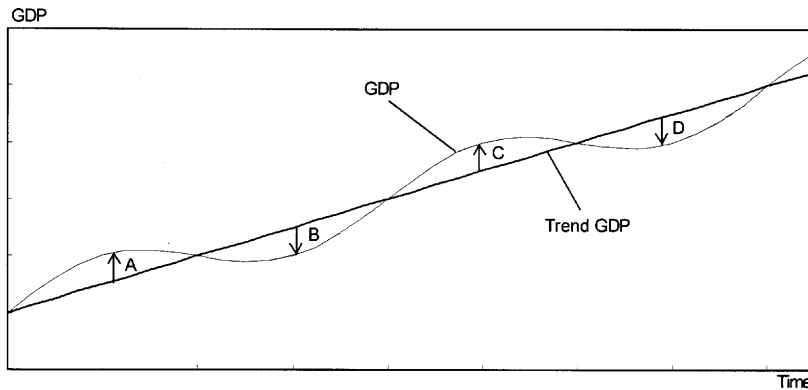
Figure 1 Actual and trend GDP, and the GDP gap

GDP is following after abstracting from the short-term fluctuations. In some periods, GDP is above trend while in other periods, GDP falls below trend.

The difference between the actual level of GDP and its trend level at each point in time is sometimes referred to as a 'GDP gap' (Commonwealth of Australia 1996a). For example, the arrows marked A, B, C and D in figure 1 are the GDP gaps at four different points in time in this simple stylised example. The GDP gap is a simple measure which indicates whether the economy is operating above or below its trend level. In other words, it indicates whether productive resources in the economy are being utilised at rates above or below the average rate.

In practice, there are numerous complexities surrounding the definition and measurement of the GDP gap. The determination of the trend level of GDP is itself problematic. The trend level of GDP is typically estimated from a span of data on actual GDP and, ideally, each span of data should represent one or more full cycles in GDP. If the span of data does not represent a set of complete cycles in GDP, then the endpoints of the data used to estimate the trend will have a substantial influence on the estimated trend. Selection of such endpoints is a relatively simple exercise in the stylised example, but is much more problematic in practice where cyclical behaviour is less regular. There is also a range of other measures, often referred to as 'output gaps', which have been developed by the OECD and others to capture the difference between actual output and its potential level at each point in time. These measures are discussed in more detail in section 4. Given these complexities, the discussion in the remainder of this section deals with the broad concepts, rather than fine detail.

In the simplest intuitive terms, fiscal policy could be said to be counter-cyclical if the size of the fluctuations in GDP in figure 1 are reduced through changes in government expenditure or taxation policy. There are additional
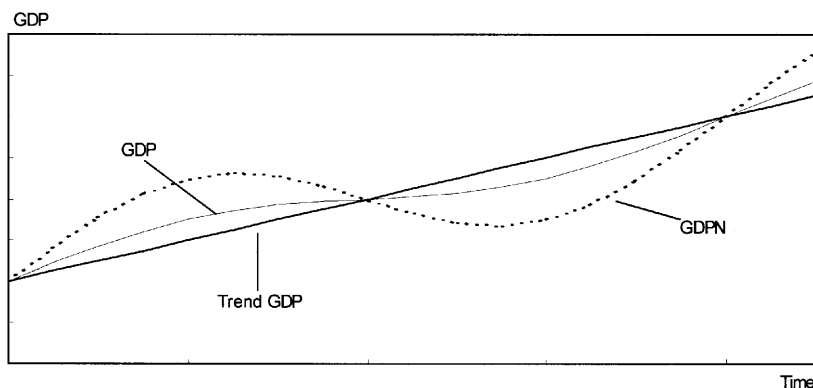
Figure 2 Counter-cyclical fiscal policy

complications if the duration of upswings and downturns is also influenced, but these are not dealt with here.

In the simple stylised example presented in figure 2, 'GDP' and 'trend GDP' are as described above while 'GDPN' represents the level of output that would have occurred if taxation and government expenditure policies were unchanged from year to year over the cycle (discussed below). Importantly, in this analysis it is assumed that the underlying trend rate of growth of GDP is unaffected by changes in the stance of fiscal policy. As shown in figure 2, the size of the fluctuations in GDPN are greater than those of GDP, so the changes in the level of taxation and government expenditure as a share of GDP could be regarded as having operated in a counter-cyclical fashion over that period. Conversely, if GDPN had been less volatile than GDP over this period, the changes in the level of taxation and government expenditure as a share of GDP could be regarded as having been pro-cyclical.

In a discussion of counter-cyclical fiscal policy, it is useful to draw a distinction between changes in aggregate taxation revenue or expenditure as a share of GDP which flow from the operation of the so-called 'automatic stabilisers', and changes in taxation revenue or expenditure as a share of GDP which might be regarded as flowing from 'structural' or 'discretionary' changes in policy on the part of the government. Examples of such structural measures include changes to statutory tax rates and rates of benefit payment or changes to conditions of eligibility for benefits. Broadly speaking, the 'automatic stabilisers' are those components of government expenditure and taxation, the levels of which are linked directly with the economic cycle and which may help to alleviate the cycle. While the operation of the automatic stabilisers results in changes in government expenditure and taxation levels which tend to be counter-cyclical, they do not result from any specific policy

decision by the government to implement a counter-cyclical fiscal policy. For example, expenditure on unemployment benefits tends to rise and fall in line with the unemployment rate and hence may help to limit the fall in household expenditures during economic downturns, with the effect being reversed during upturns. Similarly, personal and corporate income tax revenue also tends to rise and fall over the economic cycle as personal income and corporate profits rise and fall, even in the absence of changes in tax rates. Again this may help to limit the fall in household and corporate spending during economic downturns and restrain such spending during economic upturns.

In principle, the concepts illustrated in figure 2 could also be applied to the 'structural' and 'automatic stabiliser' components of government expenditure and taxation as a share of GDP individually. In other words, 'GDPN' could be defined to include the effects of the 'automatic stabilisers' but to exclude the effects of the structural changes to taxation and government expenditure. In that way, an assessment could be made as to whether the structural changes to government spending and taxation have been counter-cyclical or pro-cyclical. This is the approach adopted in section 4, which also includes a discussion of the many practical complexities involved in categorising taxation revenue and government expenditure in this way, and some empirical results for Australia and other countries.

The discussion above is, by design, intuitive and highly simplified for illustrative purposes. In reality there are numerous factors that it would be desirable to take into account in a more complete analysis. A primary issue revolves around attempting to construct an accurate estimate of 'GDPN', given that it cannot be directly observed. As discussed earlier in this section, there is also a multitude of issues surrounding the lags associated with implementing different policies. Disentangling the impacts of the various policies which should be assigned to particular years is a complex task, as the presence of lags means that there is some doubt as to the speed with which changes in the fiscal stance are reflected in measured output. A second issue is that different policies have different multiplier effects. Not only will expenditure and taxation typically have different multiplier effects, but different expenditure components of the budget will also have different multiplier effects. A third complication is that there is likely to be some interaction between fiscal and monetary policy. A further complexity is how the expectations of the private sector should be identified and assessed. In other words, an assessment needs to be made about the extent to which individuals alter their behaviour in anticipation that the government will change policy in order to stabilise the economy. These various issues are discussed further, and addressed to some extent, in later sections.

