

RESEARCH DISCUSSION PAPER

PUBLIC SECTOR GROWTH AND THE CURRENT
ACCOUNT IN AUSTRALIA:
A LONGER RUN PERSPECTIVE

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RDP 9002

RESEARCH DEPARTMENT

RESERVE BANK OF AUSTRALIA



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ABSTRACT

This paper examines the macroeconomic experience of Australia from 1961/62 to 1988/89 focusing on the links between the fiscal deficit, private savings, private investment, the balance of payments and relative prices. Alternative theoretical hypotheses are considered in an attempt to explain the evolution of the Australian economy over this period.

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Warwick J. McKibbin and Steven Morling

1. INTRODUCTION

Over the past five or more years, despite unprecedented fiscal contraction, the current account deficit has risen and inflation has remained stubbornly above the rates in other OECD economies. The purpose of this paper is to place the current macroeconomic situation in Australia in a longer-run perspective and to disentangle broad trends from short-run fluctuations.¹

In Section 2 we introduce an accounting framework for examining the relationship between fiscal policy, domestic saving and investment, and the current account. In Section 3, we present a range of "stylized facts" about the behaviour of the Australian macroeconomy from 1961/62 to 1988/89. An attempt to explain these facts is presented in Section 4 where we introduce behavioural assumptions into the accounting framework. As this paper is intended to be a broad overview of the major issues, we refer the reader to other papers produced as part of the MSG2 modelling project for the empirical framework underlying the analysis.² Finally, a conclusion and summary are contained in Section 5.

There are both positive and normative aspects to this paper. We argue that the gradual deterioration in the balance of payments since 1973 is the macroeconomic consequence of having a larger government sector while maintaining private expenditure. Even though the public sector borrowing requirement has been reduced to zero, the public sector is still a larger proportion of the economy than it was before 1973. The *composition* of receipts and expenditures is just as important as the *size* of the fiscal deficit or surplus. Both the level of government spending and the distortions caused by the tax system are important. In particular private sector saving decisions are distorted by the interaction of the tax system and inflation over this period.

1 The reader is referred to studies by Corden (1988) and Caves and Krause (1984) for further detailed coverage before this period and Maddock and McLean (1988) for a study of Australia's economic performance this century.

2 The interested reader should refer to McKibbin and Sachs (1989), McKibbin and Siegfloff (1988b) and McKibbin and Elliott (1989) for a formalization of the MSG2 model.

2. AN ACCOUNTING FRAMEWORK

The framework in this section is familiar from other discussions of fiscal policy and the current account.³ The identities not only provide a framework for understanding the economy, but also allow analysis of the sustainability of a given level of domestic or external debt.

A natural starting point to examine the relationship between saving, fiscal policy and the current account is the National Income identity. We start from the market clearing condition for the supply and demand for goods and services. If economy-wide income is equal to expenditure on goods and services (adjusted by a statistical discrepancy) we get:

$$Y = Q + SD = C + I + G^c + G^i + X - M + DV + SD \quad (1)$$

where all variables are in current dollars and

- Y = national income;
- Q = production of domestic goods and services;
- SD = the statistical discrepancy;
- C = total private consumption of goods and services;
- I = total private purchases of goods and services for investment;
- G^c = total government consumption of goods and services ;
- Gⁱ = total government purchases of goods and services for investment;
- X = exports of domestic goods and services;
- M = imports of goods and services; and
- DV = change in stocks of goods.

Note that the measure of income in the National Accounts is not strictly the economic concept of income because it ignores several items, especially the role of capital gains as part of income.⁴ The implications of this for the 1980s is that income is likely to be underestimated. The corollary is that saving may also be underestimated.

³ See for example Genberg (1988).

⁴ See Eisner (1989) for a good outline of the many problems with interpreting National Accounts data.

By subtracting and adding total taxes (T) and government transfers to the private sector (L) respectively, equation (1) can be rearranged to get sectoral relationships:

$$(Y+L-C-T-I-DV) = (G^c+G^i+L-T) + (X-M) + SD \quad (2)$$

We will refer to the first term as the (net-of-interest) private saving/investment balance, the second term as the primary fiscal balance and the third term as the trade balance. Finally if we assume that Australia is a net debtor, we add net interest flows and other non-interest income and net transfers to foreigners (N) to both sides of equation (2), to derive the relationship between the current account and the public sector borrowing requirement (PSBR)⁵:

$$\begin{aligned} & (Y+L+rBP-r^*DP-C-T-N-I-DV) - (G^c+G^i+r(BP^d+B^f)+L-T) \\ & = (X-M-r^*DP-rB^f-N) + SD \end{aligned} \quad (3)$$

$$\text{or } (S-I-DV) - PSBR = CA + SD.$$

Where:

- r = the domestic interest rate on government debt;
- r* = foreign interest rate on external debt;
- BP = net government debt held by the domestic private sector;
- B^f = net government debt held by foreigners;
- DP = net private debt held by foreigners;
- S = private saving;
- PSBR = public sector borrowing requirement (government dis-saving); and
- CA = current account surplus (economy saving).

In short, the excess of private saving over investment plus government saving is approximately equal to the current account. It is clear from this identity that an increase in government dis-saving (i.e a fiscal deficit) for a *given* level of private saving and investment will imply an increase in the current account deficit; an economy which invests more than it saves will finance this by borrowing from foreigners.

⁵ Note that we include public authorities as well as state and local government in our definition of government. The actual PSBR also includes miscellaneous items such as non-tax revenue, provisions for depreciation and asset sales, etc.

In addition to this static identity we also need to introduce some intertemporal identities. These link flows and stocks. For example, a current account deficit implies a build-up of foreign debt and a fiscal deficit implies a build-up of government debt, both of which need to be serviced. This affects the size of future current account deficits and fiscal deficits, which affect future behaviour of the private sector. The future servicing of accumulated debt will affect asset markets in the present.

First consider the accumulation equation for the debt of the economy as a whole⁶:

$$D_{t+1} - D_t = (r_t^* + e_t)D_t + (M_t - X_t) \quad (4)$$

where D is in domestic currency units and e_t is the rate of depreciation of the nominal exchange rate during period t . This equation shows that the change in debt is equal to the trade balance deficit ($M-X$) plus the servicing costs of the outstanding stock of foreign debt. Even in the case of balanced trade, an initial debt will lead to an ever-increasing stock of debt. A trade balance surplus ($X>M$) would be required to service the debt and hence to achieve current account balance.

This relationship may be expressed in terms of the ratio of debt to GDP. In this case it can be shown that:

$$d_{t+1} - d_t = (r_t^* + e_t - n)d_t + m_t - x_t \quad (5)$$

In equation (5) we now use lower case letters to denote variables as a proportion of GDP, and we have introduced a term n which is the nominal growth rate of the economy. It can be seen from equation (5) that stabilization of the ratio of debt to GDP implies a different trade balance to that required for the level of debt to stabilize. In particular, if the nominal growth rate of the economy is greater than the interest rate on the debt (adjusted for exchange rate changes), the economy can still run a trade balance deficit and stabilize the ratio of debt to GDP. In other words, it is quite possible that the future flows of production generated in the economy will be more than capable of servicing a growing foreign debt.

⁶ Note that, for simplicity, we have ignored the other income transfers which appear in the current account. In this example we have also assumed that all debt is short term, denominated in a single foreign currency and paying the same foreign rate of interest. The current account is also assumed to be funded by debt; equity flows are ignored.

Recent theory suggests that these intertemporal identities have important implications for short run behaviour because of the links between the future path of the economy and current asset prices.⁷ This will be elaborated below.

3. THE AUSTRALIAN EXPERIENCE⁸

In this section our aim is to present some "stylized facts" for the Australian economy using the framework introduced above. All National Accounts data are expressed in current prices as a proportion of current price GDP. We deflate by GDP to provide a yardstick for examining results. Nominal data rather than real data are used, partly because of data limitations, and partly due to unusual behaviour of some price deflators at points where data has been re-based. It is important to note, therefore, that some of the behaviour in the data will incorporate relative price changes as well as quantity changes. This is especially important for the trade balance data which includes terms of trade effects.

It is worth highlighting several features:

- a) Taxation as a proportion of GDP has risen continually between 1960 and 1988/89. From the early 1970s to 1984/85 there was a large growth in the size of government in Australia. Higher taxation as a percent of GDP financed an increase in government current expenditure and transfers, as a percent of GDP. There has been a decline in government capital expenditure as a percent of GDP.
- b) The increase in taxation has been focused almost entirely on the household sector.
- c) Since 1983/84 the trend of government spending has been reversed, with the largest cutbacks in the 1987/88 and 1988/89 fiscal years. These cutbacks focussed equally on transfer payments and expenditure. The trend in taxation was reversed only in 1988/89.
- d) The growth in government during the 1970s coincided with a trend deterioration in the trade balance (particularly after 1979/80) as well as rising private consumption expenditure and falling private saving (although

7 For example see Sachs and Wyplosz (1984).

8 See Corden (1988) for an excellent description and interpretation of the experience between 1970 and 1985 and a comparison of the Australian experience with other countries. The focus in the current paper differs from Corden's in emphasis but not in overall conclusion. The reader is also referred to Gruen (1986) for a discussion of Australia's growth performance, which is not explicitly considered here.

interpreting the statistical discrepancy as unrecorded consumption reverses the consumption/saving story).

- e) The fiscal cutback in the most recent few years has been associated with some improvement in the trade balance, a strong rise in private investment and a large rise in the statistical discrepancy.
- f) Over the period since the early 1970s, Australia also experienced large movements in real and nominal exchange rates, and real and nominal interest rates.

a. Sectoral Balances

Figure 1 shows the trade balance, primary fiscal deficit and net-of-interest private saving/investment balance as defined in equation (2) as a proportion of GDP from 1961/62 to 1988/89. Several features of this graph stand out. In particular there was a rise in the primary fiscal deficit from less than 4 percent of GDP in 1970/71 to 10 percent of GDP in 1983/84. This was followed by a fall to 2-1/2 percent of GDP in 1988/89. Also noteworthy is the deterioration in the trade balance from an historically-large surplus of close to 4 percent of GDP 1972/73 to a deficit of 2 percent of GDP in 1988/89.⁹ The trade balance deficit through the 1980s was clearly larger than the deficit on average during the 1970s, although in 1988/89 the deficit of close to 2 percent of GDP was an improvement over the low point of 4 percent of GDP reached in 1981/82. The trade deficit was also similar, relative to the size of the economy, to those experienced during the mid 1960s.

