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EXCHANGE RATES, INTEREST RATES AND AGRICULTURE: A MACROECONOMIC VIEW*

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The underlying causes of longer term movements in real exchange rates, and the implications of such movements for the Australian farm sector, received considerable attention after the mid-1970s. Following the floating of the Australian dollar in 1983, major swings in the nominal and real exchange rate and in interest rates stimulated a new round of research in these areas. Because the real exchange rate and the real interest rate are probably the two domestic macroeconomic variables with the greatest potential to affect the Australian farm sector, they have also been high on the list of research priorities in the Australian Bureau of Agricultural and Resource Economics (ABARE). In the paper, this recent ABARE research is reviewed from both an Australian and an international perspective. The focus is on the forces driving exchange rates and interest rates, and the outlook for those variables.

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1. INTRODUCTION

Macroeconomic influences on agriculture, particularly exchange rate influences, were a key focus of the August 1986 meeting of the International Agricultural Trade Research Consortium. In many of the papers, the emphasis was on the US experience and on the results of some associated empirical and theoretical research (Paarlberg and Chambers 1988). The objective of the present paper is to complement that earlier material by reviewing the recent Australian experience and economic research in the area of exchange rates, interest rates and agriculture.

Australia adopted something approaching a floating exchange rate only in 1983, some years later than many other countries, although a degree of flexibility along the lines of a 'crawling peg' had been introduced in 1976. However, it had long been recognised by Australian economists that a fixed nominal exchange would neither prevent, nor eliminate the need for, movements in the real exchange rate from time to time (Swan 1955, 1960; Salter 1959).

The underlying causes of longer term movements in real exchange rates, and the implications of such movements for the Australian farm sector, received considerable attention after the mid-1970s (for example, Gregory 1976; Snape 1977; Stoeckel 1979; O'Mara, Garland and Campbell 1980). Following the floating of the Australian dollar in 1983, major swings in the nominal and real exchange rate and in interest rates stimulated a new round of research in these areas. Because the real exchange rate and real interest rates are probably the two domestic macroeconomic variables with the greatest potential to affect the Australian farm sector, they have also been high on the list of research priorities in the Australian Bureau of Agricultural and Resource Economics (ABARE). In what follows, the focus is on the forces driving exchange rates and interest rates, and the outlook for those variables, rather than on the detailed microeconomic effects of movements in these variables on the farm sector. The latter issues have been addressed at some length by, for example, Martin and Shaw (1986) and Higgs (1986).

In the next section, recent macroeconomic developments in Australia are reviewed briefly, particularly with respect to exchange rates and interest rates and the associated issues of the current account balance, the terms of trade and foreign debt levels. The theoretical models which have underpinned and provided the intuitive basis for much of the recent Australian research are outlined in section 3. Some of the key components of that research are drawn together and discussed in section 4, with an emphasis on the ABARE contributions. Taken together, that research has permitted ABARE to place a particular interpretation on the recent exchange rate and interest rate developments in Australia, and on that basis to make medium term projections of those variables. In section 5, some recent ABARE research on international current account imbalances and exchange rate movements is discussed briefly Finally, section 6 contains some concluding remarks, with particular reference to the sustainability of present key exchange rates.

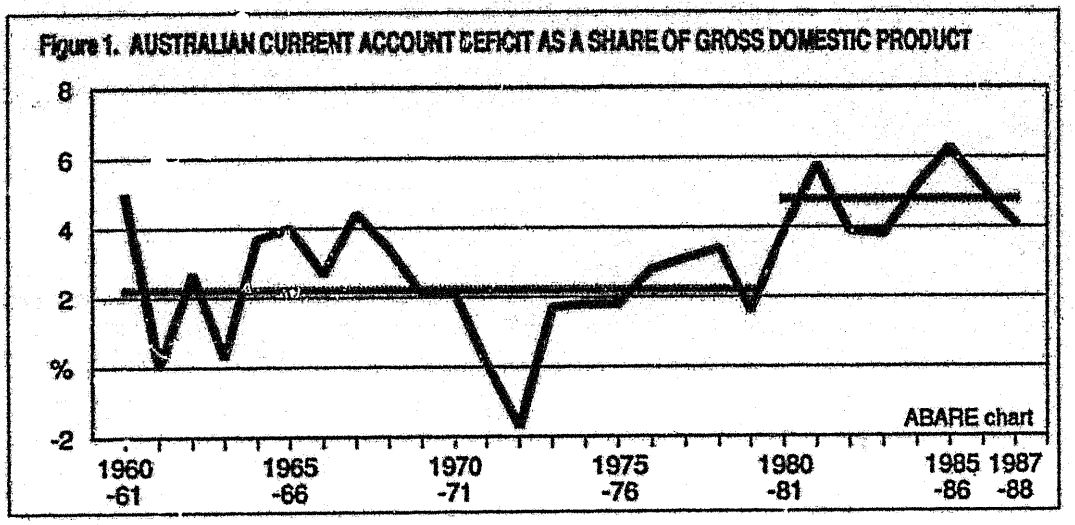
2. RECENT ECONOMIC DEVELOPMENTS IN AUSTRALIA

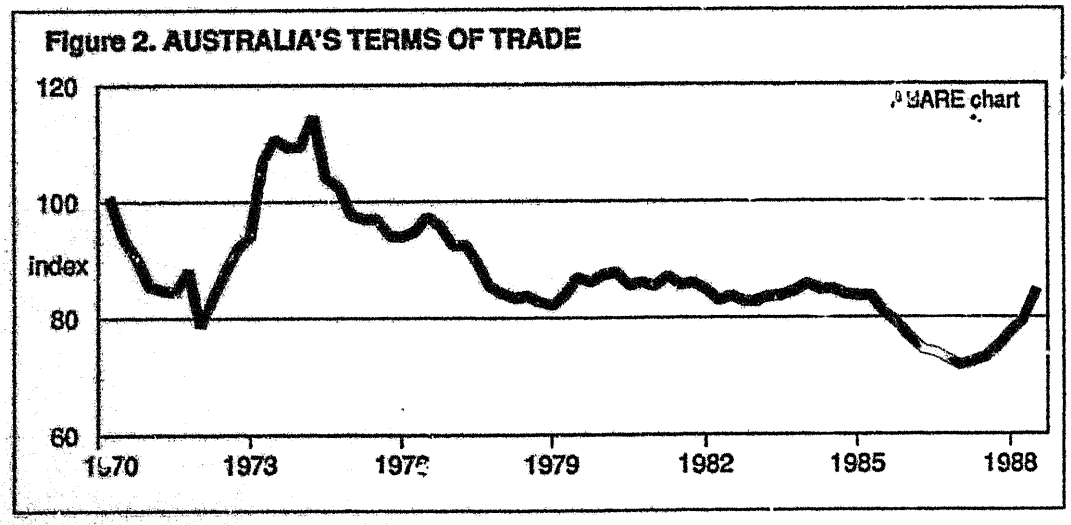
A crucial feature of Australia's economic performance during the 1980s has been a marked increase in the deficit in the current account. Since the early 1960s, the current account deficit had averaged around 2 per cent of GDP, but during the 1980s the average has been around 5 per cent, peaking at about 6 per cent in 1985-86 (see figure 1). Since then a significant

improvement has occurred, with the deficit in 1988-89 expected to be around 3 per cent of GDP.

These developments on the current account have mirrored, to some extent, a sharp decline in Australia's terms of trade during the mid-1980s (figure 2), followed by a substantial recovery more recently. It is clear from figure 2, however, that Australia's terms of trade have long been subject to major volatility, and the experience of recent years has not really been atypical.

Australia's real exchange rate - defined as the nominal exchange rate against major trading partners weighted by general trade shares and adjusted for inflation differentials - fell dramatically, by around 37 per cent, between the December quarter 1984 and the September quarter 1986 (figure 3). Though estimates of the real exchange rate over long periods of history are necessarily uncertain, there is some evidence that the fall in the real exchange rate in the mid-1980s was one of the sharpest this century and carried it to the lowest level this century (McKenzie 1986). Since the latter part of 1986, the real exchange rate has risen markedly, although by





the September quarter 1988 it was still around 20 per cent below its 1984 level.

The deterioration in the current account balance and the overall decline in the real exchange rate since 1984 have both contributed to a rapid rise in Australia's net foreign debt, from less than 10 per cent of GDP in the early 1980s to around 30 per cent in 1988 (figure 4). The devaluation contributed to the rise because much of Australia's foreign debt is contracted in foreign currency. Stabilising and then gradually reducing the debt ratio has emerged as a key priority for Australian policy makers, because the level and rate of growth of this ratio is widely seen as a major influence on sentiment in financial markets and therefore on the presence of, and size of, a risk premium in the Australian interest rate structure.

The sharp fall in the exchange rate during 1985 and 1986 was accompanied by a marked increase in interest rates in Australia, with many rates reaching record levels during this period (figure 5). Much of this increase has since been reversed, with most interest rates in Australia now at levels broadly in line with those of 1984, prior to the depreciation episode.