4. Some simple empirical evidence on the counter-cyclical effect of fiscal policy

In this section an attempt is made to assess the practical effectiveness of the structural component of counter-cyclical fiscal policy by reviewing the historical performance of such policy in Australia and other OECD economies. Since the mid-1980s, the evidence suggests that, of the OECD countries considered, Australia has been one of the more active countries in terms of structural changes to taxation and expenditure and that such policy has been effective to some extent in reducing the volatility of the economic cycle. In doing so, it may also have reduced the volatility in real interest rates and the real exchange rate in Australia, two variables of major significance for the agricultural and resources sectors.

4.1 Measuring the stance of fiscal policy

The measurement of the macroeconomic stance of fiscal policy requires a clearly defined concept of fiscal policy, along with readily calculable measures. The 'fiscal deficit' is a major focus for policy-makers and economic commentators as it is considered to be a key indicator of the impact of fiscal policy on the macroeconomy and financial markets. However, there is no universally accepted definition of the fiscal deficit. This is due, in part, to differences in accounting standards between countries. More importantly, the most useful measure of the fiscal deficit often depends on the nature of the issue to be analysed.

The measurement of the stance of fiscal policy can be based on a variety of definitions of the government sector. The measure used by the OECD is based on the combined balance for all levels of general government (i.e. excluding Public Trading Enterprises). However, measures commonly used in Australia are often limited to just the Commonwealth general government or Commonwealth budget sectors. This reflects the fact that the Commonwealth government only has direct control over these sectors.

The purpose in undertaking the analysis of the fiscal stance will often determine the appropriate sectoral definition. For example, an analysis of the fiscal stance can provide information about the extent to which changes in the fiscal position are due to the operation of the 'automatic stabilisers', on the one hand, or 'discretionary' changes to taxation and government expenditure, on the other. Alternatively, the removal of the cyclical component from the observed budget balance may provide a more accurate indication of the medium-term fiscal position. In one case the focus may be on a particular level of government and its performance in terms of policy action. In another case, the focus may be on the medium-term fiscal position of the country as a whole, which is the result of policy decisions taken at all levels of government.

In Australia in the past, the *Commonwealth Budget deficit* has been the most widely quoted and used definition of the fiscal deficit. The Commonwealth Budget deficit, or *headline budget balance*, measures the difference between those Commonwealth government outlays and receipts which are included in the Budget. A wider measure which is also given attention by policy makers is the *Net Public Sector Borrowing Requirement* (Net PSBR). The Net PSBR is the net borrowing requirement of the Commonwealth and the States, including public sector trading enterprises but excluding public sector financial enterprises. This measure is of interest because it indicates the public sector's overall call on domestic private sector and overseas savings in the year in question.

The *underlying budget deficit*, which has been adopted by the Government as the key indicator of the Commonwealth fiscal position, is measured as the headline budget deficit adjusted for net advances, that is, transactions in financial assets undertaken for policy purposes. Net advances consist primarily of net policy lending (new policy loans and advances less repayments) and net equity injections (injections/purchases of equity less equity sales). The importance of the underlying budget deficit is that it approximates closely the direct contribution of the Commonwealth budget sector to the national saving/investment imbalance (the current account deficit). The headline Commonwealth Budget deficit and the underlying Commonwealth Budget deficit are shown in figure 3 for the period from the early 1960s, including projections for the period to the end of the 1990s. It is clear that the two measures of the budget deficit have deviated significantly over this period, with net advances being substantially positive in the 1960s and 1970s and substantially negative in more recent years.
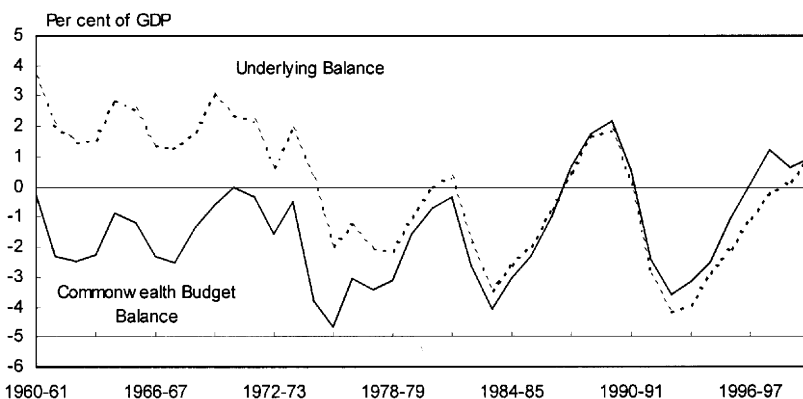

Figure 3 Headline and underlying measures of the budget deficit
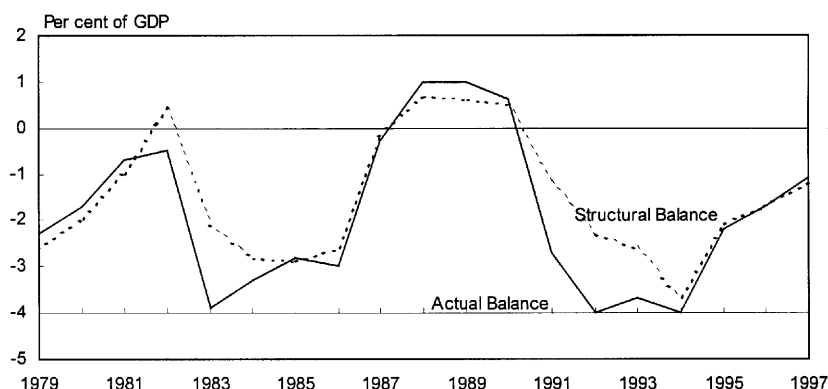
Source: Commonwealth of Australia (1996b).

Figure 4 OECD estimates of the structural and actual balance for the Australian general government sector

Source: OECD (1996).

The budget balance (either headline or underlying) tends to vary with the state of the business cycle. For example, during economic downturns taxation revenue tends to fall while social welfare payments tend to increase, relative to their corresponding levels when the economy is operating at or near full capacity. This more or less automatic variation over the course of the business cycle reduces the usefulness of the budget balance *per se* as an indicator of the fiscal stance. In order to overcome this problem the *structural balance*, also known as the *cyclically adjusted balance*, includes an adjustment to revenue and expenditure to remove the effects of cyclical fluctuations in economic activity (see, for example, Barrell *et al.* 1995).

In figure 4, the OECD measure of the structural balance (measured essentially in underlying terms, as discussed above) for the Australian general government sector is presented for the period from 1979 to 1997. The estimates are suggestive that a deterioration in the structural balance started in 1982 and that structural deficits began to decline in the mid-1980s, with structural surpluses appearing by 1988. From 1990 until 1994, the estimates indicate increasing structural deficits, with a turnaround occurring in 1995. On this measure, the structural balance remained in deficit on average over the period as a whole.

