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## Inflation, Monetary Policy and Australia's Primary Industries

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*Australia's rate of inflation has been high relative to the average OECD rate throughout most of the 1970s and 1980s. In many overseas countries there has been a shift toward the view that the primary medium term objective of monetary policy should be the achievement of a low rate of inflation. There is a wide range of views, however, about the priority which the government should give to reducing the inflation rate in Australia. In this paper some key macroeconomic implications of a gradual tightening of monetary policy to achieve a substantial reduction in the rate of inflation over the medium term are examined. Tighter monetary policy, by increasing real interest rates and the real exchange rate in the short term, imposes significant adjustment costs on primary industries and the rest of the economy. However, it is not immediately apparent that these costs are substantially less than the costs associated with a relatively steady annual inflation rate of around 7–8 per cent as Australia has experienced in recent years.*

## *Introduction*

Throughout much of the postwar period, trends in Australia's rate of inflation have been broadly similar to those of other industrialised economies. Inflation was low throughout most of the 1950s and 1960s, increased sharply in the 1970s and moderated in the 1980s. However, while inflation fell markedly in most economies in the 1980s, the fall in Australia was relatively moderate by comparison.

The achievement of a low rate of inflation has been an important objective of economic policy in Japan and Germany as well as in many other industrialised countries, particularly in the 1980s. Even in some countries with traditionally relatively high rates of inflation, such as New Zealand, much stronger emphasis has recently been given to achieving a low inflation rate. Australia's inflation performance and the priority which the Reserve Bank should give to reducing inflation are topics which have been debated vigorously over the past year. The conduct of monetary policy by the Reserve Bank has important implications for Australia's primary industries through its influence on interest rates and the exchange rate. In this paper, the key implications of possible changes to monetary policy in response to inflationary pressures are examined for Australia's primary industries.

## *Australia's Inflation Performance*

The inflation rate is the rate of change in the general level of prices in the economy from one period to the next. There are several measures of the general price level. These are price indexes, which are either constructed directly from survey data on the prices of goods and services or derived from national accounts data. In practice, movements in the consumer price index are the main indicator of inflation in Australia. The consumer price index measures changes in the price of a basket of a wide range of goods and services which account for a large share of purchases by metropolitan wage and salary earner households. Movements in the consumer price index are frequently used as an official measure of inflation. For example, some government charges are regularly adjusted by movements in the consumer price index and the excise rates for tobacco, beer and petroleum products are adjusted each August and February in line with half-yearly movements in the consumer price index (Commonwealth of Australia 1989).

Much broader price indexes than the consumer price index can be derived from national accounts data. It is possible, for example, to obtain an index of the overall price movements of all goods and services produced in the economy, or of the goods and services actually consumed. However, an advantage of the consumer price index is that, compared with national

accounts data, it is published relatively quickly and is not subject to significant and frequent revision.

Price stability has been achieved infrequently in Australia's history. Prior to the early 1950s, consumer prices fluctuated widely with periods of large rises — World War I and the Korean War — as well as episodes of significant falls — notably the depression in the early 1930s. Excluding the period of the Korean War, price stability was largely achieved during the remainder of the 1950s and 1960s, with an average annual rise in the consumer price index of about 2.5 per cent. Inflation rose sharply in the 1970s to an average annual rate of 9.4 per cent, although it moderated slightly to 8.7 per cent in the 1980s. However, apart from a brief period between 1979 and 1981, Australia's inflation rate has been consistently above the average rate in the industrialised countries since 1971 (Figure 1).