The excess of private saving over private investment was relatively flat at around 3 percent of GDP during the 1960s but then rose to a peak of 10 percent of GDP in 1972/73. This was followed by a gradual decline to 2 per cent of GDP. The sharp fall in 1980/81 and 1981/82 reflected the surge in investment associated with the "resources boom".

(i) Private Saving and Investment

The saving/investment balance is decomposed in Figure 2 into saving (as defined in equation 2), investment and consumption. Private consumption expenditure as a proportion of GDP has changed slowly over this period, falling

⁹ The peak of the trade balance surplus corresponded to a period of exceptionally strong commodity prices. If this is taken into account, the decline in the trade balance is not clearly apparent until 1979/80.

Figure 1
SECTORAL BALANCES
(% GDP)

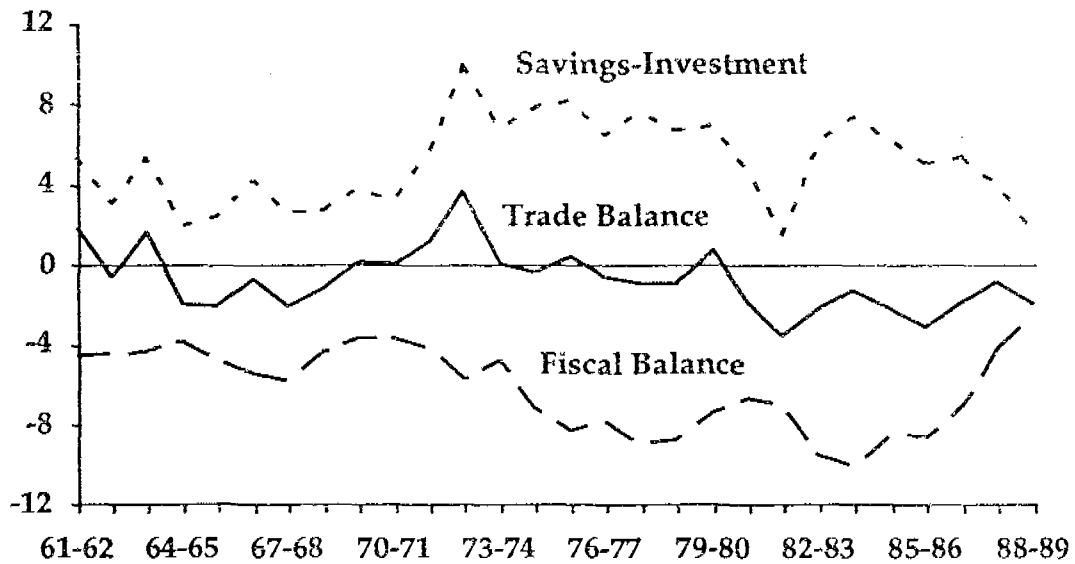
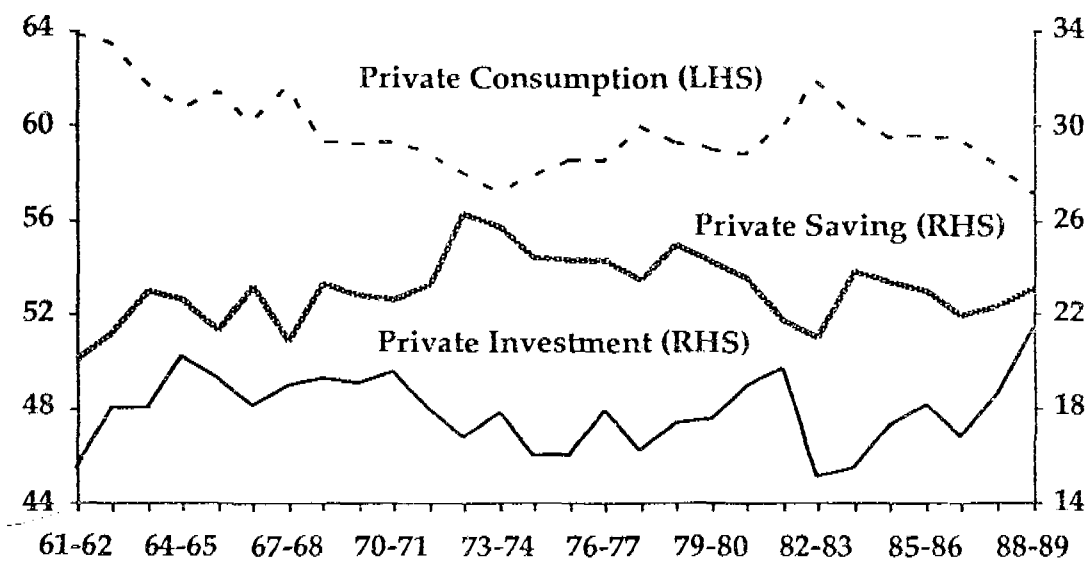


Figure 2
SAVINGS, INVESTMENT and CONSUMPTION
(% GDP)

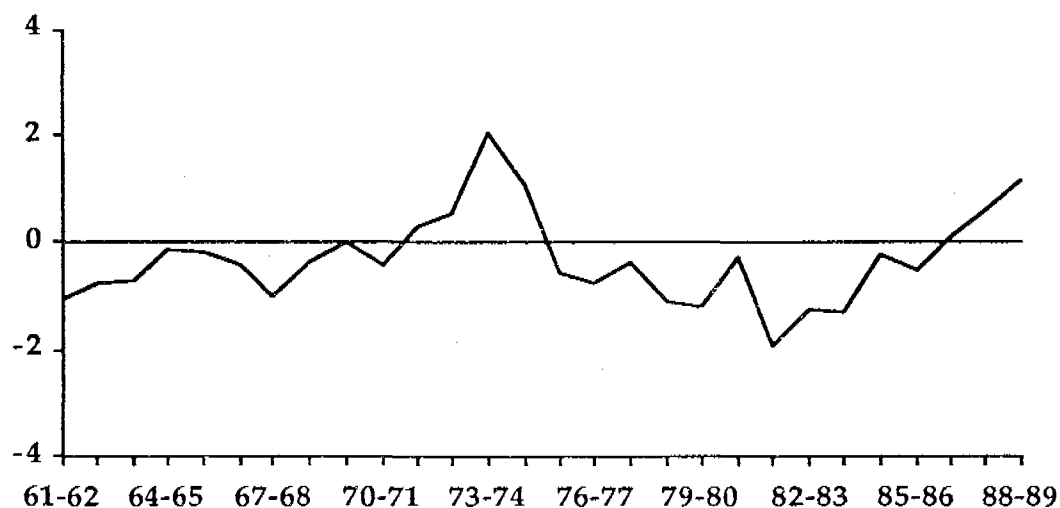


by 6 percent of GDP from 1961-62 to 1973-74 and then rising steadily by 5 percent of GDP from 1974/75 to 1982/83 before again falling steadily by 5 percent of GDP to 1988/89. Private savings shows the inverse behaviour. Private investment has maintained its share of GDP, with a sharp rise associated with the resources boom in 1980/81 and 1981/82 followed by a sharp fall during the recession in 1982/83 and a strong rise in 1987/88 and 1988/89.

(ii) The Statistical Discrepancy

Since the sectoral balances as we have defined them in Figure 1 should add to zero, any discrepancy should be reflected in the statistical discrepancy shown in Figure 3. Several features of this figure stand out. The statistical discrepancy is clearly not random. There appears to be distinct trend changes in 1974/75 and 1982/83. The discrepancy is also highly negatively correlated with consumption (shown in Figure 2). The recent rise in the discrepancy of nearly 2 percent of GDP from 1985/86 to 1988/89 is equal to about half of the deterioration of the trade balance since 1961/62.

Figure 3
STATISTICAL DISCREPANCY
(% GDP)



Given that this is such a large error in the data, it is worth attempting to allocate the discrepancy to the sectoral balances to see how different the economy would look. In Appendix A we reconstruct Figures 1 and 2 assuming that the discrepancy is unreported consumption. The effect of this assumption is quite

dramatic and points to an important unresolved issue: what does the statistical discrepancy represent?

(iii) Government Taxation and Outlays

Another major component of the saving/investment balance is taxes. In Figure 4 we plot total taxes and the decomposition into personal income tax, company tax and other taxes. Several features of this figure are quite remarkable. Total taxes as a percent of GDP have risen steadily since the beginning of the period but noticeably faster since 1972/73, increasing by approximately 7 percent of GDP between this date and 1988/89 (or by 30 percent of their 1972/73 level). Company tax as a percent of GDP has fallen steadily since 1970/71 from 4 percent of GDP to 3 percent of GDP. At the same time as company tax has fallen, household income tax and other tax have risen dramatically from 1970/71, with income tax continuing the trend of the 1960s.

The final major component of the private saving/investment balance is net transfers from the public sector to the private sector. This is plotted in Figure 5 together with total government spending on goods and services (both current and capital expenditure) as a percent of GDP. Note that government is defined inclusive of state and local governments and public enterprises. The behaviour of transfers is similar to that for taxes until 1984/85, after which they fell as part of the fiscal cutbacks, while taxation continued to rise. The net of taxes and transfers therefore tend to cancel out in the saving data up until 1984/85, but becomes important for the behaviour after 1984/85.

As shown in Figure 5, government spending on goods and services rose consistently from 1961/62 to 1982/83. Movements in total government spending reflect change in the consumption component, with the trend rise in consumption slightly offset by the trend decline in public sector capital expenditure. There is a distinct jump of total government spending in 1974/75 to a new level 4 percent of GDP higher than 1961/62. Since the peak in 1982/83 there has been a fall of about 4 percent of GDP in government spending to 1988/89.