It should be noted, of course, that there are various other adjustments which could also be made to the measures of government revenue and expenditure and hence the measures of the budget balance, beyond those discussed above. For example, interest payments on public sector debt could be broken into a real and nominal component with only the real component included in measures of the budget balance. Similarly, for some purposes,

there is likely to be merit in making an allowance for unfunded liabilities, such as some components of public sector superannuation. Many of these issues are discussed in detail in O'Mara *et al.* (1998) but, for simplicity, are not considered further here.

4.2 'Fiscal activism' in Australia and other countries

It is likely that the extent to which structural changes in fiscal policy have an effect on the economy in the short term depends, in part, on the size of the deviations in the structural balance from the trend level of the structural balance.

An important question which arises immediately when considering the impact of discretionary fiscal policy is whether it is the *level* of the structural balance in each year which matters, or *changes* in the structural balance. One view is that the impact of discretionary policy should depend on the level of the structural deficit or surplus. However, consider the case of a country which continually runs a large but constant structural deficit. In such a case, this large but constant structural deficit would eventually cease to have significant short-term effects on economic activity as, after a time, prices and wages (and expectations) would adjust to the level of the structural deficit, and GDP would not be permanently higher than in the absence of the deficit (and indeed may be lower depending on developments elsewhere in the economy).

An alternative view is that the impact of discretionary fiscal policy should depend on changes in the structural balance from one year to the next. However, consider the case of a country which records equally large structural deficits two years in succession, while its longer-term average or trend structural deficit is close to zero. In such a case, while there is no change in the structural balance between the first and second year, fiscal policy could be regarded as expansionary in both years relative to the longer-term trend budgetary position.

Given that in time an economy adjusts to the level of the structural balance, it is likely that the trend structural balance over any time period will be associated with trend GDP over the same period. As a result, deviations of the actual structural balance from the trend structural balance are likely to be associated with movements in GDP relative to trend GDP.

As a measure of the degree of structural change to fiscal policy, the focus in this analysis is therefore on the deviations in the actual structural balance from the trend structural balance as a share of trend GDP. For convenience, this measure is referred to here as the extent of 'fiscal activism'. In this analysis, the Hodrick-Prescott filter is used to calculate the trend in the structural balance measured as a share of trend GDP.
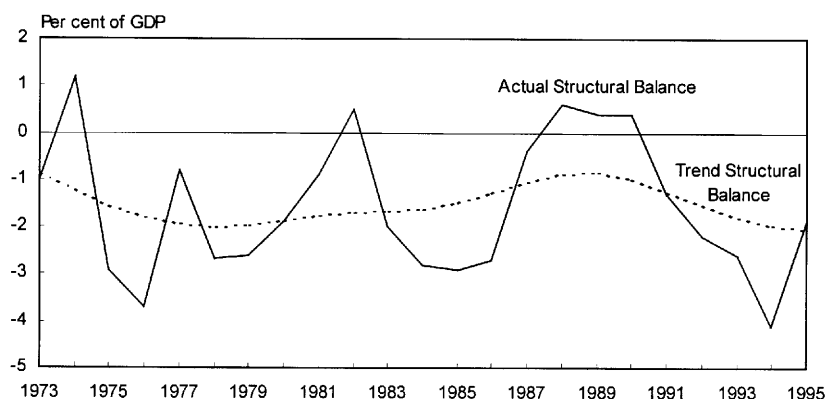
Figure 5 Actual and trend structural balances for the Australian general government sector[a]

Note: (a) The trend structural balance is calculated using a Hodrick-Prescott filter with $\lambda = 25$.
Source: OECD (1995) and Treasury estimates.

The actual structural balance and the trend structural balance for Australia are shown in figure 5 for the period from 1973 to 1995, using the OECD's measure of the structural balance as discussed above. The average difference in absolute terms between the actual structural balance and the trend structural balance over this period is around 1 per cent of GDP. Similar calculations have been done for other OECD countries and are illustrated in figure 6. It is interesting to note that the G7 countries are generally at the lower end of the fiscal activism measure. On this measure, Australia is estimated to have had the sixth highest degree of fiscal activism across the OECD on average over the period from 1973 to 1995. That is, the structural balance in Australia deviated from its trend level more than in most other OECD countries. Portugal, Sweden and Finland had the highest levels of fiscal activism across the OECD between 1973 and 1995. Countries with the lowest levels of fiscal activism include the United States, France and Spain.

4.3 Has 'activist' fiscal policy been counter-cyclical?

It should be noted that the concept of fiscal activism outlined above refers only to variations in the structural balance around its trend level. As such, it does not, in itself, provide any indication of the effect, if any, which these variations in the structural balance have on the macroeconomy. In particular, it provides no direct guidance as to whether these effects were
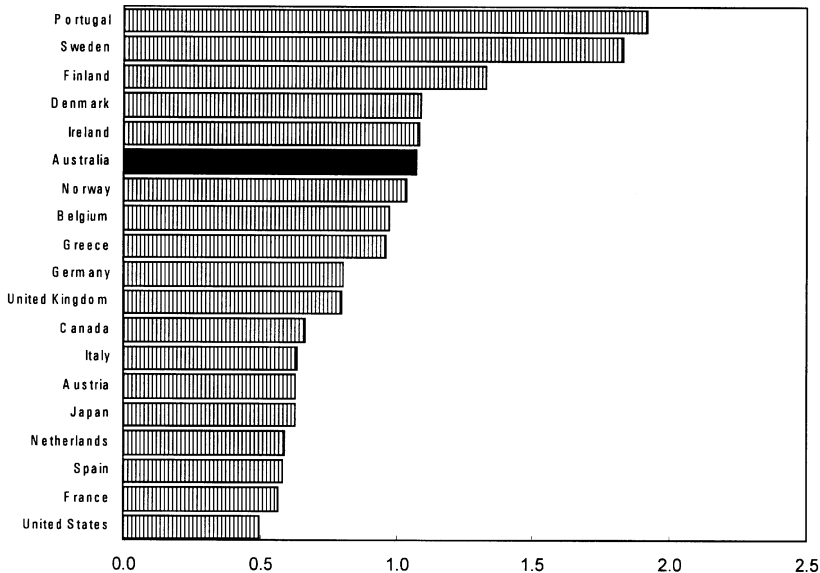
Figure 6 'Fiscal activism' across OECD countries[a] (average 1973–95)

Note: (a) 'Fiscal activism' is measured as the average deviation of the actual structural balance from the trend structural balance in absolute terms as a percentage of GDP, where the trend structural balance is calculated using the Hodrick-Prescott filter with $\lambda = 25$.

Source: Treasury estimates based on OECD data.

pro-cyclical or counter-cyclical, as discussed at some length in section 3. This issue is examined further below.

To make an initial assessment of whether changes in the structural balance relative to trend have been counter-cyclical or pro-cyclical, a simple rule was used. Under this rule, when the OECD estimates of the output gap and the deviations in the structural balance from the baseline have the same sign, then the structural component of fiscal policy is interpreted to have had a counter-cyclical effect, and when they have the opposite sign, fiscal policy is interpreted to have had a pro-cyclical effect. As discussed in O'Mara *et al.* (1998), this rule may lead to a counter-cyclical structural stance of fiscal policy on occasions being interpreted as being pro-cyclical. The analysis presented here may therefore slightly understate the degree to which the structural stance of fiscal policy has been counter-cyclical.