Figure 3. AUSTRALIA'S REAL EFFECTIVE EXCHANGE RATE

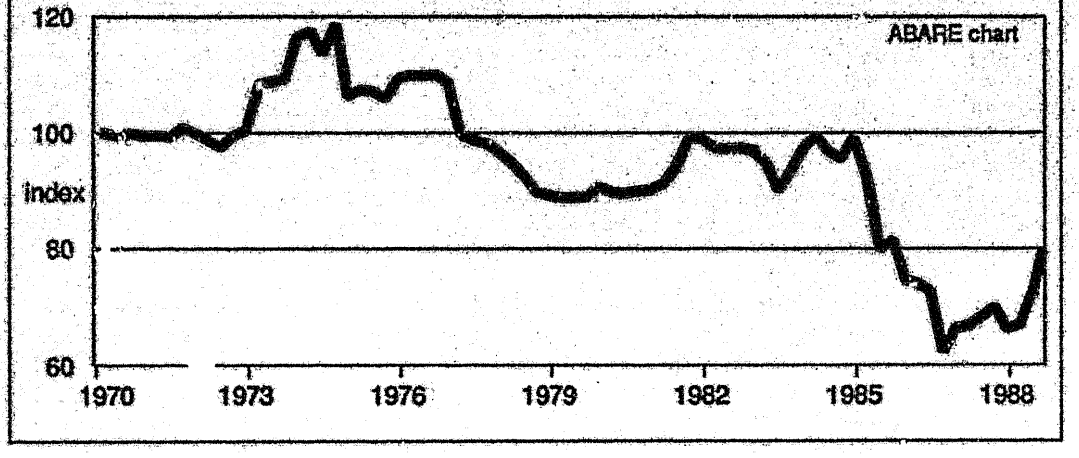


Figure 4. NET FOREIGN DEBT TO GDP AND DEBT SERVICE RATIOS

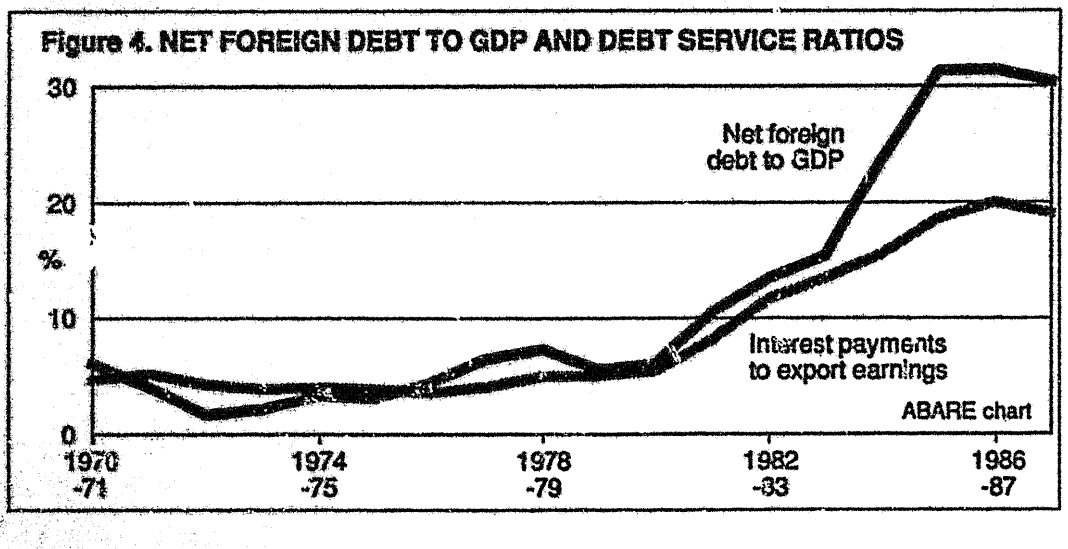
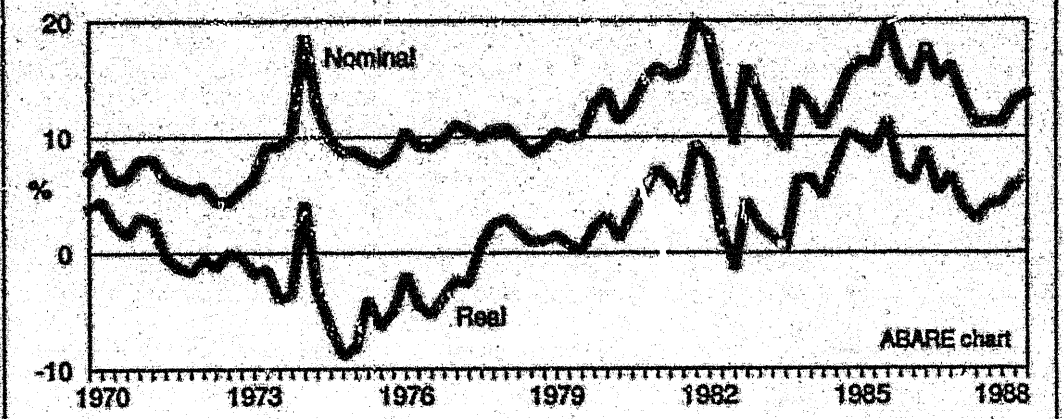


Figure 3. INTEREST RATES 90-day bank bill



From the viewpoint of the Australian farm sector, the real exchange rate and real interest rates are the domestic macroeconomic variables with the greatest potential to affect profitability. For example, the decline in the real exchange rate in 1985 and 1986 was so large as to cushion much of the effect of the worldwide slump in primary commodity prices at that time (Martin and Shaw 1986). Indeed, the key livestock industries, wool and beef, remained very profitable during this period despite the fact that, measured in foreign currency, the world prices of both commodities were relatively depressed. On the other hand, the very high interest rates ruling at that time eroded part of the benefit of the low real exchange rate by adding to the cash costs of indebted farmers and by depressing farm asset values.

3. SOME KEY THEORIES

There is no question that the factors which drive exchange rates are numerous and complex. There are, however, some key theories and theoretical models which enable some order to be made out of the chaos. From a medium and longer term perspective, important insights can be gained from a simple theoretical paradigm developed by two Australian economists during the 1950s - Swan (1955, 1960) and Salter (1959). In the short run, the major influences on exchange rates are likely to be monetary factors, expectations and sentiment. Theoretical and empirical work on these latter issues is now legion, but much has its origins in the seminal work by Dornbusch (1976).

In the real world, at any point in time, exchange rates are driven by a combination of these longer term and short term influences. However, in order to make economic research more tractable, it is often convenient to draw a distinction between the two and focus on one or the other. This is the approach which has generally been adopted by ABARE in its exchange rate research.

3.1 The Swan/Salter Paradigm

The Swan/Salter paradigm can be conceptualised as a simple general equilibrium model which distinguishes two classes of goods and services - traded and non-traded. The key relative price in the model is the relative price of traded and non-traded goods - in other words, the real exchange rate. Since the model originated as a mode of analysis for a 'small' open economy, it is assumed that the relative price of importables and

exportables - the terms of trade - is determined exogenously. It is assumed that resources flow between the traded and non-traded goods sectors in response to changes in the real exchange rate. Domestic demand for both classes of goods is assumed to be a function of aggregate demand (or absorption) and the real exchange rate. A simple geometric representation of the model is set out in appendix A, along with some standard manipulations.

A central conclusion to emerge from analysis with the model is that the role of the real exchange rate is not to equate the demand for and supply of traded goods, and hence to maintain equilibrium in a country's external accounts. Rather, its role is to ensure that the market for non-traded goods is in equilibrium.

Intuitively, the reason for this result is relatively simple. As non-traded goods cannot, by definition, be either exported or imported, then any excess demand for, or supply of, non-traded goods must be eliminated by substitution and switching between traded and non-traded goods. To bring this about requires a change in the relative price of traded and non-traded goods. The domestic demand for and supply of traded goods, in contrast, need not be equal at all points in time. If demand for traded goods exceeds the local production of traded goods, the difference takes the form of a balance of trade deficit, and conversely.

It is also instructive to note that, given equilibrium in the market for non-traded goods, an excess demand for traded goods must imply that absorption exceeds aggregate production, and conversely. In other words, the driving force behind a trade imbalance is an imbalance between absorption and GNP.

The existence of a trade imbalance does not, therefore, necessarily mean that the real exchange rate is at an inappropriate level, or that a change in the real exchange rate will, in isolation, provide a solution. Rather, the ultimate solution lies in the narrowing or closing of the gap between absorption and GDP. Most often, this will occur more or less automatically as the private sector of the economy responds to the changes in its wealth position which have resulted from its previous borrowing and lending decisions - decisions which are likely to have been rational in the sense that they resulted in an intertemporal maximisation of expected utility. However, a change in fiscal policy may be required if an excessively loose or tight fiscal policy was a major contributor to the gap between absorption and GDP, and if that fiscal policy stance did not result in a change in private sector savings in the way suggested by Barro (1974, 1979). If either or both of these adjustments occurs too slowly for the satisfaction of participants in financial markets, then they may seek to force the pace of adjustment. In the case of an external deficit, for example, investors may generate an outflow of capital, driving up domestic interest rates sufficiently to either choke off some private sector demand or to force the government to tighten fiscal policy.

As the gap between absorption and GDP narrows via one or more of these routes, then, and only then, is a sustained change in the real exchange rate likely to occur. The extent of the change in the real exchange rate will be governed by the need to maintain equilibrium in the non-traded goods sector.

The Swan/Salter model also provides important insights into the interaction, over the medium term, between a country's terms of trade and its real exchange rate. This is a crucial issue for countries (such as Australia) whose exports include a large proportion of primary commodities.

Because the prices of primary commodities tend to be relatively volatile on world markets, the terms of trade of primary commodity exporters also tend to be volatile.

In the context of the Swan/Salter framework, it follows readily that the effect on the real exchange rate of a decline (for example) in the terms of trade will be governed by the change in domestic demand which accompanies that decline. If domestic demand does not decline despite the decline in real effective income brought about by the decline in the terms of trade, then the preexisting equilibrium in the non-traded goods sector may not be disturbed significantly, and hence there will be little requirement for the real exchange rate to change. On the other hand, if, as seems likely, domestic demand does decline, it is likely that the relative price of non-traded goods will fall - in other words, that a real devaluation will occur. Further, it can be shown readily that, if domestic demand falls by less than the decline in real effective income following the decline in the terms of trade, the current account will deteriorate (see appendix B). In other words, the new equilibrium real exchange rate following the decline in the terms of trade will not necessarily be associated with an unchanged balance of trade and current account outcome.

Finally, the equilibrium real exchange rate obtained from this type of analysis, focusing as it does on longer term structural factors, can also be interpreted as a measure of the Fundamental Equilibrium Exchange Rate, or FEER, proposed by Williamson (1985). Also in keeping with the FEER approach, there is no presumption that the real exchange rate will approximate its longer term equilibrium level at all points in time. In particular, shorter term influences may, in some periods, cause the actual real exchange rate to differ markedly from its longer term equilibrium level.

3.2 Theories of Short Term Exchange Rate Behaviour

(a) The monetary overshooting model

Over the past decade, an extensive literature has emerged dealing with the impact of monetary policy and expectations on the nominal and real exchange rate. The primary contribution was probably that of Dornbusch (1976), with important extensions being made by, among others, Gray and Turnovsky (1979), Bhandari (1981) and Turnovsky (1981).

At the risk of some oversimplification, two key assumptions or relationships can be said to provide the driving force in these models. Firstly, it is assumed that with capital very mobile around the world, arbitrage will ensure that interest rates, adjusted for expected exchange rate movements and risk, are equated around the world: the interest rate parity condition. Secondly, it is assumed that, in the short term, prices in financial markets, such as interest rates and exchange rates, are more responsive to market forces than are prices in goods markets - particularly the prices of non-traded goods. Dornbusch (1976) considered the case of a change in monetary policy under such circumstances. His results for the long run are quite conventional - monetary policy is neutral with respect to real variables, including the real exchange rate. In other words, over the medium to longer term, analysts can ignore monetary influences and focus on general equilibrium or structural factors such as those identified in, for example, the Swan/Salter approach.

In the short run, however, the role of monetary influences can be much more important. A monetary shock can cause not only an immediate change in

the nominal exchange rate, but a change which carries it temporarily beyond its new equilibrium position - in other words, a monetary shock can cause the nominal exchange rate to 'overshoot' in the short term. Further, because (by assumption) many prices in the goods market, and hence the overall price level, respond to the monetary shock with a lag, the movement in the nominal exchange rate constitutes a short run change in the real exchange rate. The relative stickiness of some prices in response to monetary shocks has been examined recently by Chalfant, Love, Rausser and Stamoulis (1986), Devadoss and Meyers (1987) and, from an Australian perspective, by Lewis and Dwyer (1988).

The intuition behind the short term overshooting of the nominal exchange rate is quite straightforward. Suppose, for example, that the money supply, or its rate of growth, increases exogenously. With output and prices in the goods market assumed relatively fixed in the short run, the burden of maintaining equilibrium in the money market will fall on a lowering of interest rates. But at the same time, arbitrage on world financial markets will not allow the interest rate parity condition to be violated. The resolution to this apparent impasse comes in the form of an immediate downward movement in the nominal exchange rate to a point below its new long run equilibrium position. Participants in financial markets, who are assumed to be rational (or at least quasi-rational), are thus persuaded to expect a subsequent appreciation of the nominal exchange rate and hence become willing to accept a lower interest rate. Over time, however, the price level will rise, thus eliminating the need for lower interest rates and an overshot nominal exchange rate. The combination of a rising price level and a rising nominal exchange rate will serve to eventually eliminate the initial real devaluation.

After Dornbusch's seminal work on overshooting of the exchange rate in the short run, some research effort was directed toward identifying circumstances under which an overshoot may not occur in response to a monetary shock. For example, Turnovsky (1981) argued that an overshoot may not be necessary if output is not fixed. In other words, part of the burden of maintaining equilibrium in the money market may be borne by a change in output, reducing the need for change in the interest rate and hence in the exchange rate. Gray and Turnovsky (1979) demonstrated that a pre-announcement of the monetary shock could reduce the extent of, or perhaps eliminate, the short run overshoot of the nominal exchange rate. From an alternative perspective, Bhandari (1981) demonstrated that, if the assumed instantaneous equilibrium in the money market is replaced by partial adjustment, then again a short run overshoot in the exchange rate may be avoided.