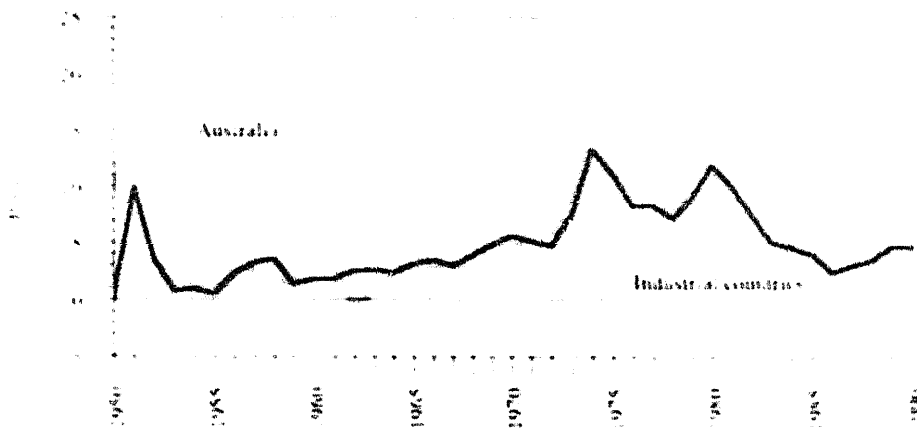


FIGURE 1 — *Inflation in Australia and industrialised countries*

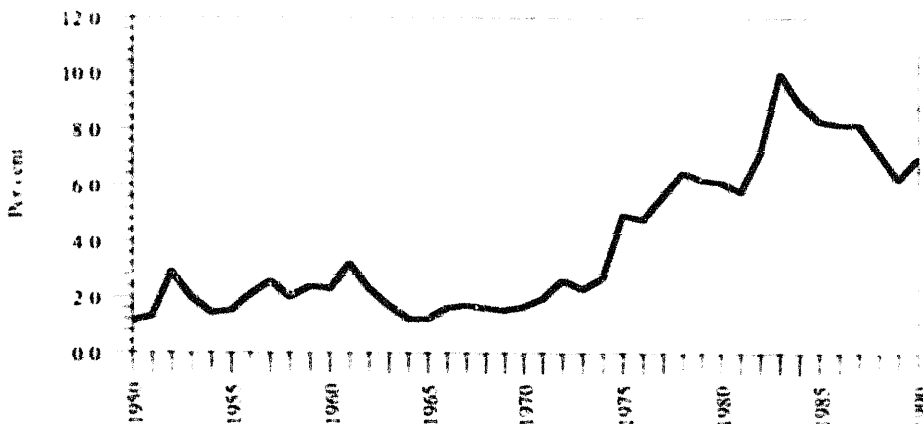


FIGURE 2 — *Unemployment rate in Australia*

In the 1950s and 1960s, inflation in Australia largely reflected the strength of demand for goods and services in the economy. In the 1970s, however, a different source of inflationary pressure emerged and inflation coincided with a large rise in the unemployment rate (Figure 2). Inflation rose sharply following substantial rises in import prices in the middle and late 1970s associated with large increases in the international price of crude oil in 1973-74 and again in 1978-79 (Figure 3). In principle, such price rises may produce only a temporary increase in the rate of inflation, reflecting a rise in the price of oil and oil intensive products relative to other goods and services in the economy. However, additional inflationary pressures stemmed from increased wage demands, reflecting in part an apparent expectation on the part of trade unions that the rise in oil prices would stimulate a resources boom in Australia (INDECS 1990). Monetary policy on both occasions tended to be relatively accommodating in that the sharp increases in wages was allowed to flow into price increases in order to minimise the impact on

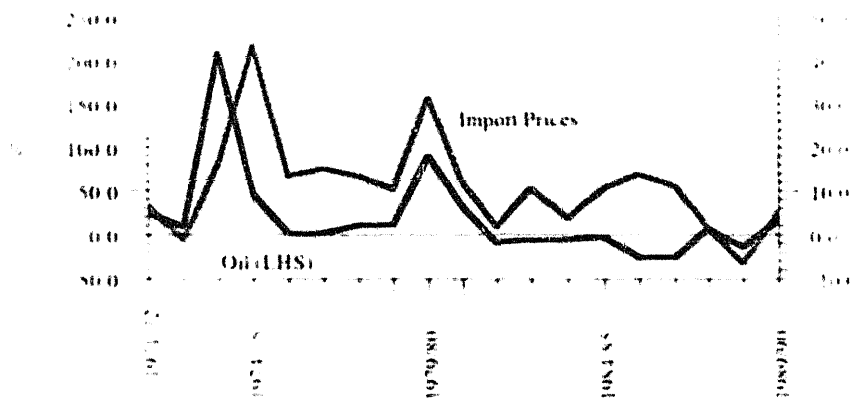


FIGURE 3 — *Movements in international crude oil prices and Australia's import prices*

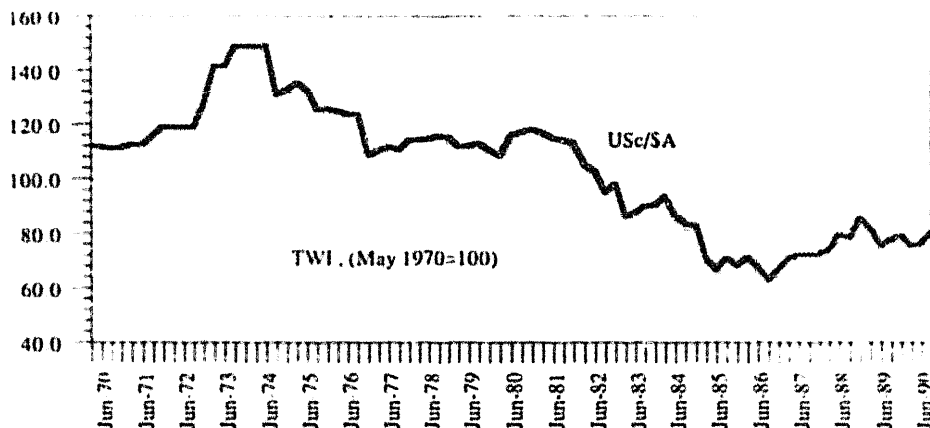


FIGURE 4 — *Nominal exchange rates*

real wage costs and hence economic activity and employment. Relatively high rates of inflation persisted as individual firms and consumers adjusted their price setting and spending behaviour according to their expectations of continuing inflation. In both the mid-1970s and the early 1980s Australia's inflation rate declined well after such falls had occurred in other industrialised economies.

In the mid-1980s, the average rate of inflation in the industrialised countries moderated further, particularly following the sharp fall in international oil prices during the first half of 1986 (Figure 3). By contrast, inflation in Australia rose again following a substantial rise in import prices caused by the large depreciation of the Australian dollar during 1985 and the first half of 1986 (Figure 4). In recent years, while Australia's inflation rate has been relatively steady at around 7–8 per cent, inflationary pressures have increased in other economies as a consequence of strong growth in demand during a period when those economies were operating close to full productive capacity (IMF 1990). The average OECD inflation rate increased from 2.7 per cent in 1986 to about 4.5 per cent in 1990 with the significant rise in oil prices in the second half of 1990 also adding to inflationary pressures.