The analysis is also based on various simplifying assumptions. For example, no account is taken of any lags between changes in the structural stance of fiscal policy and the impact of these changes on the economy. Nevertheless, as the analysis is based on the observed changes in the structural balance, this consideration only applies to the 'impact' lag, rather
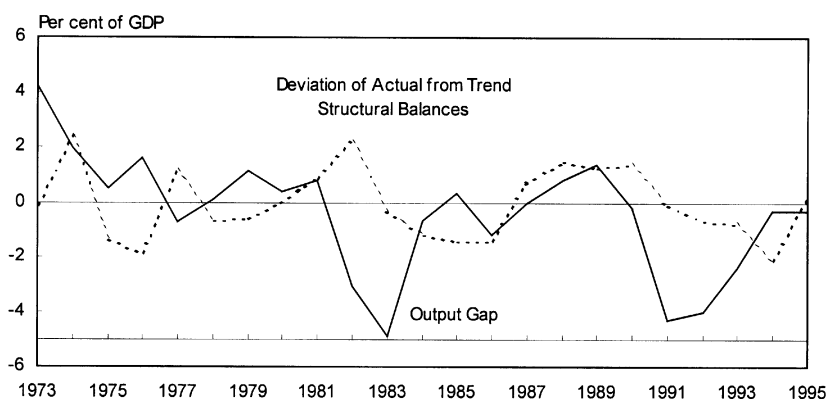
Figure 7 Actual structural balance relative to trend and the OECD estimates of the output gap for Australia[a]

Note: (a) A positive output gap as measured by the OECD indicates that GDP is above its benchmark level.
Source: OECD (1996).

than the 'recognition' lag and 'implementation' lag as outlined in section 2. Further, the analysis is based on annual data so that the effect of lags is likely to be less significant than would be the case with quarterly data.

The OECD estimate of the output gap for Australia and the deviation of the structural balance from its trend level for Australia over the period from 1973 to 1995 are shown in figure 7. On these estimates, changes in the structural balance relative to its trend level in Australia seem to have been counter-cyclical in only slightly more than 50 per cent of years over this period as a whole, and pro-cyclical in the remainder. This would imply that changes in the structural balance relative to trend may have done little to stabilise the economy over this period as a whole. However, the years in which fiscal policy was pro-cyclical on this measure seem to be concentrated to some extent in the 1970s and early 1980s. Since the mid-1980s, fiscal policy was counter-cyclical on this measure in around 70 per cent of the years.

Using this same simple approach, deviations in the structural balance from its trend level amongst OECD countries as a group appear to have been counter-cyclical in around 50 per cent of the years from 1973 to 1995 (figure 8 a and b), a ratio similar to that for Australia. That is, on this measure fiscal policy in OECD countries was counter-cyclical and pro-cyclical on about the same number of occasions over this period. Fiscal policy was counter-cyclical in Denmark, United States, Sweden and Canada for the greatest proportion of years over this period. For the period since 1985, the proportion of years in which fiscal policy was counter-cyclical, for
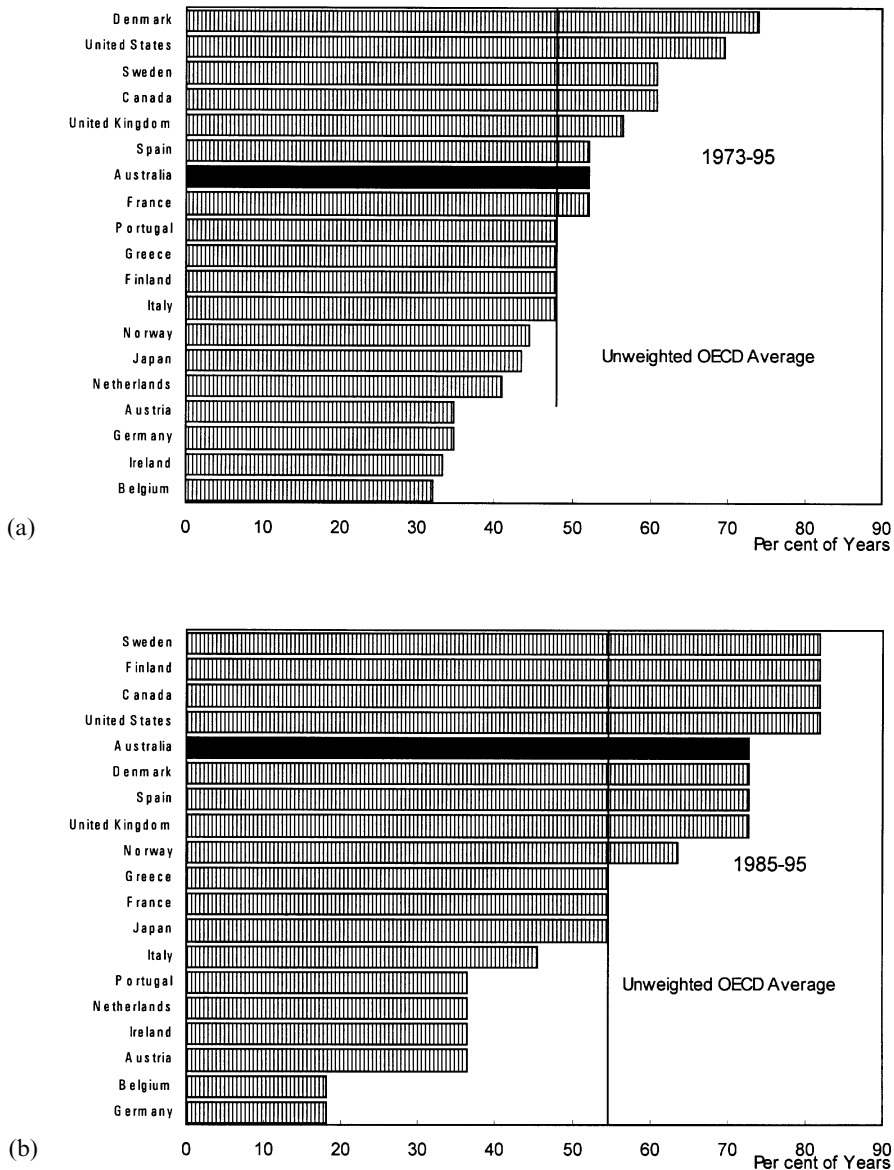
Figure 8 Percentage of years in which fiscal policy was counter-cyclical

Source: Treasury estimates based on OECD data.

the OECD as a whole, increases marginally to around 55 per cent, somewhat below the ratio of around 70 per cent in Australia (figure 8 b).