Throughout the period of general government expansion, the capital expenditure component of government has fallen as a proportion of GDP. In the

Figure 4
TAXATION
(% GDP)

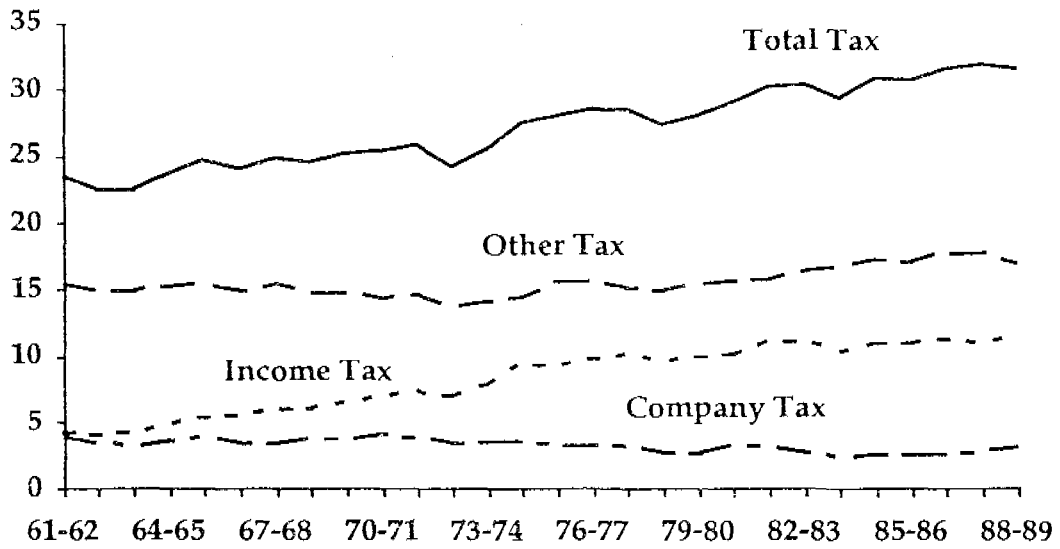
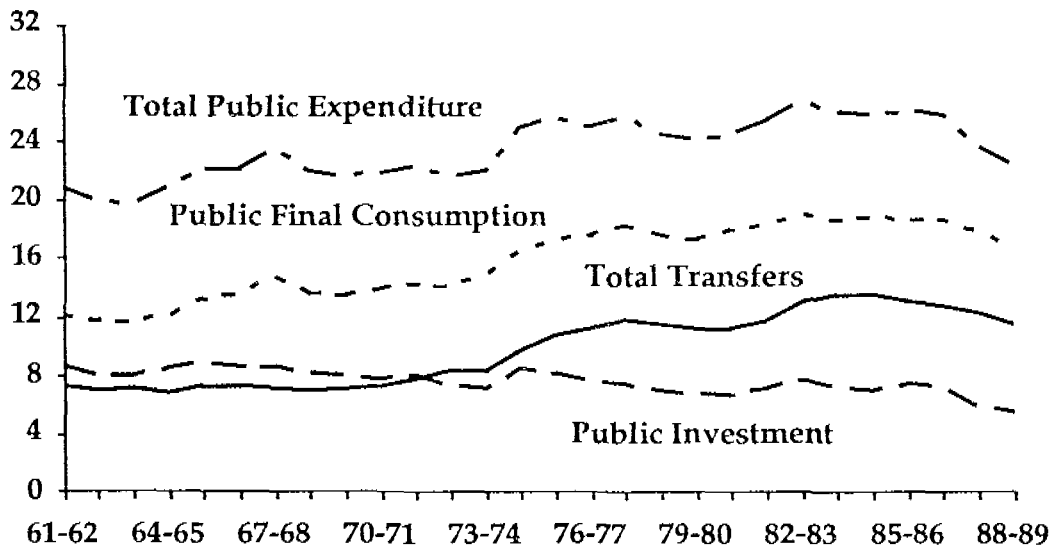


Figure 5
GOVERNMENT OUTLAYS
(% GDP)



recent period of fiscal tightening the cut has been the equivalent of 2-1/2 percent of GDP. Government consumption expenditure in 1988/89 was still about 2-1/2 percent of GDP above the level in 1972/73 and 4-1/2 percent above the level in 1961/62.

In Figure 6 we present two alternative measures of fiscal position. One is the primary fiscal deficit on which we have focussed so far, and the other is the PSBR, which is the usual focus of public debate. The difference between the two measures is interest servicing costs (which would tend to make the PSBR measure larger than the primary fiscal deficit) and in "other revenue", interest received and depreciation provisions (all of which tend to make the PSBR smaller than the primary fiscal deficit). The general movements in the data are quite similar.

It is interesting to concentrate on the recent fiscal adjustment. In Table 1 we calculate different categories of government outlays and expenditure as percent of GDP based on the government accounts.

Table 1

FINANCING TRANSACTIONS OF THE PUBLIC SECTOR

% GDP	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	Change 1983-84 to 1987-88	Estimated Change 1983-84 to 1987-88
FINAL SPENDING	23.82	23.57	23.70	23.49	21.35	20.60	-2.47	-3.21
INTEREST	4.31	4.94	5.49	5.70	5.36	5.03	1.05	0.72
OTHER OUTLAYS	14.04	13.91	13.45	12.91	11.97	11.49	-2.06	-2.55
TOTAL OUTLAYS	42.16	42.43	42.64	42.10	38.69	37.12	-3.47	-5.04
TAX REVENUE	29.60	31.12	30.85	31.45	31.74	31.04	2.14	1.45
OTHER REVENUE	4.25	4.73	5.43	5.58	5.19	4.83	0.94	0.58
TOTAL REVENUE	33.85	35.85	36.28	37.03	36.93	35.87	3.08	2.02
NET PSBR	6.75	5.11	4.86	3.53	0.35	-0.06	-6.40	-6.81
INCREASE IN PROVISIONS	1.57	1.46	1.50	1.53	1.41	1.31	-0.17	-0.27

Between 1983/84 and 1988/89 the PSBR fell by 8.41 per cent of GDP. Of this fall, 2.86 per cent of GDP was due to increased revenue and 3.45 per cent of GDP was due to cuts in spending on goods and services. Cuts to other outlays such as transfer payments accounted for a further 2.79 per cent of GDP. It is important to note, however, that the fall in the final spending component did not occur until

Figure 6
ALTERNATIVE MEASURES OF FISCAL POSITION
(% GDP)

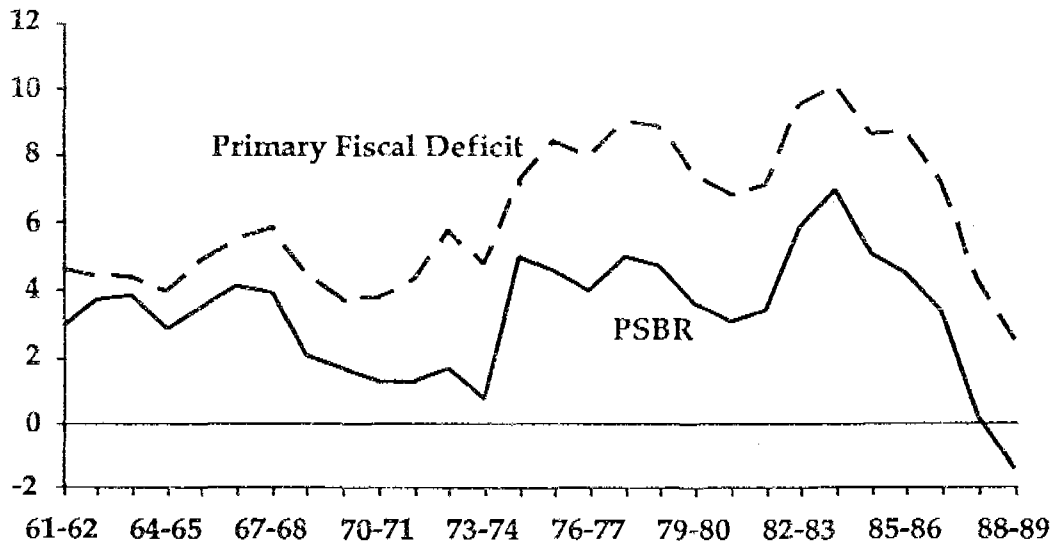
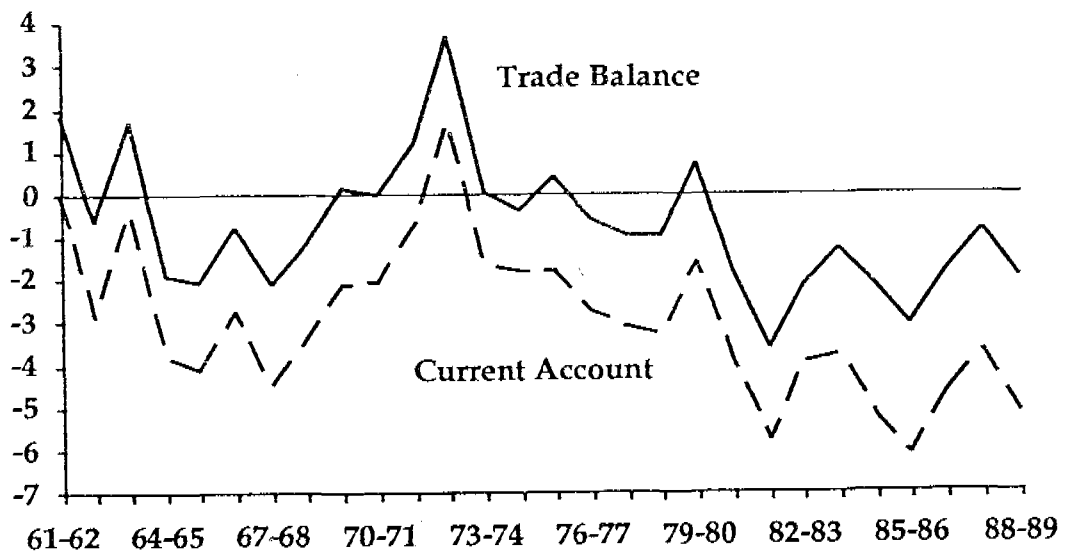


Figure 7
CURRENT ACCOUNT and TRADE BALANCE
(% GDP)



1987/88. Between 1983/84 and 1986/87 the PSBR fell by 3.54 per cent of GDP, but the fall in the final spending component during this period was close to zero. In terms of the split between current and capital expenditure, the government accounts show that the cuts have been divided equally between capital expenditure and current expenditure. Much of the reduction in current expenditure, however, did not occur until 1988/89.

In terms of another measure of fiscal position - the debt accumulation equation - it is worth pointing out that between 1983/84 and 1988/89, the ratio of interest to GDP rose by 0.64 percent but through 1987/88 and 1988/89 the ratio began to fall due to declining government debt over this period. For the ratio of debt to GDP to reflect only the primary fiscal deficit, we require a cut in outlays equal to the rise in servicing costs. By 1988/89 the cut in government spending on goods and services of 3.45 percent of GDP was a net improvement in the spending side of fiscal policy (adjusting for higher servicing costs) of about 2.8 percent of GDP. The improvement in the trade balance in 1988/89 over the average from 1981/82 to 1985/86 is about 1/2 of one per cent of GDP. The reduction in spending places the fiscal adjustment in a much better light from the view of sustainability compared to the position up to 1986/87.