### *Price Stability and the Role of Monetary Policy*

In most industrialised countries the central bank has, in the past, used monetary policy to pursue a range of economic goals including price stability, full employment, exchange rate stability and external balance. In recent years, however, there has been a shift toward the view that the achievement of price stability should be the primary objective of monetary policy. Several industrialised countries, most notably Japan and Germany, have already identified the primary medium to long term objective of monetary policy to be the achievement and maintenance of approximate price stability, usually defined as inflation rates close to zero (OECD 1989; IMF 1990). In New Zealand, the government and the Reserve Bank have reached an agreement under which the Reserve Bank must achieve an inflation rate, as measured by movements in the consumer price index, of 0–2 per cent by the end of 1992 and then maintain it within this range in subsequent years (Fraser 1990). In the United States, there has also been increasing pressure for achieving price stability through a progressive tightening of monetary policy. Indeed, a resolution was recently introduced in the US Congress with the purpose of directing the Federal Reserve to eliminate inflation within five years and to maintain price stability thereafter (Black 1990).

Reducing or eliminating inflation, however, usually results in lower rates of economic growth during the transition period and hence can impose significant adjustment costs on the economy. The reorientation of economic policies in recent years toward medium term objectives in the

major industrialised countries has occurred against a background of these countries incurring substantial costs, first as a consequence of high inflation and unemployment in the 1970s and then as a result of the short term adjustment costs incurred during the transition to a lower rate of inflation in the early 1980s. Inflation was reduced in this period at the cost of significantly lower and at times negative growth in output and employment. Since many of these countries have already incurred the costs of adjusting from a high to a low inflation environment, the maintenance of low inflation is likely to remain a primary objective of monetary policy over the next several years (D.P. Morgan 1990).

The adjustment of the New Zealand economy to a relatively low inflation rate has occurred more recently than in the major industrialised economies. New Zealand's inflation rate has been lower than that of Australia since 1988, which is in marked contrast to the general experience of the 1970s and 1980s when New Zealand's inflation rate was typically above that of Australia. However, the reduction of inflation has imposed significant adjustment costs on the New Zealand economy. Economic growth was low or negative throughout much of the second half of the 1980s and the unemployment rate increased sharply.

In the case of Australia, monetary policy continues to be used to influence a range of economic variables. In its 1989 annual report, the Reserve Bank of Australia stated that the primary objective of monetary policy must be to reduce inflationary pressures, but that monetary policy was also an important tool to reduce the demand for imports and, hence, the current account deficit (Reserve Bank of Australia 1989). More recently, the Reserve Bank has stated that the appropriate medium term goal of monetary policy should be the elimination of inflation without incurring unacceptably high costs in terms of significant reductions in output and employment growth (Fraser 1990). Hence, the Reserve Bank has advocated greater use of other policies, especially wages policy, to complement the tightening of monetary policy in such a way as to reduce the adjustment costs associated with reducing inflation (Burrell and Dusevic 1990). It is also evident from the 1990-91 Budget documents that monetary policy will continue to be used to target the current account deficit and inflation (Commonwealth of Australia 1990).

Other economic commentators have also expressed a diversity of views in Australia about the priority which the government should give to achieving and maintaining a low rate of inflation. For example, Carmichael (1990) argued that the costs of eliminating inflation outweigh the benefits. He suggested that deregulation of financial markets and the floating of the Australian dollar in the early 1980s provided the Reserve Bank with the scope to adopt a more independent inflation strategy than had been possible in previous years. Hence, the deterioration in Australia's inflation rate relative to the average OECD rate in the remainder of the 1980s was the result of a conscious choice of the government to adopt an overall macroeconomic policy strategy designed to achieve high economic growth with a relatively

steady inflation rate. Others, however, argue strongly that the achievement of price stability should be the primary focus of monetary policy (D. Morgan 1990; McTaggart 1990).

The key reason for this continuing lack of agreement over the appropriate role of monetary policy appears to be that it is extremely difficult to identify and measure all the costs and benefits associated with inflation and its reduction. The primary objective of monetary policy should be to reduce or eliminate inflation if the longer term benefits of lower inflation are greater than the costs incurred during the transition to the lower or zero rate of inflation, where those costs primarily take the form of slower economic growth. If, as seems likely, one of the short term costs is a reduction in, or slower growth in, private investment expenditure, the long term implications for the productive capacity of the economy also need to be taken into account. In the following sections, some of the key costs of inflation are identified, the policy options to reduce inflation are discussed and some major effects of different monetary policy actions to reduce inflation are examined.

## *Costs of Inflation*

A wide range of costs associated with inflation have been identified in the economics literature (McTaggart 1990). Some of these costs, however, may not be large in Australia where inflation has been relatively steady in recent years. For example, it has been argued that inflation can result in a misallocation of resources, reducing the economy's overall efficiency, because firms find it difficult to distinguish between general price movements and price changes resulting from fundamental changes in the demand for and supply of the goods and services which they produce. While such problems may become severe when inflation is very volatile or is extremely high, as in many Central and South American countries, firms are less likely to confuse price signals if inflation is relatively steady and moderate.

Two important costs, which can be readily identified, relate to the interaction of inflation with taxation arrangements and the impact of inflation on economic uncertainty. Given its importance for primary industries, the implications of inflation for Australia's international competitiveness are also considered.

### *Taxation distortions*

Saving and investment decisions are distorted through the interaction of the tax system with inflation (Edey and Britten-Jones 1990). While these distortions have been reduced in recent years, an important distortion which remains is caused by the taxation treatment of nominal interest receipts and payments (Minnis 1988). The nominal interest rate has two components. The first is the real interest rate which can be regarded as the income earned by the lender as



compensation for postponing consumption. The second component serves to compensate the lender for the expected loss in the purchasing power of the principal that occurs as a result of inflation.