It must be stressed, however, that the crucial issue from the viewpoint of those sectors of the economy which are exposed to exchange rate movements (which in most countries include the farm sector) is not that the exchange rate may overshoot its long run level in the short run. It is that the exchange rate, and hence the price of traded goods, is likely to change more quickly in response to a monetary shock than will the price of non-traded goods and hence the general price level. Therefore, even if a short run overshoot is circumvented - by, for example, one or more of the 'circuit-breakers' noted above - the monetary shock may well still result in a change in the real exchange rate in the short run and therefore have an effect on the farm sector.

(b) Exchange rate expectations and risk premiums

The interest rate parity condition is a fundamental premise on which the overshooting model of short run exchange rate behaviour is based. Most such models also assume that exchange rate expectations are formed rationally (or at least 'quasi-rationally', or 'regressively'). However, in recent papers, Frankel and Froot (1986, 1988) explored some implications of a limited departure from rationally formed exchange rate expectations and were led to the concept of a 'speculative bubble'. During periods when the exchange rate exhibits a significant trend, it is likely that exchange rate forecasts based on simple time series analysis would perform relatively well, and that participants in the foreign exchange market would give them a significant weighting when forming their exchange rate expectations. Such expectations may become self-fulfilling for a time, resulting in a continuation of the trend in the exchange rate beyond a level consistent with the country's longer term economic fundamentals (such as the level that might be implied by a Swan/Salter type analysis). However, as the time series forecasts gradually move out of line with market fundamentals, their accuracy will decline, encouraging market participants to give more weight to market fundamentals and eventually leading to a 'bursting of the speculative bubble'.

The theory provides little guidance as to the length of time over which a speculative bubble may persist. In the particular case of the US dollar, Frankel and Froot suggest that a bubble may have been present for around 15 months, from early 1984 to March 1985. Generally, it seems reasonable to suppose that such a phenomenon would be restricted to the relatively short term.

In addition to attempting to anticipate movements in the exchange rate - perhaps on the basis of rational expectations or of the speculative bubble phenomenon - participants in financial markets may also seek a risk premium in the returns on their investments in one country relative to other countries. The size of that relative risk premium or discount is likely to reflect, among other factors, the degree of certainty with which the exchange rate expectation is held, as well as the more nebulous factors of optimism or pessimism about the future prospects for the economy and the likely path to be followed by economic policy.

In terms of the monetary overshooting model, the effect of the emergence of, or a change in the size of, a risk premium can be analysed in exactly the same way as can that of an exogenous change in the world interest rate. Consider the case, for example, of an increase in the risk premium. The options available to the domestic monetary authorities are essentially the same as those which would be available to them in the case of a rise in the world interest rate. On the one hand, they could tighten monetary policy sufficiently to ensure that the risk premium is incorporated rapidly into the domestic interest rate structure. As financial markets would be satisfied with the new, higher domestic interest rate structure, major capital outflows would be avoided and the nominal and real exchange rates would remain relatively stable in the short run. However, to the extent that the higher domestic real interest rate reduces domestic demand for goods and services by encouraging saving and discouraging investment, some downward pressure would be placed on the real exchange rate over the medium term - an outcome which emerges readily from the Swan/Salter framework.

The alternative strategy is to leave monetary policy alone. This would mean that domestic interest rates would not rise immediately to incorporate

the risk premium. In terms of the Dornbusch analysis, the outcome would be similar to the case, outlined above, where the domestic money supply is assumed to increase. The nominal exchange rate would weaken immediately and 'overshoot' downward, creating an expectation of a subsequent exchange rate appreciation and thus providing financial markets with the risk premium they desire. Given the assumption of sluggish prices, particularly in the non-traded goods sector, this weakening of the nominal exchange rate will also lower the real exchange rate. Over the medium term, the general price level will rise, reducing the real money stock and hence placing upward pressure on domestic interest rates. As the risk premium is reflected increasingly in the domestic interest rate structure, the need for an overshot exchange rate will be reduced. The combination of a strengthening nominal exchange rate and a rising price level will reverse much of the real devaluation which occurs in the short term. As under the first strategy outlined above, the real devaluation which remains over the medium term, if any, will be governed by the decline in demand for goods and services in response to the higher domestic real interest rate.

4. RECENT ABARE RESEARCH

4.1 Application of the Swan/Salter Theory

Perhaps the most obvious, and certainly the most popular, explanation for the dramatic decline in Australia's real exchange rate in 1985 and 1986 was the fall in the terms of trade and the associated deterioration in the current account balance and rise in the foreign debt level. For example, researchers at the Institute of Applied Economic and Social Research at the University of Melbourne (Dixon and Parmenter 1987; Fraser 1987) argued that not only could all of the decline in the real exchange rate be explained in this way, but that even further real devaluation was warranted, relative to the level reached in mid-1986. The prospect of further real devaluation also led these researchers to suggest that real interest rates would remain very high in Australia during the remainder of the 1980s as the declining real exchange rate was reflected in exchange rate expectations.

A major government advisory body, the Economic Planning Advisory Council (EPAC) has taken a slightly less extreme view. They argued that while all of the decline in the real exchange rate in 1985 and 1986 could be explained in terms of the developments in Australia's current account and terms of trade, no further decline in the real exchange rate was required relative to its mid-1986 level (EPAC 1986, 1988). With the real exchange rate expected to be relatively stable in the latter half of the 1980s, EPAC was relatively optimistic that (in contrast to the Melbourne Institute view) interest rates would decline from the levels reached in 1985 and 1986.

ABARE used as a vehicle for its analysis a large scale general equilibrium model of the Australian economy, code named ORANI (Dixon, Parmenter, Sutton and Vincent 1982). This model has been developed and refined over a period of well in excess of ten years by several government departments and agencies in cooperation with the University of Melbourne. It has been used extensively in industry and policy analysis during that time. Most sectors and industries in the Australian economy are captured in some detail in ORANI. The philosophy underlying its structure is strongly neo-classical, although price rigidities and non-market-clearance in key areas can be imposed at will.

ORANI is an excellent vehicle for quantifying the effects of the influences identified and discussed in the context of the Swan/Salter model.

Indeed, to the extent that a distinction can be drawn between traded and non-traded goods in ORANI, analyses with that model can be validly thought of as an attempt to give some practical expression to the Swan/Salter theory.

To check the robustness of the results obtained from ORANI, use was also made of a much smaller general equilibrium model developed within ABARE - Crowley, O'Hara and Campbell (1983).

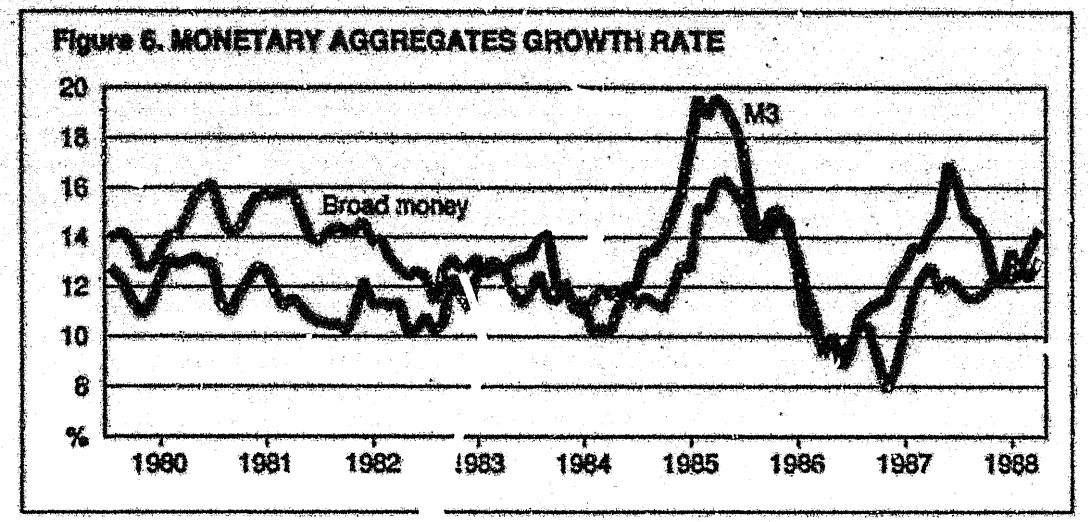
The first step in the ABARE research (O'Hara, Wallace and Meshios 1987; O'Hara, Crofts and Coote 1987; O'Hara 1988) was to assess the effect on the real exchange rate of the decline in the terms of trade in 1985 and 1986. In line with the discussion of the Swan/Salter model above, a range of assumptions were made about the size of the change in absorption that would be likely to be induced by, or to otherwise accompany, the decline in the terms of trade. In brief, the results indicated that the decline in the real exchange rate would be, at most, around 10 per cent.

Even before the decline in the terms of trade in 1985 and 1986, Australia's current account deficit was somewhat larger than its historical average as a share of GDP - large enough to imply that Australia's foreign debt as a share of GDP would trend upward. Australia's foreign debt to GDP ratio was already around 30 per cent by 1986 and a source of some concern for policy makers and in financial markets. It therefore seemed probable that, in one form or another, adjustments would occur during the remainder of the 1980s to reduce the underlying current account deficit to a level closer to its historical average. There were, of course, several ways in which the required decline in absorption relative to GDP might come about - increases in private saving in response to changing debt and wealth levels, a tightening of fiscal policy, or, by default, enforced adjustment in the private sector in response to the imposition of a risk premium in the interest rate structure. In either case, the analysis indicated that this further adjustment would be unlikely to be accompanied by a sustained additional decline in the real exchange rate of more than around 10 per cent. In other words, even if it were hypothesised that the decline in the real exchange rate in 1985 and 1986 reflected not only the concurrent decline in Australia's terms of trade but also the anticipated effects of structural adjustments likely to occur later in the 1980s, it was difficult to rationalise a fall in the real exchange rate of more than around 20 per cent.

As with all general equilibrium models, the numerical results obtained need to be interpreted carefully and allowance made for a significant margin of error. Nevertheless, the gap between the measured decline in the real exchange rate in 1985 and 1986 - close to 40 per cent - and the decline suggested by an examination of the longer term economic fundamentals as outlined above is quite striking. It was concluded that there was plenty of scope for other, shorter term, influences to have contributed to the outcome.

4.2 Application of Shorter Term Theories

One candidate for inclusion in the list of possible short term influences on the exchange rate during the mid-1980s is an expansionary monetary shock. A very pronounced increase occurred in the rate of growth of the major monetary aggregates in Australia in the latter part of 1984 and during 1985, around the same time as the large fall in the exchange rate (figure 6). This conjunction of developments would seem to fit quite neatly



into the Dornbusch overshooting framework. Unfortunately, the picture is complicated by the fact that deregulation of the Australian financial system was proceeding apace at the same time. Among other effects, deregulation improved the competitiveness of banks relative to non-bank financial institutions and led to the emergence of various new forms of financial instrument. This is likely to have caused a slowdown in the velocity of circulation of money, particularly of the more narrowly defined money supplies. Consequently, despite the fact that the monetary aggregates were observed to be growing very quickly, there was considerable uncertainty among policy makers and policy advisers as to whether this implied an excessively rapid rate of monetary growth.