(iv) The Balance of Payments

In Figure 7 we plot the current account and the trade balance as a percent of GDP. The difference is primarily interest servicing costs, which have risen since 1982/83. As in the case of the fiscal deficit, the larger the interest servicing costs, the larger the trade balance surplus required to service the outstanding stock of debt. In the 1980s real interest rates have been positive, which places a greater debt servicing burden on the public sector and the economy. The size of the trade surplus and fiscal surplus required to prevent foreign debt or government debt from accumulating is larger in the 1980s than in the 1970s.

(v) Does the Twin Deficits Proposition Apply?

A comparison can be made between the current account and PSBR. These are the two series that are frequently linked by the "twin deficits" proposition. As noted on page 3 (based on the identity in equation 2), a change in the government's fiscal position will be associated with a change in the current account, *provided that* the private savings/investment balance remains unchanged. The

relationship between the two deficits seem to be, at best, loose. Netting out the effect of rising real interest rates (which tend to worsen both the fiscal deficit and the current account) only slightly improves the relationship. It seems that in the case of Australia, the private saving/investment balance cannot be taken as given, as assumed in the twin deficits proposition.

Before we can interpret the behaviour of the sectoral balances from the national accounts data we need to examine other key macroeconomic variables. We focus attention on real output growth, real wages, inflation, nominal and real exchange rates and interest rates.

b. Real Growth

The behaviour of real output is shown in Figure 8. This figure measures the percentage change in output from the same quarter of the previous year. This smooths out quarterly fluctuations. Note that the 1970s was a period of lower average real growth than in the 1960s. The 1980s, which began with a severe slowdown in growth, is now a period of faster growth than the 1970s.

c. The Behaviour of Relative Prices

(i) Real Wages

Figure 9 shows the growth of the four-quarter percentage change in nominal wages (defined as average weekly earnings) and the GDP deflator. Several well known features of this Figure are the rise in real wages in 1974/75 after a levelling in the previous two years, and a further rise in real wages in 1981/82 after a levelling out. It is not shown here, but the decline in real wages is associated with strong employment growth, a substantial fall in the wage share and a correspondingly larger profit share.

(ii) Inflation and Real Interest Rates

In Figures 10 and 11 we plot the rate of inflation defined in terms of the CPI and GDP deflators respectively. We also need some measure of expected inflation to calculate an ex-ante real rate of return. The method of calculation of an expected inflation series is shown in Appendix A.

Figure 8
REAL OUTPUT GROWTH
(Four Quarter Percentage Change)

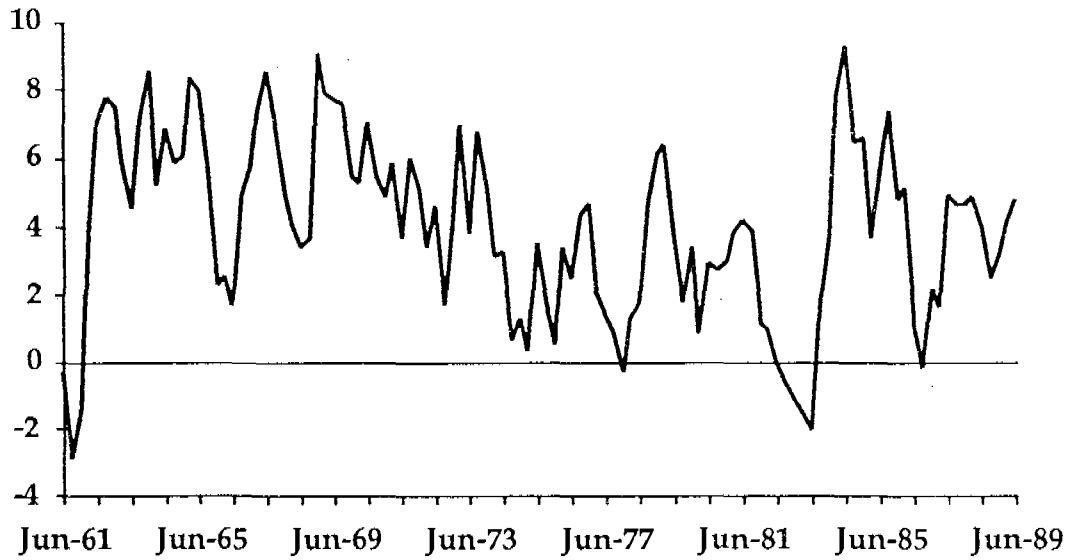


Figure 9
WAGES and PRICES
(Four Quarter Percentage Change)

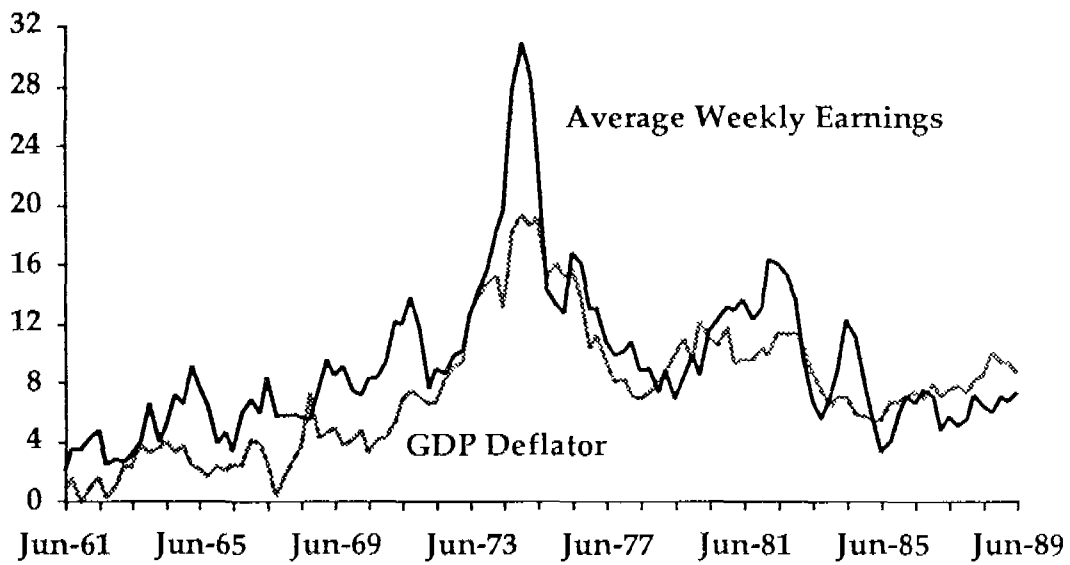


Figure 10
ACTUAL and EXPECTED CPI
(Annualised Quarterly Change %)

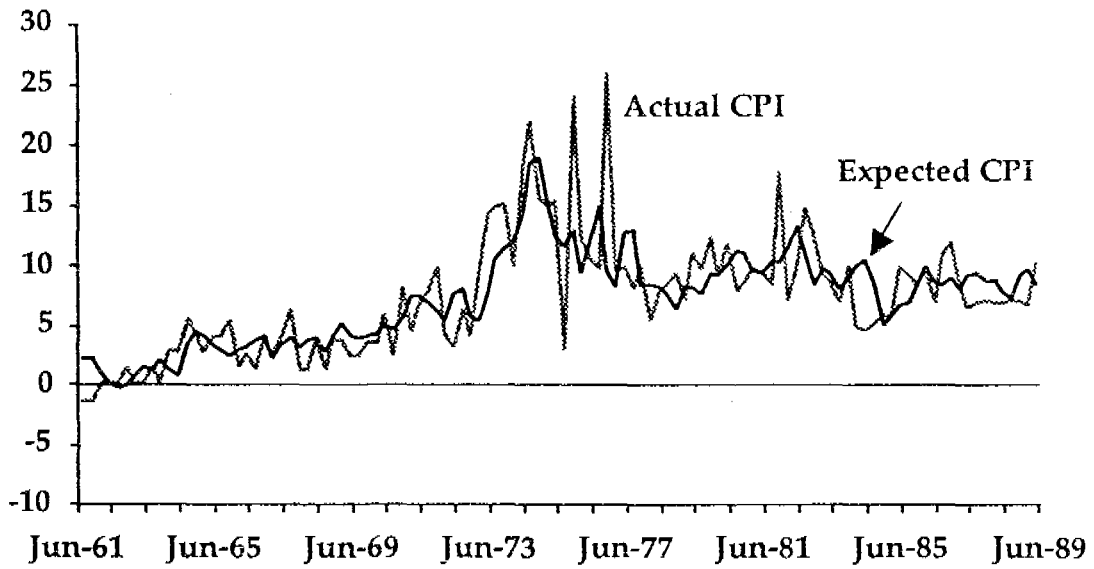
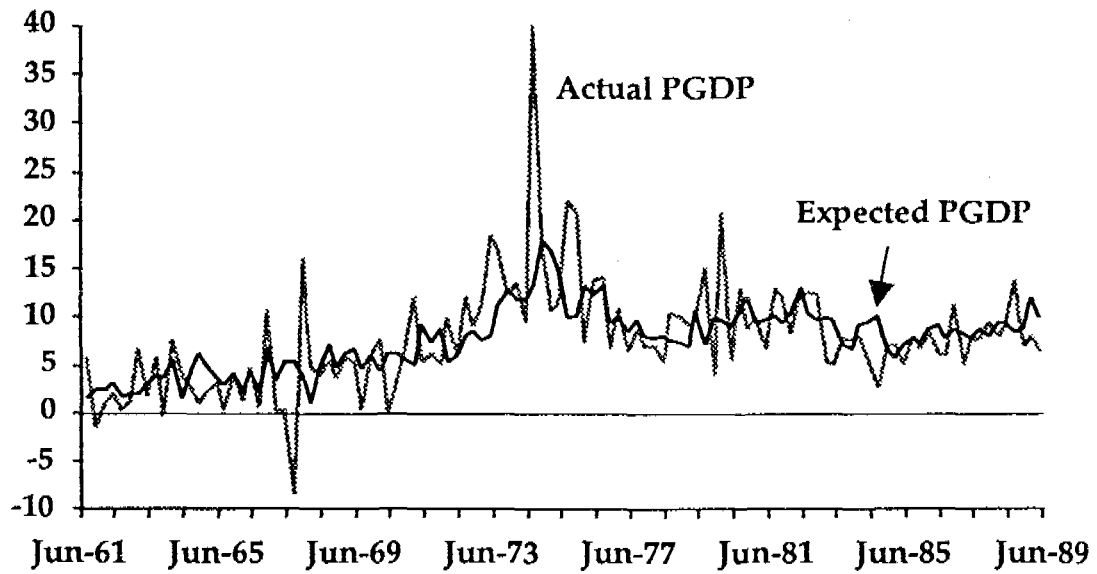


Figure 11
ACTUAL and EXPECTED PGDP
(Annualised Quarterly Change %)



The CPI and GDP deflators have moved somewhat differently late in the period, with the CPI falling from around 12 per cent in late 1986 to around 8 per cent by 1988/89, while the GDP deflator has risen from around 5-1/2 per cent in 1984/85 to about 7 per cent in 1988/89. The different trends are even more pronounced when the expected inflation series are used. The difference between the two series primarily reflects changes in the terms of trade over this period, and partly definitional differences between the implicit deflator and the consumer price index.¹⁰

In Figure 12 we plot the quarterly data for both a short-term and long-term real interest rate in Australia with expected inflation defined in terms of the GDP deflator. The short-term interest rate used is the return on 90 day bank bills. The long-term interest rate is the yield on 10-year government bonds. Each series is converted into an annualized return for each quarter. Real short-term interest rates defined in terms of the GDP deflator and the CPI series tell similar stories except for the recent few observations and therefore only one short-term real interest rate series is graphed. The 1970s was a period of very low and negative real short and long term interest rates. Rates rose steadily from the March quarter 1975 and peaked in the December quarter 1985 for short rates and three quarters earlier for long rates: they then fell until early 1988 by both measures. Since the March quarter 1988, real interest rates have again risen.

