CHANGES IN THE CHARACTERISTICS OF THE AUSTRALIAN BUSINESS CYCLE: SOME LESSONS FOR MONETARY POLICY FROM THE 1980s AND EARLY 1990s

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Research Discussion Paper
9212

December 1992

Economic Research Department

Reserve Bank of Australia

Research assistance from Alison Tarditi, Alexandra Heath and Chris Kent is gratefully acknowledged. The opinions expressed are those of the authors, and not necessarily those of the Reserve Bank of Australia.

ABSTRACT

This paper examines the causes of asset price inflation and deflation in the Australian economy, their links with borrowing and recent problems that have arisen for banks' balance sheets. Implications for the business cycle and monetary policy are drawn out in some detail. The difficulties encountered are attributed partly to the once-for-all transition from regulated to deregulated financial markets, and it is argued that it would be wrong to extrapolate recent developments into the future . It is suggested that arguments to make asset price inflation an explicit objective of monetary policy are not helpful. The paper goes to point out some encouraging new trends in Australia's linkages with the rest of the world. Export performance has been greatly enhanced by longer-term reforms and exchange rate depreciation during the 1980s.

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1. INTRODUCTION

Since the early 1980s, business cycle dynamics and the transmission mechanisms of monetary policy have been subject to important changes in Australia. To a large extent, these changes derive from the deregulation of financial markets. But the floating of the Australian dollar, and the increased integration of the Australian economy in world trade generally, and in the Asian region in particular, have also played an important role.

During the late 1970s and the first half of the 1980s a number of OECD countries liberalised their financial markets. In Australia's case this was carried out over a relatively short period of time in the early 1980s. Such changes should reduce the vulnerability of economies to business cycles. This is because financial regulations impose liquidity constraints on the behaviour of the private sector, making it more vulnerable to transitory shocks to the real economy, often considered to be the main source of cyclical fluctuations in business activity. In Australia's case, fluctuations in the terms of trade, government outlays, taxes, world demand, and rural sector output (due to weather conditions), would impact on current income. In the presence of regulations which inhibit the capital markets, the private sector's current spending would be strongly affected, thereby amplifying the disturbance. As financial markets are liberalised, expenditure is more easily smoothed by borrowing and lending. Views about expected future income and wealth, given relative financial prices, should be more important determinants of current spending than income or cash flow in the current period.

At first glance, Australia's experience in the second half of the 1980s and the early 1990s gives few grounds for confidence about this view of the working of free financial markets. Financial liberalisation did not appear to be associated with a reduction in the frequency or amplitude of the business

cycle. Only the broad characteristics of the cycle seemed to change. Thus, the sharp upswing in economic activity and investment in the late 1980s had three unusual features:

(i) strong asset price inflation;
(ii) rapid growth in corporate borrowing from financial intermediaries; and
(iii) the absence of any upsurge in goods price inflation, despite the strength of demand.

Subsequently, the asset price inflation was reversed, creating severe problems for financial intermediaries that provided the flood of credit in the 1980s. Credit growth slowed, and then became negative. The economy experienced a relatively deep recession, and an unusually slow recovery from it in the early 1990s, during which time inflation fell to historically low levels.

These broad patterns were not unique to Australia. Indeed, the United States, Japan, the United Kingdom, Canada and some of the Scandinavian countries have all experienced strikingly similar developments. All had relatively strong real growth, asset price inflation and increased gearing in the second half of the 1980s, while asset price deflation and high outstanding levels of debt appear to be major factors inhibiting recovery during the 1990s. These countries had in common important moves to liberalise their financial systems during the late 1970s and 1980s.

The reduced constraints on the behaviour of financial intermediaries and the increased role of asset prices, therefore, seem to be important for understanding the changed characteristics of the business cycle in recent years. There is a need to review this experience with a view to identifying major influences on asset prices and borrowing, and to draw lessons for the future conduct of monetary policy. Of particular interest is the question of whether the difficulties in recent years are endemic to free markets, and might be expected to continue. Alternatively, were the problems more period-specific, resulting from the release in pent-up demand during the transition from regulated to deregulated financial markets?

Historically, the terms of trade has been a major source of cyclical fluctuations in the Australian economy. As a mainly commodity-exporting country, the world commodity price cycle dominates large movements in Australia's terms of trade. Prior to the floating of the Australian dollar ($A) in December 1983, income effects generated by these fluctuations contributed to major inflationary and deflationary episodes. In theory, the floating of the $A should have greatly reduced this source of business cycle disturbance, acting as a shock absorber in the face of such real shocks. A rise in the terms of trade, for example, increases real incomes, generating excess demand for non-traded goods. The exchange rate appreciates, causing substitution in demand towards imports, thereby offsetting the inflationary pressure.

In this way the floating $A should greatly facilitate the role of monetary policy in achieving a low-inflation outcome. Sometimes, however, the "cost" of this is severe movements in competitiveness of the Australian traded-goods sector. When the exchange rate appreciates in response to a strong rise in world commodity prices, the commodity sector is less affected because it benefits from strong demand and prices for its products. But the loss of competitiveness may be much more damaging for the manufacturing and services sectors. Thus, it has been argued, while floating helps to contain the terms of trade as a source of inflation cycles, it is likely to inhibit the development of non-commodity exports. Such diversification might be important from the perspective of longer-run growth and welfare. Furthermore, exchange rate movements have a direct impact on prices, and may themselves lead to wage-price interactions. There is, then, a need for some assessment of Australia's experience with floating exchange rates in the conduct of monetary policy.

Section 2 examines Australia's experience with asset price inflation and borrowing during the most recent cycle in economic activity and inflation. The role of the exchange rate in changing business cycle and inflation dynamics is reviewed in Section 3. Finally, some concluding remarks are offered in Section 4.

2. ASSET PRICE INFLATION, BORROWING AND THE BUSINESS CYCLE

(a) Developments Following Financial Deregulation

During the early 1980s, the more-or-less complete deregulation of the Australian financial system proceeded very rapidly. The most important regulatory changes were:

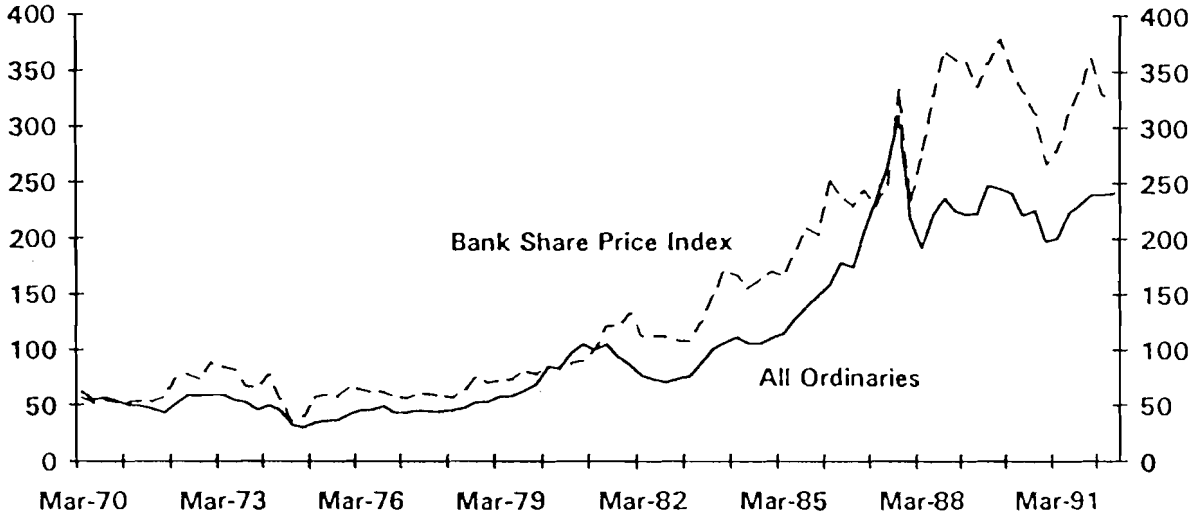
- the lifting of interest ceilings in 1980 (except for owner-occupied housing);
- credit directives ceasing by the end of 1981;
- the introduction of a tender system for all government securities by 1982, which permitted the separation of monetary and debt management;
- the floating of the $A and removal of all exchange controls by December 1983; and
- the domestic banking system being opened to competition from foreign banks by 1985.

In addition, there were important innovations in the financial system, as assets with characteristics similar to money began to multiply. Cash management trusts emerged, for example, and were instrumental in forcing banks to offer competitive market-related interest rates on deposits.

These changes greatly enhanced the market's perception of the future profitability of banks. Figure 2.1 shows bank share prices and the All Ordinaries index. Bank share prices rose even more quickly than the market average from early 1984, greatly enhancing banks' ability to finance new lending. Moreover, credit could be allocated according to the price mechanism, rather than by quantity rationing (with banks choosing the least risky amongst queues of borrowers). Banks became "liability managers", first deciding how much to lend, and then using their control over deposit rates to attract the funds. These developments improved longer-run growth possibilities from the supply side of the financial system.

Figure 2.1

Bank Share Price and All Ordinaries Index



But business expectations also became more buoyant from the mid 1980s, greatly enhancing the demand for loans:

- the recovery from the 1983 recession was rapid, and profits rose in the cyclical upswing;

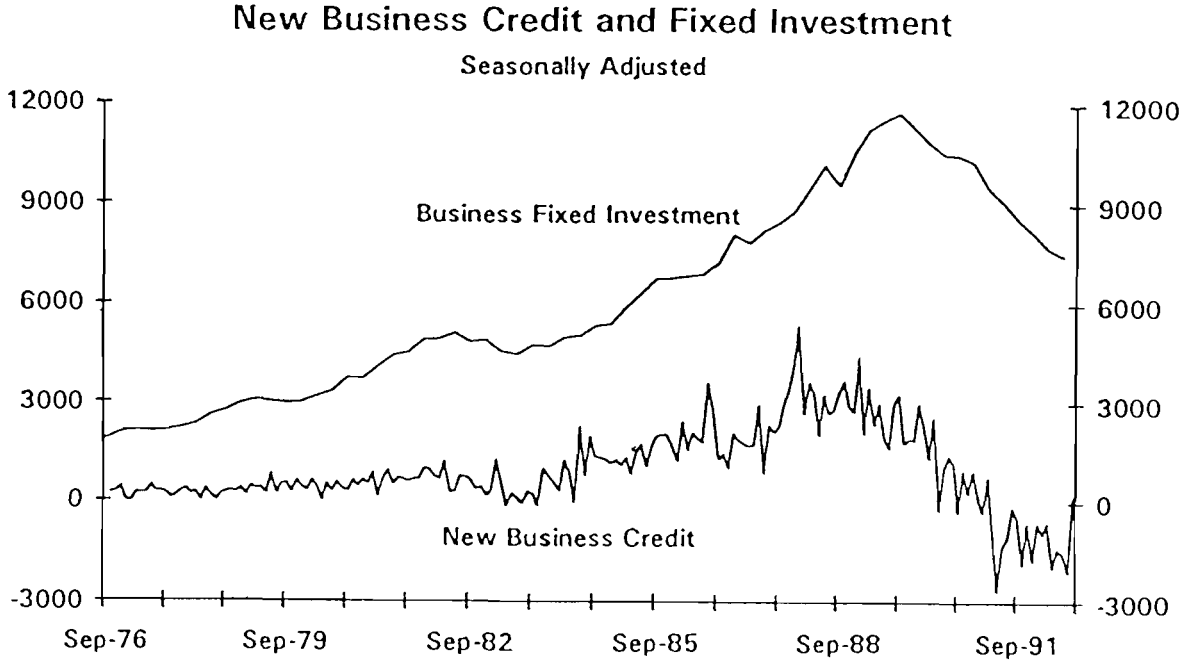
- the new Labor Government implemented a "Prices and Incomes Accord" with the union movement, which effectively reduced real wages and increased the profit share of GDP;

- in the early stage of the recovery fiscal policy was initially expansionary, but by 1985 the government implemented a longer-run program of fiscal consolidation to reduce the constraints on growth imposed by the balance of payments situation; and

- as the 1980s proceeded, the government embarked upon a broad program of other micro-economic reforms. Tax reforms, including the introduction of dividend imputation in 1987, were of particular importance.

Economic growth and investment accelerated rapidly from the end of 1983, and while being checked by tighter monetary policy in 1985 and 1986, accelerated again as the world economy picked up momentum in the second half of the 1980s. New investment was particularly strong at this time, with business credit provided by financial intermediaries playing an important role in financing it, as shown in Figure 2.2.

Figure 2.2



Improved growth expectations certainly appear to have been reflected in the behaviour of asset prices. Figure 2.3 shows equity prices, commercial property prices and house prices in the first panel, and aggregate asset prices in the second.[1] Equity prices began to rise sharply relative to the consumer prices from 1984. While Australian share prices fell with the world-wide market break in October 1987, the price of equities remained relatively high (compared with a basket of consumer goods). Moreover, the other components of wealth began to inflate more rapidly in the late 1980s. Commercial property prices rose sharply from mid 1987, peaking in 1989. At this time there was sustantial investment in hotels, shopping centres and offices. Residential house prices rose on a sustained basis from the middle of 1987.

