Proceedings of a Conference

INTERNATIONAL INTEGRATION OF THE AUSTRALIAN ECONOMY

Economic Group
Reserve Bank of Australia

Proceedings of a Conference

held at the H.C. Coombs Centre
for Financial Studies, Kirribilli
on 11/12 July 1994

INTERNATIONAL INTEGRATION OF THE AUSTRALIAN ECONOMY

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ISBN 0 642 21283 X

Printed in Australia by Ambassador Press Pty Ltd

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Introduction

Philip Lowe

The structure and performance of the Australian economy have been shaped profoundly by international linkages. Despite their enduring importance, however, the strength of the links between Australia and the rest of the world have varied considerably through time. The depression of the 1930s, and then World War II, saw the trade links weakened substantially. In the three and a half decades that followed, little effort was made to re-build these linkages, as Australia pursued a development strategy that left the greater part of the economy relatively isolated from the world. This gave Australia some of the characteristics of a 'dual economy': one part (resources and agriculture) closely integrated with the outside world, and another (larger) part that was inward looking and sheltered from the efficiency and pricing pressures that come with international integration.

In the past decade, all this has changed. Australia has embraced the idea of an outward-looking, export-oriented economy, with both its goods and financial markets increasingly integrated with world markets. Arguably, today our links with the rest of the world are stronger and more pervasive than at any time, at least over the past century. This change has seen a weakening of the division between the outward-oriented sectors and the domestic sectors, and has led to many non-traded industries also feeling the impact of international integration.

This increase in international integration can be seen in a number of indicators. The average effective rate of assistance to industry has fallen from 24 per cent in 1984 to about 10 per cent in 1993. Over the same period, the ratio of exports plus imports to GDP has increased from about 30 per cent to nearly 40 per cent. On the foreign investment front, the removal of foreign exchange controls in 1983 allowed Australian firms to exploit their comparative advantages on a global scale. Since the removal of these controls, outward foreign direct investment has averaged about one per cent of GDP per year; a ratio three times higher than in previous decades. Financial liberalisation has also allowed domestic investment to be financed from foreign savings to a greater extent than had been the case for many years. Reflecting this change, the current account deficit averaged nearly 4.5 per cent of GDP over the past decade, almost 2 percentage points higher than in the previous decade.

Despite this deeper integration into the world economy, Australia's trade share remains relatively low compared with that of other industrialised countries of a similar size. Australia barely participated in the rapid increase in world trade that took place in the decades following World War II. In addition to being a legacy of high protection, the low trade share reflects the nature of Australia's resource endowments and the long distances to the centres where much of world production takes place. In both of these areas, things are changing. The centre of world production is moving inexorably towards Asia, and the rising skill level of the Australian workforce is likely to lead to further increases in exports of manufactured goods and intra-industry trade. Further, an emerging comparative advantage in a number of highly income-elastic service industries, in conjunction with a solid commitment to the international economy, should see the trade share continue to rise in the years ahead.

The papers in this Volume were commissioned by the Reserve Bank of Australia to help improve our understanding of the depth and implications of this process of internationalisation. In particular, the papers attempt to throw light on three related questions. These are:

- What are the effects of increased integration on medium-term economic growth?
- What are the implications of increased integration for employment and wages?
- What impact does increased integration have on the management of inflation and the business cycle?

Tariff protection for domestic manufacturing had been a central policy tool since Federation and the development of this sector was further fostered by World War II. In the post-war period, high rates of immigration and the continued expansion of a protected manufacturing sector were inter-connected central elements of the development strategy. This strategy was pursued in an environment in which Australian workers were paid relatively high wages by international standards, and the wage distribution was relatively compressed. The high wages reflected, in part, the small labour force and the resource rents from primary production (and later minerals). Given the dislike of inequality in the Australian ethos, the centralised wage-fixation system acted to protect these high wages, and, in particular, protect the wages paid to unskilled workers. The high tariffs on manufactured goods, combined with Australia's distance from major world markets, were also important in allowing increasing employment in manufacturing, without any significant downward pressure on relative manufacturing wages.

From the late 1960s onwards this strategy was increasingly questioned. This reflected two concerns. First, the relative size of the primary sector of the economy had declined, and hence its ability to generate high average living standards had diminished. Second, many manufacturers, sheltered behind tariff walls, had become focussed on producing solely for the domestic market. They could not exploit scale economies and, when met with increased competition from international rivals, often sought increased protection, rather than improvements in efficiency. With many manufacturing firms moribund in their protective cocoon, there was relatively little research, development and innovation. The concern became that this environment was not conducive to sustained increases in output and wages. While it had been helpful in developing the manufacturing industry and keeping wages high for a period of time, the tariff wall and the inward orientation risked condemning Australian workers to stagnating wages. Elsewhere in the world, and particularly in the Asian region, outward-oriented economies were experiencing fast rates of growth and rapidly rising living standards.

In response to these developments, a major program of economic liberalisation was begun. The promise was that liberalisation could deliver a faster rate of economic growth than that which the previous system could deliver. This growth dividend has its roots in increased competition and efficiency, the more effective exploitation of Australia's comparative advantages and an increase in the returns to innovation, training and research. There are tentative signs that these effects are at work, and that the economy is entering a period of faster labour-productivity growth than that experienced over the past decade. This faster productivity growth should eventually deliver increasing real wages for all Australian workers.

However, to the extent that tariffs played a role in compressing the wage distribution, trade liberalisation could also lead to pressure to increase wage dispersion. This increased dispersion is generally seen as undesirable. The optimistic view is that the greater dispersion is temporary. By increasing the relative return to skilled labour, trade increases the incentive to acquire skills. As a result, both individuals and government devote greater resources to training. The increasing number of skilled workers then acts to again compress the wage distribution. The pessimistic view is that the wage distribution should be permanently wider, and that if the wage system stands in the way, the price will be sustained unemployment for workers with relatively few skills. The unenviable choice would be between widening wage disparities (the US model?) or persistent high unemployment supported by income redistribution (the European model?). A third, more attractive, outcome is also possible. That is, *wage* dispersion increases, but the stronger economic growth generates both higher wages for all, and the wherewithal for income redistribution to prevent *income* dispersion from also increasing.

Internationalisation and Economic Growth

Conceptually, the benefits of increased trade can be decomposed into increases in the *level* of output and the *growth rate* of output. In practice, given that the level effects may take a long time to be realised, the distinction is often blurred. Traditional models of trade have emphasised the level effects. By leading to a concentration of resources in the goods that a country produces relatively efficiently, international trade increases the level of output. Once this shift in resources has occurred, the growth rate is unchanged.

More recent models, which fall under the general heading of 'endogenous growth theory', or 'new growth theory', emphasise the growth-rate effects. These models crystallise insights that have been around for many years. They start by noting that resource endowments and technology are not in fixed supply, but rather can be accumulated. If international trade affects the speed and type of accumulation, then it may be able to change an economy's growth rate.

If increased trade does increase the level and growth rate of national income, what are the principal mechanisms through which this occurs?

First, the more outward oriented the economy, the greater is the incentive for finding better ways of doing things. This applies not only to the production of goods that are internationally traded, but also to a range of non-traded goods. For traded goods, international competition increases the penalty for poorly performing firms, and increases the return to efficient firms. For some non-traded goods, inward foreign direct investment provides the same type of discipline, by allowing foreign firms with superior technologies to compete with domestic firms. Outward foreign direct investment also allows efficient Australian firms to exploit their comparative advantage on a world scale.

Further, once the logic that competition improves efficiency is accepted, it seems incongruous not to apply that same logic throughout the economy. In particular, as the trade share rises, concerns about competitiveness increase. This puts pressure on any sector, or factor, that supplies inputs to the production of exports or import-competing goods. In addition, the general concern with efficiency makes it easier to reform sectors that have nothing to do with the international economy. These 'cascading' competitive effects are a major conduit through which international trade improves welfare. It is no coincidence that the drive for increased micro-reform has coincided with trade liberalisation.

The second linkage between outward orientation and growth rests on factor accumulation. Here the new growth theory suggests that trade may either increase or decrease an economy's growth rate. If trade redirects resources into activities that do not stimulate learning and technological advances, then it risks trapping the economy in a low-growth path. Alternatively, if trade stimulates training, innovation and research and development it can propel the economy onto a higher growth trajectory.

In Australia's case, the concern is sometimes expressed that free trade will force a reallocation of resources away from manufacturing and towards the primary sector, and that this sector does not offer significant potential for the type of skill accumulation that underpins continuing economic growth. Certainly, as trade reform has taken place, the size of the manufacturing sector has declined. However, this decline began while tariffs were still rising and it has occurred in all industrialised economies. Further, it has been the services sector, and not the primary resources sector, that has been expanding. Despite these trend changes, the last few years have seen the re-emergence of the manufacturing sector, which is now experiencing employment growth and rapid productivity growth.

The challenge for Australia is to underpin the trade reform with the type of domestic policies that encourage competition, innovation, training and the accumulation of skills. The basic message is that trade policy should not be thought of as being independent of what could be loosely called 'background industrial policy'. To achieve the maximum benefit from free trade, Australia needs a highly-skilled and innovative workforce that can easily adapt to, and develop, new technologies.

Internationalisation, Employment and Wages

If trade reform does indeed lead to a more efficient and dynamic economy, real wages and employment opportunities will increase. The concern is that the dispersion of wages will also increase. As tariffs continue to fall, and imports from low-wage countries rise, there may be downward pressure on the employment and the relative wages of workers with few skills. To date, however, the loss of low-skilled jobs in Australia as the result of trade reform appears to be relatively modest. It is only in the clothing and footwear industry that cheaper import prices, associated with lower tariffs, have caused significant job losses.

An alternative but related view is that changes in technology, rather than the direct effects of trade, are driving developments in the labour market. The suggestion is that there is some world-wide technological change that is reducing the demand for unskilled labour. This technological change is mainly driven by general scientific advance. In the United States it is leading to lower wages for unskilled workers. In Australia, and in other countries with relatively inflexible relative wages, it is raising the possibility of chronic unemployment of unskilled workers.

Both increasing wage dispersion and high unemployment are leading to pressure in many countries to limit or reverse trade liberalisation. These pressures seem generally inappropriate, and particularly so, if the real force is technological change. A more appropriate response is to ask what type of policies might be used to limit, and to deal with, increasing inequality and unemployment.

One response is to give up on the notion that the wages system is an appropriate tool to achieve income distribution goals. Perhaps an economy adjusts more easily to various types of shocks if relative wages are free to move. In the end, a more flexible labour market may deliver lower unemployment and a more dynamic economy. If this is the case, the tax and transfer system is probably the appropriate policy tool to achieve distributional goals. The difficult issue is how to do this. If the market-clearing wage for unskilled workers falls too close to the level of unemployment benefits, is the incentive to work affected? If highly-skilled labour that is internationally mobile is taxed heavily, the incentive to acquire skills may be reduced and the high taxes might lead to a ‘brain-drain’. Understanding these interactions between the tax and transfer system and people’s incentives is critical to developing successful policies concerning income distribution.

A second response is to upgrade the skills of relatively unskilled workers through increased training. By reducing the relative supply of unskilled workers, it may be possible to increase their relative wage. This idea is attractive. If the training is of the right type, the new growth theory suggests that it might also increase the economy’s rate of growth. The fact that training holds the promise of increased growth and less dispersion of income has seen many governments embrace the idea in recent years. The real problem is what type of training is required. Should it be vocational or general? Should training be conducted by government or in the private sector? How should training be paid for? These are questions with no simple answers. However, the twin processes of technological change and internationalisation significantly increase the returns to finding the right answers.

Internationalisation and Macro-Management

In addition to affecting the behaviour of goods and factor markets, internationalisation has affected the financial markets and the interaction of financial markets and the real economy. In this regard, three policy reforms have been particularly important; the floating of the exchange rate and the removal of exchange controls, domestic financial liberalisation and reductions in tariffs. These changes have affected the inflation process, the current account deficit and the relationship between the world and Australian business cycles.

The floating of the exchange rate fundamentally changed the way in which external shocks impact on the domestic economy. Under the fixed rate system, an increase in the terms of trade led to an increase in the foreign exchange reserves at the Reserve Bank and to a substantial increase in domestic demand. Typically, these additional reserves could not be sterilised as interest rates were relatively inflexible. The resulting expansion of money and credit, in conjunction with the higher demand, meant that an increase in the terms of trade led to an increase in the inflation rate; a terms of trade fall deflating the economy.

Under the floating system, increases in the terms of trade appreciate the nominal exchange rate, rather than increase the central bank’s reserves. The appreciation has two effects. First, it redistributes part of the real income gains away from exporters, towards consumers of imports. Second, and perhaps more importantly, the appreciation reduces the Australian dollar price of imports. It may even be that these lower import prices offset the higher prices of non-traded goods brought about by the income-induced rise in demand, with the end result, a decline, rather than an increase, in the measured rate of inflation.

The process of internationalisation also has a number of other implications for both inflation dynamics and the average inflation rate. As the trade share rises, the prices of more and more goods come to be influenced by the exchange rate. This increases the importance of exchange rate movements for understanding the short-run dynamics of inflation. Here, the issue of exchange rate pass-through also becomes more important.

Long-run inflation pressures may also be changed by the process of internationalisation. When financial prices were administered and transactions were regulated, it was relatively difficult for markets to show their concern or displeasure about policy. This is no longer the case: the reaction can be immediate and severe. This may change the incentives for policy makers to undertake radical policies, or policies that the financial markets dislike. If the financial markets dislike inflation more than other groups in society, financial liberalisation and internationalisation might significantly reduce the incentive to inflate.

Further, if a more outward-oriented economy can deliver faster growth, the pressure on policy makers to generate growth through exploiting the short-run trade-off between inflation and growth is reduced. There is also direct downward pressure on prices through the faster productivity growth. In addition, concern over international competitiveness may see workers become more subdued in their wage demands and enterprises more concerned about improving margins through lower costs, rather than higher prices. All these factors suggest that a more open economy may deliver lower average rates of inflation.

A second area in which liberalisation has had a significant impact is the size of the current account deficit. Financial deregulation removed the artificial borrowing constraints on many individuals and firms. With no exchange controls, the increased imbalance between domestic savings and investment was easily financed by capital inflow. The other side of these capital flows was larger and more persistent current account deficits.

The size of these deficits and the resulting rise in foreign debt has generated much debate. There have been two related issues. The first is, should we worry about the size of the resulting liabilities? The second is, if we should worry, what should be done? If the foreign borrowing is the result of undistorted decisions by the private sector, the central concern is whether or not the increase in debt raises the possibility of dramatic domestic adjustment following some general trouble in world capital markets. History suggests that such troubles occur periodically and can cause severe domestic adjustments. Concern also arises if the savings-investment imbalance is driven by a lack of government savings, or if private investors over-estimate the return on investment, or under-estimate future world real interest rates.

A central policy problem is to ensure that individual decisions concerning investment and savings are not distorted unduly by the tax and transfer system. Just as the costs to having inappropriate training policies are amplified by internationalisation, so too are the costs associated with distortions affecting savings and investment. Other than keeping inflation low, monetary policy has no influence in this area, and is thus an inappropriate instrument with which to influence the size of the current account.

The process of internationalisation also appears to have increased the correlation between the Australian business cycle and the OECD business cycle. There are at least three possible explanations for this change. The first relies on the strengthened trade links. Since the share of Australian output sold abroad has increased, foreign business cycles should have an increased impact on the demand for Australian output. This link between foreign demand and Australian output is not restricted to just the traded sector of the economy. If producers in the non-traded sector see a world recession spilling over to Australia, they are also likely to cut back investment and production.

The second explanation rests on financial markets. Closer movements between Australian and foreign asset markets, coupled with widespread financial deregulation have probably led to a greater synchronisation of the Australian and world business cycles. Many of the countries that liberalised their financial markets in the 1980s experienced an equity and property boom in the second half of the 1980s. The boom was followed by a period of slow output growth in many countries, as companies and banks came to terms with the excessive leading done on the back of the inflated asset prices.

The third explanation for the stronger link between the Australian and world business cycles is the more rapid spread of ideas. Advances in communications technology make it easier to transmit both scientific breakthroughs and policy ideas across national borders. The effects of these advances have been amplified by an increased commitment to the world economy by Australian business people and policy makers.

The Papers

This Volume consists of seven principal papers. In the opening paper, Steve Dowrick provides a survey of both traditional and recent thinking on the links between international trade and economic growth. The paper also presents an empirical study that examines the interactions between openness, investment and growth using data from a range of countries. It tentatively suggests that if Australia's trade ratio was in some sense 'normal', this might add up to half of one percentage point per annum to the long-run growth rate.

While trade liberalisation should increase labour productivity, the macroeconomic data do not provide strong evidence that it is doing so, at least not yet. In part, this reflects the more general problem of explaining trends in aggregate labour productivity. In response to these difficulties, Henry Ergas and Mark Wright use firm-level data from a survey undertaken by the Australian Manufacturing Council to examine how exposure to the international market place changes the behaviour of firms.

In the third paper, John Howe details trends in foreign direct investment over the past decade and examines the relationship between trade and foreign direct investment. In a supplementary paper, Kuzuhiko Ishida examines Japanese foreign direct investment in East Asia and its influence on Japan's trade structure and trade elasticities.

The fourth and fifth papers discuss the interactions between the labour market, trade and technology. Jerome Fahrer and Andrew Pease examine these interactions for the Australian case. Robert Lawrence examines the US case, using both US domestic data and data on US multinationals' foreign operations. Both papers conclude that technological change, rather than trade, is the dominant factor explaining movements in relative wages and employment growth for skilled and unskilled workers.

The final two papers discuss issues related to management of the macro-economy. Susan Collins examines the policy responses of Australia and a number of Asian countries to current account deficits, while David Gruen and Geoffrey Shuetrim examine the implications of greater integration of financial and goods markets for Australian inflation and the business cycle.

Openness and Growth

Steve Dowrick

1. Introduction – Opening Up the Australian Economy

Opening up the Australian economy to international trade has become one of the cornerstones of economic policy over the past decade. Tariff protection and assistance to the manufacturing sector, for instance, have already fallen dramatically and are intended to be reduced to negligible proportions by the end of the century. Whereas average effective rates of assistance were over 20 per cent in 1984, they are currently below ten per cent and are projected to fall to five per cent.[1]

The volume of trade has expanded rapidly. In 1981, less than 14 per cent of output was produced for export, much the same as the ratio that had been exported in 1970. By 1993, however, the share of exports in GDP had risen above 20 per cent.[2] Some two-thirds of the increase in exports went to East Asia, the most rapidly growing region in the world.

The mining industry, along with mining-related manufacture, has taken over from agriculture as the dominant exporting sector. Exports of cars and other more high-tech goods are increasing rapidly, albeit from a small base, but Australia remains a substantial net importer of manufactures such as electrical and capital goods.

Following on the work of Australian trade theorists such as Max Corden, Murray Kemp and Peter Lloyd, it has become an article of faith in most economic and policy circles that opening up the economy to international trade will produce substantial benefits in terms of greater consumer choice and higher living standards. Higher productivity is expected to be realised through competitive pressure and through opportunity to specialise in productive activities where we have a comparative advantage or where we can gain from economies of scale.

Belief in the beneficial effects of trade liberalisation has been fuelled by comparisons of the relatively moribund post-war performance of the protected and isolated Australian economy with the dynamic growth in trade and living standards in the economies of East Asia. Such casual empiricism can, however, be quite misleading as it ignores a host of other explanations for the East Asian economic 'miracles' including the opportunity for less developed economies to import technology as they industrialise. It is also recognised by the World Bank (1993) that governments of some of these fast growing economies have in fact intervened heavily in trade and have protected domestic industry, especially in the early stages of industrialisation.

There is nevertheless a strong consensus amongst economists that openness to trade, even if combined with elements of direction and protection, tends to promote economic welfare. There are indeed good theoretical reasons to believe that trade liberalisation should increase economic welfare under a wide range of plausible circumstances. It has,

1. Figures are from *Industry Commission Annual Report 1992-93*.
2. ABS constant 1989/90 price data cited by the Industry Commission.

however, proved rather more difficult to come up with good reasons why such welfare gains should be at all sizeable. Conventional economic modelling typically estimates the benefit of trade liberalisation as an increase in the level of national income of around one per cent. Whilst such figures are not negligible, they are hardly the basis on which to justify a radical restructuring of the economy with all of its inevitable adjustment costs. So trade optimists have a long tradition of appealing to beneficial effects of trade on the growth prospects of the economy.

Concepts of 'dynamic gains from trade' and 'dynamic comparative advantage' have long been bandied about as justifications for trade liberalisation, just as trade pessimists and protectionists have supplemented their analyses of terms of trade deterioration and strategic advantage with concepts of 'immiserising growth'. It is only recently, however, that developments in the modelling of long-run growth have enabled a more formal examination of the consequences of trade for growth.

The main purpose of this paper is to survey some of these recent developments in the economic theory of trade and growth to see if they do provide a sound basis for trade optimism. These new growth theories are contrasted with the conventional static models of trade. The paper then goes on to examine evidence on the link between countries' trade policies and their economic performance before presenting some new empirical results.

The broad conclusion that emerges from the theoretical survey is that trade liberalisation can indeed stimulate growth *in the aggregate world economy* by enhancing the international flow of knowledge and innovation and by allowing economies of specialisation, not only in the production of goods, but also in the generation of new knowledge and new inputs into production. Whilst trade may have such positive benefits for some countries, it may conversely lock other countries into a pattern of specialisation in low-skill, low-growth activities. To avoid the low growth trap, it is important to link trade liberalisation with appropriate policies on education, training and research and development; otherwise, failures in the markets for investment in skills and knowledge may be compounded by inappropriate trade-induced specialisation.

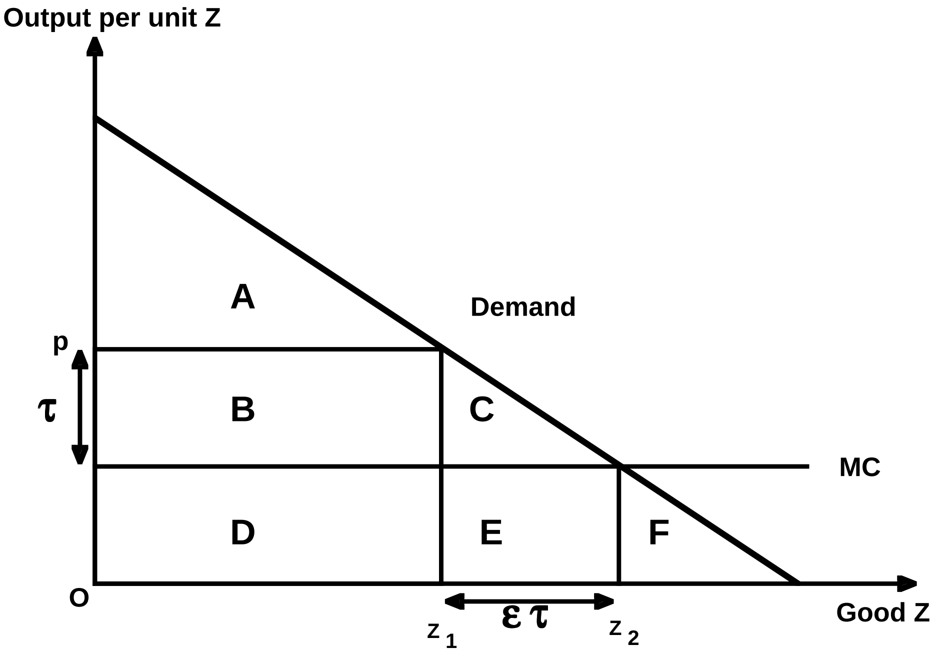
Empirical estimates of growth returns to trade liberalisation emphasise that such returns are not automatic for all countries. Nevertheless, it is not unreasonable to suppose that with appropriate supporting policies the process of trade liberalisation on which Australia has embarked might raise the long-run annual rate of growth by one half of a percentage point.

2. Estimates of the Gains from Trade – Based on Static Models of the Economy

The standard textbook treatment of gains from trade deals with comparative advantage and the efficiency loss associated with tariffs or other impediments to mutually advantageous trade. I shall use the familiar tool of partial equilibrium analysis, illustrated in Figure 1, for expository purposes.[3] Treating the line MC as the world price of an

3. The partial equilibrium reasoning here is adapted from Romer's (1994a) exposition where the good Z under analysis is an intermediate input into the production of a consumer good, so the derived demand represents the marginal productivity of Z and the marginal cost represents the opportunity cost, both measured in terms of the consumption good.

Figure 1
(adapted from Romer (1994a))



imported good, a distortion such as a tariff raises the domestic price by the amount τ to p. Demand falls by $\varepsilon\tau$, where ε is the elasticity of demand. The size of the efficiency loss, in a partial equilibrium analysis, is the area of the triangle $C = \varepsilon\tau^2/2$. So if the tariff is ten per cent and the elasticity of demand is unity, the welfare loss is half of one per cent of consumer expenditure.

The small magnitude of such losses from trade restrictions is an example of the principle that Harberger applied to both trade and monopoly power. The result extends from this partial equilibrium analysis to general competitive equilibrium analysis as well, allowing for domestic supply responses and income effects on consumer demand. If an economy starts from a competitive pareto-efficient position, then any small distortion will have only second-order effects, of the order of magnitude of the square of the tariff rate.

Baldwin (1992a, p. 162) refers to the body of empirical research which 'consistently find[s] that trade liberalizations raise aggregate income by an amount that is negligible (0.1 per cent …) or small …'.

The difficulty of finding sizeable gains from trade in conventional economic models is highlighted by a recent World Bank paper by Martin and Yanagishima (1993). Appreciating the point that efficiency gains will usually be tiny unless supply and demand elasticities are large, the authors develop a CGE model on which they impose elasticities ranging from 3 to 6. They acknowledge that these elasticities are substantially larger than those typically estimated by econometric studies, but they fall back on the CGE modellers' favourite observation – that errors in the measurement of variables will tend to lead to under-estimation of parameters in econometric models. Despite their courageous efforts to overcome such econometric deficiencies, the model predicts that liberalisation of trade in the Pacific region will typically yield welfare gains of less than one third of one per cent. In the case of Australia and New Zealand the model actually predicts (tiny) welfare losses from Pacific trade liberalisation due to adverse effects on the terms of trade.

2.1 Second-Best Welfare Gains

It is of course possible to construct models where the welfare loss from the tariff is substantially larger. For example, if there are pre-existing distortions to the idealised competitive economy, the private marginal cost (MC) faced by consumers may exceed the true social cost (e.g. if consumers face distortionary taxation). The loss of consumer surplus due to the imposition of the tariff may now be represented in Figure 1 by C + D + E . We have added to the Harberger triangle a second-best rectangle whose height is determined by the pre-existing distortion between social and private marginal costs. In this case, the efficiency loss due to the tariff may be substantially higher than the first-best analysis indicated.

In a second-best world, policy interventions can have first-order effects. This does not necessarily imply, however, that the case for trade liberalisation is strengthened. Rather, second-best analysis suggests that the stakes are higher. Without a full understanding of the whole range of market imperfections we cannot be sure that trade liberalisation may not move the economy away from, rather than towards, the first-best position.

2.2 Product Differentiation, Monopolistic Competition and Increasing Returns to Scale

Nevertheless, it is clearly not desirable to use the complexity of second-best analysis to paralyse all policy initiatives on the grounds that any change might make things worse. Most economists would probably have a strong presumption that lowering tariffs will in most circumstances move the economy in the desired direction. This presumption is strengthened by the analysis of trade in differentiated products with increasing returns to scale – a case which probably applies to a large proportion of modern trade in manufacturing. Lowering trade barriers allows consumers in a small economy access to a wide range of products at non-tariff prices and, at the same time, allows the domestic producers to exploit economies of scale by concentrating production on a small range of goods for export.[4]

Overall, trade liberalisation can account for a substantial increase in intra-industry trade and lowering of costs in both home and foreign industries. Referring to Figure 1, the gains from liberalisation may again be represented by triangle C plus a rectangle D+E where the height of the rectangle is the fall in domestic costs of production occasioned by the opportunity to exploit economies of scale.

4. The recent increase of both imports and exports of cars and their components is probably a good example of intra-industry trade facilitated by trade liberalisation and flexibility.

Applied researchers such as Harris and Cox (1985) investigating the Canadian economy have estimated gains from trade liberalisation of the order of magnitude of five per cent when economies of scale are realised by the expansion of intra-industry trade.

Tyers (1993) has applied such an approach to the Australian economy. He builds a calibrated CGE model where there are substantial unrealised scale economies in most Australian manufacturing industries. Trade liberalisation is predicted to actually reduce GDP by around one per cent, largely because of net reductions in the capital stock as the loss of protection hits the more capital intensive industries. The measure of GDP includes, however, returns to foreign owners (lenders) who have financed the capital intensive industries. A better measure of economic welfare is provided by GNP which does increase in response to the removal of tariffs, although the gains are less than one half of one per cent. Moreover, if trade liberalisation is accompanied by more competitive pricing behaviour by Australian firms, then income rises by an additional one or two per cent.

The low estimate of the direct returns to Australian trade liberalisation, despite the opportunity to realise economies of scale, is probably due to the relatively small size of the Australian manufacturing sector, only 15 per cent of GDP, which is where the economies of scale are presumed to exist. Tyers estimates for Korea, where manufacturing value added constitutes 30 per cent of GDP, that income would increase as a result of liberalisation by over three per cent.

2.3 Terms of Trade and Strategic Trade Policy

It is well known that the optimal tariff or export subsidy may not be zero if we relax the assumption of a small country to allow the terms of trade between imports and exports to change. Equivalently, with oligopolistic competition in product markets, the relative prices and strategic responses of home and foreign rivals' products may be altered by domestic trade policy. In such cases, rents (represented, for example, by rectangle B in Figure 1, treating demand as coming from the rest of the world) may be increased by appropriate tariffs.

These strategic or terms-of-trade concerns are probably appropriate, though complex, for large trading blocs such as NAFTA or the EC, or the homes of major exporting manufacturers. There is little suggestion that a small country such as Australia stands to gain much from such strategic interventions.

2.4 New Non-Rivalrous Goods

A very recent paper by Romer (1994a) argues that the gains from trade may be much higher than in traditional competitive analysis if we include the possibility of new non-rivalrous inputs into production. Such goods might be traditional public goods such as bridges, or they might be the knowledge required to set up a new manufacturing process, or the blueprint for a new product, or a dealership network to distribute conventional goods.[5] The technological representation of non-rivalry in production is the existence of a large fixed cost and constant marginal costs. Romer's basic premise is that such non-rivalrous inputs are at the heart of economic progress.

The development of new non-rivalrous inputs can drive long-run growth. But even in a static framework, Romer argues the potential importance of such inputs for welfare analysis. Referring again to Figure 1, although the owner of the newly created good may possess sufficient market power so as to price above marginal costs, competition between producers and arbitrage amongst consumers will in general prevent the owner from realising the full consumer surplus associated with the new good. The area A in the figure is the Dupuit triangle, named after the 19th century French engineer who developed cost-benefit analysis for investment in non-rivalrous goods such as bridges. The size of the Dupuit triangle captures the likely extent of market failure in the provision of new goods.

Romer develops a simple mathematical model to illustrate the possible range of welfare losses due to tariffs in an economy which imports its capital goods. With a fixed range of goods, the welfare loss from a ten per cent tariff is one per cent of national income. When, however, the possibility for the introduction of new non-rivalrous goods is impeded by tariffs, the cost of protection rises to nearly 20 per cent of national income. This example illustrates the more general point that Dupuit triangles associated with innovative goods are expected to be an order of magnitude larger than the welfare losses associated with Harberger triangles. Romer suggests that these 'static' welfare costs associated with traditional analyses of non-rivalrous goods are at the heart of the welfare analysis of economic growth.

3. Models of Endogenous Growth and Trade

Given the problems of finding large scale gains from static models of trade liberalisation, there has been a long tradition of appealing to 'dynamic gains' to justify trade optimism. Such gains may be associated with capital accumulation, with external economies of scale, with learning by doing, or with technology transfer. In many formal models, the dynamics are transitional in the sense that the model will eventually approach a steady state level, as in the Solow-Swan model of growth. Dynamic gains have also been analysed in the sense of changing the long-run growth path of the economy, as in the work of Schumpeter (1934) and Kaldor (1981). There has been a tremendous upsurge of interest in formal economic modelling of long-run growth over the past five years, typically under the labels of 'new growth models' or 'the theory of endogenous growth'.

3.1 New Theories of Endogenous Growth

The essential feature of supply-side models of economic growth is the accumulation of factors of production; generic capital that might consist of machines and buildings and

5. This technological transfer takes place not only through *trade,* but also through foreign direct investment (FDI). Some of these links between FDI and technological transfer and productivity are discussed in the papers by Ergas and Wright and Howe in this Volume.

infrastructure, but can also consist of human skills and knowledge. Any policies which affect the rate of accumulation will affect rates of growth, for example taxation which alters the private returns to capital accumulation.[6]

An awful lot of heat and some light have been generated by the recent round of formal modelling of the processes of economic growth.[7] There are two distinguishing features to these models: first, the technical features which provide sufficient conditions for accumulation to generate long-run growth; and second, an emphasis on the accumulation of non-tangible capital such as skills and knowledge.

Whereas a previous generation of economic theorists, notably Schumpeter and Kaldor, had raised many of the ideas about which the latest generation are now getting excited, genuine innovation has occurred in the mathematical modelling of long-run growth. This has been particularly important in overcoming the long-run investment pessimism associated with decreasing returns to accumulation in the Solow-Swan model.

Romer, Lucas, Barro and others have extended the neo-classical growth model, characterised by formal modelling of investment decisions by a forward looking, rational agent, to clarify the conditions that are required for long-run growth to occur. Hammond and Rodriguez-Clare (1993) have produced a coherent synthesis of the technical features of these models of endogenous growth.

The driving force of all these models is capital accumulation. By building up stocks which increase productive capacity, and using that enhanced capacity to further build up stocks, it may be possible that incentives to continue investing are sufficient to generate continuous growth, but it is also possible that decreasing returns to capital may inhibit growth in the long run. Much of the recent theoretical literature is concerned with the technical conditions under which accumulation can drive growth.

It is important to distinguish between three principal forms of capital:

- physical capital, produced by investment in equipment and structures;
- human capital, generated by education and training and learning by doing; and
- disembodied knowledge, or blueprints, generated by research and development and/or learning by doing.[8]

6. There are also demand-side models of economic growth, e.g., some of the work of Thirlwall (1979) as cited by Kaldor (1981) where growth is constrained by a requirement to achieve balance on the current account. If income elasticities of demand dominate price elasticities, or prices are rigid, then domestic growth is constrained to the (exogenous) rate of growth of export demand divided by the income elasticity of demand for imports. Such models ignore or discount capital flows, price responses and resource allocation. I do not consider them here in any detail.

7. There have been a number of recent symposiums in this burgeoning field, published in *Journal of Political Economy* (1990), *Quarterly Journal of Economics* (1991), *Journal of Economic Theory* (1992), *Oxford Review of Economic Policy* (1992), *Journal of Monetary Economics* (1993). Some of the most important theoretical contributions have come from Romer (1987, 1990), Lucas (1988), Jones and Manuelli (1990) and Grossman and Helpman (1990, 1991a, 1991b, 1993). Readable summaries are found in Sheehan (1992) and Romer (1994b).

8. The interaction among trade, technology, factor accumulation and growth are usually discussed at the macroeconomic level. The paper by Ergas and Wright in this Volume examines the evidence that these interactions exist at the firm level.

It is also useful to distinguish between three different sorts of technological interaction:

- *flexibility* in the production of final goods – the extent to which capital can substitute for fixed factors of production such as labour and natural resources. Models based on production flexibility typically follow in the tradition of the Solow-Swan model and are usually compatible with perfect competition.
- *feedback* in the accumulation of capital – the extent to which the stock of capital reduces the cost of generating further capital. Feedback models are often used in a neo-Schumpeterian framework where new goods and new ideas produce further goods and further ideas and they typically involve temporary monopoly power.
- *spillovers* in the production of final goods – the stock of capital owned by one producer affects the productivity of other producers. Models based on spillovers use notions related to the Kaldorian concepts of external economies and Verdoorn's law of dynamic economies of scale.

I shall give a brief summary of three cases where endogenous growth occurs.

Case 1: capital flexibility generates long-run growth

Long-run growth is not feasible if increasing capital intensity drives the marginal product of capital to zero (the Inada condition). This occurs if capital is not readily substituted for labour, for example in the case of a Cobb-Douglas production function. Labour is 'essential' in production, in the sense that the marginal product of capital approaches zero as the ratio of capital to labour rises. In the absence of feedback or spillover the long-run growth of output is constrained by the growth of the labour supply and by the growth of exogenous technology. Agents can accumulate human capital and physical capital as much as they like, but they will always run aground on the rock of diminishing returns in the long run. Hence the 'investment pessimism' traditionally associated with the Solow-Swan model.

If, on the other hand, the elasticity of substitution between fixed and accumulable factors exceeds unity, then the marginal product of capital no longer declines to zero; labour is no longer 'essential'. In effect, robots can replace humans on the production line; they can even replace humans in the production of further robots. Of course, labour is still required to organise and direct the production process; but the essential point is that if there is sufficient substitutability between capital and labour, then investment will always contribute to growth. This case is analysed by Pitchford (1960) and more recently by Jones and Manuelli (1990). As long as the return on investment is above the inter-temporal discount rate, then rational agents should choose to invest and the economy will keep on growing.

Case 2: investment feedback generates long-run growth

Feedback might occur where training or research activity increases the individual's stock of knowledge or human capital. It may be the case, for instance, that the larger the stock of knowledge, the easier it is to increase it. Better educated and more knowledgable people learn faster and develop new ideas more easily. An appealing idea is that existing knowledge and understanding, combined with further education and research, generate further knowledge.

Romer (1990, 1993) has particularly argued the case that such feedback is a vitally important feature of the generation of new ideas or blueprints which are intermediate inputs into the production of capital goods but are also inputs into the production of the next generation of blueprints. Grossman and Helpman have modelled direct feedback in the generation of new goods.[9] Learning by doing can be interpreted as a feedback mechanism too.

Case 3: investment spillovers generate long-run growth

The idea here is that the productivity of fixed factors such as labour may be enhanced by spillover benefits from the capital accumulation of other agents. There are several features of investment which may produce such spillovers. The public good qualities of knowledge are a prime example, suggesting positive spillovers from R&D or from learning by doing.

Not surprisingly, private investment decisions which ignore positive spillover benefits to other producers generate a sub-optimal rate of growth. On the other hand, in some circumstances new ideas may be substitutes rather than complements, as in the case of patent races or quality upgrading, in which case the common pool problem implies that there may be over-investment in research.

3.2 The Contribution of Trade to Growth

In the standard neo-classical tradition, the Heckshер-Ohlin-Samuelson analysis, trade will affect the level and composition of output and welfare, but not long-run growth. The new growth models have something in common with the classical tradition of Ricardo and Marx, as developed by Lewis (1980) in his Nobel lecture, where trade can increase the rate of profit and hence the rate of investment and growth.

We can usefully distinguish two sorts of trade-growth models. On the one hand, there are those models that follow Adam Smith in emphasising the role of trade in enabling specialisation which yields increases in productivity through learning by doing or through specialisation in research. Such models rely on spillover and/or feedback mechanisms to generate cumulative increases in productivity and specialisation.

On the other hand, there are Ricardian models where comparative advantage leads to specialisation in particular activities. Some activities are characterised by higher rates of productivity growth, hence countries which specialise in these will tend to grow faster. However, productivity growth is not derived from the specialisation *per se*; it is an inherent feature of each activity.

3.3 Specialisation as a Source of Growth

This idea lies behind the notion of internal economies of scale in production. Access to foreign markets allows the realisation of potential economies as each country concentrates on the activities in which it has comparative advantage. In traditional models, realisation of scale economies affects levels rather than long-run growth, but if

9. See Grossman and Helpman (1990, 1991a, 1991b, 1993).

there are sufficient feedback or spillover effects (for example through the development or acquisition of machine tools which enable production of superior tools), then the opportunity to specialise through trade may raise long-run growth.

Rivera-Batiz and Romer (1991) and Rivera-Batiz and Xie (1992) concentrate on the non-rival nature of knowledge as the prime determinant of growth. In their models, the primary growth-enhancing effect of trade in final goods arises because it enables countries to specialise in production and to avoid the duplication of R&D efforts which would occur if each had to produce the entire range of goods for its domestic market.

3.4 Dynamic Comparative Advantage as a Source of Growth

In these Ricardian models, where countries specialise in faster or slower growing activities, a key determinant of patterns of growth is the extent to which skills and knowledge spill over national boundaries. In the case where there are no impediments to the transfer of knowledge – that is, where knowledge is a global public good – the predicted pattern of specialisation in production and trade depends on relative supplies of the other factors of production: natural resources, labour and human capital (or skilled labour). Grossman and Helpman (1991a) find that their analysis of dynamic comparative advantage does not necessarily overturn the traditional Hecksher-Ohlin predictions of static trade theory. Countries with relatively high endowments of skilled labour will specialise in production of innovative or high-technology goods, whilst others will specialise in production of traditional manufactured (unskilled labour intensive) goods or resource based goods.

The rate of growth of *output* (real GDP) will be higher in the skill-intensive country which specialises in innovative products. Grossman and Helpman (1991a) cite the experience of the Japanese economy in the 1960s and 1970s as it rapidly built up its skill base and transformed the structure of output towards innovative products. But a crucial point in their welfare analysis of trade and specialisation is that this does not necessarily mean that the 'high-tech' country will be better off than the labour or resource-intensive countries. In a long-run equilibrium with free trade, their model predicts similar rates of growth of real consumption for all countries. The point here is that with free trade in goods and free transmission of knowledge, it does not matter to consumers whether they are located in the labour-intensive or skill-intensive country; they can enjoy the benefits of innovation through the purchase of traded goods. Faster growth of output in the skill intensive country is offset by deteriorating terms of trade. High-tech goods become relatively cheaper, controlling for quality, in direct proportion to their faster rate of innovation.

These conclusions change somewhat if knowledge is not transmitted freely across national boundaries. With knowledge a national public good, but not an international public good, the more technologically advanced country will have a comparative advantage in the production of further knowledge; hence it will tend to extend its technological lead and expand its share of world production of the innovative products. This cumulative causation will, in a simple model where no knowledge spills over to other countries, lead to a situation of complete specialisation. The country with a head start in the accumulation of knowledge will tend to widen its lead, unless the laggard country's government intervenes to overcome the initial disadvantage.

In Young's (1991) model of learning by doing, where the learning does not spill over national boundaries, a similar prediction emerges: the larger and more advanced countries will grow faster as a result of free trade. They have a comparative advantage in the industries with learning by doing economies of scale, so those industries will expand in response to the opening up of trade and the realisation of further economies will compound their comparative advantage.

Thus, where knowledge is contained within national boundaries, success can breed success. It also follows that intervention can affect the subsequent growth path. Countries are not necessarily constrained by an exogenous factor endowment. However, once again, it does not necessarily follow that gaining a technological lead will make a country better off. International trade in assets and goods still allows the residents of the country that specialises in the production of labour-intensive 'traditional' goods to invest their savings in foreign assets and to import the new and cheaper innovative goods.

If private incentives for accumulation of human and knowledge capital reflect social costs and benefits, then, although it may be possible to increase output growth by intervening to change the pattern of dynamic comparative advantage, doing so can actually reduce welfare.

In practice, however, capital market imperfections typically imply sub-optimal investment in human capital; given that human capital is a complement to research, there is then a presumption that incentives to invest in R&D are also sub-optimal, compounding failures in the market for knowledge. A 'revealed comparative disadvantage' in knowledge-intensive production may in fact reflect these market failures. In this case, trade liberalisation may lower welfare if it encourages specialisation in low-learning, low-knowledge industries which further decreases incentives for investment in human capital and knowledge.

3.5 Summary

The general import of these models is that trade liberalisation should increase world growth and welfare *in aggregate*. In the neo-Smithian analysis, everyone grows faster as a result of economic integration. This is also true if trade speeds the international diffusion of knowledge. In the neo-Ricardian analysis, however, some countries whose comparative advantage is in low-growth activities may find that their growth is retarded. Low growth need not be a welfare problem if markets are complete: the citizens of that country will gain from falling prices of the high-tech goods which are more efficiently produced elsewhere. It is only a problem if there are market failures in the acquisition of skills and knowledge which are compounded by trade specialisation. If so, a 'lucky' country with abundant natural resources, like Australia, may find itself locked out of the areas of dynamic learning and growth.

4. The Welfare Economics of Growth

Because growth rates compound over time to produce large differences in levels, it is tempting to presume that policies which affect growth must necessarily be more important than policies which only affect levels; hence much of the policy interest in the new wave of theorising about the causes of economic growth. The presumption that growth matters more than levels is not necessarily well founded. There are two related reasons. First, our social welfare calculus will typically discount future income gains. Second, we have to offset the discounted gains from growth with the current costs of the investment (that is, the consumption foregone in order to generate that growth).

If our benchmark is that of a fully competitive, perfect information world, then just as deviations from the static equilibrium position will have only second-order effects, so too will deviations from the dynamic growth path of the economy in terms of net present values. This point is made by Baldwin (1992a) in his analysis of the transitional dynamics of a model with decreasing returns to investment (one which does not, therefore, exhibit long-run growth).

Indeed, Baldwin makes the point which should be familiar from a careful reading of the welfare economics of static models, that trade liberalisation effects are likely to be significant only if there are pre-existing distortions in the economy. If, for example, the social rate of return exceeds the private rate of return (or, presumably, if the social discount rate is less than the private discount rate) and if trade raises profitability, then the extra investment induced by trade will yield a dynamic welfare gain to complement the standard static efficiency effect.

For example, Baldwin suggests that the static output effect of the 1992 EC trade agreement may be to increase GDP by around 4 per cent. Increased profitability should also increase investment, and he calculates that this dynamic effect will in the long run add around 2 per cent to steady-state GDP levels. So the dynamic output effect is around one half of the static effect. But, because the extra investment has to be paid for, and because the returns are realised later, Baldwin estimates that the welfare impact of the dynamic effects is minimal.

Of course, if there are major distortions or information problems in capital markets or substantial externalities in the process of capital accumulation, which raise social returns above private returns, then the dynamic benefits of trade reform may be higher. But we are again faced with the same policy problems as beset static second-best analysis. First, we will often not be sure of the direction of the distortions. Second, even if we know that private returns to investment are sub-optimal, it may not be obvious that trade liberalisation will necessarily increase returns to investment. Third, there is a strong presumption that it would be better to address the market failure in the capital markets directly rather than using trade policy as a second-best instrument.

These arguments are developed by Baldwin (1992b) in the context of a model of investment which leads to a long-run steady state level of output and consumption. Jones and Manuelli (1990) make much the same point in their analysis of endogenous growth models. Once we take account of the opportunity cost of investment and once we discount its returns, there is no presumption that the welfare implications of policies in long-run growth models are substantially different from their effects in models where output converges to a steady state.

This point is implicit in Romer's (1993) discussion of policies for the funding and management of research and development. Although he identifies R&D as being at the core of the growth process, the welfare analysis is couched almost entirely in the traditional terms of static welfare analysis of non-rival and non-excludable goods. The important welfare implication of endogenous growth theory appears to lie not so much in the predictions of the growth process itself, but rather in the focussing of attention on the importance of public goods problems associated with the development of new knowledge and new goods.

From a normative viewpoint then, it is far from obvious that we need be concerned with the effects of trade on growth over and above the effects on static efficiency. Of course, there may be special cases in growth models where the long-run welfare gains from growth outweigh static level effects. If, for instance, there are multiple equilibria in growth paths, then growth effects may predominate.

I draw the tentative conclusion that, in general, welfare analysis loses little if it calculates the welfare gains and losses in the context of conventional static models. What is important is that such analysis should recognise the importance of learning and the accumulation of knowledge and the development of new goods, and that it should deal with the associated problems of non-appropriability, non-rivalry, common pools, etc.

5. Econometric Evidence on the Impact of Trade on Growth – A Brief Survey

A wide range of studies conducted over the past decade or so have indicated a fairly consistent pattern of positive correlations between trade openness and growth. Almost all of these studies are based on cross-country comparisons. For instance, the World Bank (1987) divides a sample of 41 developing countries into four categories of more or less inward or outward-oriented economies. Their classification is based on evidence of rates of protection, direct import controls, export incentives and exchange rate over-valuation plus a considerable element of judgment. GDP growth is strongest in the most outward-oriented countries, and weakest in the most inward-oriented.

As Evans (1989) points out, however, there is little difference between the weakly outward and the weakly inward-oriented groups. Moreover, the strongly outward-oriented group consists of three very particular outliers (Hong Kong, South Korea and Singapore) where other unmeasured factors may be playing a role in their strong growth performance.

Other researchers such as Agarwala (1983) and Dollar (1992) have used measures of price distortion (relative to world prices) for developing countries and find higher growth in those countries with lower price distortions.

Evans (1989) also reports on an unpublished paper by Chenery and Syrquin which predicts trade levels by country size and income, taking the deviation from predictions as a measure of openness. They find that outward orientation is associated with faster growth, particularly for small countries with a comparative advantage in manufacturing.

Lee (1993) estimates trade distortions as a function of tariffs and black market premia for 81 countries, covering developed and developing economies. He finds that, for example, a 20 per cent tariff for a country trading 20 per cent of its output reduces annual growth by 0.6 percentage points, with the effect working mainly through diminished rates of investment.

Further econometric support for the growth enhancing effects of freeing trade is found in studies by Helliwell (1992) and Edwards (1992). Singer and Gray (1988) suggest that the advantages of freer trade are greater for the group of countries whose exports are subject to strongly growing world demand.

A couple of recent studies explore more explicitly some of the ideas thrown up by recent theorising about growth.

Coe and Helpman (1993) find support for their hypothesis that trade flows between developed economies interact with the knowledge gap (measured by differences in stocks of R&D) to raise productivity growth. Whilst their evidence does not contradict their contention that trade diffuses knowledge, they do not explicitly confront alternative hypotheses such as that diffusion might be related to foreign direct investment, geographical proximity, language and culture, telecommunication links, etc.

Backus *et al.* (1992) appear to have re-discovered the results if not the work of Kaldor and 'Verdoorn's Law'. They suggest that larger economies and more specialised economies should grow faster than smaller or less specialised economies. They find support for this hypothesis in cross-country comparisons of rates of growth of productivity in manufacturing, but not for non-manufacturing activities.

Lal (1993) is critical of trade and growth studies on the grounds that the indices of trade bias sometimes rely on subjective assessment that is pre-conditioned on the authors' knowledge of economic success. Such a criticism can be made of the World Bank study, but is not particularly pertinent to most of those referred to above which are based on objective measures of trade flows or price distortions. Lal also cites Sheehy (1990) as criticising studies of bivariate correlations between the growth of exports and the growth of GDP for ignoring questions of causation. None of the studies cited above use this specification of the trade-growth relationship.

A different line of criticism comes from Levine and Renelt (1992) who focus on the sensitivity of cross-country partial correlations to the inclusion of other explanatory variables. They find, for instance, that on a single cross-section (averaged over 30 years) the partial correlation between growth and openness is weak when other variables such as investment are included in the regression. Whilst their study sounds a valuable warning about the dangers of inference when important explanatory variables are missing, their approach to 'data under-mining' lacks a theoretical basis for arguing why certain variables should, or should not, be included in the regression analysis and for distinguishing endogenous from exogenous variables. Despite the limitations of this approach, they report that trade openness is robustly related to levels of investment and hence to growth.

There is, then, a very strong impression from a wide range of studies of a strong empirical relationship between trade openness and growth.

In the next section I shall present a study of my own that seeks to illustrate this relationship and to test for its robustness to a wider range of statistical techniques than have typically been used. In particular, I am concerned to investigate how robust the relationship is to variation over time as well as variation across countries. We suspect that there are a great many factors influencing countries' growth paths, including institutions of government, labour markets, corporate structure, financial structure, religious beliefs, cultural attitudes, etc. Any simple cross-country correlation that fails to control for these (often unmeasurable) factors is subject to doubts about omitted variable bias. The fast growing Asian NICs are strongly outward oriented, but they also share some historical and cultural characteristics. It may be these unmeasured characteristics which drive both growth and trade quite independently, leaving us to observe a spurious correlation.

Alternatively, it may be the case that economic success leads to lowered costs and increased international competitiveness which in turn encourages trade liberalisation. This contention was the subject of vigorous debate in the 1970s as Kravis (1970), Crafts (1973) and Lewis (1980) debated whether trade was the 'engine' or 'handmaiden' of growth.

None of the econometric studies mentioned above attempt to deal with these twin issues of omitted variable bias and reverse causation, so in the following section I present the preliminary results of a study which attempts to do just that. In an attempt to overcome problems of omitted variable bias, I construct a panel of data, taking observations over three successive decades. By taking first differences it is possible to eliminate the influences of country-specific factors, or at least of those factors which are invariant over time. Using lagged values as instruments, it is also possible to test for reverse causation.

6. A Panel Study of Trade and Growth

The relationship that I want to estimate involves hypotheses that trade openness may stimulate investment and also that it may stimulate technical progress and employment growth. The regression equations are specified as follows.

The dependent variable in the first equation is the growth of output per worker, *Y/L*, indexed by *i* for country and *t* for the time period. The standard explanatory variables are the growth of capital intensity, captured by the average investment share over the period, *I/Y*, and the growth of employment, *L*. The value of labour productivity at the beginning of the period, is a negative proxy for the technology gap between country *i* and the world leader, a measure of the potential productivity gains from importing technology. *T* is an additional variable capturing the degree of openness to trade at the beginning of the period. The final three terms represent period-specific factors, country-specific factors and a white noise error term, which affect the growth of multi-factor productivity.

$$\Delta log(Y/L)_{it} = \alpha_1 (I/Y)_{it} + \alpha_2 \Delta log(L)_{it} + \alpha_3 T_{it_0} + \alpha_4 log(Y/L)_{it_0} + \varepsilon_t + \varepsilon_i + \varepsilon_{it} \qquad (1)$$

The second and third equations are based on the supposition that capital accumulation and also employment growth may be influenced by income levels, captured by labour productivity, by population growth, *P*, and by trade openness as well as by country or period-specific factors and a white noise residual.

$$(I/Y)_{it} = \beta_1 log(Y/L)_{it_0} + \beta_2 \Delta log(P)_{it} + \beta_3 T_{it_0} + \upsilon_t + \upsilon_i + \upsilon_{it} \qquad (2)$$

$$\Delta log(L)_{it} = \gamma_1 log(Y/L)_{it_0} + \gamma_2 \Delta log(P)_{it} + \gamma_3 T_{it_0} + \psi_t + \psi_i + \psi_{it} \qquad (3)$$

Substituting (2) and (3) into (1) gives a reduced form specification:

$$\Delta log(Y/L)_{it} = \delta_1 \Delta log(P)_{it} + \delta_2 T_{it_0} + \delta_3 log(Y/L)_{it_0} + \sigma_t + \sigma_i + \sigma_{it} \qquad (4)$$

Derivations of these specifications apart from the openness variable are given in Dowrick and Nguyen (1989) and Brander and Dowrick (1994). In regression (1): α_1 is the marginal gross rate of return on capital; $1+\alpha_2$ is the output/employment elasticity; α_3 is the marginal impact of openness on productivity growth; $-\alpha_4$ is the rate of catch-up or technological transfer. The ε_i term represents country-specific and time-invariant effects such as those of historically determined institutions and culture. ε_t represents common movements in the rate of technological progress, particularly to capture the productivity slow-down after the exceptional growth rates of the 1960s. ε_{it} represents random medium-term productivity shocks. Because the data have been averaged over decades, business cycle fluctuations should be largely smoothed out.

In the factor accumulation equations, *Y/L* captures income effects on savings and on labour supply; population growth is obviously important for labour supply and may have cross effects on capital accumulation. Trade is hypothesised to affect returns to factors, hence to alter their supply.

6.1 Data

Before estimating these regressions, it is useful to examine the data. The source is the latest Penn World Tables (5.5), an earlier version of which is described by Summers and Heston (1991). In order to examine variations over decades as well as cross-country variation, the data is averaged over each of the 1960s, 1970s and 1980s. Sub-Saharan African countries are excluded along with the major Middle Eastern oil exporters because the growth patterns of these countries are typically very different from those of the rest of the world and are extremely difficult to model. Countries are also excluded if more than three annual data points are missing from any decade. This leaves a sample of 74 countries, giving a sample size of 3x74 = 222. (The data are available from the author on request.)

For the purposes of preliminary data analysis I use the country averages over the period 1960-90. Figure 2 plots economic growth (in real GDP per capita) against trade intensity (exports plus imports/GDP) for the 74 countries. It is immediately obvious that there are three significant outliers in terms of trade intensity (Singapore, Hong Kong and Luxembourg). The first two of these are also outliers in terms of growth, so we may expect them to have considerable influence on subsequent statistical analysis of the relationship between trade and growth.

The presence of Hong Kong and Singapore in the sample gives a weak positive correlation between trade intensity and growth (r=0.30). Excluding the three outliers, it is evident that there is no systematic relationship; the correlation coefficient drops to 0.06.

Figure 2: Growth and Trade Intensity for 74 Countries (1960-90)

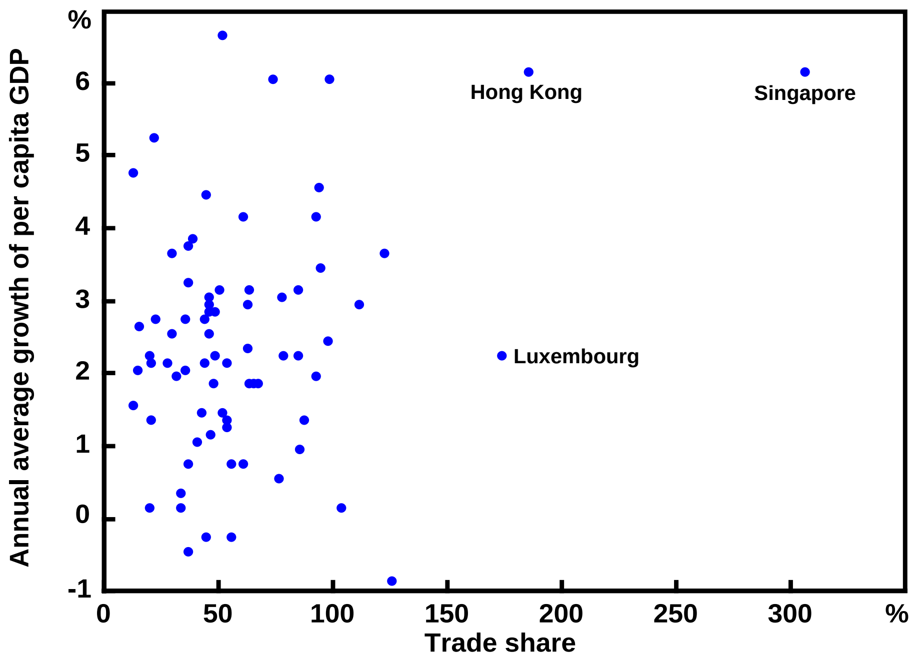


Figure 3: Trade Intensity and Population

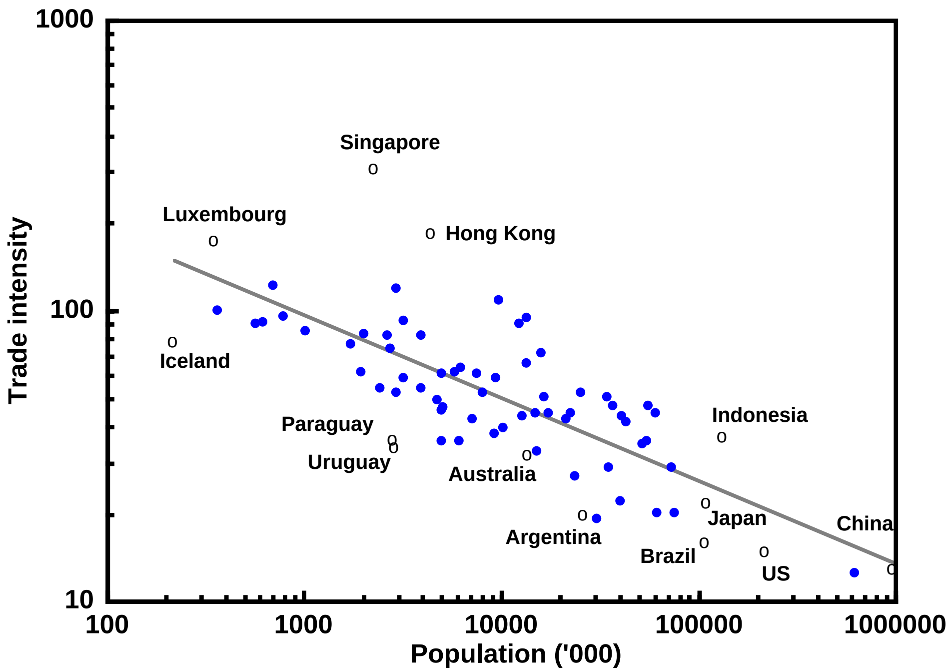


Table 1: Trade Intensity and Population
(dependant variable: log of trade intensity)

Estimation method	OLS
Sample countries	all
n	74
Regression coefficients (t-statistic):	
Population	0.277 (10)
Constant	6.48 (27)
Summary statistics:	
$\bar{R}^2$	0.57
s.e.	0.40

A common feature of the three extremely high-trading economies is that they are small countries, virtually city states. To ascertain whether their trading intensity is in fact exceptional, they should perhaps be compared with other cities rather than with other nations. Here I can approximate that comparison by plotting trade intensity against population size.

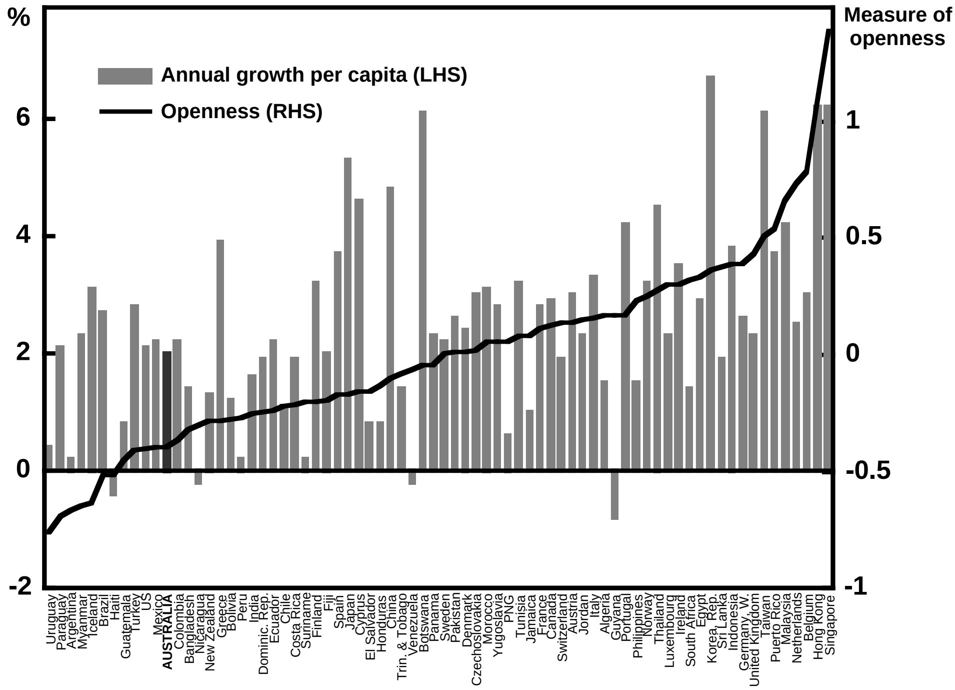
The scatter plot in Figure 3 is drawn to a logarithmic scale which shows that there is a very strong log-linear correlation between trade intensity and population. This is confirmed by the results of an ordinary least squares (OLS) regression of the log of population on the log of trade intensity, reported in Table 1.

The regression line is drawn in Figure 3 and some of the principal outliers and countries of interest are labelled. Luxembourg, for instance, is not a significant outlier; its high trade intensity is almost entirely explicable in terms of its tiny population. Singapore and Hong Kong, however, are indeed much stronger traders than other countries of similar size. Japan's relatively low trade intensity is largely explained by its size. Australia has a lower trade intensity than predicted, but by far the most significant low-trade outliers are the Latin American economies.

I take T_i, the deviation from the predicted trade intensity in the above regression, as a measure of trade openness. This measure is listed in Table 2, where countries are arranged in order of economic development in 1960.

Trade openness is plotted against real GDP growth per capita in Figure 4, with countries arranged in increasing order of openness. Although using a larger sample and more recent data than World Bank (1987), much the same conclusion can be drawn from visual inspection of this figure. It is not apparent that there is any strong correlation between openness and growth, other than at the extremes of the distribution. The few very open economies are clearly growing faster than the few very least open economies, but the relationship for the big majority of countries in the sample is not nearly so clear. There are some inward-oriented countries that have grown fast and a number of outward-oriented countries that have grown relatively slowly.

Figure 4: Openness and Growth



6.2 Preliminary Regression Results

These simple bivariate correlations do not take account, however, of differences in technology gaps or rates of growth of population, nor do they allow us to distinguish whether countries that have increased their openness over time experience any acceleration in their growth. In order to examine these factors we move to multiple regression analysis.

Table 3 presents preliminary regression results for the aggregate cross-section, averaging the data for 1960-90. The specification is similar to that used by many of the studies reported in the previous section, regressing per capita GDP growth on measures of openness, investment rates and initial GDP levels. Productivity growth does not appear to be related to raw trade intensity (regression 3.1) but it is positively correlated with our derived measure of openness (3.2).

If we drop investment from the regression, as in (3.3), we lose a substantial degree of explanatory power but we find an enhanced impact of openness on growth. This suggests that openness works partly through increasing investment rates, perhaps as a result of increased rates of return, but also has a direct effect on labour productivity.

If we drop the two extreme high-growth/high-openness countries (Hong Kong and Singapore) and also exclude the two extreme low-growth/low-openness countries (Uruguay and Argentina) we find that the impact of openness is somewhat reduced, but still highly significant. The regression results are in column (3.4) of Table 3.

Table 2: Estimated Openness 1960-90

		1960 GDP	Trade Intensity	Pop-ulation '000	Openness			1960 GDP	Trade Intensity	Pop-ulation '000	Openness
	Less Developed Countries						*More Developed Countries*				
1	Myanmar	296	20	30283	-0.65	45	Hong Kong	2210	186	4412	1.07
2	Botswana	552	99	780	-0.04	46	Czechoslovakia	2468	46	14757	0.02
3	Pakistan	618	30	72435	0.01	47	Mexico	2809	21	60963	-0.40
4	Indonesia	625	37	132531	0.39	48	Chile	2893	41	10271	-0.22
5	India	665	13	616457	-0.25	49	Japan	3033	22	109675	-0.17
6	Egypt	770	49	37046	0.33	50	Puerto Rico	3069	123	2921	0.54
7	Morocco	790	46	17466	0.06	51	Ireland	3184	95	3175	0.30
8	Bangladesh	798	21	76089	-0.32	52	Spain	3196	30	35212	-0.17
9	China	825	13	950155	-0.10	53	Argentina	3293	20	26022	-0.66
10	Haiti	873	37	4966	-0.51	54	Uruguay	3829	34	2835	-0.76
11	Korea, Rep.	907	52	34418	0.37	55	Italy	4636	37	54651	0.16
12	Thailand	929	45	40762	0.27	56	Iceland	5172	78	215	-0.64
13	Honduras	1007	61	3202	-0.13	57	Austria	5176	63	7443	0.14
14	Tunisia	1088	64	5791	0.08	58	Finland	5367	51	4706	-0.20
15	Bolivia	1112	47	4979	-0.27	59	Trin. & Tobago	5577	88	1016	-0.08
16	Philippines	1119	43	42856	0.23	60	Belgium	5583	112	9673	0.78
17	Papua New Guinea	1128	77	2754	0.06	61	Norway	5665	85	3950	0.25
18	Jordan	1141	85	2648	0.15	62	France	6013	36	51906	0.11

19	Dominic. Rep.	1162	48	5038	-0.25	63	Netherlands	6122	98	13422	0.74
20	Paraguay	1215	36	2789	-0.69	64	Venezuela	6194	45	12776	-0.06
21	Sri Lanka	1285	68	13409	0.38	65	UK	6548	49	55624	0.44
22	El Salvador	1372	56	3933	-0.15	66	Germany, W.	6637	46	60297	0.39
23	Taiwan	1382	74	15850	0.51	67	Denmark	6751	63	4967	0.01
24	Malaysia	1397	93	12340	0.66	68	Canada	7288	46	22381	0.13
25	Ecuador	1433	44	7089	-0.24	69	Sweden	7492	54	8086	0.01
26	Nicaragua	1466	56	2425	-0.30	70	Australia	7879	32	13549	-0.39
27	Panama	1520	79	1732	-0.04	71	New Zealand	7920	54	2954	-0.28
28	Guyana	1524	126	700	0.17	72	Luxembourg	8112	174	351	0.30
29	Turkey	1604	23	40007	-0.41	73	Switzerland	9639	66	6203	0.14
30	Guatemala	1641	37	6103	-0.45	74	United States	9776	15	215246	-0.40
31	Colombia	1652	28	23673	-0.36						
32	Singapore	1712	307	2264	1.39						
33	Algeria	1717	52	16426	0.17						
34	Brazil	1758	16	108036	-0.51						
35	Jamaica	1788	86	2002	0.08						
36	Portugal	1869	61	9412	0.17						
37	Peru	1917	34	15187	-0.27						
38	Yugoslavia	1955	44	21206	0.06						
39	Costa Rica	2021	64	1959	-0.21						
40	Cyprus	2043	94	621	-0.15						
41	Fiji	2046	93	571	-0.19						
42	Greece	2088	39	9176	-0.28						
43	Suriname	2097	104	364	-0.20						
44	South Africa	2109	54	25454	0.32						

Note: Openness is the residual from the regression reported in Table 1. Trade intensity and population are averages for 1960-90.