In an attempt to introduce taxes into the calculation of real rates of return, Figure 13 shows the annualized before-tax nominal interest rate, after-tax real interest rate and expected inflation.¹¹ Although Australia has experienced relative high nominal interest rates during the period, real after-tax interest rates have been positive only since 1981. Both interest rate measures fell during 1987/88 but have risen again in 1988/89.

Figure 13 updates the Carmichael and Stebbing (1983) graph of the "Inverted Fisher Hypothesis". Carmichael and Stebbing argued that in a regulated financial

10 Which series is appropriate for constructing a real interest rate depends on the purpose. If it is to reflect the real interest rate facing consumers in deciding whether to consume today or tomorrow, it should be a price index for the consumption bundle. On the other hand for a firm facing an investment decision the appropriate opportunity cost of producing today or tomorrow is the change in the GDP deflator.

11 Defined as the average of the four quarterly observations on interest rates where each quarterly rate is measured as the rate at the end of the quarter. The method of calculating after-tax rates of interest is outlined in Morling (1990).

Figure 12
REAL INTEREST RATES
 (Annualised Quarterly Rates, % p.a.)

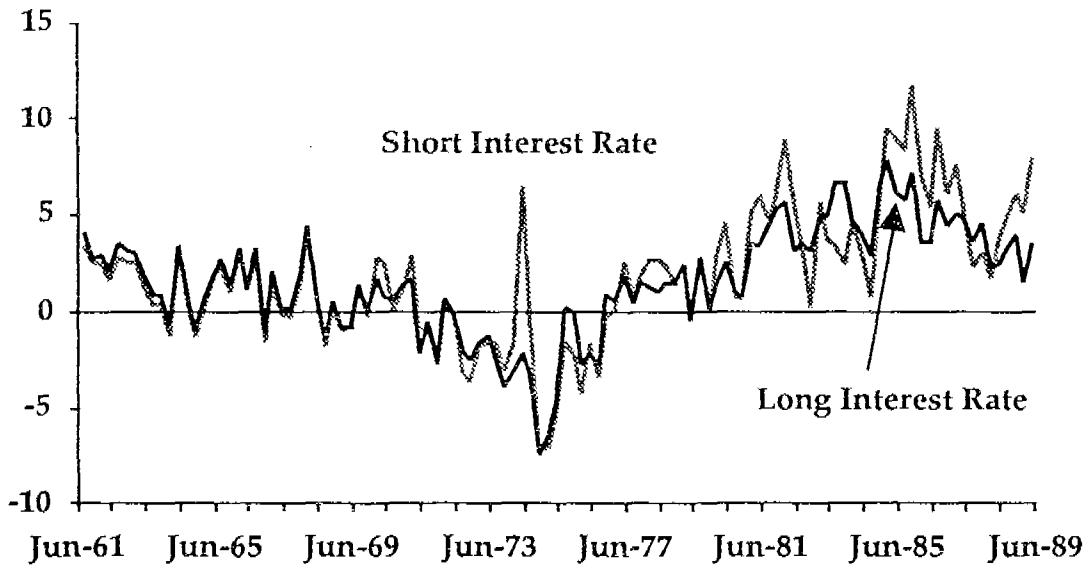
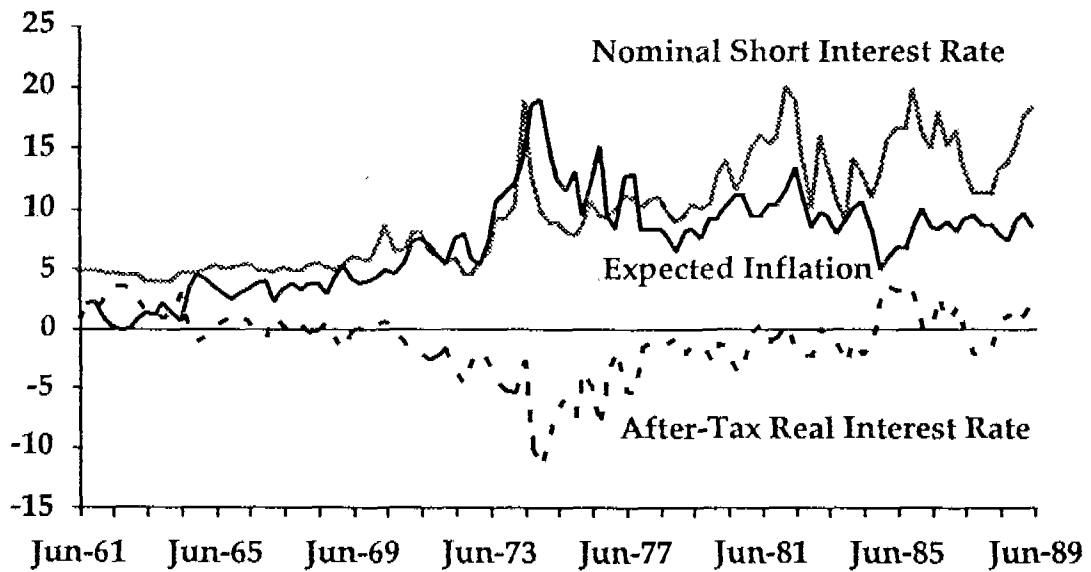


Figure 13
AFTER - TAX REAL INTEREST RATES
 (Four Quarter Average, % p.a.)



market with a zero nominal return to money balances, if financial assets are closely substitutable for money, then changes in expected inflation will be reflected in changes in real interest rates rather than changes in nominal interest rates on financial assets. If this is the case, then real returns to financial assets are unlikely to be a good approximation to the real returns to capital when inflationary expectations are changing. This is clearly the case in the period up to 1981. Carmichael and Stebbing also speculated that deregulation of financial markets would tend to dilute the relation between changes in inflation and changes in real returns to financial assets, and the graph gives some evidence to support this. What is the appropriate rate of return to use for investment and savings decisions? During the 1970s, a weighted average of returns to financial and real assets may be a better approximation of the real return to savings. The dramatic difference this could make can be seen from the U.S. evidence that the real return to capital remained positive during the 1970s even though the real return to financial assets became sharply negative.¹²

(iii) Real Exchange Rates and Foreign Real Interest Rates

So far we have ignored the impact of the rest of the world on Australia except through the trade balance. Capital flows are also an important link. To gauge the behaviour of Australian interest rates relative to the rest of the world we present in Figure 14 the annual series for the Australian nominal interest rate together with the annual U.S. 90 day interest rate.¹³ We also present results for real interest rates in Australia and the U.S. in Figure 15. Nominal and real exchange rates relative to the U.S. are presented in Figure 16, and nominal and real exchange rates relative to Japan are presented in Figure 17.

First consider the behaviour of nominal interest rates in Figure 14. In a broad sense, uncovered interest parity seems to work pretty well in explaining interest differentials over the period, even despite the presence of capital controls until the early 1980s. Domestic and foreign interest rates are reasonably similar during the period of fixed exchange rates until 1972. Given the capital restrictions until the early 1980s, it is not surprising that domestic and foreign interest rates are reasonably similar in the period to around 1972. The two series diverge in 1972/73. The sharp appreciation of the nominal exchange rate in 1972/73 corresponded to the emerging fiscal deficit and a strong rise in world commodity

¹² See Bosworth (1982).

¹³ The series is the annual average of the quarterly interest rate series.

Figure 14
NOMINAL INTEREST RATES
 (U.S. and Australian 90 - Day Bank Bills % p.a.)

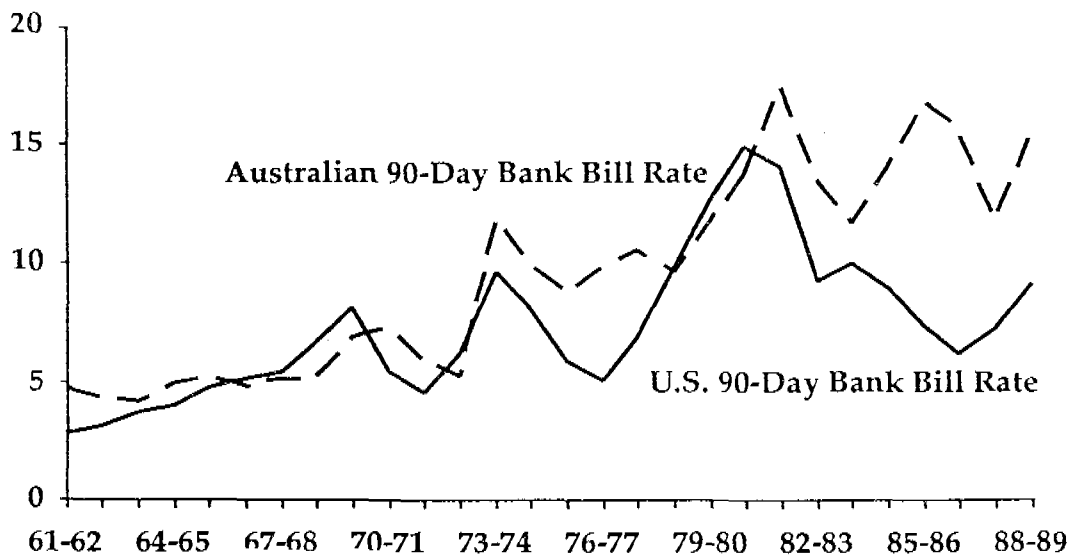


Figure 15
REAL INTEREST RATES
 (U.S. and Australian 90 - Day Bank Bills % p.a.)