As noted above, deviations in the structural balance from its trend level have been relatively large in Australia compared with many other OECD
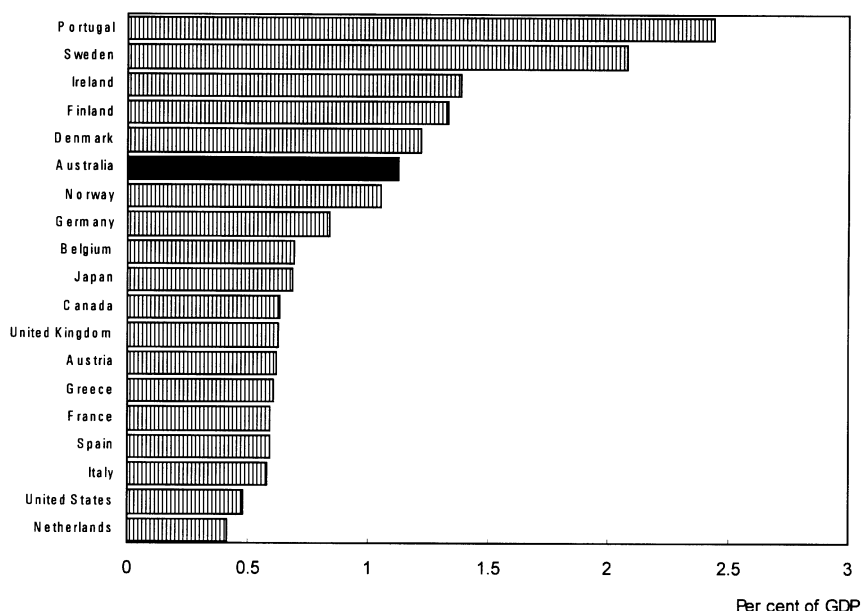
Figure 9 Magnitude of fiscal policy when counter-cyclical (average 1973–95)[a]

Note: (a) The average magnitude of counter-cyclical fiscal policy is measured as the average deviation of the actual structural balance from the trend structural balance as a percentage of trend GDP over the periods when the signs of the deviation and the output gap are the same, that is when fiscal policy is defined to be counter-cyclical.

Source: Treasury estimates based on OECD data.

countries over this period as a whole. This tendency is evident both when fiscal policy was counter-cyclical and when it was pro-cyclical, as defined in this analysis. In the case where fiscal policy was counter-cyclical, the average magnitude of the change in the structural balance relative to trend in Australia was the sixth largest out of 19 OECD countries (figure 9), while in the case where fiscal policy was pro-cyclical, it was the eighth largest out of the OECD countries (figure 10).

More generally, the ranking of countries in terms of the average magnitude of the change in the structural balance relative to trend when the stance was counter-cyclical, is broadly similar to the corresponding ranking when the fiscal stance was pro-cyclical. For example, Sweden, Portugal and Finland rank highly in both figures 9 and 10 while the United States and France rank towards the bottom on both figures.

The extent to which fiscal policy has been counter-cyclical overall depends, in part, on both the frequency with which counter-cyclical fiscal policy has been used and the average magnitudes of fiscal activism during counter-cyclical and pro-cyclical periods. To reflect this, a simple measure of net
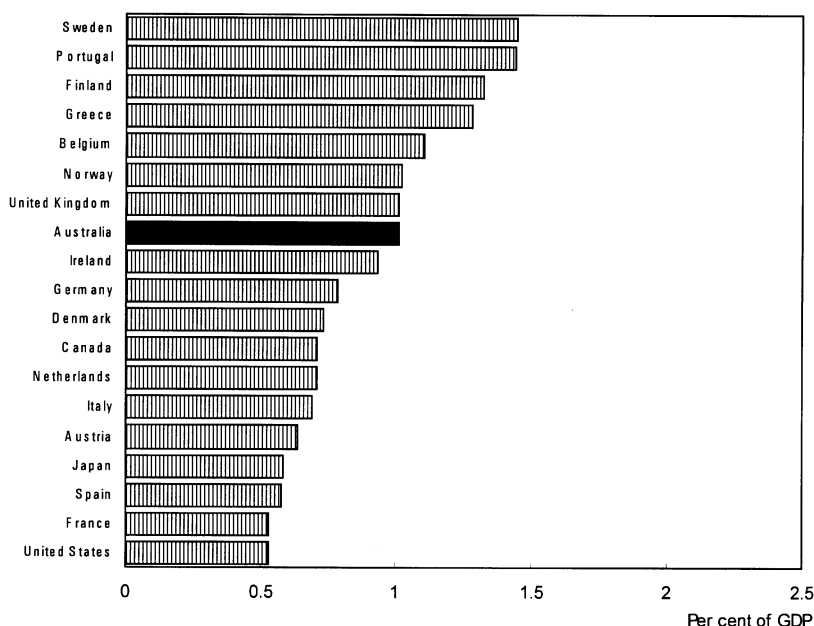
Figure 10 Magnitude of fiscal policy when pro-cyclical (average 1973–95)[a]

Note: (a) The average magnitude of pro-cyclical fiscal policy is measured as the average deviation of the actual structural balance from the trend structural balance as a percentage of trend GDP over periods when the signs of the deviation and the output gap differ, that is when fiscal policy is defined to be counter-cyclical.
Source: Treasury estimates based on OECD data.

counter-cyclical fiscal policy has been constructed for each country. This measure is defined as the average difference between the actual structural balance and the trend structural balance in those years when fiscal policy was counter-cyclical, minus the average difference between the actual structural balance and the trend structural balance in those years when fiscal policy was pro-cyclical, weighted by the respective number of years in which fiscal policy has been counter- and pro-cyclical. In other words, the measure of net counter-cyclical fiscal policy may provide some indication as to whether changes in the structural balance relative to trend have stabilised or destabilised these economies overall, although sight should not be lost of the various simplifying assumptions underlying the analysis.

The estimated net counter-cyclical fiscal policy, calculated over the period 1973 to 1995, is shown in figure 11 for the OECD countries considered in this analysis. On this measure, the net effect of changes in the structural balance relative to trend is estimated to have been counter-cyclical overall in eight OECD countries over this period, including Australia, which was ranked sixth in this regard. The top ranked countries between 1973 and
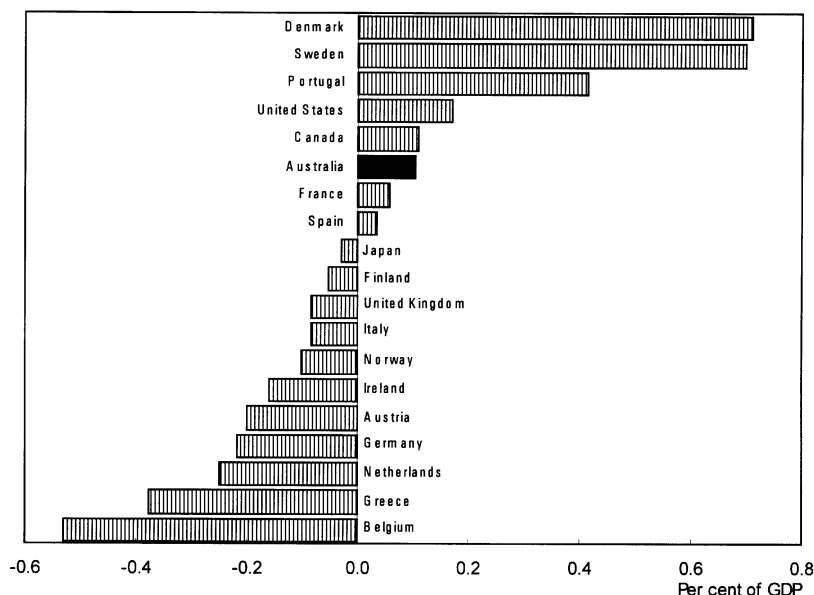
Figure 11 Net counter-cyclical fiscal policy 1973–95[a]

Note: (a) Net counter-cyclical fiscal policy is defined as the average difference between the actual structural balance and the trend structural balance in those years when fiscal policy was counter-cyclical, minus the average difference between the actual structural balance and the trend structural balance in those years when fiscal policy was pro-cyclical, weighted by the respective number of years in which fiscal policy has been counter- and pro-cyclical.