With the benefit of hindsight, it now seems clear that the rate of growth of the money supply was, in fact, excessive during the latter part of 1984 and 1985. In addition to the sharp decline in the exchange rate, inflation in Australia increased sharply, from around 6 per cent in 1984 to more than 9 per cent in 1986, and growth in aggregate demand and GDP were very strong during much of 1985. These developments are consistent with the hypothesis that an expansionary monetary shock occurred during this period. More formal empirical support for this hypothesis has been provided by ABARE research (Hogan 1986). In that analysis, several conventional monetary models of short term exchange rate behaviour were estimated using Australian data up to mid-1985. At least some of those models seem to be capable of tracking and explaining at least part of the large decline in the exchange rate in 1985.

Other ABARE research has explored the questions of whether the emergence of a risk premium in the Australian interest rate structure, or the formation of a speculative bubble in the foreign exchange market, may have also contributed to the decline in the exchange rate in 1985 and 1986 (Thorpe, Hogan and Coote 1988). A common approach to the measurement of risk premiums is to assume that exchange rate expectations are formed rationally and hence that, given covered interest parity, the observed prediction error in the currency forward market represents the risk premium (or discount). An obvious problem with this approach is that, even if currency markets are rational or speculatively efficient, prediction errors can arise as a result of new information coming to hand after the expectation is formed. In its research, ABARE adopted the alternative approach of measuring the risk

premium as the difference between the forward market quote and the expected future spot rate obtained from a survey of market participants.

The results indicate that a very substantial risk premium emerged during 1985, at times reaching double digits as an annual rate. However, the risk premium seemed to become appreciably smaller during 1986, before increasing briefly in the period just after the stock market slump in October 1987. It is interesting to note that, while the risk premium appeared to become smaller in 1986, there is also evidence of less rationality in the formation of exchange rate expectations at that time. One possibility is that, given the volatility of the exchange rate in 1985, survey respondents were in 1986 more inclined to base their exchange rate expectations on the forward market quote itself, thus biasing the survey results. Alternatively, the weakness in the exchange rate in 1985 may have been sufficient to create an expectation of further weakness in 1986, in the manner of a speculative bubble.

4.3 An Alternative Perspective on the Real Exchange Rate

Another key area of exchange rate research in ABARE has been the definition and measurement of the real exchange rate and of international competitiveness. This issue has generated a great deal of interest in the profession, both in Australia and elsewhere, over the past decade and has spawned a vast literature. Much of this literature has been directed at the relatively mechanistic aspects of the choice of countries and weightings in the construction of real effective exchange rate indices - particularly the construction of commodity specific real exchange rates. Many of the issues involved have been surveyed recently by Dutton and Grennes (1985, 1987) Juttner (1988) and Fagerberg (1988).

Recent ABARE research has taken as a starting point the definition of an industry's competitiveness as its ability or otherwise to attract resources from elsewhere in the economy.

From a microeconomic perspective, the key factors influencing the competitiveness of an industry, thus defined, would include: the output price relative to the prices of other goods in the economy; the input prices relative to those paid in other industries; the relative rate of technological change; and the relative influence of government regulations and controls. At a macroeconomic level, of course, the focus must be on broad sectors rather than on individual industries. Taking a lead from the Swan/Salter model, an obvious basis for aggregating industries is the traded and non-traded categorisation. Thus, the competitiveness of traded goods in general can be defined as the ability of the traded goods sector to attract and hold resources in competition with the non-traded goods sector. The key relative price in that case is the relative price of traded and non-traded goods, or the real exchange rate.

Even where the focus is on the competitiveness of an individual industry within the traded goods sector, this approach remains valid. A sensible first step is still to consider the relative price of traded and non-traded goods in general as an indicator of the competitiveness of the overall traded goods sector, other factors unchanged. This leads naturally to the second step of considering microeconomic factors which are peculiar to the particular industry and which may make its experience different from that of other traded goods industries. An obvious such factor is a change in the price of the commodity in question on world markets relative to other traded commodities. Hence, the focus returns immediately to the familiar territory

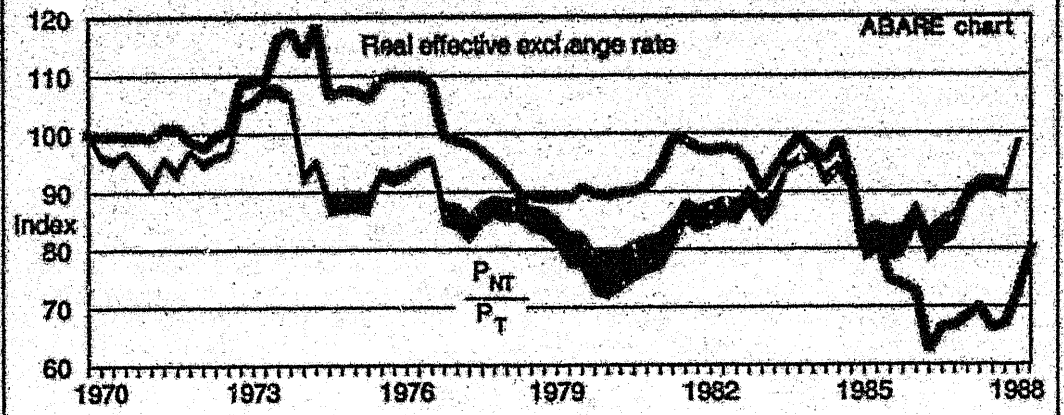
of demand for and supply of individual commodities on world markets. Many influences are likely to be at work, but included among them may be changes in the relative prices of traded and non-traded goods in other countries which are major exporters or importers of the commodity in question.

In some cases, it may be convenient to take all of these relevant real exchange rate movements and weight them together to form an index. However, that index should be interpreted as an attempt to capture the balance of exchange rate forces on the world demand and supply, and therefore on the world price, of the commodity in question - the price variable being the relevant one as far as the 'competitiveness' of the local industry is concerned. Further, in view of the difficulties likely to be encountered in determining appropriate weights for each country, it may be more sensible to abandon the attempts at aggregation into an index and treat developments in each country on their merits, in much the same way as might be done for weather shocks or changes in market intervention. In any event, even if an index is to be formed, the theory outlined here indicates clearly that the variables which should be weighted together are the movements in the relative prices of traded and non-traded goods in the relevant economies, rather than the more conventional real bilateral exchange rates.

Though it is common to define the real exchange rate theoretically as the relative price of traded and non-traded goods, empirical estimates have generally been obtained indirectly because of the difficulty of obtaining price data for non-traded goods. Specifically, empirical estimates are generally obtained as an index derived from the movements in the nominal exchange rates against major trading partners, weighted by overall trade shares and adjusted for inflation differentials. However, the two measures are closely related, and under certain assumptions their movements will be proportional (see appendix C). Those assumptions are that the 'law of one price' holds with respect to traded goods, and that the relative prices of traded and non-traded goods do not change in any of the home country's trading partners (or at least that any such movements exactly cancel out). These assumptions, while plausible, are sufficiently restrictive to raise the possibility that, on occasion, the conventional empirical measure may not provide an accurate guide to the actual movements in the relative price of traded and non-traded goods. This is an important issue for ABARE, because the Bureau has for many years published a regularly updated real exchange rate index computed in the conventional way, and has interpreted the movements in that index as being indicative of changes in the relative price of traded and non-traded goods (O'Mara, Carland and Campbell 1980).

In recent ABARE research (Dwyer 1987; Dwyer and O'Mara 1988) an attempt has been made to obtain a direct measure of movements in the relative price of traded and non-traded goods in Australia. Implicit price deflators are readily available for exports and imports, and it was assumed that the prices of exportables consumed domestically and importables produced domestically would move in sympathy. Making a range of plausible assumptions about the share of traded goods in the CPI, the implied movements in the price of non-traded goods were obtained by deduction. Finally, to remove the direct price effects of changes in Australia's terms of trade, it was assumed that movements in export prices were identical to the movements in import prices. The ABARE's conventional real exchange rate measure and this alternative measure are shown in figure 7. The relative price index is represented as a band to reflect the use of a range of assumptions about the share of traded goods in the CPI. A fall in that locus implies a rise in the relative price of traded goods, and conversely.

Figure 7. AUSTRALIA'S REAL EXCHANGE RATE



While there is evident correlation between the two series, the relationship is obviously far from precise. Of particular interest are the movements in 1985 and 1986. As noted earlier, the conventional measure of Australia's real exchange rate declined by close to 40 per cent during that period. However, the rise in the relative price of traded goods, though substantial, was significantly less at around 20 per cent. Several factors are likely to have been at work in producing this divergence. The real exchange rates of several of Australia's trading partners changed significantly during this period - most notably those of the United States and Japan. However, as the movements were in opposite directions, their effects on the conventional real exchange rate would have cancelled out to some extent. Following such a major change in the exchange rate, the 'law of one price' is also likely to have been violated in the short term as foreign suppliers of imports absorbed some of the effects of the devaluation in order to maintain market share. Contractual arrangements may also have slowed the flow-on of the devaluation into the domestic price of traded goods.

It is noteworthy, however, that over the period since the latter part of 1986, during which time the Australian dollar has trended upward, the relative movements in the two series have been much more comparable. In other words, the effects of contractual arrangements, departures from the law of one price and so on seem to have produced much less tardiness in the price of traded goods in the presence of an appreciation than during the earlier devaluation episode. Consequently, while the real effective exchange rate remains about 20 per cent below its level of 1984, the relative price series has returned to around its 1984 level - although it remains to be seen whether subsequent data will result in some modification of this conclusion. Nevertheless, should the relative price series remain around its 1984 level, it may indicate that some real devaluation is in prospect, given that some sustained improvement in competitiveness is required as part of the process of reducing Australia's current account deficit and foreign debt burden.

More generally, it may be sensible to interpret the conventional measure of the real exchange rate as providing some indication of the change which might occur ultimately in the relative prices of traded and non-traded goods, after sufficient time has elapsed for the various lags and rigidities to have been worked out.

4.4 Summing Up

It may be useful to now draw together the various strands of the recent ABARE research in the area of exchange rates and interest rates, and to assess the extent to which it has enabled ABARE to place a quite specific interpretation on recent exchange rate and interest rate developments in Australia. Firstly, analysis of the medium and longer term influences on the exchange rate, along the lines of the Swan/Salter model, led ABARE to conclude that the dramatic decline in the real exchange rate in 1985 and 1986 was excessive and was probably driven in part by unsustainable shorter term influences. Other ABARE research has helped to fill out some of the details of these shorter term influences. In particular, there is evidence of an expansionary monetary shock in the spirit of the Dornbusch overshooting analysis, evidence of the emergence of a risk premium in the Australian interest rate structure, and some evidence of a 'speculative bubble' in the foreign exchange market. Finally, there is evidence that the price of traded goods relative to non-traded goods increased less than might have been anticipated following the devaluation, at least partly due to various lags, although these lags seem to have been less significant during the period of exchange rate appreciation since the latter part of 1986.

Some uncertainty remains as to why the results of the ABARE research differ so markedly from those of Dixon and Parmenter (1987) and Fraser (1987) and, to a lesser extent, EPAC (1986, 1988). It will be recalled that these authors argued that all of the developments on the exchange rate and interest rate fronts in 1985 and 1986 could be explained without appeal to short term influences. Dixon and Parmenter also argued that interest rates would remain very high over the remainder of the 1980s and that the real exchange rate would fall even further from its level in 1986. Use of different models provide part of the explanation, although the Dixon and Parmenter analysis also used a version of ORANI.