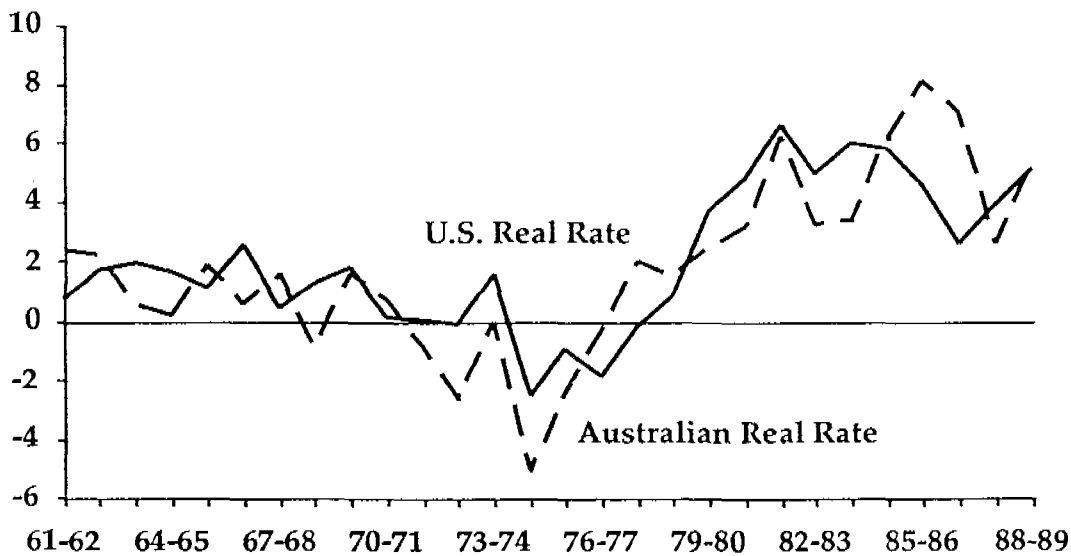


Figure 16
EXCHANGE RATES
 (Nominal and Real, Relative to U.S.)

Log of index
 based in 1961/62

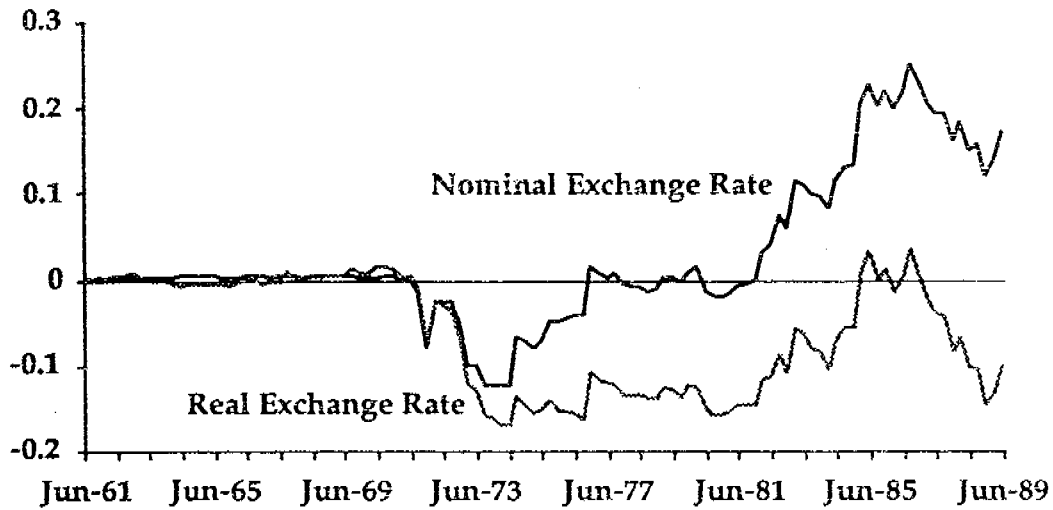
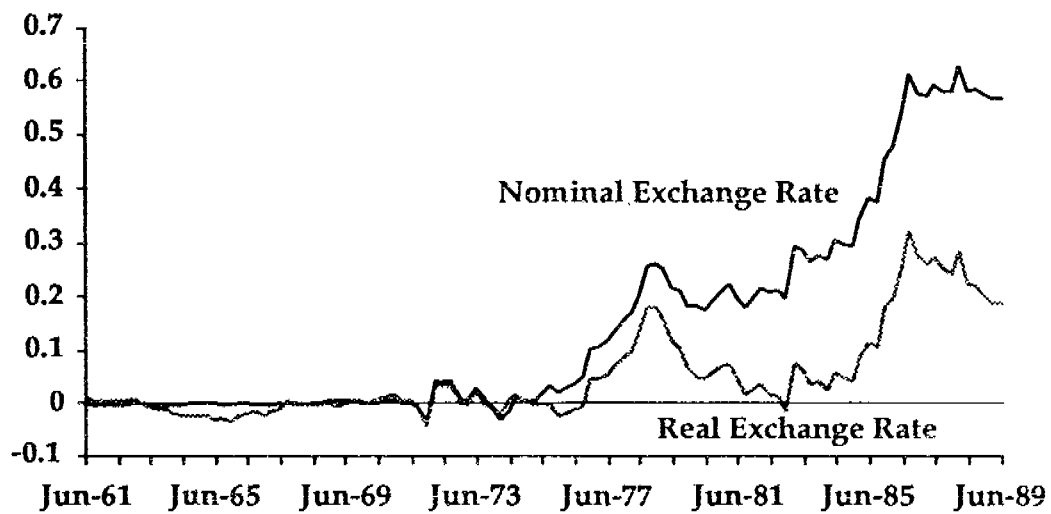


Figure 17
EXCHANGE RATES
 (Nominal and Real, Relative to Japan)

Log of index
 based in 1961/62



prices. The interest differential widened and the nominal exchange rate depreciated until 1977. The second period of domestic interest rates above world interest rates began in 1981/82 and corresponded to a period of nominal exchange rate depreciation against the U.S. dollar. This partly reflected the higher inflation rate in Australia relative to the U.S. as well as a strong appreciation of the U.S. dollar until late 1985.¹⁴ The sharp widening of the interest differential coincides with a large depreciation of the exchange rate in 1985. The fall in interest rates during 1987 corresponds to a period of nominal exchange rate appreciation which was primarily due to strong commodity prices.

In Figure 16 we also plot the real exchange rate relative to the U.S. dollar. Ideally we should use a trade weighted basket but data limitations and the desire to examine interest parity conditions restrict us to focus on the U.S. dollar. The broad trends are similar to the movement relative to the yen and other major currencies - except in 1981-85. Note that a fall in both the real and nominal exchange rate is an appreciation. The commodity price boom in 1972 and 1973 was accompanied by a nominal and real appreciation. The real appreciation of 1972 was locked in until 1982 by the strong wage growth which offset the nominal exchange rate depreciation over this period. It was not until mid-1981 that the overvalued real exchange rate began to depreciate against the U.S. dollar, and not until 1985 against other currencies. Exchange rate changes were not passed into wage settlements, thus improving competitiveness in U.S. dollar terms from 1981 until 1986. Much of the real depreciation relative to the U.S. dollar was reversed by the nominal appreciation through 1987 and 1988. This rise in relative prices will show initially as an improvement in the trade balance (as we measure it), but over time as the real trade balance deteriorates, the trade balance will worsen. As a comparison, we present the real and nominal exchange rate relative to the yen in Figure 17. Note that the loss in competitiveness in 1988/89 is smaller when calculated in terms of yen.

Figure 15 plots real interest rates for Australia and the U.S.. This shows that broad trends in real interest rates are similar to those in the U.S. (was the inverted Fisher effect working in the U.S. as well?), although there are large deviations in the short run. The period before 1980 reflects the regime of fixed or managed exchange rates between Australia and the U.S.. The real interest rate

¹⁴ Smith and Gruen (1989) give a detailed analysis of the ex-post breakdown of this since 1985. The continuing large interest differential from 1985 suggests that market participants increasingly expected a decline in the Australian dollar which did not emerge.

differential was in Australia's favour from 1972 (i.e. our real rates were lower than the U.S. rates) which is hard to reconcile with the overvalued real exchange rate of the time. The greater flexibility of rate regime in the 1980s has allowed for a bigger divergence between nominal rates of return, but real rates have not diverged much. In 1982/83 and 1983/84, when the Australian real interest rate was below the U.S. real interest rate, it corresponded with a period of expected real U.S. depreciation. In the period after 1984/85 the high Australian real rates coincided with a period of expected real exchange rate depreciation. The large fall in real interest rates in 1987/88 coincided with the strongly appreciating real exchange rate.

This section has presented a variety of data on the Australian economy which was summarized at the beginning of this section. In the following figure we attempt to explain how it all fits together.

4. INTERPRETING THE AUSTRALIAN EXPERIENCE

a. A Theoretical Framework

Our views reflect the following uncontroversial propositions:

1. relative prices are important in equating demand and supply over time and in satisfying the economy and sectoral wealth constraints;
2. expectations play a crucial role in the adjustment of prices and quantities to equilibrium.¹⁵

More specifically:

3. Investment and production decisions of firms are based on current and expected future profits. Expectation of the future path of the economy as well as real long term interest rates are important determinants of expected future profit. Short term nominal interest rates only matter if they reflect sustained changes in real interest rates. Capital market imperfections affect

¹⁵ These views are formalised in the MSG2 model of the Australian economy. The interested reader should refer to McKibbin and Sachs (1989), McKibbin and Sieglhoff (1988b) and McKibbin and Elliott (1989) for a formalisation of the MSG2 model.

this relationship. Financial market deregulation in the 1980s has probably increased the relevance of this theory.¹⁶

4. The trade balance is determined by relative prices, current income and expected future income.¹⁷
5. Asset prices are determined by market-clearing conditions and arbitrage relationships (e.g. if domestic short-term nominal interest rates are above equivalent world interest rates, this reflects an expectation of depreciation of the nominal exchange rate).
6. On the supply side, firms employ factors of production based on marginal productivity relative to costs. The labour market is assumed not to clear since nominal wages are set independently of the short run conditions in the economy, although expected inflation plays an important role. The stickiness of nominal wages provide a good deal of the explanation for short run stickiness of goods prices and the resulting overshooting of asset prices, as in the Dornbusch (1976) model.
7. Money can have substantial short run real effects by changing short-run real rates of return that affect liquidity constrained individuals. In the long run, the rate of inflation is all monetary policy can affect. The effect on the balance of payments, of a monetary policy induced rise in interest rates, is ambiguous because the reduction in imports due to a fall in real income is offset by a deterioration in net exports due to the induced real exchange rate appreciation.¹⁸
8. Consumption is based on the "life cycle model" in which households attempt to smooth consumption over their life-cycle. In this theory a temporary rise in income leads to a small change in consumption and a rise in saving as consumers spread the transitory income gain across their lifetime. A permanent rise in income in each period would lead to an

16 McKibbin and Siegloff (1988) find empirical support for this hypothesis.

17 Early work on imports summarised by Macfarlane (1979) found empirical support for the role of relative prices in affecting import demand. Recent work by McKibbin and Cairns (1988) found that relative prices are empirically important although the elasticity is approximately -0.4, which is lower than in earlier studies.