Table 3: Preliminary Regression Results for the Aggregate Cross-Section
(dependent variable: growth of per capita GDP 1960-90)

	3.1	3.2	3.3	3.4	3.5	3.6
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS
Sample countries	all	all	all	exclude HK, Singapore, Uruguay, Argentina	low initial income	high initial income
n	74	74	74	70	44	30
Regression coefficients (t-statistics):						
Trade intensity	0.0014 (0.5)					
Openness		**0.014 (4.2)**	**0.021 (5.8)**	**0.016 (3.3)**	**0.013 (2.9)**	**0.013 (3.4)**
Investment	0.168 (6.8)	0.141 (6.1)			0.166 (4.9)	0.130 (5.9)
Initial GDP	-0.012 (-5.1)	-0.011 (-4.8)	-0.003 (-1.5)	-0.002 (-1.2)	-0.022 (-4.5)	-0.017 (-4.4)
Summary statistics:						
$\bar{R}^2$	0.3727	0.4754	0.2446	0.0970	0.4640	0.7196
s.e.	0.0129	0.0118	0.0141	0.0142	0.0132	0.0071
Diagnostic tests:						
Heteroscedasticity	**	*	—	—	—	—
Functional form	—	—	—	—	—	*
Parameter stability	*	*	—	*	—	—

Note: Trade share is log(imports+exports/GDP); openness is the residual from the regression reported in Table 1; investment is constant price share of investment in GDP; initial GDP is real GDP per capita in 1960.
Diagnostic tests: **, * indicate statistical significance at 1%, 5% level for the Breusch-Pagan or Glesjer tests for heteroscedasticity and the Reset2 test for functional form. '—' indicates absence of statistical significance at 5% level. Where heteroscedasticity is significant, t-statistics are adjusted by the White method.
Parameter stability between more and less developed country groups is tested by ranking the countries in order of initial income and performing sequential Chow tests. The test statistic reaches a maximum in regression 3.2 of F(4,66)=2.7 when the sample is split 44:30.

Much of the previous literature has concentrated on the developing rather than the industrialised countries, suggesting that the growth process is fundamentally different between the two groups of countries. Indeed, ranking countries in terms of their 1960 GDP levels we do find a statistically significant break in our model parameters between the less and more developed countries. Regressions (3.5) and (3.6) in Table 3 indicate, however, that this break does not affect the openness variable which has the same coefficient in each sample.

These results are really a check that our data are not fundamentally different from those used in previous econometric studies. We confirm that the aggregate cross-section does indeed show a positive correlation between trade and growth.

6.3 Panel Estimation

A major advantage of a panel data set over simple cross-section data (apart from the additional observations and degrees of freedom) is that it enables some control for time-invariant country-specific factors such as institutional arrangements that might be correlated with the explanatory variables. In equations (1) to (4), allowance is made for country-specific terms, ε_i, υ_i, etc. If these terms are correlated with openness and growth but are not included in the regression, then OLS regression will yield biased parameter estimates.

One approach is to assume that these unmeasured country-specific terms are fixed parameters which can be estimated by the least squares dummy variable (LSDV) method. This corresponds to the *fixed effects* model. The inclusion of country dummies is equivalent to first differencing the data and then examining them for correlations between changes in openness and acceleration of growth. Such a procedure certainly avoids bias from omitted country-specific and time-invariant variables, but it is also inefficient in that it effectively discards all the information contained in the pure cross-section averages of the data set.

An alternative procedure that can make more efficient use of the cross-section data as well as the time-series variation is to treat the ε_i as a random variable and estimate using generalised least squares (GLS). This is the *random effects* model. It makes use of more of the information in the data set, but parameter estimates may still suffer from bias.

I report results from all three models, noting that the OLS estimates are dominated by the cross-section information; the LSDV estimates utilise only the inter-decade variations in the data; while the GLS estimates utilise both cross-section and time-series variation.

Preliminary results for the reduced form growth equation (4) are reported in the appendix. Tests indicate that the estimates may be biased by the simultaneous impact of economic growth on openness. To deal with the endogeneity of the openness variable, I take the simple expedient of redefining openness as the value at the beginning of the decade rather than the average value over the course of the decade. I report in Table 4 both the LSDV and the GLS results.

The GLS estimate of the openness parameter δ_2 is 0.011 while the LSDV estimator is 0.014 (see regression 4.4). These parameter values are substantially smaller than the OLS estimate of 0.021 reported in regression 3.3. This comparison suggests that omitting the unmeasured country effects does indeed bias upwards the estimates, indicating that previous studies which do not control for such effects have probably over estimated the true impact of openness on growth.

Nevertheless, the panel estimates do suggest that the impact of openness on growth is positive. Countries which increase their openness from one decade to the next do tend to have accelerated growth in output relative to countries where trade intensity is static or declining.

Table 4: Full Panel Estimates Measuring Openness at the Start of Each Decade
(1960-70, 1970-80, 1980-90 for 74 countries)

	4.1		4.2		4.3		4.4	
Dependent variable	Growth of labour productivity		Investment rate		Growth of workforce		Growth of labour productivity	
Sample countries	all		all		all		all	
n	222		222		222		222	
Estimation method	*LSDV*	*GLS*	*LSDV*	*GLS*	*LSDV*	*GLS*	*LSDV*	*GLS*
Regression coefficients (t-statistics):								
Initial openness	**0.006**	**0.007**	**0.046**	**0.039**	**0.001**	**0.002**	**0.014**	**0.011**
	(0.9)	**(2.2)**	**(3.1)**	**(3.6)**	**(0.3)**	**(2.2)**	**(2.0)**	**(3.2)**
Population growth			0.73	-1.1	1.00	0.98	-0.48	-0.55
			(0.9)	(-2.0)	(9.0)	(18.3)	(-1.3)	(-2.8)
Initial GDP per worker	-0.042	-0.016	0.038	0.047	0.002	0.002	-0.037	-0.010
	(-4.9)	(-6.8)	(1.9)	(5.8)	(0.8)	(3.3)	(-3.9)	(-3.9)
Investment rate	0.18	0.14						
	(5.2)	(6.4)						
Labour force growth	-0.75	-0.43						
	(-3.7)	(-3.1)						
Decade dummies	yes		yes		yes		yes	
Summary statistics:								
$\bar{R}^2$	0.752	0.462	0.867	0.425	0.837	0.700	0.514	0.344
s.e. e(i,t)	0.015	0.016	0.037	0.038	0.0052	0.0052	0.017	0.018
s.e. u(i)		0.010		0.052		0.0026		0.010
corr[{e(i,t)+u(i)}, {e(i,s)+u(i)}]		0.28		0.64		0.20		0.28
corr[e(i,t), e(i,s)]	-0.33		-0.18		-0.35		-0.32	
Specification tests:								
LSDV vs OLS	**		**		**		**	
GLS vs OLS	**		**		**		**	
LSDV vs GLS	—		—		—		—	

Note: Specification tests: ** indicate, for example, that the null hypothesis of the OLS model is rejected at the 1% level against the LSDV model.

The effect of openness on productivity growth is much smaller than it is on output growth, see regression 4.1 which controls for factor supply. The productivity effect is less than half of the total growth effect, suggesting that much of the stimulus to growth works through factor supplies. Indeed, regression 4.2 demonstrates that openness is very significant in increasing investment. On the other hand, openness has little effect on the medium-term growth in labour supply which is, not surprisingly, driven almost entirely by population growth (see regression 4.3).

Are these results dependent on just a few outlying observations, or on the pooling of less and more developed economies? I estimate the same models on a variety of alternative choices of sample. As well as dividing the sample by 1960 per capita GDP, as explained earlier, I also test the effect of omitting the four Asian tigers: Taiwan, Korea, Singapore and Hong Kong. Table 5 reports only the parameter estimates for β_3 and δ_2, the openness variable in the investment equation and the reduced form growth equation, respectively. Full results are available from the author.

Table 5: Panel Estimates for the Effect of 'Initial Openness' on Investment and Growth
(using various country samples and three decades)

Countries	n	Growth		Investment	
		LSDV	GLS	LSDV	GLS
All	222	0.014 (2.0)	0.011 (3.1)	0.046 (3.1)	0.039 (3.6)
All excl. four tigers	210	0.010 (1.3)	0.005 (1.3)	0.040 (2.5)	0.032 (2.7)
Developing	132	0.019 (2.0)	0.012 (2.2)	0.045 (2.3)	0.041 (2.9)
excl. three tigers	123	0.015 (1.3)	0.004 (0.7)	0.044 (2.0)	0.033 (2.0)
Developed	90	0.002 (0.2)	0.013 (3.3)	0.008 (0.4)	0.015 (0.9)
excl. Hong Kong	87	0.007 (0.7)	0.011 (2.2)	0.013 (0.6)	0.019 (1.1)

Note: t-statistics are in parentheses.

It is apparent that the strength of the correlation between growth and openness is dependent on the experience of the four tigers. Excluding these four, there is no statistically significant effect, except for the developed country sample using the GLS estimator. It is in the developing country sample (that most commonly used in previous empirical studies) that the statistical relationship between openness and growth appears to depend almost entirely on the strong growth and outward orientation of Taiwan, Korea and Singapore. There are still good reasons to believe that openness is important for growth in the developing world, not least that the LSDV and GLS estimators do make some allowance for special features underlying the phenomenal performance of the NICs. If we are already including country-specific effects in our model to counteract omitted variable bias, it is not clear that we are justified in also discarding the outlying observations from our sample.

With regard to investment, the exclusion of the tigers makes little difference. The strong relationship between openness and investment rates does not hold, however, for the developed country sample. In these countries, outward orientation appears to be reflected in improved productivity performance rather than in increased rates of return to investment. This might reflect greater bargaining strength of organised labour in the developed economies. If productivity increases are offset by higher wages, as workers appropriate the whole of the gains from trade, then returns to capital accumulation would not be affected and investment would not be expected to rise.

6.4 The Effects of Increasing Openness

The model tested so far concentrates on the pure growth effects of the *level* of openness at the beginning of the decade. If outward orientation produces static efficiency gains, influencing the level of output, then the growth of output should also be affected by the *growth* of openness.

I report below estimates of the reduced form growth regression augmented by a measure of the growth of trade intensity. The econometric problem here is that we may suspect reverse causation; good economic performance may increase international competitiveness and thus enhance export performance. Unfortunately, the data set does not provide good instruments for the growth of openness. Tests using lagged levels and rates of growth of openness do not reject the null hypothesis that the growth of openness is exogenous, but these tests have little power in the absence of instruments which are strongly correlated with the suspect variable. It is still of interest to inspect these results (see Table 6), but they should be interpreted with caution.

Table 6: Panel Estimates for the Effect of 'Initial Openness' and 'Growth of Openness' on Growth
(using various country samples)

Countries	n	Initial openness LSDV	Initial openness GLS	Growth of openness LSDV	Growth of openness GLS
All	222	0.029 (3.5)	0.016 (4.7)	0.19 (3.2)	0.21 (4.7)
All excl. four tigers	210	0.025 (2.9)	0.010 (2.5)	0.21 (3.5)	0.20 (4.5)
Developing	132	0.042 (3.8)	0.019 (3.7)	0.26 (3.5)	0.24 (4.3)
excl. three tigers	123	0.037 (3.2)	0.012 (2.0)	0.30 (3.9)	0.23 (4.2)
Developed	90	-0.013 (-1.2)	0.012 (3.0)	-0.24 (-2.4)	-0.07 (-0.9)
excl. Hong Kong	87	-0.012 (0.7)	0.010 (1.9)	-0.32 (-3.3)	-0.10 (-1.3)

Note: t-statistics are in parentheses.

The interesting result here is that the growth of openness is strongly significant for the developing countries, and inclusion of this variable has the effect of making the initial openness parameter statistically significant too, even when the tigers are excluded from the sample. On the other hand, the growth of openness is insignificant within the sample of developed countries. This reflects the common finding that static efficiency effects of trade liberalisation are negligible for countries with well developed markets and where initial trade barriers were relatively low.

6.5 Summary of Results

A cautious conclusion from these mixed results is possible. There is consistent evidence that high outward orientation at the beginning of a decade does increase growth prospects. Estimates of this effect are biased upwards in OLS models which do not take account of country-specific factors, but the effect is still statistically significant when we use panel data and allow for fixed or random country effects.

Approximately half of the boost to growth works through increased investment, presumably reflecting increased profitability; the other half comes from a direct increase in productivity growth, perhaps reflecting dynamic gains from specialisation or from technology transfer. There is some suggestion (from the LSDV estimates rather than the GLS estimates) that the growth dividend is stronger for the less developed economies, supporting the hypothesis that it is technology transfer from more advanced countries that is particularly important.

A trade sceptic could point to the LSDV results to claim that there is no growth dividend from trade for the more developed economies. But this is to ignore the strong cross-section evidence and rely solely on the absence of a strong correlation between changes in openness over one decade and changes in growth rates over the subsequent decade. If we accept the GLS results, utilising aggregate cross-section information as well as variations over time, then the growth effect in the developed economies is significant and very similar to that found amongst the less developed economies.

Controlling for these dynamic effects of trade openness, purely static effects appear to be significant for the less developed economies but insignificant for the more developed.

A conservative estimate of the trade parameter, δ_2, in the reduced form growth regression is 0.010. To appreciate its magnitude, a hypothetical experiment is useful. Australia's trade openness (the sum of exports and imports over GDP) averaged 32 per cent over the last three decades. For countries of similar population size, average openness is 47 per cent. If Australia had achieved this level of openness, the predicted addition to annual growth is $0.01 \times \ln(47/32) = 0.004$. That is to say, annual growth of per capita GDP might have been nearly 2.4 per cent rather than the historical 2.0 per cent. If this higher openness and growth had been achieved over the past thirty years, then GDP might have risen to a level 12 per cent higher than its current value.

7. Concluding Comments

The overall impression from a brief survey of the existing econometric literature, and from the further statistical analysis reported in the previous section, is that there are indeed significant gains to rates of economic growth from further opening up of inward-oriented economies. This evidence supports the conclusions of the new models of economic growth which suggest that world growth should be enhanced by the increased specialisation which trade makes possible in knowledge-producing and growth-enhancing activities, whether in customised research and development activities or in learning by doing.

These potential gains are not, however, of the order of magnitude suggested by some commentators who point to annual growth rates in the NICs of 8 per cent or more and naively suggest that such rapid development should be possible for an already developed economy. At most, the gains that might be expected for a country like Australia are of the order of one half of a percentage point per year.

It is also worth noting that our simplistic derivation of trade orientation may be misleading for a country like Australia which possesses substantial mineral wealth. For example, if we were to export our oil for refining and re-import it, our measured trade intensity would be significantly higher.

Moreover, the wide variance in growth rates illustrated in Figure 2 should serve as a warning that there is no simple mechanical translation from trade to growth. There are plenty of countries with a far greater outward orientation than Australia and slower or equivalent rates of economic growth, notably high-trading EC economies such as the UK, Belgium and the Netherlands amongst the developed economies.

There are also plenty of examples of less developed countries that have grown quickly despite, or maybe because of, temporary trade restrictions. Many commentators have suggested that the fast growing East Asian economies have relied on protection at least in the early stages of industrialisation. The econometric evidence does not rule out infant industry arguments, although it does suggest that long-term protection is less likely to be successful.

Nor, it should be emphasised, does either the new theory or the econometric analysis contradict the traditional result that optimal tariffs are not necessarily zero when the terms of trade can be altered.

The new growth theories point out that the growth-enhancing effect of trade is an aggregate effect; we expect it to hold on average, as confirmed by the econometric results, but not in every case. In particular, trade can reduce growth for countries that have comparative advantage in industries with low-growth potential. Lower growth does not, however, necessarily imply lower economic welfare. Specialisation through trade may move the terms of trade in favour of the low-tech country which is enabled to import cheaper high-tech goods. The new theories support the traditional analysis of comparative advantage and the beneficial impact of trade liberalisation in a world of complete and competitive markets.

Trade is not, however, necessarily welfare enhancing in the absence of competitive markets. If there are substantial market failures in the accumulation of knowledge and skills and new goods, then trade is a double-edged sword. On the one hand, trade acts as a conduit for new ideas, stimulating growth and enhancing welfare. On the other hand, trade liberalisation and consequent specialisation in low-tech activities may relegate a country that is historically disadvantaged in the accumulation of skills and knowledge to fall further and further behind.

The pessimistic view of trade liberalisation for Australia is that it might lead us to inefficient specialisation in natural resource based activities with few incentives for enhancing skills and knowledge. For example, the current recovery in the world economy is already having the effect of improving short-term prospects for the terms of trade and raising the real exchange rate. It is possible that such movements may squeeze out the recent expansion in exports of high value-added manufacturing and lower our prospects for long-run growth and welfare by compounding failures to develop our skill and knowledge base.

These are, however, second-best welfare arguments. It is not obvious that we should be using trade policy to rectify failures in the markets for the development of skill and knowledge and new goods. Rather, if we address these problems directly, both the new theory and the econometric evidence suggest that trade liberalisation is likely to enhance both growth and welfare.

Appendix

Table A1: Testing for Exogeneity of Openness on Full Panel
(dependent variable: real GDP per worker;
1960-70, 1970-80, 1980-90 for 74 countries)

Estimation method	OLS	LSDV *(fixed effects)*	GLS *(random effects)*
Sample countries	all	all	all
n	222	222	222
Regression coefficients (t-statistics):			
Openness	**0.018** **(5.6)**	**0.036** **(4.5)**	**0.019** **(5.2)**
Population growth	-0.46 (-2.8)	-0.41 (-1.2)	-0.52 (-2.8)
Initial GDP	-0.009 (-4.4)	-0.042 (-4.8)	-0.010 (-4.3)
Decade dummies	yes	yes	yes
Country effects	—	fixed	random
Summary statistics:			
$\bar{R}^2$	0.377	0.563	0.390
s.e.	0.020	0.017	e(i,t): 0.017 u(i): 0.010
Specification tests:			
Exogeneity of openness	t = 3.8**	t = 1.7	t = 3.4**
LSDV vs OLS		**	
LSDV vs GLS		—	

Note: The exogeneity of the openness variable is tested by regressing it on the exogenous variables including the (log) trade share and population at the beginning of the decade and augmenting the reported regression with the residuals from the instrumenting regression.
Specification tests: ** indicate, for example, that the null hypothesis of the OLS model is rejected at the 1% level against the LSDV model.

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Discussion

1. Palle S. Andersen

It is never pleasant to be the first discussant on the stage and it becomes particularly unpleasant when one is faced with the task of coming up with some constructive criticism of a good paper. And Steve Dowrick's paper on openness and growth is, indeed, a very good one.

In such a situation one way out is to spend a lot of time summarising the paper and its main results, but even that road is closed, because Dowrick himself provides a very good summary.

Fortunately, while fully agreeing with Dowrick's method and principal results, there are a few places where a word of caution or some complementary remarks are in place. I shall divide my intervention into three parts: comments about the theory, a few methodological remarks and some suggestions concerning the data and the empirical results. In addition, I have a number of minor points which I shall pass on after the session.

Openness and Long-Run Growth: Theoretical Foundation

Going through the major growth models it is hard to find good reasons for including foreign trade and openness among the growth-promoting factors. There is nothing in the Harrod-Domar model, nor do we find any influence in the Neoclassical model, which dominated growth theory from the early 1960s to the mid 1980s. There is one theory by Thirlwall (see note 6 in Dowrick's paper) of which a first version appeared in the early 1970s. It has reappeared under various names of which the latest is 'the 45-degree rule' (Krugman 1989) which captures the underlying idea, that if a country wants to keep its current account in balance and a stable exchange rate, its growth is constrained by demand growth of its major trading partners multiplied by the ratio of income elasticities for, respectively, exports and imports. This actually provides a strong theoretical foundation for openness and growth, assuming that by policies you are able to lift export elasticities and reduce the propensity to import. There is also some empirical evidence supporting this hypothesis for the 1960s, but not after the breakdown of the Bretton Woods system and the strong expansion of international capital flows.

So, to find theoretical support for any influence of trade on growth we have to turn to more recent theories of growth, the endogenous growth models. This is nicely covered in Dowrick's paper, so I shall confine myself to a few comments:

- It is not my impression that trade has figured prominently in endogenous models. It is not through trade that you can hope to create constant marginal returns to capital, nor is trade the first transmission mechanism that comes to mind when looking for endogenous explanations of technical progress. There is also the question of causality. Is technical innovation of some kind improving competitiveness and the net export position, or do higher net exports or more intense international pressure promote technical progress? I do not find the trade link overly convincing.

I rather think that the international transmission of knowledge and technical progress comes through direct investment flows, but more about this later.

- In several places of the paper Dowrick discusses the welfare gains associated with more open trade, looking at static as well as dynamic gains and discussing the consequences of deregulating in a second-best world with distorted factor and output markets. I do not quite share Dowrick's scepticism regarding the size and the relevance of the likely welfare gains. I do not find Baldwin's cited estimates terribly convincing and, if the criteria proposed are used in evaluating fixed investment projects, I very much doubt that we would be able to get the investment/GDP ratios that we think are desirable for high and sustainable growth.
- Regarding the initial situation, it should be recalled that a key feature of most of the endogenous growth theories (the main exception appears to be the model proposed in Mankiw *et al.* (1992)) is the assumption of monopolistic competition as opposed to perfect competition in the neoclassical models. Consequently, if we adopt these models as the theoretical foundation it is the second-best case with imperfect product and factor markets that is relevant for discussing trade effects.
- As noted in the paper, the stakes are higher in such a case and the uncertainties are especially high when a country starts rather late with liberalising trade. Take Latin America as an illustration. For several decades virtually all countries in this region pursued inward-oriented policies and over long periods actually achieved rather high rates of growth. Since the late 1980s they have started to liberalise foreign trade but many find it hard to build a solid basis for exports. They cannot compete with the more developed countries because of low productivity; nor can they compete with the dynamic Asian countries because their labour costs are too high. So, in many cases their only comparative advantage lies in the production of primary commodities which is not a desirable basis for high and sustainable growth and is unlikely to provide any terms-of-trade improvements. There have been some gains emanating from expanded intra-regional trade and cross-border investment flows, but this is all on a rather small scale. A few countries (Chile is the best example) have tried to overcome the comparative advantage problem by keeping their exchange rate low, but that is clearly a policy where you *can* question the welfare gains and, of course, this option is not open to the whole region.

Methodology

In deriving empirical estimates Dowrick applies regression analysis to pooled time-series and cross-country data. This is the methodology applied by most researchers and Dowrick is already at the forefront in this area. It is not a method without problems and, although he probably has a vested interest, it is not inappropriate to quote a recent evaluation by Solow:

> 'I had better admit that I do not find this a confidence-inspiring project. It seems altogether too vulnerable to bias from omitted variables, to reverse causation and above all to the recurrent suspicion that the experiences of very different national economies are not to explained as if they represent different "points" on some well-defined surface' (Solow 1994, p. 51).

It is also relevant to recall Levine and Renelt (1992) and Levine and Zervos (1993), who apply Leamer's extreme-bounds test to check the robustness of the determinants and find very few of the variables passing the test. It may be argued that this test is perhaps too strong and may be misleading when it comes to testing several policy-related variables that are difficult to separate (see Sala-i-Martin (1994)). Yet, having experimented a bit with estimation in this area myself, I have to recognise that few variables are robust and that the problem of biases because of omitted variables or omitted countries has to be taken seriously.

With respect to country-specific features, most researchers rely on fixed or random-effects models. Dowrick presents estimates for both, but he will have to explain to me after the session precisely how the random-effects model has been implemented.

Finally, regarding the specification, it is worth noting that when using the investment/GDP ratio as a proxy for the growth of the capital stock (see equation (1)) one is implicitly assuming that the capital/output ratio is the same in all countries which is quite a strong assumption. At the same time, this assumption can be used as a rough test of the plausibility of the parameter estimates. For instance, if you consider the GLS-equation 4.1 in Table 4 and assume that the output elasticities with respect to labour and capital should sum to unity, the implied capital/output ratio is about 3. This is a bit high, but not entirely implausible. I also note in passing that equation (1) can be looked upon as the traditional neoclassical or growth accounting equation, with trade, initial income and time and country-specific factors added to explain the Solow residual.

Empirical Estimates

Most research in this area is based on the data produced by Summers and Heston. This is, undoubtedly, the best around but in two respects I have problems:

- I can well understand that the Middle East oil producers were left out, because in their case openness makes no sense. I was, however, sorry to see that the Sub-Saharan countries were also left out. Had they been in, they would probably have strengthened the estimates favouring openness, because most of them have pursued inward-oriented policies with little or no growth. From my own experience I have found that the data for the former British colonies in the area are relatively good so it should not be a problem to include them in the sample. The former French and Belgian colonies are more problematic, because the statistics are poor. Yet it would be a shame to leave them out because their growth performance has been strongly influenced by the policy of linking their currencies to the French franc. One way out would be to use the World Bank *World Tables* which, unlike the tables in the IMF *International Financial Statistics (IFS)*, have all the necessary data for all countries.
- A second problem concerns the data on trade intensity. As a rough check of the data in Table 1, I calculated trade intensities using the national accounts data in the *IFS*. When comparing trade ratios from respectively PPP and market-based national accounts data one would expect a systematically widening discrepancy as one moves from the rich to the poorest countries. This, however, I did not find which is surprising and perhaps a bit disturbing. What I did find, on the other hand, was a very large discrepancy for most Latin American countries, but not for the Asian countries. Given their past policies, I do not dispute the low trade intensities

Dowrick finds for the Latin American countries, but the extent to which they are outliers may be overstated. Also to reduce the impact of the three outliers with very high trade shares and recognise that imports are used for exports as well as domestic demand, it might be an idea to measure trade intensity as 0.5 (X + M)/(GDP + M).

Regarding the empirical estimates reported by Dowrick, one very clear result is that openness affects growth via the investment/GDP ratio. This points to foreign direct investment as an important transmission channel of the gains from trade, but I have seen little mention of this in the literature; perhaps because it is just too obvious.

It is somewhat disturbing that the initial income level becomes insignificant when I/GDP is dropped and that openness does not seem to affect investment in the developed countries. The latter could, however, reflect factors that are not taken into account (rising government deficits, higher real interest rates, etc.); if not it would indeed be bad news for the developed countries, including Australia.

The rather large differences between the estimates of openness effects in equations with, respectively, GDP/P and GDP/L as the dependent variable are puzzling, given that openness has no effect on employment growth. For the same reason I would be a bit cautious in drawing too firm conclusions when comparing Tables 3 and 4.

Finally, the interpretation of 'static' and 'dynamic' efficiency gains is not quite clear. As I read the paper it has:

– *level* of openness and its effect on the rate of growth = dynamic gains;
– *change* of openness and its effects on the rate of growth = static gains; but
– no measure of the effect of *changes* in openness on the level of GDP.

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2. Lam San Ling

Steve Dowrick has written on a topic which is of great interest today. The paper contains a useful survey of the new endogenous growth theories and their implications for the case for free trade. Dowrick has also undertaken a careful empirical study of the trade-growth relationship.

Dowrick's concluding comments reflect the current ambivalence surrounding free trade. In the past, countries putting up trade barriers to protect infant industries, or clamouring for trade concessions, were mainly the developing countries. The recent and disturbing trend, however, is for protectionist pressures and cries against global competition in general to originate from the developed economies – the traditional champions of free trade.

Free Trade: Believers, Would-be Converts, and Doubters

It appears to me that countries in the world may be roughly divided into three groups with regard to their trade policy stance.

Countries like Singapore fall into the first group of small economies which have little choice but to be open and to remain open.[1] Hong Kong – at least before it becomes part of China – is another. These are the 'trade-believers'. Singapore's small population means that producing for the domestic market alone is usually not feasible. Singaporean producers have no choice but to compete globally. Singaporean consumers import two-thirds of their consumption. They are price takers in the world market, thus higher tariffs will be reflected almost immediately in higher prices. The decision to be one of the most open economies in the world is forced on Singapore, so it is not a difficult decision. It has enabled Singapore, as well as other small open economies, to be single-minded about reaping the gains from trade.

Choice is not always a good thing. The second group of countries are the larger developing economies – China, India, and Indonesia come to mind – which have the option of protecting industries that cater to their own domestic markets. They have relatively high levels of protection and all sorts of domestic distortions to begin with. In these countries, efforts to liberalise trade as part of economic reform are frequently resisted by domestic interest groups, but most would agree that greater openness brings substantial net benefits. These are the 'would-be converts'. One preaches free trade to these economies secure in the knowledge that one is right, and hopes that the good guys will prevail. There is evidence that some trade reforms have already been put in place in these countries.

My knowledge of Australia is too limited for me to pronounce Australia a trade-believer, a would-be convert, or a member of the final category, 'the doubters'.

The doubters pose the greatest challenge to multilateral free trade. Confronted with their more sophisticated arguments, even the preacher frequently harbours a certain element of self-doubt. The new challenges to free trade range from concerns about high

1. The few tariffs that it has serve to discourage consumption of selected items rather than to protect domestic production.

unemployment or low wages as a result of LDC imports, to charges that other countries do not play fair in trade.[2] The doubters pit the free trade ideal against worker welfare and even against the environment. They advocate some form of trade restriction, which could be in the guise of managed trade, or social preconditions to trade.

Many economists, most notably Robert Lawrence and Paul Krugman, have come out against these arguments.[3] Lawrence argues, for instance, that technology rather than trade was responsible for the decline in US real wages in the 1980s.

Trade Liberalisation and Growth

Dowrick applies the new endogenous growth theories to the question of whether more trade, especially in the presence of imperfect competition, is welfare enhancing. His econometric work on the effect of increasing openness on economic growth addresses a very pertinent issue. No one really doubts that some trade is better than autarky, or that countries with high initial trade barriers would benefit from trade liberalisation. The debate centres instead on the merits of moving along the continuum between a relatively open trade regime and an even more open one.

Dowrick concludes that for countries with relatively low trade barriers to begin with, greater openness brings only modest benefits, and can even be counter-productive. There are difficulties associated with any empirical work of this nature, including specification problems, simultaneity bias, and measurement errors. I have only a few comments.

First, a word about the trade intensity outliers in Figure 2 of Dowrick's paper. Singapore and Hong Kong's trade ratios stand out so starkly partly because of their entrepot roles. The share of Singapore's trade in GDP falls to below 200 per cent once re-exports are taken out.

Second, trade openness may not be a good measure of a country's trade orientation.[4] Greater openness is not necessarily due to trade liberalisation. For many developing countries, economic reforms and trade liberalisation did in fact lead to higher trade to GDP ratios. Greater openness reflects a decline in tariff-induced domestic distortions. In contrast, the US trade ratio is likely to increase over time, even if existing tariffs remain, simply because the US would be trading with emerging economies which are growing faster and becoming more open to international trade.

Third, higher economic growth is not the only gain from trade. Intra-industry trade in differentiated products is much more prevalent among the rich countries than among the poor, or between the rich and the poor. The increase in welfare arising from greater diversity represents an important gain from trade for the US and Europe. This gain is not necessarily measurable by a growth indicator.

Finally, the policy issue facing many industrial economies is not so much whether they should liberalise trade further, but whether they should in fact restrict trade. Dowrick shows that the measurable gains to industrial countries from letting trade ratios

2. Bhagwati (1994) summarises the old and new challenges to free trade.
3. See Lawrence (1994) and Krugman (1994).
4. A discussion of the various measures of trade orientation may be found in Edwards (1993).

rise are insignificant or negative. It would be useful to know whether the costs of putting up trade barriers would be equally small.

Policy Options: Alternatives to the Free Trade Ideal

The debate on trade liberalisation has not been helped by the complexity of the policy options facing participants in the world trading system today. The choice facing a country is not merely what level of tariffs, quotas or other non-tariff barriers to impose, but also whether to discriminate among trading partners.

The concept of regionalism has recently emerged as an alternative for countries unwilling to go all the way towards free trade. Participating in a regional trade agreement – be it a preferential trading arrangement, free trade area or customs union – allows a country to lower tariffs vis-à-vis some countries but not others. It has the apparent appeal of allowing countries to compete on a more limited basis with friendly neighbours rather than the whole world.

The debate on regionalism is still going on, however. Quite apart from the question of whether trade creation effects exceed trade diversion effects, or whether 'open regionalism' is viable, it is yet unclear whether regionalism represents an alternative, or a building block, to a more open multilateral system. A lot more empirical work is required in this area.

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3. General Discussion

The discussion centred on two questions:

- How should openness be measured?
- What are the links between trade liberalisation, domestic policies and economic growth?

There was considerable discussion regarding the merits of using the trade share of GDP as a measure of 'openness'. A number of participants made the point that openness was an elusive concept, that had as much to do with attitudes and incentives as with cold hard trade statistics. While the increased trade share does reflect greater openness of the Australian economy, most participants thought that the change in openness, and the gains from specialisation, had been more pronounced than suggested by the change in the trade share.

A number of discussants made the point that when thinking about openness, the key issue was the extent to which Australia's relations with the rest of the world influenced the domestic economy. There was widespread acceptance of the idea that over the past decade these influences had become more pronounced. The government's commitment to the international economy has made more markets contestable and has changed the incentives faced by many producers. It has also focussed many of the policy debates on the question of international competitiveness. This has helped promote reform in the labour market, macro-management and parts of the economy that are not traditionally associated with international trade. No single measure of openness was capable of capturing the strength of these influences. It was also suggested that the benefits of openness were likely to be asymmetric. There may be 'cascading' effects from liberalisation and even if further small tariff reductions yielded only small gains, small increases in tariff protection might be very costly, for they would signal a reduced commitment to the international economy and competition.

There was also a brief discussion on the determinants of openness. It was noted that the standard measures used in empirical work were heavily influenced by political boundaries and that these political boundaries were becoming less relevant for economic activity. The point was also made that an economy's resource structure influences its trade intensity. Countries that have large endowments of natural resources and a small manufacturing sector, may have relatively little intra-industry trade and hence low trade ratios, yet be extremely open in terms of their responsiveness to changes in the international economy. Finally, measuring trade intensity by the *sum* of exports and imports over GDP did not distinguish between exports and imports and also led to extreme values of openness for small economies.

Most participants acknowledged that it was difficult to judge whether or not increased openness was likely to generate small or large increases in economic growth. Part of the problem is that is difficult to assess what the situation would have been had the trade reform not taken place. Nevertheless, there was widespread acceptance of the idea that the closer integration of the Australian economy with the rest of the world would have some positive effect on growth. There was little support for the notion that free trade would force Australia into activities that did not provide the engine for long-term sustained growth. Reductions in tariffs had not seen resources flow into the primary sector of the economy, but instead have helped revitalise parts of the manufacturing sector.

An important component of the growth engine is the accumulation of 'skills'. It was noted that, unlike physical resources such as coal, the skill level of the workforce is not fixed. Skills can be accumulated as the byproduct of producing certain types of goods and through devoting resources directly to learning, innovation and education. By changing the structure of the economy and the incentives that individuals face, trade can affect the rate of skill accumulation. The type and rate of skill accumulation can also be influenced by government policies. The policy challenge is to frame government programs to encourage the type of accumulation that allows Australia to maximise the growth dividend from the more liberal trade regime. More generally, internationalisation is likely to increase the costs of any distortions in the economy. As a result, internationalisation makes it more imperative that micro-reform continues throughout the economy.

Finally, a couple of participants suggested that the static benefits of trade reform should not be overlooked. Tariffs act as a tax on exports, and now that this tax is being removed, exports of manufactures are increasing rapidly. Tariffs also created a comparative *disadvantage* and this disadvantage was now being eroded. It was argued that this was an important source of increased productivity.

Internationalisation, Firm Conduct and Productivity

Henry Ergas and Mark Wright*

1. Background and Overview

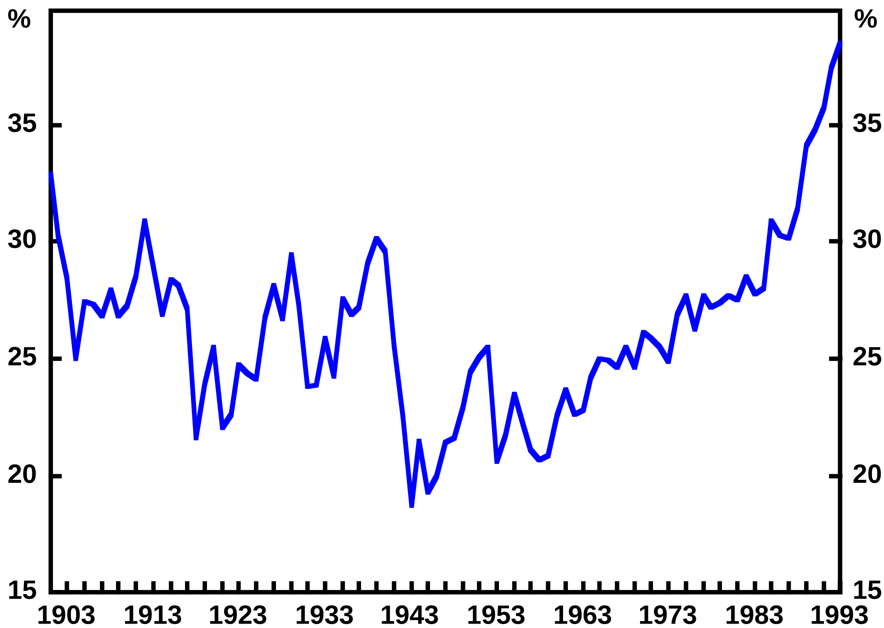
For much of the post-war period, Australia's economy was relatively insulated from international trade. In part, insulation reflected the costs arising from distance. However, the high levels of assistance provided to import-competing manufacturing during, and after World War II, also played an important role. Taken as a share of GDP, gross trade declined from the relatively high levels it had earlier achieved (Figure 1). By the 1960s, when trade levels in the other industrial countries were booming, Australia's trade share seemed unreasonably low (Kuznets 1959). Sheltered behind protective walls, manufacturing expanded rapidly (Figure 2), with an industrial structure characterised by high levels of concentration, as a small number of firms shared the relatively small domestic market. Each of these firms (the larger ones frequently being foreign owned) produced too broad a range of products, using plants too small to ever achieve economies of scale, making what were intended to be promising 'infant industries' into premature geriatrics. Market disciplines being weak, managerial slack was pervasive, as was the sharing of rents through the system of centralised wage determination. All of this contributed to the slow rate of productivity growth identified as a central concern by the Vernon Committee and by the first OECD survey of Australia.

By the early 1990s this characterisation seemed increasingly out of date, if not completely dated. Gross trade as a percentage of GDP (both expressed in real terms) rose from just under 25 per cent in 1972/73 to around 39 per cent in 1992/93. This increase paralleled substantial reductions in protection, with the effective rate of assistance to manufacturing reduced by two-thirds (from 35 per cent in 1972/73 to around 12 per cent 20 years later). The former adviser to the Hawke Government, Ross Garnaut, has written that the transformation was 'bigger than the end of the British Corn Laws that earned Peel and Cobden a dozen pages in our high school history books, eight or ten time zones and over a century away' (Garnaut 1991). And though this statement contains an element of exaggeration, the extent of the reforms remains startling in historical perspective.[1]

* The authors are especially grateful to Bill Mountford, Director of the Australian Manufacturing Council, for providing access to the results of the survey analysed in this paper. Anna Slomovic of RAND, and Philip Lowe of the RBA, provided helpful comments on an earlier draft; Scott Austin, Matthew Boge, Brian Brooke, Lynne Cockerell, Christine Groeger, Alex Heath, Eric Ralph, Mary Savva, and Geoff Shuetrim provided valuable assistance. However, the authors have sole responsibility for the views expressed.

1. Estimates of the reduction in British protection following the repeal of the Corn Laws depend on the treatment of terms of trade changes. Data in Imlah (1958) on wheat prices prior to repeal imply a domestic price wedge before transport cost in excess of 50 per cent of the world price. However, as the elasticity of foreign supply was low, the effect of repeal in 1846 was to sharply increase world prices. McCloskey (1981) argues that the terms of trade effects were so great as to actually reduce British national income, the original tariff having been close to the 'optimal tariff'. McCloskey's 'best' estimate of the extent of the tariff reductions is in the order of two-thirds.

Figure 1: Volume of Gross Trade to GDP



Underpinning the change was the government's conviction that 'suppliers of goods and services which are protected from international competition [...] are not subject to the pressures which ensure efficient management and production' (One Nation 1992). And undoubtedly, the changes must have had substantial impacts on the ways in which manufacturing firms work and the efficiency with which they use resources. Ultimately these changes should allow sustainable increases in living standards.

However, to date there is little evidence of a significant increase in the trend rate of productivity growth. Figure 3 presents data on labour productivity in the non-farm sector for the period from 1978/79 to 1993/94. The mid 1980s productivity slowdown was probably influenced by the extended period of wage moderation, which reduced capital-labour substitution. However, the path which succeeded it cannot, at this stage, be said to be above that of the past.

That it should be difficult to detect unambiguous traces of the influence of structural change on productivity growth is not surprising, for at least three reasons. First, short-run productivity trends reflect the interaction of a large number of cyclical and structural forces that cannot readily be disentangled.[2] Second, even in looking at the longer run, when the instruments of growth accounting can be deployed, economists have rarely been able to satisfactorily explain more than half of the observed change in output.[3] Finally, it is reasonable to hypothesise that the economy is still in the adjustment

2. For a recent survey see Oulton and O'Mahony (1994).

3. At least for industrial countries. Havrylyshyn (1990) notes that the proportion of growth explained by capital accumulation is generally much higher for developing countries.

Figure 2: Manufacturing Sector's Share of Total Employment and Value Added
(constant prices)

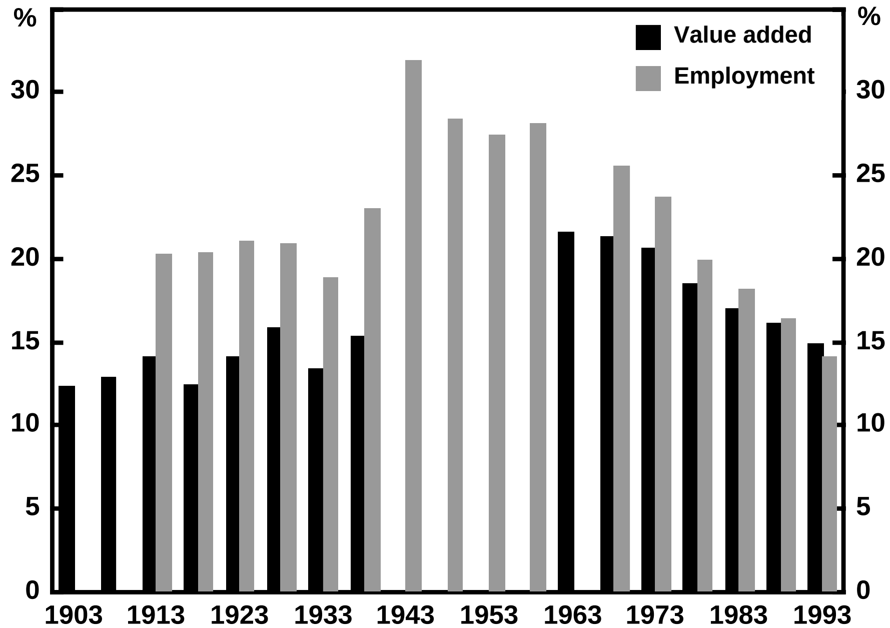
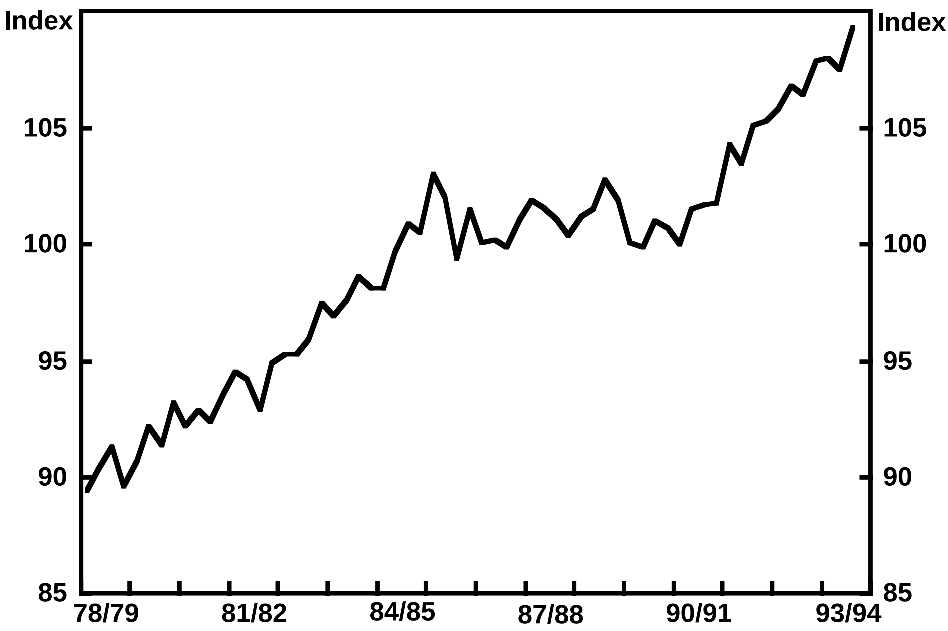


Figure 3: Non-Farm Sector Labour Productivity
(Sep 1990 = 100)



process, with changes occurring that will only really show up in the aggregates sometime down the road.

Given these difficulties it is important to examine the changes underway at a micro-level – that is, to assess the extent to which, and the ways in which, adjustment is proceeding both within, and between, industries. This is the primary task of this paper. To do this, we draw on a new data source, namely a survey of Australian manufacturers carried out by the Australian Bureau of Statistics (ABS) on behalf of the Australian Manufacturing Council (AMC).

The analysis in the paper addresses three specific questions:

- How far has the process of international integration gone? Is Australia now integrated into the world economy to an extent comparable to that of other small, industrial countries?
- How has integration affected the pattern of resource allocation between industries, notably within manufacturing? To what degree has Australian manufacturing become more specialised?
- *Within* industries, to what extent, and through what channels, has economic integration affected productive efficiency?

The paper's main findings can be summarised as follows. First, though the trade intensity of the Australian economy is still below the average for the industrial economies, the gap has diminished in recent years and, the extent to which it persists, largely reflects Australia's distance from major markets (Section 2).

Second, rapid internationalisation has been associated with greater specialisation in trade and output within manufacturing, and with accelerated structural change in the pattern of employment (Section 3).

Third, though the data do not allow us to examine changes in the behaviour of individual enterprises over time, there is strong cross-sectional evidence of international exposure affecting behaviour and performance *within* industries. These effects work partly through intensified competition, which typically leads to increased product quality and reduces intra-industry disparities in performance. But the main impacts come from involvement with foreign markets, as it is outward orientation, rather than market circumstances, which is most strongly associated with superior performance (Section 4).

In terms of the links between international exposure and firm performance we hypothesise three major effects: international exposure will encourage greater learning, as firms come into contact with, and measure themselves against, a broader range of rivals; it will force managers to tackle inherited inefficiencies; and it will encourage greater selection (as weaker firms are forced to adjust or decline). The results in Section 4 provide some support for these hypotheses and suggest the following:

- Involvement in the international economy provides firms with expanded opportunities to learn. Firms more heavily involved with the international economy (be it through exporting or through foreign direct investment) are more likely than are domestically-oriented firms to: systematically measure themselves up against world-best practice; focus on improving product quality and customer satisfaction; and successfully learn from customers and suppliers. All of these activities feed into productivity gains in the medium term.

- International involvement is also associated with greater efforts to tackle many of the rigidities which have long characterised the Australian economy. Though internationally-oriented firms are most likely to regard the current industrial relations arrangements as constraining, they also report greater success in implementing enterprise agreements that work, and are more likely to regard unions as playing a positive role in their plants.
- These differences in characteristics are associated with substantial differentiation within industries. The factors which most sharply distinguish the better performing firms are investment in intangible assets (mainly skills and R&D), less conflictual industrial relations, and a more systematic emphasis on monitoring their performance relative to rivals. Importantly, there remains a very substantial tail of firms – accounting for nearly 20 per cent of manufacturing employment – which does not export, carries out little or no R&D, and seems to make no investment in monitoring its competitive position. Nearly half of these firms supply intermediate inputs, so that their performance could act as a substantial constraint on the competitiveness of their clients. The disparities in performance tend to be greatest within industries with above average concentration and benefiting from high levels of assistance. Moreover, we find evidence of growing differentiation and specialisation within industries, as competition sorts out the good performers from those which lag.

Finally, some of the policy implications of these results are explored in Section 5.

2. Australia's Internationalisation in Comparative Perspective

The extent to which countries are integrated into the world economy depends partly on policy variables – such as the extent of protection – and partly on structural variables, such as size and distance from major markets. Since the pioneering work of Hirschman (1945), Maizels (1963) and Kuznets (1959), a substantial body of literature has developed on the way each of these variables contributes to shaping patterns of openness and trade. Drawing on the hypotheses developed in this literature, it is possible to examine empirically whether in the past, Australia was less integrated with the world economy than might have been expected on the basis of the structural variables alone; and equally, to assess the extent to which any such gap may have diminished in recent years. Subsequent sections carry out this analysis first for international trade and then for international investment.

2.1 International Trade

The ratio of gross trade (imports plus exports) to GDP is conventionally used as a measure of openness to international trade, though it is perhaps better (and more neutrally) described a measure of trade intensity.[4] Following Kuznets and Hirschman, it seems reasonable to suppose that four factors will affect the value this measure takes for a particular country. These are:

- A rise in per capita GDP will, on balance, tend to increase trade intensity as it is generally associated with greater demand for diversity. So long as product differentiation entails fixed costs, an increase in per capita GDP, holding everything else constant, will involve a higher level of imports and hence of exports.
- Higher GDP, on the other hand, will tend to be associated with reduced trade intensity, since at a given level of GDP per capita, larger economies will be able to satisfy a higher share of their needs through internal sources, thereby reducing transport costs.
- Greater proximity to potential markets increases trade intensity by reducing the natural protection which comes from the cost of transport and communications, and by diminishing the cultural distance separating market participants.
- Finally, higher trade barriers will reduce trade intensity by discouraging imports and taxing exports.

Table 1 sets out the results of a regression incorporating these variables, together with a dummy variable for Australia. The model has been estimated for 1975, 1980, 1985 and 1990 over a panel of 56 countries accounting for the vast bulk of world income. While a more detailed discussion of sources and methods is provided in Appendix A, it is clear from the table that – with the exception of the (generally insignificant) protection variables for the industrial economies – all the coefficients on the Hirschman-Kuznets variables have the expected sign and are strongly significant. These results, together with those in Table 2, suggest the following:

- Australia's trade intensity is well below the average for the OECD and the world as a whole, and has been so for the entire period covered in Table 2.[5] The gap opened up in the late 1960s, as the trade intensity of the Australian economy actually fell, whilst for most other countries it continued to rise. More recently, Australia's trade intensity has risen, whilst that of the OECD and the larger group of countries appears to have plateaued.
- The rise in Australia's trade intensity between 1975 and 1990, although partly explained by the structural determinants of trade intensity, can be mainly attributed to a decline in the degree to which Australia is peculiar. Although imprecisely estimated, the Australia dummy was negative, large and economically significant in 1975. By 1990, this was no longer the case.
- The remaining gap between Australian and average OECD trade intensity is still substantial in absolute terms, being equivalent to almost 30 per cent of 1990 GDP.

4. It is worth noting, however, that '... the ratio of exports or imports to national income overstates the relative importance of trade in domestic economic activity, increasingly so as the import content of exports rises. [Moreover], insofar as the proportion of traded goods destined for intermediate use varies between countries and over time, the ratio is an unreliable guide to either the ranking of countries by the relative importance of trade or to trends over time in the importance of international trade relative to total domestic output' (Blackhurst, Marion and Tumlir 1977, p. 18).

5. Note that these data are nominal, and thus vary from those presented in Figure 1.

Table 1: Trade Intensity Equation
(dependant variable: log of trade intensity)

	1975	1980	1985	1990
Australian dummy	-0.148 (0.304)	-0.108 (0.293)	-0.050 (0.263)	0.068 (0.291)
Real GDP	-0.220** (0.021)	-0.220** (0.021)	-0.220** (0.021)	-0.220** (0.021)
Real GDP per capita	0.234** (0.065)	0.234** (0.065)	0.234** (0.065)	0.234** (0.065)
Proximity to world production	0.002** (0.001)	0.002** (0.001)	0.002** (0.000)	0.002** (0.000)
Protection × (D1+D2)	-0.001 (0.010)	-0.013 (0.076)	-0.025 (0.106)	0.041 (0.247)
Protection × (D3)	-0.493 (0.329)	-0.593** (0.201)	-0.557* (0.247)	0.078 (0.388)
Protection × (D4)	-0.664** (0.228)	-0.441** (0.153)	-0.406** (0.138)	-0.323* (0.130)
D1 {Industrial Countries}	1.983** (0.628)	2.115** (0.625)	2.033** (0.617)	1.809** (0.630)
D2 {Western Hemisphere}	1.941** (0.537)	1.975** (0.540)	1.848** (0.526)	1.812** (0.532)
D3 {Africa, Middle East, Other Europe}	2.302** (0.548)	2.412** (0.548)	2.282** (0.551)	1.946** (0.576)
D4 {Asia}	2.751** (0.521)	2.863** (0.521)	2.646** (0.524)	2.682** (0.540)
$\bar{R}^2$	0.68	0.70	0.75	0.68

Notes:
(a) Trade intensity is equal to $\left(\frac{X+M}{GDP}\right)$.
(b) Real GDP and real GDP per capita are in logs.
(c) Standard errors are in parentheses.
(d) * (**) denote coefficients which are significant at the 5% (1%) significance level.
(e) The protection variable is represented by three variables which allows for slope variation.
(f) The test statistic for the restrictions that the coefficients on real GDP and real GDP per capita are equal across time is $\chi^2(6) = 4.212$. The null hypothesis cannot be rejected at the 1% significance level. These restrictions have been imposed.

However, it is largely attributable to the variable capturing proximity to world production. If Australia was located as close to the centre of world production as France, the estimates suggest that its trade intensity in 1990 would be more than twice as large, at 73 per cent of GDP.

- Though the Asian countries tend to trade especially heavily, as is apparent from the intercept dummy for Asia, their trade intensities are also significantly influenced by trade protection. While the coefficient on the protection variable has been diminishing over time, its continuing weight highlights the gains in terms of expanded world trade, and presumably incomes, that could accrue from further liberalisation in the region.

Table 2: Trade Intensity Ratios[(a)]

	1960	1965	1970	1975	1980	1985	1990
Australia	31.5	31.3	28.9	28.8	33.9	35.3	34.5
United States	9.4	9.4	11.3	16.1	20.8	17.1	21.1
Canada	36.0	38.4	42.9	47.2	55.1	54.5	50.5
Germany	35.3	35.6	40.3	46.5	53.3	61.5	58.4
France	26.9	25.8	31.1	36.9	44.3	47.2	45.3
OECD[(b)]	47.6	47.5	52.4	56.2	63.9	68.5	63.8
World	45.3	44.8	47.6	55.7	61.1	60.0	61.0

Notes: (a) The trade intensity ratio is defined as the sum of exports and imports as a proportion of GDP (all in current prices).

(b) The trade intensity ratios for the OECD and the 'world' are calculated as the simple average for the respective group.

Source: Penn World Table (Mark 5.5), 'OPEN' variable.

2.2 Foreign Direct Investment

Increases in trade intensity have been paralleled by a continued rise in foreign direct investment (FDI). Substantial difficulties are involved in comparisons of FDI between countries and over time. These difficulties arise because of differences in the treatment of retained earnings, in the valuation bases used, in the treatment of debt and in the control thresholds used for defining foreign ownership. As a result, the international data, and notably the series collected by the IMF and the OECD, are not fully comparable. They can, nonetheless, be suggestive of broad trends and it is in this spirit that they are examined here.

Expressed in current prices, cumulated FDI inflows to Australia were some five times greater during the period 1981-1992 than during 1973-1980 (a period of unusually low FDI inflows).[6] Comparing these two sets of years, Australia's share of OECD inward

6. As a ratio to cumulated GDP, the respective figures were 1.9 and 1.1 per cent. The rise is despite regulatory changes which removed the bias against portfolio investment.

direct investment – that is, the ratio of FDI inflows to Australia, to all FDI inflows to countries in the OECD area – remained roughly constant at around 5 per cent, but out of a strongly rising total.

At the same time, there has been a shift in the sectoral allocation of FDI away from manufacturing, mining and agriculture towards the service industries. In particular, manufacturing's share of cumulated FDI fell from 35 per cent in 1976-81 to 27 per cent in 1982-92. This may partly reflect the impact of reductions in assistance on the incentive to 'leap over the tariff wall' which earlier studies found to be an important component of FDI into Australia. It is also no doubt related to the falling significance of manufacturing in the economy as a whole. Nevertheless, foreign-owned firms still account for a large proportion of activity in the manufacturing sector. The latest ABS figures, which refer only to 1986/87, show that the share of foreign-owned firms in manufacturing value added has remained fairly stable at around 31 per cent since the mid 1970s.[7]

In contrast to the mixed picture for the inward flows, Australia's share of OECD outflows of FDI – that is, its importance as a home country for FDI – increased markedly during the time period considered. Taking the period 1973-1980, Australia accounted for less than 1 per cent of cumulated outflows of FDI from OECD countries. This more than doubled to just under 2 per cent for the period 1981-1992. Australia's FDI outflows in this latter period exceeded those of Canada and Switzerland, traditionally substantially larger foreign investors than Australia, and were barely smaller than those of Sweden.

The extent and pattern of the increase in Australian FDI can be examined using US Department of Commerce data on FDI inflows into the United States. While Australian firms accounted for barely 0.5 per cent of annual inflows of FDI into the United States in 1980 (and even less before then), their share quadrupled to between 2 and 2.5 per cent for 1985, 1986, 1987 and 1988 and then seemed to stabilise at around 1.5 per cent in 1990 and 1991. As with foreign trade, this substantial rise points to the shrinking, and perhaps even disappearance of a gap between the actual level of Australian FDI and that which might be expected from an economy with Australia's characteristics.

Much as with trade intensity, this hypothesis can be analysed by considering the factors that are likely to influence a country's share in FDI inflows into a particular host market. Drawing on the Dunning-Caves 'eclectic' model of foreign investment, it can be hypothesised that this share will be associated with: the size of the home country's economy; its distance from the market in question; the home country's level of technological and managerial sophistication as reflected in per capita income and in its share of cumulated OECD area R&D expenditures; as well as an exchange rate variable capturing the familiar Aliber effects.

A regression model estimated on this basis (with county shares of FDI inflow into the US over the period 1976-1992 as the dependent variable) explained some 36 per cent of the variance in the data, though all the coefficients were statistically significant at the

7. Graham and Krugman (1993) argue that this is a better measure of the extent of foreign direct investment than statistics based on balance of payments data. For a more detailed discussion of trends in Australian FDI see the paper by Howe in this Volume.

one per cent level. The results of this model suggest that the Australian share was significantly below the expected level in the period to the mid 1980s, and significantly above it from then on.[8]

2.3 Summary

Three major results can be drawn from the data presented above.

First, though the *trade intensity* of the Australian economy remains below that of other OECD countries, the gap has fallen substantially in recent years, and could fall further as a result of income growth in Australia's region, reductions in transport and communications costs, and cuts in protection in the Asian economies. Second, Australia remains relatively open to foreign direct investment, and has attracted continuing substantial *inflows of FDI* despite reduced incentives for simple import substitution. Third, Australian *outflows of FDI* increased very markedly over the course of the 1980s – indeed, to a point where (at least on the basis of US data) they exceeded the levels which might have been expected given Australia's economic size and structure. Combined, these results highlight the continued rapid internationalisation of Australia's economy.

3. Output and Resource Shifts Between Industries

The closer integration of the Australian economy into world markets can be expected to affect efficiency by altering the allocation of resources *between* industries, and by changing conduct and performance *within* industries. The former corresponds to the familiar mechanisms of Ricardian comparative advantage; the latter, though it has long been referred to in studies of international trade and investment, has only very recently been given a firmer analytical basis. These two, by no means mutually exclusive, types of effects are considered respectively in this section and in the next.

The factors and processes underlying changes in the pattern of output and resource use are well known. They centre on the changes in relative product prices associated with increased international integration, which should alter the structure of the economy and shift resources between industries. In principle, since protection has been reduced rather than removed, the effects on welfare are difficult to gauge *a priori*. Nonetheless, it seems reasonable to assume that reductions in assistance of the magnitude observed should be

8. Using shares in annual FDI in the United States over the period 1976 to 1992 as the dependent variable, the regression line is given by:

$$\text{USFDISHARE} = 59 - \underset{(-7.8)}{0.027}^{*}\sqrt{\text{DIST}} + \underset{(6.9)}{0.00194}^{*}\,\text{PCAPGDP} + \underset{(2.5)}{0.027}^{*}\,\text{GDP} - \underset{(-3.6)}{1.46}^{*}\sqrt{\text{GDP}}$$

$$+ \underset{(3.2)}{0.000343}^{*}\,\text{R\&D} - \underset{(-2.1)}{0.029}^{*}\,\text{EXCHRATE} \qquad R^2 = 0.374$$

where: DIST is distance of capital city from Washington, DC; PCAPGDP is per capita GDP at 1985 prices and current exchange rates; GDP is GDP in 1985 prices; R&D is Business Enterprise Outlays on R&D at 1985 prices; EXCHRATE is the percentage change in the US exchange rate over the previous five years; and t-statistics are in parentheses. Normalised by the mean error, the average gap between the actual and predicted value for Australia's share over the period to 1982 was -0.55; for the period from 1983 to 1992 it was +2.38.

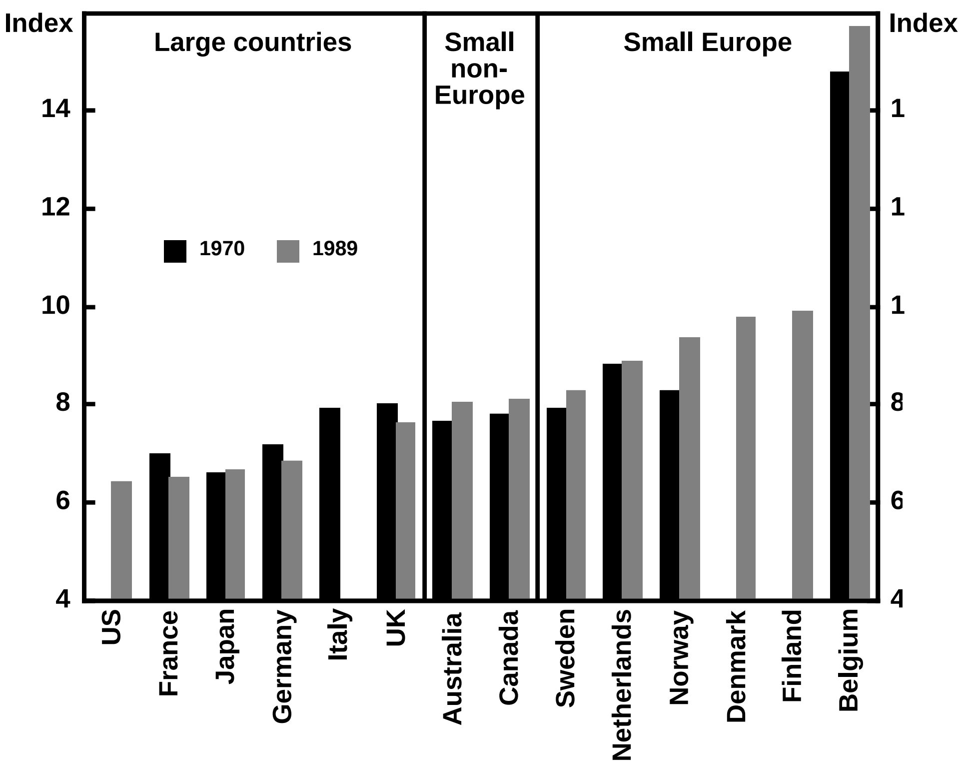
welfare increasing, as the shifts in resources in line with comparative advantage result in the transfer of resources from less to more valued uses, raise productivity measured at world prices and increase national income (see Dowrick in this Volume).

The data available do point to inter-industry shifts within manufacturing. By and large, these shifts have resulted in greater specialisation, both in terms of output and trade.

Output specialisation can be examined by assessing trends in the sectoral distribution of value added, and by measuring the degree to which a few industries dominate manufacturing net output. As a result of natural and policy protection, the Australian manufacturing sector has traditionally been far less specialised than its counterparts in other small industrial economies, most strikingly those in Europe. However, the gap in this respect between Australia and comparable countries overseas has diminished somewhat in recent years.

The relevant data are set out in Figure 4. The OECD's STAN database, which provides value-added data for 26 industry groups, has been used to calculate a Herfindahl index of manufacturing industry value added, with higher values of the index implying a higher degree of specialisation. The data cover the period from 1970 to 1989 (observations for some countries are available up to 1991). Increases in the value of the index for Australia

Figure 4: Specialisation in Production
(Herfindahl indices of manufacturing value added)



occurred in the early 1970s, in the late 1970s and then in the period from 1985. At the end of the 1980s, the value of the index for Australia was similar to that for Canada, but was still well below that for the small open European economies.

These is also some evidence of increasing specialisation in international trade. Two indicators have been examined in this respect.

The first uses series on trade and output corrected for the double counting of own-industry intermediate inputs. (These series are described in Appendix B.) These data are used to calculate ratios of import penetration, and export orientation, in volume terms for the 12 ASIC 2-digit manufacturing industries. The results, set out in Figure 5, point to increased inter-industry dispersion, in the sense that the standard deviation of the measures rise over time. However, because the means for both series increased even more rapidly, the unweighted coefficients of variation have actually tended to decline.

The second indicator of trade specialisation examined is the Balassa index of revealed comparative advantage (RCA).[9] The data are drawn from the STAN database and use trade data reclassified to the 26 STAN manufacturing industry groups. Table 3 sets out the summary statistics for the RCA estimates for 13 OECD countries, including Australia, for 1979 and 1990 (the last year for which data are available).