A more important explanation probably lies in the assumptions used, particularly with respect to fiscal policy. In the ABARE research, it was assumed that fiscal policy would be tightened over the remainder of the 1980s sufficiently to reduce the current account deficit to a level consistent with its longer term average level - a level which would also allow Australia's foreign debt to GDP ratio to be stabilised. Dixon and Parmenter assumed a similar outcome for the current account balance, but also assumed that no contribution would be made by a tightening of fiscal policy. Rather, all of the restraint on absorption was assumed to occur in the private sector, in response to very high interest rates which, in turn, required a rapidly devaluing currency in order to maintain the interest rate parity condition. However, even here a major puzzle remains because the cumulative effects of such projected real devaluations would carry the real exchange rate to a much lower level by around 1990 than found necessary by any other researchers.

Armed with its own research results, ABARE has, since the latter part of 1986, based all of its assessments of the medium term outlook for commodity prices in Australia on an assumption that the real exchange rate would trend upward significantly. It was also assumed that interest rates in Australia would decline significantly from the very high levels ruling in 1985 and 1986 as the risk premium in the interest rate structure declined and as the appreciating trend in the real exchange rate became incorporated into expectations. To date at least, both of these assumptions have proven to be quite close to the mark. Around half of the real devaluation in 1985 and

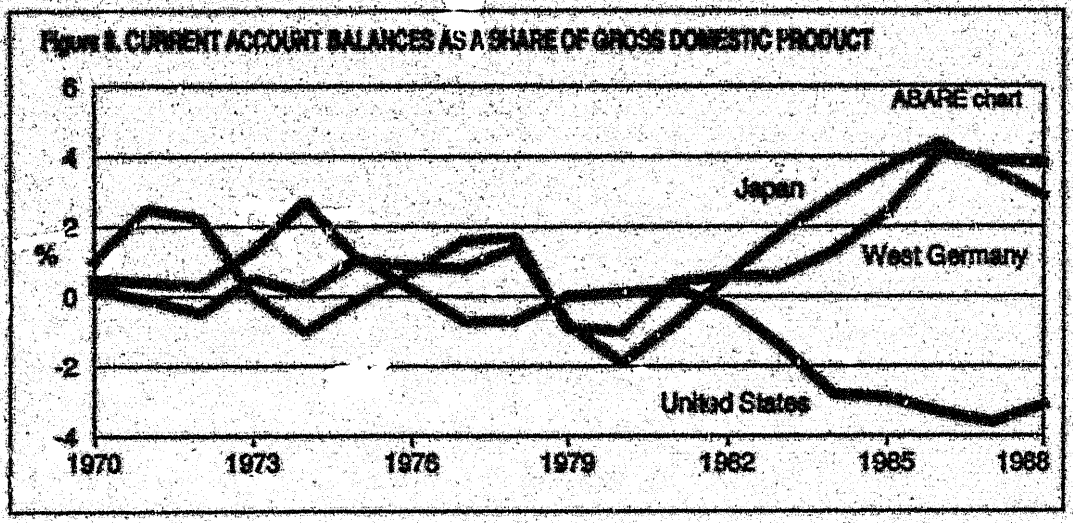
1986 has been reversed, and nominal and real interest rates have declined significantly since the latter part of 1985. Certainly, there is no evidence of the Dixon and Parmenter projections coming to pass. ABARE's latest assessment, based on updates of the earlier research and taking into account the recent recovery in Australia's terms of trade, is that scope remains over the medium term for further upward movement of the real exchange rate, as conventionally measured, and downward movement in real interest rates. However, the conclusion with respect to the exchange rate may need to be modified if the unexpectedly strong recovery in the relative price of non-traded goods since 1986 is maintained.

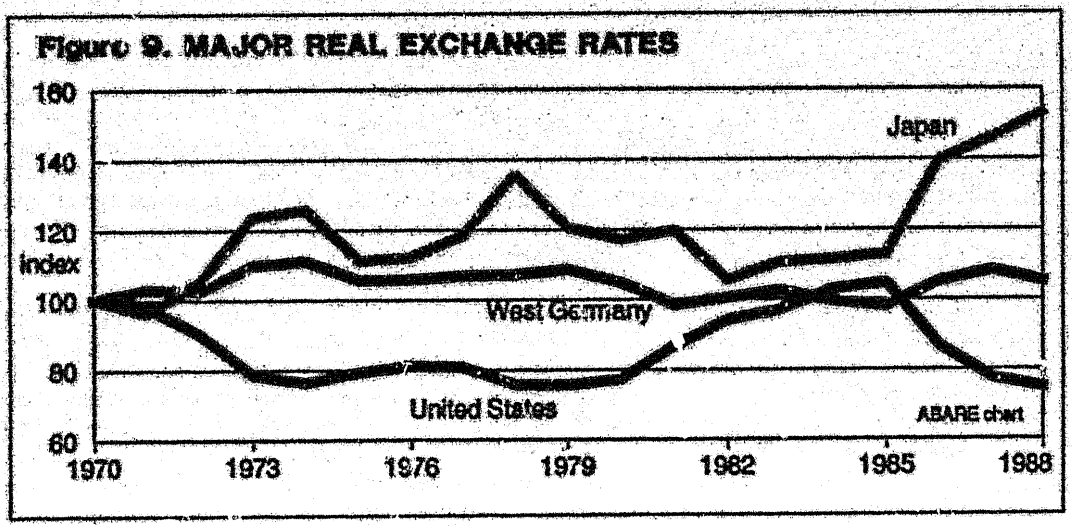
Finally, it is clear that there are some similarities and some differences between the Australian experience since the mid 1980s and the US experience particularly in the first half of the 1980s. In both cases, there is evidence that monetary policy contributed to the large change in exchange rates, albeit in opposite directions in the two countries. The US experience is well documented in, for example, Chalfant, Love, Rausser and Stamoulis (1986). In both cases, too, a 'speculative bubble' may have extended the movement in the exchange rate; the US evidence is outlined by Frankel and Froot (1986). On the other hand, it is clear that the other major contributor to the US experience was another policy variable, namely expansionary fiscal policy, while in the Australian case it was a largely exogenous deterioration in the terms of trade. The role of fiscal policy in the real devaluation of the Australian dollar in 1985 and 1986 is problematical. Fiscal policy was, in fact, relatively expansionary at that time, pointing to upward pressure on the real exchange rate, in line with the US experience, rather than downward pressure. However, the large budget deficits at that time may have contributed to the emergence of a risk premium in the Australian interest rate structure, which may have been sufficient to reverse the sign on the relationship between fiscal policy and the exchange rate.

5. SOME INTERNATIONAL ISSUES

Large current account imbalances and major swings in real exchange rates have been key features of the world economy in recent years, and are likely to remain the crucial issues for policy makers in the foreseeable future (figures 8 and 9). In that sense, Australia's experience has been something of a microcosm of developments in the world economy.

General equilibrium theory in the spirit of the Swan/Salter analysis indicates clearly that if the current account imbalances in the major economies are to be reduced to levels more acceptable to financial markets, changes may be required to both absorption and real exchange rates. Changes in real exchange rates in isolation may not be successful, or even sustainable over the medium term, without an appropriate change in absorption. This is a simple point, but it did not appear to be recognised fully at the time of the Plaza Agreement in September 1985, where the focus was mainly on the perceived need to achieve a major devaluation of the US dollar and an appreciation of the yen and the Deutschmark following the marked increase in the real value of the US dollar in the first half of the 1980s. More recently, the need for a two-pronged approach has become much more widely recognised, possibly reflecting in part the slowness of the current account imbalances to decline in the face of the very large exchange rate movements which have occurred since 1985.





There is also now widespread agreement that a decisive reduction in the US budget deficit is central to the changes in absorption which are required. Much has been written on this issue recently - for example, Branson (1986), Dornbusch (1986, 1987). However, a decline in savings relative to investment in the US private sector during the 1980s has also made an important contribution to the deterioration in the current account balance. This stands out clearly in some estimates compiled recently by ABARE (Wallace, Brasma and O'Mara 1988) - see table 1. It remains to be seen whether the wealth effects of this imbalance between saving and investment will produce a sufficiently powerful self-correcting mechanism in the private sector over the next few years, or whether financial markets will seek to force the pace of adjustment by imposing a risk premium on the US interest rate structure. Even if financial markets are relatively unconcerned about the savings/investment imbalance in the private sector per se, they may still force adjustment pressure on to the private sector in the form of a risk premium if a further tightening of US fiscal policy is not forthcoming.

Table 1: UNITED STATES: GROSS SAVING AND INVESTMENT, BY SECTOR

Year	Proportion of gross national product				
	Public investment(a)	Private investment	Public saving(b)	Private saving	Current account balance
	%	%	%	%	%
1973	0.0	18.1	0.6	18.0	0.5
1974	0.6	16.3	-0.3	17.3	0.1
1975	0.1	13.7	-4.1	19.0	1.1
1976	0.0	15.6	-2.2	18.0	0.2
1977	0.2	17.3	-1.0	17.8	-0.7
1978	0.4	18.5	0.0	18.2	-0.7
1979	0.7	18.1	0.5	17.8	0.0
1980	0.1	16.0	-1.3	17.5	0.1
1981	-0.1	16.9	-1.0	18.0	0.2
1982	0.3	14.1	-3.5	17.6	-0.3
1983	0.3	14.7	-3.8	17.4	-1.4
1984	0.3	17.6	-2.8	17.9	-2.8
1985	0.2	16.0	-3.3	16.6	-2.9
1986	0.2	15.7	-3.5	16.1	-3.3
1987(p)	0.2	15.7	-2.4	14.7	-3.6
1988(f)	0.2	16.3	-2.3	15.7	-3.1

(a) Imputed as a residual (equal to public and private sector savings less current account balance and private investment). (b) General government financial balances. (p) Preliminary estimate. (f) Forecast.
Source: Wallace, Bramma and O'Mara (1988).

There is also some uncertainty about the most appropriate changes, if any, to fiscal policy in Japan and the Federal Republic of Germany. Though fiscal policy has been tightened significantly in both countries during the 1980s, this change commenced from a position of large budget deficits, and even now both countries still have modest budget deficits (see tables 2 and 3). It would seem, therefore, that the case for the adoption of much more expansionary fiscal policies in these countries for an extended period is much weaker than is the case for a tightening of fiscal policy in the US. The large current account surpluses in Japan and FR Germany largely reflect an excess of savings over investment in the private sector, and any sustained reduction in the current account surpluses will therefore probably require adjustments in the private sector. A reduction in world real interest rates in response to a decline in the demand for capital inflow into the United States in future years is one possible source of such a change.

While it is clear that the major economies will require further adjustments to absorption over the next few years if the current account imbalances are to be reduced to levels more acceptable to financial markets, it is much less certain that further adjustments will be required to their real exchange rates. Perhaps the key lesson from exchange rate theory is that relatively short term influences on exchange rates can be quite pervasive and can carry the exchange rate temporarily to a level well removed from that which is sustainable over the longer term. Large adjustments have occurred since 1985 in the value of the US dollar, the yen and the Deutschmark, probably induced in part by monetary and speculative

Table 2: JAPAN: GROSS SAVING AND INVESTMENT, BY SECTOR

	Proportion of gross national product				
Year	Public investment	Private investment	Public saving(a)	Private saving(b)	Current account balance
	%	%	%	%	%
1973	9.6	26.8	0.6	35.8	0.0
1974	9.0	25.8	0.4	33.4	-1.0
1975	9.1	23.4	-2.7	35.1	-0.1
1976	8.7	22.5	-3.7	35.6	0.7
1977	9.1	21.1	-3.8	35.6	1.6
1978	9.8	20.6	-5.5	37.8	1.7
1979	9.9	21.7	-4.7	35.4	-0.9
1980	9.5	22.1	-4.4	35.0	-1.0
1981	9.5	21.3	-3.8	35.0	0.4
1982	9.0	20.7	-3.6	33.9	0.6
1983	8.4	19.1	-3.7	33.0	1.8
1984	7.7	20.1	-2.1	32.7	2.8
1985	6.8	20.9	-0.8	32.2	3.7
1986	6.7	20.9	-1.1	33.1	4.4
1987(p)	6.9	21.9	-0.2	32.6	3.6
1988(f)	7.2	23.4	-0.3	33.8	2.9

(a) General government financial balances. (b) Imputed as a residual (equal to the sum of private and public investment less public saving plus the current account balance). (p) Preliminary estimate. (f) Forecast.
Source: Wallace, Brasma and O'Hara (1988).

influences. Even if further changes are required, they will not necessarily be in the directions that might be suggested by intuition - that is downward in the case of the US dollar and upward in the case of the yen and the Deutschmark. For example, it is possible in principle that the recent exchange rate adjustments may have contained an element of overshooting, much as seems to have occurred in Australia in 1985 and 1986. Certainly, the mere observation that the current account imbalances remain substantial does not provide conclusive proof of the need for further exchange rate adjustment in the conventional direction.