The taxation system in Australia, as in many other OECD countries, treats the nominal interest receipts of savers as taxable income. This reduces the after-tax real return of those savings held in the form of bank deposits or other financial instruments such as debentures or bonds. The interaction of the tax system with inflation has therefore significantly reduced household savings held in this form (Dilnot 1990). Similarly, the real cost of debt capital to investors is reduced because all nominal interest payments of business borrowers are tax deductible despite the fact that part of the interest payment merely serves to compensate the lender for the effect of inflation on the principal outstanding. As a consequence, investment is encouraged and there is an incentive for businesses to finance investment projects through debt rather than equity.

The distortions to saving and investment caused by the interaction of the tax system with inflation, together with deregulation of Australia's financial and foreign exchange markets, may have contributed to the persistent historically large current account deficits recorded in the 1980s (Tease 1990). The current account deficit, as a share of gross domestic product, averaged about 5 per cent in the 1980s, considerably higher than the average of 2 per cent in the 1970s (Figure 5). Since 1983-84, however, there have been marked changes in the saving-investment balances in the public and private sectors. The public sector's financial position has switched from a large borrowing requirement to a small net lending capability and the private sector has changed from a net lending capability to a substantial net borrowing requirement (Figure 5). Indeed, since 1988-89, the current account deficit has been associated with a shortfall in private saving relative to private investment.

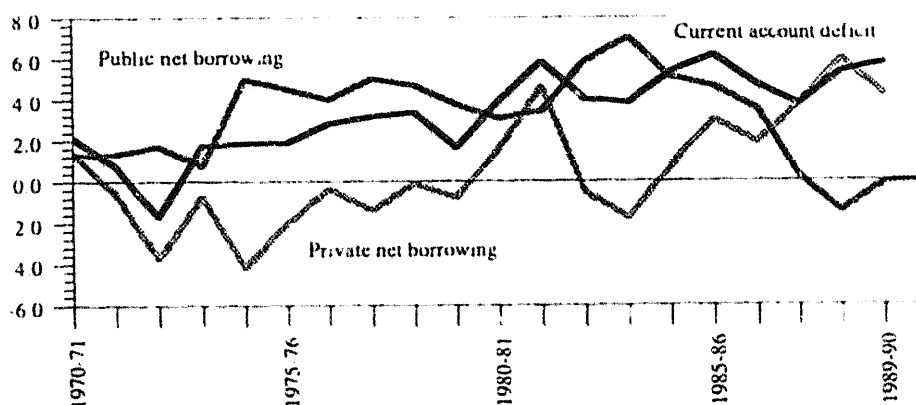


FIGURE 5 — Australia's current account deficit and net borrowings by the private and public sectors as a share of gross domestic product

Regulated financial and foreign exchange markets restricted the availability of funds within Australia, effectively limiting the extent of any inflation-taxation distortions. Deregulation, however, provided the environment for savers and investors to make decisions which more fully account for the incentives produced by the interaction of the tax system with inflation. This probably partly accounts for the increased reliance on debt rather than equity financing which occurred during the 1980s. The proportion of foreign investment which was in the form of borrowings increased from an average of 36 per cent in the 1970s to 74 per cent in the 1980s. The succession of large current account deficits and the increased reliance on debt financing contributed to a sharp rise in the level of foreign debt in the 1980s. Net foreign debt increased from about 6 per cent of gross domestic product in 1979-80 to \$125 billion or 35 per cent of gross domestic product in 1989-90. These developments are likely to have also heightened uncertainty regarding Australia's economic prospects and contributed to the emergence at times of a risk premium on Australian investments, placing downward pressure on the real exchange rate and upward pressure on domestic interest rates (Thorpe, Hogan and Coote 1988).

As with most other costs of inflation, it is difficult to measure the extent to which the interaction between inflation and the taxation system has distorted saving and investment. However, it is apparent that the effects are likely to be more pervasive in Australia than in many other OECD countries which have lower rates of inflation. If the costs of reducing or eliminating inflation are judged to be too large relative to the benefits of such action, it is possible that these taxation distortions may be substantially reduced through reform of the taxation system.

### *Economic uncertainty*

The extent to which inflation creates economic uncertainty depends on a range of factors. For example, if inflation is steady and predictable, there is, by definition, little uncertainty. Even if the inflation rate is widely expected to be volatile and therefore difficult to predict, this may not increase economic uncertainty if all prices and incomes are expected to adjust rapidly to any new inflation rate. However, if decision makers in the economy are not confident that any future unexpected changes in the inflation rate will be reflected equally in all the prices and incomes that are important to their well-being, inflation may contribute to economic uncertainty. This may occur because many prices, incomes and financial arrangements are set in advance in money terms and are changed infrequently. This is especially true for borrowers and lenders when credit is taken out with fixed interest rates for a fixed period of time. An unexpected decline in the inflation rate would result in a gain to lenders and a loss to borrowers. For example, people who have taken out fixed rate mortgages for homes would lose if inflation fell unexpectedly and sufficiently to permit market interest rates to fall sooner or further than had been expected.

There are many other arrangements in the economy, such as wage and salary contracts, where money values are set in advance and are changed at discrete intervals. Government charges or payments, such as welfare allowances, local government rates and electricity charges, are often changed annually. Private firms may also change the prices of their products infrequently for reasons such as the cost of advertising new prices. Thus, if inflation changes suddenly, there may be temporary gains and losses in different parts of the economy because of differences in the timing of the inflation adjustment. While such temporary gains and losses could occur in the presence of steady and predictable inflation, they are more likely to occur if the inflation rate is volatile and difficult to predict.