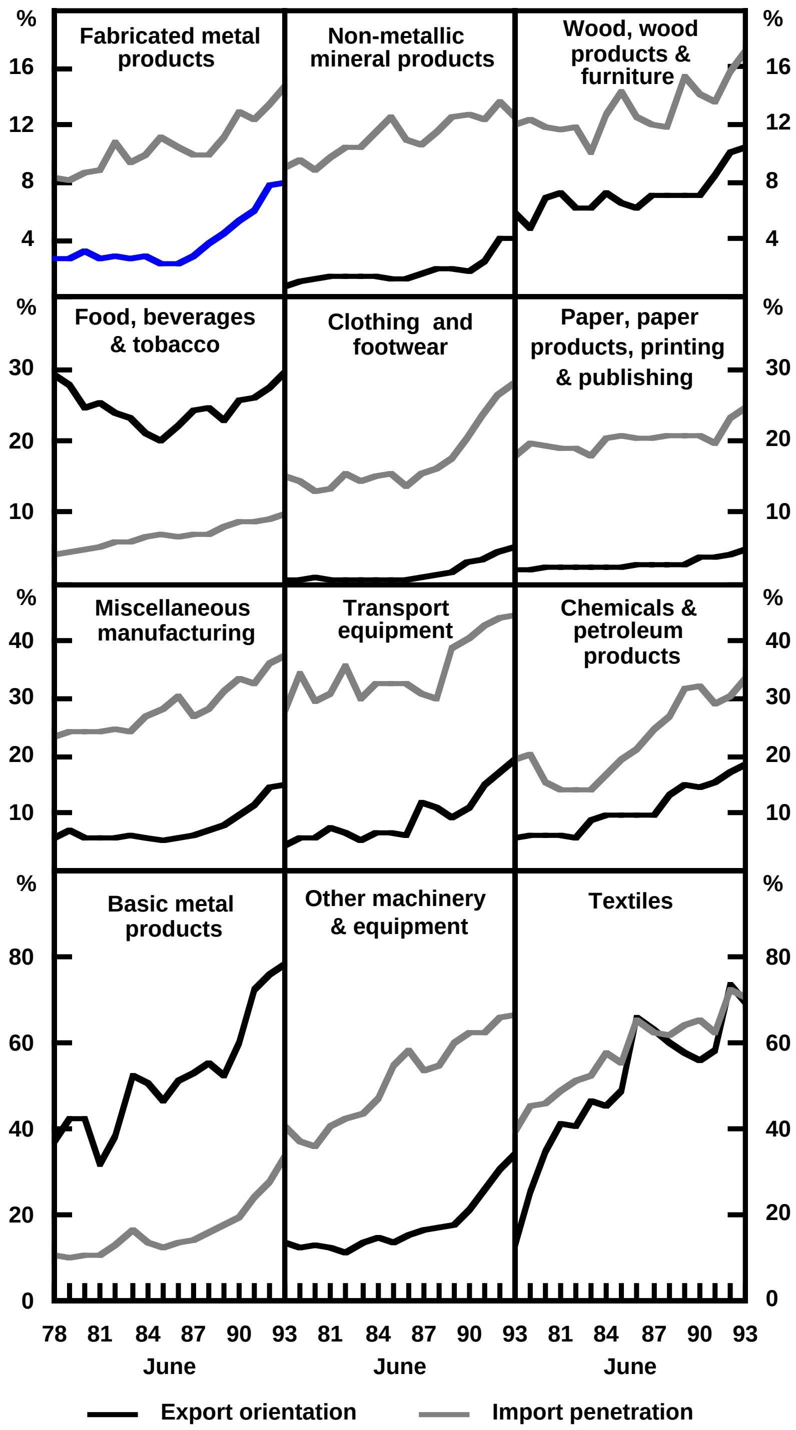
Table 3: Indices of Revealed Comparative Advantage (RCA)

	Median		Mean		Variance		Skewness		Kurtosis	
	1979	1990	1979	1990	1979	1990	1979	1990	1979	1990
Australia	0.38	0.50	1.56	1.68	12.49	12.98	2.84	3.31	9.27	13.20
Canada	0.61	0.63	1.53	1.38	5.29	3.37	2.48	2.21	8.61	7.13
Denmark	0.83	0.88	1.24	1.36	2.66	2.33	3.20	1.95	13.40	5.78
Finland	0.55	0.73	1.89	1.75	18.50	12.66	3.60	3.71	15.42	16.10
France	0.98	0.90	1.22	1.18	0.80	0.50	2.30	0.87	8.73	2.55
Germany	0.99	0.94	1.06	1.03	0.33	0.26	0.36	0.32	1.99	1.77
Italy	1.06	1.06	0.99	0.98	0.10	0.04	-0.81	-1.07	2.57	3.11
Japan	0.85	0.67	1.02	1.05	0.69	0.96	0.81	1.06	2.55	3.06
Netherlands	0.72	0.79	1.18	1.26	1.21	1.36	1.45	1.59	4.60	4.64
Norway	0.52	0.57	1.96	2.34	13.25	17.76	2.63	2.40	9.00	7.34
Sweden	0.97	0.93	1.41	1.37	4.26	2.73	3.51	3.35	15.23	14.42
UK	0.87	1.02	1.49	1.31	2.50	1.01	2.98	1.40	12.32	5.06
US	0.92	0.89	1.61	1.30	6.74	1.66	3.78	2.56	16.17	10.44

Note: Calculated as shown in footnote 9.

9. Country j's RCA in industry i is given by $RCA_j^i = \dfrac{X_j^i / X_j^{Total}}{X_{Total}^i / X_{Total}^{Total}}$ where X denotes exports.

Figure 5: Import Penetration and Export Orientation
(volumes, net of own-industry intermediate input)



In both years, the median RCA for Australia has been the lowest among the countries considered. Given the way the index is normalised, this points to a relatively skewed pattern of trade. This is borne out by the values of the indicators of skewness (third moment) and kurtosis (fourth moment). A major factor here are the very high RCAs for manufactures that are not elaborately transformed, notably Non-Metallic Minerals and Food, Beverages and Tobacco. Only Finland, with its concentration on exports of pulp and paper, has a similar pattern.

The degrees of skewness and of kurtosis have also tended to rise over time. Sharp increases during the 1980s in the RCA index for Non-Metallic Minerals appear to have been a major contributor to this change. A regression analysis of the RCAs on time shows that RCAs have also increased significantly for Petroleum Products, Textiles and (though to a lesser extent) Iron and Steel, and have declined significantly for Food, Beverages and Tobacco, Chemicals (excluding drugs) and Metal Products, while remaining stable, or displaying no clear trend, for the other industry groups.

Specialisation in trade and output have been accompanied by shifts in the pattern of resource use. Figure 6 sets out Lawrence indices of structural change calculated annually over the period from 1975 to 1994.[10] The results are presented first for manufacturing, and then for the entire non-farm economy (but keeping the 13 manufacturing subdivisions separate). Though this measure can be distorted by oscillations in industry shares, a broadly similar picture emerges when rolling 5-year-ended data are used. The results point to an increase in the year-on-year rate of structural change in manufacturing, with an especially marked rise in the extent of the shifts in employment.

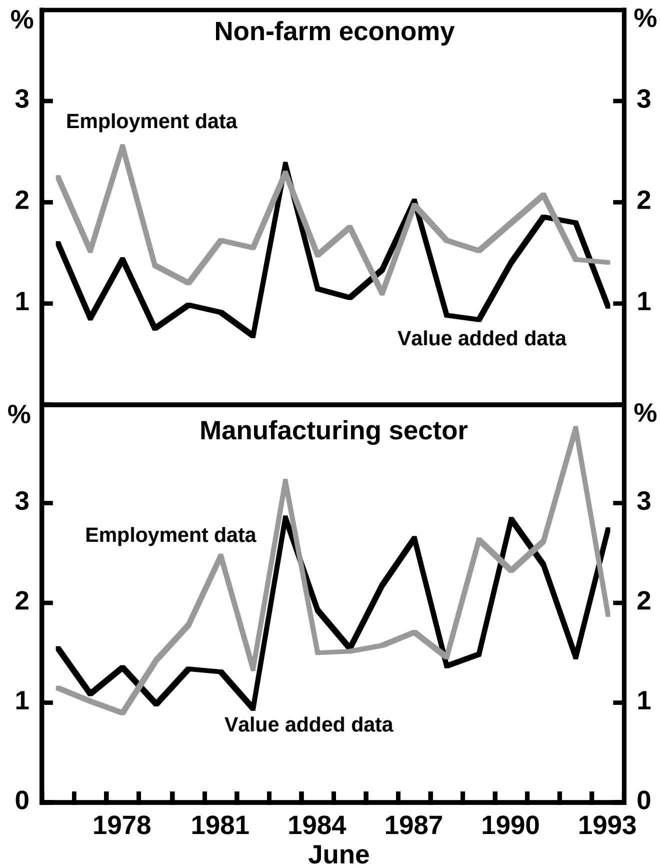
However, at least on a preliminary analysis, it is not apparent that these shifts are any larger than those experienced in other small industrial economies, as the need to reverse the legacy of a long period of protection might have suggested. For example, an indicator of structural change derived from the OECD's ISDB database[11] suggests a significantly greater stability of industry shares in Australian manufacturing employment than observed in Canada, Sweden or the UK.[12] A similar picture emerges from the ISDB data

10. Due to Lawrence (1984), the index measures structural change between two points in time as $L = 0.5 \cdot \sum_i \left| s_{i,t} - s_{i,t-1} \right|$ where s denotes share of, in this case, either value added or employment. A value of zero implies complete stability in the economy's structure, whilst a value of one implies a complete turnover.

11. This indicator was first presented in OECD (1987). An update is provided in Meyer-zu-Schlochtern (1994). The index is constructed by using the RAS adjustment procedure, commonly employed in updating input-output tables, to calculate 'expected' values of sector shares – that is, the values which would be observed if the sector share within each country evolved according to that sector's growth rate across all countries, corrected for the ratio of the economy-wide growth rate in that country, to the overall growth rate for the grouping of countries as a whole. The sum of the absolute values of the differences between the actual and the expected average annual growth rates for each country provides a measure of the extent of structural change in that country.

12. The values of the index, calculated solely for manufacturing over the period from 1970 to 1989, are (setting Australia at 100), Sweden 196, UK 211, Canada 139, Japan 107, US 80. The index here is defined as: I = sum (absolute values [expected minus actual annual average growth rate of employment]) where the sum is taken over the following industry groups: Basic Metals, Food, TCF, Wood and Wood Products, Pulp and Paper, Chemicals, Non-Metallic Mineral Products, Fabricated Metal Products, Machinery and Equipment and Means of Transport.

Figure 6: Lawrence Indices of Structural Change



on capital stocks, though greater doubts must be expressed about the reliability of these estimates.

Moreover, we find no relationship between the pattern of output change and the extent, or direction of changes, in revealed comparative advantage. Going by the data on Australian manufacturing in STAN for the period 1970-89, there was a statistically significant association between changes in RCAs and changes in output shares for only 3 of the 22 industry groups.

This suggests some caution about the extent and pattern of inter-industry shifts in resource use. Three factors may be at work.

First, protection remains significant for some of the industry groups which, were they fully exposed to international competition, might experience the largest shrinkages. This is notably the case for passenger motor vehicles and for textiles, clothing and footwear (TCF) – and indeed, the ISDB data indicate that Australia has experienced smaller declines in employment in TCF over the past two decades than most other OECD economies (Figure 7).

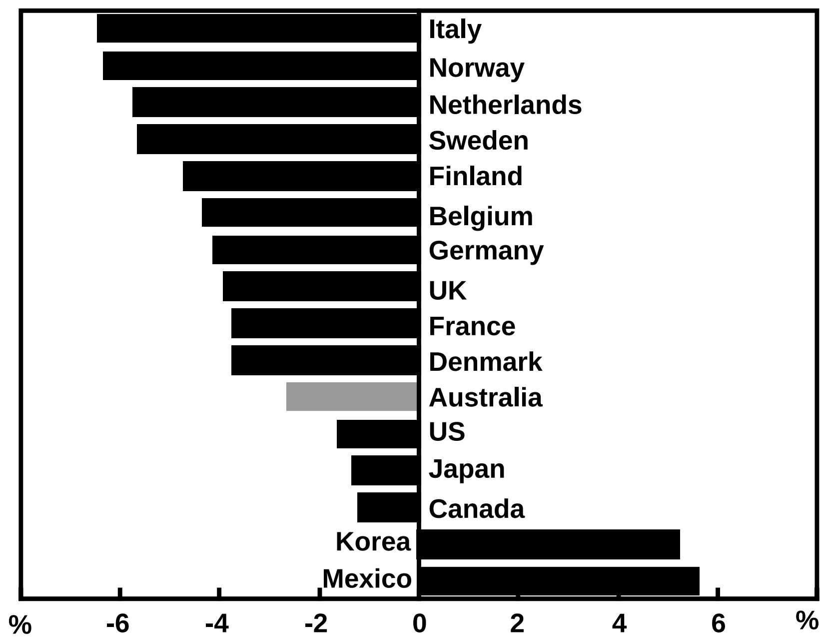
Second, change in the composition of employment may have been slowed by the extended period of wage restraint in the 1980s. Much as appears to have happened in the United States, low rates of wages growth may have offset the adjustment pressures which economic integration would otherwise have placed on low-productivity sectors.

Third, even in those sectors where adjustment is now underway, the transition period may extend well into the future. The current slow rate of change is not necessarily a reliable indicator of longer-term outcomes.

In short, further shifts in the pattern of resource use within manufacturing may still lie ahead. However, it would be wrong to think that these shifts are inevitable. After all, predictions of pure specialisation in line with comparative advantage and determined by factor proportions can only be derived on the basis of strong simplifying assumptions. It is increasingly recognised that, under conditions of imperfect competition, the patterns of specialisation which emerge from free trade may bear little resemblance to those expected from Ricardian models of comparative advantage. Indeed, in recent work which extends the general equilibrium (GE) model to include oligopoly, and then derives GE models of trade under imperfect competition, the equilibrium pattern of output is largely indeterminate (Gabszewicz and Michel 1992; Cordella 1993). In these models, most of the effects of integration arise from changes in behaviour *within* industries – a result not inconsistent with the long-term trends characterising the advanced economies.

Some indication of the relative importance of inter as compared with intra-industry shifts can be obtained by comparing the contributions to manufacturing labour-productivity

Figure 7: Textiles, Apparel and Leather Employment
(average annual percentage change, 1971-91)



growth of changes within industries on the one hand, (the upper panel in Figure 8) and of shifts in the allocation of labour between industries on the other (the lower panel in the same figure).[13] In virtually all instances, the first dominates the outcome; this suggests that it is *within* industries, rather than in intersectoral reallocation, that the greatest effects of international integration will be found.

4. Changes in Performance Within Industries

If the major benefits of trade reform are concentrated within industries, we would hope to find some evidence of the link between the international environment and firm behaviour using firm-level data. To this end, this section begins by examining the analytical reasons for expecting such a relationship; then draws on these reasons to develop testable hypotheses; and finally sets these hypotheses against data drawn mainly from the AMC survey.

4.1 The Analytical Background

Increased international integration is likely to affect efficiency at the level of the firm and the industry primarily through its impact on the intensity of competition. By reducing price-cost margins, notably in concentrated industries, greater competition will yield improvements in allocative efficiency; but it may also increase technical efficiency – that is, the productivity with which resources are used. It is the latter which is the prime concern of this paper and recent, largely theoretical work identifies three mechanisms through which it may be affected by changing product market conditions.

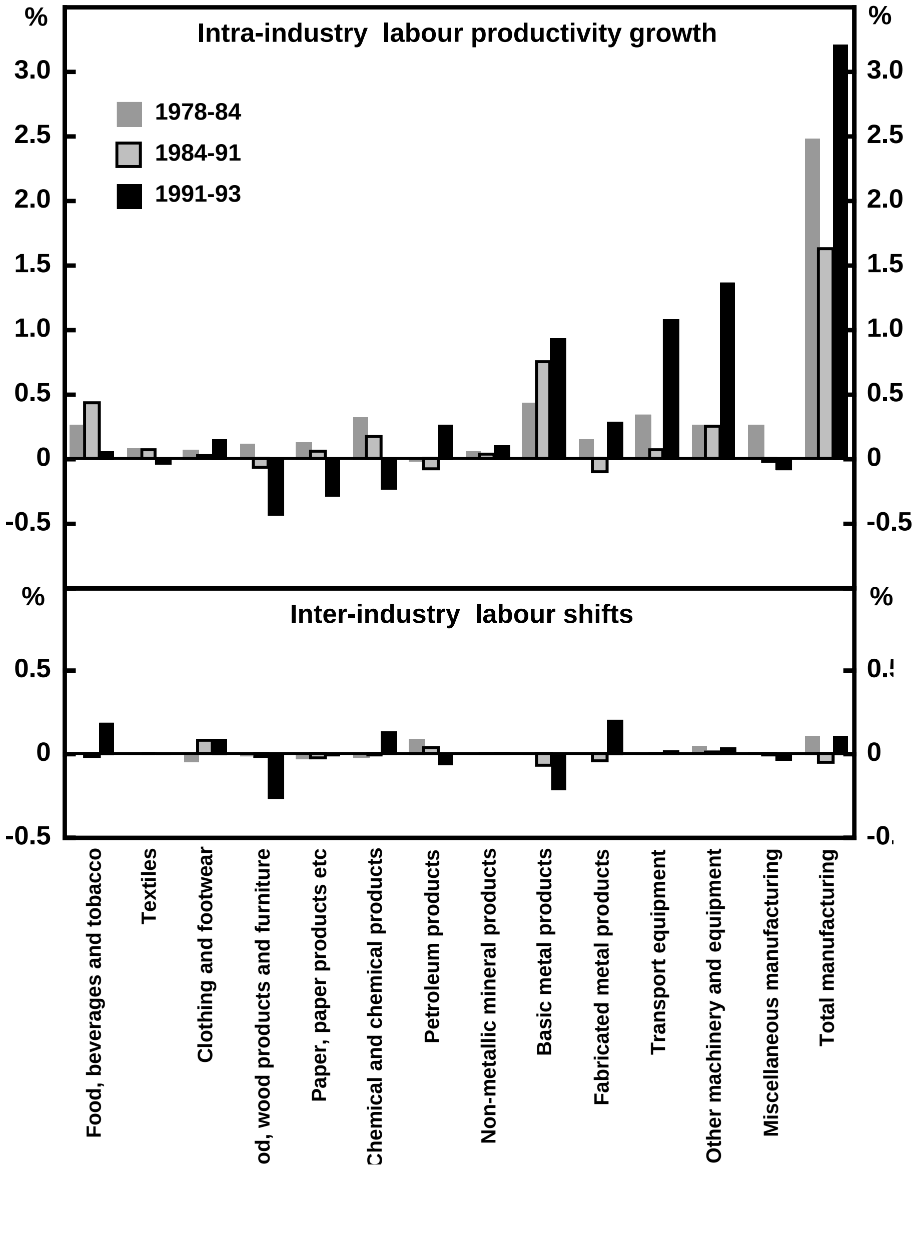
4.1.1 Yardstick efficiency

The first of these is the impact of product market conditions on agency costs – that is, on the costs owners face in ensuring that managers have adequate incentives to maximise shareholder value. The underlying notion is that in a more competitive market, owners can more readily compare the performance of the firms in which they have invested, to the performance of other firms. This allows them to discriminate between say, low profits due to industry-wide demand shocks and low profits due to managerial slack or to rent-sharing between managers and workers. As a result, owners can better structure the incentives managers face, securing a closer alignment between managerial actions and shareholder objectives. This will reduce managerial slack, and ensure that prior inefficiencies are wound back.

Two points are worth noting. The first is that greater monitoring by owners of the comparative performance of managers can be expected to lead the managers themselves to invest more heavily in comparing their performance with that of managers in other

13. The decomposition arises by noting that manfacturing labour-productivity growth in period 1 is approximately equal to the sum of the changes in individual industries labour productivity levels weighted by their start-of-period share of total hours worked $(hs_{i,0})$ plus the sum of the changes in their weights multiplied by their start-of-period labour-productivity level $(p_{i,0})$ relative to the aggregate (P_0), or $\Delta P_1 \approx \sum_i \Delta p_{i,1}.hs_{i,0} + \sum_i \Delta hs_{i,1}.(p_{i,0} - P_0)$.

Figure 8: Decomposition of Manufacturing Labour Productivity Growth



firms. Second, just as competition increases the ability of owners to monitor their agents, it makes it easier for managers to monitor the performance of the firm's other employees. As a result, intensified competition should be reflected in the tighter assessment of performance at all levels of organisation.

4.1.2 Sampling efficiency

Though yardstick efficiency depends on the basic factors determining profits within a firm being highly correlated across firms[14] (since this is what allows managerial performance to be compared), product market competition may also yield efficiencies when the firms within an industry differ in important respects. In particular, if firms are viewed as 'taking bets' on particular ways of doing things, having a greater number of firms in a market will, all other things being equal, accelerate the rate at which the most efficient approaches are discovered. To the extent that there are spillover effects (that is, the firms in an industry can learn from each other, for example through the yardstick effects of benchmarking), experimentation will increase efficiency, not only in the innovating firm, but also across the firm population as a whole.

Greater international exposure can be a particularly effective means of enhancing this process of 'letting a thousand flowers bloom'. It provides for a vast increase in the number of sampling points, as domestic firms are exposed to the example of firms overseas. Inward investment by foreign firms can also be used to 'show-case' technologies, organisational approaches and marketing techniques not in widespread use in the domestic market (though it can also have the effect of accentuating the barriers to entry confronting domestic entrepreneurs). In addition, through exporting to, and investing in, foreign markets, domestic firms may become more aware of foreign sources of technology. Finally, and perhaps especially significantly, gains may come from access to a broader range of intermediate inputs and capital goods. In addition to its immediate cost-reduction impact, the expansion in goods available, effectively lowers the costs of innovation. This effect will extend to the non-traded sector as well, which thereby benefits directly from increased integration into the world economy.[15]

4.1.3 Selection efficiency

In addition to effects at the level of the firm, increased product-market competition will alter the process by which inefficient firms are 'weeded out' and efficient firms are rewarded. The presumption here is that firms are indeed asymmetric, and that superior performance cannot be costlessly imitated. Stronger product-market competition is then presumed to result in the more rapid and complete sorting of firms into distinct performance classes, with the less productive firms being forced to exit the market. The most natural route through which this Darwinian process occurs is the reduction in price-cost margins brought by increased competition, since this will make it more difficult for inefficient firms to survive.[16] At the same time, owners, now better able to compare performance, are not likely to continue funding inefficient firms, while potential

14. That is, correlation of 'environmental' factors. Correlation of managerial talents *may* inhibit the monitoring process as managers free ride on each other's performance. See Vickers (1994) for an overview.

15. Lee (1994) presents evidence that per capita income growth rates are positively related to the ratio of imported to domestically produced capital goods. See also Coe and Helpman (1993).

16. There is considerable evidence on the impacts of internationalisation on price-cost margins. See, for example, Schmalensee (1989) and the studies referenced in Jacquemin and Sapir (1991) which are in the tradition of the older 'gross margins' literature, or the 'new empirical industrial organisation' studies of Levinsohn (1993) and Harrison (1994).

employees, mindful of the costs of redundancy, may become more wary of accepting jobs in the firms least likely to survive. As a result, inefficient firms will face tighter price and cost constraints, making their continued existence less likely.

4.1.4 Caveats

While each of these factors suggests that intensified product-market competition will be associated with increased technical efficiency, a number of caveats are worth noting.

First, the dynamics of adjusting to greater competition may be complex and costly. In particular, firms that are faced with the likelihood of exit may have strong incentives to curtail investment and raise prices, especially when their more efficient rivals realise that this is merely a transitory end-game strategy. Under these circumstances, it can be a profit-maximising strategy for the likely survivor to slow their own expansion (as they wait for exit to occur), so that the overall price level for the industry actually rises. The prediction that industry efficiency will be enhanced may then be realised only very slowly.

Second, even putting the adjustment dynamics aside, the precise features of the 'equilibrium' towards which the system is heading are not necessarily as straightforward as the above discussion suggests. This is especially so when firms can choose to compete through sunk investments such as outlays on advertising, R&D, or the holding of inventories and other forms of excess capacity. In these cases, in which sunk costs are endogenous, the expected outcomes depend very heavily on the precise characterisation of the competitive process. For example, where competition occurs largely through advertising, an increase in the threat of competition (due say, to an expansion of the market) may lead to a *rise* in costs, as incumbents increase outlays so as to protect their market position.

Equally, where fixed costs are large and sunk (for example, because production requires capital goods that have few alternative uses and a finite and relatively predictable lifetime), reduced barriers to new competition are not necessarily associated with greater productive efficiency, since they may result in excess entry and over-capacity. Last, but by no means least, is the Schumpeterian conjecture, according to which some degree of allocative inefficiency – that can only be sustainable if competition *in the market* is imperfect – is needed if firms are to make the investments required to compete *for the market.*[17]

In each of these cases, the prediction that greater competition will increase productive efficiency may not hold true, at least over some possibly significant range of the intensity of competition scale.

4.2 Implementation and Hypothesis Formulation

While the mechanisms reviewed above cannot easily be set against empirical evidence, they can be used to develop testable hypotheses. These hypotheses fall into three broad groups.

17. Rodrik (1988) presents a model in which liberalisation, by reducing market share, reduces the incentive for the firm to make productivity improving investments.

4.2.1 Integration, learning and performance

A first set of hypotheses relates integration, learning and performance.

Agency cost models of the firm, briefly described above, provide a starting point. In these models, intensified competition increases the incentives and capabilities of owners to strike efficient contracts with managers. Significant here is the ability of owners to make a broader range of comparisons between firms, and hence more readily distinguish good from poor managerial performance.[18] Given this link, it would seem reasonable to expect that managers, faced with an expanded set of competitor firms, will themselves have increased incentives to systematically monitor the behaviour of rivals and compare corporate strategies and performance. This suggests a number of hypotheses.

First, within industries, the firms most likely to engage in benchmarking are those which face the lowest costs in acquiring competitor information, for example, because they can spread the fixed costs of doing so over greater size; and/or because they are integrated into company groupings – such as multinational enterprises – that can secure comparative performance data from internal sources.

Second, there may also be an effect by which it is the 'better' managerial teams that make the greatest investment in securing comparative information, both because they stand to lose less from doing so and are better placed to act on the information they acquire.

Third, the incentives to engage in systematic comparisons may be greatest in larger firms, these being the firms for which agency costs are likely to be highest in the first place, and which, in the absence of international competition, are most likely to lack adequate domestic comparators.

In summary, there should be a relationship between firm and industry characteristics, the adoption of systematic processes of monitoring rivals, and corporate performance (for example, in terms of competitiveness on world markets). This relationship will be reinforced by the 'sampling' effects of greater product-market competition. In particular, entry by importers and the greater exposure of domestic firms to export markets will bring a larger range of alternative approaches and strategies into play. So too should contact with a more extensive set of customers and suppliers, who can act as valuable sources of market information and of technical support. All of this should result in accelerated learning, most notably by the firms directly involved in international trade but also, through spillover effects, by other firms in the industry.

18. This is not the only factor at work. Reduced shirking may also arise in principal-agent models from the effect of intensified competition on the incentives of owners and managers to trade-off the incentive and insurance components of the contract between them, for example by altering the cost of slack. Thus, Horn, Lang and Lundgren (1991) develop a model which allows for international trade but in which all potential avenues for gains from trade, other than those associated with agency costs, are excluded. In this model, managers affect productivity as their effort is assumed to increase the productivity of labour – that is, to lead to a more efficient organisation of production. International trade then has an impact on the trade-off in the agency relation in two ways: it increases the perceived price elasticity of demand, which increases output and the incentives for owners to be tough; and it increases the demand for labour which increases real wages, and so adds further incentive to economise on labour by increased managerial effort. For models with similar mechanisms at work, see Horn, Lang and Lungdren (1990, 1994). In these models, competition can increase managerial effort without necessarily decreasing the degree to which the effort supplied is inefficient.

4.2.2 Corporate practices, selection and efficiency

By tightening the product-market constraints bearing on managers, integration will also alter managers' abilities and incentives to perpetuate inefficient ways of doing things. Given the historical development of Australian manufacturing, four areas are likely to be especially important.

First, inefficient work practices are likely to come under pressure, as are the other mechanisms by which rents are shared between managers and other employees. One would therefore expect to see two effects jointly: managerial slack being reduced as agency costs are reduced; and equally, employee slack decreasing as a result of reductions in agency costs within firms. Tighter product-market constraints – a dwindling of the rents available for sharing – should make this process all the sharper.

Second, improved information and more intense selection may induce efforts to upgrade product quality.

Third, excess product variety, with its corollary of sub-scale production, could be perceived as a greater handicap. In effect, though product differentiation can dissuade new entrants, it is unlikely to be a successful strategy when it imposes a substantial cost disadvantage on domestic producers. The very broad product ranges typical of Australian industries could be expected to prove unsustainable in a more competitive environment.

Fourth, and interacting with the third point above, greater access to export opportunities, which effectively expands the market available to producers, should strengthen the incentives to exploit economies of scale. A larger market creates greater room for efficiently-scaled plants. The trade-off between carrying excess capacity at the time new plants are first introduced, and achieving lower unit costs through economies of scale over time, will tend to favour larger plants when the absolute size of the market is larger, given an independently determined growth rate of demand and producers acting on a stable pattern of oligopolistic interaction (Scherer *et al*. 1975). At the same time, access to export markets will tend to encourage more aggressive capacity expansion by low-cost producers. By allowing these producers a greater range of opportunities to displace less-efficient rivals, not only at home, but also abroad, it reduces the price fall necessary to accommodate the additional output their expansion entails.

Together, these factors should be reflected in a pattern in which the more efficient, export-oriented producers take the lead in seeking to implement new industrial relations arrangements, as well as in trying to secure the fullest benefit from economies of scale and scope.

4.2.3 Productivity and specialisation

The process within each industry which results from these forces should have four salient features.

First, as the most efficient producers self-select by leading in the adoption of more efficient ways of working, there might be, at least initially, a rising, possibly substantial, gap between firms within industries.

Second, the greater the barriers to the diffusion of new management practices, and the higher the costs of exit, the larger and more persistent this gap will be. We might, therefore, expect to find the convergence process within industries being slowest for industries or market segments where sunk costs are relatively high.

Third, given these disparities, the firms which perform best – in terms of productivity and competitiveness on world markets – should be those which have the greatest commitment and ability to learn. They would, in other words, bring together the factors set out above: orientation to benchmarking, and adoption of processes for systematically monitoring cost and quality relative to competitors; willingness to learn from foreign suppliers of technology and inputs; capacity to create an industrial relations climate sufficiently flexible to adapt to new ways of doing things; and access to the resources needed to implement change.

Finally, as this sorting process runs its course, Australian industries could become more specialised, reflecting not only the fuller exploitation of product-specific economies of scale, but also (and probably more importantly) managerial diseconomies of scope. Given a continuing (indeed, income-elastic) demand for diversity, rising intra-industry specialisation should result in greater intra-industry trade.

4.3 Testing

These hypotheses have been tested first by using the responses to the recent AMC survey and second, by analysing industry-level data on trade and output.

4.3.1 The AMC survey: background, overview and assessment of data quality

The survey was conducted over December/January 1993/94 and hence results may have been affected by either shutdowns over the Christmas period, or by seasonal work, for example, in the food industry. Aimed at firms with more than 20 employees, the survey was stratified across 12 ASIC/ANZSIC industry codes and three size categories (by employees: 20-49, 50-99 and over 100). Sampling frames were designed to ensure that all 36 cells had a minimum number of respondents. Overall, there were 962 respondents to the survey, equivalent to over 10 per cent of the population, sufficient to provide an adequate basis for analysis.

The survey contained over 100 questions, many of them involving scalar judgments (that is, the respondents were asked to rank themselves on a scale). It is consequently a very rich but complex database, with especially difficult problems being involved in disentangling the causal links between variables.

Given the number of questions, and the fact that some of the terms used in the survey may have been unfamiliar to the respondents, there is some concern that the quality of the results may have been affected by respondent fatigue. Two approaches were used to test for this:

- First, where similar questions have been asked in different parts of the questionnaire (in particular, where a question has been asked near the beginning of the questionnaire, when respondents are freshest, and a similar question is asked near the end), the correlation between responses has been examined.

- Second, where the tone of a question is different from that of the questions surrounding it (for example, because the surrounding questions involve replies where a higher value is 'better' than a lower value, while the reply structure for the question at issue goes in the other direction), the correlation between answers has been checked to see if the respondent was 'awake' to the change in scale.

The results of this analysis are reproduced in Table 4. As can be seen, for all the questions testing fatigue, except that on marketing costs (where the two questions asked are the least similar of those considered), there is a positive association in responses.[19] Equally, the questions involving a change in the direction of a scale exhibit a negative association. It therefore seems reasonable to conclude that the length and complexity of the survey did not seriously erode the quality of the replies.

The quality of the responses can also be tested by examining the concordance between firms' ranking of their performance on Likert-type scales with the rankings which emerge from comparisons of quantitative performance indicators. For example, firms were asked whether they considered themselves to be among the technological leaders in their industry. About 8 per cent of respondents rated themselves in this group. Analysis of these responses shows that the firms in this group do tend to score more highly on a range of performance indicators: they are more likely to export (about 46 per cent versus a 36 per cent average for all firms); and they do more R&D. Further, it is worth noting that these firms also rated themselves as having higher productivity growth rates and levels, were more likely to be foreign owned and were more likely to benchmark their performance against rivals (the association between a firm's rating of its 'technological lead' and these other variables was tested using Kendall's tau, all associations being significant at the one per cent level). This last point is especially significant because it suggests that the firms involved were relatively well-informed.

Table 4: Tests of Respondent Consistency

Type of question	Survey references	Kendall's tau	Standard error
Tests of 'fatigue':			
Operations focused	PL6 and TE2	0.19	(0.03)
Just-in-time	FO1B and TE1P	0.53	(0.03)
Production quality	MS3F and PO1F	0.24	(0.03)
New products	MS3H and PO1G	0.29	(0.03)
Materials	MS3D and PO1A	0.13	(0.03)
Marketing	MS3K and PO1D	-0.03	(0.03)
Tests of 'awareness':			
Technology/HRM	MS4C and MS4D	-0.16	(0.03)
HRM/simultaneous	MS4D and MS4E	-0.11	(0.03)

19. Note that although many of the tau values seem small, this does not imply anything about the strength of the correlation.

Potential response bias was investigated through a telephone survey of 108 firms that had not responded to the original postal survey. The results, which are reported in AMC (1994), found that non-respondents had higher self-assessed scores across a sub-sample of 8 questions drawn from the original postal survey. While this may be taken to imply that there is a non-response bias against the 'better' firms, it may also indicate a tendency to be overly optimistic in responses to telephone surveys. Nevertheless, the potential for some biases in this direction must be noted in interpreting the results presented below.

On balance, all of this gives some support to the view that the assessments reported in the survey are of reasonable quality, and these are consequently used below for statistical testing. For simplicity, in the presentation of the results below, the actual values of Kendall's tau, and its asymptotic standard error, are omitted. However, unless otherwise noted, the results reported are significant at the one per cent level.

4.3.2 The changing intensity of competition

An important element in the hypotheses set out above is the effect of greater integration on the intensity of product-market competition, which then alters firm conduct and performance.

However, the survey provides little indication of the competitive conditions in which firms operate. Firms were asked to report their market share – which even at the best of times is a poor indicator of market power – but there was a high non-response rate to this question, and those firms which responded appear to have done so using quite different conceptions of the relevant market. As a result, indicators of competitive conditions had to be derived from other sources. Estimates have been made of the trade-adjusted Herfindahl-Hirschman indices (HHIs) of concentration at the industry level using the methodology set out in Appendix C; but these will overstate market power in industries where entry barriers are low, and may understate it where markets are geographically fragmented.

These problems extend to assessing the degree to which firms are, or feel, constrained by international competition. Since the survey does not contain specific questions in this regard, appropriate indicators have had to be constructed. Two are especially important.

The first are time series on import penetration (see Figure 5, above). In particular, an effort has been made to develop a time series of import penetration at the industry level corrected for the consumption of own-industry intermediate inputs (methods and main results are described in Appendix B). Though these measures are an improvement on those normally used, they still have serious weaknesses.[20]

20. Import penetration measures at the industry level are likely to be too aggregated to adequately capture competitive conditions in particular product markets. These measures will overstate the degree of product market discipline exercised by trade flows when the imports in question are non-competing – be it because the incumbent domestic producers are the main importers (as is the case, for example, for paper) or because the imports are highly differentiated relative to domestic output. For example, Messerlin (1993) finds for France that domestic manufacturers account for 70 per cent of imports of home appliances, and for between 20 and 50 per cent of imports of textiles and apparel. Also see Utton and Morgan (1983). Equally, the measures will understate the disciplines trade imposes when the supply elasticity of imports at the margin is high – as may be the case in industries where competition occurs primarily on the basis of costs and where a few large retail chains account for a large share of purchases.

Second, the import-penetration measures have been supplemented by using measures of manufacturers' perceptions of the intensity of import competition. The primary source is the quarterly *Survey of Australian Manufacturing* carried out by the AMC since June 1989, the main results of which are summarised in Table 5.[21] The survey asks firms whether they believe import competition has increased in the last quarter, and hence responses are likely to be quite sensitive to exchange rate conditions. Three points can be drawn from the data set out in the table:

- The consistently positive numbers indicate that competition from imports has been continuously increasing since 1989, despite the fact that this post-dates the largest declines in protection.
- The greatest increases appear to have occurred in Clothing, Chemical and Petroleum Products, and Basic Metals. Transport Equipment, in contrast, has relatively low figures, which may reflect both continued protection and the fact that many of its imports are controlled by the domestic producers.
- The fall in some of the measures in 1993 may be due to the weaker exchange rate.

Interestingly, there is little correlation between the series on import penetration and that on perceptions of the intensity of import competition. This suggests that the distinction between arms-length imports on the one hand, and related-party imports on the other, may be significant in explaining differing degrees of product-market contestability.

For example, as shown in Figure 9, in the Paper Products, Transport Equipment, and Basic Metal Product industries, the proportions of firms responding that import competition has increased are lower than one might expect given the observed change in import penetration. This may indicate the relatively small proportion of competing imports in these industries. In contrast, perceptions of increased import competition appear greater than actual increases in penetration in the Chemical and Petroleum Products and Non-Metallic Mineral Products industries. This may reflect greater degrees of contestability in these markets.[22]

4.3.3 Integration, learning and performance

Given this background, four results associating internationalisation, learning and corporate performance emerge with some strength from the work carried out to date.

First, *the firms most likely to systematically monitor the performance of their rivals are those most engaged in the international economy.*

This is suggested by examining the responses to questions about whether the firm has mechanisms in place to benchmark its performance relative to competitors and, if so, how much time senior management devotes to this task. Replies to these questions show that export-focussed firms (that is, firms listing a foreign market as among their top two priorities) are more likely to benchmark (58 per cent having policies to this effect as against 40 per cent of the remaining group). In contrast, regionally-focussed firms (that

21. Until March 1992, the survey was of Victorian manufacturers. ASIC 2-digit figures for this period have been reweighted at the 3-digit ASIC level using the 1989/90 input-output tables.
22. On international trade and contestability, see Baumol and Lee (1991).

Table 5: Perceptions of Increased Import Competition
(annual average of quarterly net balance of percentages of respondents)

	1989/90	1990/91	1991/92	1992/93	1993/94
Food, beverages and tobacco	11.7	9.3	13.3	5.3	4.0
Textiles	12.5	15.8	17.7	27.3	31.3
Clothing and footwear	32.0	35.8	40.3	49.5	27.7
Wood products	2.8	16.5	14.5	11.8	9.0
Paper products	4.3	9.3	8.3	9.3	3.7
Chemical and petroleum products	15.9	20.3	29.6	21.8	16.3
Non-metallic mineral products	10.2	2.8	15.2	12.8	15.7
Basic metal products	1.2	18.5	22.4	19.5	10.7
Fabricated metal products	15.0	12.4	11.2	13.5	7.7
Transport equipment	21.9	11.8	12.3	8.3	5.3
Other machinery and equipment	20.8	23.7	19.8	22.8	19.0
Miscellaneous manufacturing	18.4	24.2	20.6	12.5	9.7
Total manufacturing	12.9	15.3	17.7	15.8	11.7

Note: 1993/94 data are estimates based on three-quarters to March.
Source: Australian Manufacturing Council, *Survey of Australian Manufacturing.*

is, firms selling largely within their own State), are less likely to benchmark. In addition, US and Japanese-owned firms, which presumably can secure high quality comparative information from internal sources, are far more likely to benchmark than any other category of firm, including those which are Australian-owned.

The results also show that larger firms make greater use of benchmarking than their smaller counterparts, possibly reflecting a higher incentive to benchmark (given higher agency costs in the absence of systematic performance comparisons) and the fixed costs involved in securing competitive information. Other than through international involvement, we find little relation between the frequency of benchmarking and the competitive conditions in which firms operate.

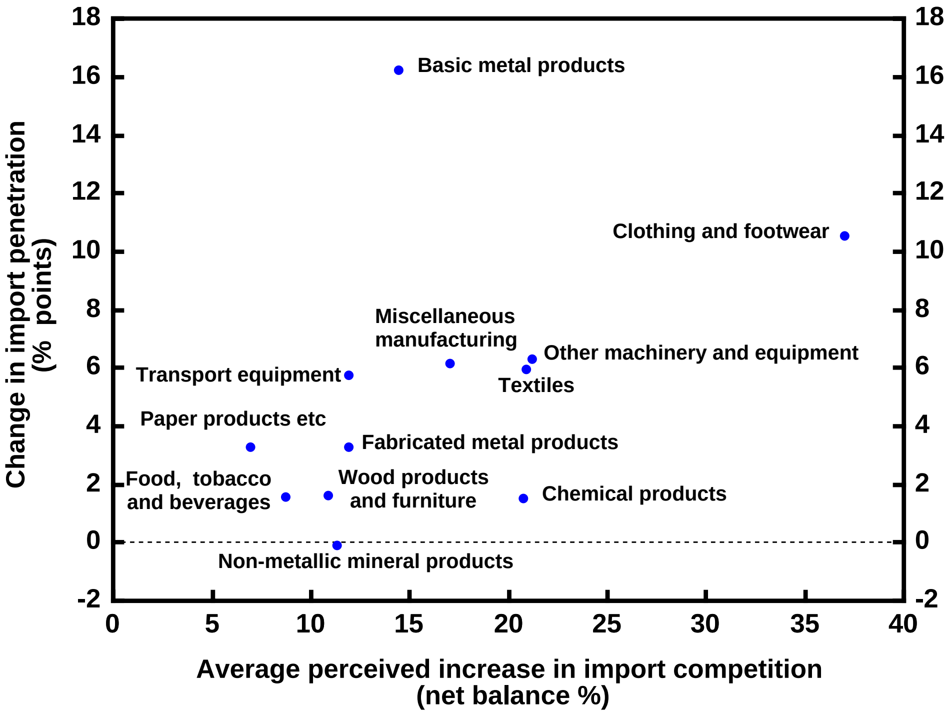
Second, *firms engaged in the international economy are also most likely to focus on customer satisfaction and on product quality.*

Exporters gave a higher score to the five questions measuring the effort devoted to monitoring customer satisfaction than did other firms. This is also true of foreign-owned firms. Exporters were also more likely to focus on controlling product quality, with significant positive relationships on all but one of the four variables in the survey aimed at capturing the investment firms make in this respect. Here too, the links primarily work through exporting, with the intensity of competition having little effect on performance.

Third, *being engaged in international markets is also the primary factor which allows firms to extend their sources of information and learning.*

Regardless of competitive conditions in the industry, exporters are more likely than domestically-oriented firms to find their customers to be of at least some assistance in

Figure 9: Perceptions of, and Observations on, Import Competition (1989-1993)



achieving world-best practice (64 per cent versus 56 per cent for non-exporters). Exporters are also far more likely than other firms to respond that *overseas firms* have been an important source of assistance. The relationship persists even after accounting for the role of customers and suppliers, probably reflecting the impact of exposure to a broader range of competitors.

Foreign-owned firms are more likely to regard their parents as a source of technical assistance than are Australian firms owned by multi-unit parents. However, even removing the impact of assistance from foreign parents, there remains a strong association between foreign ownership and assistance from foreign firms. This may reflect the impact of management structures in foreign subsidiaries, which perhaps provide for more effective learning. Also important may be the higher R&D intensity of foreign firms, which is likely to increase their information about best practice and reduce the costs involved in identifying overseas sources of technical help.

It is, however, worth noting that subsidiaries of foreign firms, though they regard their parent as a valuable source of advice, also frequently regard it as a barrier to achieving improved performance (37 per cent of foreign firms regard their parent as a barrier – compared with 23 per cent of the domestic firms owned by multi-firm entities). Importantly, the two views are often held jointly – 38 per cent of the foreign firms that found their parents of assistance also regarded them as a barrier. This suggests that the barriers in question may involve restrictions on the use in export markets, of the skills and capabilities obtained from the parent. We return to this point below.

Fourth, *learning and the international diffusion of technological progress are also likely to have been assisted by the declines in protection of imported capital goods.*

The Industries Commission estimates that the effective rate of assistance (ERA) on imports of industrial machinery and equipment (taking account of concessions for imported capital) fell from over 40 per cent at the start of the 1970s, to around 13 per cent by 1992/93. This process is especially important because it directly benefits some parts of the non-traded sector which are large importers of such equipment – the ABS estimates that more than half of the gross fixed capital expenditure of firms in the finance, property and business services and wholesale trade sectors is imported. Arguably, the diffusion of technological progress through its embodiment in capital goods is likely to be more important in imports of advanced technology. Table 6 shows the importance of imports to 22 categories of advanced manufacturing technologies. Imports were the source of over half of such items in all but one of the technology classes. Furthermore, the importance of imports as a source of such technology seems to be increasing.

In short, involvement with international markets does appear to be associated with greater and more systematic learning. It is highly likely that in practice, the causality runs both ways, creating positive feedback loops to the benefit of outward-oriented firms.

4.3.4 Corporate practices, selection and efficiency

Improvements in management incentives and information, combined with the rigours of a more demanding selection environment, should put intensified pressure on inherited inefficiencies. Out of the broad range of results derived from analysing the survey, three can be used to examine these impacts.

First, *firms' efforts to upgrade their product quality appear to be related to their involvement in the international economy.*

The survey asked firms to rate their product defect rate relative to competitors, and to report the share of defective products in their product volume. Using the responses, we classified firms into two groups: those with low product quality and those with high product quality. We then estimated a probit model using variables from the survey as explanatory variables. The results are reported in Table 7. A positive coefficient indicates that the relevant variable makes it more likely that the firm is a high-product-quality firm.

The results suggest that firms in industries with higher levels of protection tend to have lower product quality, as do those in industries which have recently experienced large reductions in protection. Size also tends to be associated with lower relative product quality, as is industrial concentration measured by the estimated HHI.

Foreign ownership is the single variable most strongly associated with higher product quality. However, those subsidiaries which report that they are subject to parent-company restrictions limiting their competitiveness (the 'parent restrictions' variable in the model) tend to have significantly higher product defect rates, possibly as a result of foregone learning economies. Some management practices are also associated with higher product quality, notably the efforts the firm makes to measure product quality, the

Table 6: Importance of Imported Capital

(proportion of advanced technology items that is foreign sourced)

	1988	1991
Design and engineering:		
Computer-aided design (CAD) and/or engineering (CAE)	54	76
CAD output used in control manufacturing machines	63	75
Digital representation of CAD output used in procurement activities	46	66
Fabrication, machining and assembly:		
Stand-alone NC/CNC machines	84	88
Flexible manufacturing cells or systems	66	72
Materials working lasers	62	79
Advanced cutting technologies apart from lasers	51	64
Advanced joining and coating technologies apart from lasers	n.a.	81
Advanced treatment apart from lasers	n.a.	59
Filament winding, reaction injection moulding, pultrusion, and/or casting	n.a.	46
Simple pick and place robots	65	64
Other more complex robots (those used for spot or arc welding)	65	86
Other more complex robots (those used for assembly, finishing or other applications)	84	82
Automated material handling:		
Automatic storage and retrieval systems	58	57
Automated guided vehicle systems	70	66
Automated sensor-based inspection and/or testing equipment:		
Performed on incoming materials or in process	63	78
Performed on final product	64	66
Communications and control:		
Local area computer network for technical data	60	72
Local area computer network for factory use	52	68
Programmable logic controllers	63	77
Intercompany computer network linking plant to subcontractors, suppliers and/or customers	53	56
Computers used for control on the factory floor	59	75

Source: ABS Cat. No. 8123.0.

Table 7: Quality Equation

Variable	Relative defect rate		Defects/volume	
Constant	0.11	(0.29)	0.42	(1.13)
Industry dummies:				
Food, beverages and tobacco	0.30	(1.40)	0.44	(2.15)
Textiles	-0.22	(-0.71)	-0.37	(-1.16)
Clothing and footwear	0.32	(1.31)	0.23	(1.00)
Wood products	0.67	(2.84)	0.18	(0.80)
Paper products	0.02	(0.11)	-0.09	(-0.42)
Chemical and petroleum products	-0.41	(-1.54)	0.34	(1.32)
Non-metallic mineral products	-0.31	(-1.02)	-0.56	(-1.69)
Basic metal products	-0.49	(-1.46)	-0.09	(-0.32)
Fabricated metal products	-0.18	(-0.91)	0.47	(2.38)
Transport equipment	0.14	(0.52)	0.52	(1.92)
Other machinery and equipment	-0.17	(-0.76)	0.57	(2.67)
Foreign ownership	0.42	(2.81)	0.27	(1.85)
Parent restrictions	-0.19	(-1.26)	-0.98	(-6.50)
R&D/sales	-0.002	(-0.07)	-0.14	(-3.97)
Size	-0.27	(-3.67)	-0.26	(-3.78)
Export	0.06	(0.49)	0.12	(1.04)
Adopted any advanced technology	—	—	-0.23	(-1.79)
Customer focus in design	-0.22	(-1.35)	-0.52	(-3.31)
Measure quality	0.20	(2.18)	0.09	(1.04)
Standardised procedures	0.15	(2.55)	0.09	(1.58)
Pay-for-performance scheme	0.002	(1.36)	-0.0008	(-0.68)
Number of trade unions	-0.07	(-1.56)	-0.03	(-0.80)
Number of quality inspectors	-1.70	(-1.86)	0.73	(0.85)
Frequent review of cost of quality	-0.08	(-1.70)	-0.07	(-1.47)
Frequent review of customer satisfaction	0.05	(1.00)	0.13	(3.06)
Likelihood ratio	76.64		167.72	
Per cent correctly predicted	64.86		69.91	

Note: t-statistics are in parentheses.

extent to which it has standardised procedures for controlling quality, and the frequency with which it reviews customer satisfaction.

The negative and significant coefficients on the number of quality inspectors and on frequency of review of the cost of product quality, and equally negative but not significant coefficients for R&D intensity and customer focus in design, suggest that these measures may have been introduced in response to problems with quality in the first place. The coefficient on exporting is also positive but not significant.

Second, *the firms most oriented to international markets seem to be among the leaders in industrial relations reform.*

In a probit model explaining exports (discussed in greater detail below), there is a positive association between export involvement and having an enterprise agreement. Moreover, exporters are much more likely to rate their enterprise agreement as effective, as well as to respond that unions have a positive role in their plants – possibly reflecting greater willingness by unions to cooperate in the face of tighter product market constraints. Nonetheless, exporters are more likely to regard the current industrial relations system as a constraint on their performance.

A similar pattern holds for foreign-owned firms, which, like exporters, are more likely to have an enterprise agreement, more likely to regard it as effective, and more likely to view unions as having a positive role in their plants. Foreign-owned firms appear slightly more likely to introduce gain-sharing, productivity-related pay and piece rates. This may be related to the fact that these firms use different technologies from their Australian-owned counterparts, and notably seem to make greater use of advanced manufacturing techniques.

Third, *there is some, albeit mixed, evidence linking protection to excess product variety, though less so to foregone economies of scale*.

Firms were asked whether they thought they produced too many product varieties or perceived their size to be a barrier in competition. As far as product variety is concerned, the sectoral pattern is complex but suggestive. Transport Equipment, despite its high levels of protection, has the lowest rate of respondents considering excess product variety to be a problem. This may well reflect the incentives which have been provided under the Passenger Motor Vehicle Plan to reduce the number of models each firm produces in Australia. Partly as a result of these incentives, the number of Australian-made models has fallen from 13 in 1985 to 6 today. Once the Transport Equipment industry is removed, the relationship between the level of the effective rate of assistance and the frequency with which firms in an industry report excess variety as a problem, becomes significantly positive.

An equally complex pattern emerges in respect of economies of scale. Fewer than 30 per cent of firms regard themselves as handicapped by the scale of their operations. Interestingly, the highest proportion of these is in chemicals, which has relatively low ERAs now but was highly protected until the late 1970s. Since that time, the industry has experienced relatively slow rates of domestic demand growth and sharp increases in import penetration, which may have limited the ability to exploit scale economies. There is also some clustering of positive responses in the highly protected clothing and footwear industries, possibly capturing firms’ perception that long-run survival will depend on their ability to offset a labour-cost disadvantage through greater scale economies. However, firms producing transport equipment and textiles do not consider themselves to be sub-scale.

Overall, in a probit model including size, foreign ownership, whether the parent company imposed barriers on the affiliate, an estimate of the Minimum Efficient Scale (MES) and whether firms are automated, an increase in the ERA increases the likelihood of scale being viewed as a barrier but the coefficient is not significant.[23]

In considering these results, it is worth noting the uncertainties which surround the extent and significance of scale economies.

Recent studies find, for example, that even in industries in which scale economies seem substantial, there is considerable entry by firms operating far below MES (Acs and Audretsch 1988, 1989). Though Schumpeterian selection may ensure that some of these firms disappear while others eventually expand to MES, it also seems to be the case that a not insignificant proportion survive while remaining below the MES threshold. This suggests that scale penalties are either smaller than the conventional MES estimates suggest and/or can be offset by other factors such as superior product quality, higher market flexibility and better customer service.

Moreover, technical change may be reducing MES in many industries. Though the evidence is largely anecdotal, the hypothesis gets some support from overseas trends in the size distribution of firms. A similar pattern emerges for Australia, as can be seen from the evidence on the changing size distribution of Australian plants presented in Figure 10. In every industry, the average number of employees per firm has fallen over the past 15 years, in many cases substantially. Furthermore, the distribution of employment per firm has become more positively skewed as the number of small firms has increased. This may reflect rapidly rising labour productivity in the larger firms (which could imply an increase in the MES); but it seems difficult to believe that there would be so uniform a trend away from employment in larger plants if substantial parts of Australian manufacturing were seriously sub-scale. The 'conventional wisdom' that Australian manufacturing plants are too small may consequently need to be re-examined.

4.3.5 Competition, productivity, export performance and specialisation

All of this highlights the many and diverse respects through which international involvement alters corporate conduct; the key issue then is how this translates into differences in performance. Six results of the analysis are worth emphasising here.

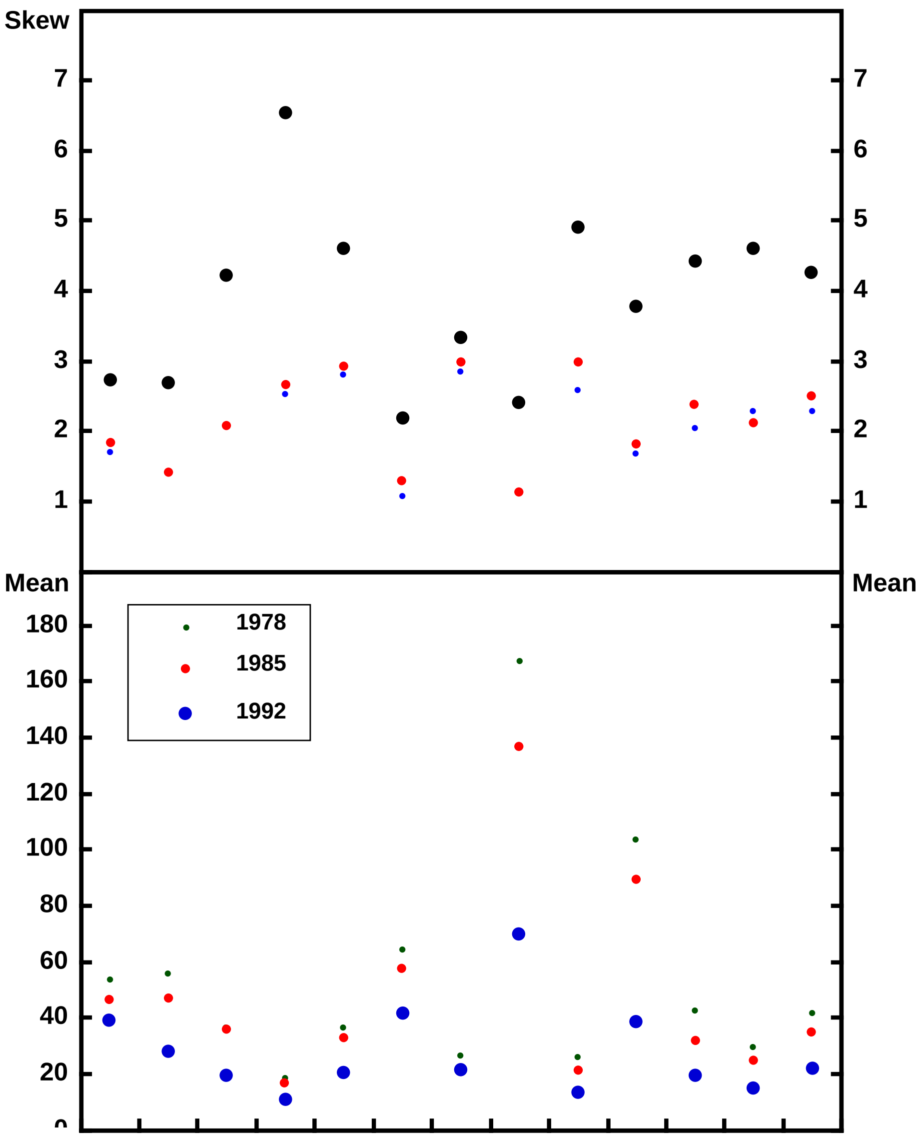
First, *there appears to be a rising dispersion in performance within industries.*

This rising dispersion is most evident in the information available on labour productivity (data on capital stocks are not available for individual firms). In particular, we have used data on employment and output to compute average productivity levels for each size-class of firms, as a basis for calculating the coefficient of variation of within-industry productivity.[24] The results show that for almost all of the 12 2-digit industries the

23. We have relatively little faith in the MES estimates which were adapted from Mueller and Owen (1985), often augmented by arbitrary assumptions. However, the same results hold even if this variable is excluded from the analysis.

24. The approach echoes that of Baily (1992).

Figure 10: Employment per Plant



coefficient of variation increased over the period 1978-1992. This result also emerges from a regression of the survey data on productivity *levels* (together with other variables) against the survey responses on productivity *growth rates*, yielding a significant positive coefficient. It can be supposed that this reflects the differing capacity of firms to make the transition to a more open environment; but as the disparities open up, they may well be accentuated by the more frequent shocks, notably resulting from supply-side innovations,[25] which can be expected to characterise a competitive, internationally exposed economy.

Second, *dispersion appears to be greatest in industries which are highly concentrated and which are either now highly protected, or were so until recently.*

It is reasonable to expect dispersion to be greatest in industries which are sheltered from domestic and international competition – that is, industries where high entry barriers ensure that the inefficiencies encouraged by trade protection are not rapidly undermined by competing domestic entry. This presumption is strengthened by the likelihood that adjustment to reductions in assistance will be a long and drawn-out process in industries in which sunk costs are high (since these make exit costly). The analysis bears this presumption out, since the intra-industry dispersion in relative unit costs is strongly positively related to the product of the HHI and the ERA (the correlation coefficient between these being 0.34).[26]

Third, *the factors which most sharply differentiate firms within industries in terms of their relative unit costs are intangible investment, specialisation and industrial relations.*

This is suggested by the probit regression model for relative unit costs presented in Table 8. Since a higher number implies lower costs than those of rivals, positive (negative) coefficients refer to variables which increase (reduce) competitiveness. Investment in knowledge (as measured by the ratio of R&D to sales) and in people (as measured by training expense relative to payroll) are more significant determinants of competitiveness than are investments in automation, or the use of advanced technologies (which has a *negative*, albeit insignificant, coefficient). While the evidence is relatively weak, it is consistent with the argument that intangible assets – such as skills and know-how – are idiosyncratic and difficult to imitate, and hence provide a greater differentiating factor than do other forms of investment.

The worst performers seem to be firms which feel they are too small, produce too many products, and do not have the capital to expand. An inability to use capital effectively, which is likely to be related to inadequate specialisation and/or industrial relations constraints, is also a highly significant drag on cost competitiveness. The results also suggest that firms without unions tend to have significantly and substantially lower costs. For firms which do have unions, having a ‘good’ enterprise agreement partly

25. The overall level of industry demand, on the other hand, might be more stable, if cyclical positions internationally are not fully synchronised. Even so, given the impact of market widening on demand elasticities, the demand facing individual firms would probably become less predictable, all the more so once firms had lost the cushion of ‘made to measure’ protection.

26. In a stochastic frontier production function study of technical efficiency in Australian manufacturing, Harris (1992) finds that tariffs increase the intra-industry dispersion in efficiency. This finding is confirmed for some other countries in Caves (1992a, 1992b).

Table 8: Relative Unit Costs Equation

Variable	Industry dummies		Industry averages	
Constant	-1.91	(-3.70)	-2.64	(-3.02)
Industry dummies:				
Food, beverages and tobacco	0.29	(0.99)	—	—
Textiles	0.80	(2.32)	—	—
Clothing and footwear	0.42	(1.34)	—	—
Wood products	0.85	(3.11)	—	—
Paper products	0.68	(2.23)	—	—
Chemical and petroleum products	0.43	(1.33)	—	—
Non-metallic mineral products	0.56	(1.55)	—	—
Basic metal products	0.16	(0.42)	—	—
Fabricated metal products	0.47	(1.88)	—	—
Transport equipment	0.50	(1.51)	—	—
Other machinery and equipment	0.32	(1.17)	—	—
Good enterprise agreement	0.18	(1.07)	0.18	(1.14)
Pay-for-performance	-0.003	(-1.92)	-0.003	(-2.09)
Advanced technology	-0.07	(-0.37)	-0.03	(-0.16)
R&D/sales	0.08	(1.75)	0.06	(1.55)
Size	0.02	(0.20)	-0.005	(-0.06)
Constraints on finance for capital	-0.48	(-3.52)	-0.50	(-3.73)
Too diversified	-0.23	(-1.75)	-0.25	(-1.93)
Too small	-0.37	(-2.46)	-0.43	(-2.99)
Utilise capital effectively	0.41	(2.94)	0.43	(3.24)
Training expense	0.05	(1.34)	0.05	(1.28)
Automation	0.07	(0.96)	0.07	(1.03)
Work team	0.15	(2.31)	0.16	(2.51)
Does *not* benchmark	-0.03	(-0.24)	-0.05	(-0.38)
Government as customer	-0.19	(-1.34)	-0.15	(-1.11)
No trade union	0.62	(3.83)	0.57	(3.75)
Industry average relative unit cost	—	—	0.46	(1.60)
Likelihood ratio	92.64		79.41	
Per cent correctly predicted	73.63		73.15	

Note: t-statistics are in parentheses.

offsets the cost penalty. Using work teams tends to reduce costs while pay-for-performance tends to increase them (though the causality here may well run from having higher costs to adopting pay-for-performance).

There is some evidence of intra-industry spillover, perhaps through demonstration effects. This can be seen by replacing the industry dummies by the industry average response to the question on relative unit costs, as is done in the second column of the table. The other coefficients remain stable while the industry average term is positive and significant at just over the 10 per cent level on a 2-sided test.

Fourth, *one aspect of the disparities in the firm performance is the presence of a large tail of firms – accounting for just under 30 per cent of firms and 20 per cent of employment – which carries out little or no R&D, undertakes no benchmarking and does not export.*

These firms are most likely to be selling intermediate inputs, generally in regional markets. Typically they also have poorer cash flow than other firms and lower (self-assessed) rates of growth of productivity.

Fifth, *export competitiveness at the level of the firm appears to be strongly influenced by relative unit costs, but is also affected by size, ownership, benchmarking, technological capability and emphasis on quality. As has been argued above, many of these variables ultimately seem to hinge on the firm's exposure to, and willingness and ability to learn from, world-best practice.*

Table 9 reports a probit model on export orientation, defined as whether a firm lists a foreign market as among its top two priorities. All the variables have the expected sign, and the model correctly predicts, within sample, over 72 per cent of the observations.

Even correcting for other factors, large firms are more likely to be exporters than are small firms. This confirms the results of the cross-tabulation analysis, which showed that 46 per cent of the firms with more than 100 employees were export oriented, as compared to under 25 per cent of those in the smallest size class (50 employees or less). Foreign ownership also remains a significant factor increasing export orientation. However, the effect can be offset, at least partly, by parent company restrictions; respondents stating that they were subject to such restrictions having significantly lower export propensities. As noted above, 37 per cent of the foreign firms reported being subject to parent company restrictions – those doing so comprising 47 per cent of the US-owned firms, 33 per cent of the UK-owned firms but only 18 per cent of the much smaller number of Japanese-owned firms. These differences may be related to differences in access to parent-company technology, but it has not yet been possible to test this hypothesis.

Technological capability, as measured by the ratio of R&D to sales and by possession of an advanced technology, has an effect on the propensity to export, above and beyond its effect on relative unit costs. In addition to product differentiation this may also be because firms which invest heavily in technical know-how are more likely to be aware of broader market trends.

Quality also appears to play a significant role in export orientation. Here too the commitment to monitoring performance – proxied in this context by whether the firm systematically measures the quality of its products – seems particularly important. Firms which benchmark are also more likely to be export oriented, as are firms which are heavily involved with, and rely on, foreign suppliers.

Table 9: Export Equation

Variable	Probit estimate	
Constant	-3.34	(-5.39)
Industry dummies:		
Food, beverages and tobacco	0.30	(1.33)
Textiles	0.69	(2.26)
Clothing and footwear	0.44	(1.67)
Wood products	0.17	(0.69)
Paper products	-0.59	(-2.24)
Chemical and petroleum products	0.27	(0.99)
Non-metallic mineral products	-0.64	(-1.86)
Basic metal products	0.07	(0.23)
Fabricated metal products	0.35	(1.63)
Transport equipment	0.27	(0.92)
Other machinery and equipment	0.17	(0.75)
Foreign ownership	0.44	(2.90)
Parent restrictions	-0.28	(-1.85)
R&D/sales	0.17	(4.89)
Size	0.15	(2.15)
Training expenditures/payroll	0.12	(0.90)
Customer relation is top priority	0.05	(1.16)
Customer complaint resolving process	0.02	(0.32)
Quality is top priority	0.07	(1.15)
Suppliers located overseas	0.30	(1.94)
Measures quality of output	0.26	(3.24)
Far away from quality certification	-0.02	(-0.39)
Possesses an advanced technology	0.47	(3.04)
Does *not* benchmark	-0.27	(-2.40)
Has an enterprise agreement	0.19	(1.55)
Defect/volume rate	-0.10	(-1.13)
Relative unit costs	0.21	(3.46)
Likelihood ratio	193.23	
Per cent correctly predicted	72.46	

Note: t-statistics are in parentheses.

Finally, it is worth noting that when the other factors affecting export orientation are taken into account, the Transport Equipment industry does not appear to be especially export oriented – despite the large-scale export assistance which this industry receives.[27] The dummy on Transport Equipment, though positive, is not higher than those for a range of industries which are much less heavily assisted.

Sixth and last, *the processes discussed above appear to have been paralleled by a move to greater specialisation within industries, presumably reflecting the sorting out of 'good' from 'bad' firms, and the elimination of excess product variety.*

The AMC survey itself does not provide information on changing patterns of intra-industry specialisation. Nonetheless, an indicator of the trends in this respect can be obtained by examining trends in intra-industry trade, since they can be expected to capture the survival, and perhaps expansion, of those products within each industry in which Australian firms are competitive, and the contraction, and perhaps disappearance, of those in which they are not.

Two approaches have been used to examine trends in intra-industry trade. The first relies on the separation of imports into 'competing' and 'non-competing' classes (the former referring to imports which are similar to goods produced domestically, and the latter, to those which are not).[28] Madge, Bennett and Robertson (1989) present data on the ratio of 'competitive' to total imports from 1973 to 1987. These results confirm the intra-industry specialisation hypothesis – the ratio fell in 28 out of 41 3-digit industries examined. However, in a small number of cases, the largest falls in the ratio were experienced in the late 1970s with some beginning to rise towards 1987. The absence of more recent data inhibits identification of whether this is a change in the trend of the series.