In the light of that conclusion, it is perhaps not surprising that opinion seems to remain divided about the prospects for the key international currencies over the medium term. For example, Dornbusch (1987) argued that the US dollar might need to decline much further than it has done to date, to around 100 yen. However, other eminent commentators in this field, such as McKinnon and Williamson, have been recently reported to hold the contrary view that the US dollar is at present substantially undervalued (Economist 1988).

There are grounds for supposing that the real levels of the US dollar and the Deutschmark in the September quarter 1988 may have been broadly consistent with, or slightly above, their sustainable longer term levels, while the yen may have been somewhat overvalued in real terms. The real value of the US dollar in the September quarter 1988 was around 5 per cent

Table 3: FR GERMANY: GROSS SAVING AND INVESTMENT, BY SECTOR

Year	Public investment	Private investment	Public saving(a)	Private saving(b)	Current account balance
	Proportion of gross national product				
	%	%	%	%	%
1973	3.8	20.0	1.2	23.9	1.3
1974	4.1	17.5	-1.3	25.6	2.7
1975	3.9	16.5	-5.7	27.1	1.0
1976	3.5	16.5	-3.4	24.3	0.9
1977	3.3	17.0	-2.4	23.5	0.8
1978	3.3	17.3	-2.4	24.4	1.4
1979	3.4	18.3	-2.5	23.4	-0.8
1980	3.6	19.0	-2.9	23.6	-1.9
1981	3.2	18.5	-3.7	24.6	-0.8
1982	2.8	17.6	-3.3	24.3	0.6
1983	2.5	18.0	-2.5	23.6	0.6
1984	2.4	17.7	-1.9	23.3	1.3
1985	2.3	17.2	-1.1	23.0	2.4
1986	2.4	16.9	-1.2	24.6	4.1
1987(p)	2.4	16.8	-1.7	24.8	3.9
1988(f)	2.4	17.2	-2.6	26.0	3.8

(a) General government financial balances. (b) Imputed as a residual (equal to the sum of private and public investment less public saving plus the current account balance). (p) Preliminary estimate. (f) Forecast.
Source: Wallace, Tramma and O'Mara (1988).

below its level in the early 1980s, the most recent period in which the US economy was close to internal and external balance. Since that time, however, the United States has moved from being a net creditor nation to a net debtor nation, and by the early 1990s the turnaround in net transfers abroad could be equivalent to around 0.7 per cent of GDP (see tables 4 and 5). Assuming that the overall current account deficit has been reduced to more acceptable levels by the early 1990s, then the balance of trade will need to be sufficiently stronger than in the early 1980s to allow these debt servicing costs to be met. This means, of course, that absorption will need to be lower relative to GNP than it was in 1980, and with other factors unchanged the real exchange rate will also need to be lower than in 1980. On the basis of plausible assumptions about the relationship between absorption and the real exchange rate, as set out in table 4, a sustained decline in the real exchange rate of between around 1-5 per cent relative to its level in the early 1980s may be required, other factors unchanged.

Adopting a similar line of analysis with respect to the yen and the Deutschmark, it is likely that the sustainable real value of both currencies is somewhat higher than in the early 1980s, the most recent period in which Japan and FR Germany were in approximate internal and external balance. In the interim, both countries have experienced a large buildup in their net foreign assets, and this process is likely to continue for several more years yet (see tables 4 and 5). The net income received from these investments, if reflected in a higher level of absorption relative to GNP

Table 4: EXPECTED CHANGES IN THE NET EXTERNAL ASSET POSITIONS OF THE UNITED STATES, JAPAN AND GERMANY (a)

	Nominal GNP		Current account balance		Net external asset position(b)	
	Change(c)	Level	Level	Share of GNP	Level	Share of GNP
	%	US$b	US$b	%	US$b	%
United States						
1980	8.9	2 731.9	1.9	0.1	95	3.5
1987	6.7	4 526.7	-154.0	-3.4	-435	-9.6
1988(d)	6.0	4 798.3	-141.1	-2.9	-577	-12.0
1989(d)	6.5	5 110.2	-133.8	-2.6	-710	-13.9
1990	7.0	5 467.9	-109.4	-2.0	-819	-15.0
1991	7.5	5 878.0	-76.4	-1.3	-896	-15.2
1992	7.5	6 318.8	-46.2	-0.7	-940	-14.9
1993	7.5	6 792.8	0	0	-940	-13.8
		¥b	¥b		¥b	
Japan						
1981	7.0	256 817	1 052	0.4	2 177	0.8
1987	4.1	344 888	12 416	3.6	32 852	9.5
1988(d)	6.0	365 581	9 871	2.7	42 723	11.7
1989(d)	6.0	387 516	9 688	2.5	52 411	13.5
1990	6.0	410 767	7 805	1.9	60 216	14.7
1991	6.0	435 413	5 660	1.3	65 876	15.1
1992	6.0	461 538	2 769	0.6	68 645	14.9
1993	6.0	489 230	0	0	68 645	14.0
		DMb	DMb		DMb	
Germany						
1981	4.0	1 545.1	-7.7	-0.5	45	2.9
1987	3.8	2 023.2	80.8	4.0	239	11.8
1988(d)	3.0	2 083.9	68.8	3.3	308	14.8
1989(d)	4.0	2 167.3	67.2	3.1	375	17.3
1990	5.0	2 275.6	52.3	2.3	527	18.8
1991	5.0	2 389.4	38.2	1.6	466	19.5
1992	5.0	2 508.9	20.1	0.8	486	19.4
1993	5.0	2 634.3	0	0	486	18.4

(a) 1990-93 figures are ABARE estimates. (b) Defined as the sum of overseas lending and direct investment by the home country less the sum of lending and direct investment by foreigners in the home country. (c) From previous year; ABARE estimates for 1988-93. (d) Levels of the current account balance and net external assets are IMF estimates.

Table 5: EXPECTED CHANGES IN REAL EXCHANGE RATE FOR THE UNITED STATES, JAPAN AND GERMANY BETWEEN SEPTEMBER QUARTERS 1988 AND 1993

	United States	Japan	FR Germany
Percentage point change in net external assets to GNP ratio (1980-93)(a)	-17.3	13.2	15.5
Percentage point change in net external income to GNP ratio (1980-93)(a)(b)	-0.7	0.5	0.6
Percentage change in terms of trade (1980-93)(c)	-3.1	13.1	4.4
Required percentage change in real exchange rate between Sept quarter 1988 and 1993, assuming that external balance is re-established in the presence of the changes outlined above, taking into account the real exchange rate changes which have occurred since 1980(d) and assuming the following elasticities(e)			

Rise in the real exchange rate associated with a 1% rise in the terms of trade	Fall (rise) in the real exchange rate associated with a 1 percentage point fall in the trade deficit (surplus) to GNP ratio(f)			
%	%	%	%	%
0.2	2	-0.0	-17.4	-5.8
	5	-2.1	-16.2	-4.0
	8	-4.2	-14.9	-2.3
0.5	2	-1.0	-14.3	-4.5
	5	-3.1	-13.0	-2.8
	8	-5.2	-11.8	-1.1
0.8	2	-1.9	-11.2	-3.3
	5	-4.1	-9.9	-1.6
	8	-6.2	-8.7	0.1

(a) Based on figures in table 4. 1981-93 for Japan and Germany. (b) Due to the change in the net external asset position. Assumes a 4 per cent real return on assets. (c) Assumes a 10 per cent fall in 1988 and no change thereafter. 1981-93 for Japan and Germany. (d) Based on real exchange rates published by Morgan Guaranty. (e) In both cases, a relatively wide range of elasticities has been used, the midpoint of the range being broadly consistent with the Australian experience as outlined in, for example, O'Mara, Wallace and Meshios (1987). (f) The fall in the trade balance to GNP ratio is assumed to be equal, but opposite in sign, to the change in the net external income to GNP ratio over the period from 1980 to 1993.

than was the case in the early 1980s, may require a real exchange rate around 1-5 per cent higher than in that earlier period.

It is also important to make allowance for changes in the terms of trade experienced by these countries over this period. All three countries enjoyed a rise in their terms of trade between the early 1980s and 1987, with Japan experiencing the largest rise. The recent recovery in commodity prices may see some reversal of that trend. If, in all three countries, the terms of trade are assumed to fall by 10 per cent in 1988 and then to remain stable at that new level over the medium term to 1993, the US terms of trade would be about 3 per cent below the level of the early 1980s (see table 4). That might provide some justification for a real exchange rate perhaps 0.5-2.0 per cent below that of the early 1980s. The same assumptions imply that Japan's terms of trade would remain around 13 per cent above, and Germany's around 4 per cent above, their levels in the early 1980s - in both cases pointing to some upward pressure on the real exchange rate.

Adding together the effects of changes in net foreign assets and terms of trade since the early 1980s (see table 5), the equilibrium real level of the US dollar may be, at most, around 6 per cent below that of the September quarter 1988. In the case of the yen, the equilibrium real level could be at least 8 per cent, and perhaps closer to 20 per cent, below its level at that time. The situation for the Deutschmark is similar to that for the US dollar.

Such estimates are, of course, only approximations. Apart from the uncertainties about the size of the elasticities, it is possible that structural changes within each economy have also had some influence on the equilibrium real exchange rates. For example, the traded and non-traded goods sectors may have had unequal rates of growth in capital stocks and in technological advancement. Thus, in terms of the geometric representation of the Swan/Salter model in appendix A, the shape of the production possibility frontier may have changed over time. Further, in the light of Australian experience it would be important to assess the extent to which movements in the relative price of traded and non-traded have mirrored the movements in the conventionally measured real exchange rate index during the 1980s.

6. SUMMARY AND CONCLUSIONS

The Australian experience of the mid-1980s is in one respect similar to the US experience during the first half of the 1980s: it seems to have provided another practical illustration of the phenomenon of overshooting in financial markets. In the mid-1980s, a sharp decline in Australia's terms of trade and a deterioration in the current account deficit and foreign debt level provided a sound theoretical rationale for a significant decline in the exchange rate. However, ABARE research indicates that such factors alone are unlikely to explain the full extent of the decline in the exchange rate or the very high real interest rates which emerged at the same time. Shorter term factors, including an element of overshooting in response to an expansionary monetary shock, a risk premium in the Australian interest rate structure, and possibly a 'speculative bubble' in the foreign exchange market, are also likely to have been important. The marked recovery in the exchange rate and fall in interest rates in 1987 and 1988 probably reflect, at least in part, a gradual dissipation of these shorter term influences, allowing the earlier overshooting to be reversed. This is not to deny that the recovery which has occurred in Australia's terms of trade since early 1987 has also played a role.