Inflation will have an adverse impact on economic growth if it increases economic uncertainty and private investors prefer to avoid taking risks. If economic uncertainty increases, risk averse investors will demand an additional return on their investments, which is in excess of a normal expected rate of return or profit, in order to compensate them for bearing the extra risk. Investment projects which are not expected to be profitable enough to provide investors with this additional risk premium will not be undertaken in such an environment. Since investment directly influences the productive capacity of the economy, economic growth is likely to be lower when the degree of economic uncertainty is higher.

The extent to which inflation increases economic uncertainty in Australia has probably diminished during the 1980s. The recorded rate of inflation has been relatively steady in recent years, although at times the actual inflation outcome has been considerably higher than predicted by many economic commentators. Perhaps more importantly, the inflationary experience of the past two decades has seen the development of various innovations which reduce the risk of losses (and gains) that changes in the inflation rate could bring. Examples include variable interest rate financial instruments and the indexing, often informally, of wages, prices and government charges.

### ***International competitiveness***

Of particular importance to primary industries is the argument that Australia's international competitiveness is reduced as a consequence of the high domestic rate of inflation relative to the overseas performance (Fraser 1990). It has been argued that inflation causes the costs of domestic export and import competing industries to increase relative to costs overseas, thus reducing Australia's international competitiveness. However, the nominal exchange rate as well as relative inflation rates need to be considered when assessing the international competitiveness of these industries (Dwyer and O'Mara 1988). For example, a higher domestic rate of inflation relative to Australia's major trading partners would not reduce the competitiveness of local industries if a sufficiently large decline in the Australian dollar were to

occur at the same time. The *net* effect of changes in relative inflation rates and the exchange rate is captured in the *real* exchange rate. The real exchange rate is a trade weighted nominal exchange rate adjusted for the inflation differential between Australia and its major trading partners (McKenzie 1986). A rise in the real exchange rate indicates that the international competitiveness of Australia's export and import competing industries is reduced, and conversely. Even though Australia's inflation rate has generally been above the OECD average, the real exchange rate has both increased and decreased during the 1970s and 1980s (Figure 6).

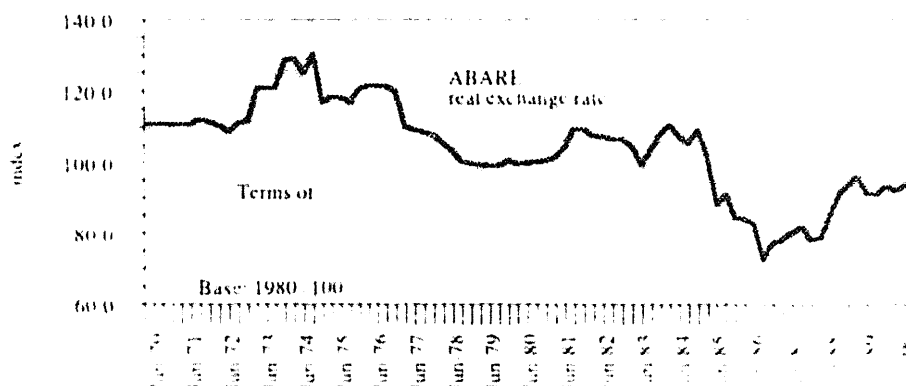


FIGURE 6 — *Australia's real exchange rate and the terms of trade*

A wide range of factors can cause the real exchange rate to change over time. Changes in the real exchange rate which are sustained over the medium to long term tend to reflect changes in the underlying structure of the economy such as the development or depletion of natural resources. Shorter term changes can be caused by changes in monetary and fiscal policy, changes in the terms of trade, or changes in sentiment in financial markets which result in foreign capital flowing into or out of Australia. The fall in the real exchange rate in 1985 and the first half of 1986 was exceptionally large and ABARE research conducted at that time indicated that it was due in part to short term influences which would not be sustained (O'Mara, Wallace and Meshios 1987). The rise in the real exchange rate since mid-1986 is consistent with that view. In the September quarter 1990, the real exchange rate is judged to have been only slightly above the level which is likely to be sustainable over the medium term.

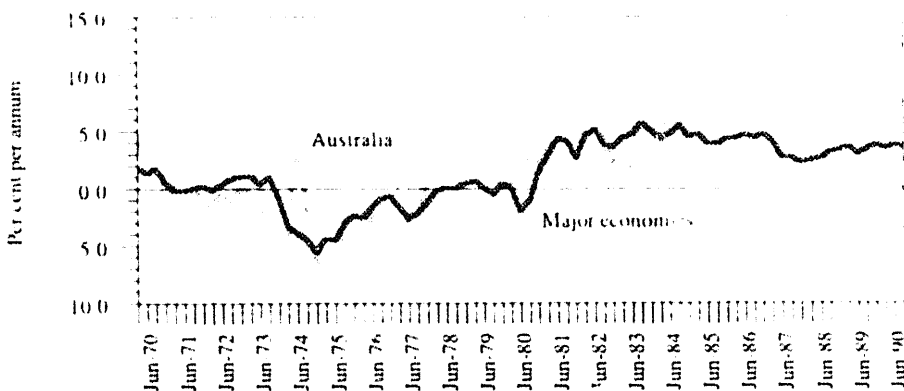
## *Reducing Inflation*

### *Policy options*

Implementing restrictive monetary and fiscal policies to reduce demand pressures has been used regularly by governments, both in Australia and overseas, as a means of controlling