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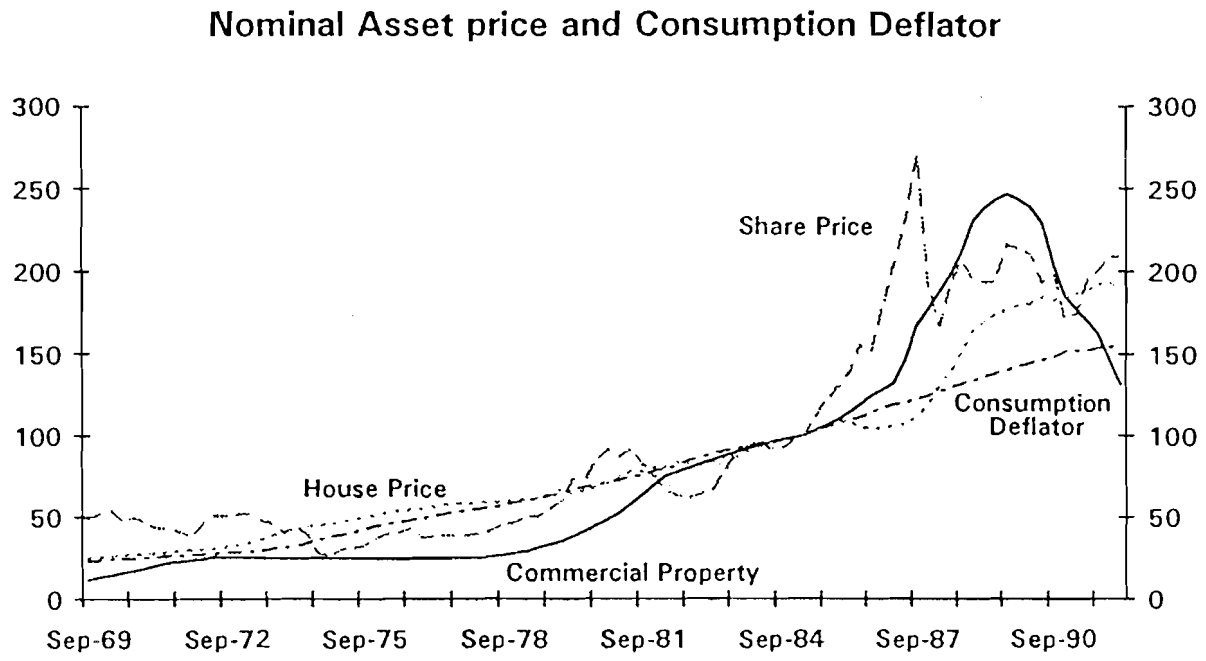
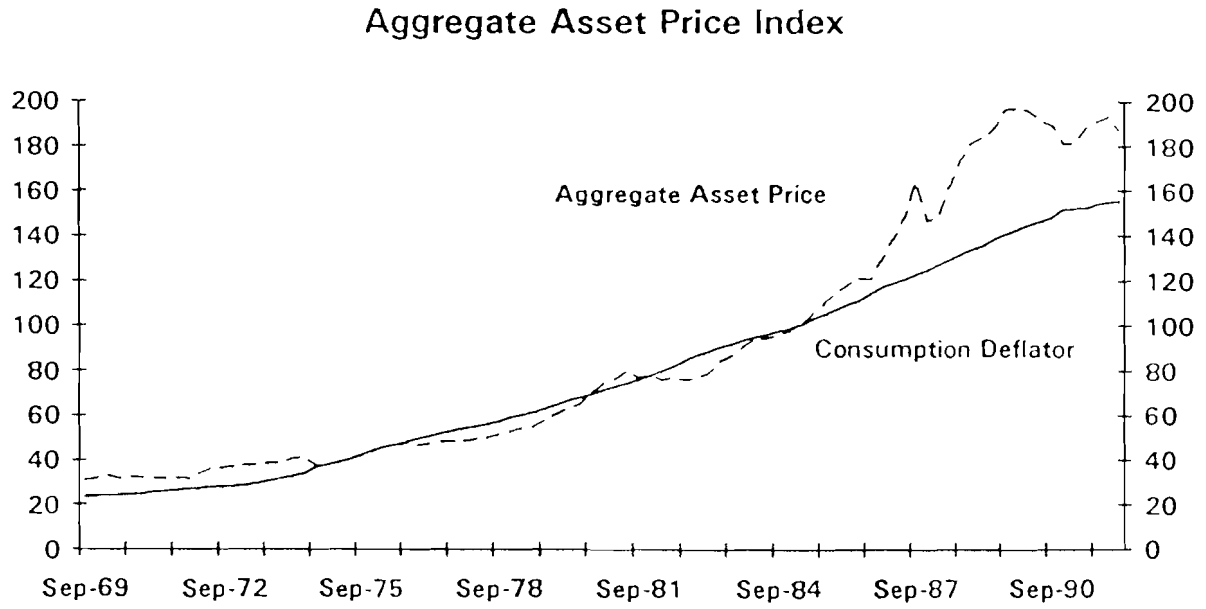
[1] Weighted by the average components of wealth derived in Callen (1991).

Figure 2.3


Nominal Asset price and Consumption Deflator
300
250
200
150
100
50
0
Share Price
Consumption Deflator
House Price
Commercial Property
Sep-69
Sep-72
Sep-75
Sep-78
Sep-81
Sep-84
Sep-87
Sep-90


Aggregate Asset Price Index
200
180
160
140
120
100
80
60
40
20
0
Aggregate Asset Price
Consumption Deflator
Sep-69
Sep-72
Sep-75
Sep-78
Sep-81
Sep-84
Sep-87
Sep-90

While fundamentals certainly were a factor in the initial rise in asset prices, it is also possible that speculative dynamics were important in continuing the process. Recent research has stressed the importance of positive feedback in asset price behaviour - a rising market leads to further price increases, and vice versa. Positive feedback effects from rising asset prices in the domestic economy, or through international spillover effects, can push asset prices beyond levels justified by fundamentals. Such increases risk excessive growth in nominal wealth, and hence demand, with adverse consequences for inflation.

There are reasons to believe that the same factors which influence the behaviour of asset prices also affect borrowing from financial intermediaries in liberalised financial markets. On the demand side, borrowing is likely to be driven by expectations about the future profitability of investment, which is also reflected in the market valuation of current assets. Similarly, the demand for loans may be driven by speculative activity in circumstances of asset price inflation, as economic agents position themselves to take advantage of capital gains. On the supply side, recent theories about the behaviour of financial intermediaries emphasise the importance of non-diversifiable market risk, related to the cycle in economic activity, and the role of asset values in providing collateral for loans.[2] Most loan defaults occur in economic downturns, while asset values and levels of collateral are relatively low. In these circumstances, banks tend to be relatively less willing to lend. When the outlook for activity improves, on the other hand, perceived credit risks decline and collateral improves as asset prices begin to rise. Banks and other financial institutions become more willing to lend.

Figure 2.4 distinguishes between business and housing credit: the growth rate of business credit is shown in the top panel with both equity and commercial property price inflation, while housing credit is displayed with house price inflation in the middle panel. Growth rates of credit extended by all financial institutions (AFI credit) and aggregate asset prices are displayed in the third panel of Figure 2.4. Asset prices are more volatile than credit. Nevertheless, broad swings in the components of the asset price index, and the aggregate index itself, tend to lead the respective credit variables.

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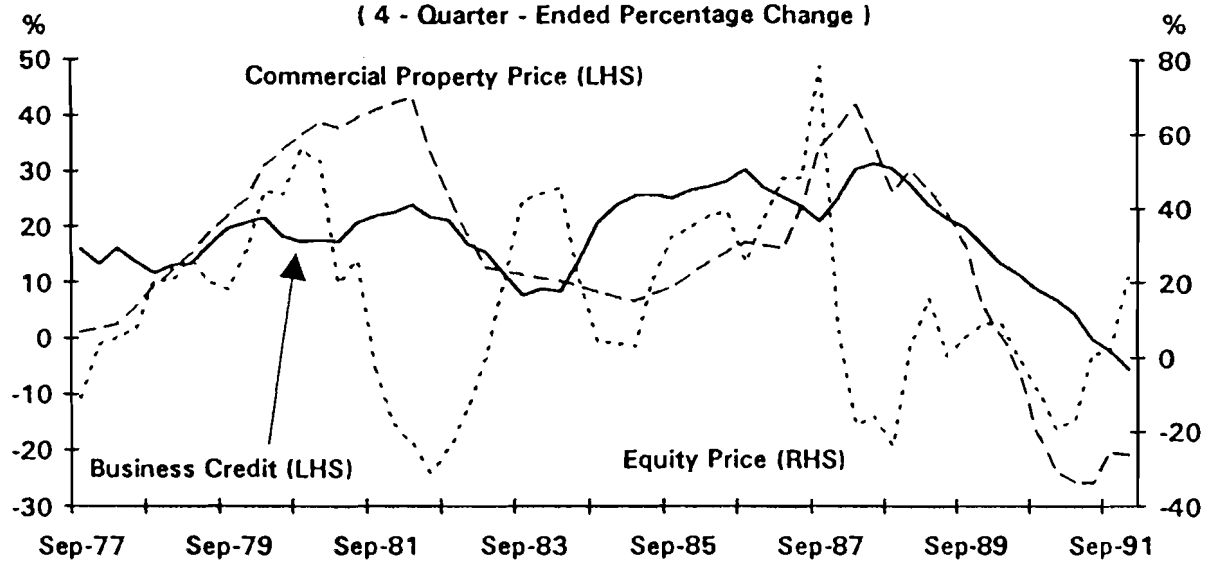
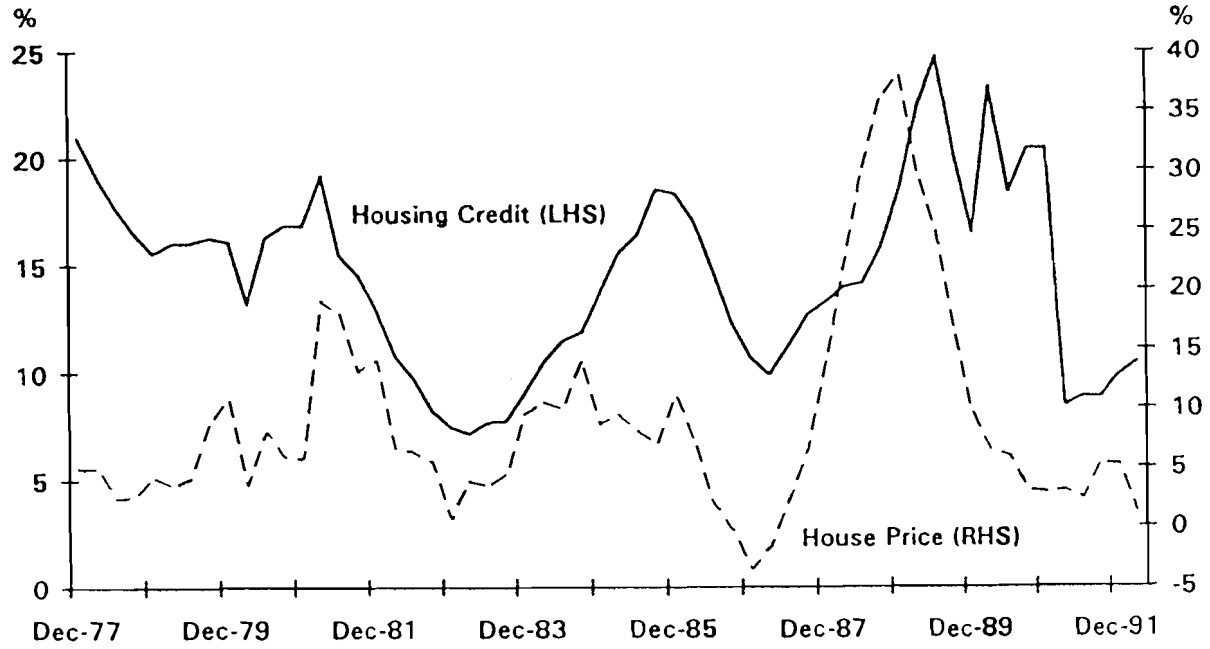
2 These are discussed in Blundell-Wignall and Gizycki (1992). See in particular Bernanke and Gertler (1989) and Greenwald and Stiglitz (1990).

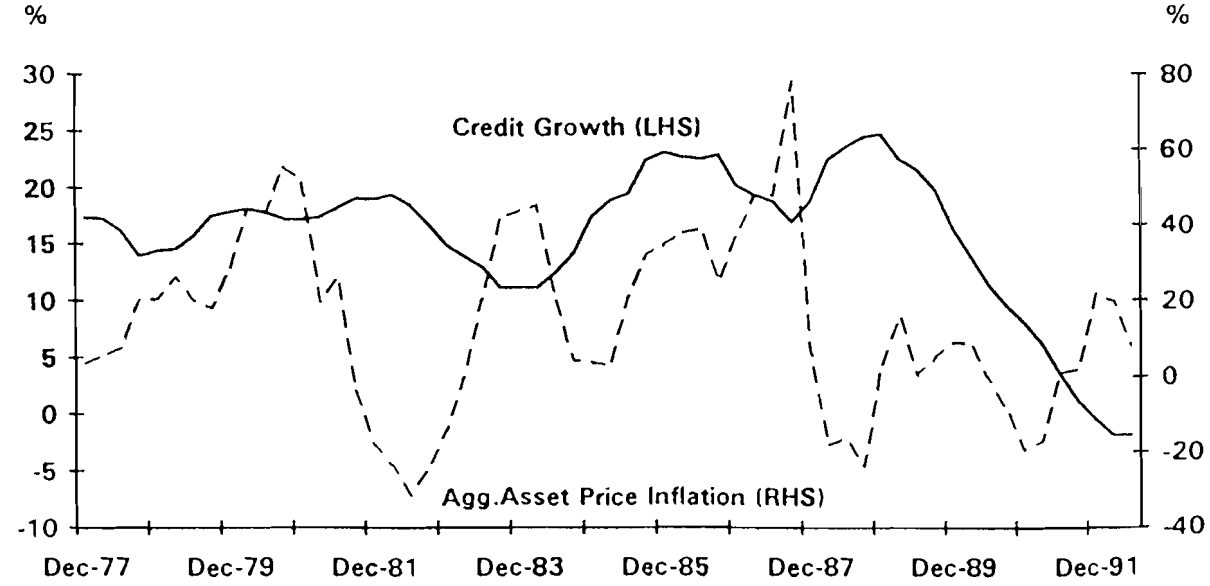
Figure 2.4

Asset Price Inflation and Credit Growth

(4 - Quarter - Ended Percentage Change)







Following financial liberalisation in the first half of the 1980s, both asset price inflation and credit growth rose to historically very high levels. Since business credit constitutes about 65 per cent of total credit in Australia, most of this sharp rise is explained by corporate borrowing. Subsequently, asset price inflation declined sharply.