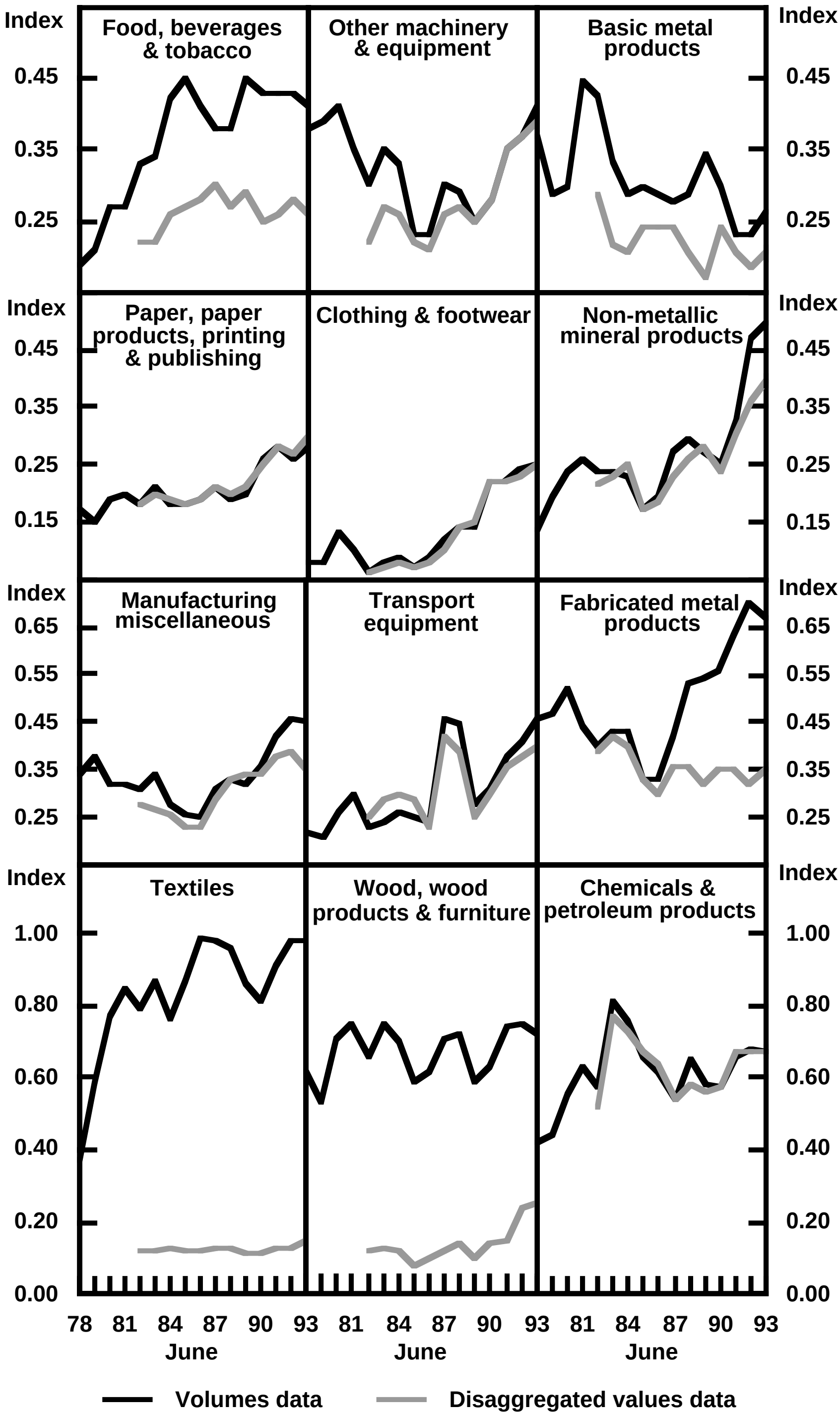
The second approach relies on trade data reclassified into industry categories to calculate Grubel-Lloyd indices of intra-industry trade.[29] The results are set out in Figure 11, first calculated on the basis of volume data at the 2-digit level beginning in 1978, and then using data expressed in current values at the 4-digit level for the period from 1981/82 (highly disaggregated data not being available prior to that date on an industry basis). While it is clearly preferable to work with volumes, the value data are subject to less aggregation bias. Indeed, aggregation can produce very large differences in the level of the series, in particular for textiles and wood products. However, aggregation has less of an effect on changes in the indices. Both series provide strong support for the hypothesis of increased intra-industry specialisation, with the Grubel-Lloyd indices rising for almost all industry groups.

27. According to the Industry Commission (1993), outlays on the Passenger Motor Vehicle Export Facilitation Scheme were likely to amount to some $180 million in 1993-94, absorbing just over 20 per cent of outlays on specific export facilitation and assistance programs and 14 per cent of outlays on all export-related programs.

28. Such a distinction is used in the ABS input-output tables, and by Industries Assistance Commission (1985) and Madge, Bennett and Robertson (1989).

29. The Grubel-Lloyd index is defined as: $I = 1 - [|X - M|]/[X + M]$.

Figure 11: Grubel-Lloyd Indices of Intra-Industry Trade



4.3.6 Concluding remarks

Taken as a whole, these results point to far-reaching change. Change, however, is not an objective in its own right; rather, it is valued because it contributes to improved productivity, and thereby creates scope for sustainable increases in living standards. It is, after all, an essential part of the case for trade liberalisation that, in the words of the seminal paper by Samuelson, 'although it cannot be shown that every individual is made better off by the introduction of trade, it can be shown that through trade every individual could be better off, or in the limiting case, no worse off' (Samuelson 1939, pp. 204).[30]

The evidence reviewed above cannot prove that the changes which have occurred pass the compensation test of welfare economics. Considerable adjustment is indeed underway, and its main features seem consistent with the broad goals of reform, but at least three observations need to be made.

First, there are obvious methodological limits to the analysis. As has already been noted, the cross-sectional relationships examined through the AMC survey are inherently complex, and further exploration of their causal structure is needed before it can safely be concluded that altering the trade exposure variables would produce the desired changes in performance.

Second, even with the rather large datasets available, there are many things which remain unexplained. It is a familiar finding of empirical research at a micro level that the factors which distinguish more from less successful organisations cannot be pinned down completely, regardless of how many control variables are factored into the analysis.[31] For example, 30 years of research on the factors determining school performance has tended to converge on the conclusion that the key element is leadership – a conclusion which, though it would hardly have been unpalatable to economists as diverse as Marshall, Pareto and Schumpeter, provides little comfort to would-be social engineers.

Third, the findings provide only limited support for those versions of the analytical arguments, summarised at the start of this section, which emphasise the role of intensified competition in generating increases in productive efficiency.[32] Competitive conditions, though, do play a significant role in determining product quality and in

30. It is worth noting that even in general equilibrium this result does not hold when competition is imperfect (Ventura and Cordella 1992).

31. There may be a '40 per cent' rule in this respect. Cross-sectional studies in areas as diverse as the explanation of wage structures, of educational outcomes and of the probability of bankruptcy typically explain no more than 40 per cent of the variance in the dependent variable. In other words, 60 per cent of the variance is within cell, almost regardless of the number of cells. The results presented here are usually well above and rarely below this benchmark.

32. These findings echo those of Nickell (1993).33. It is, however, worth noting that rather similar studies for Japan, Taiwan and Korea, but which relied on questionnaires in which firms were asked to rank the intensity of competition they faced, did find a relation between the effort firms made in searching out external sources of information and the intensity of competition. See respectively Yoshitaka Okada, Interactive Learning and Techno-Governance Structures (manuscript) April 1994; Gee San, Study on Policy and International Priorities for Technology Development: The Case of Taiwan (manuscript) April 1994; Kee Young Kim, Policies and Institutions for Industrial and Technological Development: A Korea Study (manuscript) June 1994.

reducing intra-industry dispersion in performance. However, by far the strongest relationships found in this paper link superior performance to export orientation – not to competition *per se*. Several factors may be at work.

- This relationship may partly reflect the lack of an accurate indicator of the market conditions facing individual firms and, in particular, of the intensity of competition. Though this explanation is attractive, the range of indicators tried suggests that it is not very powerful.[33]
- To the extent that competition affects all firms in an industry, but exporting only affects those which have superior features and are best placed to adjust, we would expect the link to other dimensions of performance to be stronger for the latter, than for the former. However, this explanation, though attractive, may have less power than it seems. After all, especially when set against such a large sample, it would merely point to a weaker relationship between competition and performance than that found between export orientation and performance – not to an absence of a relationship altogether.[34]
- More plausibly, export orientation involves a substantial amount of self-selection: it is presumably the 'better' firms which accept the challenge of entering markets overseas. The fact that the links to performance seem to depend on whether or not the firm is export oriented, rather than on the amount of its exports, supports this view of export orientation as a shift variable signalling better managerial quality.[35] At the same time, of course, exporting very probably exposes the firm to new learning opportunities, which then serve to make the better firms even stronger.
- Finally, it may well be that export orientation pays particularly large dividends in terms of performance and notably in terms of learning.[36] This has often been suggested in the context of the dynamic Asian economies, and may plausibly also have been at work in the productivity surge in post-war Europe.[37] Much as it is sometimes claimed that successful industrialisation in a number of East Asian countries combined protection of the domestic market, with strong inducements to

33. It is, however, worth noting that rather similar studies for Japan, Taiwan and Korea, relied on questionnaires in which firms were asked to rank the intensity of competition they faced, did find a relation between the effort firms made in searching out external sources of information and the intensity of competition. See respectively Yoshitaka Okada, Interactive Learning and Techno-Governance Structures (manuscript) April 1994; Gee San, Study on Policy and International Priorities for Technology Development: The Case of Taiwan (manuscript) April 1994; Kee Young Kim, Policies and Institutions for Industrial and Technological Development: A Korea Study (manuscript) June 1994.
34. For example, we find no link between competition and productivity growth, automation, most dimensions of time spent reviewing business performance, or likelihood of export-orientation.
35. This is consistent with recent work on R&D which finds greater differences between those firms which carry out R&D, and those which do not, than between those which carry out some R&D, and some which carry out a great deal. It can be hypothesised that much like exporting, the R&D variable is picking up a greater interest and ability to learn about the outside world, and hence to adjust promptly to change.
36. The general argument that export orientation is closely associated with productivity growth and some supporting evidence is set out in Balassa (1988). Important micro-level analyses are Dahlman, Ross-Larson and Westphal (1987) and Pack (1988).
37. On East Asia, see World Bank (1993) and on Europe, see Mueller and Owen (1985) and the results (which in several respects parallel those reported here) in Zimmerman (1987).

export, this effect may be quite independent of competition in the domestic market. Rather, the argument runs that the (at least partly) sheltered conditions in the domestic market provided firms with the resources required to compete vigorously overseas. The productivity benefits of the latter, outweighing the costs of the former, the outcomes were supportive of rapid economic expansion.[38]

5. Policy Implications

In market economies, firms are the primary focus of activity. Yet firms differ greatly, and in ways which are often difficult to explain. A great deal of recent work in economics emphasises this heterogeneity *within* industries, and tries to analyse its causes and consequences.

The work reported on here also emphasises these differences, which then play a major role in understanding the response to the increasing international integration of the Australian economy.

Seen from a societal point of view, many of these differences in firm behaviour are inevitable and some are positively desirable – since it is impossible to know in advance which response to change will ultimately prove most successful. Nonetheless, the persistence of a large tail of firms which seems to operate far from best practice, makes little effort to monitor efficiency and has little involvement in the international economy, could be a cause for concern.

It is interesting in this respect to compare the replies to the AMC survey with those of a recent, and as yet unpublished, survey of manufacturing firms carried out by the World Bank. In particular, in the World Bank replies for Japan, Korea and Taiwan, the gap in performance between the firms which considered themselves as technology leaders and others is considerably smaller than it appears to be in Australia.

In part, this may simply reflect different points on the adjustment path – and so be viewed as a problem which will prove largely self-correcting. But it may also be amenable to policy action aimed at accelerating the rate at which large gaps between best and average practice are narrowed.[39] Three options, which might be seen as mutually reinforcing, may be identified in this respect.[40]

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38. See, for example, Wade (1992) (on Taiwan), Amsden (1989) (on Korea), and Samuels (1994) (on Japan). The views expressed by these authors are controversial. See also essays in Krause and Kihwan (1991).

39. Clearly, this gap may well be larger in a highly-dynamic economy than in one in which change is proceeding slowly. Nonetheless, there is no evidence to suggest that the larger gap observed in Australia arises from greater dynamism. Indeed, going by conventional indicators such as the FMS indicator in the ISDB, the rate of structural change in the Japanese and Taiwanese economies considerably exceeds that in Australia.

40. The government's 'industry plans' each contain some mix of these measures, though they generally place less weight on strengthening market disciplines. The automotive industry plan, for example, appears to have resulted in substantial improvements in some indicators – for example, physical productivity, product quality and export orientation; but it also appears to have been associated with a fairly sharp rise in motor vehicle prices (Automotive Industry Authority 1993). It is arguable whether the 'industry plan' model could, or should be, used more broadly. It seems vulnerable to collusion and the problems which need to be tackled span so broad a range of industries that a more horizontal and industry-neutral approach seems preferable.

A first is to 'toughen' the selection environment in which firms work. The evidence reviewed above does provide some support for this option, since there is a relationship between the intensity of competition and the extent of inter-industry dispersion in firm performance (although not the *level* of that performance). Going by the AMC survey, many of the 'lagging' Australian firms survive in regional markets, where competitive disciplines are most likely to be weak. While competition cannot be said to be a panacea, further progress in removing the impediments to trade between the States should induce greater and more rapid change among this part of the corporate population – including exit by those firms whose long-run prospects are poorest.[41]

A second option is to seek to strengthen the capabilities of lagging firms to catch-up. Access to technical competence is a case in point. A very high fraction of Japanese, Korean and Taiwanese firms surveyed by the World Bank make significant use of industrial extension services and of practically-oriented technical institutions (such as the Prefectural Laboratories in Japan or ITRI and CPC in Taiwan). These too are surely no panacea, but there may well be lessons here for making more effective use of the resources currently devoted to National Industry Extension Service and to the CSIRO.

Finally, a third option involves better identifying and easing the obstacles firms face to greater involvement with international markets. A specific question in this respect is asked in the AMC survey: and a major obstacle identified related to exchange rate uncertainty – with export-oriented firms seeing this as a greater problem than did their domestically-oriented counterparts. It is perhaps too easy to dismiss these views as reflecting a lack of understanding of the relevant options – after all, there is no reason to view firms as more ignorant in this respect than they are in others. The challenge then is to take these perceptions seriously, while recognising that for this problem, as for the others dealt with in this paper, there are simply no magic answers.

41. Given that many of the worst performers report poor cash flow, greater competition is likely to substantially reduce their survival chances.

Appendix A: Trade Equation: Concepts, Sources and Methods

The equation was estimated using data for 1975, 1980, 1985 and 1990 by SUR. Inspection of the data suggested that different country groups had different intercepts, and that the relation between protection and trade intensity also differed across country groups. As a result, shift and slope dummies were included to allow for these different relationships. The differing relationship between protection and trade intensity may reflect the inadequacy of our measure of the former (based on tariff-receipts data) and regional differences in non-tariff barriers.

Across and within equation restrictions were tested. The restrictions that the coefficients on real GDP and real GDP per capita are equal across time could not be rejected and, as a result, were imposed.

A number of different specifications of the 'proximity' variable were tested as shown in Table A1. The specification used in the estimates presented in the text is given by:

$$PROX_j = \sum_k \left[\ln\left(\frac{GDP_k}{DIST_{jk}} \right) \right]^2$$

where distance is the airline distance between major cities. The variable measures the sum of world output discounted by distance – the square of the log of these figures is then taken to allow for non-linearities in the relationship.[42] Of the other measures, a number have been commonly used in the literature – for example Lawrence (1987) uses the log, and square of the log, of the fifth measure in the table. In addition, in order to allow for non-linearities in the relationship between distance and transport costs, the variables were entered in a number of different ways. It was consistently found that the specification of this variable had little impact on the results.

Proximity variables on a regional basis were also constructed but were of limited success in estimation.

Where available, data were collected for the 66 countries set out in Table A2. Singapore was removed for the estimation because it was considered an outlier and was thought to influence the results. Senegal, Tanzania, Zimbabwe, Bangladesh, Malaysia, Yugoslavia, Iran, Honduras and Jamaica were excluded due to incomplete data. The model was then estimated for 56 countries. In the estimation, logs were taken of trade intensity, real GDP and real GDP per capita.

The split into country groups is according to the IMF. IC denotes 'industrial countries', and 'developing' countries are split into: AF = Africa; AS = Asia; ME = Middle East; E = Europe; WH = Western Hemisphere.

Trade intensity is defined as $\frac{X+M}{GDP}$ (all in nominal values), and is the variable 'OPEN' in the Penn World Tables (5.5) (PWT).

Real GDP per capita in constant dollars (chain index) is the variable 'RGDPCH' in the PWT.

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42. See Balassa (1986) for a discussion of the relationship between distance and transport costs.

Real GDP is calculated by multiplying real GDP per capita by population which is the variable 'POP' in the PWT.

The distance data used to construct *PROX* were obtained from the Macintosh Map. The choice of major cities follows Frankel and Wei (1993). Where a country was not included in Frankel and Wei, the city with the largest population was used.

Table A1: Alternative Measures of Proximity

Formulae	How it entered the equation
$PROX_j = \sum_k \ln\left(\frac{GDP_k}{DIST_{jk}}\right)$	$PROX_j$
$PROX_j = \sum_k \frac{GDP_k}{DIST_{jk}}$	$\ln(PROX_j)$
$PROX_j = \sum_k \frac{\ln GDP_k}{DIST_{jk}}$	$\ln(PROX_j)$, $[\ln(PROX_j)]^2$
$PROX_j = \sum_k \left(\frac{GDP_k}{\sum_k GDP_k} DIST_{jk}\right)$	$\ln(PROX_j)$
$PROX_j = \frac{\sum_{k \neq j} GDP_k}{\sum_{k \neq j} \frac{GDP_k}{DIST_{jk}}}$	$\ln(PROX_j)$, $[\ln(PROX_j)]^2$, $[\ln(PROX_j)]^{\frac{1}{2}}$
$PROX_j = \frac{\sum_{k \neq j} \ln GDP_k}{\sum_{k \neq j} \frac{\ln GDP_k}{DIST_{jk}}}$	$PROX_j$, $\ln(PROX_j)$

The variable measuring the degree of protection is defined as the ratio of customs duty (in domestic currency) to manufacturing imports (in domestic currency).

Data on customs duty in domestic currency were taken from the IMF *Government Finance Statistics (*various issues). Breaks in the custom data series may affect the 1975 observation for Denmark, Italy and the United Kingdom. The 1990 observation was unavailable for Argentina, Barbados, Canada, Chile, Colombia, Guatemala, New Zealand and South Africa and was replaced, where available, with the 1989 observation. For Chile and New Zealand the 1988 observation was used. In some cases customs data had to be adjusted for changes in the currency of denomination.

Data on manufactured imports in domestic currency used in the construction of the protection variable were taken from the UN *Yearbook of International Trade Statistics,* Volume 1 (various years). Manufactured imports are defined as BEC categories 4,5 and 6.

Table A2: List of Countries and Major Cities

Group	Country	Major city	Group	Country	Major city
WH	Argentina	Buenos Aires	AF	Kenya	Nairobi
IC	Australia	Sydney	AS	Korea	Seoul
IC	Austria	Vienna	AS	Malaysia	Kuala Lumpur
AS	Bangladesh	Dacca	E	Malta	Birkirkara
WH	Barbados	Bridgetown	WH	Mexico	Mexico City
IC	Belgium	Brussels	AF	Morocco	Casablanca
WH	Bolivia	La Paz	IC	Netherlands	Amsterdam
WH	Brazil	Sao Paulo	IC	New Zealand	Wellington
AF	Cameroon	Douala	IC	Norway	Oslo
IC	Canada	Ottawa	AS	Pakistan	Karachi
WH	Chile	Santiago	WH	Panama	Panama
WH	Colombia	Bogota	WH	Paraguay	Asuncion
WH	Costa Rica	San Jose	WH	Peru	Lima
E	Cyprus	Nicosia	AS	Philippines	Manila
IC	Denmark	Copenhagen	IC	Portugal	Lisbon
WH	Dominican Republic	Santo Domingo	AF	Senegal	Dakar
WH	Ecuador	Quito	AS	Singapore	Singapore
WH	El Salvador	San Salvador	AF	South Africa	Pretoria
IC	Finland	Helsinki	IC	Spain	Madrid
IC	France	Paris	AS	Sri Lanka	Colombo
IC	Germany	Bonn	IC	Sweden	Stockholm
OC	Greece	Athens	IC	Switzerland	Geneva
WH	Guatemala	Guatemala	ME	Syrian Arab Republic	Damascus
WH	Honduras	Tegucigalpa	AF	Tanzania	Dar es Salaam
IC	Iceland	Reykjavik	AS	Thailand	Bangkok
AS	India	New Delhi	AF	Tunisia	Tunis
AS	Indonesia	Djakarta	E	Turkey	Ankara
ME	Iran	Tehran	IC	United Kingdom	London
IC	Ireland	Dublin	IC	United States	Chicago
ME	Israel	Jerusalem	WH	Uruguay	Montevideo
IC	Italy	Rome	WH	Venezuela	Caracas
WH	Jamaica	Kingston	IC	Yugoslavia	Belgrade
IC	Japan	Tokyo	AF	Zimbabwe	Harare

Manufactured imports, rather than total imports, were used in the construction of the protection variable, given the perception that quantitative barriers were more common on non-manufactures (excluding textiles and apparel). However, the correlation coefficient between this measure and one based on total imports is above 0.9 in all years.

The use of a customs-based measure for protection is less than ideal. Dornbusch (1993) identifies a number of problems with such a measure. First, as elasticities of demand and supply vary over goods, an aggregate customs measure gives a poor indication of the marginal protective effect of a tariff. Second, it ignores the effects of protection on intermediate inputs and, third, it ignores non-tariff barriers. Prohibitive tariffs will also be understated using such a measure. Of particular concern is the possibility that as, over time, quantitative barriers are replaced by tariffs, these measures will imply rising protection.

Appendix B: Measures of Export Orientation and Import Penetration

When examining the openness of goods markets, it is common to look at the extent to which imports account for the supply of goods to the domestic market (their share in apparent consumption), and similarly, the proportion of domestic sales that is exported (see Industries Assistance Commission (IAC) (1985) and Gruen (1985)).

There are a number of problems with this sort of analysis. The first concerns the treatment of own-industry intermediate input in the construction of the domestic sales measure. This problem has two parts. First, these measures typically double count own intermediate input (OII). This can lead to a substantial under estimation of the level of orientation and penetration measures in sectors where own intermediate input usage is high – for example, in textiles, wood products, paper products, non-petroleum based chemicals, and basic metal products, own-industry intermediate input makes up over one fifth of 'gross' output (in an input-output sense) or sales. Further it double counts imported own intermediate inputs. Second, because the measures include OII when it is traded between establishments in an industry, but not when it is traded within the establishment, the level of the series is sensitive to the definition of 'establishment' used.

As a result of the first problem, estimates of the share of own intermediate input in gross output have been calculated from the 1989/90 input-output tables and used to adjust the level of turnover/sales used to calculate the penetration/orientation measures. The resulting change is most significant in those industries listed above where own intermediate input is a large proportion of gross output.

The second problem with the conventional analysis revolves around whether sales or turnover data are used, the former being available from a quarterly survey of business, and the latter from the Census of Manufacturing. Although the measure of sales is probably closer to the desired concept, the fact that turnover is a result of the Census and is thus likely to be more accurate means that it is used below. These data were also preferred in the IAC/Gruen series and so make the series constructed here more comparable to the earlier work. It should be noted that because sales is a narrower concept that turnover, measures created using the former data would lead to higher measures of import penetration and export orientation. In years where the Census was not undertaken, sales data from the Manufacturers Stocks and Sales release has been used to interpolate. The deflators used to construct constant price sales data have also been used to deflate the nominal turnover data (this is the process adopted by the ABS in the construction of constant price product data).

One final problem worthy of note relates to the ABS definition of activity undertaken in a business. Importantly, production undertaken by a business on commission for another company using that other company's own inputs (intermediate only) is not counted as production by that firm. However, the commission earned is included in turnover. The ABS believes that this could be a problem in the clothing and petroleum refining sectors.[43] The problem can be corrected for the petroleum refining industry because the major refiners changed the way they operated between 1988/89 and 1990/91

43. The problem understates the level of sales and thus overstates the orientation/penetration measures.

and began reporting the value of goods produced under commission for their parents as gross output. As a result, the ABS believes that turnover figures from 1990/91 accurately reflect the value of production by the industry. Nominal turnover data are then extrapolated backwards using volume measures of production (taken from ABARE) inflated using the APMI for petroleum products (this is the method used by the ABS to construct constant price value added data for the sector). However, it is impossible to make similar adjustments for the clothing data and so the level, if not the growth in, the series for this industry must be interpreted with caution.

In summary, import penetration has been calculated by taking f.o.b. total imports as a ratio to an estimate of the size of domestic sales. The latter has been calculated as turnover by domestic firms, less exports f.o.b., plus imports f.o.b., less an adjustment for own intermediate input to remove double counting of both own intermediate input produced at home and that which has been imported. Export orientation has been calculated as the ratio of exports f.o.b. to turnover of domestic firms, adjusted similarly for own intermediate input. All of the above uses volumes data. The adjustment for OII has been taken from the 1989/90 national accounts (which is the base year for constant price estimates). This has been calculated as advocated in Chapter 19 of the Australian National Accounts: Concepts Sources and Methods on Input-Output Tables (paragraph 19.34).[44] Using a table which allocates competing imports indirectly, the diagonal of the 1st quadrant (that containing own-industry intermediate input) has been used to obtain an adjustment factor for gross turnover. As a consistency check, the resulting series were then compared with those derived by IAC/Gruen – not surprisingly, given the adjustment, the constructed series is above that of the IAC/Gruen in every case but that of petroleum where a different turnover series has been used. The petroleum refining volumes series was compared to a series derived from ABARE data and was found to be very similar.[45]

44. Note that this paragraph discusses how to construct a measure of 'net' domestic output, which involves subtracting the value of domestically sourced own intermediate input from gross output but leaving behind imported OII. For our purposes, to avoid double counting imported OII, this is removed as well.

45. ABARE use a different distinction between refined and crude petroleum than does the ASIC. The ABARE data are from the *Commodity Statistical Bulletin 1993*, Table 269.

Appendix C: Construction of Approximate Herfindahl Indices

The approximate Hirschman-Herfindahl indices (HHI) referred to in the text have been constructed using trade-adjusted concentration ratios by two methods described in Schmalensee (1977). The two methods ('MIN' and 'MINL' in Schmalensee's terminology) were ranked in the top 5 out of 12 plausible surrogates presented. The method MINL was the computationally least demanding of the top two surrogates and is the basis for the results presented in the text.[46]

The starting point for these measures is data on concentration ratios published by the ABS. The concentration ratio corresponding to the share in some measure of activity, A, of the firms in the k'th rank, is given by $C_k = \frac{A_k}{A}$ where A_k is some measure of activity for the firms in the k'th rank (in the analysis below, the measure is turnover or sales). In a closed economy context, the ratio in terms of sales would take total sales of the four largest firms as a proportion of the entire sales of the industry (note that the familiar double counting of own industry intermediate input arises – this is abstracted from below). When allowance is made for the open economy, the relevant measures become $C_k = \frac{S_k - X_k}{S - X + M}$ where X represents exports, M imports, S sales. Unfortunately, there is no data source on exports by size of firm constructed on the same basis as these figures, and so it is usual to assume that exports of the firms in the k'th rank are in proportion to their share of total sales, or $X_k = \frac{S_k}{S} \cdot X$ (Clark 1985). The 'trade-adjusted' (superscript '*ta*') concentration ratio for the k'th rank can then be written as $C_k^{ta} = \frac{S_k}{S + M.S/(S-X)}$. Obviously, if larger firms are more likely to export, measures constructed on this basis will overstate concentration in the industry. Another problem with the figures is that it makes no distinction between total imports and those that are 'competing'. In a number of industries it is believed that domestic manufacturers are substantial importers of products and so not attributing these to the firms themselves will understate their market power (offsetting the bias in the export figures).

It is possible to then approximate the HHI using the trade-adjusted concentration ratios. The simplest method, Schmalensee's *MIN*, is to take the average share for each class size (the Australian data presents information on the market shares five ranks, each of four firms, plus a remainder) given by C_k^{ta}/N_k where N_k is the number of firms in the k'th rank, and then to construct the approximate HHI as $MIN = \sum_{k=1}^{K} N_k \cdot \left(C_k^{ta}/N_k\right)^2$ where K is the total number of ranks.

It is important to note that the figure MIN represents the minimum value the HHI could take, given the concentration ratio data, because firms within ranks are assumed to have

46. Madge, Bennett and Robertson (1989) present results using Australian data for the MIN surrogate.

exactly equal market shares. Importantly, if the degree of equality in market share within ranks varies over time, then the magnitude by which MIN understates the true HHI will also vary. The other measures presented in Schmalensee (1977) involve making various assumptions about how market share varies within ranks. Given that the largest firms have the largest weights within the index, the methods which vary the share of the top ranks of firms have the most effect. The method Schmalensee denoted MINL makes the assumption that all firms in ranks, other than the top rank, have shares equal to the average for that rank, however, the shares within the top rank varied linearly with the smallest having the same share as the average for the second rank. This proxy is calculated as $MINL = MIN + \left(\frac{C_1^{ta}}{N_1} - \frac{C_2^{ta}}{N_2} \right)^2 \cdot \frac{(N_1)^2 - 1}{12 N_1}$ which shows that it always greater than the proxy MIN, and that the difference between the two measures depends on the squared difference between the average shares of the top two ranks.

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Discussion

1. Catherine Mann

Ergas and Wright investigate the extent to which the internationalisation of the Australian economy has been reflected in resource reallocations, changes in firm behaviour, and improved aggregate productivity. They assess the strength of the evidence both for the ultimate question – has the opening up of the economy yielded the increase in productivity growth that is the foundation for a permanently increased rate of income growth – as well as for whether changes in firm conduct are the key channel of transmission of the forces of internationalisation.

To summarise their most basic conclusions:

- The opening-up of Australia has yielded greater specialisation by firms (in terms of both their output and trade) as well as by labour in its employment.
- Opening-up appears to affect firm performance more through 'outward orientation' than through changes in domestic market competition caused by opening-up.
- As yet, there is little evidence for an improvement in labour productivity, either within industry sectors or for the aggregate economy. The authors attribute this to the still on-going process of adjustment, as well as to the fact that many firms remain insulated from international competition.

Although I will comment on various sections of the paper, the most important comment is that I come away from this paper with a puzzle: how much does internationalisation affect domestic competition, and how important is this, as opposed to other consequences of opening-up, for the gains from trade? What do the data indicate about the validity of alternative theories of how internationalisation affects economic performance?

First, there is some question as to the sign of the effect. Two theories of international trade – Heckscher-Ohlin-Samuelson (HOS) and intra-industry (IIT) trade – would yield opposite signs. Opening-up in the HOS model could yield increased specialisation and concentration as the economy moves resources toward industries with international comparative advantage. In the IIT model, opening-up would decrease industry concentration as new varieties of goods produced by new firms become increasingly important with trade. Although the authors and the data are mixed on these points, it would seem that the increased openness of Australia should lead to greater intra-industry trade, which should increase domestic competition and reduce measures of industry concentration.

Second, what is the key channel of transmission of the forces of internationalisation to economic performance? On the one hand, the data suggest that increases in aggregate labour productivity appear to come relatively more from resource reallocation within industry sectors rather than resource reallocation across industry sectors. This supports the notion that the relatively more important effect of openness on the efficient use of resources is to increase competition between firms within an industry. But this observation contrasts with the conclusion from HOS trade theory that it is resource reallocation across industry groups (from those with a comparative disadvantage to those with a comparative advantage) that is the principal source of the gains from opening-up.

As a third possibility, the survey indicates that it is not domestic competition, but outward orientation that yields the greatest improvements in firm performance. Why should the external market be more demanding of firms than the internal market? Does this suggest that domestic firms find it more difficult to enter a new domestic market than a new international market?

This paper makes an important contribution to our understanding of how internationalisation affects firm performance and productivity. However, there are several channels of transmission that the authors do not address. Specifically, they present no evidence on how internationalisation affects prices (although they do consider how opening-up affects costs), and from there on to affect firm performance and productivity. Thus, the relative importance of the various channels through which internationalisation affects performance and productivity remains unclear.

The first half of the paper tries to establish both where Australia is now and where it is likely to go as the process of internationalisation matures. First, the authors measure how much Australia has opened up using measures of trade intensity and FDI linkages. They also rank Australia against selected other OECD countries as comparators for what we might expect as internationalisation proceeds. Second, they analyse measures of inter and intra-sectoral resource reallocations using concentration, trade specialisation, and structural adjustment indices and consider to what extent we might have expected the observed results from the process of opening-up.

I have some reservations about the comparator countries as an indication of what we might expect of Australia in the future. It seems quite difficult to find a good comparator country for Australia. The individual European countries are not appropriate because of their different resource endowments, as well as the key issue of proximity. An alternative approach would be to use the European Union as a single unit in the ranking, and judge the openness of Australia relative to the US, Canada, Japan and the EU. As a rationale for this approach, recall that soon trade data will only be available for trade between the EU and the world, but not for intra-EU member trade.

A key observation is that Australia differs from the other countries not so much in the level of trade intensity but in how little trade intensity has changed over the decades, and also how it fell and then rose more recently after the reforms. Trade intensity has increased markedly and uniformly for the other countries shown. Any apparent delay in Australia's response to opening-up may be a result of having to catch-up with the other countries. An alternative modelling strategy might focus on changes in openness, instead of levels of openness.

Second, the underlying premiss on how some of the measures of resource reallocation should change with greater openness could be questioned. The authors suggest that greater openness and associated resource reallocation toward sectors with comparative advantage should lead to increased Herfindahl indexes of domestic competition. They show that these indices have increased a bit, but remain below levels of some European countries. Besides the issue of the comparator, noted above, another issue emerges. As the authors note, one outcome of internationalisation is increased intra-industry trade. (There is some evidence of increased IIT for Australia, although it is hard to see in the figure.) But, openness and increasing IIT may imply increasing numbers of firms that produce for specific market niches at home and abroad, which would probably reduce the Herfindahl indices. Moreover, an important issue for both the Herfindahl and IIT indices is the aggregation bias.

A very important observation is that increases in aggregate manufacturing labour productivity growth appear to have come mostly from changes in labour productivity within an industry group, rather than from shifting labour across industry groups. This is not what we would expect if the fundamental outcome of opening the Australian economy was to shift resources toward sectors with a comparative advantage and away from sectors with a comparative disadvantage. However, the data do make sense if Australia's resources already were concentrated in the sectors of comparative advantage, but with insufficient domestic and foreign competition to encourage efficient production. Based on this observation, it appears that the most important channel through which openness can affect economic performance is increased domestic and foreign competition within a sector. In this regard, it is unfortunate that the authors do not examine price data to see what it might imply for competition.

The second part of the paper utilises a new survey dataset that focuses on the role of international competition in affecting firm performance. The survey creates a very extensive dataset on manufacturing strategy, management methods, and firm performance, with an explicit focus on the international environment.

There are quite a few generalisations offered in this section based on the survey responses, and in some cases, based on regression analysis of these data. Some of the regressions investigate various hypotheses about how openness might affect firm performance, e.g. quality of product, relative unit costs, and exports. The presentation of the results might be enhanced if the survey analysis and regressions were more closely tied to a concrete and central hypothesis, say how internationalisation affects the 'structure, conduct, performance' paradigm used in industrial organisation studies. Moreover, the regressions seem somewhat disjointed, in that in any given regression, the authors appear to have chosen a subset of the available variables for inclusion without really explaining their variable choices. Since this part of the paper represents a first effort in assessing a new dataset, it is not surprising that the analysis is far-ranging and the data somewhat overwhelming.

One of the stronger conclusions is that firms with an outward orientation perform better. Unfortunately, the survey provides little information on the degree of domestic or import competition faced by the firms, although the authors do attempt to remedy this gap by constructing several measures of import competition. Thus, it is hard to judge whether it is international competition more generally that spurs improved performance, or an explicitly outward orientation.

While recognising the risks of suggesting that the authors add more to this section, an important question in many countries is how small and medium-sized enterprises perform, as compared with large firms. Since the survey provides several measures of size (sales, employees) an analysis of systematic differences across firm size would be possible.

2. General Discussion

The discussion was wide ranging, but was dominated by four issues:

- the usefulness of the survey for analysing questions regarding internationalisation;
- the links between trade orientation and firm behaviour;
- the impact of greater openness on the services and non-traded sectors; and
- the implications of exchange rate volatility.

The general tone of the discussion was that research using firm-level data was extremely valuable. Perhaps the most important gains from trade were not from a reallocation of resources between industries (as traditional theory suggests), but rather from an improvement in the use of resources within industries. If this is correct, then studies examining the links between international trade and firm behaviour were vitally important in establishing and quantifying the benefits of trade reform.

A number of issues were raised concerning the interpretation of the survey and its results. Some participants wondered whether the results could be generalised to industries other than manufacturing, and asked how the degree of competition in a market should be measured. Others wondered about the direction of causation – are firms that have relatively large research and development programs more likely to export, or do firms that export have a greater incentive to do research and development? Most thought that causation ran in both directions. One participant suggested that the conclusions about the links between exporting and firm behaviour would be stronger if time-series, rather than cross-section, data were used. Finally, one participant was quite hostile to the survey, and the use to which it had been put in the paper. It was argued that the survey and paper did not address the really important issues, namely the excessive capital-labour ratio and low capacity utilisation in Australian manufacturing.

In terms of the links between labour productivity and trade reform, a number of participants asked whether the 'stick' of increased imports, or the 'carrot' of increased exports, was more important in generating increases in productivity. Results of work, both in Australia and in Korea, were reported which suggested that those industries that were subject to the largest reductions in protection, experienced the largest increases in trade intensity and the largest gains in efficiency. One participant picked up the statement in the paper that 30 years of research on school performance highlighted the importance of leadership. It was suggested that the same is true for firm performance. By increasing the return to good leadership, and the penalty for poor leadership, trade liberalisation should lead to better management in manufacturing firms. It was felt that the results presented in the paper represented some weak evidence in support of this idea.

In discussing the wider implications of internationalisation on labour productivity, there was some discussion of the non-traded sector. The point was made that trade liberalisation changed the political environment to one that was more conducive to reform of the traditionally non-traded sectors of the economy. This happens in a number of ways. First, trade reform is predicated on the notion that competition is 'good'. Once this notion is accepted, it seems inappropriate to stop the idea being applied to other parts of the economy. Second, as international trade becomes more important, 'competitiveness' issues loom larger in the national mind-set. This helps focus attention on reform in industries producing intermediate inputs into the production of final goods. Third, once a free trade environment is adopted, policy makers can give more attention to policy reform in non-traded sectors of the economy. A number of participants argued that these ‘spillover’ pressures on the non-traded part of the economy represented a significant benefit of trade liberalisation.

On the issue of exchange rate volatility, there was some discussion of the statement in the conclusion of the paper that manufacturers found exchange rate variability to be a major obstacle to exporting. There was little doubt that despite a variety of hedging techniques, exporters and importers of manufacturers found exchange rate variability an impediment to trade. On the other hand, movements in the exchange rate help insulate the domestic economy from a variety of shocks, including terms of trade changes. If changes in the exchange rate did not occur, it is likely that the economy would experience larger swings in domestic output and inflation. It is far from clear that these movements would be less costly to exporters and importers than the swings in the exchange rate that they currently experience.

Internationalisation, Trade and Foreign Direct Investment

John Howe

1. Introduction

The process of internationalisation or 'globalisation' involves a thorough transformation of the Australian economy from being inward looking and protectionist, to being externally oriented in both trade and investment. The process has been helped along by the liberalisation of capital markets and the removal of barriers to trade, but other factors such as technological advances and innovations may have also motivated these changes.

Australia is not alone in pursuing policies consistent with increased international integration over the past decade. A feature of the world-wide process of globalisation is the increase in both trade and foreign direct investment (FDI) flows that have been observed in OECD countries. In fact, the widespread nature of globalisation suggests that it would have been very difficult for a country like Australia to stand against the tide. Moreover, successful resistance could have proven very costly.

Globalisation presents many opportunities for Australia. Taking advantage of these opportunities requires the effective exploitation of Australia's comparative advantages in skilled labour, resources and technology. Increasingly, this exploitation occurs not only through trade, but through foreign direct investment.

Investment overseas by Australian firms allows them to exploit their comparative advantage in technology, and the provision of services, on a global scale. In doing so, it also exposes firms to new technologies, new management and new ways of doing things. Similarly, FDI in Australia exposes Australian firms, particularly in the service industries, to greater competition and should provide valuable demonstration effects. Traditionally, FDI flows have been between Australia and the OECD. In the future, however, FDI patterns are likely to follow the change in trade patterns towards Asia.

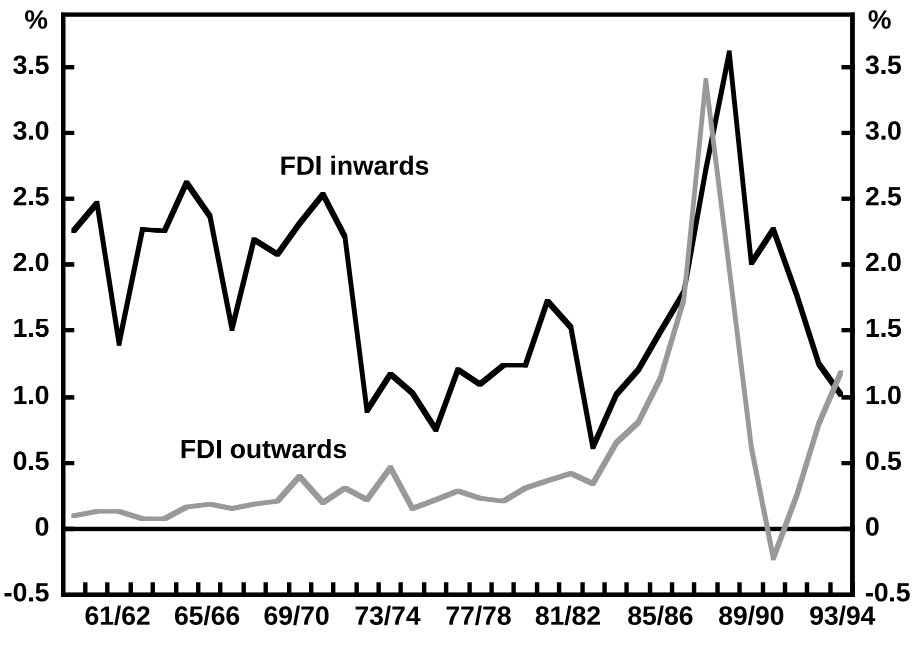
The paper examines trends in both FDI and trade over the past decade, but emphasises the behaviour of FDI flows. Section 2 sets out the trends in aggregate FDI and trade. Section 3 examines recent trends in the structure of trade and FDI with a view to assessing the role of FDI in the process of making Australia a more internationally-oriented economy. It looks at the composition of FDI and trade at a regional level, a broad industry level and, finally, within the manufacturing sector. Section 4 then discusses some issues that have emerged, or may emerge, in relation to increased FDI flows.

2. Aggregate Trends in FDI and Trade

Foreign direct investment flowing into and out of Australia increased markedly in the second half of the 1980s.[1] Inwards FDI increased from an average of little more than 1 per cent of GDP from 1976/77 to 1982/83, to an average of about 2 per cent of GDP from 1983/84 to 1992/93. Over the same periods, FDI outwards increased from about 0.3 per cent to 1.5 per cent of GDP on average (Figure 1).

Australia has always been an importer of capital, partly reflecting our rapid population growth and the consequent need to provide social and economic infrastructure. The high level of inwards FDI in the second half of the 1980s was not out of line with that in the 1960s or the early 1970s. But the lift in FDI outwards over the second half of the 1980s – to a high of over 3 per cent of GDP – represents a significant change from historical experience. The recent trends in FDI for Australia correspond to the worldwide expansion in FDI flows, and capital flows more generally, over the same period (see Figure 2).

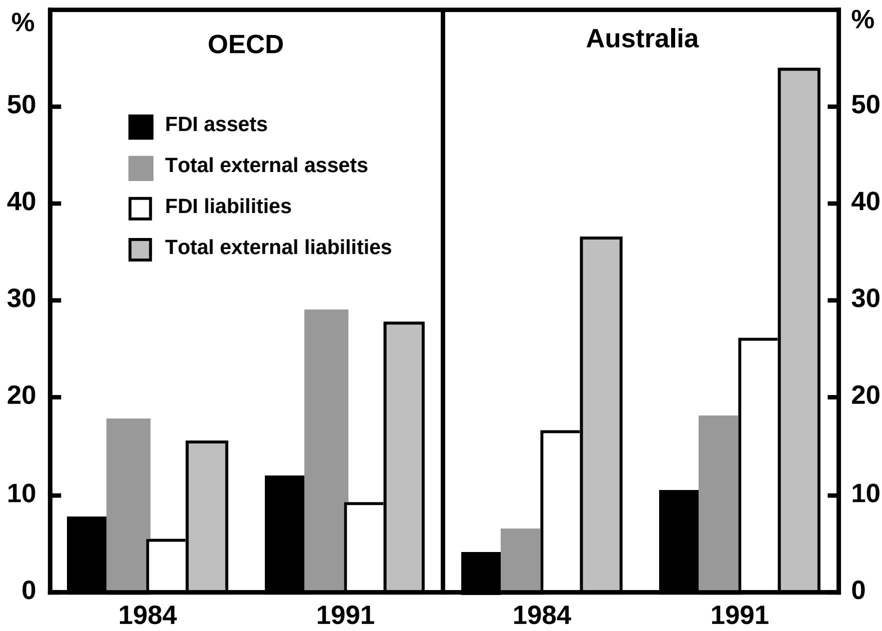
Figure 1: Foreign Direct Investment Flows
(per cent of GDP)



Note: 1993/94 data are for the first three quarters only.

1. Direct investment refers to financial investments by a non-resident that allows the non-resident significant *direct* influence over policy decisions of the enterprise. Until 30 June 1985, the Australian Bureau of Statistics (ABS) used a minimum ownership level of 25 per cent of the ordinary shares of voting stock (or equivalent equity interest) for investment to be classified as direct. Since 1985 the minimum ownership level has been 10 per cent, in line with international practice.The Bureau of Industry Economics (BIE) notes that the change appears to have had little effect on trends in the data (BIE 1993a).

Figure 2: External Assets and Liabilities of the Non-Official Sector
(Australia and the OECD; per cent of GDP)



Note: Excluding financial institutions. Australian external assets and liabilities are calculated at market value, while those of the OECD are at book value.

Source: Rider (1994).

It has been argued, for example by Froot (1991), that the traditional theories of FDI flows that focus on firm-specific and locational advantages (see Appendix A), do not fully explain periodic surges in FDI such as occurred over the second half of the 1980s.

Additional explanations usually focus on the coincidence of several factors. Widening external imbalances among OECD countries would have established the conditions for offshore investment. Figure 2 shows that, for the OECD, changes in FDI played the lessor role in the growth of private sector liabilities, accounting for about one-third of the total change in non-official external liabilities from 1984 to 1991.[2] In contrast, for Australia, non-official FDI liabilities accounted for about 50 per cent of the change in external liabilities over the same period. This reflects a lower share of FDI flows in foreign investment than had been the case in the previous two decades.[3]

2. Not surprisingly, these changes in inward OECD stocks of capital were matched by changes in outward stocks of FDI and total assets since the OECD comprises the vast bulk of the world capital market. Much of the data reflect intra-OECD investments.

3. However, this may partly reflect difficulties in estimation of FDI flows under more liberal capital markets (see Appendix B).

Australia's external deficits and our depreciating exchange rate in the 1980s may have contributed to the increases in FDI liabilities in Australia in the 1980s. But these factors fail to explain why Australia increased FDI asset holdings over the period (from about 4 per cent of GDP in 1984 to about 10 per cent of GDP now, a level which is not far below the OECD average).

Financial liberalisation enabled significant outwards FDI flows to occur for the first time in many OECD countries, including Australia. This was particularly important in the case of Japan where, by world standards, liberalisation coincided with a relatively low cost of equity and a very strong currency. These factors made foreign assets relatively cheap to acquire.[4] Such an explanation can be reconciled with traditional FDI theories. For example, acquisitions of foreign firms by Japanese firms would have improved market access in areas where they believed they held competitive advantages. Similarly, Australian investors may have been responding to first-time opportunities to invest offshore, except that in this case the offshore investments were largely financed using overseas borrowing (Bullock, Grenville and Pease 1992).

Rapid technological progress and innovations were also very important. First, innovations in corporate financing and improvements to information technology made it easier, and less risky, to acquire foreign assets through mergers and acquisitions (which increased markedly over the period as a means of conducting FDI). Second, in some cases, technological advances have led to development and production costs that are beyond the financial resources of even the largest firms.[5] This has created incentives for the formation of alliances, and the international rationalisation of production and R&D. Third, a firm that has developed a technological edge may often invest overseas through FDI, rather than trade in the technology (e.g. through licensing), thereby retaining the benefits of the technological edge for a longer period (see Appendix A).

In fact, the widespread moves towards deregulation in the 1980s were probably an inevitable consequence of the telecommunications and computer revolution and the globalisation process itself. Even if they had wanted to maintain tight boundaries around their economies, governments would have found it very difficult to detect, let alone control, many international financial transactions as electronic banking and other innovative financial services and practices became widespread.

Policy changes – including those in the areas of tax, competition policy and microeconomic reform – may also help to explain part of the increased FDI flows in the second half of the 1980s. However, the reverse can also be argued: policy changes may have been driven by the increased mobility of capital (and embodied technology and management skills). If this is the case, it tends to raise the costs of policy failure if investment opportunities are missed.

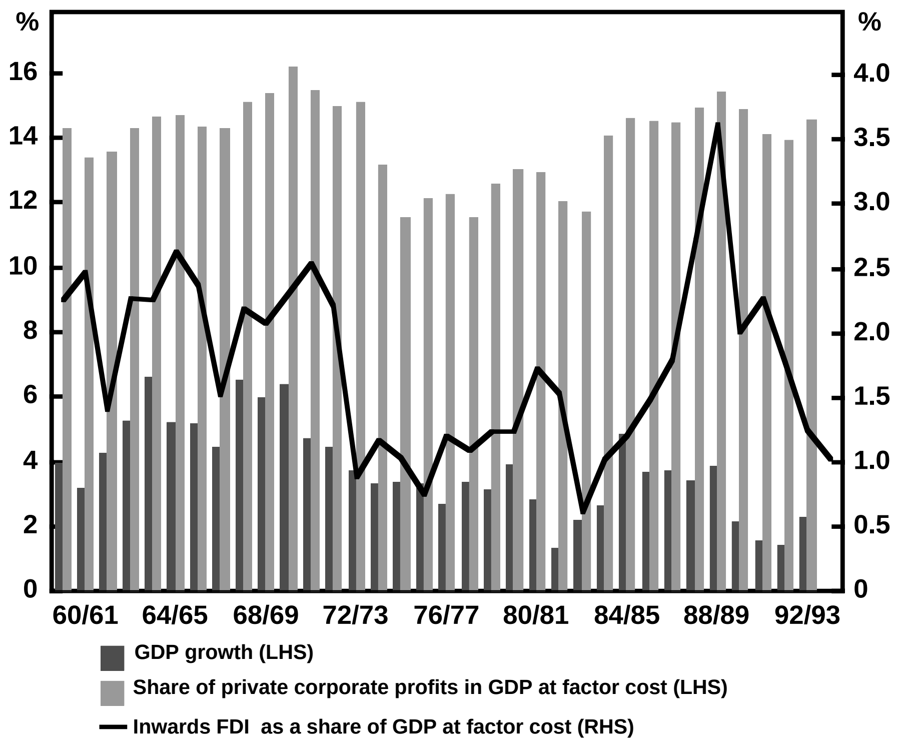
4. Japan increased outwards FDI at over 60 per cent per annum between 1985 and 1989 (UNCTC 1991). Germany (FRG) also increased its outwards FDI rapidly over the period and was exposed to influences similar to those of Japan.

5. Consider, for example, technological advances in fields such as large passenger aircraft, microprocessors, telecommunications switching stations, satellites and pharmaceuticals.

The role that we are ascribing to technological change here is not universally accepted as an explanator of the surge in FDI in the 1980s. For example, Froot (1991) argues that by lowering transaction costs, technical progress would have reduced the need for firms to extend their boundaries through FDI. On balance, the sort of surge in FDI that was experienced in the second half of the 1980s may never be fully explained by any particular theory of FDI. Nonetheless, the factors that traditional FDI theories would predict as being important clearly played a role. Indeed, Figure 3 shows a relatively close correlation between inwards FDI (relative to GDP), corporate profitability and GDP growth. At the aggregate level this is consistent with the market-based and supply-side determinants of location for FDI that are predicted by the traditional theory (as outlined in Appendix A). Whether the theory helps to explain trends at a more disaggregated level is addressed in Section 3.

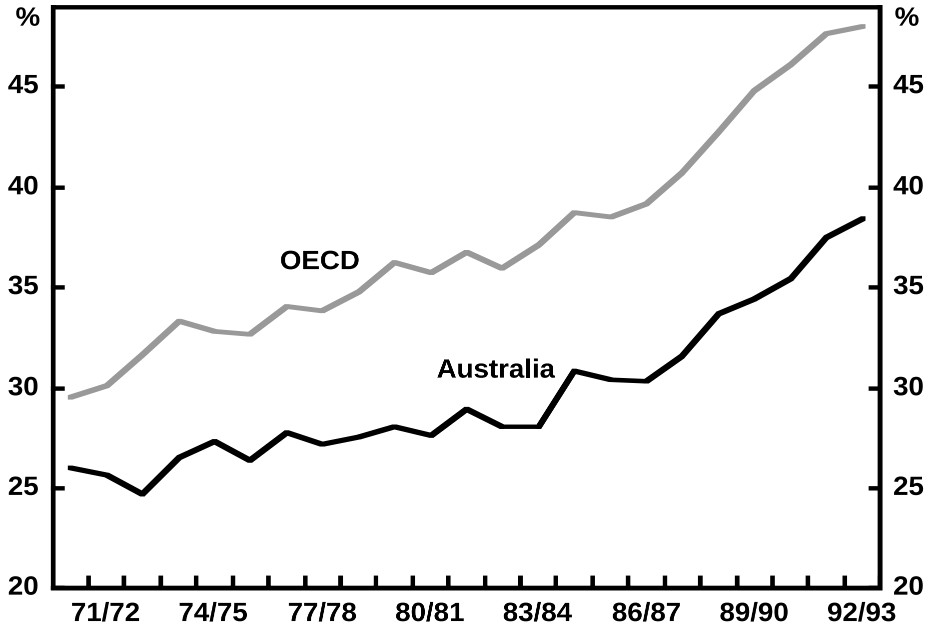
Complementing the technological incentives to openness on the financial side was the reasonably widespread dismantling of trade barriers, as governments became convinced of the benefits of freer trade in goods and services. Figure 4 shows the increase in trade intensity for both Australia and the OECD since the early 1980s. Figure 5 shows the relationship between growth in exports and total-factor productivity (TFP) that has helped to motivate the shift towards greater international integration of OECD countries in recent years.

Figure 3: Inwards FDI Flows, Corporate Profitability and GDP Growth



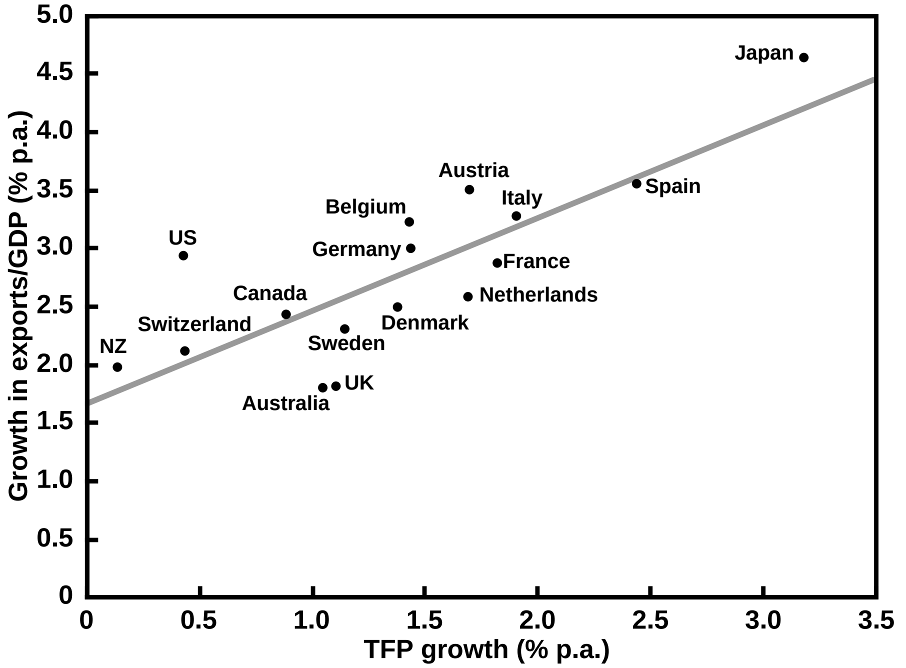
Note: GDP growth is a centred three-year-moving average annual growth rate.

Figure 4: Trade Intensity: Australia and the OECD Average
(per cent of GDP)



Note: Trade intensity is exports plus imports relative to GDP (all in constant prices).

Figure 5: Growth in Exports and Efficiency
(OECD 1960-1991)



Source: EPAC (1993).

3. Trends in the Structure of Trade and FDI

In this section we examine the recent trends in the structure of trade and FDI, inwards and outwards, with a view to establishing whether they have been consistent with building on competitive advantages that we already have, and/or the perceived requirement to improve competitiveness in the domestic economy.[6] We generally show patterns of FDI and trade together in order to shed some light on whether there is any systematic relationship between the two.

The issue of the effects of FDI on trade and industry structure has been discussed in a number of recent publications, and a summary of the debate is presented in the accompanying box.[7] However, little has been done empirically to address this question. One reason for this is the paucity of data, particularly in respect of FDI by Australian companies overseas. Also, the data that are available are aggregated by industry.[8] These problems are equally pressing here and we are forced to take a qualitative approach to analysing the impact of FDI at a disaggregated level. That said, if there are systematic effects on trade and industry structure associated with FDI flows, the effects should be appearing at the level of aggregation that we examine here.

3.1 Regional Composition of Trade and FDI

Over the past decade, the Asian and East Asian economies have increased in importance as both a market for our exports and as a supplier of our imports (Figure 6). Within this change there has also been a shift in the direction of trade from Japan towards the more rapidly growing East Asian economies. Australia's experience in this regard is similar to that of most developed countries as world attention switched towards the rapidly growing East Asian economies over the period.

On the other hand, the strong increase in both inwards and outwards FDI over the past decade has been dominated by OECD countries that are our 'traditional' trading partners. Japan has accounted for the bulk of changes in inwards FDI but has been well supported by North America, New Zealand, the UK and other OECD countries. Outwards FDI has followed a similar pattern, except in the case of Japan, which generally discourages inwards FDI.

The reliance on OECD countries as a source of FDI is generally explicable in terms of the technological superiority of these countries with respect to production, management and marketing. If FDI is reflecting firm-specific advantages, we would mostly expect to find them in these countries. Also, as noted in Section 2 the coincidence of financial

6. With respect to traded sectors this would mean adding value to commodities, and creating potential for niche markets for more elaborately transformed manufactures and certain service industries. For non-traded areas it means reducing costs or increasing productivity. Non-traded areas are, however, not focussed on here.

7. See OECD (1991, 1992a), BIE (1993a) and EAAU (1994), for a more detailed discussion.

8. There are no data available on manufacturing trade classified by ASIC industry before the early 1980s.The FDI data for the manufacturing sector are only reported at the 2-digit ASIC level for manufacturing industries used in this paper. It is, therefore, impossible to obtain a match-up of FDI and trade data prior to the early 1980s. Moreover, in recent years, there are significant gaps in FDI data at the 2-digit ASIC level, due mainly to confidentiality problems.

FDI: Its Links with Trade and Industry Structure

Concerns about the impact of FDI on trade usually centre on whether FDI is complementing potential gains from trade or whether it may be displacing trade, such that the benefits derived from FDI would have been available anyway. One reason for this concern is that FDI is itself trade in factors of production. For example, management expertise, technology and organisational know-how might be traded for access to markets, raw materials or cheaper labour. But this view is based on the notion that international factor and goods markets operate perfectly. In this case, FDI flows would not be necessary. Given imperfect markets, FDI should complement trade in goods and services (Markusen 1983). But, as noted by the East Asia Analytical Unit (EAAU), FDI can, in the short term at least, have trade-displacing or trade-enhancing effects depending on the circumstances involved (EAAU 1994). As is also pointed out by the EAAU, the equilibrium effects will generally counter any short-run effects of FDI on trade.

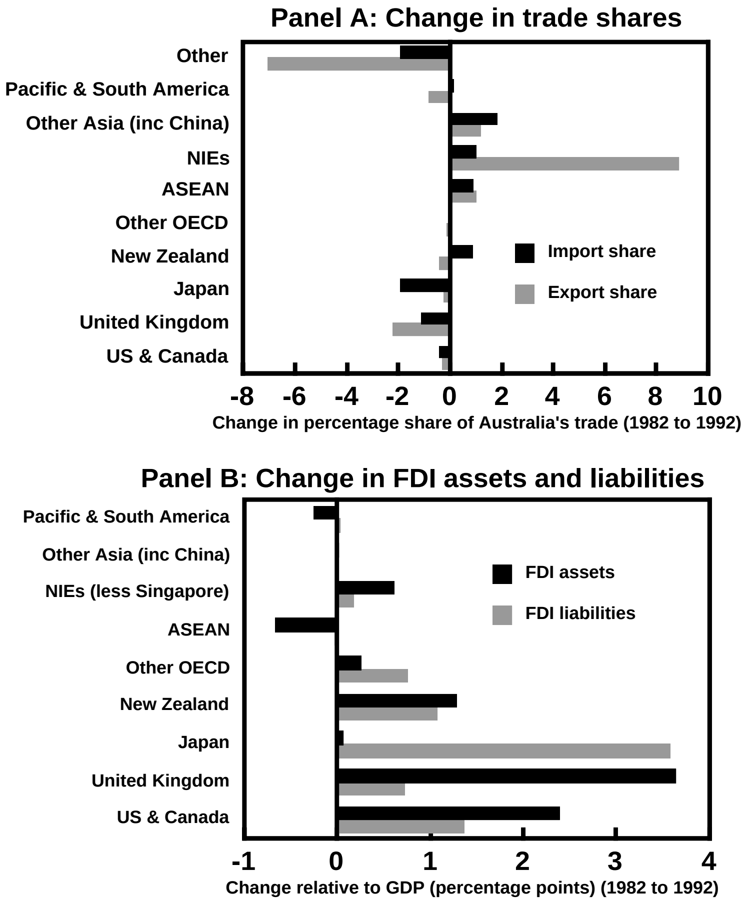
For example, an FDI project by an Australian company in Asia that generated an enormous increase in the export of Aus-widgets will inevitably displace other potential exporters. The magnitude of this effect would be subject to effects on the exchange rate which, in turn, may ultimately depend on how the additional export income is spent. Transition is important because it may be obvious that eventually resources would have been directed into Aus-widgets, but the FDI would still be beneficial if it enabled the economy to be restructured. The same argument can be made in the case of FDI that displaced exports. In both cases, the Australian economy will benefit if the export enhancing (or displacing) activity generates a better structure for the domestic economy in terms of longer-run growth.

On this basis, the key determinant of whether FDI is good for the economy or not is ultimately determined by its effects on the structure of the economy. The impact on trade is important because it allows us to obtain some insights into whether or not we are getting the right sort of structure. (Although trade-enhancing FDI is clearly consistent with the aim of better integration in world markets.)

In general, we might expect to find a cross-country investment portfolio that reflects the competitive advantages held by the host country in each location. To an extent, this is what we do see. (Australia, for example, has never found difficulty in attracting FDI into areas of mining.) But it is also clear that the location of FDI responds to factors other than underlying competitive advantages, including a raft of government policies. The behaviour of firms involved with FDI flows will also have a bearing on the structural impact of FDI. Border protection in Australia after World War II is an example of a policy-based distortion. Allegations that FDI firms use market power and behave strategically in the interests of the home country is an example of a distortion that would arise from the FDI investors.

To focus on the effects of FDI on trade alone would risk missing the point that the restructuring and globalisation of the Australian economy are ultimately aimed at creating the conditions for longer-term growth and increased wealth, not a better trade performance *per se*. Stronger growth and improved trade performance are of course inter-linked for the economy as a whole, but not necessarily for each sector, industry, or firm.

Figure 6: Changes in Australia's Trade and FDI by Region, 1982 to 1992



Note: NIEs include Hong Kong, Korea, Singapore and Taiwan for trade. Singapore is included in the ASEAN countries for FDI.

liberalisation, low costs of equity and very strong currencies in Japan and some European countries meant that Australia was bound to increase its sourcing of FDI from these areas. Finally, a number of East Asian economies, including Korea and Taiwan, have discouraged outflows of capital (World Bank 1993).

Australia was not alone in directing the bulk of its outwards FDI towards OECD markets as worldwide flows of FDI in the 1980s were concentrated in Europe, Japan and the US (UNCTAD 1993). One explanation for the disproportionate amount of outwards FDI flowing to OECD countries is that these economies comprise the vast bulk of the world market. It is logical for companies which perceive themselves to have a competitive edge to take that edge into the large markets first. Another is that investors focussed on culturally-close markets as potential locations in their initial phase of investing offshore (see, for example, Yetton, Davis and Swan (1991)). Also, the EAAU (1994) argues that lack of information about institutional changes (including lower protection) and about growth prospects in Asia may have played an important role in low Australian FDI investment in that region.

Whatever the reason for the lack of FDI flows corresponding to the regional focus of trade in the past decade, it appears that it may be reversed in the future. Access Economics estimate that over 50 per cent of the value of current and planned outwards FDI projects are expected to be located in Asia (including PNG) (Access Economics 1994). About half of these projects are in the mining industry, 10 per cent in manufacturing, and services comprise the rest.

3.2 Composition of Trade and FDI by Industry

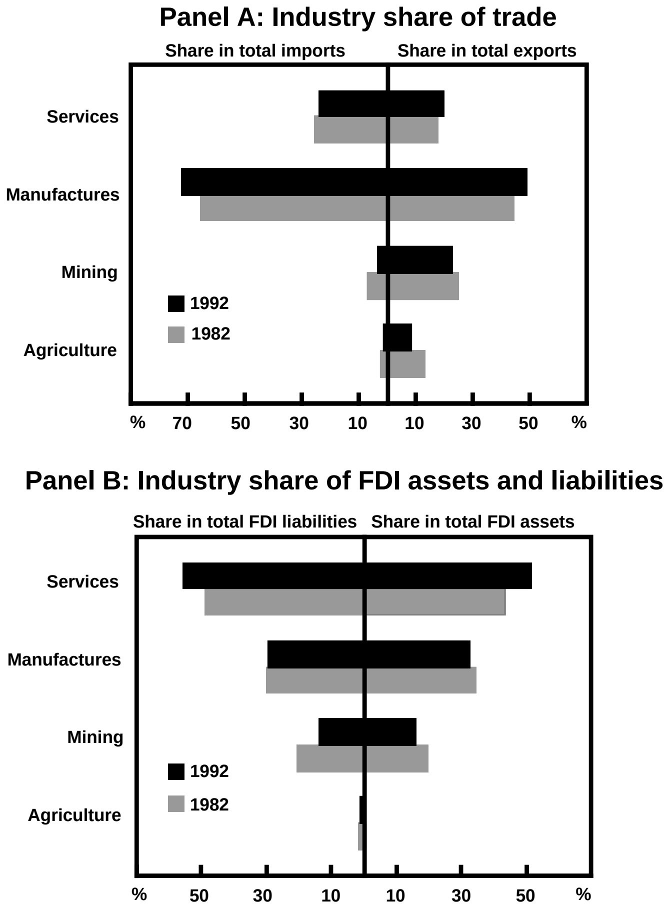
At a broad industry level we again observe little correspondence between recent trends in trade and FDI. Figure 7 shows that manufacturing comprises the bulk of our trade whereas services dominate FDI assets and liabilities. The changes over the past decade have emphasised the difference, with manufacturing increasing its share of trade, and the service sector its share of FDI.