1995 were Denmark, Sweden and Portugal. Of the 11 OECD countries which operated net pro-cyclical fiscal policy overall on this measure, the estimated pro-cyclical outcome was most marked in Belgium, Greece and the Netherlands.

Estimates of net counter-cyclical fiscal policy for Australia and the OECD average are shown in figure 12 for the sub-periods 1973–84 and 1985–95. The estimates imply that changes in the structural balance relative to trend were generally pro-cyclical in Australia and across the OECD more generally in the earlier period, and counter-cyclical in the latter period. In both cases, the net effect in Australia was larger than the OECD average.

4.4 Some implications for commodity markets

The focus in the above analysis is on the potential impact of activist fiscal policies in the major world economies on the stability of economic activity in those economies. The main channel of influence (albeit implicit) from fiscal policy to economic activity in this analysis comes through the effects of fiscal policy on aggregate demand.
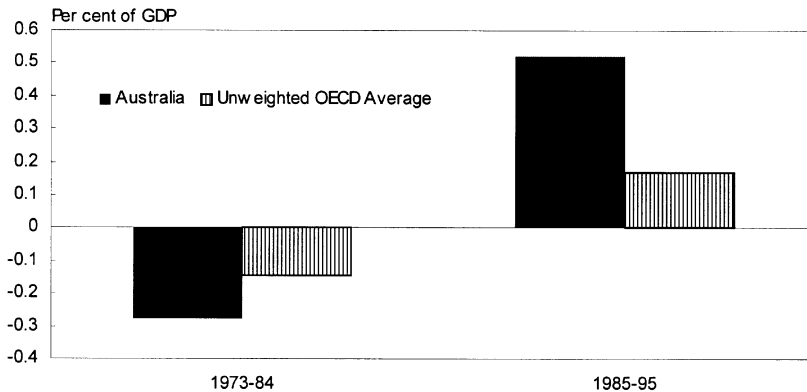
Figure 12 Net counter-cyclical fiscal policy for Australia and the OECD average in selected periods

Source: Treasury estimates based on OECD data.

World commodity markets are, of course, subject to shocks from both the demand and supply side. For example, in the case of agricultural commodities, supply side shocks arising from variations in seasonal conditions in major world producing areas can have a major impact on world prices for those commodities. The impact of such supply side shocks on commodity prices tends to be larger the more price inelastic are demand and supply. With the possible exception of wool, there is some evidence that such supply shocks have been a more important explanation for short-term variations in agricultural commodity prices in the past than have demand side shocks, see, for example, Love *et al.* (1994). The reverse seems likely to be the case for minerals and energy, reflecting a generally higher income elasticity of demand and a lower level of supply side volatility in the short term.

The above comments notwithstanding, volatility in economic activity or economic growth rates in the OECD region is likely to be reflected in the demand for, and prices of, most commodities to varying extents. The results presented in section 4.3, therefore, imply that structural variations in fiscal policy amongst OECD economies may have destabilised the demand for commodities to some extent during the 1970s and early 1980s, but may have helped to stabilise commodity demand in the period since then. Amongst the major world economies, commodity demand may have been stabilised to some extent by fiscal policy in the United States and destabilised in Germany over the period since the early 1970s, with little overall impact in either direction in Japan.

For those commodities for which the Australian domestic market is important, that market may have been destabilised by fiscal policy during the 1970s and early 1980s, but stabilised to some extent since then.

However, for most of Australia's commodity industries, movements in interest rates and exchange rates are likely to be of at least equal, and probably greater, importance than domestic demand *per se* in influencing their overall financial performance. The interaction between fiscal policy, interest rates and the exchange rate in Australia is considered in the next section.

5. Model-based evidence on counter-cyclical fiscal policy

In the previous section, the analysis was based on a relatively simple association between changes in the structural balance relative to trend and the OECD estimates of the output gap. However, there are various important limitations to this approach. It was not possible to take into account complexities such as the lags between changes in the structural stance of fiscal policy and the impact of those changes on the economy, the magnitude of multiplier effects, interactions with monetary policy or the role of expectations.

For example, the presence of lags in the effect of fiscal policy on the macroeconomy may mean that the assessment of the degree to which fiscal policy has been counter-cyclical is not completely accurate if based solely on an alignment between the structural balance relative to trend and the output gap in each period. Similarly, analysis based on such alignments does not reveal the magnitude of the effect of a particular stance of fiscal policy on the macroeconomy. Also, the role of monetary policy is implicit rather than explicit in the analysis presented in the previous section. Fair (1994) noted that the effects of fiscal policy on the macroeconomy are not independent of the assumed path of monetary policy. The formation of expectations can also influence the effectiveness of the fiscal stance in terms of its impact on the macroeconomy.

Some of these complexities in the analysis of fiscal policy can be captured through the use of a macroeconometric model such as the TRYM model (Commonwealth of Australia 1996c, 1996d). Simulation results can provide a quantitative estimate of the effect of lags in the impact of fiscal policy and the magnitude of multiplier effects. The role of expectations in the effectiveness of fiscal policy can also be captured to some extent through the use of such a model. In addition, the use of a macroeconometric model enables explicit assumptions to be made about the stance of monetary policy when assessing the impact of fiscal policy. However, while macroeconomic models are a useful tool for analysing the impact of different policy options (including fiscal policy), it should be noted that all macroeconomic models are necessarily based on a set of simplifying assumptions about how the economy operates.

The TRYM model was used to simulate macroeconomic outcomes in Australia in the absence of structural changes to fiscal policy that occurred over the period since the mid-1980s. In particular, an attempt was made to assess whether the Australian economy would have been more or less stable over this period in the absence of such changes to fiscal policy.

In the simulation, real structural public expenditure, defined as real public sector expenditure less interest payments and changes in expenditure associated with cyclical variations in unemployment, was assumed to be a constant share of trend real GDP. Public debt interest payments were allowed to move in line with changes in the stock of public debt. Hence, the only major source of cyclical variation in public expenditure as a share of trend GDP was a component which reflected the variation in the actual rate of unemployment around the rate of unemployment consistent with a stable inflation rate in the model. On the revenue side, tax rates were held constant over the course of the simulation (at approximately their average levels over the period from 1980 to 1995) so that the only source of variation in tax revenue as a share of trend GDP was that associated with changes in the magnitude of the tax base over the course of the cycle. In essence, this simulation was structured in such a way as to result in an average simulated Net PSBR over the period 1986 to 1995 equal to that observed in the historical data. It was assumed that the rate of growth of the money supply, and hence the level of the money supply, were unchanged relative to that which had actually occurred since the mid-1980s.