To the extent credit was extended on the basis of asset prices that were not based on fundamentals, but had become overvalued because of speculative dynamics, it is not difficult to see how financial fragility problems might have emerged. Outstanding levels of debt would prove to be too large, and a period of balance sheet restructuring and more cautious lending attitudes might follow. Figure 2.4 shows that the recent decline in asset prices precedes the marked slowing in credit growth.

(b) Determinants of Asset Prices

Asset prices are conditioned by expectations about the future and, being determined in auction markets, may jump quickly to new levels. In theory, asset prices are determined as the present discounted value of expected future returns. That is, they depend on expectations about future nominal returns, and a rate of time discount.

Within this framework there are three broad channels through which asset prices are affected:

(i) economic fundamentals;
(ii) monetary policy; and
(iii) speculative dynamics that drive asset prices temporarily away from fundamentals.

Economic fundamentals may shift because of changes in such factors as financial regulations, technology, productivity, the profit share (influenced partly by incomes policy), taxation arrangements, fiscal policy and world economic activity. A number of these factors, which may have contributed to pushing up asset prices in Australia during the second half of the 1980s, were mentioned in Section 2(a). Such asset price movements should be thought of as permanent relative price shifts, reflecting anticipated changes in real income and wealth.

The impact of monetary policy on asset prices is not completely separate from the first channel, since it influences expectations about future activity and inflation. At the same time, though, it impacts on the rate at which future expected returns are discounted. This is important, if monetary policy is to counter excessive pressures on goods prices arising from other factors driving the business cycle. However, it also means that monetary policy errors may be transmitted to the economy through wealth effects. Thus excessively easy monetary policy may give rise to asset price inflation in the first instance, and hence rising nominal (and real) wealth, and goods price inflation later on.

The third potential influence on asset prices concerns market inefficiencies, which give rise to positive feedback effects, and "bubble-like" movements in asset prices unrelated to economic fundamentals. Cutler, Poterba and Summers (1990) examined a wide range of asset prices from thirteen different countries, and found such effects to be so pervasive that they were likely to be inherent features of the speculative process. Over short horizons, all asset prices appear to be driven by their recent past behaviour, reverting to fundamentals only in the longer run. Such short-term asset price movements also influence nominal wealth, and facilitate borrowing and spending, with possible implications for the business cycle and inflation.

It is relatively straightforward to formalise these relationships. For example, if q represents share prices, then the return on holding shares is the expected rate of change of the price of those shares, plus the expected dividend return. Arbitrage between bonds and shares therefore implies:

$$\dot{q}^e/q + \pi/q = i \qquad (2.1)$$

where i is the return on bonds, π is expected profits, and an "e" superscript denotes expectations. Since in the steady state the expected change in asset prices is zero (or perhaps some constant), a long-run equilibrium relationship is implied between share prices, profits and the return on bonds:

$$q = \pi/i \qquad (2.2)$$

Similar propositions apply to other asset prices. Thus commercial property prices depend on the expected changes in property values, commercial rental

returns and the interest rate. Residential property prices depend on expected appreciation of house prices, rental returns and the interest rate.

The rest of this section examines empirical evidence on the nature of asset price determination in the Australian economy. The main interest is to see whether there is evidence of speculative dynamics in the short run, with reversion to fundamentals in the long run. Table 2.1 presents cointegration tests (using the Johansen procedure) based on the long-run relationship expressed in equation (2.2) in its first two panels. Results for the All Ordinaries share price index are shown first. This asks whether there is a long-run relationship between share prices, profits (proxied by the total gross operating surplus in the economy available for dividend, interest and rental income) and the two-year bond rate. Results for the aggregate asset price index are shown in the second panel, using the same explanatory variables. In neither case was it possible to identify a cointegrating relationship.

The Johansen procedure, unlike other approaches to cointegration, estimates both the long-run relationship and the short-run dynamics of the model as a system.[3] However, if the short-run dynamics of asset price determination are strongly influenced by other factors, it may be difficult to identify the underlying equilibrium relationship. In terms of equation (2.1), the expected rate of change of asset prices in the short run may be important, and related to variables that play no role in equilibrium in the longer run. If this were so, the inclusion of rates of change of these other variables, thought to have influenced expectations in the short-run, might improve the power of the cointegration tests.

One important possibility here is that extreme movements in foreign asset prices may have had international spillover effects on speculation in Australian assets. The bubble-like upward movement in international equity prices in 1987, followed by the world-wide market break in October 1987, is a potentially important case in point. Figure 2.3 shows a similarly sharp upward movement in Australian equity prices in 1987, and subsequent

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3 See Johansen (1988) and Johansen and Juselius (1990). The main advantage of such system estimation is that it facilitates the identification of the number of cointegrating relationships characterising the set of variables.

Table 2.1: Asset Price Determination
(Cointegration Tests)

	Long-run Coefficient	Short-run Coefficient	Max λ Cointegration Test		Trace Cointegration Test	
			(Sample Period: 1969Q3 - 1992Q1)			
Share Price			Ho:r=2	3.78	Ho:r≤2	3.78
GOS	0.61		Ho:r=1	5.91	Ho:r≤1	9.69
2-year Bond Rate	0.05		Ho:r=0	6.38	Ho:r≤0	16.07
Agg. Asset Price			Ho:r=2	4.21	Ho:r≤2	4.21
GOS	0.54		Ho:r=1	5.53	Ho:r≤1	9.75
2-year Bond Rate	-0.07		Ho:r=0	8.91	Ho:r≤0	18.65
Share Price			Ho:r=3	3.22	Ho:r≤3	3.22
GOS	0.97		Ho:r=2	6.12	Ho:r≤2	9.34
2-year Bond Rate	-0.10		Ho:r=1	6.88	Ho:r≤1	16.23
% Change Dow Jones	16.26		Ho:r=0	32.58***	Ho:r≤0	48.81**
% Change Share Price (t-2)		0.27**				
Agg. Asset Price			Ho:r=3	3.96	Ho:r≤3	3.96
GOS	0.92		Ho:r=2	6.11	Ho:r≤2	10.08
2-year Bond Rate	-0.09		Ho:r=1	7.25	Ho:r≤1	17.32
% Change Dow Jones	19.17		Ho:r=0	32.66***	Ho:r≤0	49.99**
% Change Asset Price (t-2)		0.22**				

Note: The Johansen procedure is used to test for cointegration between the log of the respective asset price index, the log of the gross operating surplus (GOS), and the two-year bond rate. The per cent change of the Dow Jones Index is then added to the cointegrating system. Four lags are used. Three asterisks denotes rejection of the null hypothesis shown at the one per cent level, two asterisks at the five per cent level, and one asterisk at the ten per cent level.

reversal. It was this pattern which caused the first of the two extreme peaks in the aggregate asset price index during the late 1980s.

Such international spillover effects should play no role in determining longer-run equilibrium asset values for the Australian economy. Yet their importance in the short-run may make it difficult to identify the "fundamental" factors determining asset prices in the longer run. To test this proposition, the rate of change of the Dow Jones stock price index for the United States was included in the above systems. The results for the All Ordinaries and aggregate asset price index are reported in the third and fourth panels of Table 2.1. In both cases, it proved possible to identify a single cointegrating relationship. Moreover, all of the long-run coefficients had the expected sign. The domestic Gross Operating Surplus in the Australian economy has a strong positive influence on Australian asset prices in the longer run, interest rates have a negative impact, and the rate of change of the Dow Jones index has the expected positive sign. In addition, short-run dynamics of the share price and the aggregate asset price indexes, respectively, are consistent with the presence of positive feedback effects. In both cases, the second lag of the change in asset prices is positively and significantly correlated with their level in the current period.

(c) Credit and Asset Prices

It has long been thought that much of the borrowing in the 1980s in countries such as the United States, Japan, the United Kingdom, Scandinavian countries and Australia was related to the marked rise in asset prices. In Australia, this argument was first advanced by Macfarlane (1989).[4] The sort of model that underlies a lot of thinking about this period is set out in Goodhart (1992). Modifying this model to be consistent with equilibrium prevailing in the long run, loan demand is given by:

$$L^D = f(q, i, L_{-1}), \qquad f'_1 \lesseqgtr 0;\ f'_2, f'_3 < 0 \tag{2.3}$$

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4 In the case of business lending by Australian financial intermediaries, Blundell-Wignall and Gizycki (1992) find that the market value of corporate equity (as collateral) is a key determinant of loan supply, in a model of the demand and supply functions for business loans.

where q is the share price or, alternatively, the aggregate asset price index, i is the loan rate, and L is the outstanding stock of loans. Loan demand may depend positively on the level of asset prices, which summarises expectations about future income and wealth. The sign is ambiguous, however, because it is possible that borrowers may substitute to other forms of finance as asset prices change. For example, if equity prices are very high, there may be substitution towards equity finance. Loan demand depends negatively on the loan rate. Loan supply is given by:

$$L^S = g(q, i, L_{-1}), \qquad g'_1 > 0 \quad g'_2 > 0 \quad g'_3 < 0 \tag{2.4}$$

It depends positively on the actual level of asset prices, which determine wealth and hence collateral available to banks, and positively on the interest rate. Loan supply and demand also depend negatively on the level of outstanding debt in this model.

Setting loan supply equal to loan demand yields a long-run equilibrium relationship between the outstanding level of credit, the level of asset prices, and the interest rate:

$$L = h(q, i), \qquad h' \lesseqgtr 0, \quad h'_2 \lesseqgtr 0 \tag{2.5}$$

As before, short-run dynamics, which may be important for identifying the long-run equilibrium between these variables, are automatically taken into account when the Johansen procedure is used to estimate equation (2.5). This implies estimating the cointegrating relationship between credit, asset prices and the interest rate. While the expected signs are ambiguous, their estimated empirical values will provide some insight into the longer-run relationship between asset prices and credit.

The results are presented in Table 2.2 for the share price index in the first panel, and the aggregate asset price index in the second panel. In both cases, there appears to be a single cointegrating vector, implying a long-run equilibrium relationship between the level of credit, the value of assets and the interest rate. The long-run coefficients are positive for asset prices and negative for the interest rate. The positive asset price coefficient suggests that expected wealth on the demand side, and the value of asset collateral on the supply side, dominate any (negative) substitution effects in demand.

Table 2.2: Asset Prices and Credit (Cointegration Tests)

	Long-run Coefficient	Short-run Coefficient	Max λ Cointegration Test		Trace Cointegration Test	
			(Sample Period: 1976Q1 - 1992Q1)			
AFI Credit			Ho:r=2	4.49	Ho:r≤2	4.49
Share Price Index	1.35		Ho:r=1	12.34	Ho:r≤1	16.84
Loan Rate/100	-1.57		Ho:r=0	23.56**	Ho:r≤0	40.39**
% Change Credit (t-1)		-0.92***				
AFI Credit			Ho:r=2	3.73	Ho:r≤2	3.73
Agg. Asset Price	1.62		Ho:r=1	10.56	Ho:r≤1	14.30
Loan Rate/100	-1.72		Ho:r=0	27.82***	Ho:r≤0	42.12**
% Change Credit (t-1)		-0.92***				

Note: The Johansen procedure is used to test for cointegration between the log of credit, the log of the share or asset price index, and the loan rate. Six lags are used. Three asterisks denotes rejection of the null hypothesis shown at the one per cent level, two asterisks at the five per cent level, and one asterisk at the ten per cent level.

The negative interest rate sign suggests that demand-side factors dominate any (positive) supply-side effects of the level of interest rates.

These results are consistent with the views outlined earlier concerning how financial fragility problems might arise. As asset prices start to rise, loan demand rises for speculative purposes, and loan supply expands because rising nominal wealth provides adequate collateral. However, if asset prices overshoot, because of positive feedback, or international spillover

effects, their reversal will leave outstanding levels of debt that are "too large". In the absence of renewed growth in asset prices, equilibrium can be restored only by winding back the outstanding stock of credit. To the extent that credit is important in financing expenditure, this will have implications for the business cycle.

(d) Some Implications for Monetary Policy

Economic theory suggests that monetary policy in liberalised financial markets influences economic activity and inflation (via the Phillips curve) through wealth and intertemporal substitution effects. Causation is from monetary policy to unobservable expected future income, wealth and spending. Credit does not itself cause economic activity, but it may reflect intertemporal substitution and wealth effects.