18 Empirical support for this in Australia is provided by both the Murphy (1988) and MSG models. It is also supported by the major global models surveyed in Bryant et. al (1988).

increase in consumption in each period and therefore little change in saving.

A controversial (and extreme) extension of the life-cycle model is Barro's (1974) "Ricardian Equivalence Proposition". This proposition argues that in a distortion-free world, consumers incorporate the government budget constraint into their own. Therefore they do not view government debt as part of wealth because of the future taxes implied in repaying the debt. A change in government spending on goods can affect consumption behaviour, but a change in the debt/tax mix for a given level of government spending will have no effect on consumption: it will only change private saving. It is worth elaborating this. Consider the case of a change in government spending on goods and services. Supposing the extra expenditure is on goods which consumers would have bought anyway (e.g. school lunches). In this extreme case, a permanent increase in government spending would have no effect on total saving or real interest rates, and therefore no effect on the trade balance or the current account. Consumption would fall instantly by exactly the extent that government spending rose. The means of financing the spending would be irrelevant. In the case of tax financing, the higher tax would merely be a transfer of purchasing power from the consumer to the government to purchase the goods that the consumer would have purchased. In the case of debt financing, consumers would willingly hold the additional bonds to save for the future taxes which will ultimately finance the debt. A similar argument can be made for a rise in transfer payments.

A *temporary* increase in government expenditure would raise interest rates, which would induce a temporary increase in private saving, a fall in investment and an appreciation in the real exchange rate which would imply a trade balance deficit. The funding of the temporary overall spending increase would have to be from abroad.

It is apparent that the assumptions required for full Ricardian equivalence are violated in one way or another.¹⁹ Limited access to financial markets, especially for borrowing against human capital, as well as differential rates of return between government borrowing and private borrowing is likely to cause deviations from the behaviour predicted by the theory. But the intuition provided by the theory may still be useful since the direction of change implied

¹⁹ For example see Carmichael (1982) for a detailed analysis.

by the theory can still be relevant. Financial market deregulation in the 1980s and the greater availability of credit has probably increased the importance of the life cycle model in explaining consumption behaviour.

b. An Interpretation of the Recent Experience

In Section 3 we highlighted several stylized facts. The first is the gradual increase in taxation on households, which rose as a proportion of GDP throughout the period. This financed a gradual rise in government spending on goods and services during the 1960s which accelerated during the 1970s and then remained at a high level until 1986/87. The rising taxes also financed a rise in transfers. Transfers and government spending grew faster than taxes from 1974/75 to 1983/84, implying an increasing fiscal deficit.

During the 1960s as government spending rose (financed by taxes) with a relative stable fiscal deficit, private saving also rose, even though real interest rates were falling slightly up until 1969/70. If consumers thought that taxes would *go on* rising, this would be consistent with the life cycle theory with some Ricardian elements. In the Ricardian view, the perception of higher future government spending implies a fall in consumption and a rise in private saving. It is *also* consistent with alternative views, e.g., that fiscal policy was responding to a change in private saving rather than the other way around. One way of viewing this is that fiscal policy was subject to a balance of payments constraint. An exogenous increase in private saving would result in an improvement in the balance of payments which lessens the restriction on gradual fiscal expansion.

Understanding the period from 1972/73 is more difficult mainly because of our uncertainty about what the statistical discrepancy represents. If it is ignored, then during the 1970s private saving fell as government spending rose. This does not fit the Ricardian model, although this is consistent with the life-cycle theory if the period of lower growth in the 1970s was perceived to be *temporary*. Private consumption was maintained at the expense of savings. It is also consistent with the view that tax distortions combined with high inflation acted as a gradually increasing dis-incentive to save.

An attempt to capture this effect by constructing an after-tax real rate of return does not seem to support this argument, because from 1974/75 to 1981/82 there was a massive increase in real interest rates on bonds which dominates any

distortion. Our measure of real interest rates relevant for saving decision is problematic because, as we stressed above, the rate of return to capital was positive during the 1970s and therefore the bond rate is probably a misleading measure of the total return to saving. It still may be useful to use the real return to bonds to calculate the distortion in this return due to the interaction of inflation and rising interest rates. For example, for a given real rate of return, the gap between pre- and post-tax real returns has widened from 1973 because of a rise in the average marginal tax rate and a rise in nominal interest rates, both of which worsen the distortion. The gradual increase in the wedge is positively correlated with the gradual decline in savings. Thus although we probably do not have the appropriate real return to savings, we do have some measure of the distortion. This is, of course, highly speculative.

The fiscal expansion in 1974/75 was followed a couple of years later by a rise in Australian real interest rates - even greater than the rise in world real interest rates. The decline in private saving and government saving may have pushed real interest rates up. It coincided with a deterioration in the trade balance, although the real exchange rate did not change much during this period. The link may be that the real exchange rate appreciation up to 1973, locked in by a wage explosion, prevented any real depreciation throughout the 1970s, keeping the exchange rate over-valued.

As shown in Appendix A, if the statistical discrepancy is allocated to consumption then the Ricardian model looks pretty good for the 1970s. The rise in private savings from 1961/62 to 1977/78 can be seen as Ricardian from 1973/74 onwards, although the earlier period (where there was no fiscal deficit) requires resort to more complex explanations relying on expectations of future tax increases. The problem with the Ricardian explanation is in explaining the movement in real interest rates, unless we appeal to other factors.

Finally we come to the period of fiscal restraint. This episode since 1984/85 has coincided with private saving falling a little from the peak of 1983/84, but trending upwards for the period as a whole. There was a rise in private investment and a rise in the statistical discrepancy. This doesn't look very Ricardian at first sight.

If the statistical discrepancy is included in consumption, the Ricardian explanation looks better although it still does not explain the fall in real interest

rates. This fall in real interest rates is consistent with the life-cycle model. In the life-cycle model the fiscal contraction would partially increase consumption. But the rise in consumption would not be enough to offset the effect of the fiscal adjustment in reducing aggregate demand. The result would be lower real interest rates and a depreciation of the real exchange rate. The change in real interest rates should stimulate private investment and private savings which would further offset the fiscal adjustment. The depreciation of the real exchange rate should crowd in net exports. The balance of payments did not improve via this channel in the recent phase of fiscal adjustment because the real exchange rate actually appreciated, reflecting strong commodity prices and tight monetary policy.

An alternative to the life-cycle argument and especially the extreme Ricardian view can be based on another important difference in the post 1984/85 period: taxes and transfer payments have diverged. During the period up to 1984/85 the rise in taxes was offset by a rise in transfers, but transfers have fallen since 1984/85, while taxes continue to rise. The large fall in savings corresponding to the fiscal contraction implies that the rise in taxes has apparently been paid for out of private saving. This suggests that the apparently "Ricardian" behaviour could simply be Australians attempting to maintain a level of consumption they have always had. This also occurred in the 1970s during a period of below-average growth.

The result is that the recent fiscal adjustment has coincided with a decline in private saving (if the statistical discrepancy is included in consumption) and a rise in investment, with very little effect on the balance of payments. But there is an important change: although the balance of payments appears to have improved very little, it is more sustainable than before. An increase in *investment* can explain most of the continuing external imbalance and to the extent that we are now using foreign funding to increase investment rather than consumption, this is less worrying. Anything which contributes to higher future growth will imply a smaller required loss of consumption by future generations to service the outstanding stock of external debt. The remaining concern, however, would be that a good part of the improvement in the fiscal position has come from cutting *capital* expenditure, so to some extent the extra private investment is offset by reduced government investment.

We cannot rule out an alternative (or additional) explanation. The size of government outlays may not be the important issue. The evidence also suggests that the tax distortions driving saving and investment behaviour may be at least as important.²⁰ This distortion is important for explaining the 1970s with a life-cycle model. Further evidence that the tax distortion has a significant effect on the economy can be found in the growth in corporate debt, detailed in Macfarlane (1989). Because firms could deduct the total interest payments rather than only the real component of interest, they had an incentive to borrow rather than raise equity. This did not necessarily change the amount of investment but would have affected the debt/equity mix.

5. CONCLUSION

We have examined the behaviour of private savings and investment, the primary fiscal deficit and the trade balance since the 1960s. We argue that the general deterioration in the balance of payments between 1975 and 1983 was related to the growth in the size of the public sector.

By distinguishing between the consequences of changes in government spending on goods and services, transfer payments and taxation, we argue that the fiscal adjustment since 1985 has not been as large as would be suggested by only focusing on the change in the public sector borrowing requirement. In addition, a significant part of the fiscal adjustment on the spending side has fallen on capital expenditure, which *may* have implications for future productivity of the economy if these cuts have been on essential public goods such as infrastructure investment.²¹ This needs further study.

Nonetheless, the recent fiscal adjustment has been substantial and so we suggest two explanations why the large cuts to government spending on goods and services have not yet led to an improvement in the balance of payments. The first is that the adjustment has been partly offset by Ricardian-type fall in private saving, and strong investment growth partly induced by the fall in long real interest rates in response to the fiscal adjustment. Any remaining spillover into

20 Kotlikoff (1989) argues that the U.S. evidence points to an important effect of tax distortions on savings behaviour. Feldstein (1989) points to the need for tax reform in the U.S. to stimulate savings.

21 Evidence in Aschauer (1989) for the United States suggests a strong statistical relationship between declines in U.S. public sector capital expenditure and declines in economy-wide productivity.

an improvement in the balance of payments via secondary changes in relative prices has been postponed by the appreciation of the real exchange rate due to strong commodity prices which was followed by tight monetary policy. The second explanation is that the distortions caused by the interaction of the tax system and inflation may have been as important as the effects of changes in government spending.