Other researchers have, however, reached different conclusions, arguing that all of the fall in the exchange rate and the rise in interest rates can be explained by the deterioration in the terms of trade and the need to achieve a satisfactory current account balance. While these different conclusions are partly attributable to differences in the models used, the assumptions made with respect to fiscal policy also seem crucial. In the ABARE research, it was assumed that fiscal policy would be tightened sufficiently to complement whatever adjustments occurred in the private sector so as to ensure that the outcome for the current account balance would be acceptable to financial markets. The alternative assumption - seemingly adopted by other researchers - is that fiscal policy would not be tightened and hence that financial markets would force additional adjustment on to the private sector via the maintenance of very high interest rates and, in the short term at least, a very low exchange rate.

Other ABARE research has focused on the relationship between the traditional empirical measure of the real exchange rate and its theoretical analog, the relative price of traded and non-traded goods. It was found that the relative price of traded goods did not rise, at least immediately, by as much as might have been expected from the extent of the decline in the traditional real exchange rate in 1985 and 1986, all of that increase subsequently being reversed. This will need to be borne in mind when assessing the extent of the overshoot in the exchange rate.

In the international arena, resolution of the current account imbalances of the major industrial economies requires, in principle, adjustments to both absorption and real exchange rates. For that purpose, the adjustments which have occurred in absorption to date have been insufficient, particularly with respect to fiscal policy in the United States. In contrast, there is some evidence that the major realignment of real exchange rates which has occurred since 1985 may have brought those exchange rates - particularly those of the US dollar and the Deutschmark - quite close to their sustainable longer term levels. In other words, as was the case in Australia in 1985 and 1986, these exchange rate adjustments may have occurred much more quickly than the adjustments to absorption. However, unlike the Australian case, it is not clear that the exchange rate adjustments have contained a large element of short run overshooting: with the possible exception of the yen, the exchange rates may have been carried to about - rather than markedly beyond - their longer term equilibrium level. Even so, this dichotomous adjustment of exchange rates and absorption is unlikely to be viable other than in the relatively short term. In other words, unless the adjustments to absorption catch up relatively soon, it is likely that market forces will prevent the present levels of the real exchange rates from being sustained until such time as absorption has adjusted.

Finally, there is a range of issues on which further research by ABARE and others may prove useful. One example is the factors which determined the size and behaviour of the apparent risk premium in the Australian interest rate structure in the mid- 1980s, including the role of fiscal and monetary policy. A second is the relationship between the alternative measures of the real exchange rate, particularly the size and nature of the lags involved. Extending that analysis to the major international exchange rates may also help to clarify whether the adjustments to these exchange rates since 1985 have carried them to a level broadly consistent with a longer term equilibrium.

Appendix A

THE SWAN/SALTER MODEL

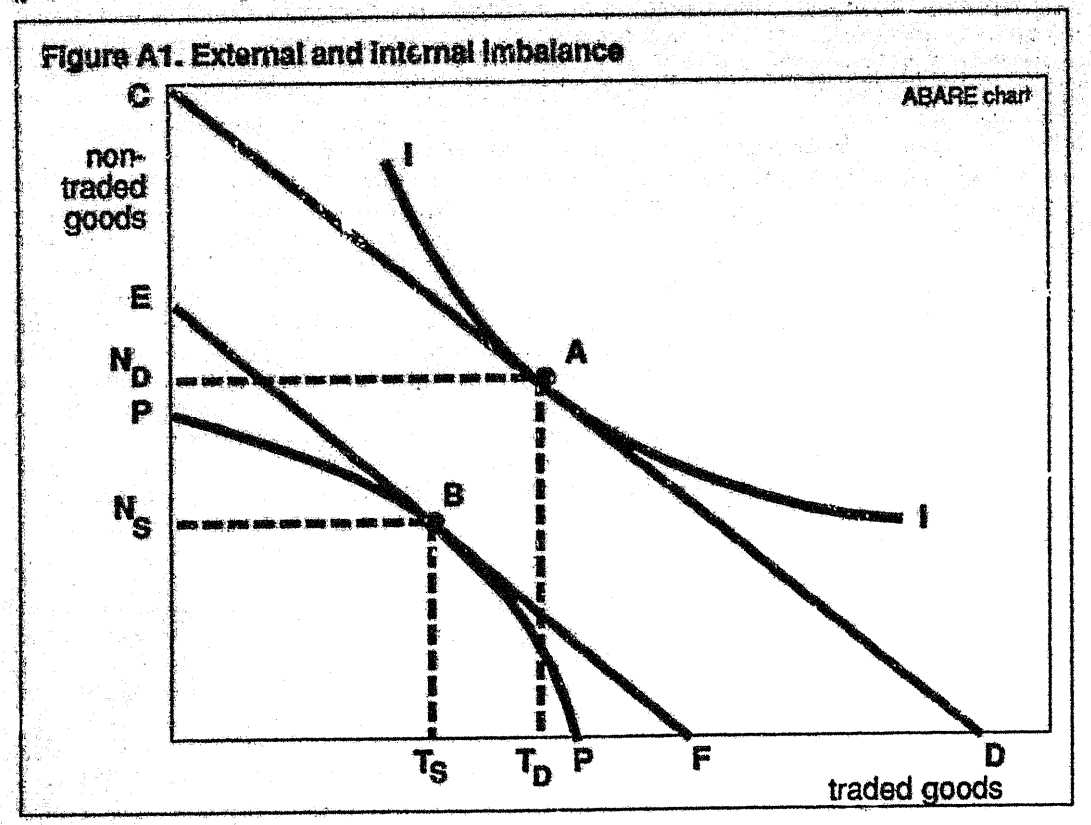
The model developed by Swan (1955, 1960) and Salter (1959) is illustrated in figure A1. The domestic economy is assumed to be small and open, comprising a traded and a non-traded goods sector. The prices of traded goods are determined on world markets, and hence the terms of trade is exogenous. The price of non-traded goods is determined by demand and supply factors in the domestic economy.

Quantities of traded goods are measured on the horizontal axis, and of non-traded goods on the vertical axis. The production possibility frontier (PP) represents all combinations of traded and non-traded goods which can be produced efficiently. Indifference curves, such as II, represent combinations of traded and non-traded goods among which consumers have equal preference.

Suppose that, initially, the relative price of traded and non-traded goods is represented by the slope of the lines EF and CD. The point of tangency between EF and PP defines the initial level of output of non-traded goods, N_S, and traded goods, T_S. Also suppose, however, that the initial level of aggregate expenditure is represented by the line CD. The point of tangency between CD and II defines the initial level of demand for non-traded goods, N_D, and traded goods, T_D.

It is clear that, as drawn, the initial situation is one of excess demand for both traded and non-traded goods. The excess demand for traded goods will be expressed in a balance of trade deficit - a situation which

Figure A1. External and internal imbalance



can be sustained for some time. The excess demand for non-traded goods, in contrast, is clearly not sustainable, and will engender a rise in the price of non-traded goods relative to traded goods - that is, a rise in the real exchange rate.

The rise in the relative price of non-traded goods changes the slope of the expenditure and income lines, as in figure A2. The effect is an increase in the production of non-traded goods and a fall in demand for them, so that equilibrium is reached in the non-traded goods market. Conversely, production of traded goods falls and demand increases, so that the balance of trade deficit deteriorates. In other words, the role of the change in the real exchange rate has been to re-establish equilibrium in the non-traded goods sector, rather than in the traded goods sector. The higher real exchange rate has reduced the ability of the traded goods sector to hold resources in competition with the non-traded goods sector - in other words, the competitiveness of the traded goods sector has been reduced.

In figure A2, the driving force behind the balance of trade deficit is clearly the excess of demand over income. While ever that gap remains, it will not be possible to reduce the balance of trade deficit simply by raising the relative price of traded goods. For example, in figure A3, the relative price of traded goods has been raised to a level at which, ceteris paribus, production of and demand for traded goods are equated, but only at the expense of increased excess demand for non-traded goods - an unsustainable condition.

Changes in the terms of trade are a little less convenient to analyse geometrically. One approach is to add a third dimension to the diagram to allow traded goods to be separated into importables and exportables. It is more common, however, to retain the two dimensional representation and to recognise that a change in the terms of trade can be expressed by a biased movement in a 'shadow' production possibility frontier.[1] Consider the case, for example, of a rise in the terms of trade. For any given level of output of non-traded goods, the economy now has the potential to consume a larger bundle of traded goods than previously, without running a balance of trade deficit. This is similar, in effect, to an increased ability to produce traded goods. In figure A4, the economy is initially in internal and trade balance. PP is the actual production possibility frontier; PP_1, the shadow frontier, is PP with the improvement in the terms of trade factored into the output of traded goods. Assuming that the average price of traded goods is unchanged following the rise in the terms of trade, and hence that the real exchange rate does not change, output is determined at point A, but effective real income is given by point B on PP_1.

Provided that at least part of the rise in real effective income is reflected in increased absorption, then the expenditure line will also move to the right, from EF to (say) GH. If the expenditure elasticity of demand for non-traded goods is positive, it is clear that this rightward movement

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1 This analysis of a change in the terms of trade is somewhat similar to the analysis of a mineral 'boom' given by Snape (1977). There is, however, a subtle difference. In the case of new mineral discoveries or some other physical progress in the traded goods sector, the production possibilities frontier actually moves. The new production point can then be determined as the point of tangency between the new frontier and a relative price line. In contrast, in the case of a terms of trade change, the production point must still be determined on the actual rather than the 'shadow' frontier.