The central role of asset prices in leading the business cycle is illustrated in Figure 2.5, which shows the output gap (measured relative to a trend defined by the Hodrick-Prescott filter) and the four-quarter-ended percentage change in the aggregate asset price index. The rate of growth of credit is also shown in the second panel, though here the relationship is more tenuous, with credit leading the upturn in 1988 and the downturn in the early 1990s, but at other times lagging the cycle in real activity. Econometric evidence derived from estimating equation (2.6) over the period 1969 Q3 to 1992 Q1, confirms that aggregate asset prices are a highly significant leading indicator of the output gap:

$$(\ln y - \ln y^*) = \text{const} + \sum_{i=1}^{4} \alpha (\ln y - \ln y^*)_{t-i} + \sum_{i=1}^{4} \beta_i \Delta \ln q_{t-1} \qquad (2.6)$$

$$\text{Ho} : \alpha_1 \ldots\ldots \alpha_4 = 0 \qquad \text{Chi - Square Value } 50.22^{***}$$
$$\text{Ho} : \beta_1 \ldots\ldots \beta_4 = 0 \qquad \text{Chi - Square Value } 10.37^{**}$$

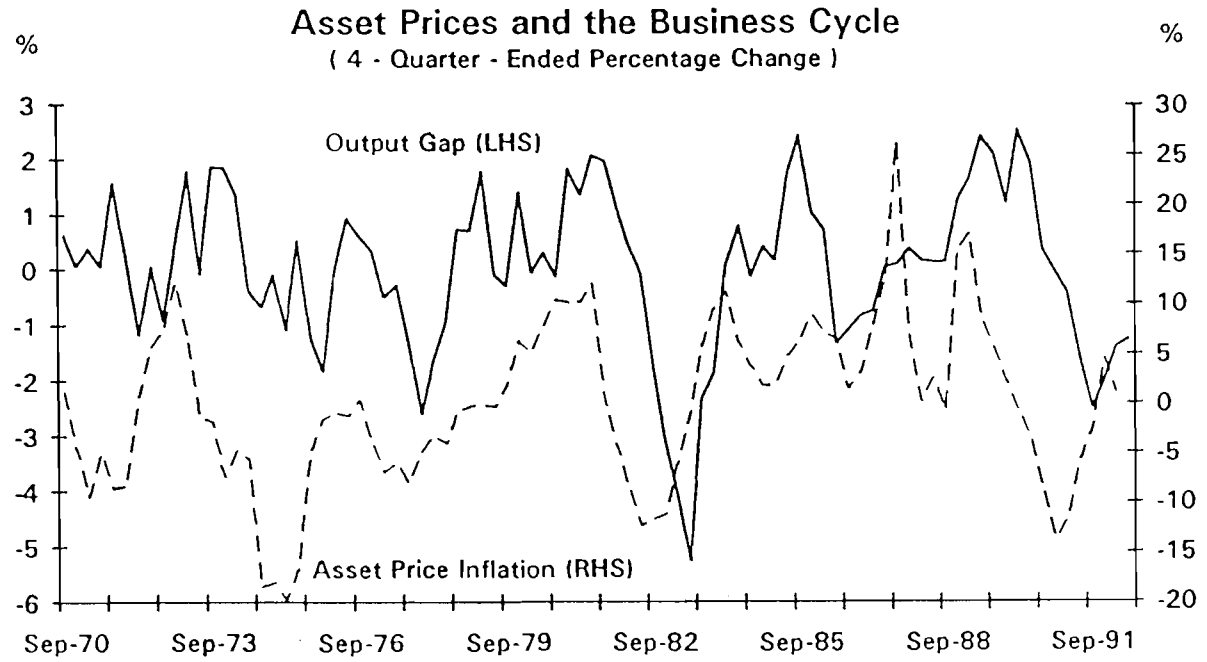
Three asterisks denotes significance at the 1 per cent level and two asterisks at the 5 per cent level.

This linkage between asset prices in the monetary transmission mechanism and the output gap is important, since a principal objective of monetary

policy is to achieve low inflation. Previous research has shown that the output gap has had a significant and stable influence on Australian inflation over sample periods estimated to the late 1980s.[5] This is illustrated in Figure 2.6, which shows the output gap and the four-quarter-ended percentage change in the consumption deflator. Subsequently, this relationship weakened; the late 1980s saw a very strong upswing in economic activity which did not result in increased inflation.

The main explanation of this recent anomaly is the success of the Accord in containing wages growth despite tight labour market conditions. Wage restraint in the face of rising nominal demand implied a continuation of earlier improvements in Gross Operating Surplus (GOS) during the 1980s. Profits rose through 1987 and 1988, while interest rates at first declined (see Figure 2.7). These pressures, however, appear to have spilled over into the asset price inflation that was under way at the time. Consistent with the above empirical findings, the divergent movements of GOS and interest rates contributed to the strength of asset prices in the late 1980s. As nominal wealth rose, so too did collateral available to banks for lending, further fueling asset price inflation.

Figure 2.5



5 See Blundell-Wignall, Lowe and Tarditi (1992).

Figure 2.5 (cont.)

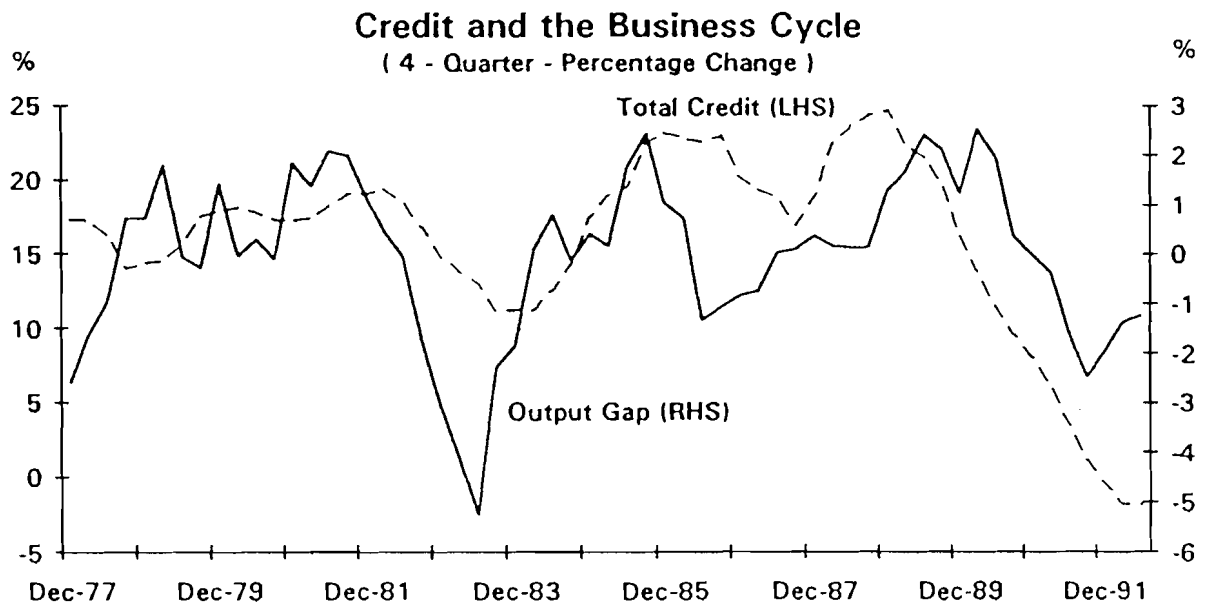


Figure 2.6

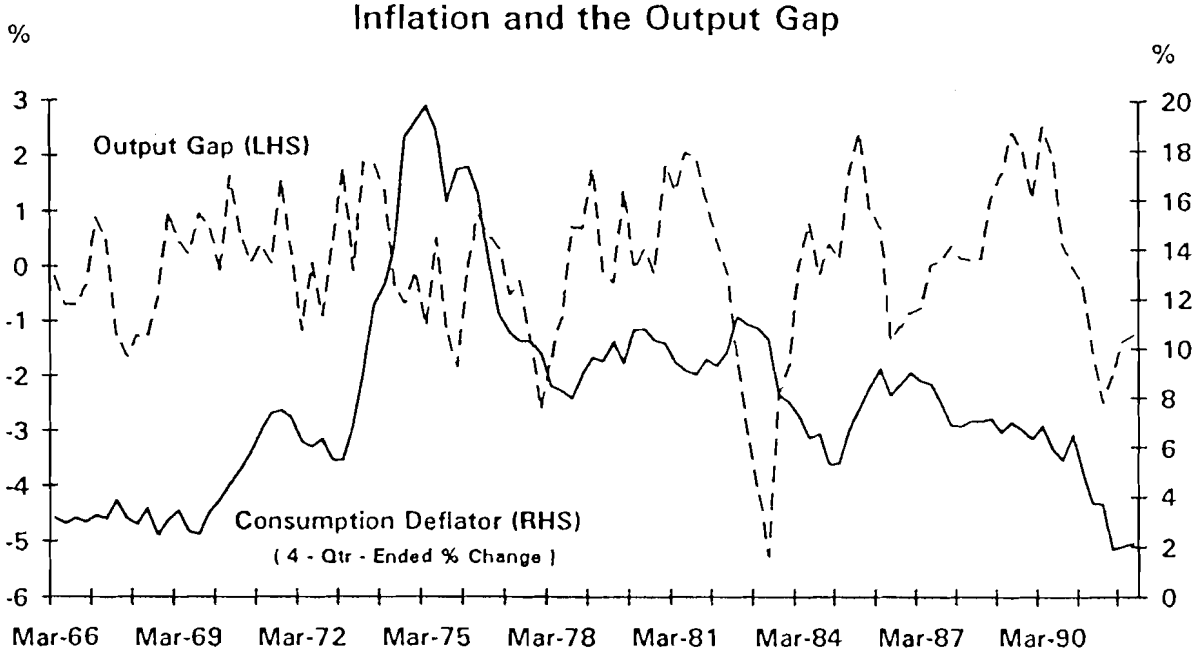
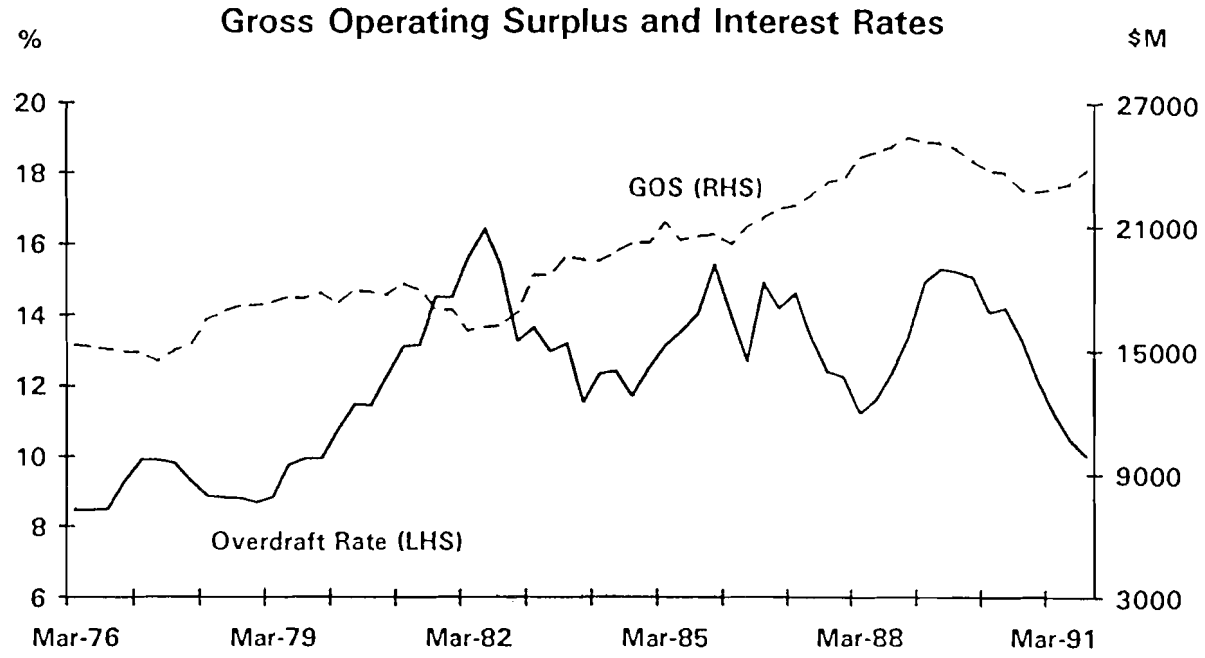


Figure 2.7



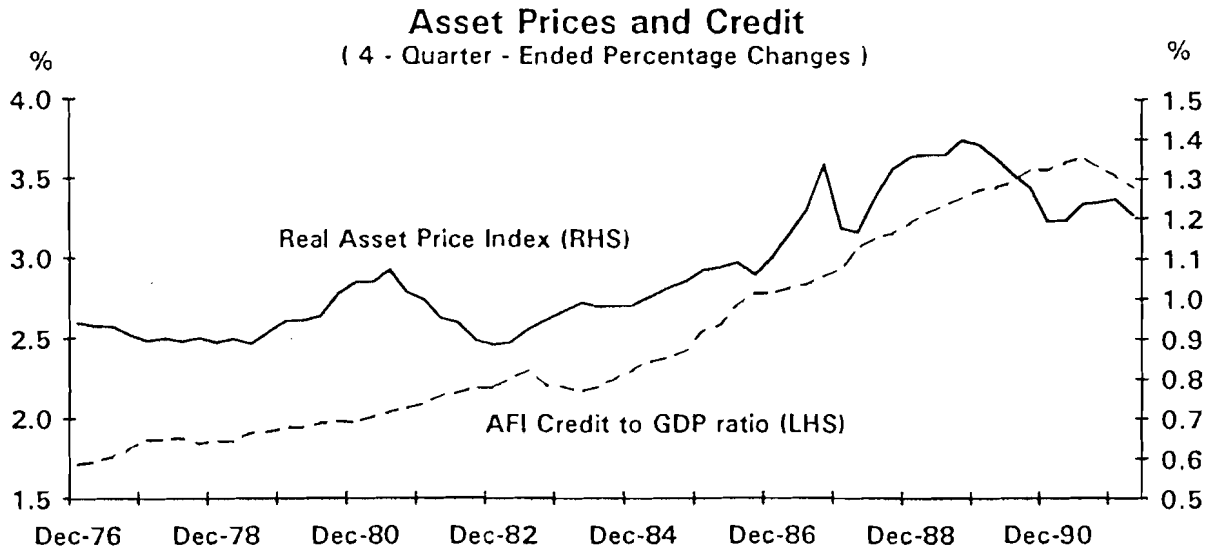
Strong profits, favourable business expectations, rising asset prices and related borrowing contributed to the strength of economic activity during the upswing in the business cycle in the late 1980s. While the Accord could delay the impact of strong economic activity on inflation for a time, it could not be expected to do so indefinitely. If monetary policy had not been tightened in the late 1980s, increased demand pressures would eventually have led to a rise in goods price inflation. Since wealth effects are a key element of the monetary transmission mechanism, any "cooling" of economic activity required the asset price inflation be brought to a halt.