The strong performance of the manufacturing sector in exports over the past decade partly reflects a continuation of the long-run reduction in the terms of trade for commodities (particularly for mining products in the 1980s).[9] But manufacturing exports have also grown more rapidly than agriculture and mining exports in volume terms. At the same time, manufacturing imports have increased as a share of total imports and the trade deficit in manufacturing has not improved by much (BIE 1994). Some may view these results with concern, arguing that a reduction in the manufacturing trade deficit is essential to Australia's economic future. But the real issue is whether or not Australia is making the best possible use of its resources. We should expect a trade deficit in manufacturing in a country that generates surpluses through the export of natural resources. In addition, the correspondence of increases in exports and imports suggests increased specialisation and restructuring within the manufacturing sector, which is consistent with the globalisation process.

The domination of FDI flows by the service sector is a relatively recent phenomenon. In the 1950s and 1960s, manufacturing and mining were more highly represented. This change in the composition of FDI happened almost everywhere reflecting the increased importance of services as a component of national product in most industrial countries (OECD 1992a). Also, the non-tradeable nature of much of the service sector means that firms with competitive advantages in Australia are unable to reap the benefits through trade, but they can through FDI. The increase in the service sector share in the 1980s mainly reflects financial liberalisation and the attendant world-wide increases in FDI in the finance, property and business service sector.

9. The manufacturing sector here is defined on the Australian Standard Industrial Classification (ASIC) basis. It includes very early-stage processing of agricultural and mining products such as wool scouring and minerals processing.

Figure 7: Share of Australia's Trade and FDI by Industry, 1982 and 1992
(in current prices)



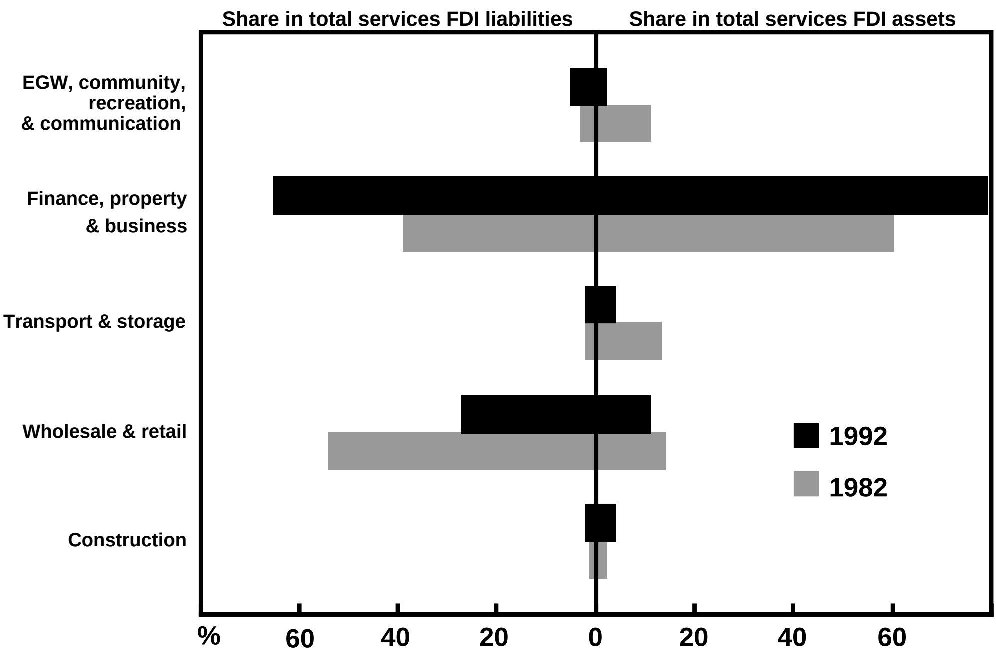
Note: The industries are classified according to ASIC. The manufacturing sector, therefore, includes early-stage processing of agricultural and mining products.

The decline in the relative importance of Australia's manufacturing sector in FDI inflows partly reflects the trend decline in manufacturing production relative to GDP in most developed countries. The BIE (1993a) concluded that it may also be due to changes in Australia's trade policies away from import replacement (and border protection). The removal of trade barriers over the past decade and increased mobility of capital might have been expected to be associated with significant disinvestment in the less competitive manufacturing sector. But the manufacturing sector largely maintained its share of FDI liabilities (and assets), despite the fact that it was a period of enormous growth in both inwards and outwards FDI. The correspondence of increased inwards and outwards FDI in manufacturing is consistent with increased specialisation in production. More importantly, it appears that, the opportunity to disinvest domestically in manufacturing has not been taken up. This probably reflects the substantial supply-side improvements in Australia's manufacturing sector over the decade, as well as reductions in company tax rates and measures to increase international links (such as partnerships for development and the 'Factor f' program).

Figure 8 confirms that most of the FDI in service industries has been directed into the non-traded areas of finance, property and business, and wholesale and retail services. This is not to say that investment in these areas cannot contribute to improved trade. Outputs from these industries are often embedded in traded goods and services. Improvements to productivity through technology transfer and organisational innovations in these industries that result from FDI can play an important role improving competitiveness more generally.

There is little doubt that FDI in the wholesale and retail sector has generally improved efficiency in Australia. The experience in finance, property and business has been more mixed. Much of the FDI flows into this sector in the 1980s were responding to – and helped to fuel – the asset price boom in property. Foreign (and domestic) investors have experienced substantial losses in the subsequent fallout. Similarly, some of the Australian investments offshore in this sector have not performed well. Transmission of the asset

Figure 8: Share of FDI Assets and Liabilities in Services by Industry, 1982 and 1992



Note: In current prices. EGW is electricity, gas and water.

price boom was a major source of instability in the Australian (and world) economy over the past decade. However, any deleterious effects, including those on industry structure, are likely to be unwound through the restructuring of corporate balance sheets and investment portfolios.

The fact that over 50 per cent of FDI assets and liabilities are accounted for by low-trade service industries is an important counter to those who argue that we should be concerned about trade displacement of FDI. Much of the increase of trade in services has been accounted for by tourism, but the FDI in this sector (included in EGW etc. in Figure 8) has not been a significant portion of total FDI in services. Also, if we are concerned about FDI flows distorting domestic production towards low-value-added activity, we would generally not look to the service industries for evidence. These industries tend to have higher wages than manufacturing and agriculture. Agriculture attracts very little FDI flows (Figure 7). It follows that if we are to get an appreciation of the impact of FDI on trade and industry structure we need to focus attention on the manufacturing sector.

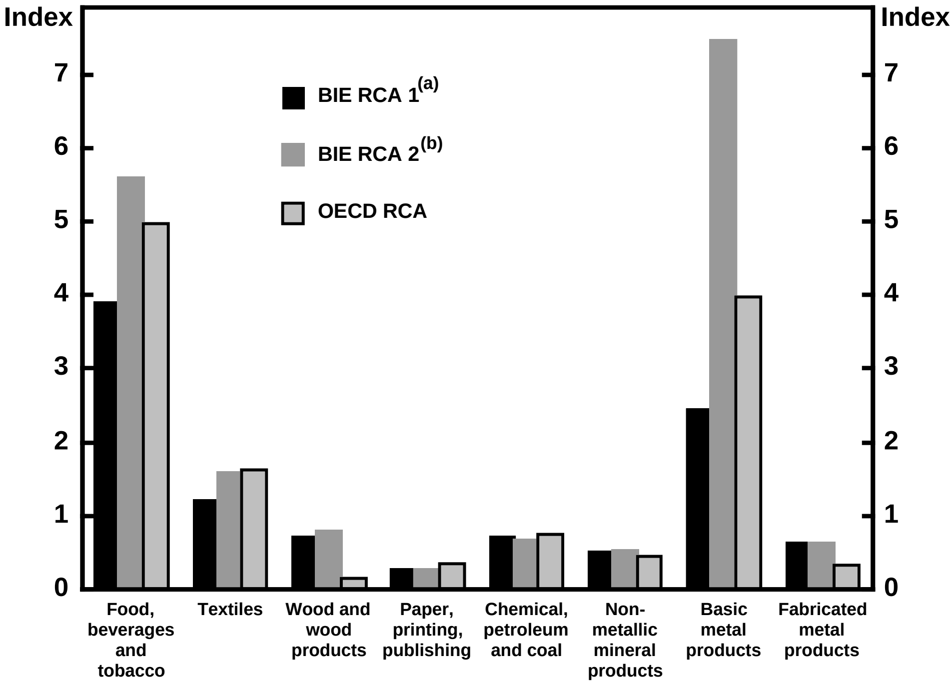
In order to examine the impact of FDI flows on the structure of the domestic manufacturing industry we need to get some idea of where Australia's competitive strengths lie, and where changes in competitiveness have occured. One way to do this is by measuring revealed comparative advantage by industry in the manufacturing sector.[10]

The OECD (1993) calculated a set of revealed comparative advantages (RCAs) for manufacturing industries in a sample of 13 OECD countries. As defined by the OECD, an industry's RCA is its share in the country's exports as a ratio of the average share in exports of that industry for all the countries in the sample. The set of OECD RCAs show the export orientation for a country, by industry, relative to the wider OECD area. If an industry's RCA is greater than unity, then that industry's export orientation exceeds the OECD average. This is interpreted as reflecting a relative (revealed) advantage held by that industry in international trade.

The BIE has also been monitoring the relative trade orientation of industries in Australia's manufacturing sector using estimates of export propensity and import penetration (BIE 1993b, 1993c). It is possible to draw comparisons with the OECD estimates of RCAs for Australia's manufacturing industries using the BIE estimates of trade orientation. One measure involves scaling the BIE measures of trade orientation for each industry by the trade orientation of the manufacturing sector as a whole. A second method is to scale the exports to imports ratio of each industry with the ratio of exports to imports of the total manufacturing sector. Figure 9 compares results using these methods with those generated by the OECD for a comparable sample of manufacturing industries. It is clear from the figure that the alternative approaches yield similar results across most industries. There is some difference in the relative magnitudes of RCAs, particularly for Basic Metal Products. Nonetheless, the same conclusions about comparative advantage within the Australian manufacturing sector would be drawn using any of the three measures shown.

10. Such measures are, however, imperfect because industries are not internally homogeneous with respect to factors of production, marketing, or the general business climate. Nevertheless, they do provide a general guide as to which industries are most competitive in world markets.

Figure 9: Alternative Estimates of Revealed Comparative Advantage for Australia's Manufacturing Industries



Notes: (a) Ratio of export propensity to import penetration for industry *i*, divided by the corresponding ratio for the manufacturing sector as a whole.

(b) Ratio of exports to imports for industry *i*, divided by the corresponding ratio for the manufacturing sector as a whole.

The similarity of results should not be surprising because, in all three methods, the results are driven by the relative export performance of the industry concerned. The results, however, are an important platform for the discussion of trends in foreign direct investment by the manufacturing sector.

Matching up changes in FDI flows with measures of revealed comparative advantage enables us to address two important questions related to the impact of FDI on the structure of the manufacturing industry. First, what is the relationship between an industry's comparative advantage in trade and its involvement in FDI? Second, what is the relationship between FDI flows and changes in Australia's revealed competitive strengths? These issues are addressed in subsequent sections of the paper.

3.3 FDI Orientation and the Structure of the Manufacturing Industry

Figure 10 shows the relationship between an industry's competitiveness in 1982 and subsequent changes in its FDI orientation. The horizontal axis shows the RCA for each industry. Industries with a high RCA are located to the right of the mid-point of this axis, and low-RCA industries to the left. The figure shows that in 1982, the Food, Beverages and Tobacco, and Basic Metal Products industries had the highest RCA's. These industries generate large surpluses by adding value to primary products and (following the methodology established by the BIE (1993b)) can be classified as the 'export group' of Australian manufacturing industries. Moving left along the horizontal axis, another grouping can be characterised as the 'intra-industry trade' group. To a degree, intra-industry trade is a feature of all twelve manufacturing industries. However, it is most apparent in Textiles, and Chemicals, Petroleum and Coal products industries.[11]

A third group of industries can be characterised as being 'low-trade' as they have both low import penetration and export propensity, due to a high level of natural protection from import competition (BIE 1993b). These industries include Fabricated Metal Products, Non-Metallic Mineral Products, and Wood and Wood Products. They are primarily geared towards the domestic market and are generally competitive in that market.

The final set of industries, including Clothing and Footwear, Transport and Equipment, Other Machinery and Equipment, Miscellaneous Manufacturing, and Paper and Paper Products suggest themselves as primarily import industries. This group has been generally characterised as being internationally uncompetitive through cost disadvantages, particularly in the early 1980s.

The vertical axis of Figure 10 shows the changes in orientation of FDI in the 1980s by industry while holding the index of comparative advantage fixed in 1982.[12]

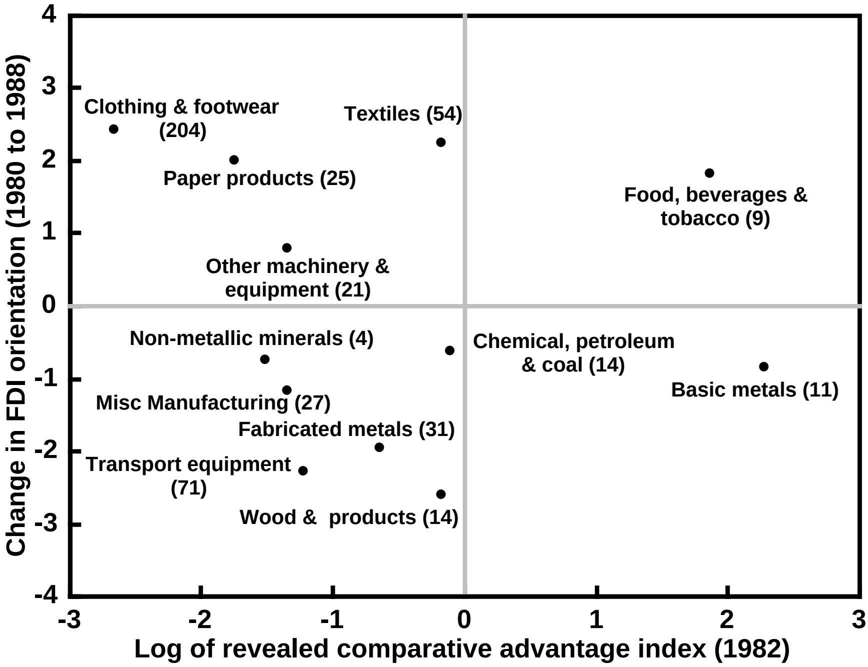
The low-trade group, Chemicals, Petroleum and Coal (an intra-industry group) and two import-group industries (Transport Equipment and Miscellaneous Manufacturing) increased relative holdings of FDI liabilities from 1980 to 1988.[13] For the latter, this may be somewhat surprising given the reduction in border protection over the period (and promises of continued reduction into the 1990s). The inwards FDI in these industries is therefore probably unrelated to prospects of border protection. It is much more likely to be due to the fact that these industries are focussed primarily on the Australian market and to microeconomic reforms that have improved profitability in these industries over

11. The Wood and Wood Products industry has a high degree of intra-industry trade, but this characteristic is dominated by the low amount of trade in this industry, hence its allocation to the 'low-trade' group.

12. The choice of 1988 as the year for assessing the change in FDI orientation reflects the lack of a complete set of FDI data by manufacturing sector beyond that year. However, 1988 has the advantage of coinciding with the very rapid growth of FDI flows in the second half of the 1980s, and it avoids the effects of the recession at the end of the decade.

13. It is worth noting that the industries more likely to invest offshore in 1982, (i.e. had a ratio of FDI assets to liabilities greater than the ratio for all manufacturing of 25 per cent) were the relatively low-traded Fabricated Metals and Non-Metallic Minerals industries.The rationale for low-traded industries to invest offshore is market driven, as described in Appendix A.

Figure 10: Changes in FDI Orientation and Revealed Comparative Advantage



Note: FDI orientation is the share of FDI assets by industry in total FDI assets for manufacturing, divided by the corresponding share for liabilities. The vertical axis shows the change in each industry's propensity to hold FDI assets relative to FDI liabilities (scaled by the ratio of FDI assets to FDI liabilities for all manufacturing). Where data points are greater than zero, industries have increased offshore orientation by more than manufacturing as a whole. The RCA index is the share of exports by industry in total manufacturing exports divided by the corresponding share for imports. Where data points are greater than zero on the RCA axis, industries have an export orientation greater than that of manufacturing as a whole. The numbers in brackets show the effective rate of assistance by industry in 1981/82 (IAC 1985).

the past decade. Government policies aimed at enhancing links with foreign investors such as Partnerships for Development, and the 'Factor f' program for pharmaceuticals may also have helped to attract inwards FDI.

The propensity to move offshore from 1980 to 1988 was most apparent in less competitive industries (Clothing and Footwear, Paper and Paper Products, and Other Machinery and Equipment). Textiles, which is allocated here to the 'intra-industry trade' group, also suffers from severe cost disadvantages in certain areas, and has been highly protected in the past. There is little doubt that moves offshore in these industries reflect the cost disadvantages of locating certain stages of manufacturing in Australia.[14] For

14. The shift offshore by the Paper and Paper Products industry may have been partly motivated by a limited domestic market, and diminishing investment opportunities because of heightened environmental concerns in Australia. Also, the Textiles industry may have seen a reversal recently with inwards FDI in wool processing (BIE 1994).

example, according to the Textiles Clothing and Footwear Development Authority (TCFDA 1993), much of the investment offshore in clothing and footwear has been directed to China in the area of low-value-added clothing manufactures (where labour costs are estimated to be 4 per cent of those in Australia).

However, the industry has been able to retain some competitive elements within Australia. The domestic industry has restructured to focus more on low-volume production, incorporating greater design content, higher quality, and higher prices (TCFDA 1993). Restructuring under these circumstances may well have enabled Australia to hold onto these competitive areas of the industry. Furthermore, it may help to generate competitive advantages in design and marketing in future, as these aspects of the industry will not be weighed down by high relative costs in lower value-adding stages of production.

That said, there are likely to be substantial costs associated with adjustment for people who find themselves out of work because of measures to improve productivity and relocate production. The government has provided assistance for industries in transition in order to lower the costs of adjustment and enhance restructuring of domestic production towards more competitive parts of the industry. Specific measures include assistance with lowering the costs of upgrading capital stock, and more recently through the Import Credit Scheme which offers duty credits on exports, and the Overseas Assembly Scheme which provides preferential treatment of Australian fabrics assembled overseas.

The experience of the Food, Beverages and Tobacco industry over the 1980s is more problematical. In some cases, the offshore investment, for example by major beverage producers in Europe and North America, has been clearly market driven. In other cases, there has been cost-based restructuring of this industry along similar lines to that of clothing and footwear. This process has, however, been helped along by Asian governments offering investment incentives for agri-food producers to move operations to Asia. How important these enticements have been is difficult to assess but two factors are worth considering.

First, the offshore FDI in these industries may have occurred at any event. The Asian market is extremely large and fast growing which would be a strong incentive for entry by Australian producers of food and beverages. Marketing success in these industries is often associated with intangibles such as trademarks, strong cultural identification with the product, and leading-edge packaging and promotions. Competitive advantages associated with production may not always be readily transferable to marketing and distribution, as there may be significant imposts on the traded product arising from transport costs, duties and interest cost of capital tied to goods in transit.[15] The nature of the products suggests that much of the offshore FDI in the 1980s may have come about through a legitimate desire to capture additional markets based on competitive strengths developed in Australia.

Second, there has been quite strong FDI investment in Australia in the Food, Beverages and Tobacco industry reflecting, among other things, Australia's competitive

15. These factors were found to be especially significant for 25 manufacturing investors in the UK surveyed by Edwards (1994).

advantage in agriculture, and location advantages in infrastructure and close proximity to the large Asian market (BIE 1994). More recently, there have been reports of strong Japanese investment in Australia in the food industry.[16] In fact, in 1992, the Food, Beverages and Tobacco industry had a lower propensity to invest offshore compared with manufacturing as a whole (although this change may be related to the economic downturn).

On balance, it seems unlikely that the increased orientation towards offshore FDI by the Food, Beverages and Tobacco industry would have negative effects on the structure of the domestic industry. Indeed, overseas investment in this industry probably enhances intra-industry trade and creates jobs in higher value-added areas (such as management and technical services), as firms strive to maintain competitive advantages. It is true that there is a risk that overseas operations may develop to such an extent that we eventually become relatively less competitive in these areas. However, that would imply more rapid innovation, greater efficiency, and improved products on the part of the offshore operations. In such circumstances, rather than increased imports, we would likely see more FDI inwards in Australia and the catch-up process would be reversed.

Finally, it is worth noting that many manufacturing industries in Australia increased FDI liabilities, as well as FDI assets, in the 1980s (see Figure 11). This, of itself, is indicative of restructuring within industries. The net effect may be very small in terms of changes in the FDI orientation measure used here, but the implied restructuring can have strong positive effects for the industries concerned. Also, while the discussion here has focussed on the shift offshore following financial liberalisation, it is worth noting that FDI assets were still only about 50 per cent of FDI liabilities in manufacturing in 1992 (up from 25 per cent in 1980). The continued flow of inwards FDI to Australian manufacturing by itself suggests that the industry has significant marketing and production advantages for foreign investors.

3.4 Changes in FDI Orientation and Trade Performance by Industry

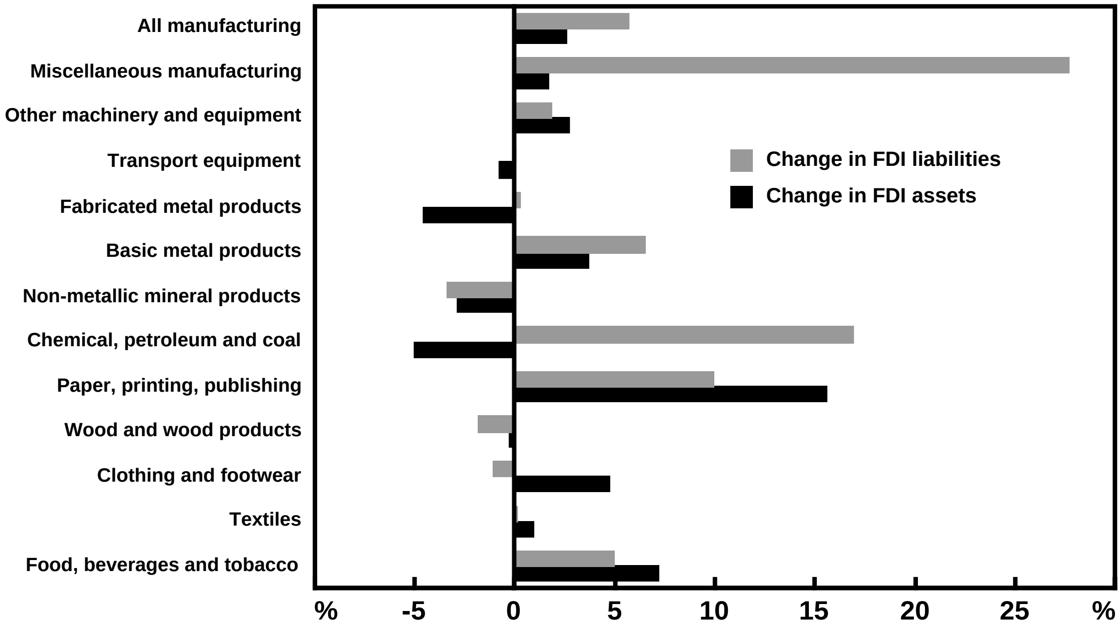
Apart from effects on industry structure, one concern about large changes in FDI flows is the impact on trade. This section examines the association between changes in FDI orientation from 1980 to 1988 and changes in manufacturing trade by industry over the past decade or so.

Figure 12 shows the change in orientation of FDI over the period 1980 to 1988, alongside changes in the share of manufactured exports by industry from 1982 to 1992. If an industry has increased its propensity to hold FDI assets relative to liabilities (compared to the average for manufacturing as a whole) it will be in the positive half of the vertical axis. Industries that increased their relative share in exports will be in the positive half of the horizontal axis.

The data shown in Figure 12 suggest that the change in outwards orientation of FDI does not appear to be systematically associated with changes in export shares. In some

16. See, for example, the article entitled ‘Manufacturing Lures Japanese Investment’ in the *Australian Financial Review*, 5 July 1994. Data in this article were drawn from the Australia-Japan Economic Institute.

Figure 11: Changes in FDI Stocks Relative to Sales of Domestic Product by Manufacturing Industry, 1982 to 1988



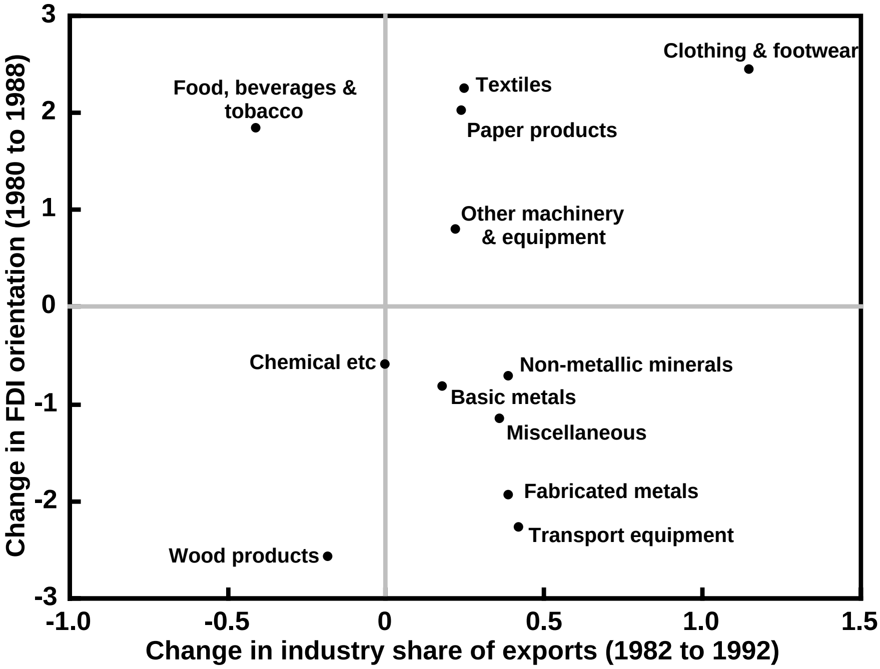
industries (notably Clothing and Footwear) a shift towards holding more offshore assets corresponds with very strong growth in exports. As noted earlier, both the Textiles and Clothing and Footwear industries shifted less competitive later-stage processing plants offshore over the period. This meant increased intra-industry trade as Australian firms increased the export of early-stage products to offshore plants. The consequent growth in imports of the more highly processed products is particularly apparent for clothing and footwear products (Figure 13).

In fact, if there is any systematic relationship between FDI flows and trade it may lie in a positive correlation between the change in the volume of trade and total FDI (Figure 14). The figure suggests a very tenuous degree of complementarity between the two variables. More definitive results might emerge if comparisons could be made over a longer period of time, but the necessary data are not available.

Exports by industries that increased holdings of FDI liabilities also rose quite dramatically over the period (Figure 12). Much of this increase represents greater product differentiation and specialisation in these industries. Not surprisingly, these industries did not increase imports to the same extent as those industries which tended to shift production offshore (Figure 13).

The stand-out industry in Figures 12 and 13 is the Food, Beverages and Tobacco industry which increased its outwards FDI orientation significantly from 1980 to 1988 and experienced sluggish growth in exports, and a more rapid growth in imports, relative

Figure 12: Changes in FDI Orientation and Changes in Industry Share of Exports



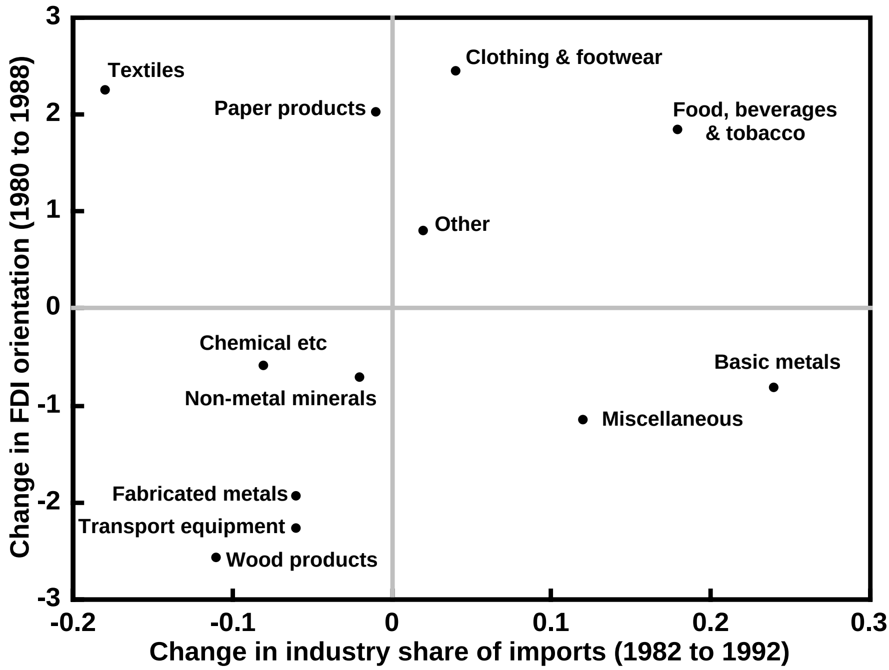
Note: The vertical axis is the same as that shown in Figure 10. It shows the change in each industries propensity to hold offshore FDI assets relative to liabilities between 1980 and 1988. Industries located on the positive side of the horizontal axis have increased their share of exports of manufactures over the period. The fact that just two industries are located on the negative side of the horizontal access can be explained by the very large share of the food, beverages and tobacco industry in manufactured exports (being 37 per cent in 1982 and 26 per cent in 1992). Industry export shares are in natural logarithms.

to other industries. There may be a suggestion that the shift in FDI orientation has been harmful for this industry.

On the imports side it is probable that Australia's demand for imported (highly differentiated) food and beverages reflects changes in the structure of our population and greater competition from Asian producers, along with the well-known effects of EC agricultural subsidies.

On the exports side we need to place the relatively poor performance of Food, Beverages and Tobacco over the past decade in the context of the very strong performance of all other manufacturing industries over the period. Table 1 shows the growth in manufactured exports for manufacturing industries at the 2-digit ASIC level between 1982 and 1992, classified according to the trade groups used in this paper. It is true that exports by the Food, Beverages and Tobacco industry grew slower than average over the past decade. But nominal growth of exports from food, beverages and tobacco manufacturers was still a very respectable 8.4 per cent per year between 1982 and 1992,

Figure 13: Changes in FDI Orientation and Changes in Industry Share of Imports



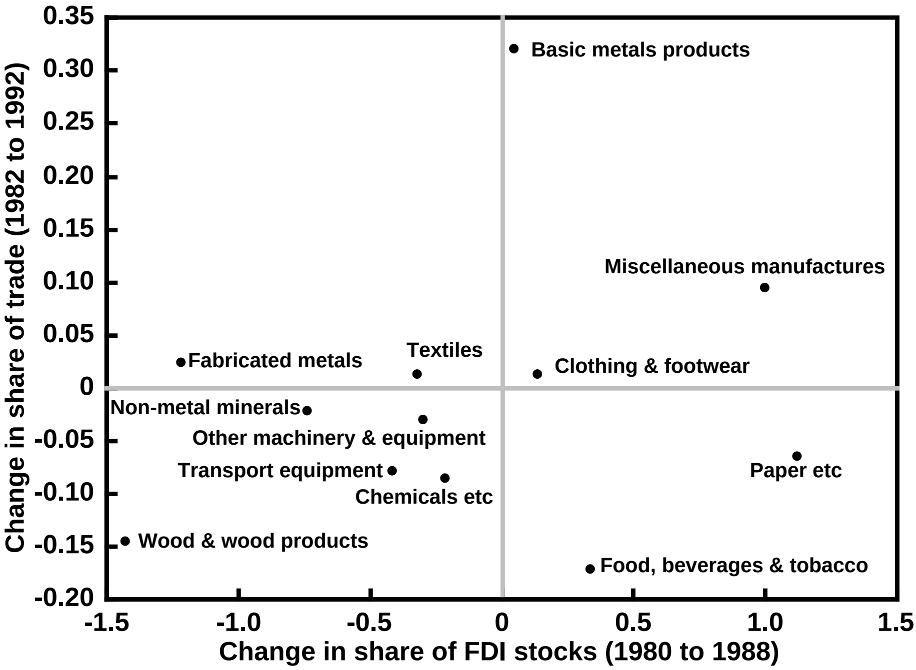
Note: The vertical axis is the same as that shown in Figures 10 and 12. It shows the change in each industry's propensity to hold offshore FDI assets relative to liabilities between 1980 and 1988. Industries located on the positive side of the horizontal axis have increased their share of imports of manufactures over the period. Industry import shares are in natural logarithms.

which was only marginally below nominal GDP growth. In fact, exports of food, beverages and tobacco products grew much more quickly than did exports of the agricultural products from which they are made (see Table 2). Moreover, since world demand for early stage manufactured foodstuffs is probably linked quite closely to the demand for primary produce (EPAC 1988), the slow growth in agricultural exports may suggest a primary reason for the relative decline in exports of food, beverage and tobacco manufactures.

Virtually every other manufacturing industry experienced export growth well in excess of GDP growth over the period 1982 to 1992. Perhaps the most notable feature being the rapid export growth from those industries that started from a position of being least competitive – the 'import group' (Table 1). The impressive export performance of the import-group industries over the past decade is encouraging as it suggests Australia is able to successfully compete in niche markets for more highly value-added products.[17]

17. Many of these industries receive export assistance, be it explicitly or implicitly. However, the impact of these programs on export growth from these industries is unclear, although in some cases it is believed to be significant (see IC (1993)). Of course, the ultimate test of the viability of these industries will be when this assistance is removed.

Figure 14: Changes in Shares of Total FDI Stocks and Trade Share



Note: The vertical axis shows the change in trade intensity (exports plus imports) for each industry relative to the change for total manufacturing. The horizontal axis shows the change in total FDI stocks (assets plus liabilities) for each industry relative to the change for total manufacturing. All shares are in natural logarithms.

It is consistent with the findings of the recent Emerging Exporters study (McKinsey and Co. 1993).[18] In fact, the results may even indicate a wider export success for niche marketing of import group industries than that suggested by McKinsey and Co. (1993), which focussed on the performance of selected firms from all manufacturing industries.

On balance, therefore, the decline in share of food, beverage and tobacco exports does not appear to be due to an increased propensity for investment offshore. It is more likely to be a consequence of shifts in world demand and the very strong export performance by other manufacturing industries.

Another encouraging aspect of the performance of Australia's manufacturing exports from 1982 to 1992 is the very strong growth in exports to Asia (see Table 3). The growth rate of exports in all manufacturing industries (with the exception of miscellaneous manufactures) from 1982 to 1992 was greater for Asia (Table 3) than for all regions

18. The AMC/McKinsey study found that many low-trade firms are competing successfully in areas such as product design, customer service, and timeliness, thereby overcoming the disadvantage posed by high unit labour costs and the distances between Australia and its export markets. Although encouraging, it should be noted that these firms remain the exception rather than the rule.They do, however, indicate that potential exists for Australian manufacturing to develop world-competitive firms in niche markets.

Table 1: Manufactured Exports by Industry, 1982 to 1992
(current prices)

	Value 1982 ($m)	Value 1992 ($m)	Average annual growth 1982 to 1992 (per cent)	Contribution to total export growth 1982 to 1992 (percentage points)
Total	**10,290.3**	**33,377.6**	**12.5**	**100.0**
Export group	**6,804.4**	**20,366.1**	**11.6**	**58.7**
Food, beverages and tobacco	3,795.1	8,540.9	8.4	20.6
Basic metal products	3,009.3	11,825.2	14.7	38.2
Import group	**1,292.9**	**6,156.5**	**16.9**	**21.1**
Clothing and footwear	15.8	182.9	28.2	0.7
Transport equipment	324.2	1,672.9	17.8	5.8
Other machinery and equipment	680.1	3,005.1	16.0	10.1
Miscellaneous manufactures	185.8	905.9	17.2	3.1
Paper, printing and publishing	87.5	389.6	16.1	1.3
Intra-industry trade group	**1,791.5**	**5,350.2**	**11.6**	**15.4**
Textiles	580.7	2,302.1	14.8	7.5
Chemical, petroleum and coal products	1,210.7	3,048.1	9.7	8.0
Low-trade group	**401.5**	**1,504.8**	**14.1**	**4.8**
Non-metallic mineral products	44.7	252.5	18.9	0.9
Fabricated metal products	148.5	734.3	17.3	2.5
Wood, wood products and furniture	208.3	518.0	9.5	1.3
Memo: GDP ($m)	167,916	396,250	9.0	n.a.

Source: DFAT Stars database.

Table 2: Merchandise Exports by Sector, 1982 to 1992
(current prices)

	Value 1992 ($b)	Average annual growth 1982 to 1992 (per cent)	Contribution to total export growth 1982 to 1992 (percentage points)
Total	54.4	10.6	100.0
Agriculture	5.7	2.8	3.9
Mining	15.4	11.3	29.2
Manufacturing	33.4	12.5	66.8

Source: DFAT Stars database.

Table 3: Manufactured Exports to Asia by Industry, 1982 to 1992
(current prices)

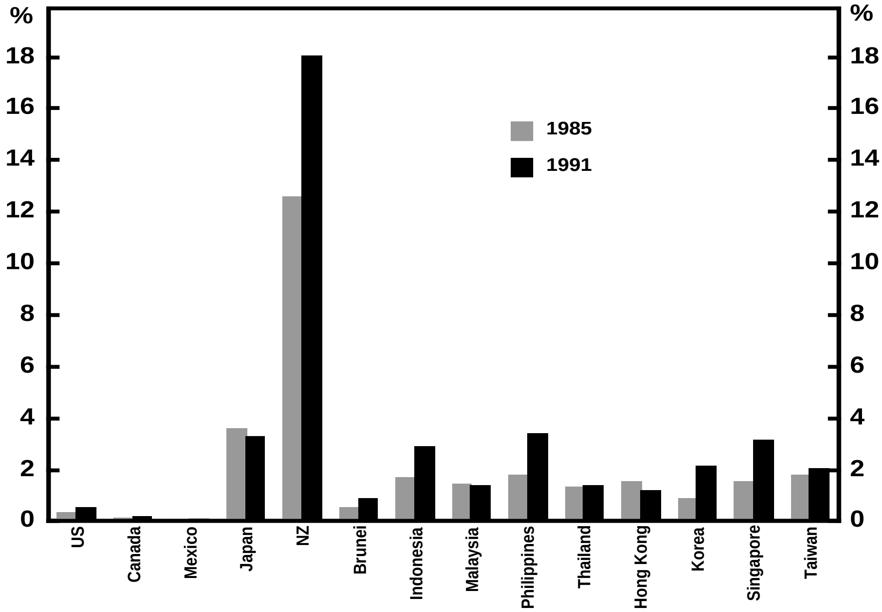
	Value 1982 ($m)	Value 1992 ($m)	Average annual growth 1982 to 1992 (per cent)	Contribution to total export growth to Asia 1982 to 1992 (percentage points)
Total	**3,667.3**	**17,706.7**	**17.1**	**100.0**
Export group	**2,280.9**	**11,568.7**	**17.6**	**66.2**
Food, beverages and tobacco	1,707.6	4,016.7	8.9	16.4
Basic metal products	573.3	7,552.0	29.4	49.7
Import group	**358.8**	**2,285.9**	**20.3**	**13.7**
Clothing and footwear	3.7	27.8	22.2	0.2
Transport equipment	35.1	400.0	27.5	2.6
Other machinery and equipment	214.7	1,370.9	20.4	8.2
Miscellaneous manufactures	82.1	351.5	15.6	1.9
Paper, printing and publishing	23.1	135.8	19.4	0.8
Intra-industry trade group	**783.1**	**2,887.4**	**13.9**	**15.0**
Textiles	430.5	1,737.2	15.0	9.3
Chemical, petroleum and coal products	352.6	1,152.2	12.6	5.7
Low-trade group	**244.5**	**964.6**	**14.7**	**5.1**
Non-metallic mineral products	14.4	141.0	25.7	0.9
Fabricated metal products	50.9	364.6	21.8	2.2
Wood, wood products and furniture	179.3	459.0	9.9	2.0

Source: DFAT Stars database.

combined (Table 1). In particular, exports of basic metal products to Asia grew strongly (at an average rate of 29 per cent per annum) as Australia's comparative advantage in early-stage processing of metals matches well with demand from rapidly growing Asian producers of more elaborately transformed metal based manufactures. Concerns have been raised about the declining share of aggregate exports in East Asian imports, the suggestion being that Australia may be losing competitiveness (IC 1993). Figure 15, however, shows that manufacturing sector exports have increased penetration in most markets over the period 1985 to 1991, including in most East Asian markets. At the same time, however, the share of Australia's total exports in East Asian imports fell from a little over 4 per cent to about 3.7 per cent (IC 1993).

In summary, the export performance of the manufacturing sector appears to be compatible with perceived requirements for increased integration with world markets, in particular the Asian region. Moreover, the data (at the 2-digit ASIC level) suggest that FDI flows have been generally consistent with assisting the adjustment process necessary

Figure 15: Penetration of Markets by Australia's Manufactured Exports



Note: Market penetration by Australia's manufactured exports is the share of Australia's manufacturing exports in each country's manufacturing imports on a broad economic category basis.

for a better trade performance. The lack of FDI investment in Asia (relative to total FDI assets) may have meant slower growth of exports to Asia than would otherwise be the case (IC 1993). However, the growth in exports to Asia has been impressive and with FDI outflows from Australia's manufacturing sector to Asia set to increase (see Access Economics (1994)), this constraint is likely to become less important.

That said, the very strong performance of some of the less competitive 'import group' industries is partly due to government assistance with restructuring aimed at lowering costs, promoting exports, and improving links with multinational companies. A more complete assessment of the underlying strength in these industries awaits the unwinding of restructuring assistance measures.

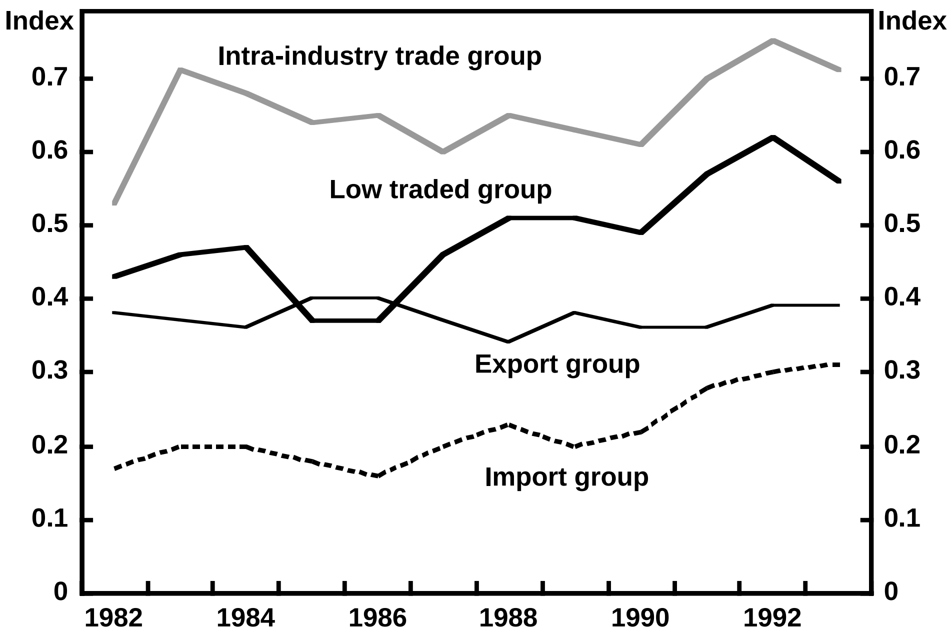
Finally, it needs to be remembered that manufacturing sector imports also grew very strongly over the past decade, and imports exceeded exports by more than $28 billion in 1992. The fact that imports exceed exports in manufacturing is not surprising. The generation of strong export growth relies on Australia's ability to produce specialised goods for niche markets. This takes time and involves increased imports as intra-industry trade expands.

3.5 Intra-Industry Trade

Throughout the discussion of recent trends in Australia's trade and FDI, mention has been made of signs that intra-industry trade has increased over the past decade. A sustained increase in the level of intra-industry trade signals increased specialisation and concentration on niche production/marketing within the industry. This is consistent with increased globalisation. It is also beneficial in the adjustment process for Australia's historically less competitive areas of manufacturing. To the extent that these industries can adapt and forge competitive strengths in specialised areas, the lower will be the costs to the economy in aggregate.

Figure 16 shows that intra-industry trade has increased significantly over the past decade in the import group and in the low-traded group of industries. The index is at a very broad level; lower levels of intra-industry trade would be expected in a more disaggregated study. Also it should be noted that, while a sustained increase in intra-industry trade is indicative of increased integration in international markets, it should not be taken as an indicator of competitiveness. For example, the index of intra-industry trade for the export group has remained quite flat, but competitiveness in these industries may have increased by as much, or more than, in the other industries shown. The export-group industries have historically engaged in *inter*-industry trade with high exports and low import penetration of the domestic market. For these industries the intra-industry trade index is unlikely to increase unless there is a significant increase in imports. Also, the increased intra-industry trade in the import group of industries mainly reflects the strong export growth over the past decade. The export performance in some of those industries may be due mainly to restructuring assistance measures. The rapid increase in exports and intra-industry trade may plateau with the winding down of these measures.

Figure 16: Intra-Industry Trade by Broad Industry Grouping



Note: Intra-industry trade is measured using the Grubel and Lloyd index. That is, I = 1 – [|X – M|]/[X + M].

4. Some Issues Arising from FDI Flows

The data presented in Sections 2 and 3 confirm that a feature of the process of internationalisation or globalisation in Australia is increased foreign direct investment and trade. Also, the cyclical nature of FDI suggests that FDI, both outwards and inwards, may be set to increase once recovery becomes more widespread. For example, on the outwards FDI side, Access Economics (1994) has estimated that as of March 1994, about 25 per cent of the value of projects to which Australian companies are committed (or are considering) would be directed offshore, compared with a figure of about 10 per cent just one year ago.

Greater caution following the debt overhang in the 1980s may see increased flows of inwards FDI (equity) in the 1990s (Whitelaw and Howe 1992). In addition, the importance of profitability in attracting FDI (Figure 3) and the current high levels of profitability, along with our geographical and trade links with the fast-growing Asian economies may help to attract FDI into Australia.

In theory, FDI can generate ‘win-win’ benefits similar to those generated through trade. FDI inwards can contribute to investment, import spillover benefits, increase competition domestically, and provide access to world markets. FDI outwards can generate high returns for domestic investors, export management expertise and know-how, enable the purchase of foreign technologies, and expand the market for internationally competitive domestic firms. Yet, the benefits of FDI are sometimes qualified.

Not everyone will welcome high levels of FDI flows. Setting aside ‘cultural’ arguments, typical concerns about FDI inflows in this context include: the potential to bias domestic production towards relatively low-value-added or low-growth industries; concerns about excessive market power of multinational enterprises (MNEs) (especially in certain industries such as the media); and beliefs that MNEs contribute to current account deficits, both through policies that are biased against net exporting and through undesirable capital inflows (that subsequently drive current account deficits, through servicing requirements).[19] It is also argued that outwards FDI can have negative effects on the structure of the domestic economy. In addition, there is a concern that outwards FDI may reduce domestic investment, exports and employment opportunities.[20]

The consensus among economists, however, is that such problems are either illusory, overstated or should be addressed directly rather than intervening in capital markets (and risking the loss of benefits associated with FDI, among other things).

4.1 FDI Flows and Industry Structure

It has been argued that FDI inwards can bias domestic production by displacing investment in strategic domestic activities such as research and development. Testing this hypothesis is beyond the scope of this paper. However, it should be noted that if something untoward were happening in this area, it would be likely to have implications for the conduct of domestic industry policy, rather than for capital market arrangements.

19. These sentiments appear to be more prevalent in the US where residents may have been surprised by the influx of FDI into that country in recent years (Graham and Krugman 1989). But with the strong flow of FDI into Australia recently, these issues may resurface. For an Australian perspective see Jones (1992).

20. Such concerns explain the restrictions placed on outwards FDI in Australia until the 1980s. See BIE (1984).

Another example of distortionary behaviour by FDI investors is alleged discriminatory commercial policies that distort domestic production (for example, procurement that is biased towards imports from the home market and export franchises). It is by no means clear that there are problems here. For example, the sourcing of inputs from the home country may be based on sound commercial considerations because home suppliers hold advantages (technological or otherwise) needed by the affiliate. Also, such advantages may diminish over time as suggested by MITI (1992). In fact, this issue may be more critical for Japanese FDI into the US than for Australia. Drysdale (1993) presents evidence to suggest that, in 1990, Japanese affiliates in Australia exported a greater percentage of total sales back to Japan than for investments in North America and Europe, while maintaining a fairly average ratio of imports in total purchases.

In addition, the discussion in Section 3 suggested that recent trends in the direction and composition of Australia's manufacturing trade have been consistent with perceived needs to create a more externally-oriented industry, focussing on production and export of more highly differentiated products for niche markets. Exports from industries based on adding value to mining resources have also grown strongly over the period, whereas exports of manufactures based on agricultural products have been relatively subdued. FDI flows, both inwards and outwards, appear to have been consistent with the industry restructuring needed to underpin a better trade performance.

Problems with multinational enterprises exercising market power also reflect more on domestic competition policies than on the behaviour of MNEs. In fact, there is a widely held view that industry concentration is not a problem as long as new firms can enter relatively easily. Unrestricted threat of entry by foreign investors may therefore be positive for domestic competition. Also, foreign investors can increase domestic competition through the use of new technology and management/workplace practices. Competition among potential suppliers to the foreign company may also be enhanced.

Concerns about alleged abuse of market power and strategic behaviour favouring the home market by FDI investors will remain. However, the analysis in this paper suggests that if there are problems in this area, they do not appear to have been very systematic, or the effects are so small as to have little or no impact at more aggregate levels. The likely answer is that abuses of market power by FDI investors proceed along similar lines as abuses by domestic investors – that is, on a case by case basis. It is worth noting that in the presence of factor-market imperfections, any investment (by domestic or foreign investors) is capable of distorting industry structure and trade.[21] The practical solution is to improve the operation of the appropriate market, through industry or competition policy. Should there be a specific instance of distortion-creating behaviour by FDI investors (in or out) there would probably be little or no implication for aggregate policy governing FDI flows.

4.2 FDI and the Current Account

Arguments that foreign companies influence the current account (in any direction) ignore the fact that current account deficits arise through domestic saving being less than investment, both of which are thought to be driven by more fundamental factors than the

21. For example, domestic investors could shepherd domestic labour into low-value-added activities if the investment is aimed at extracting rents through the exploitation of market power.The rents may be retained in the domestic economy but that is unlikely to help with obtaining the best industry or trading structure.

structure of external finance. On this view, to the extent that there are any effects of MNE intervention in trade flows, they would eventually be unwound by changes in the real exchange rate.[22] Also, inwards FDI appears to respond to fundamentals governing Australia's investment climate (including growth and profitability), rather than to changes in the aggregate financing requirement. Attempts to address the current account deficit through intervention in FDI flows would involve a high risk that adjustment may come about at a substantial cost to growth (through lower investment).

A coincident increase in both FDI inwards and outwards, such as we saw in the 1980s, may see a continuation of the dominant role for what is often regarded as more 'footloose' portfolio and other capital in financing the current account deficit. Figure 17 shows that the increase in outwards FDI meant that in net terms, FDI flows were very low in the 1980s. There is a suggestion that portfolio and other inflows helped to finance offshore FDI investment (Bullock, Grenville and Pease 1992).

If this happened again in the 1990s, net external debt would probably continue to grow in importance relative to equity in net external liabilities. Although this may help to alleviate concerns about 'selling off the farm', it may create renewed concern about exposure of the domestic economy to external shocks, and the costs of adjustment associated with increasing external debt.

On the basis of research by Kearney (1992) and Carmichael (1992), EPAC (1992) concluded that increased capital mobility has not been a source of greater macroeconomic instability, although the view is not universal (Schubert 1992). The potentially adverse consequences of capital market failures continue to be of concern to policy makers, although there is general recognition that there is little to be gained through direct government intervention in capital markets. To the extent that increasing external debt (or portfolio equity) creates problems, it reflects inadequate domestic saving rather than inappropriate external financial structures. Debate about a role for government in influencing the level of foreign debt rightly focus on its role in promoting domestic saving. See FitzGerald (1993), Whitelaw and Howe (1992) and Collins (in this Volume) for a discussion of these issues.

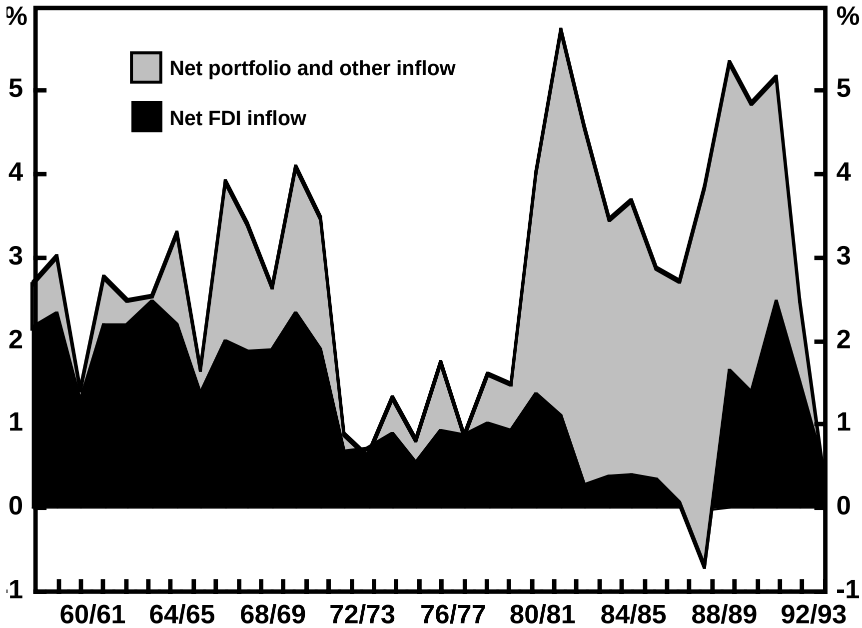
4.3 FDI Outflows and Domestic Investment

It is sometimes argued that outwards FDI may reduce domestic investment, exports and employment opportunities. For example, using a cross-country study of OECD countries, Feldstein (1994a) estimated that each $1 of outward FDI from the US reduces the domestic capital stock by about 20 to 40 cents. The implication is that export potential is shifted offshore. This view relies on the existence of impediments to international capital flows which mean that expansion of domestic capital stock is reliant on domestic saving.[23]

22. See Graham and Krugman (1989), Forsyth (1990) and EPAC (1993) for an Australian perspective on this.

23. In other words, outwards FDI shifts domestic saving offshore and domestic investors cannot access foreign saving to finance the implied increase in domestic investment opportunities.The importance of domestic saving for capital stock expansion is underlined by the widely held view that high rates of domestic saving have been an important factor in strong growth in the developing Asian economies. But capital markets are still regulated in these countries. For example, many of these countries have discouraged FDI as a source of capital, and high domestic saving may have been a more important source of finance for them than is the case in the developed countries. Also, World Bank (1993) found that per capita GDP growth was more likely to be leading to high rates of saving in the rapidly growing East Asian economies rather than the other way around.

Figure 17: Net FDI, Portfolio and Other Inflows
(per cent of GDP)



Note: Net non-official borrowing is the upper line on this stacked figure. It is equal to net FDI plus net portfolio and other capital inflows.

The notion that outwards FDI causes permanently higher unemployment requires domestic labour-market rigidities which impede adjustment to full employment (following any dislocation of jobs directly related to the offshore investment). Although correction of these rigidities may involve some short-term pain, their existence means that there would be high welfare costs associated with any economic shock – and policy should address them directly. Governments can help with the adjustment through programs aimed at reducing costs for the employees concerned, but impeding the flow of FDI offshore is likely to be counter-productive.

However, if outwards FDI lowers domestic investment (as claimed by Feldstein) it could lead to lower capital per worker domestically, reduced productivity growth and lower real wages. There are several points that mitigate such concerns.

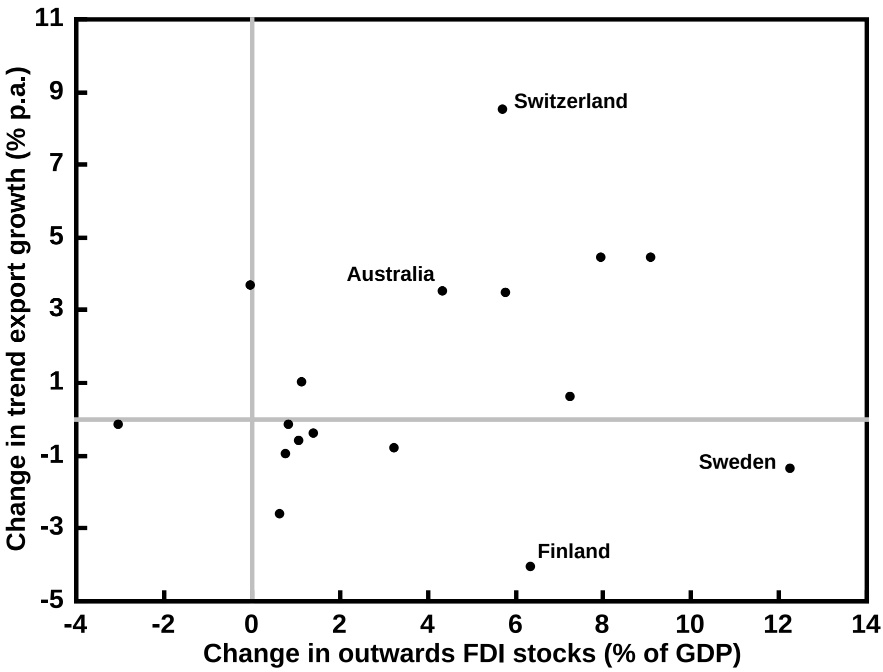
First, there may be differing impacts of outwards FDI on a large country that is a world leader in many production technologies (such as the US) compared with smaller, more open, countries that import technology, like Australia.

Second, country-specific studies have generally found that there is no reduction in the aggregate capital stock due to outwards FDI. Blomstrom and Kokka (1994), in a literature review of the issue for Sweden found that outwards FDI in that country stimulated domestic exports and investment. The result is based on the view that the subsidiary captures a greater market share than otherwise possible, and the exports of finished products that are displaced are offset by Swedish exports of intermediate goods and related products. Lipsey and Weiss (1981) and Lipsey (1994) have drawn similar conclusions based on US data.

Although data constraints have not enabled econometric studies of the effects of outwards FDI on exports and capital stock in Australia, most reports that have addressed the issue suggest that we should not be too concerned about possible negative impacts. The BIE (1984), Yetton *et al.* (1991), McKinsey and Co. (1993), and Edwards (1994) all concluded that outwards FDI was in net terms complementary to Australian exports. Thomsen and Nicholaides (1991) drew the same conclusion for Japanese outwards FDI. The OECD (1992b) suggests that for Japan a 1 per cent increase in the stock of outward FDI is associated with a 0.65 per cent increase in private capital stock in the domestic market.

Third, there are data which do not appear to support the notion that outwards FDI is systematically harmful for export growth, or for growth in capital stock per worker. Figure 18 suggests that changes in the trend rate of growth in exports between 1970-1984 and 1984-1991 across a sample of OECD countries is not strongly correlated with the change in holdings of FDI assets over the same periods.

Figure 18: Changes in Outwards FDI and Export Growth in OECD Countries

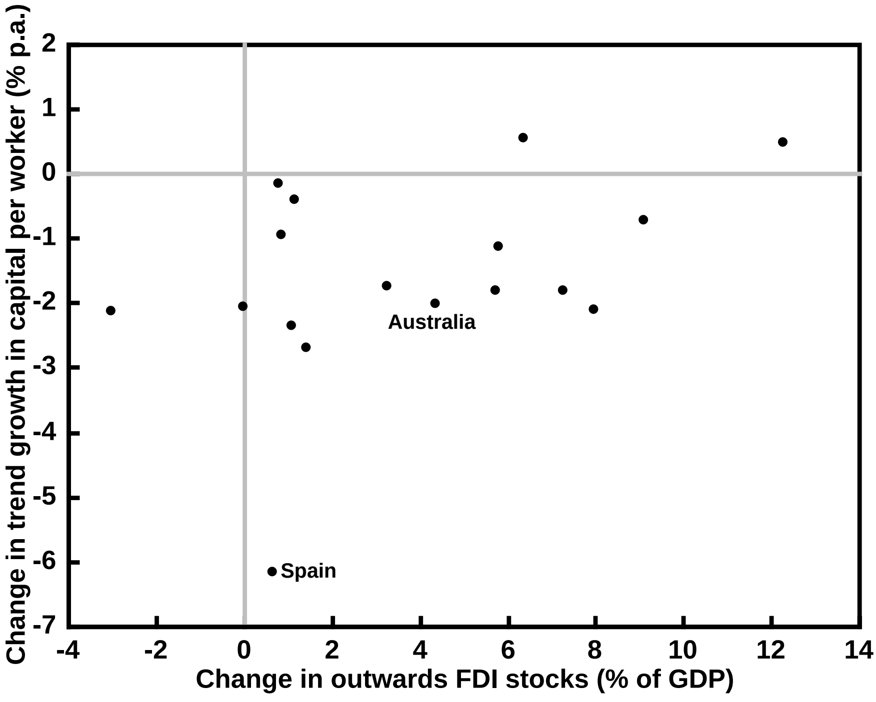


Note: The changes in outwards FDI and export growth relate to the periods 1984-91 and 1970-84. For FDI the change refers to the increase in FDI stocks from 1984 to 1991 less the increase from 1970 to 1984. The change in real export growth refers to the change in the trend rate of growth in exports from 1984 to 1991 less the trend rate of growth from 1970 to 1984. Exports are in volumes. FDI stocks are nominal relative to GDP. The sources of data for FDI stocks from 1970 to 1984 are Sinn (1990) and, from 1984 to 1991, Rider (1994). The export data are drawn from the OECD.

Figure 19 suggests that those countries which increased FDI outwards the most after 1984 tended to experience a lower trend reduction in capital deepening in the business sector than on average.[24] This implies that rather than reducing capital per worker, outwards FDI may help to increase it. One explanation is that outwards FDI from OECD countries may be biased towards labour-intensive industries such that domestic capital intensity is increased by the outflow. An example of this in Australia is the shift offshore of parts of the clothing and footwear industry – which has hardly made a strong contribution to exports. If this is the case, it is consistent with the finding elsewhere in this Volume (see Fahrer and Pease) that pursuit of productivity improvements have been the important factor in reducing employment opportunities for relatively unskilled workers in the 1980s.

Fourth, increases in the capital stock are not necessarily ‘good’ *per se*. It is rates of return that matter. Feldstein (1994b) found that, although outwards FDI reduces domestic investment, it is welfare enhancing for US residents as long as the after-tax rate

Figure 19: Changes in Outwards FDI and Growth of Capital per Worker in OECD Countries



Note: FDI outwards is the same as for Figure 18. Capital per worker is business sector capital stock relative to total employment. The data are drawn from the OECD Outlook Database. The change in trend growth of capital per worker is determined in the same way as export growth in Figure 18.

24. Trend growth in capital per worker (capital deepening) declined in most OECD countries in the 1980s as the general increases in real unit labour costs in the 1970s were unwound.

of return on the investment exceeds the after-tax cost of foreign borrowing used to finance the investment. This is based on the assumption that debt capital raised by foreign subsidiaries cannot be imported by the parent company to finance additional investment in the US – that is, it is an additional source of capital that is unavailable to domestic US investors.

Finally, the level of the domestic capital stock is determined by FDI inwards as well as outwards. Australia has always been able to raise sufficient capital to maintain an investment rate well above the OECD average and this continued during, and after, the large increase in outwards FDI in the 1980s. If we have a problem, it is that we have been unable to use our capital stock as efficiently as our competitors – our capital productivity is about 10 per cent lower than the OECD average.[25] The internationalisation of the economy appears to be helping to get the right structure of domestic investment (see Section 3), and it should also help to improve the quality of investment through embedded efficiency improvements. If we get these things right, we will almost certainly get right the amount of aggregate investment.

4.4 FDI Inflows and Domestic Investment

Figure 20 suggests that FDI investors, in aggregate, may be somewhat more sensitive to (or in a better position to react to) changes in the domestic climate than domestic investors. It shows that the relative decline in importance of FDI as a component of private business investment corresponds quite closely with the decline in company profitability seen in the mid 1970s. In other words, the data suggest that the allocation of foreign (or international) saving by multinational companies is more mobile than that of domestic saving. Alternatively, if the new growth theories which ascribe a key role for investment are correct, it is consistent with FDI inwards helping to drive economic growth in Australia.

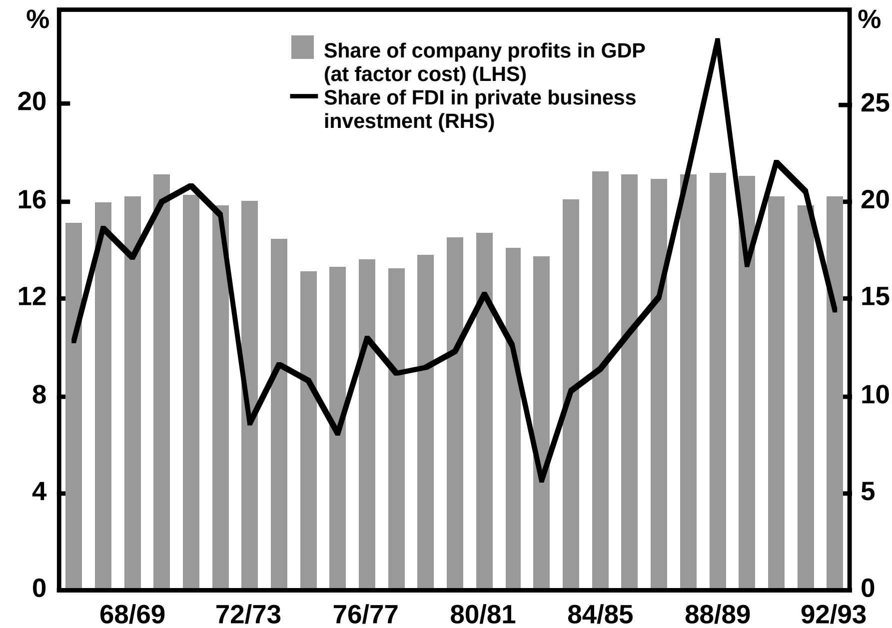
Either way, the data suggest that FDI investors in Australia play an important role in disciplining domestic economic management. This discipline may even go beyond that which multinational enterprises impose on private sector competitors and potential suppliers of goods and services to the MNEs. It adds weight to Kasper's (1992) arguments that the more immobile factors of production, such as government and workers, must create an attractive environment for investment. Moreover, it supports the view that we need to focus our attention on getting the climate for domestic investment right as the best means of attracting international capital. (See BIE (1993a) among many others.)

As is the case in most OECD countries, in the second half of the 1980s much was done to improve the domestic investment climate. That this is bearing fruit for Australia is suggested by recent improvements in perceptions about Australia's competitive position, as monitored by the IMD/World Economic Forum (1993),[26] especially in relation to the

25. It has been argued that this may be due to relative prices in Australia favouring less productive dwelling investments, compared with equipment (Dowrick 1994). Whitelaw (1994), however, argues that relatively high prices of equipment in Australia is a byproduct of lower efficiency growth.

26. Especially in relation to the executive opinion survey contained in that report.

Figure 20: Share of FDI in Private Business Investment and Corporate Profitability



government's performance in enhancing competitiveness and progress on internationalisation.