Under this monetary policy assumption, there were no restrictions on movements in nominal or real interest rates in the simulation. Given that the money supply was assumed to remain at its historical levels, changes in the level or growth rate of output arising from the simulated changes in fiscal policy led to changes in interest rates so as to ensure the maintenance of monetary equilibrium. Actual historical values were used for the exogenous variables in the model simulations. A more detailed description of the fiscal structure of the simulation and the monetary policy assumptions is provided in O'Mara *et al.* (1998).

A comparison between the simulated outcome with the hypothetical alternative fiscal regime in place and the actual historical outcome provides some indication of the extent to which active fiscal policy ameliorated the impact of the business cycle in Australia over this period. (In essence, TRYM was forced to replicate history exactly in the base case by feeding the model residuals back in.) The results are suggestive that changes in the structural stance of fiscal policy during the period since the mid-1980s reduced the amplitude of the business cycle relative to what would have occurred had the structural stance of fiscal policy remained constant, as defined above. The key elements of the results are presented in table 1.

Table 1 Simulated effectiveness of fiscal policy (1986Q1 to 1995Q3)

Variable	Average		Standard Deviation	
	Actual	Simulation	Actual	Simulation
GDP Gap (% of GDP)	0.1	0.5	1.6	2.6
GDP Growth (% pa)	3.0	2.9	2.1	2.6
Inflation (% pa)	4.4	4.6	2.9	3.3
Unemployment Rate (%)	8.6	8.5	1.6	2.2

The average rate of GDP growth is similar in the simulation and over history. In contrast, the average GDP gap is larger in the simulation than in history. This reflects a slight change in the timing of the cycle. However, the standard deviations of these variables are greater in the simulation, implying that the actual stance of fiscal policy that was adopted ameliorated the effects of the business cycle relative to an alternative policy of maintaining a constant structural balance. In figure 13 it can be seen that the simulation results imply that changes in the structural stance of fiscal policy reduced the extent to which the economy would otherwise have exceeded trend GDP during the boom of the late 1980s. It also reduced the size of the GDP gap during the latter part of the 1991 recession. A similar pattern of results emerges from figure 14 in which the actual and simulated rate of GDP growth are depicted.

The average rate of inflation actually observed is marginally lower than that generated in the simulation (figure 15). However, the standard deviation of inflation is higher under the simulation. During the period from 1986 to 1990, the inflation rate in the simulation exhibits greater
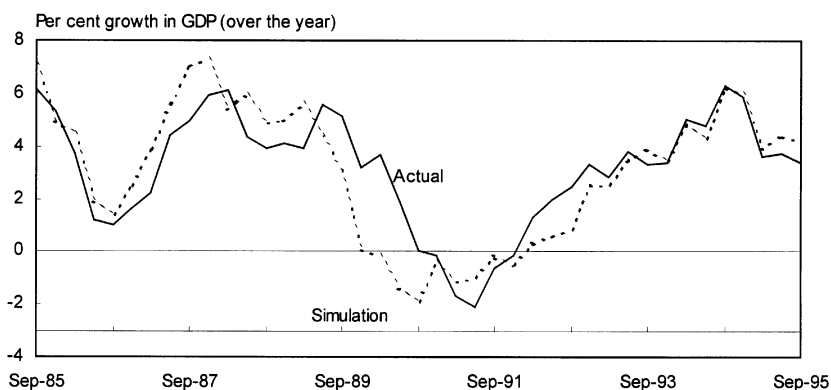

Figure 13 GDP gap

Per cent growth in GDP (over the year)
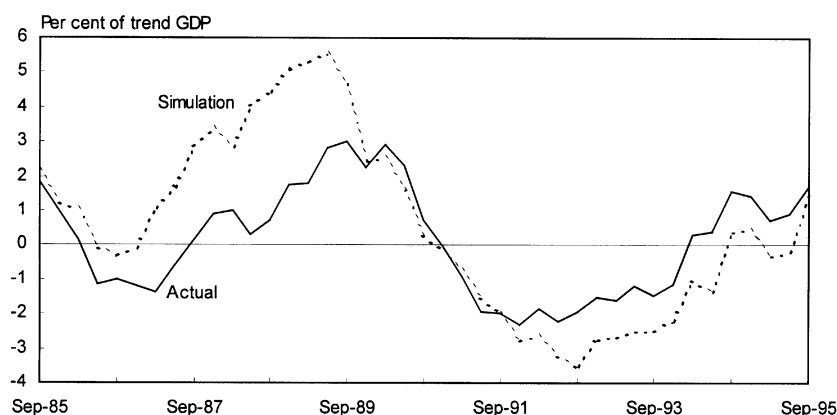
Figure 14 Through the year growth in GDP[a]

Note: (a) Through the year growth is defined as growth to the current quarter from the same quarter in the previous year.
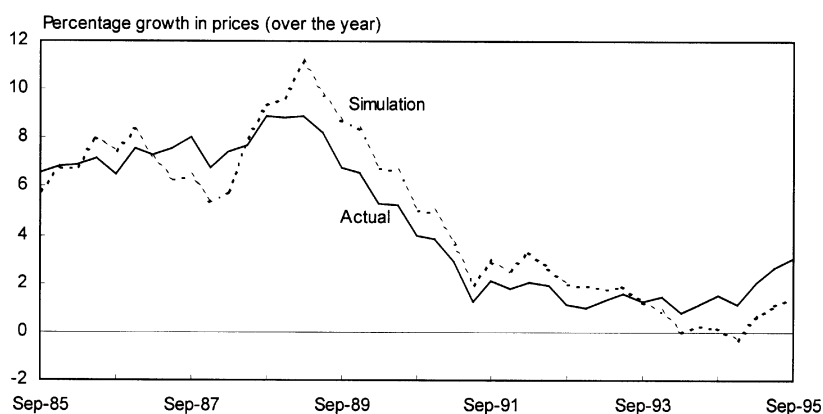

Figure 15 Inflation rate

variation than was observed historically, although beyond this period the inflation rate in the simulation tends to track movements in the actual inflation rate much more closely. The more volatile rate of inflation in the simulation largely reflects the more volatile path followed by GDP and the GDP gap in the simulation.