Perhaps the most important lesson of this period, however, is that speculative increases in asset prices and borrowing, once under way, are difficult to reverse in the short run. During such periods, asset prices appear to be less directly responsive to monetary policy, implying the need for higher interest rates than would otherwise be the case. This appears to be due to anticipated capital gains from speculative buying which, if realised, would make even very high nominal interest rates seem of less consequence. Reinforcing this, as Macfarlane (1989) has emphasised, the tax deductability of **nominal** interest payments for businesses encouraged borrowing (rather

than use of equity) to finance asset purchases. These circumstances were somewhat akin to a "knife edge", making it difficult to control the extent to which expectations about the future would decline, once the asset price inflation was reversed.

A second implication of the above analysis is that banks do not appear to have distinguished between collateral values justified by economic "fundamentals", and those inflated by speculation. Corporate borrowing during the late 1980s proved, with hindsight, to be much too large in relation to the underlying value of assets. When asset price inflation was reversed, a period of slowing and then negative credit growth followed. This is illustrated in Figure 2.8, which shows the AFI credit to GDP ratio and the aggregate asset price index as a ratio to the consumption deflator. Both series appear to have changed trend in an upward direction during the 1980s. The decline in asset values at the end of the 1980s leads the decline in the credit to GDP ratio. There can be little doubt that this process is a painful one, with balance sheet restructuring by banks tending to make for cautious lending attitudes.

Figure 2.8



These financial considerations appear to be a major explanation of the slow nature of the recovery at present. While the demand for loans declined in line with business expectations during the recession, the supply curve of loans has also moved inwards. Figure 2.9 shows the prime lending rate in

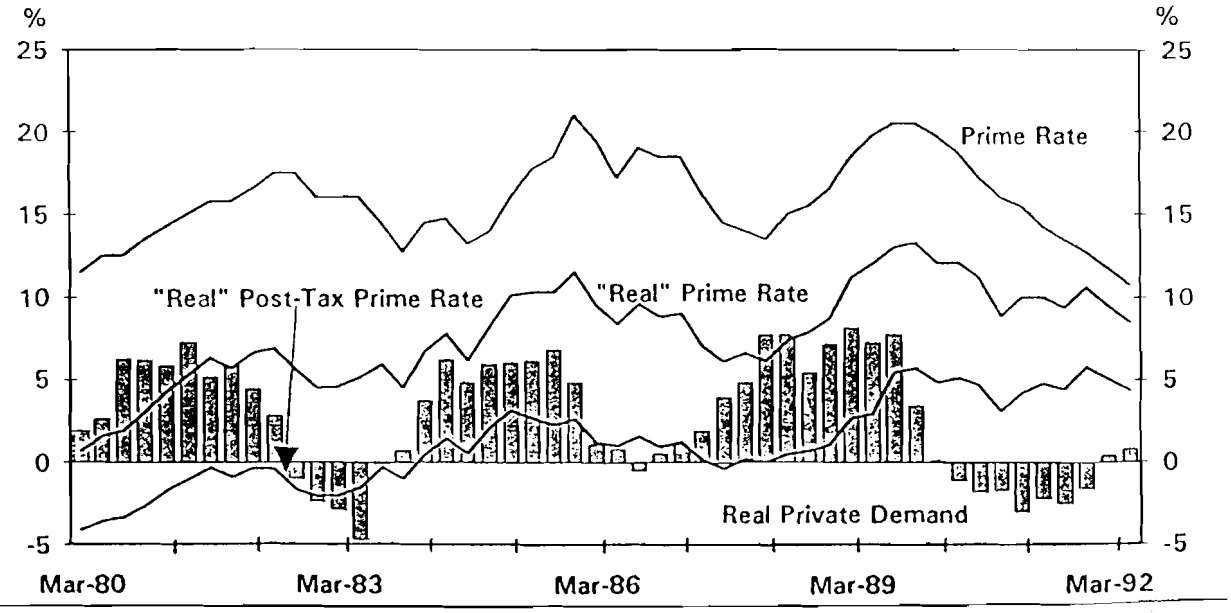
nominal and real terms, as well as the after-tax real prime rate, during the early 1980s and early 1990s recessions. Real lending rates remain high for this stage of the cycle.

However, while there are important lessons to be learned from the experiences of the 1980s, the difficulties implied on the basis of this experience for the conduct of monetary policy in the future can be exaggerated. This is because financial liberalisation of the 1980s was a once-and-for-all major structural change.

The removal of constraints on financial intermediaries released pent-up demand for investments. This contributed to, and was reinforced by, strong growth and rising profits. As expectations about future returns improved, and asset prices rose, financial institutions were prepared to lend more and more. The problems of managing this transition to liberalised financial markets was then complicated by the positive feedback aspects of asset price dynamics, that had not been fully foreseen, and hence excessive borrowing. In these respects, the lack of experience of policy makers and market participants in asset price and borrowing dynamics in liberalised financial systems is likely to have been a contributory factor.[6]

Figure 2.9

Prime Rate and Private Demand



6 It is worth noting that one has to go back to the 1890s and 1920s/30s to find parallel episodes.

The general nature of the difficulties encountered is underlined by the fact that Australia's experience was by no means unique. While the household and corporate sectors were affected to different degrees, most other countries that liberalised their financial markets had broadly similar experiences. Since managing the transition from a regulated to a deregulated financial system is now largely behind them, it is unlikely that these particular shocks will be repeated in these countries.

One lesson that should not be drawn from the experiences of the 1980s and early 1990s is that any asset price inflation is a bad thing. Discussions about whether monetary policy should target asset price inflation directly come very close to this notion.[7] This would be an over-reaction to recent events. Asset prices, it was noted earlier, adjust in response to expectations about future activity and returns, as well as in response to monetary policy and short-run speculative dynamics. Asset price adjustments in response to changing fundamentals represent relative price shifts that have little to do with on-going inflation. In this sense, it is doubtful whether economies will significantly recover from their current relatively weak state, and borrowing resume, until there is some improvement in fundamentals, and hence in the relative price of assets. The task for monetary policy is to permit these relative price adjustments to occur, while avoiding speculative bubbles and excessively easy monetary policy when the upturn reaches a more mature stage.

3. THE EXCHANGE RATE AND THE INTERNATIONAL CYCLE

(a) Transmission of the International Business Cycle

As a small country which relies heavily on commodities for its export income, Australia is particularly vulnerable to external disturbances. In 1991/92, around 65 per cent of Australia's export earnings were from rural or resource-based exports (see Table 3.1). Furthermore, a very large proportion of Australian imports are manufactured goods or services.[8]

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7 This was discussed at the recent international conference on inflation at the Reserve Bank. See Blundell-Wignall (ed.) (1992).

8 The split between commodity-based exports/imports and manufactures is done at a very broad level. For example, many of the commodity-based imports are

Being determined in auction markets, prices for primary commodities fluctuate widely with cycles in world economic activity (see Figure 3.1), much more so than prices of manufactured imports. The Australian economy is therefore subject to substantial terms of trade shocks [9].

Table 3.1: Composition of Australian Exports and Imports*
(percentage of total goods and services)

	Exports	Imports
Commodity based	64.5	15.1
Manufactures	15.0	60.5
Services	20.5	24.4

* See Appendix for definitions of these categories.

A boom in the rest of the world results in sharply higher prices for commodity exports, which increase the terms of trade. This impacts on the domestic economy primarily through income effects. At existing levels of production, prices and exchange rates, excess demand for non-traded goods emerges, putting upward pressure on domestic inflation.

Australia's terms of trade are highly volatile, both in absolute terms and relative to most other industrial countries. For example, there were particularly sharp changes in the terms of trade in 1972-1973 (a rise of about 45 per cent), 1985-1986 (a fall of around 13 per cent) and 1987-1988 (a rise of almost 30 per cent). Over the period 1949 to 1991, the average annual absolute percentage change in the terms of trade was 7.7 per cent; the only

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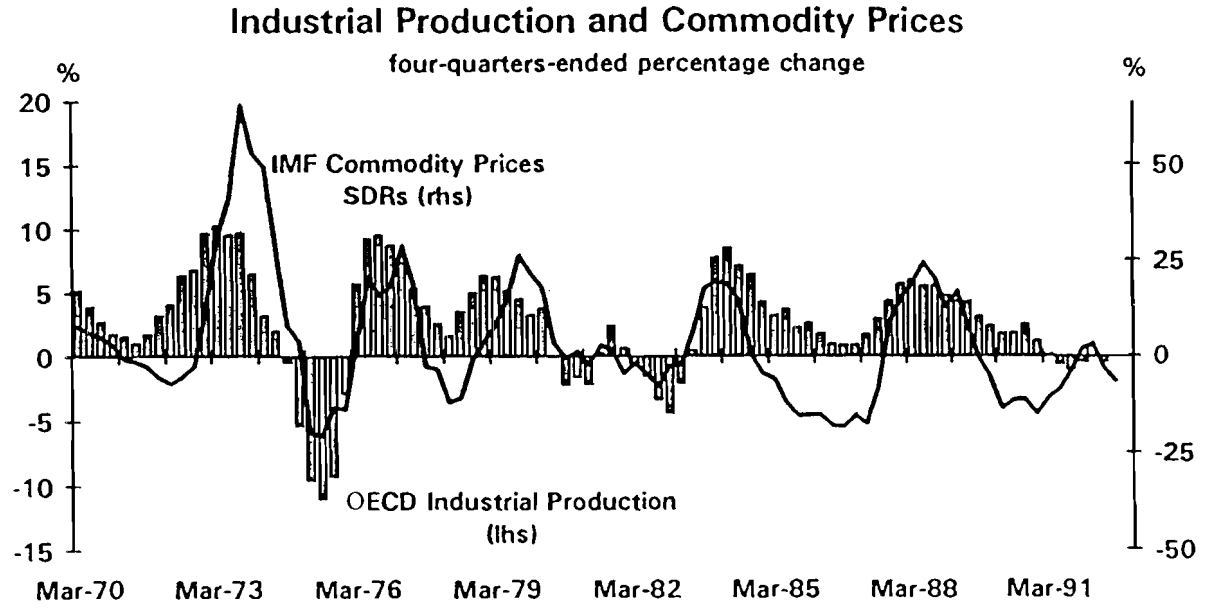
processed food products which could arguably be included in manufactures; if anything, Table 3.1 overstates the importance of commodities in Australian imports.

9 Australia's terms of trade is very highly positively correlated with commodity prices. The correlation coefficient between the quarterly change in the terms of trade and quarterly changes in the RBA commodity price index in SDRs over the period June 1983 to June 1992 is 0.71.

country with a higher level of volatility on this basis was New Zealand. Most European countries and the United States experienced around half this level of volatility (see Appendix).

Figure 3.1



The effect of these swings in the terms of trade on domestic income can be quite substantial. Figure 3.2 shows four-quarter-ended changes in the terms of trade, GDP, and GDP adjusted for the terms of trade (GDP adj).[10] When the terms of trade falls, the adjusted GDP figure is lower than the standard GDP measure. For example, the terms of trade fell by around 13 per cent over 1985 and 1986. This is estimated to have reduced growth in GDP by around $1\frac{1}{2}$ percentage points. Over 1987 and 1988, the terms of trade rose by 27 per cent, which was equivalent to a boost to GDP of a little over 2 per

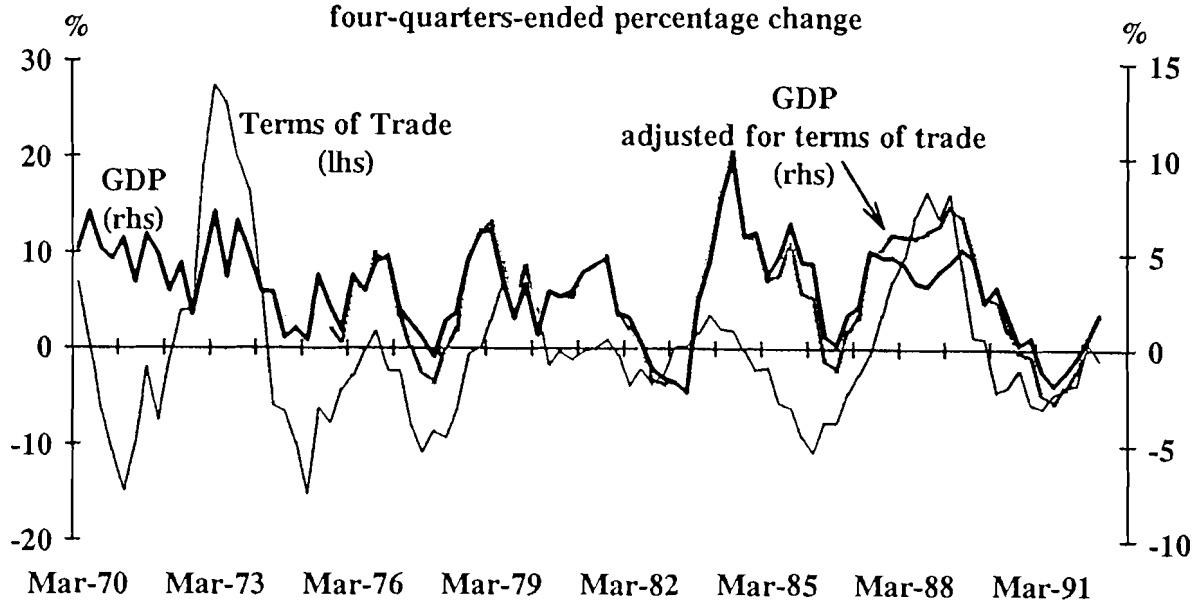
10 This adjustment is made to try to capture the effect of terms of trade changes on domestic purchasing power. It is calculated by revaluing exports of goods and services by the implicit price deflator (IPD) for imports of goods and services to provide an estimate of the purchasing power of exports over imports. This value is then substituted for the actual constant price value of exports of goods and services and GDP calculated in the usual way by summing expenditures. For more details see Australian Bureau of Statistics Cat. No. 5206.0, December 1990 issue.

cent per annum; the subsequent decline in the terms of trade effectively reduced GDP by a bit under 1 per cent per annum.