An FDI investor will clearly ascribe different weights to the various factors that determine location, depending on the characteristics of the project. It would be useful from a policy point of view to have a better idea of the relative importance of the contributing factors governing FDI flows in Australia, so that policy may be concentrated in certain areas. But, it needs to be borne in mind that location is determined on a project by project basis. For example, we might conclude that, in general, unit labour costs may receive little weight as a locational determinant for a higher-wage country such as Australia (especially with the abundance of cheaper and productive labour nearby in Asia). However, in the specific case, it may be the critical determinant of the choice between Australia and another similar OECD country. Also, the increased mobility of capital, and embodied technology and management skills, has meant that the costs of policy failure are potentially high.[27]

Finally, the internationalisation of the economy gives cause for optimism that the necessary changes are occuring to allow Australia to reap the full benefit of its recources. FDI plays a central role in this process. The challenge for govenment is to create the

27. In this sense, the process of globalisation has probably increased competition among governments in providing a suitable economic climate for investment.

climate to encourage high and profitable investment. Amongst other things this requires: ensuring appropriate taxation arrangements; enhancing the efficiency of economic and social infrastructure; improving the quality of human capital and technological capability; containing production costs; encouraging flexible workplace practices; and ensuring stable economic management. The process of internationalisation increases the benefits of getting these policies right.

Appendix A: Motivations and Locational Determinants of Direct Investment

The decision to invest abroad is generally thought to be motivated by differential returns on investment and the need for portfolio diversification. But, these factors alone fail to explain the distinction between 'portfolio and other' investment which does not require control over the host country assets, and FDI investment, which does (IMF 1991; Harris 1994).[28] In a perfect world there is no reason for choosing to exercise this control. The various explanations for the decision to invest directly in another economy have therefore come to rely on market imperfections of one sort or another.

The eclectic framework developed by Dunning (1988) combines three strands of theory on FDI – industrial organisation, internalisation theory, and location theory.[29] It suggests that a firm will engage in FDI only if:

- the firm possesses ownership advantages (e.g. patents, trademarks, management skills, and exclusive access);
- there are market imperfections such that it is more profitable for the firm that possesses ownership advantages to use them itself, rather than to sell or lease them to foreign firms; and
- it is profitable for the firm to utilise its advantages in conjunction with some factor inputs outside its home country.

The first two conditions establish the reasons that a firm may want to invest abroad. The third provides an insight into the issue of why certain locations are chosen over others.

Country advantages as locations for direct investment can take several forms. Table A1 shows the results of a survey of econometric studies of the effects of host and home-country characteristics on locational decisions by firms. Relatively little attention has been given to home-country characteristics to date, although Culem (1988) suggests that home characteristics relative to those in the host country can be influential in some circumstances. The results suggest that important host characteristics include market-based criteria such as the existing industry concentration, sales, population, and GNP. Market size is intuitively important. Taking a firm-specific advantage and succeeding in the US market, even if it were not growing much, would generate much larger profits than taking the same advantage to a rapidly growing Tuvalu (population 10,000). On the other hand, growth prospects are clearly important for assessing future demand.

The more policy-based variables capable of influencing the locational decisions of multinationals include trade-related measures (depending on the orientation of the investments), tax-related measures, transport infrastructure, and economic management. Skill levels, technological capability, and unit input costs are also shown to be key determinants of location.

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28. In fact, differential returns and portfolio diversification are regarded as satisfactory explanations for 'portfolio and other' investment.
29. Other theories, such as the product cycle and strength of currency, are regarded as unsatisfactory in some crucial areas (IMF 1991).

Another approach, that may have some application in Australia, is the process-oriented model of Johanson and Vahlne (1977) which suggests that initially companies focus on culturally close markets as potential locations, but more distant markets are considered as companies gain more experience (Yetton *et al.* 1991). Proximity and having the same language relative to the home country are also important according to Veugelers (1991).

The information in the following table is drawn from a background paper by Harris (1994) which presents results from a survey of econometric studies (in some cases using data drawn from companies and in others using aggregate statistics), of the effects of host and home-country characteristics on locational decisions by firms.

Table A1: Locational Determinants of Direct Investment

Variable	Reference	Effect	Comment
Host country variables:			
Population	Ondrich and Wasylenko (1993)	Positive	State study
Land area	Coughlin *et al.* (1991)	Positive	State study
	Bartik (1985)	Positive	State study
Per capita income	Woodward and Rolfe (1993)	Positive	Developing countries
	Coughlin *et al.* (1991)	Positive	State study
GDP (corrected for openness)	Veugelers (1991)	Positive	Intra-OECD FDI
GNP	Culem (1988)	Positive	Inter-industrialised countries. Results vary by sample. US FDI in EC
	Scaperlanda and Balough (1983)	Positive	US FDI in EC
	Lunn (1980)	Positive	
Change in GNP	Culem (1988)	Positive	Inter-industrialised countries. Generally significant but varies with lag
	Lunn (1980)	Varies	US FDI in EC
Acceleration in GNP	Lunn (1980)	Positive	US FDI in EC
GNP growth relative to home	Culem (1988)	Positive	Inter-industrialised countries. Generally significant
Predicted sales	Scaperlanda and Balough (1983)	Positive	US FDI in EC. Generally significant

Variable	Reference	Effect	Comment
Predicted sales growth	Scaperlanda and Balough (1983)	Positive	US FDI in EC. Generally significant
Non-tariff barrier	Jeon (1992)	Positive	Developed countries
Free trade zone	Woodward and Rolfe (1993)	Positive	Export-oriented investment. Developing countries
Trade barrier	Culem (1988)	Positive	Inter-industrialised countries. Results vary by sample. US FDI in EC. Generally significant
	Scaperlanda and Balough (1983)	Positive	US FDI in EC
	Lunn (1980)	Negative	
Interest rate relative to rest of world	Culem (1988)	Positive	Inter-industrialised countries. Often significant
Corporate and personal tax	Luger and Shetty (1985)	Negative	Results vary by industry. State study
Corporate tax	Ondrich and Wasylenko (1993)	Negative	State study
	Bartik (1985)	Negative	State study
Tax holiday length	Woodward and Rolfe (1993)	Positive	Developing countries
Restrictions on profit repatriation	Woodward and Rolfe (1993)	Negative	Developing countries
Transport infrastructure	Coughlin *et al.* (1991)	Positive	State study
Expenditure on higher education	Ondrich and Wasylenko (1993)	Positive	State study
Promotional expenditure to attract MNEs	Coughlin *et al.* (1991)	Positive	State study
Effort index	Luger and Shetty (1985)	Positive	State study
Political stability (rating)	Woodward and Rolfe (1993)	Positive	Developing countries
Exchange rate devaluation	Woodward and Rolfe (1993)	Positive	Developing countries
Inflation rate	Woodward and Rolfe (1993)	Negative	Developing countries
Jurisdiction deficit	Ondrich and Wasylenko (1993)	Negative	State study
User charges	Ondrich and Wasylenko (1993)	Negative	State study

Variable	Reference	Effect	Comment
Manufacturing concentration	Ondrich and Wasylenko (1993)	Positive	State study
	Woodward and Rolfe (1993)	Positive	Developing countries
	Coughlin *et al.* (1991)	Positive	State study
	Bartik (1985)	Positive	State study
	Luger and Shetty (1985)	Positive	State study
	Carlton (1983)	Positive	State study
Wage rate	Woodward and Rolfe (1993)	Negative	Developing countries
	Coughlin *et al.* (1991)	Negative	State study
	Bartik (1985)	Negative	State study
	Luger and Shetty (1985)	Negative	State study
Unit labour cost	Culem (1988)	Negative	Inter-industrialised countries
ULC relative to home country	Culem (1988)	Varies	
Technological capability	Neven and Siotis (1993)	Positive	Manufacturing FDI in EC
Labour skill (White-collar proportion)	Luger and Shetty (1985)	Positive	One of three industries. State study
(Number of engineers)	Carlton (1983)	Positive	One of three industries. State study
Workers' compensation insurance rate	Bartik (1985)	Positive	State study
Unionisation rate	Coughlin *et al.* (1991)	Positive	State study
	Bartik (1985)	Negative	State study
Unemployment rate	Coughlin *et al.* (1991)	Positive	State study
Ratio of actual rate to average over several years	Carlton (1983)	Positive	Results vary by industry. State study
Transport costs as proportion of export value	Woodward and Rolfe (1993)	Negative	Developing countries
Energy prices	Carlton (1983)	Negative	State study
Investment to GDP	Veugelers (1991)	Negative	Intra-OECD FDI
Same language	Veugelers (1991)	Positive	Intra-OECD FDI
Neighbour	Veugelers (1991)	Positive	Intra-OECD FDI
Neighbour x size	Veugelers (1991)	Positive	Intra-OECD FDI

Variable	Reference	Effect	Comment
Capital export control	Scaperlanda and Balough (1983)	Varies	US FDI in EC
Growth rate of home economy (lagged)	Jeon (1992)	Positive	Developed countries
	Jeon (1992)	Negative	Developing countries
Wages in home economy	Jeon (1992)	Positive	Developing countries
Exports from home to host country, relative to home GNP (lagged)	Culem (1988)	Varies	Inter-industrialised countries. Generally significant and positive

Source: Harris (1994).

Appendix B: The Structure of Private External Borrowing

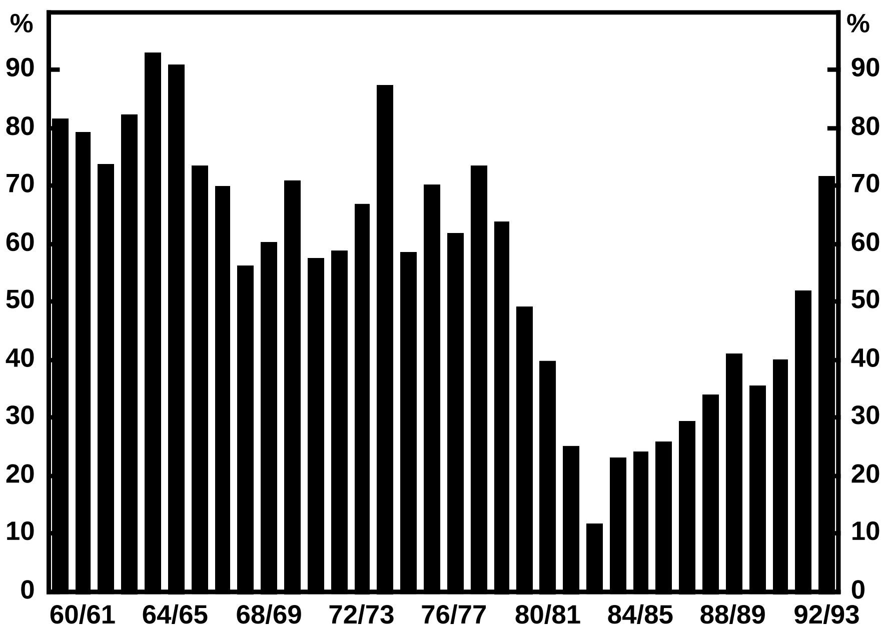
The increasing importance of inwards FDI for Australia over the past few years reflects a gradual return to the average contribution of inwards FDI to the gross financing requirement of the non-official sector applying in the late 1960s and early 1970s (Figure B1). Some of the apparent relative decline in FDI flows inwards in the 1980s may, however, be illusory.

First, the blurring of distinctions between FDI and portfolio and other capital investment due to innovations in financial intermediation makes it difficult to be too precise about the structure of corporate finance in the 1980s.

Second, some part of the debt classed as portfolio and other investment in Australia should properly be ascribed to FDI. The reason for this is that FDI flows can be in the form of equity or borrowing. Any offshore borrowing that is attached to foreign equity should, in principle, be allocated to FDI flows. Data from the ABS suggest that borrowing overseas by foreign companies has historically been very low relative to equity inflows, suggesting that FDI investors gear up using debt raised locally (see Figure B2). However, this may have changed following the liberalisation of capital markets in the early 1980s.

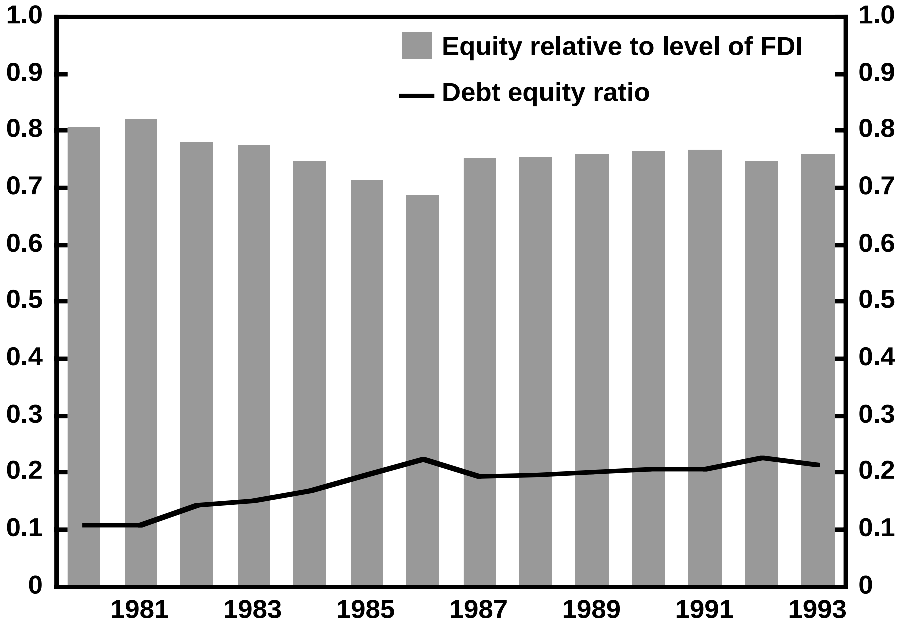
It is not unreasonable to expect that FDI investors increased their borrowing and debt/equity ratios along the same lines, or even more so, than domestic investors following financial liberalisation in the early 1980s. This, however, is not reflected in Figure B2 which shows that direct foreign borrowing levels relative to equity remained

Figure B1: The Structure of Non-Official Inwards Investment
(FDI flows relative to total capital inflow for Australia)



low. It is likely, therefore, that FDI investors geared up in the 1980s using some of the debt raised offshore by domestic banks – which is classified as portfolio and other investment but is tied to FDI liabilities.

Figure B2: Structure of Inwards Level of FDI and Implied Debt/Equity Ratio



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Japan's Foreign Direct Investment in East Asia: Its Influence on Recipient Countries and Japan's Trade Structure

Kazuhiko Ishida*

1. Increase in Japan's Foreign Direct Investment in East Asia

Following the sharp appreciation of the yen after the Plaza Agreement of September 1985**,** Japan's foreign direct investment (FDI) in East Asian countries increased rapidly: from around $US1 billion during the first half of the 1980s, it started to increase sharply in 1986 and hit a peak of around $US8 billion in 1989. This rapid increase then stopped as the appreciation of the yen slowed during 1990-92, although the level has stayed around $US6-7 billion (Figure 1). However, it should also be noted that Japan's total FDI has increased significantly since 1986, and that East Asia has not necessarily been the major investment destination for Japan (Figure 2).

The main factors that have driven this rapid increase in Japan's FDI in East Asia can be summarised as follows:

- the appreciation of the yen;
- the aggravation of trade friction;
- lower wages in East Asian countries; and
- imports from East Asian countries.

The appreciation of the yen after the Plaza Agreement was regarded as irreversible by most Japanese firms and, since corporate ability to maintain export volumes by squeezing profits was thought to be very limited, firms tended to respond by effecting structural changes to improve their competitiveness in international markets, including shifting production overseas.

In spite of the sharp appreciation of the yen, Japan's trade surplus did not decrease significantly until 1988, which further aggravated trade friction. Voluntary export restrictions vis-à-vis the United States and EC countries were introduced or strengthened in certain areas (automobiles, machinery etc.). In some cases, anti-dumping duties were imposed on Japanese exports. These restrictions on exports also prompted Japanese firms to shift production out of Japan. While some (mainly automakers) shifted production directly to North America and Europe, others chose to set up production sites in East Asian countries from which to export to the United States and Europe.

For most Japanese firms that have chosen to invest in East Asia, the main reason to shift their production was, at least initially, to take advantage of lower wages in these countries so as to improve their competitiveness in international markets. For example,

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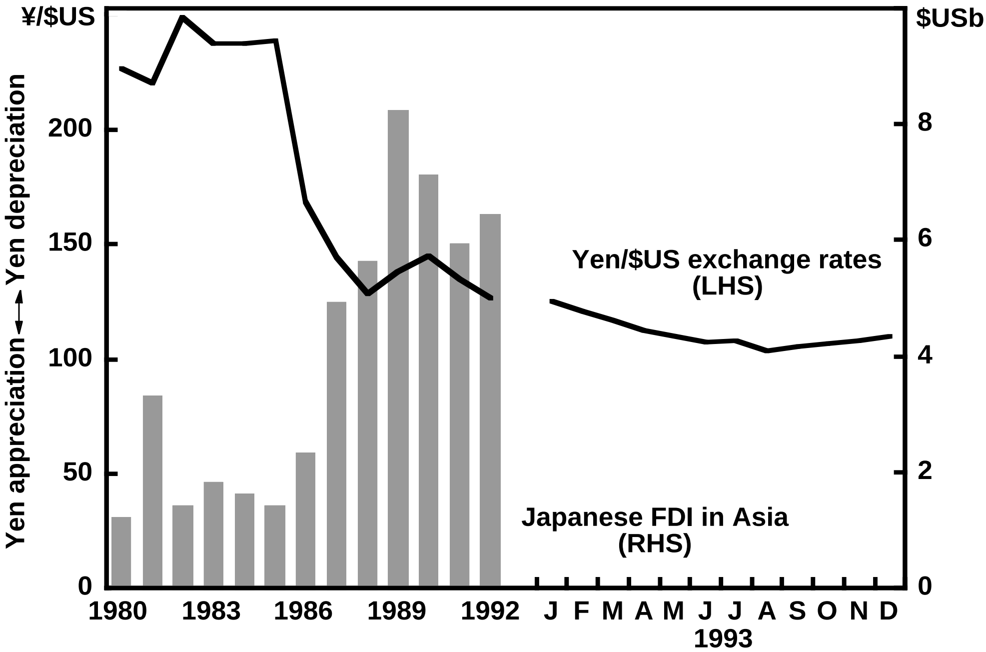
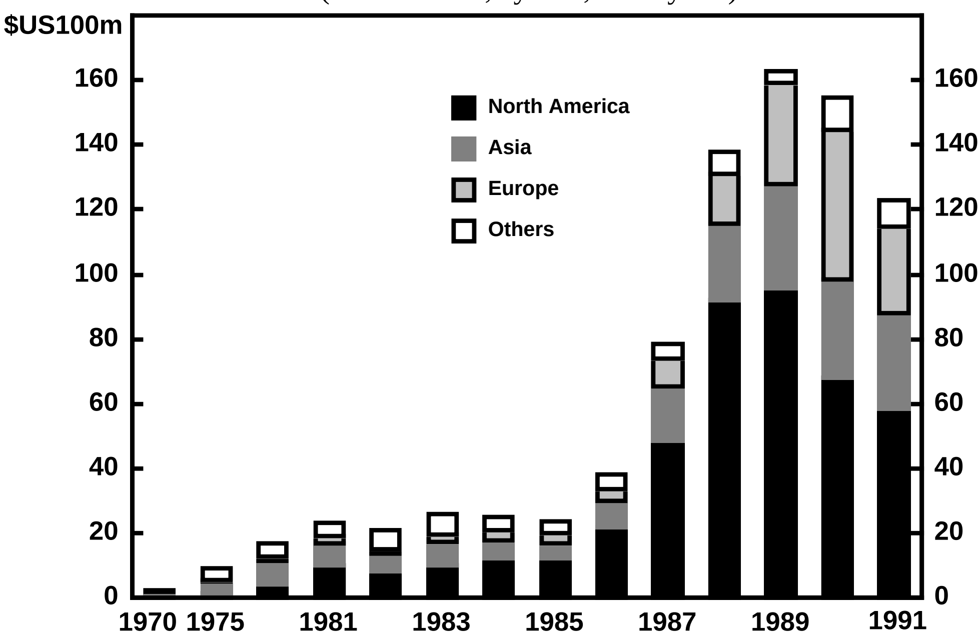
* The views expressed are those of the author and do not necessarily reflect those of the Bank of Japan.

Figure 1: Yen/US Dollar Exchange Rate and Japanese FDI in Asia



Note: The yen/$US rate is a central rate average.
Source: Ministry of Finance, *Annual Report of International Finance Bureau*; Bank of Japan, *Economic Statistics Monthly*.

Figure 2: Japan's Foreign Direct Investment
(manufactures, by area; fiscal years)

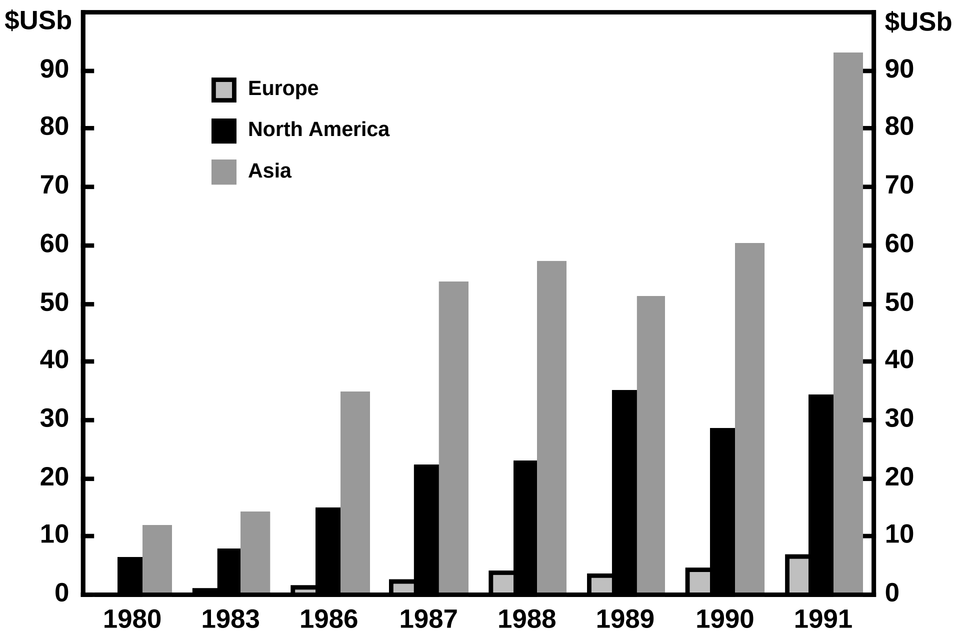


in 1986, average real wage costs in newly industrialising economies (NIEs) were only slightly more than 20 per cent (and in ASEAN countries less than 10 per cent) of the figure for Japan.

While most of the components were, at least initially, exported from Japan, the assembly process, which is relatively labour intensive, was shifted to low-wage countries in East Asia. This kind of production shift to East Asian countries can be thought of as a typical example of the most important structural response to the appreciation of the yen – that is, restructuring domestic production to specialise in high-value-added products. Similar to high-value-added final goods, certain components which require a high level of technology and a well-trained workforce remained competitive in spite of the sharp appreciation of the yen, as there were few competing producers. These components, therefore, could be, and in fact had to be, produced domestically. On the other hand, the assembly process, which does not necessarily need such high technology, nor such skilled workers, could be shifted to countries where wages were lower so as to improve the price competitiveness of the final product.

Whilst initially the main purpose for Japanese firms to invest in East Asian countries was to improve their competitiveness in international markets, as this shift proceeded, Japanese firms started to import certain products from their production sites in East Asia (Figure 3). This was especially the case for low-value-added or 'lower-end' goods. For these goods, competition in the domestic market is also high, and firms have tried to become more competitive by importing from their affiliates in East Asian countries where production costs are lower. In fact, in recent years, importing from overseas

Figure 3: Imports from Overseas Affiliates
(manufacturing)



Source: MITI, *Basic Survey on Japanese Business Activities Abroad.*

affiliates has been cited by a number of firms as one of the main reasons for undertaking FDI, especially in East Asia. For example, according to the survey published by the Export-Import Bank of Japan, more than 20 per cent of firms which invested in ASEAN countries in 1993 raised this reason; the corresponding figure being around 20 per cent in the case of China, and 12 per cent for NIEs.

2. The Influence of Foreign Direct Investment in East Asian Countries

As suggested by Figure 4, from the viewpoint of recipient East Asian countries, movements in the inflow of foreign direct investment can be classified into the following three stages:

- Investment in NIEs first increased during 1986-89. This was mainly because these economies provided a reasonably good environment for foreign investment in terms of infrastructure, level of education, institutional framework and political stability.
- Second, investment in ASEAN countries increased during 1988-90. This was because, by then, the wage level in NIEs had increased significantly, reflecting their own rapid growth (that is, the benefit of lower wage costs had largely been lost in NIEs). Even NIE firms started to invest in ASEAN countries as they gradually lost their competitiveness due to higher domestic labour costs as well as exchange rate changes vis-à-vis the US dollar.
- Since 1990, investment in China has grown dramatically in line with the opening up of its economy.

The share of Japan's investment in total FDI received by these economies has been around 30 per cent in NIEs and around 20 per cent in ASEAN countries. In the case of China, Hong Kong occupies by far the largest share, but this is because foreign investments, including those from Japan and the United States, made through affiliates in Hong Kong are included.

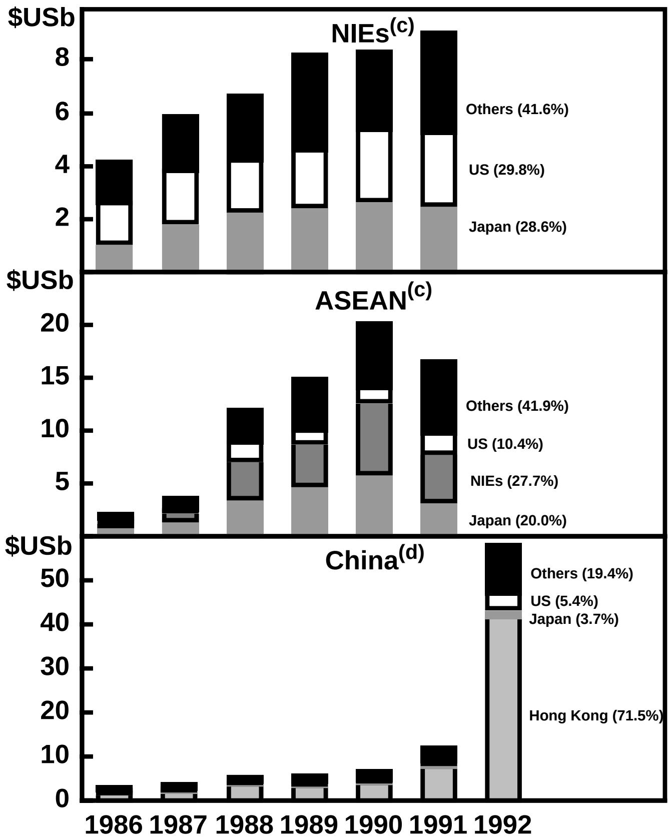
This rapid increase in FDI has had a significant impact on East Asian countries, not only economically but also socially. The scope of this paper, however, is limited to economic effects, which can be classified into three areas, namely: supply capacity, foreign trade and domestic demand.

2.1 Influence of FDI on Supply Capacity

The increase in FDI has influenced the supply capacity of recipient countries by effecting shifts in industrial structure, increasing labour productivity and contributing to production technology.

During the 1980s, in most East Asian countries, the primary sector decreased as a share of GDP while the secondary and tertiary sectors grew (Figure 5). This kind of change in industrial structure is, of course, seen in many industrialising countries, and it is not clear to what extent it can be attributed to the increase in FDI. Figure 6 indicates the relationship between shifts in industrial structure and the increase in FDI for Malaysia and Indonesia, where relevant annual data are available. It can be seen from this figure

Figure 4: FDI in NIEs, ASEAN and China (a)(b)



Notes: (a) Amounts are those approved by the governments.
(b) Based on the most recent available data.
(c) For Hong Kong, Singapore and Malaysia manufacturing sector only. Indonesia excludes financial and oil and gas sectors.
(d) Investment in China from Hong Kong includes indirect investment by United States, Japanese and NIE firms via Hong Kong.

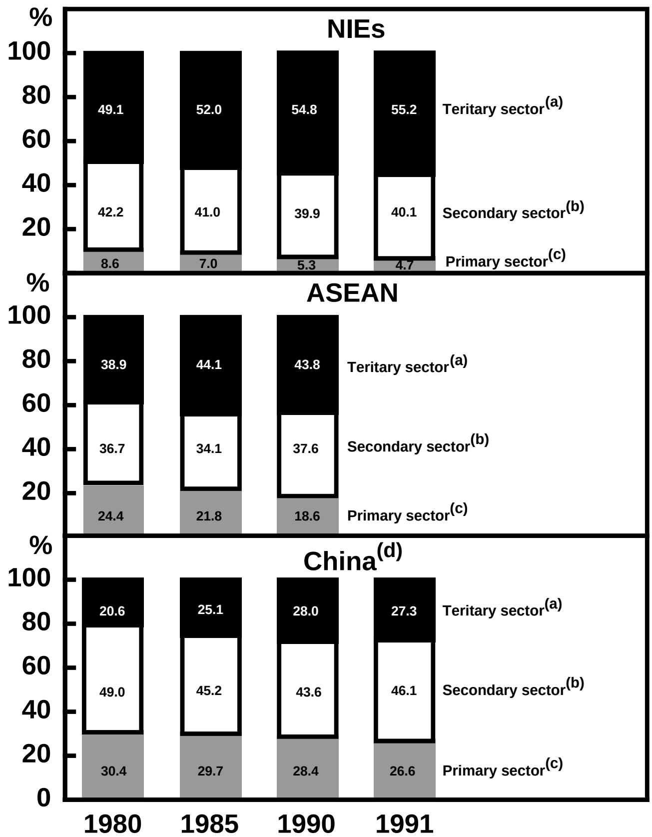
Source: JETRO, *Cross-Border Direct Investment of Japan and World: Investment.*

that the shift in industrial structure has taken place broadly in accordance with the increase in FDI, which suggests that FDI has played a significant role in changing industrial structure in these countries. It seems likely that this has also been the case in most other counties, although data availability is too limited to present clear evidence.

In the case of NIEs, the increase in the share of the secondary sector had halted by the mid 1980s and, in fact, the share has slightly fallen since 1985. This might be because the tertiary sector has been growing more rapidly in line with the growth of consumption in these economies, as argued later.

Labour productivity, measured in terms of real GDP per worker, has been on a steady increase in most East Asian countries since the 1980s (Figure 7). Although, again, it is

Figure 5: Sectoral Composition of GDP
(per cent)

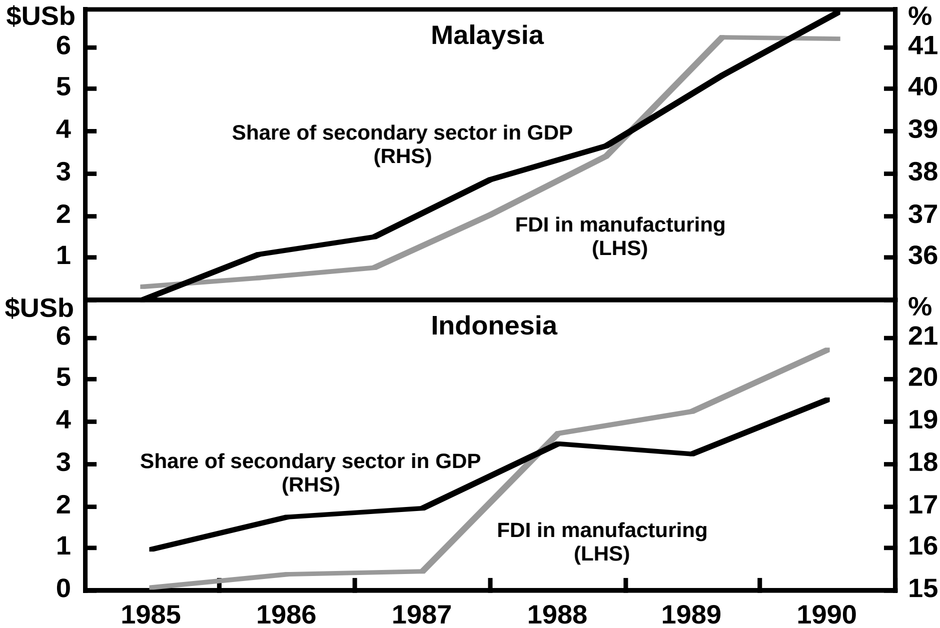


Notes: (a) Services, etc.
(b) Manufacturing, mining and construction.
(c) Agriculture, forestry and fisheries.
(d) GNP basis.

Sources: Asian Development Bank (ADB), *Key Indicators of Developing Asian and Pacific Countries*; and local statistics.

not clear to what extent FDI has contributed to this improvement, in most ASEAN countries (except the Philippines) it seems to have played a major role. This is suggested by the fact that the acceleration of labour productivity has coincided with the rapid increase in FDI, and that the share of FDI in aggregate domestic investment remains at an extremely high level. Comparing the development of the capital equipment ratio with FDI in Thailand and the Republic of Korea (for which statistics are available), there is a clear sign of labour productivity improvement in Thailand in the second half of the 1980s, with FDI serving as a locomotive enhancing the ratio. In the Republic of Korea also, developments in the capital equipment ratio generally coincide with those of FDI received (Figure 8).

Figure 6: FDI in Relation to Industrial Structure



Sources: JETRO, *Cross-Border Direct Investment of Japan and World: Investment*; ADB, *Key Indicators of Developing Asian and Pacific Countries.*

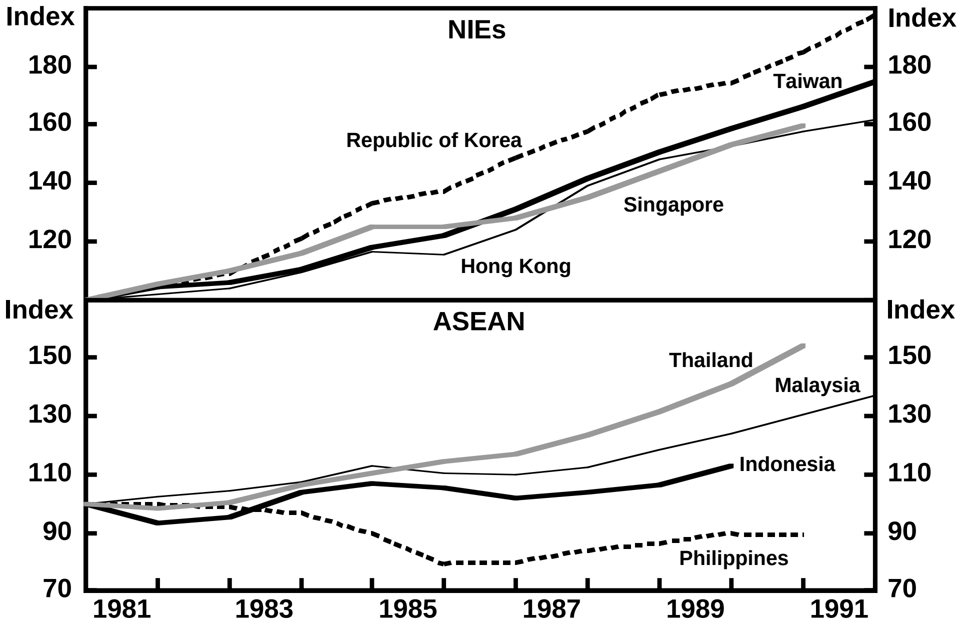
The increase in FDI is expected to contribute to the progress of production technology in recipient countries (technology transfer). This effect is very difficult to quantify. It could, for example, be guessed from the increase in the share of industrial products in total exports and the increase in exports to industrial countries (Figures 9 and 10), which will be mentioned later. It is, however, often argued that those exports are still produced by the affiliates of firms from Japan and other industrial countries. Thus the extent to which the technology has been well transplanted in recipient countries might be questionable.

2.2 Influence of FDI on Foreign Trade

In accordance with the shifts in the industrial structure induced by the increase in FDI in East Asian countries, the structure of their exports has changed gradually. The share of industrial products in total exports has grown significantly since the mid 1980s and the share of primary products has decreased (Figure 9). This change is supposed to have contributed to making their export earnings less sensitive to movements in commodity prices, which has laid a solid basis for their stable growth.

The contribution of net exports to their growth, however, has remained fairly limited, because their imports have also increased broadly in line with exports (Figure 10). This increase in imports can be mostly attributed to the import of capital goods and intermediate goods (various components) associated with FDI. It should, however, be

Figure 7: Real GDP per Worker
(1980 = 100)



Sources: Bank of Japan, *Foreign Economic Statistics Annual*; ADB, *Key Indicators of Developing Asian and Pacific Countries*.

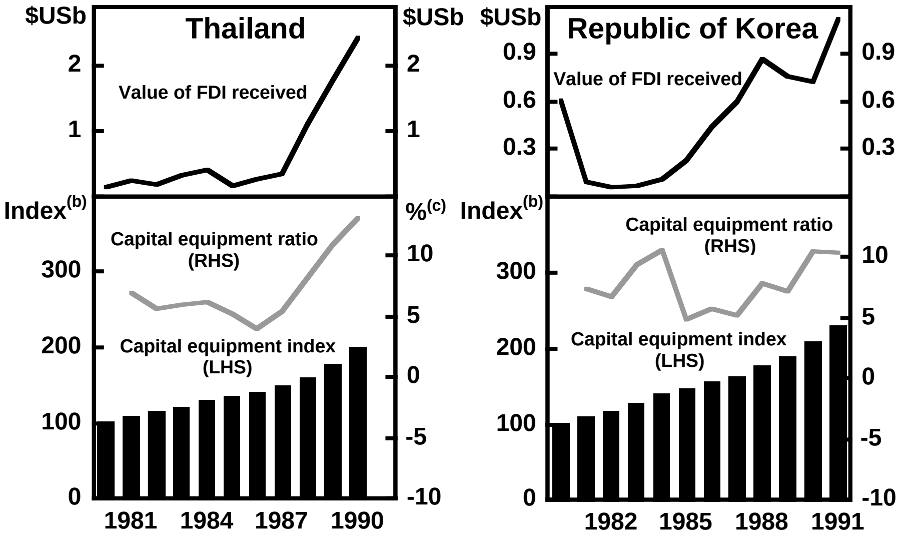
noted that, without the expansion of their export market induced by the shift in their export structure, the increase in their imports of capital goods would not have been possible, which would have significantly limited their economic growth.

In addition, because of the change in the export and import structure in each country induced by the increase in FDI, regional trade flows have changed significantly (Figure 11). For example, the value of trade (exports plus imports) between the United States and NIEs doubled between 1985 and 1992, and that between Japan and NIEs tripled, at least partly reflecting 'indirect' exports from Japan to the United States through NIEs. A similar pattern is also observed for ASEAN countries. Furthermore, the expansion of inter-regional trade flows among NIEs, ASEAN countries and China, is also significant. This expansion of inter-regional trade seems to reflect strengthening of mutual economic ties, especially the establishment of the horizontal division of production among those countries, which has gradually grown as a result of the increase in FDI.

2.3 Influence on Domestic Demand

The increase in FDI, combined with domestic investments induced by FDI, seems to have resulted in an expansion of job opportunities in East Asian countries, which has contributed to a rise in personal income, and hence personal consumption. The increase in domestic demand induced by FDI through this channel is likely to have also supported

Figure 8: Capital Equipment Ratio in Thailand and Korea[(a)]



Notes: (a) Capital equipment to labour ratio (K/L) and accumulated investment (K) from 1965, on the assumption that annual capital depreciation is 6 per cent.
(b) Index, 1980=100.
(c) Annual percentage change.
Sources: IMF, *International Financial Statistics*; and local statistics.

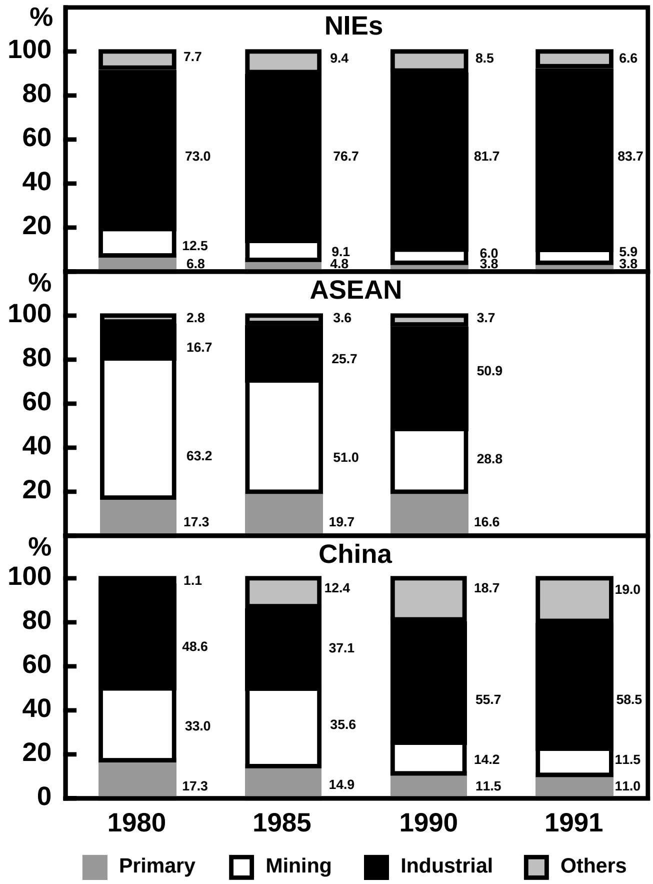
the high growth enjoyed by East Asian countries in recent years. In fact, parallel increases in FDI, labour income and personal consumption can be observed in NIEs, ASEAN countries, and China (Figure 12).

3. Influence of the Increase in Foreign Direct Investment on Japan's Trade Structure

The rapid increase in Japan's FDI has also affected Japan's own trade structure. Noteworthy is that while the share of Japan's FDI in East Asia is not so large compared with Japan's total FDI, its influence has played a significant role in changing Japan's trade structure.

First, the rise in FDI has resulted in an increase in so-called 'induced' exports. At the initial stage of overseas production, capital goods (mainly production equipment) are usually exported from Japan. Then, once production has started, many components for production are exported. In fact, a significant increase in exports to overseas subsidiaries has been observed in line with the increase in FDI (Figure 13). This increase in induced exports has been particularly significant in the case of FDI in East Asian countries because the supply of capital and intermediate goods has been very limited in these countries. An increase in induced exports is expected to lower the price elasticity of Japan's exports, because induced exports tend to respond less to exchange rate fluctuations.

Figure 9: Share of Export Items



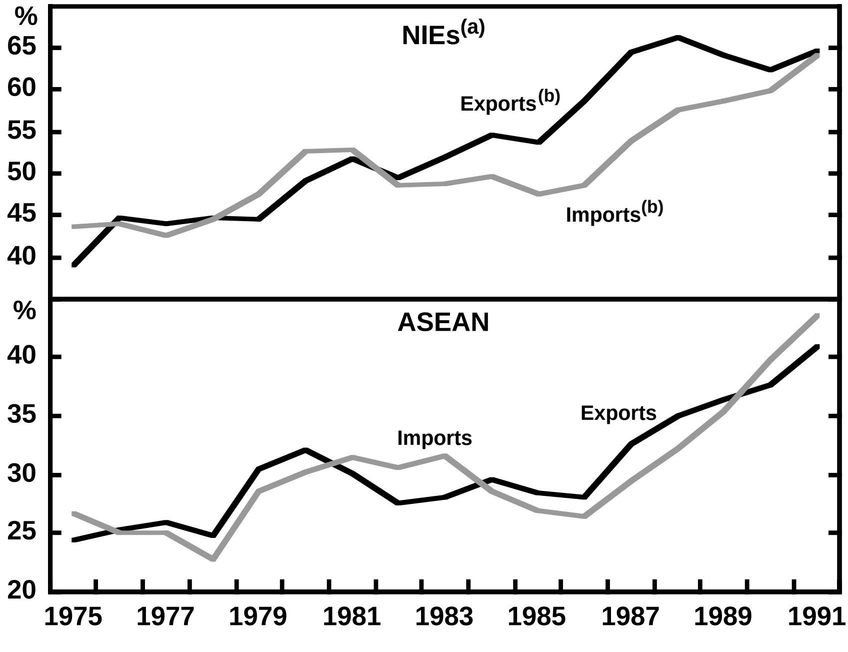
Sources: ADB, *Key Indicators of Developing Asian and Pacific Countries*; Bank of Japan, *Foreign Economic Statistics Annual*; and IMF, *International Financial Statistics.*

Second, as stated before, restructuring of domestic production has taken place in accordance with the increase in FDI, so that domestic production has come to be more specialised in high-value-added goods. These high-value-added goods are often technology intensive, and hence exhibit strong non-price competitiveness. Export of these goods, therefore, tends to be less sensitive to changes in the exchange rate, resulting in the lower price elasticity of Japan's exports.

As a result of the two above-mentioned factors, Japan's export volume is expected to have become less elastic to changes in the exchange rate. In fact, the elasticity of Japan's export volume to the relative price factor is found to have decreased significantly for the estimation period after the Plaza Agreement (see Table 1 results for 1986-92).[1]

1. It should be noted that structural changes took place continuously during the estimation period, and hence the estimated parameters could be different from those to be obtained after all the changes have been completed. This is also the case for Table 2, where the results seem more puzzling.

Figure 10: Share of Imports and Exports in GDP
(per cent)



Notes: (a) Excludes Singapore.
(b) Calculated using the figures of exports and imports from the national accounts.

Sources: IMF, *International Financial Statistics*; and local statistics.

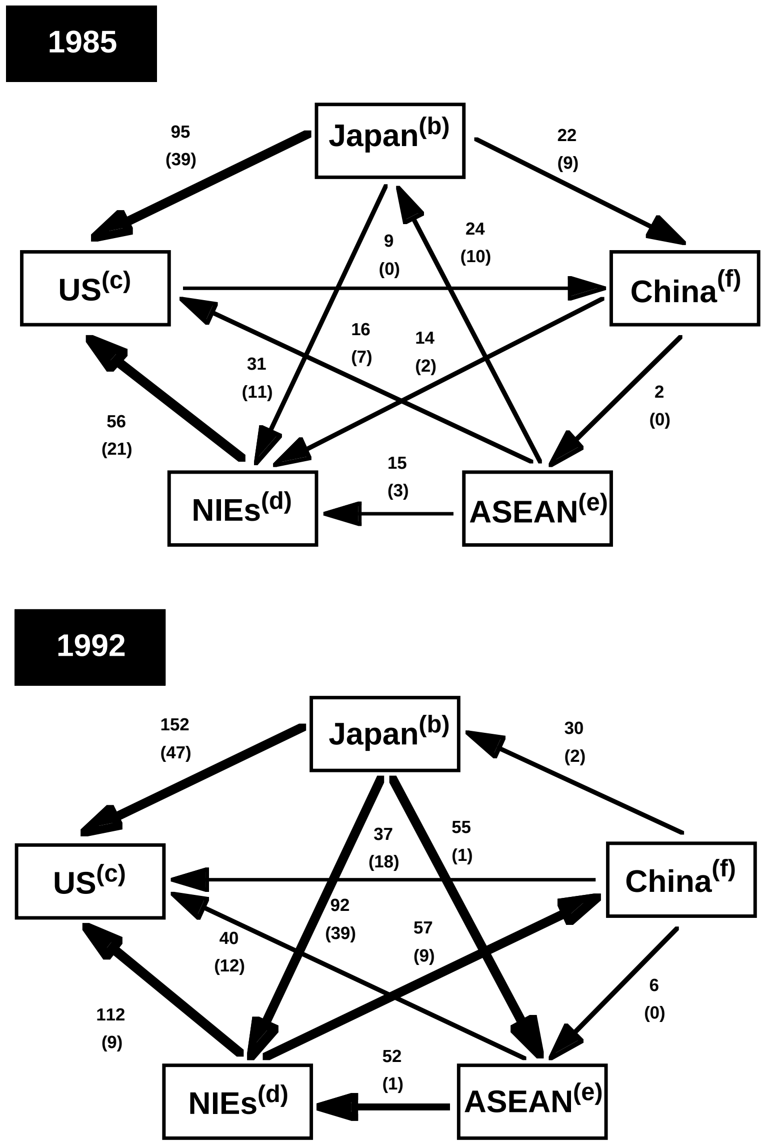
Table 1: Parameters of Export Volume Equations

Estimation period	Income factor	Relative price factor
1975:1 – 1985:4	1.75	-1.53
1986:1 – 1992:3	0.50	-0.62

Third, on the import side, the shift of production of low-value-added or 'lower-end' products overseas, associated with the increase in FDI, has resulted in an increase in imports from Japanese firms' overseas affiliates. This, again, has been particularly the case for FDI in East Asian countries because the shift of production of this category of goods has been mainly directed to these countries where the advantage of lower wages is larger.

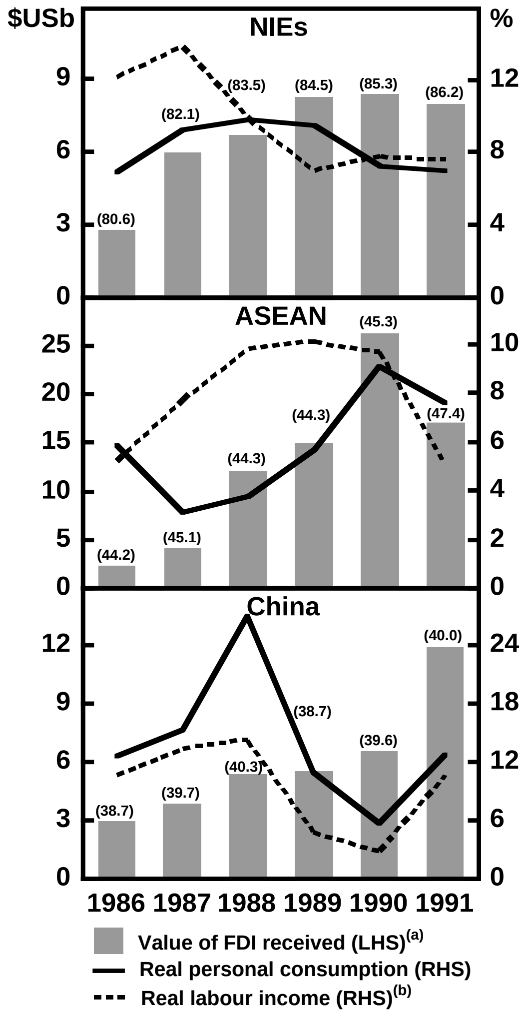
For individual firms, this shift has meant the establishment of the horizontal division of production between domestic factories and those overseas. Once this division has been established as a result of FDI and importing from overseas affiliates has commenced, the existence of 'sunk costs' tends to prevent frequent adjustment in such imports. For example, import volumes are less likely to decrease immediately even when the yen

Figure 11: Changing Trade Patterns (a)



Notes:
(a) $US billion. Trade values of exports and imports. Figures in parentheses represent trade balances. Intermediary trade via Hong Kong partially adjusted.
(b) Trade values between Japan and other partners excluding China based on Japan statistics.
(c) Trade values between US and China/ASEAN based on US statistics.
(d) Trade values between NIEs and China/US based on NIEs statistics.
(e) Trade values between ASEAN and NIEs/China based on ASEAN statistics.
(f) Trade values between Japan and China based on China statistics.

Figure 12: Personal Income, Consumption and FDI
($US billion; annual percentage change)



Notes: (a) Values of FDI are those approved by the governments. For Singapore and Malaysia, manufacturing sector only; for Indonesia, excluding finance and oil and gas. Figures in parentheses represent share of workers engaged in secondary and tertiary sectors on a GDP basis.

(b) Figures represent labour income of workers in secondary and tertiary sectors on a GDP basis.

Sources: IMF, *International Financial Statistics*; JETRO, *Cross-Border Direct Investment of Japan and World: Investment;* ADB, *Key Indicators of Developing Asian and Pacific Countries,* and local statistics.

depreciates. In other words, at least some of the influence of exchange rate changes can be absorbed by each individual firm in terms of the reallocation of profit between head office and overseas subsidiaries. This could be a possible factor reducing the elasticity of Japan's imports to exchange rate changes.

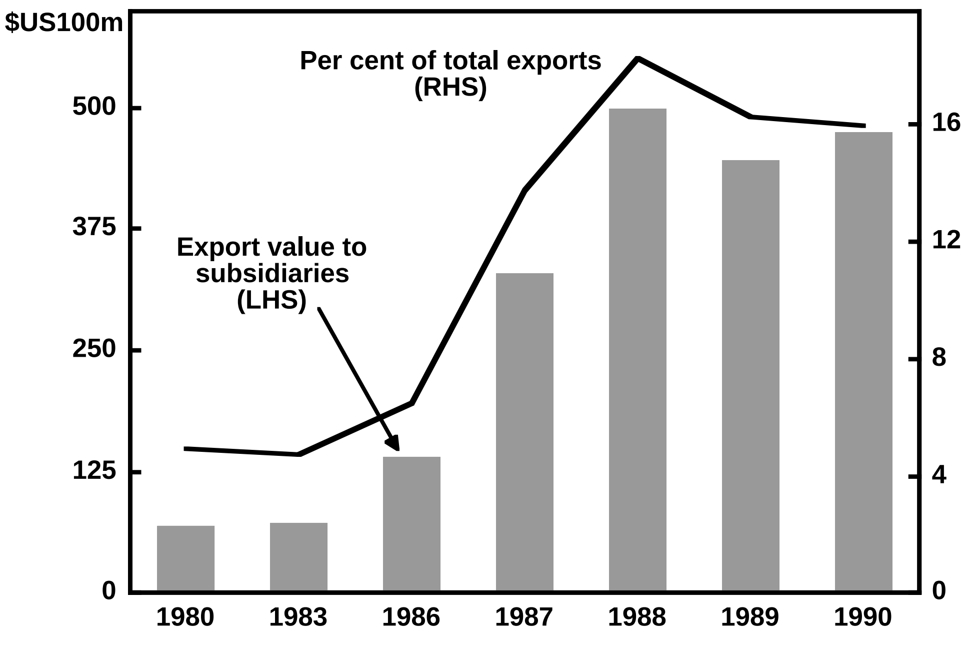
In fact, the price elasticity of Japan's import volume seems to have fallen slightly (from -0.33 to -0.26) since the Plaza Agreement (Table 2), although it is questionable whether or not this fall is statistically significant. Taking account of the fact that this observed fall during 1986-92 took place against the background of various structural measures to promote imports, it seems that the influence of the increase in FDI on Japan's imports has, in fact, been significant.

Table 2: Parameters of Import Volume Equations

Estimation period	Income factor	Relative price factor
1975:1 – 1985:4	0.88	-0.33
1986:1 – 1992:3	1.04	-0.26

In conclusion, it is likely that these changes in Japan's trade structure induced by the increase in FDI have made Japan's trade balance less sensitive to exchange rate changes. It is, therefore, possible that changes in the exchange rate have become less effective in adjusting the trade imbalance as a result of the increase in FDI.

Figure 13: Exports to Japanese Overseas Subsidiaries



Note: Export value equals total purchases of Japanese overseas subsidiaries multiplied by the per cent of purchases from Japan, in each fiscal year.

Discussion

1. Bijit Bora

Terms such as 'globalisation', 'integration' and 'internationalisation' are commonly used to describe events in the global economy during the past decade. Despite a formal definition of each term, they all share the common factor that the economic significance of national borders has been reduced. Various indices can be constructed to measure the extent of this development and we can be sure that one such measure is the flow and stock of foreign direct investment (FDI).

The task that has been set for John Howe is, indeed, a difficult one. He has been asked to examine the effect of foreign direct investment on Australia's pattern and volume of international trade. The paper begins with an exploratory picture of Australia's role during the global surge in FDI during the late 1980s. Figure 1 shows quite convincingly that Australia was not left behind. Its inward and outward FDI as a share of GDP rose sharply and then declined at a time when global FDI had also declined rapidly.

Most explanations of the surge in FDI during the late 1980s have focussed on the appreciation of the yen, financial market deregulation and international integration. Howe subscribes to each of these explanations and does not suggest that Australia has responded differently from other countries. He also notes, quite correctly, that during the 1980s Australia was in the midst of its own unilaterally imposed structural adjustment process caused by financial market deregulation and reductions in protection.

When examining the role played by FDI in changing Australia's trade orientation, Howe is unable to conclude that FDI has had any significant impact. Between 1983 and 1992, the growth in Australia's trade with Asian countries dominated the growth in trade with developed countries. In contrast, developed countries played a major role as sources of, and hosts for, FDI. Howe is at odds attempting to explain this result. He does suggest that information asymmetry may have been a problem, or possibly the compatibility of the Australian market with other developed country markets.

The primary focus on the structural effects of FDI was on the manufacturing industry. Howe uses revealed comparative advantage (RCA) indices along with changes in import and export shares to measure the effects of FDI. The data presented in this section are exploratory. Howe does not seek to test any particular hypothesis, but tries to deliver evidence of any correlations that may be present in the data.

Howe creates a measure of FDI orientation which is the ratio of FDI assets to liabilities in a particular industry plotted against a RCA index. I'm not sure what to make of Figure 10. We have some industries that have invested offshore and increased their RCA values, but then so have some industries that increased their liabilities relative to their assets. Perhaps the ambiguity arises from the implication that the outward-orientation ratio treats outward and inward flows symmetrically. A dollar of FDI overseas could be cancelled out by the flow of a dollar of FDI into Australia. Such a treatment ignores the difference in technology and asset transfer associated with inward and outward FDI.

Even if the figures showed a clear trend in Australian industries towards one particular quadrant, a more important question is whether or not the methodology adopted by

Howe is robust. Howe's explanation of his results assumes that domestic and foreign firms behave the same way and have the same trade, employment and business conduct practices. Is it possible that only domestic firms have been the explanation of the change in the RCA values?

Ergas and Wright in this Volume go to great lengths to explain the behaviour of domestic firms. Bora (1992) shows that the local sales propensity of American affiliates in Australia is quite high in absolute terms. This would indicate that US affiliates are inward looking. Drysdale (1993) and MITI (1992) examine data on Japanese and American affiliates and find that, in general, Japanese affiliates are more outward looking than American affiliates. Does this result hold for Australia? Does this mean that Australia should encourage outward-looking investors?

In the absence of a more robust theoretical model of how changes in the FDI orientation affect trade patterns, the best that the Howe paper can do is be suggestive. One possible mechanism to explain his results is to examine the role played by FDI in affecting industry structure. The structural approach emphasises industry structure as a rationale for entry into a foreign market.[1] Multinationals possess firm-specific assets that allow them to exploit a degree of monopoly power and also enjoy increasing returns to scale technology. The contrast between this approach and the capital accumulation approach is obvious. It suggests that in order to examine the effects of foreign direct investment on trade one needs to examine, first the effects of multinationals on the domestic market structure and second, how these changes will flow through and affect the pattern and volume of trade.[2]

Howe makes no attempt at all to examine the structural effects of foreign participation in Australian industry. This is not surprising and probably wasn't feasible given the time required to write the paper. However, I am raising this issue since it deserves future attention and in my mind is where the research should be headed.

Market structure is the 'nature of the beast'. Multinationals are prevalent in imperfect markets by virtue of the firm-specific asset that provides them with an advantage in the market place. The most recent paper to address the issue of foreign investment is Caves (1984). Even then his study, despite its comprehensiveness, is targeted at the general issue of scale and productivity. However, scale and productivity are structural issues and they determine the pattern of trade. Caves, using 1977 data, finds that foreign involvement in manufacturing had a positive effect on productivity and scale, which would lead to a more competitive industry.

While Caves's findings are interesting, the use of 1977 data does not allow us to extend his conclusions to 1994. More work based on the Caves study using recent data

1. An alternative approach is to emphasise the foreign capital element of FDI, which is the approach that Howe seems to be have adopted. This approach is consistent with the treatment of foreign capital flows used in the traditional two-sector model of trade. The papers by Bhagwati and Brecher (1980) and Brecher and Bhagwati (1981) have examined many of these issues. Markusen (1983) addresses the issue of whether or not factor flows and trade flows are complements. However, one would question the application of the basic trade model to examining the effects of multinational corporations because of its reliance on constant returns to scale and perfect competition. For a general treatment and proposed framework for analysing multinational corporations see Markusen (1991).

2. The latter approach is contained in Helpman and Krugman (1985). Bora (1994) applies these basic concepts when he illustrates the effects of Australia's attempt to induce foreign factor flows by using trade policy.

could yield some interesting results. A comparison of these results with Caves (1984) would also indicate to what extent scale, productivity and openness have impacted on the structural adjustment of Australian industries during the past decade of ‘globalisation’.

A study based on this approach would provide an insight into Figures 10,12 and 13 in Howe’s paper.[3] These tables suggest interesting correlations. However, the revealed comparative advantage index is calculated for the industry and does not distinguish between foreign and domestic firms. Therefore, changes in the index could be attributed to a change in orientation of domestic firms.[4] But, to what extent has openness motivated these changes?

This issue is also taken up in the paper by Ishida in his examination of Japanese investment in East Asia. Ishida has the advantage of using superior data and is quite convincing in his argument that FDI has had a structural effect in East Asia and in Japan. The most prominent finding in his paper is to confirm that Japanese multinationals shift capital goods and production equipment and then follow that with exporting intermediate goods. The net effect is a shift in the composition of trade caused by the establishment of a production facility overseas. I would agree with this finding and would argue that similar data are required to study the effects of multinationals on Australia’s trade structure.

Conclusions

The Howe paper is an important contribution to an area that is of increasing significance to the Australian economy. He has adequately completed the first step which is to ensure that economists have an indication of the general trends and flows of foreign direct investment. There are questions about his methodology that would indicate some reservations about drawing implications about the effects of these flows for Australia. Nevertheless, he has set the stage for future work.

Howe concludes that foreign direct investment has not impeded Australia’s structural adjustment process. I would argue that further work in this area will rephrase this conclusion in a more positive manner and show that foreign direct investment unambiguously complements the structural adjustment process.

Policy Implications

Howe did not summarise with any policy implications so I shall conclude by attempting to draw three to attention:

- the current focus of targeting the Asia-Pacific region;
- the implications for competition policy; and
- Australia’s foreign investment policy.

3. A parallel issue is how these structural changes will affect the response of Australian industries to exogenous changes and whether or not foreign and domestic firms will respond differently. Caves (1991) analyses this issue for the Canadian manufacturing sector and concludes that foreign ownership does have some effect.

4. Ergas and Wright in this Volume show that foreign firms in the Australian manufacturing industry tend to be more outward looking than domestic firms.

It is no secret that the Australia's current foreign and trade policy is aimed at the Asia-Pacific region. There are few who would argue against this policy. What is at issue is the sequence of trade and investment initiatives that are required for a consistent policy. One unique finding of Howe's paper is to show that while Australia's trade has expanded rapidly in the Asia-Pacific region, it has not been complemented by outflows of capital. This would suggest that foreign direct investment would not complement trade flows.

Such a conclusion would be erroneous. Howe's selected time period was between 1982 and 1992. Most of the surge in exports to the Asia-Pacific region occurred in the latter half of the 1980s. One possible explanation is that exports precede FDI flows as a form of market entry. Accessing a foreign market by exporting allows a firm to establish a market share and learn more about the foreign country as a potential host. The latter half of the 1990s may see a huge rise in Australian FDI flows in the region as the next step in market access. Therefore, the current bias against FDI flows to the region should not deter the government from continuing its efforts to liberalise trade and investment flows in the Asia-Pacific region in a non-discriminatory manner.

The second policy implication flows directly from the structural approach to the study of foreign direct investment. Multinational firms operate in markets with a small number of competitors and produce under increasing returns to scale conditions. As a result, they are frequently targets for anti-competitive claims. An increasingly integrated Australia will require a continued vigilance on new firms.

This perceived threat of multinationals also needs to be balanced by the pro-competitive effects of a new entrant into an industry. A liberalised foreign investment regime will lead to greater access of the Australian market to prospective firms. New firms and a more open industry policy will combine to impose a market discipline on domestic firms.

An element of the competition policy implications of multinational corporations is the emerging issue of extra-territoriality. Allowing foreign firms to operate in Australia with control overseas requires a high degree of cooperation, consultation and harmonisation with the competitive bureaux in the various home countries. Australia and New Zealand have moved towards harmonisation of their *Trade Practices Act*, but there are forces present, led by the soaring number of multinationals in Australia, to extend this initiative to a regional level.

The third and final policy implication is, of course, for Australia's foreign investment policy. Australia in general has not had a xenophobic attitude towards foreign investment. It does have a Foreign Investment Review Board, but this Board, by and large, has encouraged foreign investors. Although major changes to Australia's foreign investment policy were made in 1992, there has yet to be a systematic policy review in light of the recent trend towards internationalisation and regional integration.

Howe's results show that Australia's receptiveness to foreign direct investment has not retarded the structural adjustment process. I have no doubt that future studies will show that foreign direct investment will have enhanced the structural adjustment process and raised its overall competitiveness in the global market place. In order to ensure that this process continues, Australia will have to embrace a more liberal and less uncertain foreign investment regime. This approach could be along the lines suggested by Bora (1995) of a non-discriminatory set of investment principles for the Asia-Pacific region.

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2. General Discussion

The discussion revolved around three broad topics:

- the determinants of Australian foreign direct investment abroad;
- the benefits of inward foreign direct investment in Australia; and
- a number of issues relating to US and Japanese foreign direct investment.

One participant argued that much of the outward foreign direct investment (FDI) undertaken by Australian firms was significantly different from the type of foreign direct investment performed by firms from other countries. It was argued that Australian firms that undertake FDI tend to be 'multi-domestic' firms, rather than multinational firms.

The distinction here is that multi-domestic firms replicate their domestic operations abroad, while multinational firms engage in different activities in different countries, often vertically integrating their operations around the world. While multinational firms might generate increased intra-firm international trade, this is much less likely to be the case for multi-domestic firms. If Australian outward FDI is concentrated in these multi-domestic firms, there is unlikely to be any trade bonanza from FDI, but the FDI could generate increased dividends at some point in the future. It was also suggested that the increase in exports that Australia has experienced in recent years is particularly encouraging, as it is not driven by increased intra-firm trade, as is the case for some other countries.

The notion that much of Australian outward FDI represents firms replicating themselves abroad was not universally accepted. Some participants noted that there has been a substantial movement offshore of firms whose production processes are highly labour intensive. This FDI has not been generated by a desire to take advantage of superior technology on a world scale, but rather to take advantage of cheaper factor prices abroad.

A number of participants took up the issue of the high degree of inward orientation of US manufacturing firms in Australia. It was suggested that many of the firms established operations in the 1950s and 1960s, and were encouraged to set up in Australia by the tariff wall. As a result, they had an inward orientation from birth. Some participants thought that FDI encouraged by a tariff wall in conjunction with government policies that did not emphasise training and innovation meant that Australia had not received the full benefits of FDI.

On the other hand, it was suggested that in today's more open environment, the inward orientation of US firms in Australia may not represent a problem, as it may stimulate competition in the domestic market. It was also noted that Japanese foreign direct investment in Australia tends to be more outward focussed than US investment in Australia. In large part, this was thought to reflect the fact that Japanese investment has occurred more recently.

One participant argued that Australia had for far too long been obsessed with the 'technology fix' approach to inward FDI; that is, the idea that FDI gives the technology to generate rising living standards. It was noted that thinking has moved quite a lot in recent years, with a number of participants reiterating the conclusion of previous papers that the trade regime and domestic policies were important factors in generating improvements in technology.

The ferocity of the US debate concerning FDI was commented on by a number of speakers. Some US commentators argue that the US has a large trade deficit with Japan because Japan limits US FDI, and that the lifting of these restrictions was important. On the other side, some argue that FDI represents the exporting of jobs, and thus it should be subject to some sort of limit. It was suggested that such pressures, however inappropriate, will continue as long as unemployment remains a problem and real wages are stagnant. There was also a brief discussion of the role that exchange rate changes play in generating FDI. One participant reported that recent research suggested that real factors, other than the exchange rate, were capable of explaining international trends in FDI. A number of participants also expressed their surprise at the low trade elasticities reported in the paper by Kazuhiko Ishida and wondered whether the elasticities were only temporarily low.