Figure A2. Internal balance and external imbalance

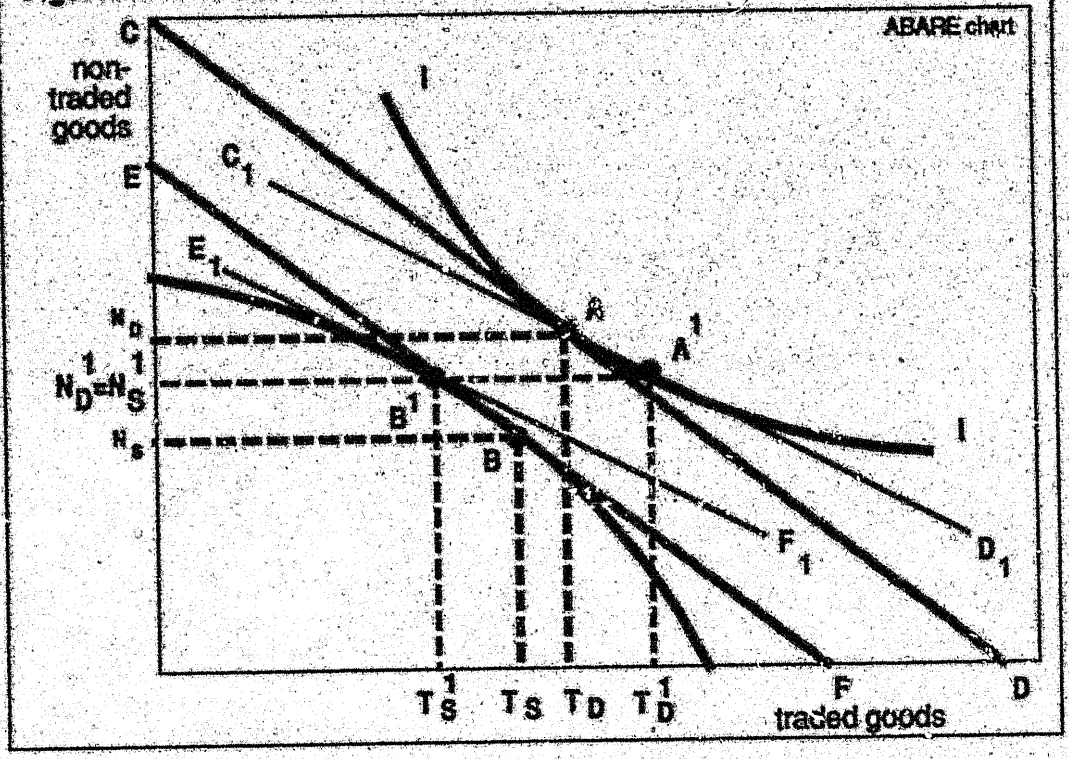


Figure A3. External balance and internal imbalance

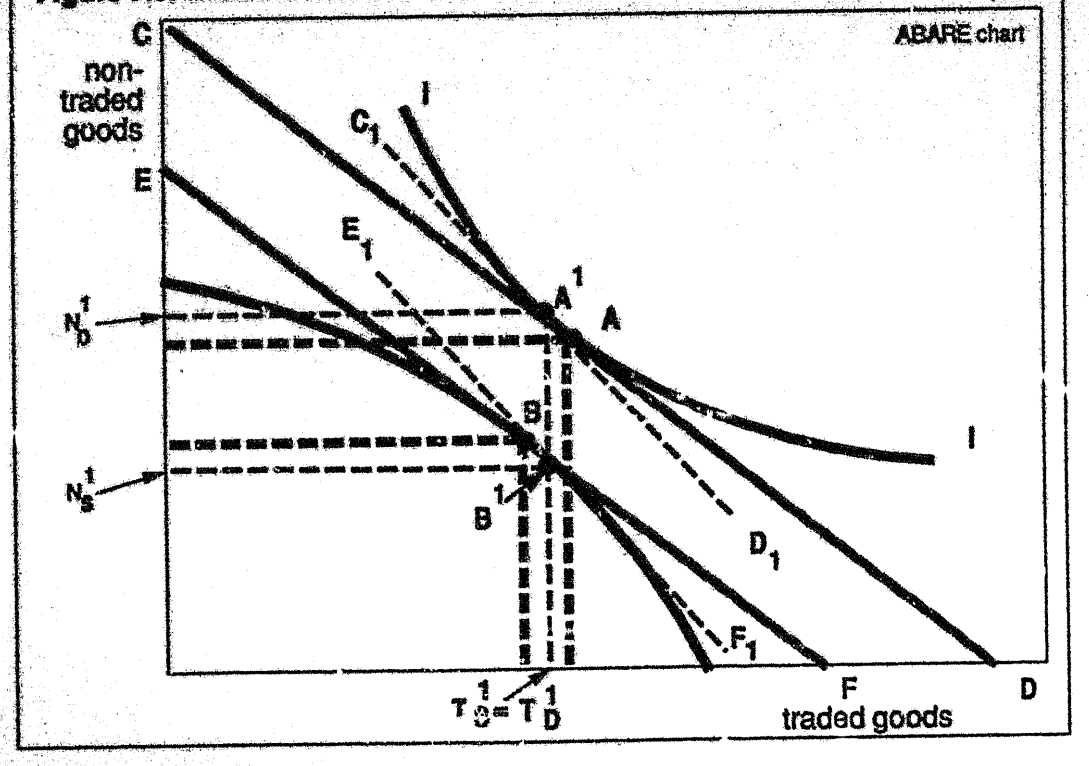
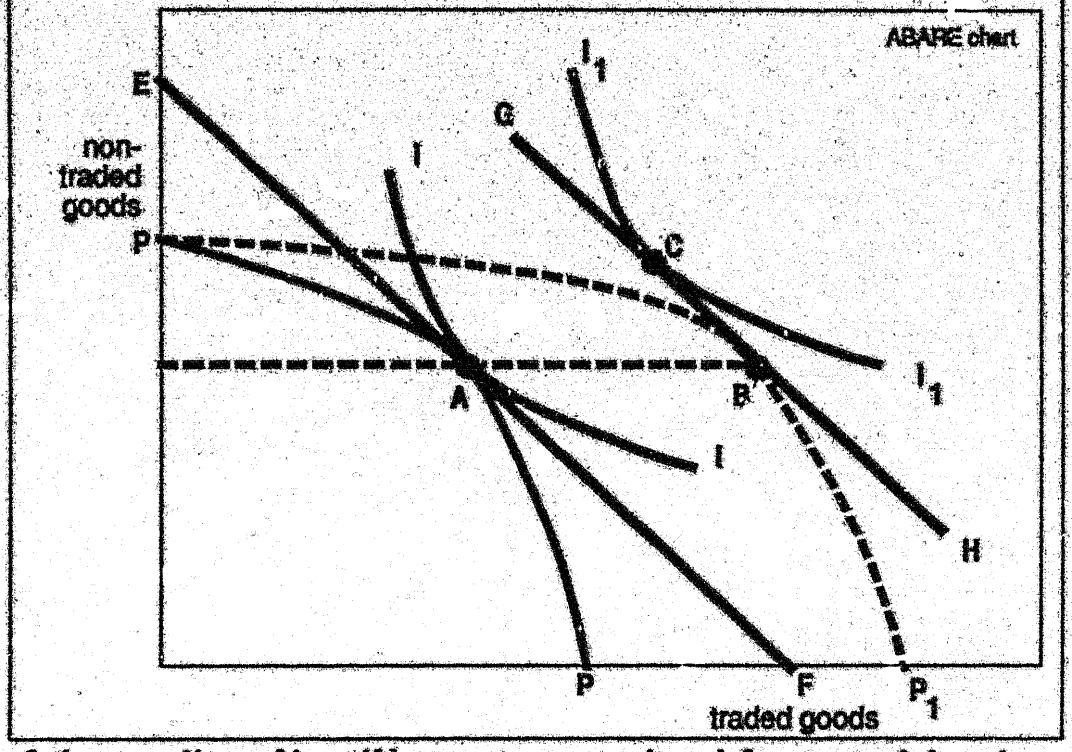


Figure A4. Terms of trade improvement



of the expenditure line will generate excess demand for non-traded goods, placing upward pressure on the relative price of non-traded goods. The extent of the upward movement will be governed by the extent of the rightward movement of the expenditure line - in other words, by the rise in absorption which is induced by the rise in the terms of trade.

APPENDIX A

TERMS OF TRADE, ABSORPTION AND THE BALANCE OF TRADE

The relationship between the terms of trade, absorption and the balance of trade can be considered in the context of the following very simple model.

Notation

Y = real GDP

C = aggregate volume of consumption expenditure

I = aggregate volume of investment expenditure

G = aggregate volume of government expenditure

X = aggregate volume of exports

M = aggregate volume of imports

p_i = implicit deflator for i, where $i = y, c, i, g, x$ and m to indicate GDP, consumption, investment, government spending, exports and imports respectively.

Model

The national accounting identity can be expressed in nominal terms thus:

$$(B1) \qquad p_y Y = p_c C + p_i I + p_g G + p_x X - p_m M$$

For simplicity, it is assumed that the volume of consumption expenditure is a simple function of the effective spending power of GDP:

$$(B2) \qquad C = a + b \frac{p_y Y}{p_c}, \quad b > 0$$

Similarly, there is a positive relationship between the volume of investment expenditure and real GDP expressed in terms of investment goods. To the extent that a rise (for example) in the terms of trade raises p_y relative to p_i, it would stimulate investment, and conversely. Thus:

$$(B3) \qquad I = c + d \frac{p_y Y}{p_i}, \quad d > 0$$

The volume of imports is a function of the real level of consumption and investment expenditure when expressed in terms of importables:

$$(B4) \qquad M = e + f \left(\frac{p_c C + p_i I}{p_M}\right), \quad f > 0$$

For simplicity, government expenditure and the volume of exports are assumed to be fixed:

(B5) $G = \bar{G}$

(B6) $X = \bar{X}$

Analysis

Solving for M and taking the first partial derivative with respect to p_x,

(B7) $$\frac{\delta M}{\delta p_x} = \frac{f(b + d)\bar{X}}{p_m[1 + (b + d)(f - 1)]}$$

Suppose that $b + d = 1$. In other words, suppose that a change in $p_y Y$ induces an equivalent combined change in consumption and investment expenditure. Then:

(B8) $$\frac{\delta M}{\delta p_x} = \frac{\bar{X}}{p_m}$$

Defining the balance of trade, BT, to be:

(B9) $BT = p_x\bar{X} - p_m M$, then

(B10) $$\frac{\delta BT}{\delta p_x} = 0$$

Hence, in this case, the balance of trade is invariant to a change in export prices.

Conversely, if $b + d = 0$, then:

(B11) $$\frac{\delta BT}{\delta p_x} = \bar{X}, \text{ and hence:}$$

(B12) $dBT = dp_x\bar{X}$.

In other words, in this case a change in the export prices is reflected fully in the balance of trade.

Appendix C

RELATIONSHIP BETWEEN REAL EXCHANGE RATE MEASURES

Suppose that the home country has n trading partners. In each of those n countries, the change in the CPI can be decomposed into the change in non-traded goods prices and the change in traded goods prices.

$$(c1) \qquad \Delta CPI^i = \alpha^i \Delta P^i_{NT} + (1 - \alpha^i) \Delta P^i_T, \quad i = 1...n$$

where ΔCPI^i is the percentage change in the CPI in country i, ΔP^i_{NT} and ΔP^i_T are the percentage changes in non-traded and traded goods prices in country i and α^i is the share of non-traded goods in the CPI in country i.

Assuming that the law of one price holds with respect to traded goods, then

$$(C2) \qquad \Delta P^H_T = \sum_{i=1}^{n} \lambda^i \Delta(P^i_T e^i).$$

That is, the percentage change in the price of traded goods in the home economy, ΔP^H_T, is equal to the weighted sum of the percentage changes in traded goods prices in all of the home country's trading partners adjusted for changes in the exchange rate, e, between the home country's currency and that of each of its trading partners (defined as the number of units of the home country's currency per unit of foreign currency). The weight assigned to country i, λ^i, is the share of the home country's total trade which is conducted with country i.

Assuming that none of the home country's trading partners experience a change in the relative price of traded and non-traded goods, then:

$$(C3) \qquad \Delta P^i_T = \Delta P^i_{NT} = \Delta CPI^i, \quad i = 1...n$$

Substituting (C3) into (C2),

$$(C4) \qquad \Delta P^H_T = \sum_{i=1}^{n} \lambda^i \Delta(CPI^i e^i)$$

Similarly, movements in the CPI in the home country, ΔCPI^H, can be broken down into the changes in its traded and non-traded goods components:

$$\Delta CPI^H = \alpha \Delta P^H_{NT} + (1 - \alpha) \Delta P^H_T \qquad (C5)$$

A standard formula for the real effective exchange rate of the home country is:

$$\Delta R = \Delta CPI^H - \sum_{i=1}^{n} \lambda^i \Delta(CPI^i e^i) \qquad (C6)$$

where ΔR is the percentage change in the real effective exchange rate index.

Substituting (C4) and (C5) into (C6):

$$\Delta R = \alpha(\Delta P^H_{NT} - \Delta P^H_T) \qquad (C7)$$

It follows that, given the assumptions that the real exchange rates of the home country's trading partners are not changing (or that any such changes exactly cancel), and that the law of one price holds for traded goods, then movements in the conventionally measured real exchange rate index will be proportional to movements in the relative price of traded and non-traded goods.

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