Figure 3.2

Gross Domestic Product and Terms of Trade

four-quarters-ended percentage change



For a small commodity-exporting country the equilibrium real exchange rate is strongly influenced by the terms of trade.[11] When excess demand for non-traded goods emerges, as the terms of trade rise, real exchange rate appreciation is the mechanism by which equilibrium is restored. The link between the terms of trade and the real exchange rate is shown in Figure 3.3. The decline in the terms of trade through 1985 and 1986, for example, was accompanied by a sharp fall in the real exchange rate (achieved by a depreciation of the nominal exchange rate). When the terms of trade subsequently boomed in 1987 and 1988, the real exchange rate appreciated. The link between the terms of trade and the real exchange rate is well established in empirical research on the Australian economy.[12]

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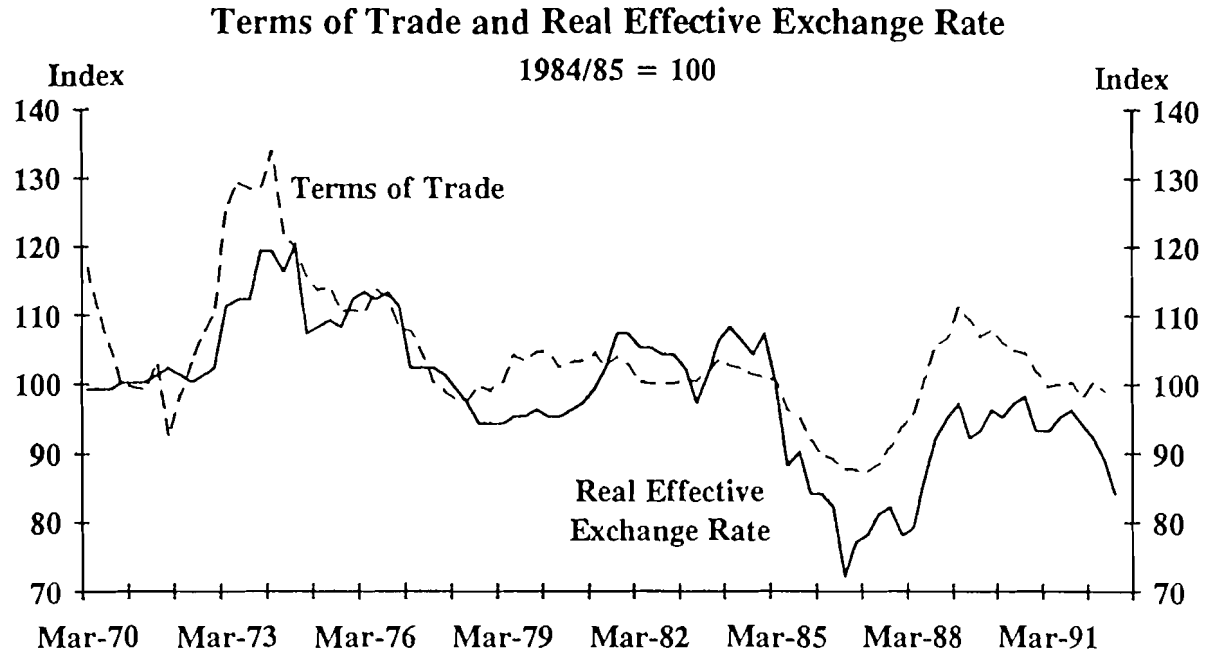
11 This is shown more formally in Blundell-Wignall and Gregory (1990).

12 Blundell-Wignall and Thomas (1987) found that the Australian real exchange rate deviated from purchasing power parity, but that this deviation could be explained by movements in the terms of trade. Blundell-Wignall and Gregory (1990) showed that a long-run relationship could be established between the real exchange rate and the terms of trade. Furthermore, they showed that this relationship is significant in an error correction framework explaining changes in the real exchange rate. A recent updating of this work shows that the real exchange rate and the terms of trade are cointegrated.

Figure 3.3



There have been periods, though, when the relationship between the exchange rate and commodity prices has seemed more tenuous. The real exchange rate appreciated through 1980, for example, despite a fairly flat terms of trade. More recently, the terms of trade declined through 1990 and 1991, with hardly any response from the real exchange rate, at least until 1992. This suggests the presence of other influences on the real exchange rate. The most important amongst these is changes in the stance of monetary policy, which might become necessary from time to time as a result of domestic real and monetary shocks.[13] If the terms of trade declined, but relatively tight monetary policy was required because of domestic inflation pressures, the exchange rate could remain at relatively high levels, reinforcing downward pressure on prices. Conversely, easy monetary policy

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[13] Gruen and Wilkinson (1991) found some evidence of a stable relationship between the Australian real exchange rate and the terms of trade. But they also found evidence of a stable relationship between the real exchange rate and the real long-run interest differential over the post-float period. Performing out of sample forecasts for the period October 1990 to March 1991, Gruen and Wilkinson found that the model which included both the terms of trade and the real long-run interest differential forecast the actual real exchange rate better than models with single explanators. In particular, a model of the real exchange rate including only the terms of trade over predicted the fall in the real exchange rate through 1991.

in the face of a rising terms of trade might see the exchange rate fail to appreciate, reinforcing upward pressure on demand and, eventually, inflation.

The way in which the real exchange rate adjusts to terms of trade shocks depends crucially on the degree of flexibility of the nominal exchange rate. At one extreme, if the nominal exchange rate is fixed, a positive terms of trade shock will push up domestic demand and economic activity, resulting in increased domestic inflation. This gradually appreciates the real exchange rate, eventually restoring equilibrium. Conversely, a negative terms of trade shock under fixed exchange rates causes a downturn in economic activity and rising unemployment, until lower inflation than abroad causes the real exchange rate to depreciate. Since goods prices are relatively "sticky", these adjustments can be long and relatively painful. On the other hand, if the nominal exchange rate is floating, the required adjustment in the real exchange rate can be achieved by appreciation or depreciation of the nominal exchange rate. This would offset to some degree the impact on economic activity and inflation of the terms of trade shock. Nominal exchange rate appreciation in response to a terms of trade boom, for example, will induce substitution in domestic demand towards imports and away from domestically produced goods. Furthermore, the decline in import prices will impact directly on the domestic price level, to the extent that final goods and services and inputs to the domestic production process are imported. This point will be picked up in a later section.

(b) Resource Allocation and the Performance of the Traded Sector

The discussion in the previous section suggests that the way in which the international business cycle impacts on the Australian economy should have changed with the floating of the exchange rate. A floating exchange rate helps to insulate the domestic economy from the world commodity price cycle, facilitating the task of monetary policy in achieving low and stable inflation. However, this might be achieved at the cost of greater instability in the traded-goods sector. In particular, it has often been argued that the swings in international competitiveness stemming from terms of trade fluctuations distort resource allocation decisions and adversely impact on

the performance of the import-competing and non-commodity exporting sectors.[14]

Exchange rate appreciation in the face of a terms of trade rise has relatively less impact on commodity exporters, who tend to be buffered by the high foreign currency prices for their exports. Manufacturers, on the other hand, will be less competitive, as the exchange rate has appreciated but the foreign price of their goods has not risen as much (given the "sticky" nature of manufactured goods prices). Furthermore, import-competing industries will lose market share as consumers switch to purchasing relatively cheaper imports. If the movement in the real exchange rate is large enough and prolonged, many of the firms in these sectors may reduce investment, or go out of business, leaving them positioned very poorly to take advantage of a lower exchange rate once the commodity price cycle turns down again. Any assessment of Australia's experience with the conduct of monetary policy since the floating of the exchange rate needs to review just how important these "costs" have been.

Econometric evidence shows that relative prices are an important determinant of import demand, and hence will impact on the import-competing sector of the economy. Wilkinson (1992) uses cointegration techniques to estimate the demand for imports, and finds the long-run price elasticity of demand to be 0.5; a 1 per cent rise in the relative price of imports results in a 0.5 per cent fall in imports over the long-run. While this elasticity may not seem large, a substantial swing in relative prices may, nevertheless, imply a large impact on import demand.

Swings in relative prices should also impact on the non-commodity export sector. But despite some substantial movements in the real exchange rate over the 1980s, there has been consistently strong growth in manufactured exports in recent years. Figure 3.4 shows the volume of Australian exports broken down into three categories: rural, resource-based and

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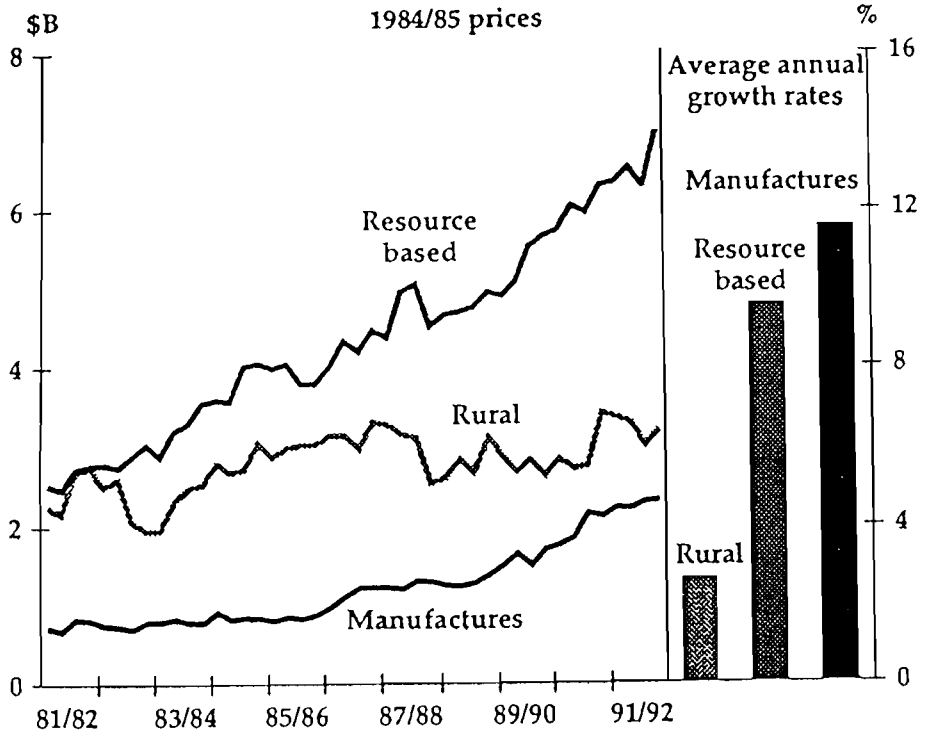
[14] As discussed in the previous section, swings in the terms of trade will result in swings in the real exchange rate even if the nominal exchange rate is fixed, since there will be an impact on domestic prices. The objection to the floating exchange rate in this context is an objection to the speed of adjustment and the possibility that the nominal (hence the real) exchange rate will overshoot.

manufactures.[15] Manufactured exports have shown the strongest growth over the 1980s, picking up substantially from the middle of the decade, albeit from a relatively low base. In the early 1980s, manufactured products represented around 12 per cent of merchandise export volumes; in 1991/92 the proportion was 19 per cent. Furthermore, if we include simply-transformed manufactures, such as iron, steel and aluminium, manufactured exports are now as large as rural exports.

Figure 3.4

Composition of Merchandise Exports



In order to explore the implications of this observation for monetary policy, it is necessary to identify the reasons why the manufactured-export sector has performed well, despite some sharp changes in competitiveness associated with the floating exchange rate. If other factors can be identified

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[15] The categories in this figure essentially correspond to those in Table 3.1. Manufactures in this case is as close as we can get to elaborately transformed manufactures. Simply transformed manufactures such as iron and steel and aluminium (which have also expanded very rapidly in recent years) are included in resource based exports. See Appendix for details.

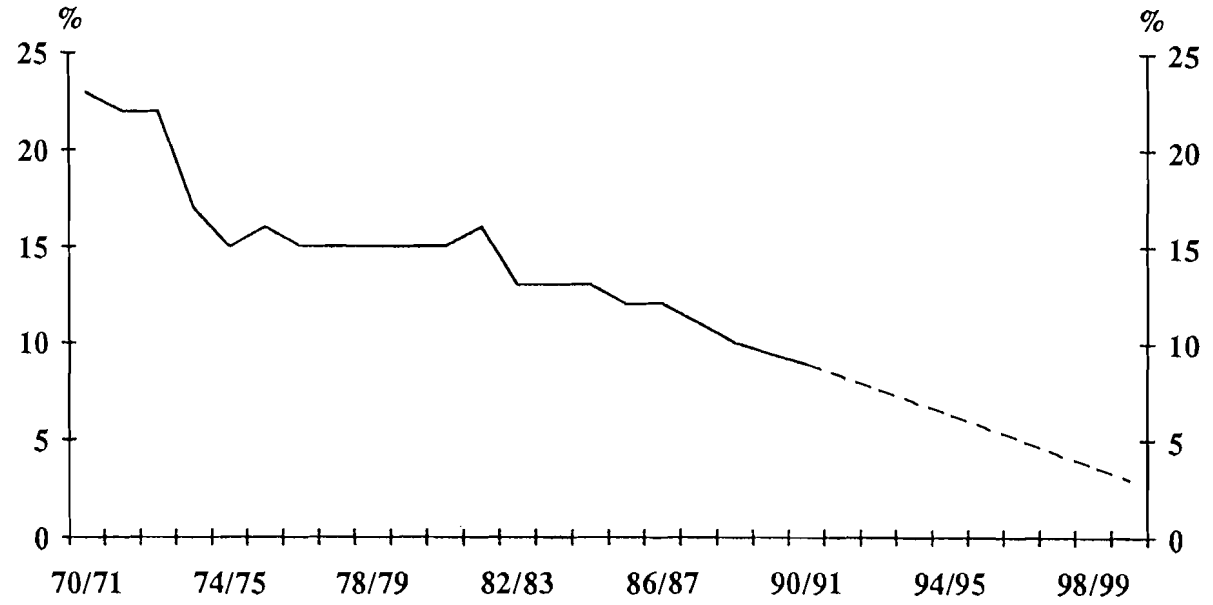
which ameliorate the impact of exchange rate swings on the traded goods sector, while also promoting its longer-run growth, monetary policy can focus on low inflation without incurring serious resource allocation costs. The remainder of this section attempts to identify these factors.