As might be expected with greater variability in output, the simulation results also imply that there would have been greater volatility in the unemployment rate had the structural stance of fiscal policy remained constant. It is estimated that the unemployment rate would have fallen temporarily to about 4.7 per cent instead of 5.8 per cent in 1989 and then climbed to nearly 12 per cent in 1993 (figure 16). The actual and simulated
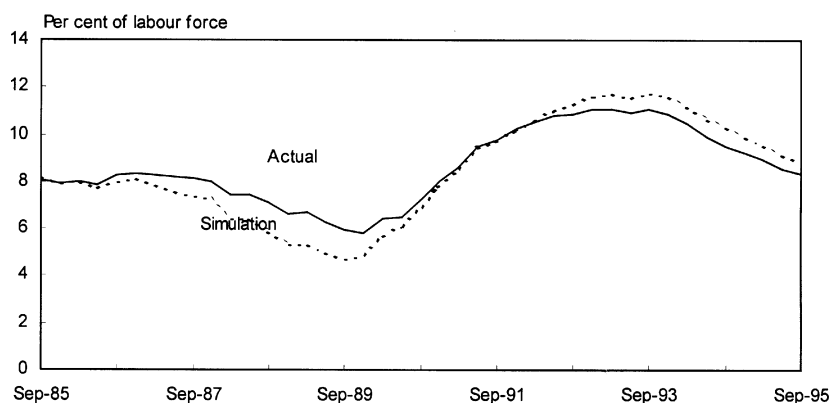
Per cent of labour force

Figure 16 Unemployment rate

outcomes with respect to the real exchange rate and real interest rates are presented in figures 17 and 18 and table 2.

It is evident that the simulated time paths for both the real exchange rate and real interest rates are a little more volatile than the historical outcomes over the simulation period. In other words, in the absence of the structural changes to fiscal policy over this period, the real exchange rate and real interest rates would have both been a little more volatile. This, of course, is quite consistent with the results noted above for output growth, the output gap, inflation and unemployment and reflects the apparent broadly counter-cyclical nature of the structural changes in fiscal policy over this period. In other words, to the extent that structural changes in fiscal policy were
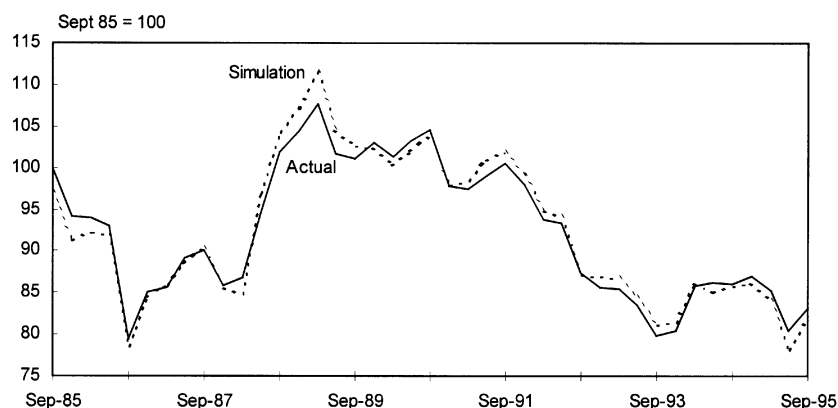
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Figure 17 Real exchange rate[a]
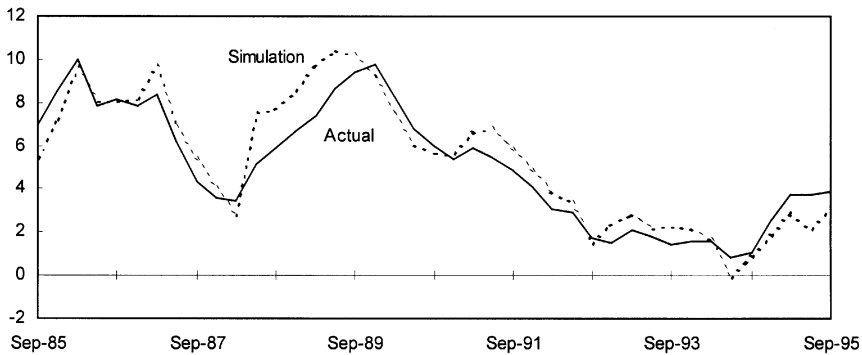
Note: (a) Based on GDP deflators.

Figure 18 Real interest rate

broadly counter-cyclical, such changes would tend to limit the upward movement in output, employment, real interest rates and the real exchange rate during economic upswings, and limit the downward movement in those variables during economic downswings.

The importance of interest rates and exchange rates to the agricultural and resource sectors in Australia has been well documented in the literature, see, for example, Tie, Bartley and O'Mara (1994), Sterland, Foo and Dlugosz (1993), Martin and Shaw (1986) and Grennes (1990). In fact, given the capital-intensive nature and export orientation of most industries in these sectors, movements in interest rates and exchange rates are likely to have a more marked impact on their financial performance than will changes in domestic economic activity *per se*. For example, Sterland *et al.* estimated that the substantial decline in interest rates and the exchange rate in Australia between 1991–92 and 1993–94, as is clearly evident in figures 17 and 18, may have increased average farm cash incomes on broadacre farms by more than A$11 000 or around 30 per cent in 1993–94. In other words, if interest rates and exchange rates had remained at their 1991–92 levels, farm cash incomes on broadacre farms in Australia may have been around 30 per cent lower than was actually recorded in 1993–94.

Table 2 Simulated effectiveness of fiscal policy (1986Q1 to 1995Q3)

Variable	Average		Standard Deviation	
	Actual	Simulation	Actual	Simulation
Real Interest	4.9	5.3	2.7	3.0
Real exchange rate	92.0	92.3	8.2	9.0

To the extent that the structural changes in fiscal policy resulted in greater stability in interest rates and in domestic economic activity over the period since the mid-1980s, there are likely to have been some benefits flowing to the agricultural and resource sectors. These benefits would have taken the form of a potentially more stable domestic market (for those commodities for which the domestic market is important) and a more predictable interest rate environment in which to make investment decisions.

However, the impact of greater stability in the real exchange rate on the agricultural and resources sectors is more problematic. This is because, in Australia, the real exchange rate tends to be positively correlated with commodity prices so that changes in the real exchange rate help to moderate the impact in Australian dollar terms of movements in international commodity prices. In other words, large movements in the real exchange rate may well help to make Australian dollar commodity prices more stable and more predictable, rather than less stable.

Over the period in question, the correlation coefficient between the actual commodity price series and the actual real exchange rate series in the TRYM database is around 0.25. The correlation coefficient between the actual commodity price series and the simulated real exchange rate is slightly higher at around 0.3. Hence, the moderating effect of counter-cyclical fiscal policy on the real exchange rate may, if anything, have led to a slightly greater degree of volatility in Australian dollar commodity prices.

6. Conclusion

The major results which emerge from the analysis can be summarised as follows. There is little evidence that short-term variations in the structural stance of fiscal policy have served to stabilise the Australian or major world economies over the period since the early 1970s as a whole. However, the nature of this effect seems to have changed over time, with the evidence pointing towards a destabilising influence from fiscal policy over the period from the early 1970s to the early to mid-1980s, and a more stabilising influence since then. Hence, it is likely that fiscal policy in the OECD region had a destabilising influence on the demand for commodities in the earlier period and possibly a stabilising influence in the latter period. Within Australia, there is some evidence that structural changes to fiscal policy may have helped to stabilise interest rates and the real exchange rate over the period since the mid-1980s. However, this stabilising influence on the real exchange may have reduced (albeit marginally) the extent to which real exchange rate movements have countervailed world commodity price changes in Australian dollar terms.

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