inflation. Indeed, such policies have been implemented in circumstances where inflationary pressures reflect one-off cost increases or inflexible inflationary expectations rather than excess demand pressures. Monetary policy influences demand and the rate of inflation through its effect on interest rates. A tightening of monetary policy results in a rise in real interest rates which reduces growth in private consumption and investment expenditure and hence lowers inflationary pressures. In the short term, at least, reduced demand for goods and services often reduces growth in output and increases unemployment which further reduces demand pressures. Assuming world real interest rates are stable, higher domestic real interest rates encourage additional capital inflow and hence place upward pressure on the nominal and real exchange rate. As a consequence, the domestic price of export and import competing goods declines and output and employment in these industries are likely to fall in the short term. Hence, during the period of adjustment to a lower inflation rate, both real interest rates and the real exchange rate increase. Tighter fiscal policy reduces demand and hence inflationary pressures directly through a combination of raising taxes and reducing government spending and this may also produce second round effects in the form of lower output and employment in the short term.

In recent years, the policies implemented to lower the current account deficit have been similar to those that would achieve reductions in inflation; that is, both monetary and fiscal policies have been tightened significantly to restrain domestic expenditure and hence imports. Real interest rates in Australia increased markedly in 1984-85 and again in 1988-89, reaching 10 per cent on each occasion (Figure 7). The public sector's financial position also switched from a large borrowing requirement of 7.0 per cent of gross domestic product in 1983-84 to a small net lending capability since 1988-89 (Figure 5).



**FIGURE 7 — Real short term interest rates in Australia and other major economies**

An important consideration in determining the effectiveness of monetary and fiscal policies is their impact on expectations. For example, the impact of higher real interest rates on domestic demand and production may be relatively minor if consumers and firms expect the rise to be temporary. In these circumstances, monetary policy may need to be tightened to a greater degree than would otherwise have been the case, increasing the upward pressure on the real exchange rate and hence increasing the burden borne by exporting and import competing industries in the short run. By contrast, private consumption and investment expenditure is likely to be reduced more rapidly if the rise in interest rates is expected to be sustained. Thus, if consumers and firms believe that the government or central bank will persist with strong anti-inflationary policies, they will revise more quickly their expectations about future output and inflation. As a result, announced government policies which are judged to be credible by consumers and firms can achieve a lower rate of inflation with a smaller effect on output and employment, including a smaller increase in the real exchange rate in the short run.

The effects of tighter monetary policy on economic growth will also be influenced by the speed with which wages and prices adjust. That is, the flexibility of the labour and products markets to respond to changing economic conditions is an important factor in assessing the costs of reducing inflation. In practice, unlike prices in financial and exchange markets, wages and goods prices tend to be relatively 'sticky' and adjust with a lag. As a consequence of the delayed impact on prices, a tightening of monetary policy will have a relatively greater negative impact on output and employment. The costs of reducing inflation are therefore likely to be greater the more inflexible are wages and prices.

Inflationary expectations are an important influence on the extent to which wages and prices are likely to adjust downward rapidly in response to the implementation of an anti-inflation policy. Recent wages outcomes negotiated under the Accord have been influenced significantly by expectations of the inflation rate. However, growth in nominal wages influences inflationary expectations and the future rate of inflation. It is for this reason that some commentators have argued that the government should place greater emphasis on achieving lower wage outcomes under the Accord, possibly through a wages-tax trade-off (D. Morgan 1990). The aim of the wages-tax trade-off is to provide income tax cuts to offset the effects of lower growth in nominal wages. Under this proposal net income is unchanged but growth in nominal wages and hence inflationary expectations are reduced. A major problem with the wages-tax trade-off proposal is that it results in a fall in the Commonwealth budget surplus, which may adversely affect market sentiment and increase the size of the risk premium on Australian investments.

### *Some estimates for Australia*

The Murphy (1988) model of the Australian economy was used to assess the size and significance of some of the effects discussed above. The model was used to simulate the

medium term effects on the Australian economy of a gradual tightening of monetary policy in the absence of a risk premium. These simulation results are reported in Table 1. The Murphy model is a relatively small model and is not sufficiently detailed to enable the effects of tighter monetary policy on primary industries to be measured directly. However, the model provides a useful framework to estimate the impact of tighter monetary policy on real interest rates and the real exchange rate. The implications of these changes for Australia's primary industries are considered in a later section.

Monetary policy is tightened sufficiently to achieve an inflation rate of 4 per cent after five years. This represents a significant reduction from the 7.25 per cent inflation rate which is assumed would otherwise occur. By year 5, the consumer price index is about 9 per cent lower than it would otherwise be. The Murphy model is based on the assumption that, in the absence of any policy changes, real gross domestic product would rise by 2.5 per cent each year. In the simulation, economic growth is somewhat lower than this rate in the first three years, but then recovers and is above this rate in subsequent years. However, even by year 5, real output is still 0.2 per cent below the level it would have been in the absence of the tightening of monetary policy. Overall, in the five years in which monetary policy is gradually tightened, real gross domestic product in 1984-85 prices, discounted at a real rate of 5 per cent to express it in present day terms, is \$3.6 billion lower than would otherwise have been recorded.