At a very broad level, the growth in manufactured exports is part of a more general trend towards increasing international integration of the Australian economy. Exports and imports of goods and services have risen as a proportion of domestic production over the 1980s (see Figure 3.5). This partly reflects benefits of the focus of micro-economic policy in Australia over the past decade. Tariffs were reduced over the 1970s and 1980s, and there is a timetable for further reductions over the 1990s (see Figure 3.6). As would be expected, imports have risen as a proportion of domestic spending, but the strong export performance requires further explanation.

Figure 3.5

Figure 3.6

Nominal Rate of Manufacturing Protection



One important reason for the good performance of Australian manufactured exports is geography. In particular, strong growth and rising real incomes in the Asian region[16] have presented plenty of opportunities for exporting. Table 3.2 shows growth in various regions since 1986.

Table 3.2: Growth in Production
Average annual rate, 1986-1991

United States	1.9
OECD Europe	2.8
Japan	5.0
Asia (excl. Brunei)	7.5

The result for Australia has been a geographical shift in our exports towards the Asian region (see Table 3.3).

16 The definition of Asia used is ASEAN (Brunei, Indonesia, Malaysia, The Philippines, Singapore and Thailand), Korea, Taiwan, Hong Kong and China. Where data problems necessitate a departure from this definition, it is noted in the text. Japan always is separately identified.

But the growth in manufactured exports is not simply the result of strong demand from Asian markets; there is also evidence of increasing market penetration. Table 3.4 shows growth in Australian manufactured exports to various regions, and growth in manufactured imports by those regions, over the period 1986 to 1990.[17] Although exports to Asia have largely been driven by the strong growth in this region, there are some indications of a rise in market share. Moreover, this is an improvement on the 1970s and early 1980s, when market share in this region was falling.

Even more striking is the fact that there have been substantial gains in market share in Australia's more traditional markets. Most notable here is North America, where Australian manufactured exports have grown four times faster than imports into that region. There were also substantial gains in market share in New Zealand and Europe. Increasing market penetration cannot be explained by Australia's geographical good fortune. It also contradicts the view that substantial swings in the real exchange rate are highly damaging for non-commodity exports.

Table 3.3: Direction of Merchandise Exports
(percentage of total exports)

	Total		Manufactures	
	1985/86	1991/92	1985/86	1991/92
North America	11.3	11.0	13.6	16.0
EEC	14.2	12.5	14.0	14.2
Japan	28.4	26.5	4.2	7.9
New Zealand	4.6	5.2	21.1	18.8
Asia	20.6	30.4	19.5	27.5
Other	21.0	14.4	27.5	15.7

17 These regions together represent around 85 per cent of our manufactured exports; see Table 3.3. Due to data limitations, the growth rates in Table 3.4 are calculated using values rather than volumes. To overcome problems due to different inflation rates, the data are all in US dollars.

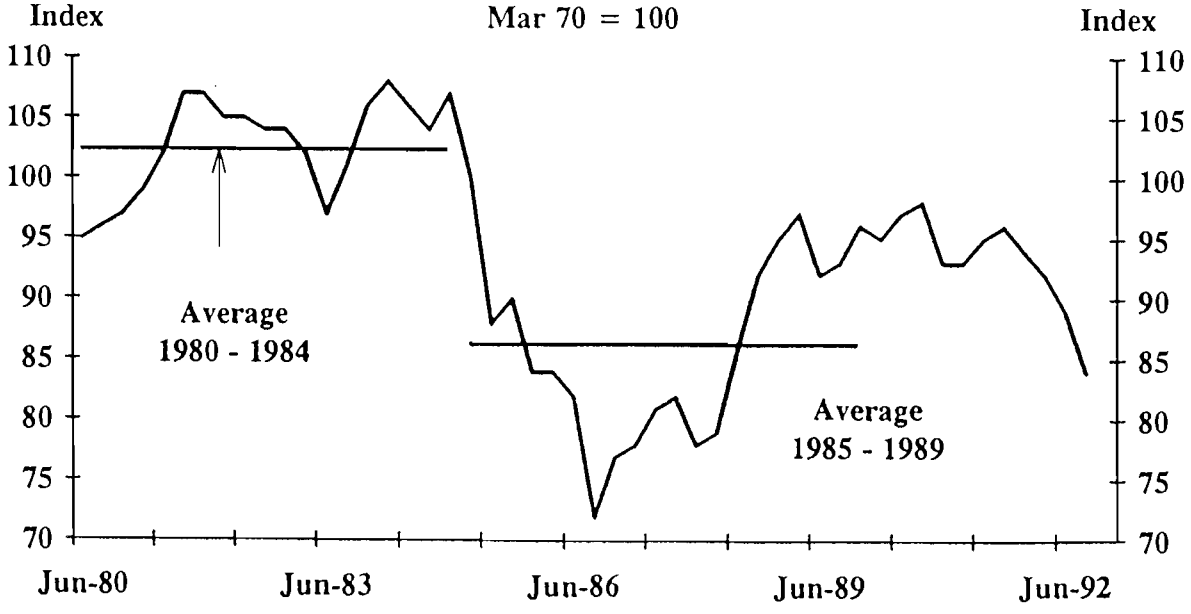
Table 3.4: Growth in Manufactured Exports 1986-1990
(average annual percentage change)

Country/region	Australian manufactured exports	Manufactured imports	Percentage of Australian manufactured exports (1990)
Hong Kong	20.5	25.3	3.4
Singapore	29.3	27.9	3.5
Korea	36.5	21.6	1.7
Thailand	39.7	42.5	1.7
Indonesia	45.1	21.0	2.8
Philippines	33.5	29.7	0.7
Malaysia	27.7	26.6	1.6
Total Asia*	**30.8**	**26.4**	**15.3**
Japan	29.6	26.3	5.0
North America	30.0	7.5	11.0
New Zealand	22.5	12.8	14.1
OECD Europe	27.5	16.1	10.6

* This definition of Asia is slightly different from that in Tables 3.2 and 3.3. In particular, this definition excludes Taiwan, China and Brunei as data on their manufactured imports is not available on a basis comparable to the other countries.

Figure 3.7

Real Effective Exchange Rate



Increased market share was probably helped by a general improvement in competitiveness over the 1980s. Figure 3.7 shows the real effective exchange rate over the 1980s and early 1990s; the horizontal lines show the averages for the first half of the 1980s and the second half. In the middle of the 1980s the exchange rate depreciated sharply, in response to the declining terms of trade and an external debt crisis, reaching a low point in December 1986. This depreciation, of around one third from its previous peak, certainly benefited the competitiveness of the non-commodity exporting sector. Nor did the subsequent appreciation, as the terms of trade rose, eliminate all of these gains. On average, the real exchange rate was lower in the second half of the 1980s than it was in the previous five years.

Although the extreme low level of the real exchange rate during 1986 was not maintained for long, the improvement in competitiveness was sufficiently large to encourage some investment in the export sector and to facilitate entry into foreign markets. Once a "beachhead" is established in a foreign market, it is unlikely to be easily surrendered, even at a higher exchange rate, given the sunk costs of entering those markets. Here it is worth noting that local knowledge, the development of distribution and service systems, personal contacts, and the like are known to be important factors for entering and maintaining a presence in many world markets. Under these circumstances, the real exchange rate would have to move by a substantial amount to reverse previous gains.

Aside from improved relative prices and "beachhead" phenomena, it is also likely that microeconomic reform and reduced protection of the domestic market through tariff cuts, together with some export-assistance measures, have stimulated a more outward-looking export orientation. Tariff cuts remove incentives for rent seeking behaviour on the part of businessmen, facilitating an export "culture". New industries are finding "niches" in external markets, where research and development, quality, marketing and reliability of supply are important considerations which affect competitiveness, but do not depend on relative prices. Furthermore, reducing tariffs on imported goods that are inputs to the domestic production process eliminates what is essentially a tax on exports. In contrast, export assistance measures are a subsidy. While they should not be continued in the long run, they can be useful in breaking down barriers to entry.

Generally speaking, it is difficult to isolate the contribution of various export assistance measures. [18] Some categories which receive assistance have grown strongly over the past six years or so, but others which receive no assistance have also expanded rapidly, while a number of assisted exports have grown more slowly. Some evidence on this is presented in Table A2 in the Appendix. It shows average annual growth in manufactured export volumes by SITC division, and contributions to growth of these categories over the period 1986/87 to 1991/92.

These data confirm that the assisted categories have made a relatively large contribution to the recent growth in manufactured exports (see column 5). Assisted exports contributed 52 per cent of the growth in manufactured export volumes over the period 1986/87 to 1991/92. This is because most of the assisted categories are fairly large; the eleven assisted categories identified in Table A2 (out of a total of 33 categories) accounted for almost 50 per cent of manufactured export volumes in 1986/87.

On the other hand, there is not an overwhelming tendency for assisted exports to have grown more quickly than unassisted exports over the period (see column 4). Of the top ten fastest growing categories, six were unassisted. In total, assisted exports grew on average by 15.7 per cent per annum, while unassisted exports grew by 13.6 per cent per annum. This does not appear to be a significant difference when taking into account the dispersion of the growth rates. So although a large part of the total growth is due to assisted exports, the strong growth in a broad range of small categories suggests that there is something more fundamental driving growth as well.

Whatever the explanations, the rising importance of manufactured (and for that matter services) exports, has helped Australia to begin the process of diversifying away from its traditional reliance on commodity exports.

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[18] For a listing of the various types of export assistance measures see Industry Commission (1992).

(c) Implications for Monetary Policy

It has been argued so far that the floating of the $A in December 1983 changed the nature of the transmission of the international business cycle to the Australian economy. Sustained movements in commodity prices impact relatively more on the nominal exchange rate, for a given stance of monetary policy, and less on domestic production and prices. This facilitates the task of monetary policy in achieving a low-inflation outcome, insofar as pressures on activity (and hence inflation) result from movements in the terms of trade. Furthermore, the evidence from section 3(b) suggests that nominal exchange rate swings have not had any obvious adverse consequences for the performance of the non-commodity export sector, which is important for longer-term productivity and growth.

But the exchange rate also impacts directly on the domestic price level through its effect on import prices. For example, a depreciation in the nominal exchange rate will, for given foreign prices, raise the domestic price of imported goods and services. If these are final goods and services then, other things equal, the price faced by the final purchaser will also rise. If the goods and services are inputs to the production process, then there may be a further impact, as domestic producers pass on their cost increase to domestic consumers. In general, the extent to which exchange rate changes affect the domestic price level will depend on the proportion of wholly or predominantly imported goods and services in our consumption bundle, and the extent to which imported inputs are used in the domestic production process.[19]

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[19] Estimates of the total impact of exchange rate changes on the domestic price level are difficult to calculate. Richards and Stevens (1987) used a "mark-up" model of domestic price determination to calculate the impact of the exchange rate depreciation through 1985 and 1986 on the domestic price level. They estimated that the elasticity of domestic prices with respect to the exchange rate was 0.35. That is, a 10 per cent depreciation in the exchange rate is estimated to add 3.5 per cent to the domestic price level, as measured by the consumer price index (CPI). Stevens (1992) modelled changes in the CPI as a function of lagged changes in the CPI, the output gap, changes in import prices and a "wage shock". He found the sum of the lagged coefficients on import prices to be between 0.05 and 0.1 (depending on the sample period). This is significantly less than Richards and Stevens estimates. Blundell-Wignall, Lowe and Tarditi (1992) find lagged changes in import prices sum to around 0.2, in an equation explaining the consumption deflator. Both studies may, however, underestimate the second round effects of rising import prices on the prices of domestically produced goods.

These direct effects are also an important consideration for monetary policy. If the exchange rate adjusted only according to changes in its underlying equilibrium determined by the terms of trade, the above discussion suggests that it should have negligible consequences for domestic inflation. The inflationary impact of exchange rate depreciation would be considerably offset by the deflationary impact of the fall in the terms of trade. However, there are two other important influences on exchange rates, which are exactly analogous to those discussed earlier in the context of other asset prices. First, monetary policy directly influences the nominal exchange rate in a world of highly mobile capital. Excessive easing or tightening of monetary policy will be transmitted into domestic inflation outcomes through movements in the exchange rate. Secondly, exchange markets are also affected by the speculative dynamics, including positive feedback, described by Cutler, Poterba and Summers (1990). For example, the very sharp fall in the $A during the mid 1980s is widely believed to have overshot as a consequence of such speculation. As the experience of this time showed, such overshooting can have significant effects on domestic prices. Such inflation pressure may become in-grained, if wage-price interactions result.

It is therefore of some interest to consider whether some of the structural developments considered earlier might have caused the direct impact of the exchange rate on inflation to change over time. Increased competition resulting from tariff reductions, for example, might reduce the importance of direct exchange rate effects because:

- it becomes more difficult to pass on increases in the price of intermediate inputs; or
- firms may be less willing to accede to wage demands in response to higher prices.

Furthermore, a reduction in the tariff rate reduces the magnifying effect which an ad-valorem tariff has on changes in import prices.

Working against these effects, the increasing international integration of the economy (partly as a result of tariff reductions) means that an increasing proportion of goods consumed and used as inputs to production are

imported. This implies that import prices may have become more important for domestic prices over time.