Finally, there were numerous calls for increased research effort to be devoted to foreign direct investment in the services industry.

International Trade and the Australian Labour Market

Jerome Fahrer and Andrew Pease

'[The Harvester judgment] was based on the wages paid in sheltered industries. The adjustments of wages to prices have protected the basic wage-earners from the costs of the tariff, and have kept the [wage] standard itself closely related to the favourable wage paying capacities of protected industries. This development is not without danger; at some time it will be necessary to review the principles of the Australian wage standard, and ... the circumstances of the unsheltered industries should not be ignored.

[However,] the unsheltered [rural] industries also have different degrees of efficiency...We reject any suggestion that wages should be reduced to the amount payable on marginal farms, and we do not suggest reduction at all. But when the wage standard is in effect determined by the sheltered industries there is a possibility of it being pushed too high, and this danger will remain with us unless the wage standard is directly related to the economic capacities of the export industries' (*Report of the Brigden Committee of Enquiry into the Australian Tariff*, 1929, p. 121).

1. Introduction

As the Australian economy becomes more closely tied with the fast-growing, but low-wage, countries of North and East Asia, several commentators have warned of important emerging changes in the labour market. In particular, the rapid growth of manufactured imports from these countries is said to imply that unskilled workers in this sector of the Australian economy face the prospect of either high unemployment or, if the centralised wage-setting system is liberalised, large reductions in their real wages. Gregory, Anstie and Klug (1991), for instance, find that the relatively high wages received by Australian textile, clothing and footwear workers (compared with their US counterparts) can be largely explained by the centralised wage-setting system, in combination with the very high rates of protection from imports that have been given to these industries. A clear implication from this study is that as protection is reduced and the labour market becomes less regulated, the wages paid in these industries will come under increased downward pressure. The decline in manufacturing employment, which has been especially severe since the early 1980s, is apparently largely due to these competitive effects.

The flavour of the issues can be gauged from Figure 1, which shows Australian imports of footwear from China. These imports have taken off spectacularly, more than trebling in value and volume in the three years from 1989/90. During this time, the effective rate of protection received by the footwear industry fell from 111 per cent to 67 per cent (Industry Commission 1993, p. 433). As Figure 2 shows, employment in the industry fell by 30 per cent over this period, compared with 13 per cent for the manufacturing sector as a whole.[1] This would appear to be a textbook example of what

1. This relative performance does not appear to be due to any excessive cyclical sensitivity during the recent recession. In the previous recession (between June 1982 and June 1983) employment in the footwear industry and manufacturing generally each fell by about 10 per cent. However, there was no surge in footwear imports from low-wage countries during this time, possibly because the effective rate of protection received by that industry was increased.

Figure 1: Imports of Footwear from China

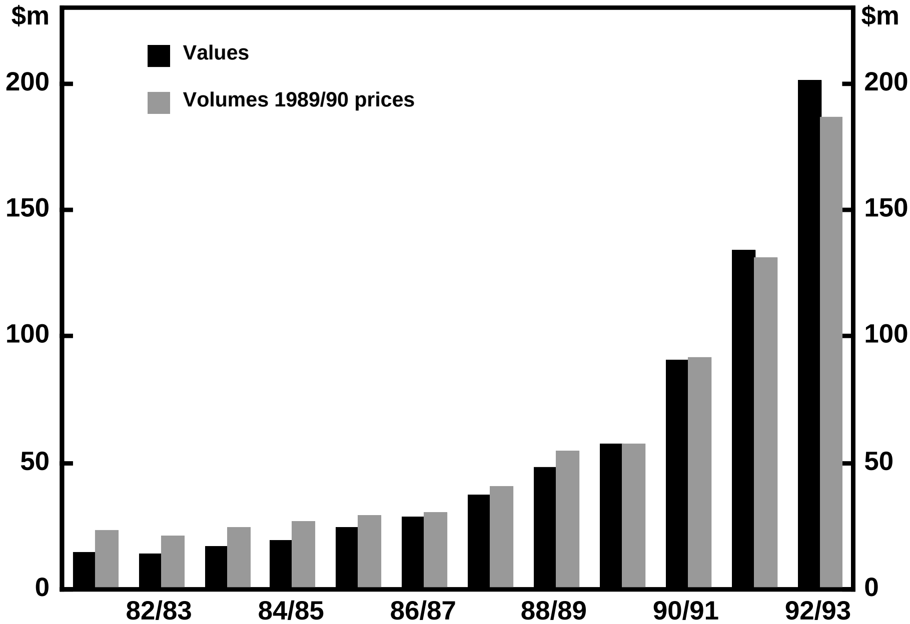
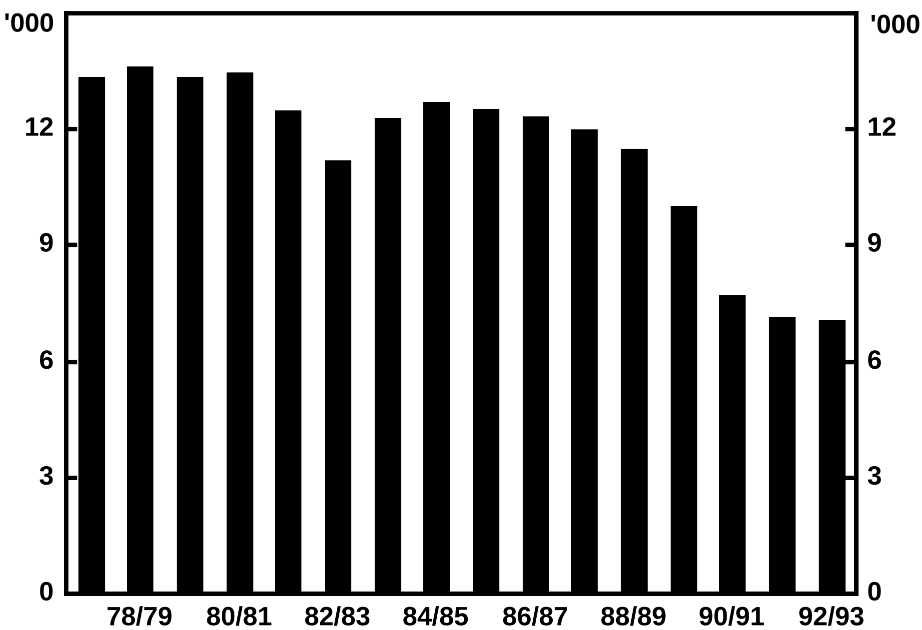


Figure 2: Employment in the Footwear Industry



happens when a hitherto protected industry is opened to international competition.

Of course, the footwear industry might be just a special case, and our purpose in this paper is to examine the impact of trade liberalisation on the entire manufacturing sector. We confine our analysis to manufacturing because over 90 per cent of merchandise imports are manufactured goods. While this sector accounts for only about 15 per cent of the economy, the changes brought to it by internationalisation are still important, as their effects on structural unemployment generally could be disproportionately large. Moreover, internationalisation can have large indirect effects on the entire labour market through, for example, the adoption of technologies that economise on the use of unskilled labour.

In Section 2 we present a brief history of the link between international trade and the labour market in Australia and review evidence on this question from other countries. In Section 3 we describe how the traded sector of the economy has expanded, in particular imports from low-wage countries. We also analyse the recent very rapid growth of elaborately transformed manufactured exports and examine why despite this expansion, employment in the industries that produce these exports has actually fallen. In Section 4 we review the mechanisms through which trade can affect prices and wages, and whether trade has had any effect on the relative wages of skilled and unskilled labour. We find no evidence of any such effect. In Section 5 we decompose the change in manufacturing employment into the effects of trade, domestic demand and productivity improvements. We find that imports from low-wage countries have directly decreased employment in only the Clothing and Footwear industry, and that by far the biggest source of employment loss in manufacturing has been productivity improvements (given the level of demand). In Section 6 we review some recently suggested channels through which one source of productivity improvement, technological progress, can affect wages and employment, and how this is linked to international trade. Finally, in Section 7 we summarise our results and address the implications of trade liberalisation for the future course of labour-market policy.

2. The Issues

The issues of trade and labour-market policy have been at the centre of the debates about Australia's economic development for around 100 years. In 1906, Prime Minister Alfred Deakin successfully secured Labor Party support for his protectionist trade policies by offering to link this protection with 'fair and reasonable' wages in manufacturing industries. This 'New Protection' policy was effected in the *Excise Tariff Act* of that year. Although, two years later, this law was found to be unconstitutional, the principles behind it were affirmed in Justice Higgins' Harvester judgment of 1907 which formed the basis of Australia's ongoing system of centralised wage determination. The Harvester judgment was predicated on the idea that wages should reflect the living costs of a worker with a wife and three children. Higgins maintained that no industry should receive protection from imports unless it had the capacity to pay this 'basic wage' and, most significantly, the judgment was based on wages then being paid in protected manufacturing industries in and around Melbourne (Brigden *et al.* 1929).

This formula for determining wages was soon criticised by many economists who argued that industry wages should be based on corresponding levels of productivity

(Copland 1924),[2] and by those who saw some shortcomings with the wage *cum* tariff policy (Shann 1930): high levels of protection enabled manufacturing firms to pass wage increases on to consumers in the form of higher prices, which led to still higher wages through the centralised wage-setting arrangements, which led to demands for higher levels of protection, and so on.[3] Exporters, however, could not pass on these higher costs to their customers.

Beginning with the Brigden Committee Report of 1929, a number of official enquiries have considered the nexus between wages and tariffs. While recognising the costs of protection, the Brigden Committee concluded that the protection of Australian manufacturing was, in net terms, beneficial for two reasons: tariffs increased Australia's terms of trade and, more importantly, the growing population could only be employed (at sufficiently high real wages) if manufacturing industries were protected, given that the rural industries had low labour intensity.[4] This rationale formed the basis of manufacturing policy over the following forty years, with the additional element that in the 20 years or so after World War II, the growing population was largely created by rapid immigration, and these migrants were predominantly employed in manufacturing.[5]

The Vernon Committee Report of 1965, in its comprehensive review of the Australian economy and policy making, endorsed the Brigden Committee's conclusions, adding that labour-saving technological improvements in agriculture added further to the need for a growing manufacturing sector. It did, however, concede that in the absence of protection, the wage share of output would probably have been lower because so too would have been the exchange rate. This conclusion was not obviously correct, as the static depreciating effects of removing protection might have been offset by dynamic efficiency gains in the traded sector of the economy (i.e. faster productivity growth) which would have appreciated the exchange rate. In any case, with memories of the Depression still fresh, post-war policy making was conducted with a policy of full employment firmly in mind. With rapid economic growth leading to low unemployment and rising living standards, questions of microeconomic efficiency, in either product or labour markets, were not of immediate concern.[6] However, by the late 1960s, the Tariff

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2. Copland's argument against centralised wage setting (which at the time he wrote meant the indexation of wages to consumer prices) was not that real wages became misaligned with productivity on average, but that this system impeded the adjustment of real wages to (what are now known as) real shocks:

   > 'The general result is that in years of rapidly rising prices, wages lagged behind when the productivity of industry might have justified higher rates, but in the period of depression wages are relatively higher than before, and the readjustment is slow. This shows the rigidity of the arbitration system and the difficulties that arise through the regulation of industrial costs on so artificial a standard' (Copland 1924, p. 47).

3. This was noted as early as 1927 by the Tariff Board in a section of its annual report appositely titled 'The Abuse of Protection' (Brigden *et al.* 1929, pp. 165-168).

4. This is also Samuelson's (1981) interpretation of the Brigden report, based on Heckscher-Ohlin trade theory. Manger (1981) disputes this interpretation contending instead that underlying the report was a Ricardian trade model. More interesting than this doctrinal debate was the dubious factual basis of the Brigden recommendations. Even by the early 1920s over half of the workforce was employed in service industries, and this fraction was growing fast (ABS 1988, p. 675). It appears that the need to maintain a large manufacturing sector to employ the growing population was exaggerated.

5. From 1947 to 1966, 69 per cent of the increase in the manufacturing employment came from immigration, compared with 49 per cent in the rest of the labour force (Norman 1971, p. 19).

6. In the 20 years from 1949/50, real consumer wages rose by nearly 70 per cent (Foster and Stewart 1991, pp. 176, 210).

Board (later the Industries Assistance Commission/Industry Commission) became more prominent in the protection debate, emphasising that the economy-wide effects of protecting particular industries were usually negative.[7] Although this view was for many years deeply unpopular, it now appears that the Industry Commission has won both the intellectual and political debates, and policy makers are now firmly committed to an open trading regime.

The first major review of the wage setting system after Vernon was by the Hancock Committee, which reported in 1985. For a variety of reasons it concluded strongly in favour of retaining centralised wage setting, but also said that 'an argument might be advanced for wage restraint as a corollary of a policy of reducing levels of protection' (p. 179, para 4.63). This statement was probably motivated by a perceived need for wage settlements to ensure 'international competitiveness' at a macroeconomic level, in the event of an opening of the economy to international trade. With inflation currently, and prospectively, at very low levels, the current debate has shifted to microeconomic issues, especially the responsiveness of relative wages to the pressures arising from freer trade and increased internationalisation generally.

Concerns about internationalisation have not been unique to Australia. Harris (1993) examines the implications of 'globalisation' in his Presidential Address to the Canadian Economics Association. He identifies the three most important causes of globalisation to be the reduction in trade and investment barriers since World War II, the rapid growth of the developing country economies and their impact on global productive capacity, and technological changes in transport and communication. He concludes that traditional international economics, which identifies national economies as conceptually useful separate units of study, may be becoming obsolete.

In the United States, discussion of these issues has been largely motivated by the slow growth of real wages over the past two decades, with average real hourly compensation (which includes fringe benefits) rising by only 5 per cent between 1973 and 1991. Moreover, there has been a sharp rise in the inequality of earnings: between December 1979 and December 1992, the earnings of white-collar workers grew by 10.9 per cent more than those of blue-collar workers (Lawrence and Slaughter 1993, p. 162). Murphy and Welch (1991) attribute these developments primarily to the decline of manufacturing employment, associated with the large increase in the United States' trade deficit in the 1980s. They claim this decline reduced the relative demand for low-skilled workers, hence the fall in their relative wages. In a widely quoted study, Borjas, Freeman and Katz (1992) calculate the quantities of skilled and unskilled labour embodied in the American trade deficit. Since the United States tends to import goods with large quantities of embodied unskilled labour, they argue that international trade has added to that country's supply of unskilled labour and thus depressed wages paid to unskilled workers.[8]

7. Some academic economists, especially Max Corden, were also influential critics of Australian protection policies. See, for example, Corden (1966).

8. Some recent anecdotal evidence suggests that such effects need not be restricted to unskilled labour. In its edition of 1 November 1993, the newspaper *Computerworld* reports that the consulting rates for computer programmers in the United States have decreased from US$400-450 to $US225-280 per day because of competition from programmers in countries like India and the former Soviet Union, with one consultant programmer suggesting an appropriate policy response might be for the US government to place tariffs on foreign services performed for US firms!

These studies, especially the latter, have been criticised as being flawed in that they do not properly test for the effects of trade on wages. In particular, standard trade theory suggests that factor prices are determined by product prices, not the quantities of goods that are being traded (or the quantities of the factors that are implicitly traded). For a country like the United States, theory suggests that a fall in the relative wage of unskilled labour should be accompanied by a rise in the price of manufactured exports relative to manufactured import prices, but this ratio fell over the 1980s (Bhagwati and Dehejia 1993, p. 21). An alternative explanation for the evolution of wages is that technological change, biased against unskilled labour, has reduced the demand for unskilled labour and therefore its wage. Krugman and Lawrence (1993) and Bound and Johnson (1992) come to this conclusion. Andersen and Dittus (1994), in a study of how trade with Eastern Europe has affected Western European labour markets, find that the trade effects on employment have been small compared with the effects of domestic developments. In contrast to the United States, in Europe, the effects have been felt in employment rather than wages, which probably reflects the relative inability of European real wages to adjust to real shocks.[9]

3. Internationalisation, Low-Wage Imports and Exports

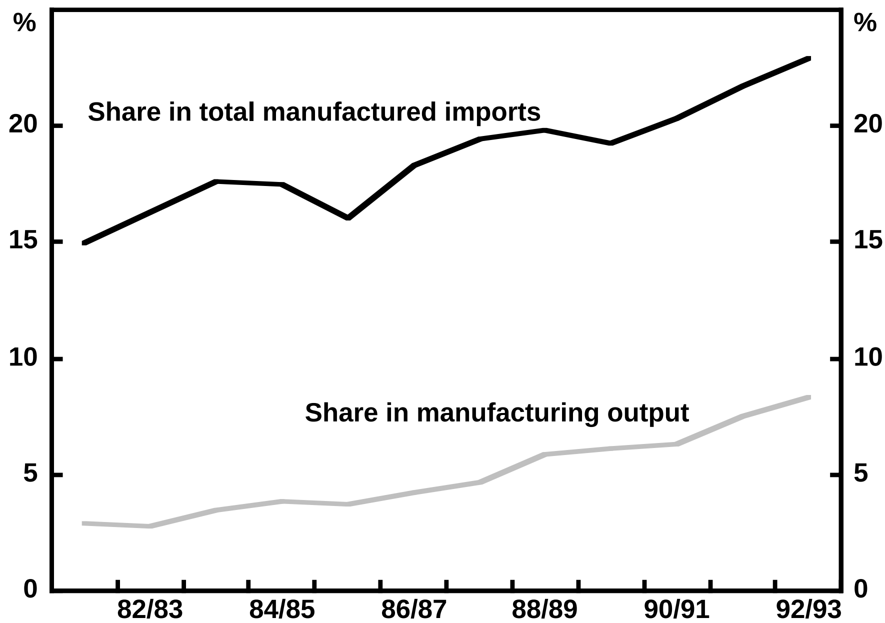
In this section, we describe the increased openness of the Australian economy; summarise the source and composition of manufactured imports, especially from low-wage countries; and analyse the growth of elaborately transformed manufactured exports. Australia's increased trade with low-wage countries is conveniently summarised in Figure 3. (Low-wage countries are defined to be the non-OECD countries, plus Greece, Portugal and Turkey, minus Singapore, Hong Kong and Israel.)[10] As a proportion of the total, imports from these countries increased from 15 per cent in 1981/82 to about 23 per cent in 1992/93. As a proportion of real manufacturing output (i.e. value added in manufacturing), they more than doubled, from 3 per cent to 8 per cent.[11]

9. Layard, Nickell and Jackman (1991, p. 58) estimate that real wage rigidity in the United States is smaller than in most of the countries of the European Union (where labour-market performance has generally been poor) but larger than in the EFTA countries (where labour-market performance, at least until recently, has generally been good).

10. This definition is consistent with the classification adopted by the World Bank in its 1993 *World Development Report*, Table 1, p. 239. A contentious issue is how to classify Taiwan, which is excluded from World Bank statistics, but is an important trading partner for Australia. According to the Summers and Heston (1991) database, Taiwan appears to be a borderline case, having moved from being unambiguously a low-wage country a decade ago to having a per capita GDP about the same as, say, Portugal. In the remainder of the paper we treat Taiwan as a low-wage country on the assumption that its manufacturing workers are relatively poorly paid.

11. Since manufacturing imports include value added from other sectors, the simple ratio of imports to manufacturing output is difficult to interpret. To account for this, we multiply the value of imports, in each industry, by the ratio of value added to final expenditure in Australia (i.e. we assume it is the same in Australia as the rest of the world). For manufacturing as a whole, the ratio is 0.36. See Appendix C for details.

Figure 3: Share of Manufactured Imports from Low-Wage Countries



3.1 Internationalisation

There are several ways to show the increased integration of the Australian economy with the rest of the world. The most simple is the increased relative size of the traded sector. Figure 4 shows exports and imports of goods and services as a fraction of GDP over the past two decades. Clearly, both the import and export shares of GDP have been trending up, with some acceleration evident since the mid 1980s. The greater volatility of the import share reflects cyclical influences.

Figure 5 shows import penetration (the ratio of imports to value added, in real terms) of manufactured goods at the 2-digit Australian Standard Industrial Classification (ASIC) level, where we have adjusted the import data for value-added effects in the manner described in Appendix C.[12] Import penetration has increased in all industries, leading to an overall increase in manufacturing import penetration from 26.5 per cent in 1981/82 to 41.5 per cent in 1992/93. Of particular note is the doubling of import penetration in Clothing and Footwear, Chemicals, and Other Machinery and Equipment (computers, agricultural machinery, household appliances etc.). The increase in Clothing and Footwear is of special significance since, as we show below, most of these imports have come from low-wage countries. Large increases also occurred in Textiles and Miscellaneous Manufactures (sporting goods etc.). Figure 6 shows the corresponding

12. Except that we further disaggregate Chemical, Petroleum and Coal Products into Chemicals and Chemical Products, and Petroleum Products, as the volatility of oil prices makes Petroleum Products an atypical manufacturing industry.

Figure 4: Exports and Imports Ratio to GDP
(average 1989/90 prices)

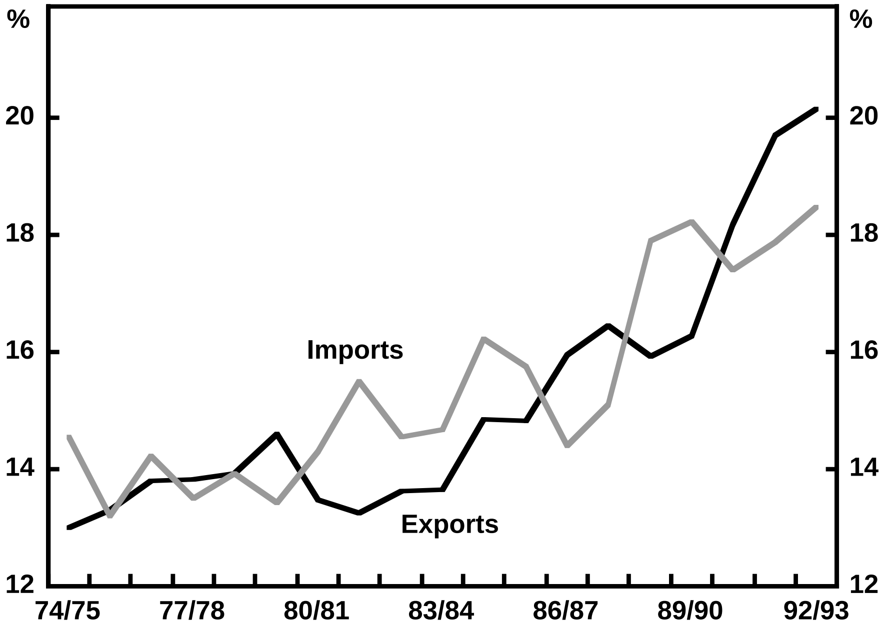


Figure 5: Import Penetration
(average 1989/90 prices)

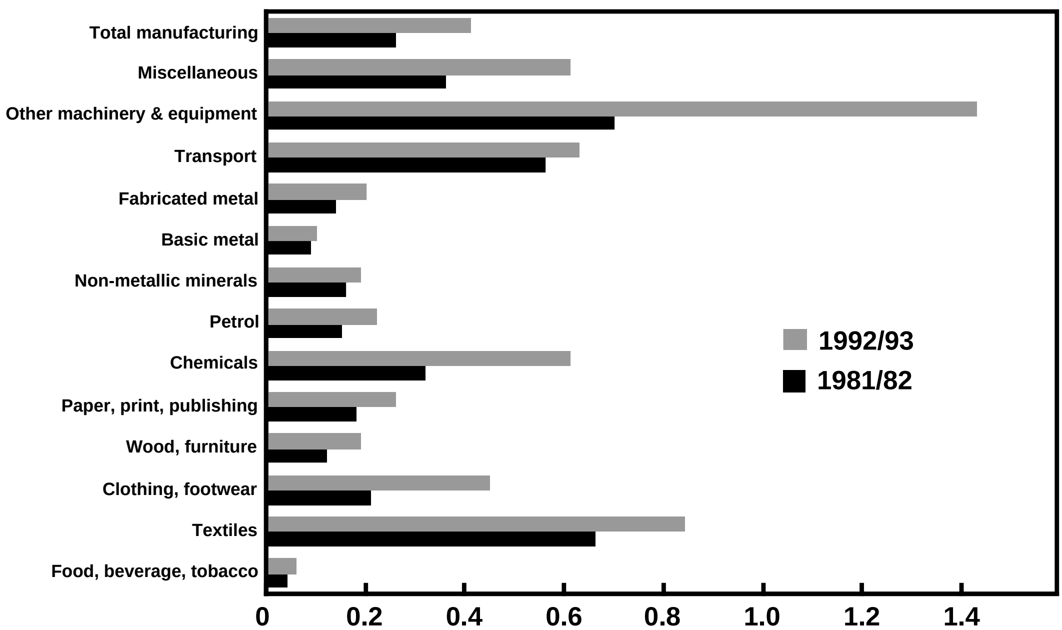
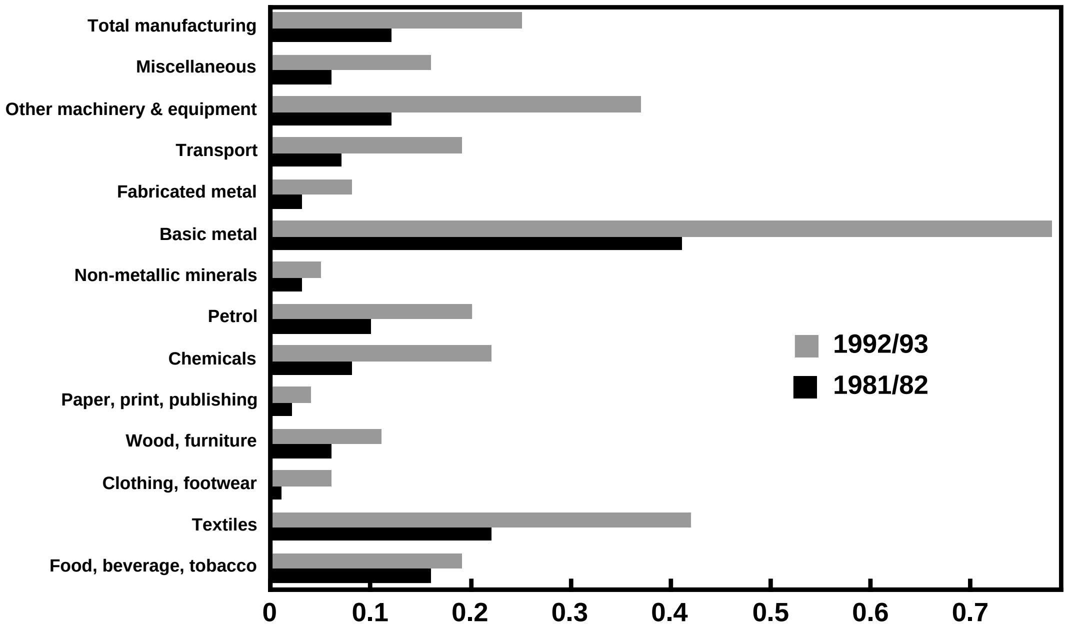


Figure 6: Ratio of Exports to Output
(average 1989/90 prices)



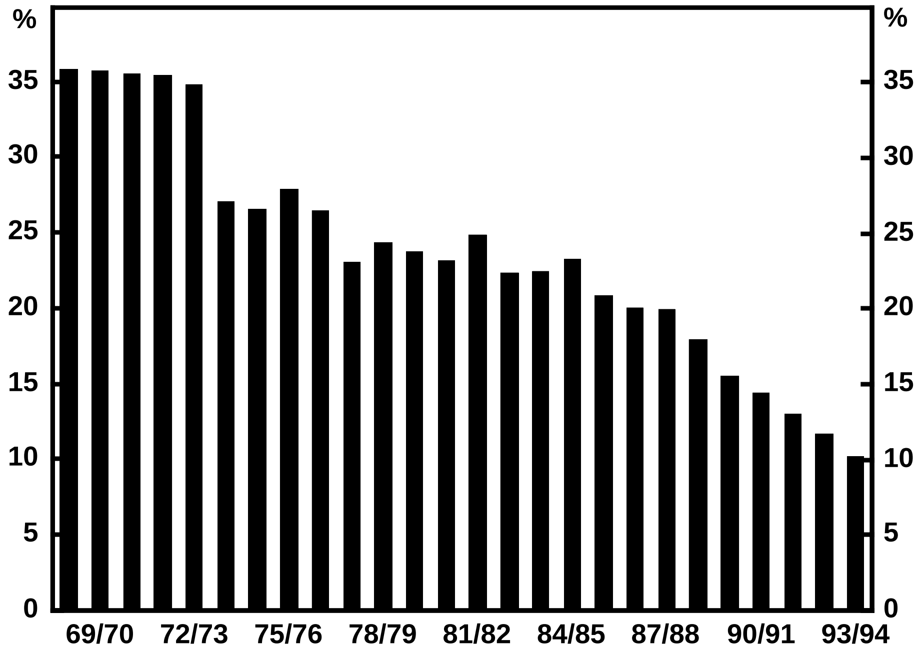
changes in the ratio of export volumes to output. Overall, this ratio increased from 12.2 per cent to 25.4 per cent, with the largest increases occurring in Textiles, Chemicals and Chemical Products, Basic Metal Products, and Other Machinery and Equipment.

The fact that the largest increases in both import and export penetration have sometimes occurred in the same industries suggests that intra-industry trade has become more important.[13] We take up this issue further in Section 3.3 in our discussion of elaborately transformed manufactured exports. Another interesting question is whether these increases have occurred because of increases in imports and exports *per se*, or whether they have been due to the declines in manufacturing output relative to the economy as a whole. We estimate that about half of the increase in the import penetration ratio has been due to a general increase in the propensity to import (the ratio of imports to GDP), and about half due to the declining share of manufacturing output to GDP (see Appendix B for details). For exports, about two-thirds of the increase in the ratio of manufactured exports to output has been due to an increase in the manufactured export share of GDP, with the remaining one-third due to the declining share of manufacturing output. Thus, the increase in the proportion of manufactured output that is exported has been due to a general increase in the propensity to export as well as an apparent reallocation of resources away from import-competing industries.

Another measure of international integration is the degree of protection domestic industries receive from imports. Figure 7 shows the effective rate of assistance (ERA)

13. See Industry Commission (1993) Appendix G for a discussion of recent developments in intra-industry trade.

Figure 7: Effective Rate of Assistance to Manufacturing



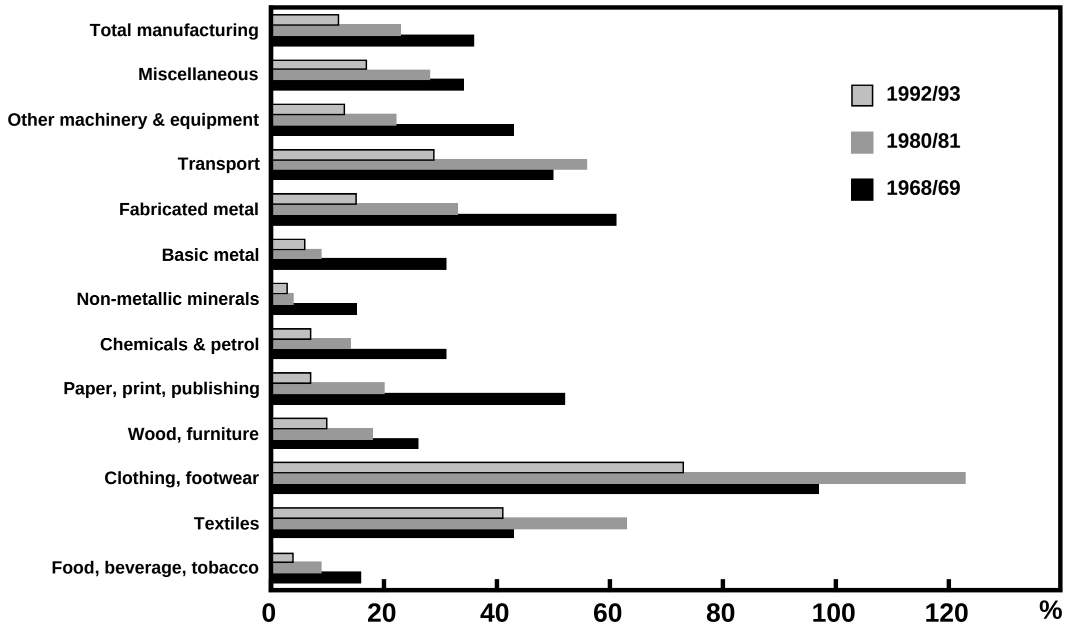
received by the manufacturing sector since 1968/69, while Figure 8 shows assistance in selected years for each 2-digit manufacturing industry.[14]

Trade liberalisation has generally occurred in two stages. The first stage was a discrete fall in effective assistance in 1973/74, caused by a 25 per cent across the board cut in tariffs. The second stage, which is ongoing, started in the mid 1980s; in 1993/94 the average effective rate of assistance to manufacturing was 10.2 per cent, compared with 23.2 per cent in 1984/85. The only industries in which assistance was significantly increased over the past two decades were Clothing and Footwear, Textiles and, to a lesser extent, Transport Equipment, where protection was increased from the mid 1970s to the mid 1980s. (The high point, or low point depending on one's point of view, occurred in 1984/85 when the ERA to Clothing and Footwear reached 240 per cent.) However, this development has since been reversed, and the ERAs to these industries are at historically low levels, albeit still significantly higher than in the rest of the manufacturing sector. Under current policies, assistance is set to fall further until the end of the decade, culminating in an average ERA to manufacturing of only 5 per cent, although considerably higher for the three industries mentioned above.

In summary, the Australian economy has become more open over the past decade. As a share of real output, volumes of exports and imports have increased significantly.

14. The level of effective assistance received by an industry is the percentage by which a country's trade barriers (tariffs, quotas, subsidies and other protective devices) raise that industry's value added per unit of final expenditure.

Figure 8: Effective Rates of Assistance for Manufacturing Subdivisions



Moreover, this expansion has been fairly broadly based. The data are consistent with the standard story that, as protection has been removed, resources have moved from the import-competing to the exporting sectors. In addition, there has been a general increase in the propensity to export manufactured goods, as well as an increase in intra-industry trade, no doubt facilitated by the decrease in tariffs on imported inputs.

3.2 Low-Wage Imports

Figure 3 above shows that manufactured imports from low-wage countries have generally increased as a proportion of total manufactured imports. However, this aggregate result masks some quite diverse trends among different industries. This can be seen in Table 1 where we show 2-digit import data for two years, 1981/82 and 1992/93, including country-specific data for Australia's four largest low-wage trading partners: China, Taiwan, Korea and Indonesia. (Appendix A contains more detailed data.)

The import data can be summarised in the following five points:

- Over the period 1981/82 to 1992/93, the share of manufactured imports from low-wage countries increased from 15.0 per cent to 22.9 per cent. This increase was almost entirely due to increased imports from China, Taiwan, Korea and Indonesia whose share as a group more than doubled, from 6.2 per cent to 13.1 per cent. China's share more than trebled, from 1.4 per cent to 4.5 per cent.
- While all industries recorded a rise in the share of low-wage imports, the magnitude of the increases varied markedly. Wood, Wood Products and Furniture recorded a

Table 1: Manufactured Imports

		Percentage from:					
1981/82	$m	China	Tai-wan	Korea	Indo-nesia	Other low wage	Total low wage
Food, beverages, tobacco	774	3.4	2.3	0.8	1.5	27.3	35.3
Textiles	1,094	7.8	5.6	4.5	0.1	13.1	31.1
Clothing, footwear	579	12.1	23.4	7.9	1.7	13.3	58.3
Wood, furniture	444	2.3	11.2	0.5	0.9	22.8	37.7
Paper, print, publishing	961	0.3	0.8	1.2	0.0	3.5	5.8
Chemicals	1,617	1.3	0.7	0.5	0.1	13.0	15.5
Petroleum	1,204	2.3	0.0	1.0	0.0	50.2	53.5
Non-metallic minerals	373	1.6	3.4	1.8	0.1	8.3	15.2
Basic metal	764	0.5	0.7	6.5	0.0	9.4	17.1
Fabricated metal	686	0.9	6.4	2.9	0.0	3.5	13.7
Transport	3,495	0.0	1.5	0.1	0.0	0.9	2.4
Other machinery and equipment	6,792	0.1	1.7	0.5	0.0	2.4	4.7
Miscellaneous	1,266	0.6	8.8	4.0	0.0	6.9	20.2
Total manufacturing	20,049	1.4	3.1	1.5	0.2	8.9	15.0
1992/93							
Food, beverages, tobacco	2,521	1.9	1.1	0.8	2.2	32.6	38.7
Textiles	2,356	11.7	8.9	7.4	5.0	17.2	50.2
Clothing, footwear	1,769	50.0	3.9	5.9	3.3	13.3	76.4
Wood, furniture	1,116	4.0	5.1	0.2	7.1	23.5	39.9
Paper, print, publishing	2,401	2.1	0.8	1.3	1.5	6.3	11.9
Chemicals	6,072	1.4	1.3	1.4	0.3	15.8	20.3
Petroleum	1,612	1.8	0.1	1.2	17.4	42.1	62.6
Non-metallic minerals	931	6.9	4.8	1.5	2.0	14.7	30.0
Basic metal	1,763	0.9	2.2	7.0	0.1	16.2	26.4
Fabricated metal	1,837	5.4	12.0	3.1	0.5	7.2	28.2
Transport	9,159	0.8	1.1	2.5	0.2	1.4	5.9
Other machinery and equipment	20,019	2.3	4.9	3.1	0.7	4.5	15.5
Miscellaneous	3,819	9.7	8.9	4.2	0.9	9.8	33.6
Total manufacturing	55,375	4.5	4.0	3.0	1.6	9.9	22.9

rise of only 2.2 percentage points (37.7 per cent to 39.9 per cent), while the low-wage share of Textile imports rose by 19.1 percentage points (31.1 per cent to 50.2 per cent). The low-wage share of Clothing and Footwear imports also rose significantly, from 58.3 per cent to 76.4 per cent. Within this category the share from

China more than quadrupled, from 12.1 per cent to 50.0 per cent; this was offset somewhat by a fall in Taiwan's share from 23.4 per cent to 3.9 per cent, reflecting a change in Taiwan's industrial structure, as that country moves up the quality ladder and produces more technologically-sophisticated goods.

- Other industries recording large increases in the low-wage share were Other Machinery and Equipment (4.7 per cent to 15.5 per cent); Fabricated Metal Products (13.7 per cent to 28.2 per cent); Non-Metallic Mineral Products (15.2 per cent to 30.0 per cent); and Miscellaneous Manufactures (20.2 per cent to 33.6 per cent). Within this last category, the Chinese share (which was mainly sporting equipment) rose from 0.6 per cent to over 9.7 per cent. The low-wage country share of Transport Equipment imports (mainly Motor Vehicles and Parts) was the smallest of all manufacturing industries. It increased from 2.4 per cent to 5.9 per cent, due mainly to more imports of cars from Korea.
- The Korean share of manufactured imports doubled over the period to 3.0 per cent. Korea is now a significant supplier to Australia of Textiles (with an import share of 7.4 per cent), Footwear (14.9 per cent); Basic Iron and Steel (10.0 per cent) and Rubber Products (9.0 per cent). Imports of manufactured goods from Indonesia also grew quickly over the period, but still accounted for only 1.6 per cent of the total in 1992/93. However, Indonesia is now a significant supplier to Australia of Wood, Wood Products and Furniture, with an import share of 7.1 per cent, Textiles (5.0 per cent), Footwear (6.1 per cent), and, most particularly, Petroleum, with a share of 17.4 per cent, compared with zero at the beginning of the 1980s.
- In 1992/93 nearly 40 per cent of imports of Food, Beverages and Tobacco came from low-wage countries, but very little of this was from the four major low-wage Asian countries. The most important sources were Thailand, Puerto Rico and Malaysia which, between them, accounted for about half of all low-wage imports in this category.

3.3 Exports

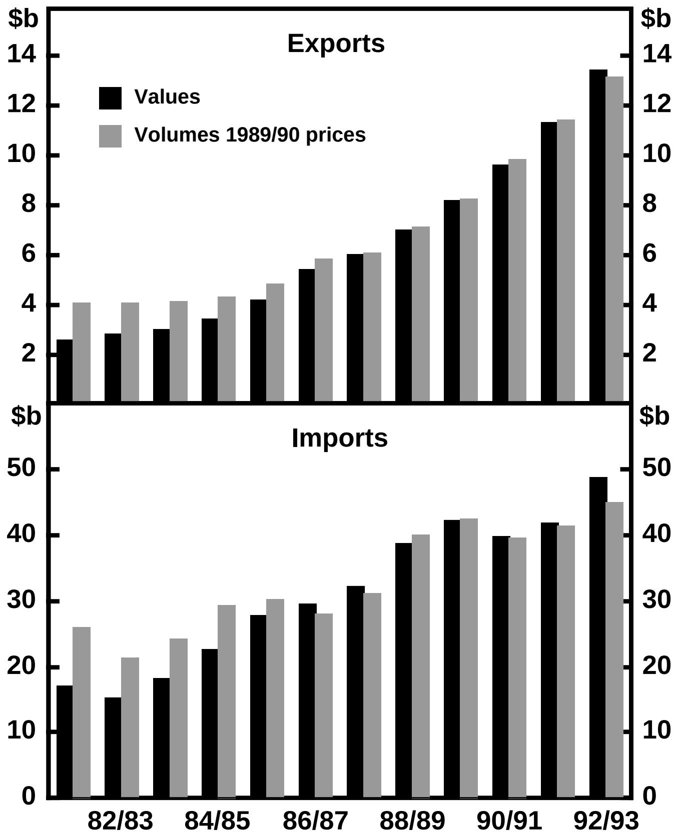
Between 1981/82 and 1992/93, exports of agricultural and mining products increased by 50 and 241 per cent, respectively in nominal terms and, in constant dollars, by 19 and 118 per cent. While these sectors account for about 40 per cent of total merchandise exports,[15] they account for only about 6 per cent of total employment, so the direct impact of this export expansion on the labour market would have been slight. Of more immediate interest are exports of manufactured goods, especially elaborately transformed manufactures (ETMs), about which much has been written recently.[16]

The top panel of Figure 9 shows that exports of these goods have indeed grown impressively in recent years, with average annual real growth of around 15 per cent in the eight years to 1992/93. However, this growth does not necessarily mean that many jobs have been created in these industries. As the bottom panel of Figure 9 shows, imports

15. Based on the ASIC classification. Using the SITC breakdown, rural and resource-based exports (which include some simply transformed manufactures) constitute around 80 per cent of merchandise exports.

16. See, for example, Reserve Bank of Australia (1992).

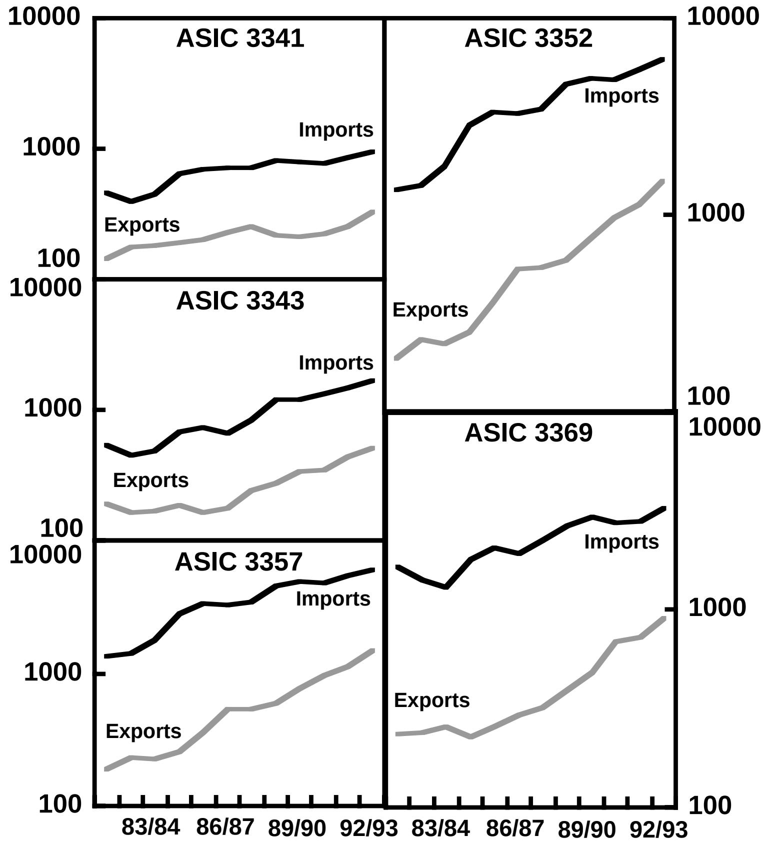
Figure 9: Exports and Imports of Elaborately Transformed Manufactures



of elaborately transformed manufactures have also shown large increases over this time period, in part reflecting a growing tendency for imported manufactures to be used as inputs for goods which are subsequently exported. Inasmuch as this simultaneous increase in exports and imports of manufactured goods reflects international differences in resource endowments and technology, it is a desirable result of internationalisation and free trade. We should expect different parts of the production process for some goods to efficiently take place in different countries. This means that growth in domestic value added (and therefore employment) in these industries is likely to be substantially less than the growth of exports. The principal benefits of increased trade in ETMs are therefore likely to be experienced elsewhere in the economy, as increased exports lead to increased demand for services and non-traded inputs.

We can examine some disaggregated data to determine more precisely the link between growth in exports, imports and value added in elaborately transformed manufactures. Figure 10 shows exports and imports in five 4-digit categories of elaborately transformed manufactures: Photographic and optical goods; Measuring, professional and scientific equipment n.e.s.; Electronic equipment n.e.s.; Electrical

Figure 10: Imports and Exports of Selected ETMs
(average 1989/90 prices, $m, log scale)



Note: 3341 Photographic and optical goods; 3343 Measuring, professional and scientific equipment n.e.s.; 3352 Electronic equipment n.e.s.; 3357 Electrical machinery and equipment n.e.c.; 3369 Industrial machinery and equipment n.e.c.

machinery and equipment n.e.c.; and Industrial machinery and equipment n.e.c. Between them, they account for about 30 per cent of ETM exports. It is immediately apparent that while exports from each of these five narrowly defined industries have grown strongly, so too have imports (though not quite as strongly).

Table 2 shows export and import values, and nominal value added, for each of these industries. In every case, value added is quite low relative to exports. Indeed, in two industries (Photographic and optical goods, and Measuring, professional and scientific equipment n.e.s.), the export values are greater than the value of production. This implies that while exports of ETMs might be booming, output and job growth in these industries will be relatively small.

This conclusion is confirmed by Figure 11, which shows employment and output growth in these five industries, and in elaborately transformed manufacturing as a whole.

Table 2: Trade and Value Added of Selected Elaborately Transformed Manufactures

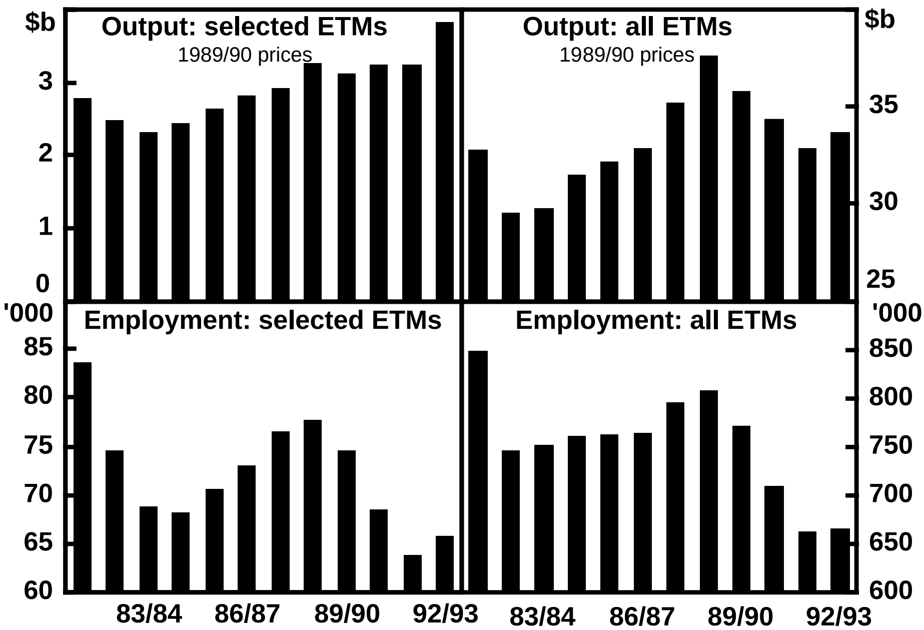
	Industry	3341	3343	3352	3357	3369	Total
1984/85	value added ($m)	71	137	603	689	782	2,281
	exports ($m)	154	151	207	152	182	846
	imports ($m)	538	564	2,358	792	1,486	5,738
	export/v.a.	2.18	1.10	0.34	0.22	0.23	0.37
	exports/imports	0.29	0.27	0.09	0.19	0.12	0.15
1989/90	value added ($m)	161	220	1,163	1,263	1,250	4,057
	exports ($m)	211	340	767	257	481	2,056
	imports ($m)	787	1,201	4,923	1,478	2,917	11,307
	export/v.a.	1.31	1.54	0.66	0.20	0.38	0.51
	exports/imports	0.27	0.28	0.16	0.17	0.16	0.18
1992/93	value added ($m)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	exports ($m)	326	500	1,471	445	892	3,635
	imports ($m)	975	1,712	6,310	1,738	3,380	14,115
	export/v.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	exports/imports	0.33	0.29	0.23	0.26	0.26	0.26

Note: Selected ETMs are: 3341 Photographic and optical goods; 3343 Measuring, professional and scientific equipment n.e.s.; 3352 Electronic equipment n.e.s.; 3357 Electrical machinery and equipment n.e.c.; 3369 Industrial machinery and equipment n.e.c.

In sharp contrast to the rapid increase in ETM real exports, which have shown unabated growth since the mid 1980s, ETM real output growth has been relatively weak, even allowing for the recent recession. In 1992/93, ETM output was still more than 10 per cent below its cyclical peak of four years earlier. (GDP, in contrast, was 3.6 per cent higher in 1992/93 than the cyclical peak of three years earlier.) Indeed, between 1981/82 and 1992/93 ETM output fell as a proportion of manufacturing output, from 67 per cent to 62 per cent. The boom in ETM exports has not led to any big employment gains either, with ETM employment falling by about 21 per cent between 1981/82 and 1992/93.

While there has been little direct output and employment growth as a result of increased ETM exports, it is quite likely that this growth has led to increased employment in those parts of the economy that provide inputs to these industries, such as banking. Moreover, the strong growth in productivity implied by the output and employment data in Figure 11 is in itself beneficial, and the implied growth of real incomes should lead to the creation of jobs in some service industries. All of this does, however, caution against thinking that the recent fast growth of ETM exports is going to generate many ‘high-skill, high-wage’ manufacturing jobs that replace those lost in industries facing stiffer import competition.

Figure 11: Employment and Output in Industries that Produce ETMs



Note: Selected ETMs are the sum of ASIC: 3341 Photographic and optical goods; 3343 Measuring, professional and scientific equipment n.e.s.; 3352 Electronic equipment n.e.s.; 3357 Electrical machinery and equipment n.e.c.; 3369 Industrial machinery and equipment n.e.c.

4. International Trade and Wages: The Stolper-Samuelson Effect

In the standard two country, two good, two factor Heckscher-Ohlin theory of international trade, a country has a comparative advantage in, and will export, the good that is produced relatively intensively by the factor in which it has a relative abundance. An important implication of this theory is given by the Stolper-Samuelson theorem, which states that a decrease in protection will raise the return of a country's relatively abundant factor, and lower the return of its scarce factor.[17] Suppose each country produces two goods, biotech and T-shirts, with two factors of production, skilled and unskilled labour. Biotech is produced relatively intensively with skilled labour. If the country intensive in skilled labour lowers its tariff on T-shirts, the price of T-shirts in that country will fall.[18] It will produce more biotech (some of which it will export) and fewer T-shirts (importing some of the other country's extra T-shirt production) with both types

17. Under reasonable assumptions, the Stolper-Samuelson theorem holds when there are more than two goods and factors.

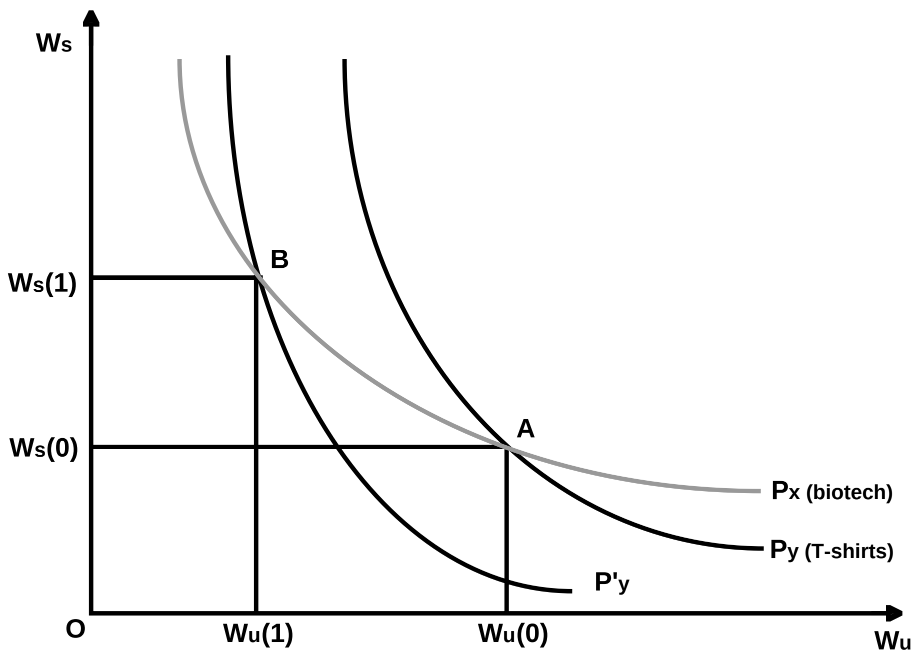
18. Strictly speaking, for this to be true, the marginal propensity to spend the foregone tariff revenue on biotech must not be so large that the reduction in spending leads to a fall in its price relative to T-shirts. This case can be ruled out by simply assuming that the country is too small to affect its terms of trade.

of labour moving from the contracting T-shirt industry to the expanding biotech industry. Because T-shirts are produced relatively intensively with unskilled labour, more unskilled than skilled labour is released by the T-shirt industry. For the labour market to clear, the wage paid to skilled workers rises, and that paid to unskilled workers falls. Because the relative price of skilled labour has risen, the ratio of skilled to unskilled labour falls in each industry, although (by assumption) production of biotech remains relatively intensive in skilled labour.

This can be seen diagrammatically in Figure 12, which we take from Mussa (1979). On the axes are the wages paid to skilled and unskilled labour (Ws and Wu). The curve labelled Px denotes the combinations of Ws and Wu at which biotech can be produced with zero economic profit, and similarly for Py in producing T-shirts. The absolute values of the slopes of the curves give the ratios of unskilled to skilled labour, at the corresponding wage ratios. A fall in the price of T-shirts shifts the Py curve inwards along a ray from the origin – that is, for a given ratio of factor quantities, factor prices fall proportionately. The point of intersection of the curves (point A) gives the equilibrium wage paid in each industry (Ws(0) and Wu(0)).

Suppose the price of T-shirts falls following a tariff cut. In the new equilibrium the ratio of unskilled to skilled labour has increased in both industries; both curves are steeper at B than at A. The nominal wage paid to skilled labour has risen to Ws(1), and so obviously has risen in real terms. The nominal wage paid to unskilled labour falls to Wu(1) and, because of the shift in factor proportions, falls by more than the price of T-shirts. The real wage paid to unskilled labour therefore falls.

Figure 12: Trade and the Relative Wages of Skilled and Unskilled Workers



The Stolper-Samuelson theorem provides the rationale for the claim that, with the liberalisation of international trade, Australian unskilled labour faces the bleak choice of either falling real wages or unemployment, if wages are insufficiently flexible to clear the labour market. However, there are a number of reasons why the theorem might not hold:[19]

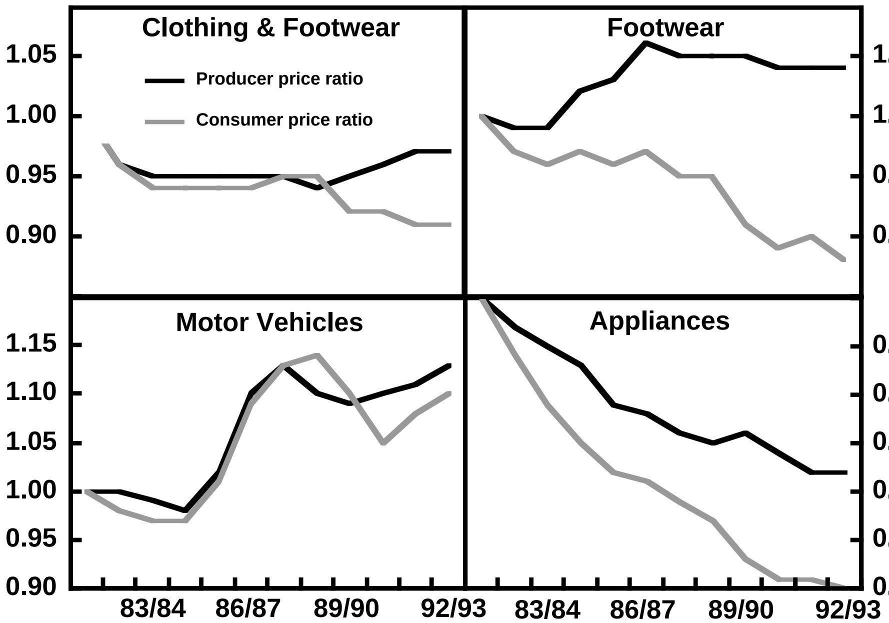
- *a reversal of factor intensities.* This occurs when T-shirt production is relatively intensive in unskilled labour at one set of factor prices, but relatively intensive in skilled labour at a different set of factor prices. (It will take place when the production function for each good is CES but the elasticities are different.) In terms of Figure 12, Py and Px intersect twice, in which case the real wage paid to unskilled labour can rise following a fall in the price of T-shirts.
- *complete specialisation.* If the two countries' endowments of the factors are sufficiently different, then under free trade each will completely specialise in the production of one good. In terms of Figure 12, Py and Px do not intersect. In this case, the simple relationship between goods and factor prices breaks down, and both factors can gain from free trade.
- *scale economies.* If the two countries have sufficiently similar factor endowments and economies of scale are sufficiently large, then intra-industry trade will take place and both unskilled and skilled labour will gain from trade (Helpman and Krugman 1986). This point would seem to have particular applicability in the Australian case to the industry Other Machinery and Equipment, where both exports and imports have been growing very quickly.
- *trade and efficiency.* If trade leads to more competition and productive efficiency, the returns to both factors could rise, again offsetting the Stolper-Samuelson effects.

These theoretical qualifications notwithstanding, how well does the Stolper-Samuelson theorem explain the Australian facts? If Stolper-Samuelson effects have been present, it must be the case that the relative price of imports has been falling. In their examination of American data, Lawrence and Slaughter (1993) conclude (amongst other reasons) that Stolper-Samuelson effects have been absent because import prices have been rising faster than export prices. For Australia, however, this is not a useful way of analysing this question since the Australian terms of trade are driven almost entirely by the cycle in world commodity prices.

In Figure 13 we show for four industries the ratio of the consumer price to the CPI, and the ratio of the producer price to the GDP deflator. (These are the only manufacturing industries for which consumer price data are available.) For Clothing and Footwear, especially Footwear, it is evident that there has been a trend decline in the relative consumer price, but not in the producer price. Since consumer prices are an average of producer and import prices, it must be the case that import prices have declined relative to the prices of domestically produced goods. For motor vehicles, on the other hand, import price effects seem to be absent, as there has been no significant divergence between relative consumer and producer prices. For Household Appliances, both relative prices have fallen, probably because of technological improvements. While the larger fall in relative consumer prices in this category indicates the possible presence of

19. See the discussion in Bhagwati and Dehejia (1993).

Figure 13: Relative Consumer and Producer Prices



import price effects, a closer examination of the data shows that this divergence started well before any cuts in tariffs on imported appliances.

The price evidence suggests the presence of Stolper-Samuelson effects in Clothing and Footwear, with cuts in protection having triggered falls in import prices, especially since the late 1980s, exactly the time when imports from low-wage countries started to increase rapidly. An interesting question is why the relative price of domestically produced Clothing and Footwear did not also fall. This cannot happen in a world of perfect competition, where the price of domestically produced goods and imports (including tariffs) must be equal. It can, however, happen in a world of imperfect competition and differentiated products, particularly if domestic prices are set as markups over costs and, for some reason – such as a wages system that constrains changes in relative wages – costs do not fall.

In Table 3 we show industry wage data for the manufacturing sector. The first column of Table 3 shows average nominal weekly wage levels in 1992/93. If we assume that industries that pay higher average wages have, on average, more highly-skilled workers, it appears to be true (as expected) that the Clothing and Footwear industry is dominated by relatively low-skilled workers, as are Textiles, Wood, Wood Products and Furniture, and Miscellaneous Manufacturing. The relatively high-skill industries appear to be Petroleum Products, Basic Metal Products, Chemicals and Chemical Products, and Non-Metallic Mineral Products. It seems that the industries which have experienced large increases in import competition from low-wage countries are those with relatively unskilled labour, but there have been exceptions: low-wage imports have also increased

Table 3: Manufacturing Wages (1981/82-1992/93)

	Weekly nominal wages			Real product wages (1981/82=100)
		Ratio to AWE		
	1992/93 ($)	1981/82	1992/93	1992/93
Food, beverages, tobacco	568.2	1.10	1.11	104.9
Textiles	557.7	1.05	1.09	116.3
Clothing, footwear	428.2	0.88	0.84	102.1
Wood, furniture	489.6	0.96	0.96	96.7
Paper, print, publishing	626.6	1.16	1.23	103.5
Chemicals	733.6	1.27	1.44	123.1
Petroleum	1,162.5	1.77	2.28	223.2
Non-metallic minerals	661.3	1.32	1.29	98.6
Basic metal	782.4	1.42	1.53	126.5
Fabricated metal	559.5	1.08	1.09	110.0
Transport	624.3	1.13	1.22	97.8
Other machinery and equipment	596.8	1.16	1.17	110.9
Miscellaneous	549.0	1.09	1.07	102.2
Total manufacturing	598.5	1.14	1.17	109.7

appreciably in Other Machinery and Equipment, where wages are about equal to the average for the whole manufacturing sector.

The real wage data, shown in the last column, reveal that, on average, real product wages in manufacturing increased by about 10 per cent over the period 1981/82 to 1992/93. As we show in Section 5 this was considerably less than labour productivity, which increased by over 40 per cent. Within the aggregate, there were large variations between industries, ranging from a fall of 3.3 per cent in Wood, Wood Products and Furniture to an increase of more than 100 per cent in Petroleum Products, driven largely by the fall in oil prices in 1986. Apart from this special case, the largest increases were recorded in Basic Metals Products and Chemicals and Chemical Products.

The second and third columns of Table 3 show the ratio of industry earnings to average weekly earnings (AWE) for the years 1981/82 and 1992/93, respectively. Except for Petroleum Products no large changes appear to be evident. At one level, it could be argued that this lack of relative wage movement proves little, since international trade is supposed to affect the relative wages paid to different factors of production (such as skilled versus unskilled labour), not relative wage levels in different industries.[20]

20. It is often asserted in policy discussions that Australian relative wages are inflexible by world standards, though this statement is actually quite difficult to substantiate empirically. In a cross-country study, Coelli, Fahrer and Lindsay (1994) find that Australian wage flexibility, measured in terms of inter-industry wage dispersion, is about equal to that of the United States, a country which is considered to have a flexible labour market. This leaves open the possibility, however, of inflexible relative wages measured along other margins, e.g. between or within occupational groups.

However, this evidence does at least suggest one of two possibilities: either trade has placed little pressure on relative wages, or such pressure has been suppressed by the operation of the centralised wages system.

A clean test of the Stolper-Samuelson theorem would examine whether there has been a systematic tendency, on an industry basis, for unskilled wages to fall relative to skilled wages. Unfortunately, this is not possible with Australian data since there are no long time series of skilled and unskilled wages by industry. We do, however, have data on wages by occupation from 1987 to 1993. We use the wages of Business Professionals as a proxy for high-skill wages, and the wages of Machine Operators as a proxy for low-skill wages. Only with the latter can we match the occupations to particular industries.[21] In Table 4 we show the ratio of the economy-wide hourly wage paid to high-skill workers to low-skill workers in each manufacturing industry. The data tend to be volatile because they are derived from relatively small samples but, overall, there is little evidence of Stolper-Samuelson effects in wages; that is, nowhere has there been a significant reduction in the ratio of unskilled to skilled wages. This remains true if we broaden the definition of skilled and unskilled workers.[22] However, like the relative industry earnings in Table 3, what is not clear is whether these effects have been absent, or just suppressed by labour market institutions which have inhibited changes in relative wages.

In all likelihood, the answer varies from industry to industry. For Clothing and Footwear, the combined price and wage evidence suggests that in a liberalised labour market, relative wages would have been driven down by Stolper-Samuelson effects. In other industries, where prices appear to have been moved more by changes to the production technology, the incipient change to relative wages (if any) is determined by where the technological change is concentrated. Technological change that affects skilled and unskilled labour equally will have no effect on relative wages, but technological change biased against unskilled labour could depress unskilled labour's relative wage, at least implicitly.

In the United States, the most telling evidence against Stolper-Samuelson effects, and in favour of biased technological effects, is that the ratio of unskilled to skilled employment, and the relative wage paid to unskilled labour, have *both* decreased throughout the economy (Lawrence and Slaughter 1993, p.193). We have no Australian data on skilled and unskilled employment by industry; however, at the aggregate level, the same picture emerges. In 1987, the ratio of Machine Operators to Business Professionals was 0.974. By 1993, it had fallen to 0.631. The fall in the ratio of unskilled to skilled workers, more broadly defined, was from 1.000 to 0.881. These decreases should be interpreted with caution as they might have been affected by the recent cyclical downturn, and they might be due to relatively fast growth of skill-intensive industries, with possibly little change in skill-intensity within each industry. Nonetheless, they are still striking, and suggest that, in recent years, either technological factors have been very

21. We could match no category of machine operators with the industry Transport Equipment so instead we used the occupation Vehicle accessories fitters, which comes under the category Miscellaneous labourers and related workers.

22. Our broad definition of unskilled workers is Plant and Machine Operators, and Drivers, and Labourers and Related Workers; while skilled workers are defined as Managers and Administrators, and Professionals. Between 1987 and 1993 this unskilled/skilled wage ratio fell only from 0.63 to 0.59.

Table 4: Relative Wages

Low-skilled occupation	Ratio of hourly wage to skilled hourly wage (as at May)						
	1987	1988	1989	1990	1991	1992	1993
(21) Food processing machine operators	0.70	0.67	0.71	0.70	0.68	0.70	0.70
(23) Textile sewing machinists	0.53	0.54	0.54	0.56	0.55	0.54	0.53
(24) Shoemaking machine operators	0.60	0.56	0.59	0.57	0.60	0.59	n.a.
(25) Wood processing machine operators	0.64	0.67	0.66	0.68	0.63	0.61	0.65
(26) Paper and paper products machine operators	0.89	0.88	0.82	0.79	0.80	0.82	0.82
(27) Chemical production machine operators	0.78	0.85	0.82	0.71	0.87	0.87	0.75
(28) Clay and stone processing machine operators	0.72	0.71	0.69	0.68	0.82	0.64	0.62
(29) Basic metal product machine operators	0.71	0.77	0.74	0.74	0.73	0.69	0.68
(31) Other metal products machine operators	0.75	0.67	0.68	0.66	0.64	0.71	0.64
(32) Vehicle accessories fitters	0.55	0.56	0.59	0.60	0.57	0.61	0.75
(33) Photographic products machine operators	0.72	0.79	0.70	0.76	0.63	0.69	0.81
(34) Plastics production machine operators	0.69	0.71	0.67	0.69	0.64	0.64	0.69

Note: Corresponding ASIC industry code in parentheses.

important, or that the absence of relative wage falls for unskilled workers has had very large negative effects on their employment.