TABLE 1

*Effects of a gradual tightening of monetary policy: simulation results(a)*

	Years				
	1	2	3	4	5
	%	%	%	%	%
<b>Changes</b>					
Consumer price index	6.63	5.70	5.18	4.59	4.06
<b>Deviations from baseline solution</b>					
Consumer price index	-0.58	-2.02	-3.92	-6.30	-9.09
Real GDP	-0.15	-0.33	-0.42	-0.33	-0.24
90 day bank bill rate(b)	0.13	-0.61	-0.84	-1.93	-2.68
Real interest rate(b)	0.75	0.94	1.24	0.73	0.51
Trade weighted value of the \$A	5.29	5.52	6.10	7.42	9.79
Real exchange rate	4.45	3.05	1.47	0.00	-1.08
Current account deficit(c)	0.50	0.51	0.34	0.16	0.01

(a) Based on the Murphy model of the Australian economy. (b) Percentage points. (c) Per cent of gross domestic product.

The 90 day bank bill interest rate increases in year 1 and declines in each of the following years. By year 5, the interest rate is about 2.7 percentage points below the rate it would otherwise have been. More importantly, the real interest rate, measured as the 90 day bank bill rate less the actual inflation rate, increases in each of the first three years before declining slightly in years 4 and 5. The gap between the real interest rate under the tighter monetary policy and that in the absence of any policy change reaches a peak of about 1.2 percentage points in year 3, but this falls to about 0.5 percentage points in year 5. These may be underestimates of the real interest rate since in any year the expected rate of inflation is likely to be lower than the actual rate.

The trade weighted value of the Australian dollar strengthens in year 1, but weakens in each of the following years. By year 5, the trade weighted index is about 10 per cent higher than it would have been in the absence of the policy shift. More importantly, the real exchange rate increases sharply by 4.7 per cent in the first year and falls by 0.8–1.2 per cent in each of the following years. Overall, by year 5 the real exchange rate falls by around 1 per cent. The real exchange rate is higher than it would otherwise have been in the first three years, but is about 1.1 per cent lower by year 5.

A key aspect of the monetary policy tightening is its impact on the current account deficit. The current account deficit, as a share of gross domestic product, increases by around 0.5 per cent after one year, is relatively steady in the second year and then gradually declines to the level it would otherwise have been after five years (Table 1). At no point does the current account deficit, as a share of gross domestic product, decline following a tightening of monetary policy aimed to reduce the rate of inflation.

An important distinction, however, needs to be made between this outcome and a tightening of monetary policy in the presence of a risk premium. Penm and Wright (1990) examined the implications of various monetary policy responses to the temporary emergence of a risk premium. They found that, if monetary policy is tightened to incorporate the risk premium directly into the interest rate structure, inflation is not significantly reduced and the current account deficit, as a share of gross domestic product, actually falls in year 1 and then gradually returns to around the level it would otherwise have been after five years. If monetary policy is tightened such that domestic real interest rates are increased by more than the size of the risk premium, inflation is significantly reduced and the current account deficit, as a share of gross domestic product, increases in the first two quarters, but then falls sharply and is lower than it would otherwise have been over the following three years. The implication of these results is that identification of the risk premium is extremely important in the conduct of monetary policy. Notably, to achieve a significant reduction in the rate of inflation through tightening monetary policy, real interest rates need to be increased by more than the size of any risk premium.



Stemp and Murphy (1990) used the Murphy model to examine the importance of expectations about monetary policy actions in achieving a reduction in inflation in the medium term. The key implication from their study is that monetary policy will need to be tighter and hence output and employment to be lower if uncertainty exists about the commitment and ability of the central bank to reduce the rate of inflation.

### *Some international estimates*

The results from international studies on the effects of various monetary policies aimed at significantly reducing the rate of inflation provide useful insights for the Australian situation. A key implication from these studies is that the Murphy model simulations appear to underestimate the potential fall in economic growth following a tightening of monetary policy.

The International Monetary Fund has estimated the costs of achieving price stability in industrialised countries (IMF 1990). Using its multicountry macroeconomic model, MULTIMOD, the International Monetary Fund simulated the effects of a gradual tightening of monetary policy to achieve approximate price stability in all industrialised countries over a period of six to eight years. The International Monetary Fund concluded that these costs are temporary and depend largely on the degree of flexibility in wages and prices in the economy and on the credibility of the central bank's commitment and ability to adopt policies consistent with achieving price stability.

In these simulations, it was assumed that monetary policy is tightened gradually between 1991 and 1997, and the anti-inflation monetary policy stance is announced in advance and is viewed as fully credible by market participants. The rate of growth of the money supply is reduced by half of one percentage point a year or until price stability is achieved. Real gross domestic product in the industrialised countries grows at a slower rate than would otherwise occur throughout the entire period. Economic growth is over 1 per cent lower throughout much of the period, recovering slightly to 0.5 per cent below the baseline rate in 1997. Notably, the transitory output losses tended to be relatively large in countries where inflation is initially quite high and where prices and wages are less flexible.

In a complementary set of simulations, the International Monetary Fund examined the impact of altering the underlying assumptions regarding the degree of nominal and real wage flexibility, the credibility of the announced monetary policy stance and the pace of the monetary policy tightening. In brief, output losses are lower if wages and prices adjust relatively quickly to changes in the economy, if monetary policy credibility is high and if the policy is implemented gradually. Increased credibility of the anti-inflation program would tend to reduce output losses by lowering expectations of future inflation and reducing the period during which real interest

rates are high. Notably, the International Monetary Fund found that output losses are reduced markedly if real wages adjust rapidly to changes in capacity utilisation and unemployment in the economy.