With the underlying economic structure changing over time, estimating a structural model with constant coefficients is inappropriate. But temporal ordering tests, such as those carried out in Blundell-Wignall, Lowe and Tarditi (1992), can give an indication of the information content of variables without constructing a full structural model. Given the changed role of the traded-goods sector discussed above, it is of interest to see if the informational content of import prices for domestic inflation has also changed over time.

To approach this question, the Blundell-Wignall/Lowe/Tarditi equation is estimated over the period 1967Q4 to 1984Q1, and then a series of rolling regressions are performed by adding successive observations to the sample period. The final regression of the series is run over the period 1967Q4 to 1992Q2. Specifically, the following equation is estimated:

$$\Delta \ln P_t = \alpha_0 + \sum_{i=1}^{6} \alpha_i \Delta \ln P_{t-i} + \sum_{i=1}^{6} \beta_i \Delta \ln TOT_{t-i} + \sum_{i=1}^{6} \gamma_i \Delta \ln MP_{t-i} \qquad (3.1)$$

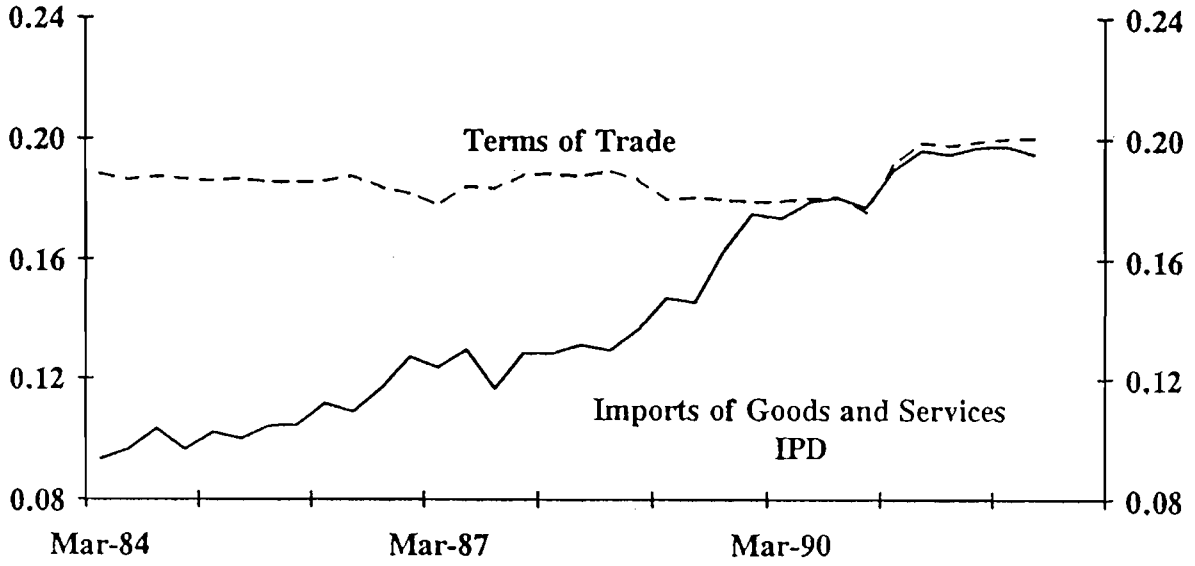
where P is the consumption deflator, TOT is the terms of trade and MP is import prices. The objective here is to examine whether the informational content of import prices for domestic inflation has changed since the beginning of 1984, the first quarter of the floating exchange regime. Blundell-Wignall et. al. found evidence of a structural break in the relationship between domestic inflation, the terms of trade and import prices at this time, so it seems a logical point to begin the regressions.

The results of these rolling regressions are shown in Figure 3.8. The dashed line shows the sum of the coefficients on the terms of trade as progressively more observations are added to the estimation period. The sum of the coefficients on the terms of trade is fairly stable. Over the period to 1984Q1,

it is 0.19 and significantly different from zero at the 1 per cent level. Successive estimates vary at most by about one fifth of a standard error from the initial sum, and by the end of the period its value is 0.2, also significantly different from zero at the 1 per cent level.

Figure 3.8

Sums of Coefficients



The solid line shows the sum of the coefficients on import prices as progressively more observations are added. Unlike the terms of trade, these estimates do not appear to be stable; the information content of import prices for domestic inflation appears to change between the beginning and the end of the period. When the equation is estimated up to the March quarter 1984, the sum of coefficients is not significantly different from zero even at the 10 per cent level. That is, import price changes provide no information on domestic inflation which is not already contained in either past inflation or terms of trade changes. As progressively more observations are added to the estimation period, the sum of the coefficients trends upwards. By the end of the period, the sum of coefficients is 0.2, and this estimate is significantly different from zero at the 1 per cent level.

This finding suggests that import prices have become a more important indicator of domestic inflation in recent years. This result would be expected as the Australian economy becomes more integrated with the world. The significance of this result is that the exchange rate will have relatively more weight in domestic monetary policy considerations.

4. CONCLUDING REMARKS

Following the liberalisation of Australia's financial markets, there have been important changes in the characteristics of the business cycle and the monetary transmission mechanism. Monetary policy now works primarily through movements in interest rates, which induce wealth and intertemporal substitution effects. But the transition to this market-oriented system from the more liquidity-constrained financial environment that preceded it, was not an entirely smooth process.

During the 1980s, improved fundamentals and financial liberalisation combined to push up asset values and borrowing in a period of buoyant business expectations. The evidence suggests, however, that speculative dynamics characterised by positive feedback and international spillover effects may have pushed the process too far. Two lessons were drawn from this. First, asset prices (and borrowing) may be relatively insensitive to interest rates when speculative dynamics are present. Second, asset values are important in financial intermediaries' lending decisions, regardless of what is driving them. If they overshoot, and then decline, the quality of banks' outstanding loans is undermined, and a period of cautious lending attitudes may follow. Such effects appear to change the usual pattern of the business cycle. Such episodes can complicate the task of monetary policy. During the upswing phase, authorities must choose between raising interest rates higher than otherwise or, alternatively, permitting asset values and borrowing to rise even higher, with prospects for greater financial fragility problems later on.

It was argued, however, that it would be unwise to extrapolate the difficulties of conducting monetary policy in the second half of the 1980s, given the structural changes under way at that time. Policy makers should certainly not over react, by coming to regard asset price changes as

unacceptable. Proposals to target asset price inflation in much the same way as goods price inflation come very close to such a judgment. The price of assets relative to prices of goods changes in response to expectations about future activity. Such relative price changes play a key role in business cycle dynamics. In this sense, improved growth of the Australian economy, and elsewhere, may require better fundamentals and an increase in the relative value of assets as a pre-requisite. This need not risk increased goods price inflation, though later in the cycle it will be important to ensure that asset price inflation does not become excessive.

The floating of the $A has also affected the nature of the Australian business cycle, by fundamentally altering the way in which the international business cycle is transmitted to the domestic economy. Real income shocks arising from fluctuations in Australia's terms of trade, which is strongly influenced by the world commodity price cycle, often drove bouts of inflation when the exchange rate was more heavily managed. Since the floating of the exchange rate, this source of pressure on domestic production and (via the Phillips curve) inflation has, for the most part, been eliminated. The counterpart to this, however, has been sharp swings in the nominal (and real) exchange rate. Such swings affect performance in the traded-goods sector, and also lead to direct effects on domestic prices and wages. Both are important considerations in any assessment of Australia's approach to monetary policy.

An intriguing aspect of Australia's recent economic performance, however, is that manufactured exports have performed extraordinarily well in the face of major swings in the exchange rate. The sharp fall in the exchange rate in the middle of the 1980s may have helped to stimulate investment in the non-commodity exporting sector, while also facilitating initial entry into foreign markets. Once "beachheads" were established, the partial reversal of these competitiveness gains in the second half of the 1980s did not have a symmetric adverse impact. In addition, there have been substantial changes in Australia's linkages with the rest of the world. Policies to internationalise the Australian economy through reduced protection and other measures have seen non-commodity exports rise as a share of GDP. This is explained partly by sustained strong growth in the Asia-Pacific region, and partly by Australian manufacturing exporters improving their market share in a number of regions. The apparent importance of these other factors, implies

that monetary policy focused on low inflation need not be associated with major resource allocation costs as the exchange rate adjusts to terms-of-trade shocks.

Increased internationalisation has also seen Australian imports rise as a share of GDP. This factor suggests that import prices, and hence the exchange rate, have become more important for domestic inflation and monetary policy considerations.

APPENDIX

(a) Volatility of the terms of trade

The volatility of the terms of trade of a number of industrial countries is calculated over the period 1949 to 1991 (except where noted by an *). The data are annual and obtained from the International Financial Statistics. The terms of trade is defined as the ratio of export unit values to import unit values. The volatility is measured as the average annual absolute percentage change in the terms of trade; that is the average size of the annual percentage change without regard to sign. These statistics are reported in column 2 below. The table also reports the average annual percentage change and the standard deviation of these changes.

Table A1: Terms of Trade
(annual percentage change)

	Absolute Mean	Mean	Standard Deviation
New Zealand	8.1	0.4	11.2
Australia	7.7	-1.3	10.8
Japan*	6.3	0.1	10.1
Turkey*	6.0	-3.0	8.3
Iceland*	5.7	1.9	7.6
Spain*	5.4	-0.04	7.5
Finland	4.6	0.4	7.3
Greece*	4.3	-0.2	5.5
Norway	4.2	0.6	6.3
Germany*	3.9	1.5	4.9
Switzerland*	3.8	0.9	4.8
Denmark	3.6	-0.04	5.0
Italy	3.5	-0.1	5.1
Ireland*	3.5	-0.05	5.3
France	3.3	0.1	4.8
Sweden	3.2	-0.04	5.4
United Kingdom*	3.1	0.3	4.5
United States	3.0	-0.6	4.2
Austria	2.9	-0.1	4.2
Canada	2.7	-0.1	3.6
Belgium/Luxembourg	2.4	-0.3	3.7
Netherlands	2.1	-0.4	2.8

* Germany 1953-1991, Greece 1952-1991, Iceland 1957-1990, Ireland 1954-1991, Japan 1952-1991, Spain 1957-1991, Switzerland 1949-1987, United Kingdom 1950-1991.

(b) Growth in manufactured exports

Table A2 ranks manufactured exports by their contribution to growth over the period 1986/87 to 1991/92. Shaded rows indicate Standard Industrial Trade Classification (SITC) divisions which consist predominantly of products receiving some form of direct export assistance as identified by the Industry Commission (1992).

(c) Commodity classification of exports and imports

Exports and imports are broadly classified into three categories: rural; resource based and manufactures, using data from the Australian Bureau of Statistics. Table A3 shows the corresponding SITC sections or divisions which make up the categories reported in Table 3.1:

TABLE A2: MANUFACTURED EXPORTS BY SITC DIVISION

SITC DIVISION	CATEGORY	EXPORT VOLUMES 1984/85 Prices 1991/92 $M	EXPORT VOLUMES ANNUAL CHANGE 86/87-91/92 %	EXPORT VOLUMES CONTR. 86/87-91/92 %.pts.
75	Office machines and automatic data processing machines	1752	29.1	28.1
66	Non-metallic mineral manufactures, nes	441	23.3	6.3
89	Miscellaneous manufactured articles, nes	458	15.9	5.3
79	Transport equipment (excl. road vechicles)	767	7.0	4.9
78	Road vehicles (incl. air-cushion vehicles)	589	8.7	4.5
54	Medicinal and pharmaceutical products	319	19.7	4.2
71	Power generating machinery and equipment	410	12.0	3.9
87	Professional, scientific and controlling instruments and apparatus, nes	324	15.0	3.6
69	Manufactures of metals, nes	377	11.9	3.6
57	Plastics in primary forms	161	109.4	3.5
53	Dyeing, tanning and colouring materials	170	47.9	3.2
52	Inorganic chemicals	198	27.0	3.1
72	Machinery specialised for particular industries	396	8.9	3.1
11	Beverages	250	16.2	2.9
74	General industrial machinery and equipment, nes and machine parts, nes	338	10.3	2.9
77	Electrical machinery, apparatus, appliances, parts (incl. non-elec. counterparts of electrical domestic equipment)	322	8.8	2.5
61	Leather, leather manufactures, and dressed furskins, nes	202	13.3	2.1
84	Articles of apparel and clothing accessories	122	32.4	2.0
76	Telecommunications and sound recording and reproducing apparatus and equipment	151	16.3	1.8
64	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	153	12.2	1.5
55	Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations	101	15.6	1.2
88	Photographic apparatus, equipment and supplies and optical goods, nes; watches and clocks	282	3.8	1.1
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, nes	55	35.6	1.0
63	Cork and wood manufactures (excl. furniture)	41	38.7	0.7
62	Rubber manufactures, nes	64	12.2	0.6
65	Textile yarn, fabrics, made-up articles, nes, and related products	128	4.6	0.6
73	Metal working machinery	47	16.4	0.6
85	Footwear	27	24.6	0.4
59	Chemical materials and products, nes	127	3.1	0.4
82	Furniture, parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	37	6.5	0.2
56	Fertilisers (excl. crude)	10	14.9	0.1
51	Organic chemicals	55	0.7	0.0
83	Travel goods, handbags and similar containers	4	0.0	0.0
58	Plastics in non-primary forms	70	-10.8	-1.2
	ASSISTED CATEGORIES	4466	15.7	51.4
	UNASSISTED CATEGORIES	4482	13.7	47.2
	TOTAL	8948	14.7	98.6

Shaded rows indicate assisted industry.

Table A3: Commodity Classification of Exports and Imports

Commodity based	SITC rev. 3 section or division
Rural	0, 1, 4, 21-26, 29
Resource based	27, 28, 3, 67, 68
Manufactures	5, 61-66, 69, 7, 8

Figure 3.4 differs very slightly from this classification in that beverages (SITC division 11) is included in manufactured exports rather than rural.

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