APPENDIX A: The Statistical Discrepancy

In Figure 1a we construct a new economy called OZ2, where we assume that all the statistical discrepancy is unmeasured consumption expenditure (which appears the most unlikely - the best alternative is that it is spread among a number of items likely of the alternatives). The behaviour of the savings and investment balance now looks quite different. The gradual rise of savings relative to investment during the 1960s is no longer reversed during the 1970s, and continues into the mid-1980s (apart from the investment induced decline at the beginning of the 1980s). The saving-investment balance then falls sharply from 1984/85, coinciding with the sharp improvement in the fiscal balance.

The decomposition of the saving-investment balance into its components for OZ2 is given in Figure 2a. Comparing Figure 2 and 2a we see that OZ2 has remarkably stable consumption, which trends down during the 1960s and 1970s and then trends up during the 1980s. Correspondingly, private saving rises gradually during the 1960s and 1970s and falls during the 1980s. One further interesting point to note is that private saving is more variable than private consumption.

The interpretation of the statistical discrepancy is important and needs to be remembered when interpreting the results in this paper (and most research results based on the National Accounts data). If the National Accounts is to retain credibility this particular problem needs to be addressed.

Figure 1a
SECTORAL BALANCES
in OZ2 (% GDP)

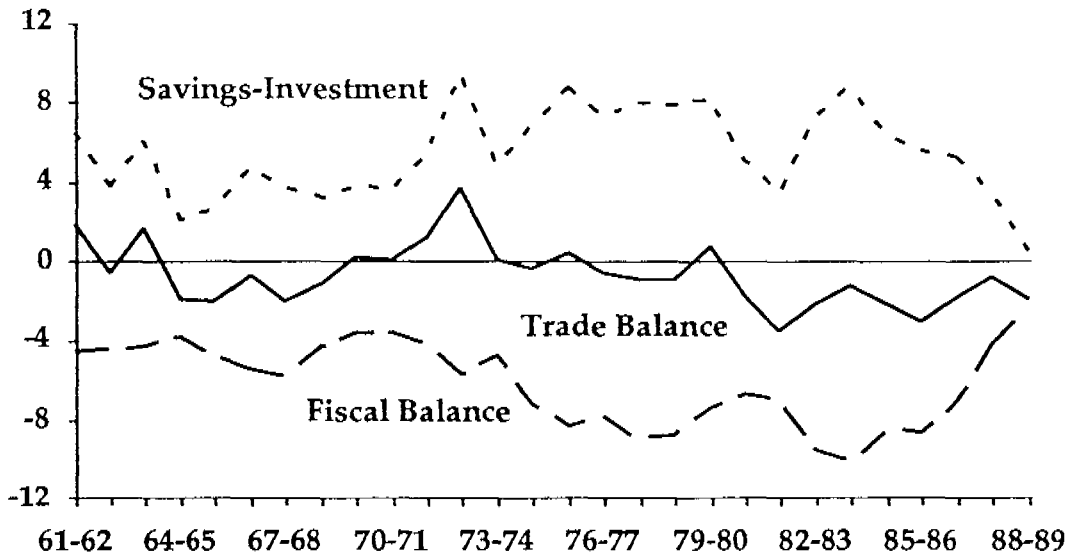
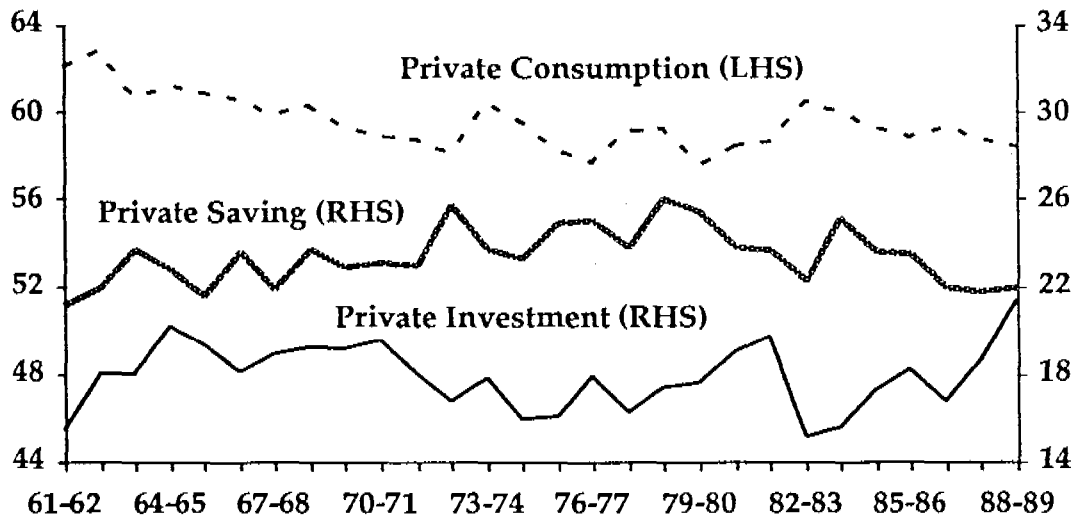


Figure 2a
SAVINGS, INVESTMENT and CONSUMPTION
in OZ2 (% GDP)



APPENDIX B: Expected Inflation

The calculation of real interest rates requires the estimation of a series for expected inflation. We use a simple forecasting model based on lagged values of the dependent variable and a vector of other variables thought to influence the formation of inflation expectations.

The models were estimated using quarterly data over the period 1961(3) to 1989(2) for both Australia and the US. The final forecasting equation (with insignificant variables dropped) for the expected change in the GDP deflator is:

$$p^e_t = -0.161 + 0.206W_{t-1} + 0.00002Y_{t-2} + 0.197p_{t-2} + 0.171p_{t-3} \quad (B1)$$

(0.396) (0.070) (0.00001) (0.092) (0.089)

$$\bar{R}^2 = 0.32$$

where p^e = expected change in the GDP deflator at time t for the period t+1
 p = actual change in the GDP deflator
 Y = Gross Domestic Product
 W = actual change in average weekly earnings,

Figures in parentheses are standard errors.

A similar equation was used to estimate the expected change in the Consumer Price Index (CPI). The final forecasting equation for the expected change in the CPI is:

$$p^e_t = -0.639 + 0.143W_t + 0.154W_{t-1} + 0.00002Y_t + 0.217p_{t-2}$$

(0.291) (0.048) (0.050) (0.000008) (0.088)

$$+ 0.221p_{t-3} \quad (B2)$$

(0.084)

$$\bar{R}^2 = 0.59$$

The variables have the same meaning as in equation (B1) except that the price terms refer to the CPI rather than to the GDP deflator.

The final forecasting equation for the expected change in the US GNP deflator is:

$$p_t^e = 0.206 + 0.437p_{t-1} + 0.199p_{t-2} + 0.207p_{t-3} \quad (B3)$$

(0.092) (0.093) (0.100) (0.092)

$$\bar{R}^2 = 0.59$$

Again the variables have the same meaning as in equation (B1) except that the price terms refer to the US GNP deflator.

APPENDIX C: Data Sources

Average Weekly Earnings - Average weekly earnings, all persons, Average Weekly Earnings, States and Australia, December 1989, A.B.S. Catalogue No. 6302.0, Table 1.

Company Tax - Taxes on income, enterprises, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 27. Figures prior to 1972-73 are obtained from the Annual Reports of the Commissioner of Taxation and various issues of the Budget Papers.

Consumer Price Index - Consumer Price Index, Australia, December Quarter 1989, A.B.S. Catalogue No. 6401.0, Table 1.

Consumption - Private final consumption expenditure on goods and services, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5602.0, Table 5.

Current Account - Balance of Payments, Australia, December Quarter 1989, A.B.S. Catalogue No. 5302.0, Table 1.

Exchange Rate - End-Period Units of foreign currency per Australian dollar, Balance of Payments, Australia, December Quarter 1989, A.B.S. Catalogue No. 5302.0, Table 21.

Government Expenditure - Total public sector final consumption spending and gross fixed capital expenditure plus the increase in public sector stocks, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Government Consumption - Total public sector consumption expenditure on goods and services, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Government Investment - Total public sector gross fixed capital expenditure, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Government Outlays - Total public sector final consumption spending and gross fixed capital expenditure, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.1, Table 12.

Gross Domestic Product - Expenditure on Gross Domestic Product, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Gross Domestic Product Implicit Price Deflator - Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 9.

Increase in Provisions - Total public sector increase in provisions, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.0, Table 12.

Interest Outlays - Total public sector required current interest payments, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue no. 5501.0, Table 12.

Interest Rate - Interest rate on 90-Day Bank Accepted Bills, RBA Bulletin database.

Investment - Total final private gross fixed capital expenditure plus the increase in private stocks, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0. Table 5.

Marginal tax rates - Rates of income tax are calculated from the general rates of tax levied on individuals. Rates are adjusted for the effects of various levies, rebates, property income surcharges, and tax thresholds imposed under various Taxation Acts. Tax statistics are taken from 'Income Tax Statistics', the Income Tax Statistics Supplement to the Budget Papers and the Annual Report of the Commissioner of Taxation (various issues).

Net Exports - Exports of goods and services less imports of goods and services; Australian National Accounts, Australia, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Net PSBR - Total public sector net financing requirement, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.0, Table 12.

Other Government Outlays - Total public sector outlays less total public sector final consumption spending and gross fixed capital expenditure and total public sector required current interest payments, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.0, Table 12.

Other Revenue - Total public sector revenue less total public sector taxes, fees and fines; Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.0, Table 12.

Payroll Tax - Payroll taxes, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 27. Figures prior to 1972-73 are obtained from the Annual Reports of the Commissioner of Taxation and various issues of the Budget Papers.

Real Gross Domestic Product - Expenditure on Gross Domestic Product at average 1984-85 prices, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 8.

Statistical Discrepancy - Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 5.

Tax Revenue - Total public sector taxes, fees and fines, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue no. 5501.0, Table 12.

Taxation - Total taxes, Australian National Accounts, December Quarter 1989, A.B.S. Catalogue No. 5206.0, Table 27. Figures prior to 1972-73 are adjusted to include Company Tax and Payroll tax and are obtained from the Annual Reports of the Commissioner of Taxation and various issues of the Budget Papers.

Total Revenue - Total public sector revenue, Government Financial Estimates, Australia, 1989-90, A.B.S. Catalogue No. 5501.0, Table 12.

U.S. Interest Rate - Interest rate on 90-Day Bank Bills, Citibase database.

United States GNP Implicit Price Deflator - OECD Database.

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