The International Monetary Fund found that a rapid tightening of monetary policy would be the most appropriate course of action in the case where wages and prices are fully flexible. In addition, the simulation results are based on the assumption that the credibility of the policy tightening is not affected by the speed with which the policy is implemented. Output losses may, therefore, be reduced if it is judged that market participants regard a rapid implementation of an anti-inflation program to be more credible than a more gradual approach.

### *Implications for primary industries*

The conduct of monetary policy by the Reserve Bank will influence primary industries primarily through its impact on real interest rates and the real exchange rate. The simulation results reported in the previous section, based on the Murphy model of the Australian economy, provide a broad indication of the macroeconomic effects of a gradual tightening of monetary policy aimed to achieve an inflation rate of about 4 per cent after five years.

Farm indebtedness to financial institutions was around \$11 billion in June 1989, which suggests that each percentage point rise in the real interest rate could increase real interest payments by the farm sector on institutional debt by around \$110 million a year. In the simulation exercise, the real interest rate was consistently higher throughout the five year period than would have occurred in the absence of a tightening of monetary policy. In particular, the simulation results suggest real interest payments could be over \$80 million higher in the first year and about \$55 million higher in the fifth year.

A sustained 1 per cent rise in the real exchange rate is estimated to reduce the net value of farm production in 1989-90 prices by around \$150 million to \$200 million or 4-5 per cent from its value in 1989-90. This is based on the assumption that around 30-50 per cent of farm costs are export or import competing goods. The simulation results suggest that a rise in the real exchange rate of over 4 per cent is possible in the first year of the assumed monetary policy tightening. However, this real appreciation is not sustained and the real exchange rate actually declines in each of the following four years. By the fifth year, the real exchange rate is about 1 per cent lower than would have been the case in the absence of the monetary policy tightening.

A survey of the minerals industry, produced by the Australian Mining Industry Council in 1989, provides an indication of the financial performance of 138 companies which cover the

majority of mineral production in Australia (AMIC 1989). In June 1989, total borrowings by these companies amounted to about \$10 billion. Hence in 1988-89 prices, each one percentage point rise in the real interest rate may increase real interest payments by around \$100 million a year.

ABARE estimates that gross turnover for the mineral resource sector was about \$42 billion in 1988-89, the latest year for which data are available. Under the assumption that net turnover as a share of gross turnover is the same in the AMIC mineral industries survey as for the mineral resource sector as a whole, net turnover for the sector is estimated to have been around \$6 billion in 1988-89. A 1 per cent fall in the real exchange rate, if sustained, is estimated to reduce net turnover in the mineral resource sector in 1988-89 prices by \$200 million to \$300 million or 4-5 per cent from its 1988-89 level. This assumes that around 30-50 per cent of mineral resource sector costs are export or import competing goods.

It should be emphasised that these simulation results are indicative of the types of movements in real interest rates and the real exchange rate which may occur as a result of a gradual tightening of monetary policy. Stemp and Murphy (1990) demonstrated that, if market participants do not expect the policy shift to be sustained, the adjustment may be quite different with higher real interest rates and a lower exchange rate, but this occurs at the cost of a larger fall in the rate of economic growth.

It appears, therefore, that there are considerable short term costs to primary industries if monetary policy is tightened to reduce inflation over the medium term. However, if inflation were maintained at its present relatively high rate, there would also be costs to primary industries. A major problem for the monetary authorities is that these costs, for both primary industries and for the economy as a whole, are extremely difficult to measure. One potentially important cost is the impact of inflation on economic uncertainty. A further important cost arises through the interaction of inflation and the taxation system. The distortions to saving and investment, including the bias toward debt rather than equity financing, may have contributed to Australia's large current account deficit and high level of foreign debt. It also appears likely that market participants have at times demanded a risk premium on Australian investments to compensate for the additional uncertainty about domestic economic prospects caused by the persistent large current account deficit and high foreign debt level. As a consequence, real interest rates in Australia have been somewhat higher and the real exchange rate somewhat lower at times in recent years than would otherwise have occurred.

## *Concluding Comments*

In the 1970s and 1980s, Australia's rate of inflation tended to be above that of other industrialised economies. While the achievement and maintenance of a low inflation rate has been a key objective of monetary policy in many overseas countries, there has been a considerable debate in Australia about the priority which the Reserve Bank should place on reducing and possibly eliminating inflation. A key problem in this continuing debate is that it is extremely difficult to identify, measure and hence compare all the costs of inflation and the costs of reducing inflation. It is not immediately apparent, however, that the costs of continuing relatively steady inflation in Australia are greater than the costs of reducing inflation.

If the Reserve Bank tightened monetary policy to achieve a substantial fall in the rate of inflation, there would be a temporary increase in real interest rates and the real exchange rate, resulting in significant adjustment costs to primary industries and the rest of the economy. If the current inflation rate were maintained, the economy would incur the continuing costs of inflation.

Although these costs are difficult to assess and further research is required to quantify them, they are likely to have been substantially diminished in recent years with, for example, the widespread introduction of indexing. The adverse impact of inflation on economic activity through increasing uncertainty is also likely to have been reduced since the rate of inflation has been relatively steady at around 7-8 per cent in recent years. A continuing rate of inflation around these levels is therefore likely to be less costly than if inflation were volatile and unpredictable. Even if inflation fluctuates more widely in future, however, microeconomic reform is likely to result in an increase in the speed with which prices and wages adjust to changes in the economy, thus lowering the adjustment costs to any new rate of inflation. Finally, the government also has the option of lowering the costs of inflation through reforming the tax system to remove or at least reduce the distortions caused by its interaction with inflation.

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