5. International Trade and Employment

The evidence presented on Section 4 suggests that if the liberalisation of international trade has affected the labour market, it has been through employment rather than wages. In Table 5 we show the changes in manufacturing employment and productivity over the period 1981/82 to 1992/93. The first column shows average employment levels in each industry over this period, the second shows the percentage change in employment, the third shows the contribution of each industry to the change in total manufacturing employment, and the last column shows the change in productivity over the period. Overall, manufacturing employment fell by nearly 25 per cent. Within the manufacturing

Table 5: Manufacturing Employment and Productivity (1981/82-1992/93)

	Average level ('000)	Employment percentage change	Contri-bution	Productivity percentage change
Food, beverages, tobacco	170.8	-14.2	-2.2	48.2
Textiles	31.7	-33.4	-1.0	53.6
Clothing, footwear	68.8	-31.3	-2.1	28.7
Wood, furniture	79.8	3.1	0.2	-15.7
Paper, print, publishing	105.8	-8.1	-0.7	20.4
Chemicals	49.7	-15.8	-0.7	45.4
Petroleum	4.9	-36.7	-0.2	71.0
Non-metallic minerals	40.5	-24.5	-1.0	36.5
Basic metal	73.3	-37.1	-3.0	116.8
Fabricated metal	100.9	-33.6	-3.4	28.3
Transport	108.8	-38.9	-4.5	62.3
Other machinery and equipment	132.6	-28.0	-3.9	56.4
Miscellaneous	62.5	-11.3	-0.6	20.8
Total manufacturing	1,030.1	-23.2	-23.2	44.5

sector, there were some very large falls: employment decreased by nearly 40 per cent in Transport Equipment and Basic Metal Products; by over 30 per cent in Textiles, Clothing and Footwear and Fabricated Metal Products; and by nearly 30 per cent in Other Machinery and Equipment. Interestingly, among these industries only Textiles and Clothing and Footwear are low-skilled industries under apparent threat from low-wage imports. For the most part, the large losses in manufacturing employment have been concentrated in industries that have greatly increased their labour productivity (such as Basic Metal Products, Transport Equipment and Other Machinery and Equipment), and where import competition, especially from low-wage countries, has been relatively unimportant.

To determine more precisely the contribution of changes in demand, exports, imports and labour productivity to employment in each industry we use a simple numerical method called shift-share analysis.[23] Expenditure (E) on the good produced in each industry i is defined as domestic expenditure (D) plus exports (X), minus imports (M):

$$E_i \equiv D_i + X_i - M_i^L - M_i^H \tag{1}$$

where we divide imports into those coming from high (H) and low (L) wage countries. At the level of GDP, expenditure is conceptually equal to output, but this is obviously

23. For applications of this method to other countries, see Krueger (1980) and UNIDO (1986).

not true at the industry level, where output is equal to the sum of the value added at many stages of production. This distinction can be important. For example, taken at face value, it appears that each year Australia exports more textiles than are actually produced. This is because most of the value added in textile exports comes not from the textile industry but from the raw materials that are used as inputs. We overcome this problem by scaling the industry export and import data by the ratio of value added to final expenditure.

If we denote output per employed person by Π_i, it then follows that:

$$\Pi_i \equiv \frac{Y_i}{N_i} \equiv \frac{\tilde{D}_i + \tilde{X}_i - \tilde{M}_i^L - \tilde{M}_i^H}{N_i} \tag{2}$$

where N_i is employment in the *i*th industry, and the tilde above exports and imports indicates that they have been adjusted by the value added ratios. We use these adjusted trade data, as well as production-based data on output, to define $\tilde{D}$ as:

$$\tilde{D}_i \equiv Y_i - \tilde{X}_i + \tilde{M}_i^L + \tilde{M}_i^H$$

where Y_i is real value added in the *i*th industry.

The contributions of domestic demand, exports, imports and productivity to changes in employment between two points in time can be found by re-arranging and linearising equation (2):

$$\Delta N_i = \frac{1}{\Pi_i^*}(\Delta\tilde{D}_i + \Delta\tilde{X}_i - \Delta\tilde{M}_i^H - \Delta\tilde{M}_i^L - N_i^*\Delta\Pi_i) \tag{3}$$

where the superscript * denotes the geometric mean of a variable's value at the beginning and end periods. Other things equal, employment in an industry will increase with increases in domestic demand and exports, and with decreases in imports and labour productivity.

Apart from the linearisation error (which is in practice small), equation (3) is an identity. This has the advantage of being by definition correct, but the disadvantage of having no behavioural content. The decomposition has, therefore, to be interpreted carefully. In particular, these influences need not be independent. For example, an increase in import competition might lead firms to adopt measures that improve their productivity. Additionally, if an increase in domestic demand is met through increased imports this will appear as a gain in employment through the demand effect, but a loss of employment through more imports, with no net employment benefit. In practice, however, no employment has been gained or lost in the first place, and it would be incorrect to conclude that a certain number of jobs had been 'lost' because of increased imports. Similarly, an industry which imports and re-exports goods with little value added will have neither gained nor lost jobs, but this will show up in the decomposition as a gain and loss of equal size. It is correct to conclude that imports have led to decreases in employment only if there have been no offsetting increases from domestic demand and/or exports.

Another important consideration is that compositional effects can lead to spurious results in this type of analysis. For example, suppose that within a 2-digit category there is a shift in demand from a low-productivity industry to a high-productivity industry.

Less labour is therefore required to produce the same level of (2-digit) output. If the analysis is conducted at the 2-digit level, the correct answer – that the fall in employment is due to demand effects – will not be revealed since demand at the 2-digit level is unchanged. Instead, the analysis will incorrectly lead to the conclusion that the employment has fallen because of an increase in productivity; this is incorrect as there has been a change only in average productivity, but not in any individual industry. This problem is important in practice. For example, the decomposition of the change in employment in Textiles at the 2-digit level leads to a large, but false, positive contribution of exports due to the very large increase in exports of Cotton ginning (ASIC 2341), an industry with an exceptionally high level of labour productivity.

To minimise this problem we conduct the analysis at the 4-digit level. The 2-digit results reported in Table 6 are the sum of the 4-digit results**,** and their interpretation is slightly different from that given above. A negative domestic demand effect for a particular 2-digit industry, for example, does not necessarily imply that demand actually fell; rather, that there was a shift in demand within that category towards industries with

Table 6: Sources of Employment Changes in Manufacturing ('000) (1981/82 – 1991/92)

		Contributions of:				
	Change in employment	Domestic demand	Exports	Imports	Low wage imports	Productivity
Food, beverages, tobacco	-13	24	11	-6	-2	-42
Textiles	-10	4	3	-5	-6	-12
Clothing, footwear	-28	-1	3	-9	-9	-19
Wood,furniture	-9	-4	2	-3	-2	-3
Paper, print, publishing	-3	24	2	-8	-1	-21
Chemicals	-9	20	7	-17	-4	-19
Petroleum	-1	0	0	0	0	-1
Non-metallic minerals	-8	-1	1	-3	-2	-6
Basic metal	-34	-18	28	-2	-1	-42
Fabricated metal	-27	-16	6	-2	-3	-15
Transport	-50	-3	12	-12	-2	-46
Other machinery and equipment	-49	61	29	-100	-20	-39
Miscellaneous	-8	13	8	-17	-9	-12
Total manufacturing	-248	104	112	-182	-62	-278
Total manufacturing [(a)]	-249	24	89	-102	-53	-258

Note: (a) Excludes Measuring, professional and scientific equipment n.e.s. (ASIC 3343), Electronic equipment n.e.s. (ASIC 3352), Aircraft (ASIC 3244), and Pharmaceutical and veterinary products (ASIC 2763).

high levels of productivity. It remains true that job losses can be ascribed to increased imports only if negative import effects have not been offset by positive export or demand effects.

We decompose the change in employment over the period 1981/82 to 1991/92 (the last year for which we have the necessary data) with the following results:

- Productivity effects have been the dominant force behind the decline in manufacturing employment, in aggregate accounting for more than 100 per cent of lost jobs between 1981/82 and 1991/92.
- The only industry in which imports from low-wage countries accounted for a substantial decrease in employment (i.e. where increased imports were not offset by increased domestic demand or exports) was Clothing and Footwear, where low-wage imports accounted for about one third of the 28,000 lost jobs, including about half of 6,000 lost jobs in Footwear.[24] Despite this large import effect, productivity improvements accounted for about two-thirds of the fall in employment in this industry.
- Low-wage imports accounted for a large number of gross job losses in Textiles and Miscellaneous Manufacturing, but not after netting out the effect of domestic demand and exports. Two 4-digit industries in Other Machinery and Equipment – Measuring, Professional and Scientific Equipment n.e.s. and Electric Equipment n.e.s. – between them accounted for an increase in employment of about 58,000 through increased demand, and an identical decrease in employment through increased imports. In fact, there was essentially no change in employment in these two industries. Excluding them leaves only a small demand effect in Other Machinery and Equipment, and an import effect net of exports of about 24,000 jobs lost, mostly due to imports from high-wage countries.[25] This is consistent with the evidence on the falling relative price of imported household appliances reported in Section 4, and may be due to domestic firms being slower to adopt new technologies than their foreign competitors.
- About 29,000 of the 39,000 jobs lost in Other Machinery and Equipment through productivity improvements were in the five industries identified in Section 3.3 as being significant exporters of elaborately transformed manufactures. It would appear that firms that are successful exporters are also those which shed the most jobs through productivity gains.
- Excluding the four industries where employment gains and losses have been grossed up by demand and import effects (the two mentioned above plus Aircraft and Pharmaceutical and Veterinary Products, which between them account for only about 5 per cent of total manufacturing output and employment) gives an aggregate effect reported in the bottom row of the table. The decline in manufacturing

24. It also appears that low-wage imports accounted for large numbers of job losses in Non-Metallic Mineral Products, since the contributions of domestic demand and exports were essentially zero. However, this is misleading. The 4-digit industries which recorded large losses through low-wage imports also recorded large gains through domestic demand; these gains were offset by decreases in demand in other industries.

25. However, in the industries Refrigerators and household appliances (ASIC 3353) and Industrial machinery and equipment n.e.c. (ASIC 3369) imports from low-wage countries accounted for a relatively high share of job losses.

employment due to productivity effects slightly exceeds the total fall in employment. Additionally, about 24,000 jobs were added through demand effects and about 13,000 jobs were subtracted by the effect of imports net of exports. Although exports grew by more than imports over the period, the comparatively low level of labour intensity in the exporting industries has meant that the expansion of the traded goods sector has led to a small net loss of manufacturing jobs.

These results indicate that, similarly to other industrialised countries, productivity improvements have far outweighed any direct trade effects on manufacturing employment. In only one industry, Clothing and Footwear, did imports from low-wage countries have a substantial direct impact on employment. However, this conclusion begs the obvious question of what caused the improvements in productivity. As many writers have pointed out, it is quite plausible that either the threat or existence of increased import competition leads, via increased competitive pressure, to productivity improvements. This can happen through the adoption of labour-saving technologies or through the reduction of featherbedding, managerial inefficiencies and so on. Additionally, in each industry, the competitive effects of trade might drive the least efficient firms from the market, leading to an increase in average industry productivity.

Conceptually, the problem is to separately estimate the productivity-induced job losses that would have occurred in the absence of trade (or the absence of an increase in trade) and those that have been due to competitive pressure from imports. Wood (1994) tries to control for internal influences by examining productivity in the non-traded sectors of several industrialised countries. This technique is inapplicable with Australian data, however, as the non-traded sector comprises primarily service industries for which the output data are constructed by assuming no growth in labour productivity.

Another way of assessing the effects of import competition while isolating productivity effects is to estimate an econometric model. This is the approach taken by Grossman (1987) and Revenga (1992) in examining how imports have affected manufacturing employment and wages in the United States. Grossman estimates reduced form wage and employment equations for nine US manufacturing industries, and finds import competition to have harmed employment in only one industry (radios and televisions). Revenga estimates wage and employment equations across a panel of 38 manufacturing industries and finds imports to have had a more widespread effect on employment and wages. Again, data limitations prevent these models being estimated for Australia.[26]

6. Technology, Wages and Employment

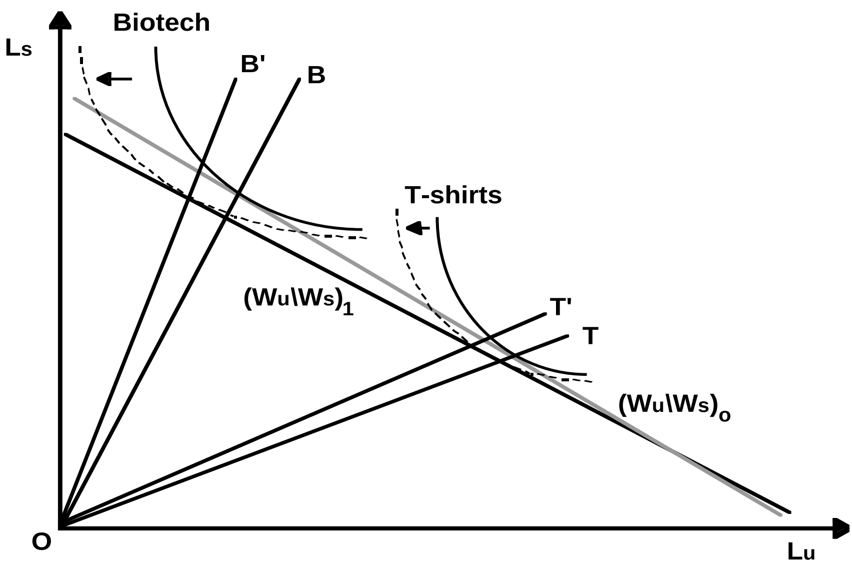
In this section we examine the relationships between one possibly important source of productivity growth – technological progress – and wages and employment. Lawrence and Slaughter (1993) suggest that technological improvement, biased against unskilled labour, can explain the increase in the ratio of skilled to unskilled labour employed throughout the American economy, and the fall in the ratio of unskilled to skilled wages. Figure 14 shows how this can occur. In the diagram, there are isoquants labelled biotech

26. Specifically, we lack the disaggregated capital stock measures for the Grossman procedure, and the finely disaggregated data on import prices of the Revenga model.

and T-shirts, with biotech (T-shirts) relatively intensive in skilled (unskilled) labour. (The skill intensities in biotech and T-shirts are given by the rays OB and OT, respectively.) The relative wage of unskilled labour is given by the slope of the line $(Wu/Ws)_0$. Technological change biased against unskilled labour shifts each isoquant to the left: for a given amount of skilled labour, less unskilled labour is needed to produce a given quantity of output. Crucially, this technological advance is concentrated in biotech, so its isoquant shifts further. In the new equilibrium, each industry is more intensive in skilled labour and the ratio of unskilled to skilled wages, now given by $(Wu/Ws)_1$, has fallen. This result depends on the technological change being concentrated in the skill-intensive industry; otherwise, the relative wage of unskilled labour increases. It also depends on there being not too much factor substitutability in either industry; otherwise the increase in the ratio of unskilled to skilled labour in response to the change in relative wages more than offsets the effect of the technological change.

The analysis is easily amended to fit the Australian facts, namely, the absence of changes to relative wages. If the technological change is spread evenly between each industry, the new relative wage line is parallel to the old line; each industry has become more intensive in skilled labour, with no change in relative wages. Alternatively, if the technological change is concentrated in the skill-intensive industry, but for some reason the wage paid to unskilled labour does not fall, unskilled labour will become unemployed. Which of these alternative explanations best represents reality is clearly important for policy purposes. As a guide to this question, we show in Figure 15 the implications of the market-clearing explanation for the absolute level of employment in each industry. The total amounts of skilled and unskilled labour in the economy are given by vertical

Figure 14: Technological Change and Relative Wages

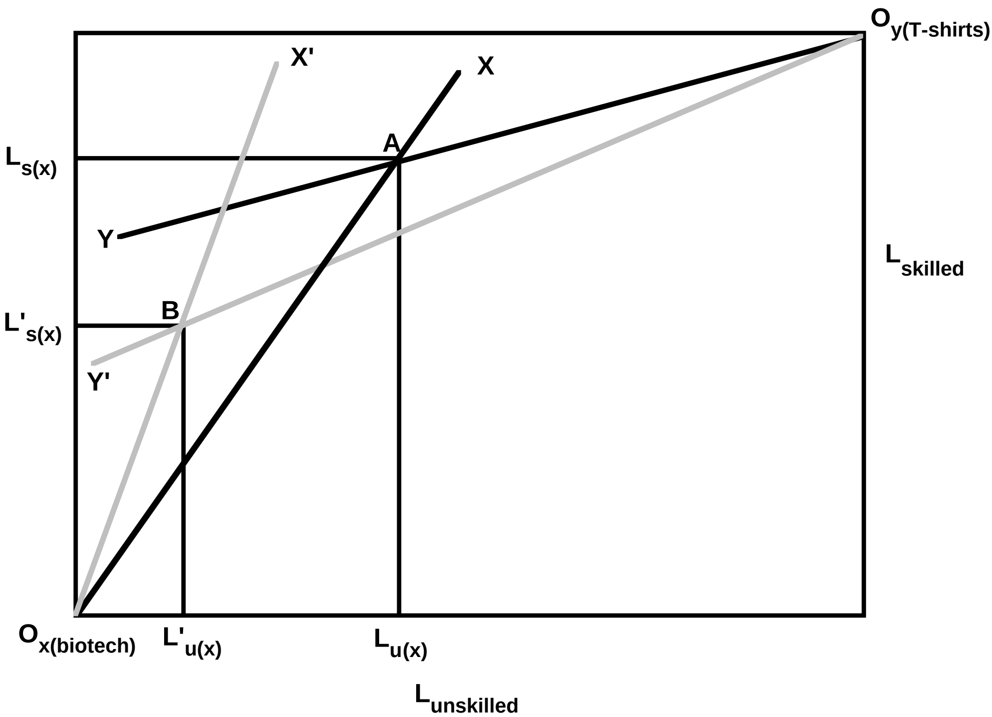


and horizontal sides of the box, respectively. The rays O_xX and O_yY show the factor intensity in each industry, with biotech relatively intensive in skilled labour. Equilibrium is given by the point A, with $O_xL_{u(x)}$ unskilled labour and $O_xL_{s(x)}$ skilled labour employed in biotech production, with the remaining labour of each type employed making T-shirts. The effect of increasing the skill-intensity of each industry is to rotate the rays to O_xX' and O_yY' with the new equilibrium at B. As a result, less labour of each type is employed in biotech and more in T-shirts.

This seems to be a good description of the labour market in industries like Other Machinery and Equipment and Transport Equipment, which produce elaborately transformed goods; that is, the fall in employment can be explained by technological factors, without recourse to stories about wage rigidities. However, this explanation does not sit well with the employment changes in the less-skilled-end of manufacturing, such as the Textile and Clothing and Footwear industries, in which, contrary to Figure 15, employment levels have contracted severely. Here the wage rigidity story is more appealing, with technological improvements leading to large falls in employment, augmented by direct trade effects in the case of Clothing and Footwear.

Another weakness of the technology story is that it does not explain why this change takes place. Many commentators have observed that increased import competition and internationalisation generally have motivated firms to improve their productivity, by reducing inefficiencies in production and by adopting new technologies. These insights have been recently formalised in models that integrate trade and technological change.

Figure 15: Technological Change and Relative Employment



Grossman and Helpman (1991) develop a model in which trade facilitates the transmission of technical knowledge. Campbell (1994) addresses the issue in a model in which protected firms, faced with the possibility of bankruptcy from emerging import competition, invest in cost-reducing technologies they had previously rejected as too risky. He calls this the 'cold shower' effect.

Bhagwati and Dehejia (1993) offer two models of trade and technology which predict a widening of the wage differential between skilled and unskilled labour. In their first model, there are two industries and two factors of production (skilled and unskilled labour). The terms of trade are volatile, increasing in one period and then decreasing in the next period to their initial level. Most important is the assumption about human capital formation. Skilled labour accumulates at the same rate in each sector, and is unaffected by any shift of skilled labour between sectors. Unskilled labour, on the other hand, is augmented only if it remains in the same sector. Thus skilled labour (e.g. computer programmers) can work equally well in either sector, but that is not true of unskilled labour. The effect of a rise then fall in the terms of trade is that the effective stock of skilled labour increases relative to the effective stock of unskilled labour. While there is no change in the real wage per effective worker of either type, the real wages of skilled workers increase by more than those of unskilled workers, because the skilled workers have accumulated more human capital.

The second model extends the first by applying the recently developed analysis of investment and uncertainty.[27] By incurring an irreversible fixed cost workers with few skills can invest in their human capital to become high-skilled workers. Suppose the relative reward to being high-skilled rather than low-skilled fluctuates with stochastic changes in the price of high-skill-intensive goods relative to low-skill-intensive goods. It then pays a low-skilled worker to wait and see before investing in new skills, because of the danger that the high to low-skilled wage differential will narrow after she has made the costly and irreversible investment in her human capital. If the initial apparent rewards to upgrading skills are sufficiently large the low-skilled worker will make the investment anyway, but, if not, a small increase in uncertainty is sufficient to postpone the investment. Thus, the increased wage inequality between high and low-skilled workers, observed in the United States and implicit in Australia, can be explained by increased uncertainty about relative goods prices.

This model implies that because low-skilled workers are behaving optimally (in the sense of individual utility maximisation) there is no immediate case for government-sponsored training schemes or subsidies aimed at increasing their welfare. However, as Bhagwati and Dehejia acknowledge, once imperfect capital markets are added to the model (so workers are unable to borrow to finance their retraining) an interventionist role for policy returns. The relevant and interesting question is whether such intervention should be confined to repairing failures in the capital market rather than the labour market, or whether this distinction can even be made in practice.

27. See, for example, Dixit and Pindyck (1994).

7. Summary and Policy Discussion

The major points to emerge from our analysis are:

- The opening of the Australian economy to international influences over the past decade has placed considerable competitive pressure on Australian manufacturing firms, which have responded by significantly increasing their levels of labour productivity.
- This has led to substantial decreases in manufacturing employment. However, there have been no falls to speak of in the wages of manufacturing workers relative to other workers, or of the wages of unskilled workers relative to skilled workers. This may have been due to changes in some relative wages being suppressed by the centralised wages system, especially in the low-skill industries like Clothing and Footwear.
- The popular perception that imports from low-wage countries have adversely affected manufacturing employment is correct only for the Clothing and Footwear industry, which accounts for just 6 per cent of total employment in the manufacturing sector.
- There has been no direct employment bonanza from the recent large increase in exports of elaborately transformed manufactures, for two reasons: the value added relative to exports in these industries is low, and they have a high level of labour productivity. Indeed, it is precisely these industries that have been shedding the most jobs through productivity improvements.

The analysis suggests a number of policy issues worthy of discussion. While internationalisation and the associated improvements in manufacturing productivity have led to large decreases in employment in that sector, this of course need not imply falls in employment in the economy as a whole. The increases in income generated by the improvements in manufacturing productivity ought to lead to increased demand, and therefore increased employment, elsewhere in the economy, especially in the service industries. However, a necessary condition for this structural adjustment to be successful is a labour market that works reasonably well. Throughout this century the centralised wage-setting system in Australia has evolved alongside, and been intimately connected with, the protection of manufacturing industries from import competition. Now that international trade is being liberalised, it seems reasonable to ask whether a corresponding liberalisation of the labour market must necessarily follow. There seems little doubt that the internationalisation of the Australian economy has increased the pressure on the low-skilled end of the labour market, though this appears to be more due to technological and productivity effects than directly through imports produced in low-wage countries. This implies, however, that this pressure will be felt by all low-skilled workers – not just those in the traded sectors – as these effects are spread throughout the economy.[28] The choice facing workers with few skills appears to be the one canvassed at the beginning of this

28. It could be argued, for example, that the recent very large increases in productivity, and corresponding falls in employment, in the railways and public utilities might be linked to a perceived need to increase efficiency throughout the economy because of the pressures arising from internationalisation (though we doubt that this can be demonstrated rigorously). Indeed, at times the entire ‘microeconomic reform’ agenda appears to be motivated by a need to improve ‘international competitiveness’ (at best an ambiguous concept) rather than productivity for its own sake.

paper: either their real wage falls or they become unemployed – or they increase their skills.

This idea has been formalised in a recent paper by Krugman (1993). In his model, technological changes lead incipiently to either less income equality or less employment. Which of these outcomes occurs is a matter of policy choice. A laissez-faire government responds by doing nothing; as a result, employment is maintained but inequality is widened. A redistributive government responds by maximising the welfare of the median voter; this leads to less inequality, but also distorts incentives and leads to a fall in employment. There is some evidence to support this idea in the literature comparing economic performance across countries. It appears that while country-specific institutions do not affect economic growth *per se*, they do affect the distribution of the burden of structural shocks in terms of unemployment and income differentials (Carlin 1994). Thus while in the 1970s and 1980s the United States and OECD Europe recorded roughly equal increases in per capita GDP, unemployment trebled in Europe but increased by much less in the United States, which 'paid' for its superior employment performance by reduced growth in productivity and real wages, and increased income inequality (Blank and Freeman 1993).

As far as Australia is concerned, for some commentators it is self-evident that any increased income inequality caused by labour-market liberalisation is preferable to higher unemployment caused by its absence. Even if true, however, a number of difficult questions remain unanswered, such as what happens if the market-clearing wage for those with few skills falls below the level of unemployment benefits? This raises the general issue of how, in a liberalised labour market, the social security and tax systems would interact to affect incentives to work while providing some kind of socially agreed upon minimum standard of living, or other distributional goals. This question is likely to become much more important than it has been in the past if the quasi-redistributive role of the wages system is discontinued and it is to act solely as an efficient allocator of labour resources.

In any case, questions about the social undesirability of a class of 'working poor' versus the social undesirability of a class of unskilled unemployed are not ones where economic analysis can offer any special insights, and are best resolved by the political process. Arguably of equal interest is whether policies which alter competitive labour market outcomes can actually enhance economic efficiency. For this to be the case, there must exist socially increasing returns or externalities from producing in some sectors rather than others. Agell and Lommerud (1993) develop a model in which growth and structural change are enhanced by compressing the relative wages of workers in the high and low-productivity sectors of the economy, where the high-productivity sector confers external benefits in the manner familiar from endogenous growth theory. The socially (but not privately) beneficial demise of the low-productivity sector is accelerated by keeping that sector's wage high. This paper is motivated by the experience of the Swedish 'solidary' wage policies which have been based on this principle, but have had to be complemented by large scale (and expensive) retraining programs for displaced workers.

Whether these market failures exist in practice is a difficult question to answer, though, in many respects, current Australian labour-market policies are at least consistent with the view that they do: despite the recent reforms to the wage setting system, changes in relative wages are constrained by the existence of awards and a growing number of schemes exist for dealing with structural adjustment and the long-term unemployed.[29] This leads us to the question of how (or whether) governments should smooth the adjustment process as internationalisation leads some industries to contract and others to expand, irrespective of whether this process is brought about by market forces or policy intervention. While it is obviously true that sufficiently fast economic growth will solve any aggregate employment problem (just as it did when employment in agriculture contracted for essentially the same reasons as the current contraction in manufacturing) it may be the case that impediments to the adjustment process will constrain the economy's maximum feasible growth rate, with the natural rate of unemployment staying high as a result.

On this issue there remain many difficult and so far unresolved questions. Are the market failures sufficiently important that there exists a respectable role for 'industry policies' (i.e. discriminatory taxes and subsidies) which, for example, promote research and development? Will attempts by policy makers to pick winning skills prove to be more successful than previous attempts to pick winning industries? Is the problem of skills mismatch really a failure of capital markets rather than labour markets and, if so, should those people displaced from industries with declining employment simply be given training vouchers (or some other financial subsidy) with instructions to choose their own form of re-skilling? Can wage subsidy schemes be designed which actually facilitate structural change and lead to the efficient creation of new jobs, and do not just involve a transfer from taxpayers to those in receipt of the subsidy? Is there any sense in giving firms wage subsidies while simultaneously imposing wage taxes (i.e. payroll taxes)? Can a wages system developed at the national level be made consistent with microeconomic adjustment, where such adjustment is often concentrated in particular regions?

We do not have definitive answers to any of these questions, and the policy and academic studies which address them tend to the not very helpful conclusion that these issues are best dealt with on a 'case by case' basis. The absence of generalised and simple policy prescriptions does not, however, alter the fact that internationalisation is in one sense no different from any other structural change: potentially there are losers as well as those who stand to benefit. But this need not be the case, and the challenge for policy is to find ways to compensate the losers, or better yet, to clear the way for them to join in those parts of the economy that will profit from internationalisation. The aggregate benefits should be large enough to make the effort worthwhile.

29. Of course, not everybody is convinced by the market failure argument. Many critics of current policy, for example Sloan and Wooden (1994), contend that current labour-market policies are inefficient, and possibly also inequitable, once the welfare of the unemployed is taken into account.

Appendix A: Imports

Table A1: Imports of Food, Beverages, and Tobacco (21)

	1981/82			1992/93		
Industry	*211-217*	*218-219*	*21*	*211-217*	*218-219*	*21*
$m	645	129	774	1,996	525	2,521
Percentage from:						
China	4.0	0.1	3.4	2.4	0.1	1.9
Taiwan	2.7	0.0	2.3	1.3	0.1	1.1
Korea	1.0	0.0	0.8	1.0	0.1	0.8
Indonesia	1.8	0.1	1.5	2.8	0.1	2.2
Other low-wage	30.5	11.4	27.3	32.4	33.5	32.6
Total low-wage	40.0	11.6	35.3	40.0	33.9	38.7

Note: Categories include: 211-217 Food; 218-219 Beverages, Malt and Tobacco.

Table A2: Imports of Textiles (23)

	1981/82			1992/93		
Industry	*234*	*235*	*23*	*234*	*235*	*23*
$m	861	233	1,094	1,792	564	2,356
Percentage from:						
China	7.5	8.7	7.8	8.3	22.5	11.7
Taiwan	5.8	4.8	5.6	9.8	5.9	8.9
Korea	5.1	2.3	4.5	9.0	2.1	7.4
Indonesia	0.2	0.0	0.1	6.0	1.6	5.0
Other low-wage	12.7	14.4	13.1	17.0	18.1	17.2
Total low-wage	31.3	30.3	31.1	50.2	50.2	50.2

Note: Categories include: 234 Textiles fibres, yarns and woven fabrics; 235 Other textile products.

Table A3: Imports of Clothing and Footwear (24)

	1981/82				1992/93			
Industry	*244*	*245*	*246*	*24*	*244*	*245*	*246*	*24*
$m	60	372	147	579	220	1,042	507	1,769
Percentage from:								
China	11.2	13.1	9.8	12.1	68.5	51.2	39.7	50.0
Taiwan	32.5	18.0	33.3	23.4	2.2	2.5	7.3	3.9
Korea	10.2	7.0	9.5	7.9	6.5	1.4	14.9	5.9
Indonesia	0.0	2.0	1.6	1.7	0.8	2.5	6.1	3.3
Other low-wage	5.8	12.5	18.3	13.3	2.6	15.3	13.7	13.3
Total low-wage	59.7	52.5	72.5	58.3	80.6	72.8	81.8	76.4

Note: Categories include: 244 Knitting Mills; 245 Clothing; 246 Footwear.

Table A4: Imports of Wood, Wood Products and Furniture (25)

	1981/82			1992/93		
Industry	*253*	*254*	*25*	*253*	*254*	*25*
$m	332	112	444	862	254	1,116
Percentage from:						
China	2.2	2.5	2.3	2.6	8.9	4.0
Taiwan	9.4	16.6	11.2	2.4	14.2	5.1
Korea	0.3	1.0	0.5	0.1	0.4	0.2
Indonesia	1.1	0.3	0.9	6.4	9.8	7.1
Other low-wage	26.1	12.8	22.8	25.3	17.4	23.5
Total low-wage	39.2	33.2	37.7	36.8	50.6	39.9

Note: Categories include: 253 Wood and wood products; 254 Furniture and mattresses.

Table A5: Imports of Paper, Paper Products, Printing and Publishing (26)

	1981/82			1992/93		
Industry	*263*	*264*	*26*	*263*	*264*	*26*
$m	651	310	961	1,496	905	2,401
Percentage from:						
China	0.4	0.2	0.3	1.7	2.7	2.1
Taiwan	1.0	0.4	0.8	0.6	1.0	0.8
Korea	1.4	0.7	1.2	1.4	1.0	1.3
Indonesia	0.0	0.0	0.0	2.0	0.6	1.5
Other low-wage	4.7	0.9	3.5	8.9	2.2	6.3
Total low-wage	7.5	2.3	5.8	14.6	7.5	11.9

Note: Categories include: 263 Paper and paper products; 264 Printing and allied industries.

Table A6: Imports of Chemicals, Chemical Products and Petroleum (27)

	1981/82				1992/93			
Industry	*275*	*276*	*277-78*	*27*	*275*	*276*	*277-78*	*27*
$m	1,136	482	1,204	2,821	3,607	2,465	1,612	7,684
Percentage from:								
China	1.4	1.1	2.3	1.7	1.8	0.8	1.8	1.5
Taiwan	0.8	0.3	0.0	0.4	1.7	0.7	0.1	1.1
Korea	0.6	0.3	1.0	0.7	1.8	0.9	1.2	1.4
Indonesia	0.0	0.3	0.0	0.1	0.4	0.1	17.4	3.9
Other low-wage	16.9	3.6	50.2	28.9	24.0	3.8	42.1	21.3
Total low-wage	19.8	5.6	53.5	31.7	29.8	6.3	62.6	29.1

Note: Categories include: 275 Basic chemicals; 276 Other chemical products; 277-78 Petroleum.

Table A7: Imports of Non-Metallic Mineral Products (28)

	1981/82					1992/93				
Industry	*285*	*286*	*287*	*288*	*28*	*285*	*286*	*287*	*288*	*28*
$m	125	192	7	49	373	275	470	19	168	931
Percentage from:										
China	0.2	3.0	0.5	0.2	1.6	10.6	6.1	5.2	3.6	6.9
Taiwan	0.8	5.0	0.5	4.0	3.4	5.3	4.2	3.4	6.1	4.8
Korea	0.6	2.9	0.2	1.0	1.8	0.7	1.5	0.0	2.9	1.5
Indonesia	0.2	0.0	0.0	0.1	0.1	3.3	1.2	0.6	2.3	2.0
Other low-wage	15.3	4.8	1.9	5.1	8.3	14.0	16.0	7.7	12.9	14.7
Total low-wage	17.1	15.7	3.1	10.3	15.2	33.9	29.0	16.9	27.7	30.0

Note: Categories include: 285 Glass and glass products; 286 Clay products and refractories; 287 Cement and concrete products; 288 Other non-metallic mineral products.

Table A8: Imports of Basic Metal Products (29)

	1981/82				1992/93			
Industry	*294*	*295*	*296*	*29*	*294*	*295*	*296*	*29*
$m	614	63	88	764	1,135	87	541	1,763
Percentage from:								
China	0.1	4.6	0.6	0.5	1.3	1.1	0.1	0.9
Taiwan	0.8	0.1	0.5	0.7	3.2	0.1	0.1	2.1
Korea	8.1	0.0	0.6	6.5	10.0	1.1	1.5	7.0
Indonesia	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.1
Other low-wage	5.4	34.3	19.0	9.3	13.0	32.7	20.4	16.3
Total low-wage	14.4	38.9	20.7	17.1	27.6	35.9	22.3	26.4

Note: Categories include: 294 Basic iron and steel; 295 Basic non-ferrous metals; 296 Non-ferrous metal basic products.

Table A9: Imports of Fabricated Metal Products (31)

	1981/82				1992/93			
Industry	*314*	*315*	*316*	*31*	*314*	*315*	*316*	*31*
$m	79	13	594	686	124	191	1,523	1,837
Percentage from:								
China	0.0	0.7	1.1	0.9	0.2	7.9	5.5	5.4
Taiwan	0.1	5.0	7.3	6.4	0.1	15.7	12.5	12.0
Korea	5.7	1.2	2.5	2.9	0.2	6.2	2.9	3.1
Indonesia	0.0	0.0	0.0	0.0	0.0	2.0	0.4	0.5
Other low-wage	0.3	16.1	3.7	3.5	9.1	11.1	6.6	7.2
Total low-wage	6.2	23.0	14.5	13.7	9.6	42.9	27.9	28.2

Note: Categories include: 314 Structural metal products; 315 Sheet metal products; 316 Other fabricated metal products.

Table A10: Imports of Transport Equipment (32)

	1981/82			1992/93		
Industry	*323*	*324*	*32*	*323*	*324*	*32*
$m	2,039	1,456	3,495	6,770	2,388	9,159
Percentage from:						
China	0.0	0.0	0.0	0.4	1.8	0.8
Taiwan	1.0	2.1	1.5	0.9	1.8	1.1
Korea	0.1	0.1	0.1	2.6	2.1	2.5
Indonesia	0.0	0.0	0.0	0.3	0.0	0.2
Other low-wage	0.6	1.3	0.9	1.4	1.2	1.4
Total low-wage	1.7	3.5	2.4	5.6	7.0	5.9

Note: Categories include: 323 Motor vehicles and parts; 324 Other transport equipment.

Table A11: Imports of Other Machinery and Equipment (33)

	1981/82				1992/93			
Industry	*334*	*335*	*336*	*33*	*334*	*335*	*336*	*33*
$m	797	2,832	3,164	6,792	2,705	11,010	6,304	20,019
Percentage from:								
China	0.2	0.1	0.1	0.1	1.0	3.3	1.1	2.3
Taiwan	0.9	2.6	1.1	1.7	1.2	7.6	1.7	4.9
Korea	0.8	0.7	0.2	0.5	0.5	3.0	4.4	3.1
Indonesia	0.0	0.0	0.0	0.0	0.0	0.2	1.8	0.7
Other low-wage	1.0	3.4	1.8	2.4	2.2	6.5	2.1	4.5
Total low-wage	2.9	6.8	3.3	4.7	5.0	20.6	11.1	15.5

Note: Categories include: 334 Photographic, professional and scientific equipment; 335 Appliances and electrical equipment; 336 Industrial machinery and equipment.

Table A12: Imports of Miscellaneous Manufacturing (34)

	1981/82					1992/93				
Industry	*345*	*346*	*347*	*348*	*34*	*345*	*346*	*347*	*348*	*34*
$m	120	305	472	368	1,266	292	881	1,600	1,046	3,819
Percentage from:										
China	1.6	0.1	0.4	1.0	0.6	19.2	1.9	11.7	10.6	9.7
Taiwan	21.4	3.0	8.6	9.7	8.8	7.2	4.0	8.3	14.4	8.9
Korea	5.4	7.4	1.3	4.0	4.0	2.5	9.0	2.4	3.6	4.2
Indonesia	0.1	0.0	0.0	0.1	0.0	0.8	0.6	1.2	0.9	0.9
Other low-wage	18.0	4.2	2.8	10.7	6.9	16.3	12.0	5.5	12.6	9.8
Total low-wage	46.4	14.7	13.0	25.5	20.2	46.0	27.5	29.1	42.1	33.6

Note: Categories include: 345 Leather and leather products; 346 Rubber products; 347 Plastic and related products; 348 Other manufacturing.

Appendix B: Decomposition of Import and Export Shares

The contributions, for each industry, of changes in the propensity to import, and changes in the share of manufacturing output in GDP, to the increase in the ratio of imports to output can be determined by writing this ratio as:

$$\frac{m_i}{q_i} \equiv \frac{\dfrac{m_i}{GDP}}{\dfrac{q_i}{GDP}} \tag{B1}$$

That is, for each industry *i*, the ratio of imports to output is identically equal to the ratio of industry imports to GDP divided by the ratio of industry output to GDP. In each industry, import penetration can increase because of an increase in the propensity to import (the share of imports to GDP), or because of a decrease in the share of that industry's output in GDP.

Similarly, for exports,

$$\frac{x_i}{q_i} \equiv \frac{\dfrac{x_i}{GDP}}{\dfrac{q_i}{GDP}} \tag{B2}$$

The contributions of each of these factors to the change in import penetration (respectively exports) can be found by linearising equations B1 and B2, as follows:

$$\Delta\frac{m_i}{q_i} \approx \left(\frac{GDP}{q_i}\right)^{*} \Delta\frac{m_i}{GDP} + \left(\frac{m_i}{GDP}\right)^{*} \Delta\frac{GDP}{q_i} \tag{B3}$$

$$\Delta\frac{x_i}{q_i} \approx \left(\frac{GDP}{q_i}\right)^{*} \Delta\frac{x_i}{GDP} + \left(\frac{x_i}{GDP}\right)^{*} \Delta\frac{GDP}{q_i} \tag{B4}$$

where: Δ denotes the change in a variable between two points in time; * denotes the geometric mean of a variable's beginning and end-point values; and where the import and export data have been adjusted for value added in the manner described in Appendix C. The results of these decompositions are shown in Tables B1 and B2.

The major points of interest are:

- As noted in the text, about half of the overall increase in the import penetration ratio has been due to an increase in the ratio of imports to GDP, and about half due to the declining share of manufacturing output to GDP, with the corresponding proportions for exports about two-thirds and one-third.
- Within these aggregates, there have been large variations. While there has been a very large increase in import penetration in Textiles, more than 100 per cent of this has been due to a fall in share of textile production in GDP, i.e. the textile import share of GDP has fallen. (This might be appear to be strange given the large fall in

Table B1: Decomposition of Import Penetration (1981/82 – 1992/93)
(average 1989/90 prices)

		Contributions of:	
	Change in m_i/q_i	Change in m_i/GDP	Change in q_i/GDP
Food, beverages, tobacco	0.020	0.016	0.004
Textiles	0.185	-0.065	0.251
Clothing, footwear	0.240	0.101	0.135
Wood, furniture	0.064	-0.006	0.070
Paper, print, publishing	0.079	0.026	0.053
Chemicals	0.282	0.244	0.037
Petroleum	0.067	0.030	0.037
Non-metallic minerals	0.034	-0.011	0.045
Basic metal	0.010	0.008	0.002
Fabricated metal	0.055	-0.027	0.083
Transport	0.070	-0.116	0.186
Other machinery and equipment	0.728	0.527	0.192
Miscellaneous	0.248	0.127	0.119
Total manufacturing	0.150	0.078	0.071

Table B2: Decomposition of Export Ratio (1981/82 – 1992/93)
(average 1989/90 prices)

		Contributions of:	
	Change in x_i/q_i	Change in x_i/GDP	Change in q_i/GDP
Food, beverages, tobacco	0.029	0.014	0.015
Textiles	0.200	0.095	0.102
Clothing, footwear	0.057	0.043	0.009
Wood, furniture	0.047	0.007	0.039
Paper, print, publishing	0.024	0.017	0.007
Chemicals	0.146	0.134	0.011
Petroleum	0.099	0.069	0.029
Non-metallic minerals	0.019	0.008	0.011
Basic metal	0.361	0.346	0.014
Fabricated metal	0.049	0.022	0.026
Transport	0.117	0.077	0.037
Other machinery and equipment	0.245	0.199	0.041
Miscellaneous	0.092	0.065	0.025
Total manufacturing	0.132	0.093	0.037

the protection given to the domestic textile industry. However, the fall in the domestic production of clothing and footwear has led to fewer imported textiles being used as inputs into that industry.) On the other hand, about 90 per cent of the increase in import penetration in Chemicals and Chemical Products has been due to an increase in the propensity to import chemicals.

- The increase in export shares in these industries can be explained by similar factors. Additionally, the very large increase in the export share of Basic Metals Products is almost entirely due to an increase in export propensity, rather than the fall in this industry's share of GDP.

Appendix C: Data Sources and Description

C.1 Trade Data

Imports and exports by country, by 4-digit ASIC were obtained from the Department of Foreign Affairs and Trade (DFAT). Imports of Non-ferrous metals n.e.c., rolling, drawing, extruding (ASIC 2962) from Papua New Guinea have been deducted from total imports. This represents the imports of semi-processed gold from PNG, which grew from virtually nil in 1981/82 to over $800 million in 1992/93. The growth in these imports matches very closely the growth in imports of semi-manufactured gold (SITC 97101) in the ABS merchandise trade statistics. These imports receive minimal processing in Australia before being exported. As a result, the values of these imports are deducted from both manufactured imports and manufactured exports.

C.2 Manufacturing Census

Data on employment, earnings and output at 4-digit ASIC come from the census of manufacturing establishments (ABS Cat. No. 8202.0, 8203.0, 8211.0, 8221.0). The ABS has constructed the manufacturing census triennially since 1986/87, with a small scale census undertaken in the intervening years. Prior to this the census was constructed annually. No census was conducted in 1985/86. As a result, data for 1985/86 were constructed by taking the average of the 1984/85 and 1986/87 observations.

Employment data for 1992/93 at the 2, 3 and 4-digit ASIC level were constructed by applying the growth rates from the survey of employment and earnings (ABS Cat. No. 6248.0). Similarly, 2, 3 and 4-digit constant price output data for 1992/93 were constructed using the growth rates for 2-digit manufacturing gross product from the national accounts (ABS Cat. No. 5206.0).

C.3 Data Sources for Figures and Tables

Figure 1: Imports of Footwear from China

From the Department of Foreign Affairs and Trade. Volumes are calculated using the implicit price deflator for footwear (ASIC 246) available from the ABS (unpublished).

Figure 2: Employment in the Footwear Industry

From the manufacturing census. The 1992/93 observation was calculated by applying the growth rate for footwear employment from the survey of employment and earnings (PC-Ausstats).

Figure 3: Share of Manufactured Imports from Low-Wage Countries

Import data are from the Department of Foreign Affairs and Trade. Low-wage countries are defined to be the non-OECD countries, plus Greece, Portugal and Turkey, minus Singapore, Hong Kong and Israel. Manufacturing output at 1989/90 prices is from the national accounts (ABS Cat. No. 5206.0), and low-wage import volumes were calculated using the implicit price deflator for manufactured imports available from the ABS (unpublished).

Since gross product measures by industry relate to value added and not the final value of production, the import data from DFAT have been adjusted to account for the share of the value added in final production in the corresponding 4-digit ASIC manufacturing industry. The share of value added in final production is calculated using Table 5 from the 1989/90 input-output tables (ABS Cat. No. 5209.0). Value added is calculated as final output less intermediate inputs and complementary imports. Final output is Australian production less competing imports. It is assumed that complementary imports are used as intermediate inputs, while competing imports are sold as final products.

Figure 4: Exports and Imports Ratio to GDP (1989/90 Prices)

National accounts ABS Cat. No. 5206.0.

Figure 5: Import Penetration (1989/90 Prices)

Figure 6: Ratio of Exports to Output (1989/90 Prices)

As in Figure 3, the import and export data from DFAT have been adjusted to account for the share of value added in production in the corresponding 4-digit ASIC manufacturing industry.

Implicit price deflators for manufactured imports and exports at 2-digit ASIC have been used to convert the trade series into constant 1989/90 prices. Constant price manufacturing gross product at 2-digit ASIC is from the national accounts (ABS Cat. No. 5206.0).

Manufacturing gross product for the 3-digit categories – Chemical Products (275/6) and Petroleum Products (277/8) – have been constructed by applying the shares of these categories in two digit value added from the manufacturing census, to 2-digit gross product in the national accounts.

Figure 7: Effective Rate of Assistance to Manufacturing

Figure 8: Effective Rates of Assistance for Manufacturing Subdivisions

Annual reports of the Industry Commission (IC) and the Industries Assistance Commission (various years). The level of the effective rate of assistance (ERA) is dependent upon the pattern of production within an industry. As a result the ERA can change because the level of protection changes, or because the pattern of production alters over time. The IC calculates effective protection rates using different base years in order to account for changes in the pattern of production. Because of this, ERAs using different base years will, for the same year, have different values. For example, the ERA for textiles in 1989/90 is 72 per cent using the series based in 1983/84, and 53 per cent using the series based in 1989/90. To link the series together, the 19 percentage points difference in the estimates are allocated evenly over the six years between 1983/84 and 1989/90. The original 1983/84 and 1989/90 base year estimates are preserved, while the observations in between are adjusted to reflect the changes in relative production that have occurred within the 2-digit category.

Figure 9: Exports and Imports of Elaborately Transformed Manufactures

SITC divisions 5 to 8 less subdivisions 67 and 68. Export values by SITC are available in ABS Cat. No. 5424.0, while volumes by SITC are available from the ABS upon request.

Figure 10: Imports and Exports of Selected ETMs

Department of Foreign Affairs and Trade (DFAT). Import and export data have been converted to 1989/90 prices using the import and export implicit price deflators for ASIC 33 available from the ABS upon request.

Figure 11: Employment and Output in Industries which Produce ETMs

Output and employment are from the manufacturing census. Output is constant price gross product at factor cost. It is defined by the ABS as turnover, plus the change in the value of stocks, less purchases, transfers in, selected expenses, land tax, rates, payroll tax and insurance premiums (other than for workers compensation). Industries which produce ETMs constitute ASIC subdivisions:

23	Textiles minus cotton ginning (2341) and wool scouring and top making (2342);
24	Clothing and footwear;
25	Wood, wood products and furniture minus log sawmilling (2531) and hardwood woodchips (2537);
26	Paper, paper products, printing and publishing;
275/276	Chemical products;
28	Non-metallic mineral products;
31	Fabricated metal products;
32	Transport equipment;
33	Other machinery and equipment minus photographic film processing (3342); and
34	Miscellaneous manufacturing.

This ASIC breakdown is based on the SITC definition of ETMs used in Figure 9.

Figure 13: Relative Consumer and Producer Prices

The producer price ratio is the ratio of the prices of articles produced by each ASIC category (ABS Cat. No. 6412.0), to the GDP deflator. Clothing and Footwear – ASIC 24; Footwear – ASIC 246; Motor Vehicles – ASIC 323; Appliances – ASIC 3353.

The consumer price ratio is the ratio of the consumer price sub-category index to the all items CPI (adjusted for Medicare, and from 1987 to 1989 for the new method of calculating mortgage interest charges).

Table 1: Manufactured Imports

DFAT trade data.

Table 2: Trade and Value Added of Selected Elaborately Transformed Manufactures

DFAT trade data. Nominal value added is from the manufacturing census. It is defined by the ABS as turnover, plus the change in the value of stocks, less purchases, transfers in, and selected expenses.

Table 3: Manufacturing Wages (1981/82 –1992/93)

From 1983/84, weekly nominal wages are from the survey of employment and earnings (ABS Cat. No. 6248.0). Prior to 1983/84 nominal wages from the census of manufacturing are spliced onto the survey of employment and earnings series. Average weekly earnings are total earnings for all employees, from ABS Cat. Nos. 6301.0 and 6302.0. Real product wages are weekly nominal wages divided by producer prices at 2-digit ASIC.

Table 4: Relative Wages

Hourly wages by occupation are from ABS Cat. No. 6306.0.

Table 5: Manufacturing Employment and Productivity (1981/82 – 1992/93)

Productivity is 2-digit ASIC gross product at 1989/90 prices divided by employment. Gross product and employment are from the manufacturing census.

Table 6: Sources of Employment Changes in Manufacturing (1981/82 – 1991/92)

The DFAT trade data have been adjusted for the share of manufacturing value added in final production (see Figures 5 and 6). Domestic demand is equal to value added less exports plus imports. Value added and employment are from the manufacturing census.

Tables A1 to A12

DFAT trade data.

C.4 ASIC Categories

	Australian Standard Industrial Classification	*Examples of main activities*
21	Food, Beverages and Tobacco	Meat products, frozen and canned vegetables, coffee, margarine, raw sugar, soft drinks, chocolate, processed seafoods, alcoholic spirits.
23	Textiles	Acrylic blankets and fabrics, cotton fabrics, cotton ginning, wool scouring.
24	Clothing and Footwear	—
25	Wood, Wood Products and Furniture	Particle board, wood veneer, picture framing, wooden toys, furniture, utensils, woodchips.
26	Paper, Paper Products and Publishing	Cardboard, newsprint, books, magazines, stationery.
27	Chemical, Petroleum and Coal Products	Fertilisers, plastics, pharmaceuticals, pesticides, paints, soap, cosmetics, adhesives, petrol, bitumen.
28	Non-Metallic Mineral Products	Glass, clay bricks, ceramics, cement, plaster products, stone products.
29	Basic Metal Products	Pig iron, wire, wrought iron, steel pipes, bauxite refining, aluminium smelting, gold refining.
31	Fabricated Metal Products	Kitchen utensils, sheet metal guttering, prefabricated steel buildings, hand tools.
32	Transport Equipment	Motor vehicles and parts, ships, aircraft, wheel barrows, bicycles.
33	Other Machinery and Equipment	Photographic goods, scientific equipment, computers, televisions, household appliances, agricultural machinery, industrial machinery.
34	Miscellaneous Manufacturing	Rubber tyres, plastic products, sporting equipment, leather tanning, jewellery.

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Discussion

1. John Quiggin

Throughout the OECD, the operations of labour markets in the 1970s and 1980s have produced outcomes unfavourable to labour in general and unskilled labour in particular. In the US, this has been reflected in declining real wages, with a slight increase in the unemployment rate. In other countries, it has been reflected in a slowdown in real wages growth and a severe increase in unemployment. At the same time, real wages have been rising in the newly industrialising countries (NICs).

An obvious way of trying to explain this outcome is that it reflects the process of factor-price equalisation predicted by the Heckscher-Ohlin model of international trade. However, this explanation immediately runs into the difficulty of accounting for the experience of the 1950s and 1960s. Wage inequalities between rich and poor market economies were just as great in this period (although the set of poor countries was different), yet real wages for unskilled workers rose both absolutely and relatively in the rich countries. In numerous other respects, the experience of the 1970s and 1980s does not fit the predictions of the Stolper-Samuelson theorem (on the assumption that the effective supply of unskilled labour from poor countries has increased).

This fact has led a number of commentators to reject the factor-price equalisation hypothesis and to focus instead on technological explanations. I see several difficulties here. First, assuming that technological trends (not necessarily levels) are similar in all countries, this implies that the equilibrium real wage for unskilled labour should be falling in all countries, unless there are unmeasured quality improvements in the NICs. Second, it is not obvious that the technological innovations of the 1970s and 1980s are more labour-saving than those of 1950s and 1960s. Indeed, it could easily be argued that the personal computer, the only noteworthy innovation of this period, is capital-saving. With a very small expenditure and a few weeks of training, almost any moderately literate person can command computing power that would have cost a large corporation millions of dollars in 1970.

More generally, it should be observed that the style of explanation here is based on the assumption that the Heckscher-Ohlin model adequately explains the economic experience of the entire postwar period (and that the factors and factor prices in that model correspond reasonably accurately to the measured variables we are seeking to explain). I would suggest an alternative hypothesis – that in this, and in many other respects, the boom commencing in 1940 and ending in 1973 was an anomalous period which neoclassical models have failed to explain in a manner consistent with the experience of the previous hundred years or the subsequent two decades.

If this hypothesis is accepted, the problem is reformulated. The issue now becomes the identification of the specific features of the economic and policy setup during the long boom that permitted labour to achieve outcomes much more favourable than a neoclassical analysis would suggest should have been possible. One obvious feature of the period was stringent restrictions on capital mobility. Even though Heckscher-Ohlin theory predicts factor-price equalisation with immobile capital, the shift to mobile capital greatly strengthens this prediction.

A more subtle manifestation of the same point was the fact that even the most multinational of corporations retained a strong national identity which has largely been eroded today. This made such corporations much more susceptible to political pressure in their home country than in other jurisdictions. The rent associated with the existence of the corporation was captured almost entirely by the home country and was, therefore, potentially available for redistribution to home-country workers.

Returning to more orthodox neoclassical explanations of the shift in wages, an obvious weakness of the whole debate is the focus on manufacturing. The small and shrinking share of manufacturing in total employment implies that, in the long run, developments in manufacturing can have only a marginal impact on equilibrium real wages. In seeking to analyse outcomes in terms of labour demand, the big missing issue in this debate is the role of the services sector and, in particular, of the publicly-funded community services sector.

An obvious structural break between the post-war boom and the subsequent slump has been the unwillingness of governments to continue financing the growth of community services employment, even though supply and demand considerations (for example, the high income elasticity of demand for these services and the very limited existence of potential for capital-labour substitution) suggest that this should be the main area of employment growth. I would suggest that the difficulties associated with financing the growth of this sector have depressed the demand for labour.

An interesting exception in this respect is the health care sector in the US. Unlike other OECD countries, the US health sector has expanded steadily as a proportion of GDP. Although the performance of this sector is highly unsatisfactory in many respects (most notably in terms of distribution, but also in terms of cost-efficiency), the demand side of the US health system is probably closer to a genuine reflection of consumer demand than that of other OECD countries. Moreover, the relatively good employment experience of the US may, in part, be due to the fact that the growth of the health care sector has not been artificially constrained.

Turning to the specifics of the Fahrer and Pease paper, I found relatively little to disagree with. I do, however, think it is inappropriate to partition employment losses in manufacturing in the way that has been done here. By treating productivity growth as generating a one-for-one reduction in employment, and all demand growth as exogenous, the deck has been stacked in favour of a productivity explanation. The critical point is that demand growth arises ultimately from productivity growth. In the presence of a uniform rate of productivity growth across the economy (and in the absence of income effects), the two would cancel out. Hence, in my view, it is appropriate to net domestic demand changes out of the effect imputed to productivity. What remains is the extent to which differential productivity growth in manufacturing reduces net domestic employment. If this is done, the conclusions drawn by Fahrer and Pease must be qualified, but only moderately. The net effect of productivity growth now accounts for about two-thirds of the gross job losses in manufacturing with the increased deficit in manufactures trade accounting for the rest.

For me, the most striking information in the paper was the existence of a declining trend in the output of elaborately transformed manufactures (ETM), and even more dramatically in ETM shares of total output and employment. Although I have long been sceptical of the notion that manufactured exports would play a key role in our economic salvation, the ceaseless repetition of the statistics on ETM exports had led me to assume that this sector was at least expanding.

In fact, the observed pattern is exactly what should be expected on the basis of standard trade theory. In particular, the rapid expansion of ETM exports, the rapid recent growth in labour productivity and the depressed level of investment are all consistent with the expected consequences of a reduction in protection.

Consider a simple model of the ETM sector in which two goods are produced, one for export and the other for home consumption (obviously, as in all models of intra-industry trade, this requires a degree of product differentiation). A general reduction in tariffs can be expected to reduce the price of the home good and raise that of the export good. Because the equilibrium exchange rate falls, the price of the export ETM good rises along with that of all other exports. However, the export ETM sector gains a special benefit which other export industries do not share. The contraction of the home ETM sector releases factors specific to ETM production and therefore drives down the equilibrium price for ETM-specific factors. Hence, it would be expected that ETM exports should grow more rapidly than other exports but not rapidly enough to offset the effect of increased import penetration.

In more concrete terms, the closure of import-competing textile producers results in high rates of unemployment among textile workers and the ready availability of machinery at low prices. This benefits textile exporters by permitting them to drive harder bargains with their workers and to acquire capital goods at low cost.

Assuming that labour is more mobile in the short term than capital, it would also be expected that production methods in the ETM sector should become more capital-intensive in the short term, with a resulting increase in labour productivity. However, since the equilibrium capital stock has declined, we would expect low rates of investment.

2. Peter Lloyd

This paper is directed towards one of the most important problems facing the Australian economy – namely (if I may rephrase the issues discussed), the effects of changes in the world economy, through the emergence of new suppliers and new relative prices and technological changes in the inputs required to produce traded commodities, on the demand for labour and employment. This is particularly important for Australia because it now has one of the most centralised of all wage systems among the OECD countries.

The authors do an admirable job of presenting the issues and alternative models that may explain changes in relative factor prices and employment in the Australian economy over the past decade or so. I agree with their principal conclusions and, in particular, with their conclusion that the opening of the Australian economy to international trade has put competitive pressure on the manufacturing industries, but that it has not been the major cause of the reduced employment in activities in this sector. However, I do have a few suggestions for the analysis and further research.

There are a few details that need to be re-examined. One of these is the role of outworkers in the clothing and textile industry. The statistics of employment in these industries do *not* include these workers and, as there is no significant number of comparable workers in other manufacturing industries, this omission distorts the analysis of these industries. This omission has several effects. As the wages of these workers are fixed by contract, there may be some substitution of them for other employed workers when the relative wages of the latter are maintained. The changes in employment in the industries may be overstated if there has been a substitution of outworkers for employed workers in these industries, or understated if the demand for these workers has also fallen.

As a measure of international integration, the average effective rate of assistance in manufacturing industries is of little value. First, as the paper acknowledges, there has been wide variation within the sector. More importantly, what matters for an industry is not the average effective rate, but this rate relative to the rates for all other industries in the manufacturing, rural and mining and service sectors. Of course, in Australia, the story over this period is one of changes in all rates but a general downward drift of the rates in manufacturing industries, especially the traditional high-protection industries of clothing textile and footwear and transport relative to other industries. This has been accompanied by a reduction in the dispersion of rates in the manufacturing sector which may be just as important as the inter-sectoral changes if intra-sectoral substitution in production is higher than inter-sectoral substitution.

The Stolper-Samuelson effect is of limited usefulness, in its present form at least, despite its enormous historical importance in the profession and in the Australian debate. The primary problem is that the Stolper-Samuelson theorem is a theorem that holds without significant modification only in a world with two factors and two commodities; it is a 2x2 theorem. If there are more than two factors in particular, the effects of changes in exogenous world prices on domestic real factor prices may be very different.

As a standard counter-example, consider the Jones 3x2 specific factor model or its generalisation, the 3x2 'extreme factor' model. We might designate the three factors 'skilled' and 'unskilled' labour and capital. What now happens to the real wages of skilled and unskilled labour when the price of the imported good falls depends on which factor is not specific or, more generally, which factor has the labour/capital ratio that is in the middle of the three ratios. Is it skilled or unskilled labour that is used intensively in the production of the imported good? If it is skilled labour and unskilled labour is the mobile or middle factor, the real wage of skilled labour falls with the fall in the price of the imported good, but the nominal wage of unskilled labour must rise to transfer resources to the other industry and its real wage may rise or fall depending upon the elasticity of demand for unskilled labour and the share of the budget devoted to the imported good.

What we have in reality is many kinds of labour and capital, and some labour and some capital having the characteristic of a specific factor. In this more realistic world, a fall in the price of imported goods will lower the returns to the factors which are specific in the production of these goods and raise the returns of some (but not all) of the non-specific factors. We need to track the changes in the real wages of skilled and unskilled labourers, but the ratio of the wages of business professionals/machine operators that is used here does not capture the skills differential for award non-professional workers.

This, and all of the other models considered, ignores too the effects of reduced import barriers on the diversity of goods available to consumers (and producers). As recent models with imperfect competition have shown, this may be an important determinant of the changes in real incomes. Note too that the price indices used in Australia almost certainly overstate the increase in consumer prices because they have little allowance for new products and product improvements and increases in consumer choice. Consequently, they understate the rate of growth of real incomes.

I applaud the decomposition analysis in Section 5. This is instructive and I agree with the conclusion that technological change rather than import competition is the main source of the fall in the demand for labour in manufacturing industries in Australia. This conclusion is not, however, new. I cannot resist here quoting myself. In a study of the change of employment in the clothing and textile industry of Australia which used the same decomposition, I concluded that 'For employment, the long-term problem is one of the substitution of capital for labour, rather than the substitution of imported for domestic supplies' (Lloyd 1985, p. 513). Moreover, one must be very cautious of interpreting the results as cause and effect because, as the authors note, the changes are interdependent; for example, an increase in the import share because of a fall in the price of imports might cause an increase in consumption and/or an increase in labour productivity, both of which would mean that the statistical contribution of rising imports would overstate the effects of these imports on employment in the decomposition.

All together the results of this paper show that we as a nation have to think more carefully about the consequences of the rigidities in our labour markets which stem from the retention of a highly centralised system. I find the Krugman (1993) technological change model appealing. There is a choice between relative factor price rigidity and its associated maintenance of the real incomes of unskilled labour but greater unemployment on the one hand, and greater wage flexibility with less unemployment but greater income inequality through changes in factor prices, on the other. This is a stark choice. However, one should note that the comparison in terms of an index of the inequality of incomes is more complicated. The supposed increase in inequality under the US-type system with a growth in 'working poor' may occur in an Australia with greater wage flexibility; the outcome in terms of inequalities will depend on the elasticities of demand for labour, the comparative unemployment benefit level and other factors. If the change in income distribution is of concern, it would seem better to counter this through expenditure transfers and tax rates rather than changes in awards that lead to inefficient production.

I want to conclude with a brief list of other things that need to be considered.

- Wage flexibility is much more than the flexibility of wage rates. It includes the ability to adjust margins for skills, shift work and overtime and other working conditions such as the ability of producers to introduce shifts or changes in working hours. In these respects I suspect the Australian system is extremely rigid. The New Zealand experiment of the *Employments Contract Act* of 1991 may provide an illuminating contrast as the benefits of greater labour market reform work themselves out. The New Zealand economy was, along with that of Australia, one in which a highly centralised system had persisted for about 100 hundred years. It is currently outperforming the Australian economy in terms of real output growth, price stability and falling unemployment but a longer period of observation is needed.

- The failure to introduce far reaching labour market reforms in Australia raises a number of issues about the sequencing of reforms. We might have got more benefit from the reforms of the capital and foreign exchange and goods markets from 1983 onwards if we had had labour market flexibility from the beginning, rather than a strategy of reforming the labour market last.
- In a net immigration country such as Australia we need to consider the effects of sustained immigration on the supplies of, and demand for, labour of various kinds. Immigrant labour is still somewhat skewed to the unskilled end of the range, especially when one considers the jobs in which migrants find work rather than the skills they declare they have, and it varies greatly among categories of immigrants.
- The objectives of increasing worker real incomes and reducing unemployment need to be considered in a broader context which looks at growth in the economy in general as well as changes in international goods markets and labour markets. We can become obsessed with these issues. In my view, there is little hope of reducing unemployment dramatically unless we accelerate the rate of growth of real output of the economy to, say, 5 or 6 per cent plus on a long-term or underlying rate basis, not just for a few quarters as we go through the recovery phase of the cycle. This means we have to look at policies which bear on the accumulation of skills, R&D, boost the savings rate of the household and corporate and government sectors, and improve the selection of immigrants, etc.

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3. General Discussion

The discussion focussed on the following two questions:

- Is the Stolper-Samuelson model appropriate for analysing the impact of international trade on the labour market?
- What are the causes and implications of wage dispersion?

Many participants noted the short-comings of the Stolper-Samuelson (SS) model for analysing the effect of trade on the relative wages of skilled versus unskilled workers, especially when much trade is intra-industry trade. The model predicts that as tariffs are lowered on imports from low-wage countries, the prices of imports from those countries will decline, and that this decline in price will lead to a fall in the wages paid to low-skilled domestic workers. The trouble with this old and venerable explanation is that substantial falls in the prices of imports from low-wage countries appear to have taken place only for a couple of goods. Many participants argued that these falls were insufficient, in and of themselves, to have a major impact on wages and employment. Immigration and the movement of capital across borders were also thought to complicate the SS explanation.

One participant suggested that the example of Hong Kong was inconsistent with the Stolper-Samuelson explanation. Since Hong Kong has opened up to China, which has a huge supply of unskilled labour, real wages for *both* skilled and unskilled workers in Hong Kong have risen and full-employment has been maintained.

This example suggests that there are more important mechanisms through which international trade affects the labour market than through the standard Stolper-Samuelson effects. Here, discussion focussed on two possible channels. The first was productivity effects. By stimulating productivity improvements and increased growth, international trade may be able to generate higher living standards for all workers, although it may cause unemployment in the short run. Factors driving productivity are, however, generally difficult to explain. Moreover since trade reform is usually closely related with reform of the domestic economy, it is difficult to assess exactly what role trade is playing in improving productivity. The second channel discussed operates through an increase in market discipline on firms as a result of an increase in the number of competitors. If trade liberalisation results in an increased variety of a certain type of good being imported, this increased variety will cause domestic firms to lower their prices, even if import prices do not fall. This fall in domestic margins may well have employment implications.

Despite these alternative explanations and the perceived weaknesses of the Stolper-Samuelson theory, research by Williamson indicated that over the past century there has been a tendency for the wages of low-skilled workers to converge across countries. This convergence has been extremely slow in most economies and has not ignited widespread political problems as it has occurred against the background of rapidly increasing real wages. As real wage growth has slowed, this issue of convergence has attracted greater attention.

In terms of wage dispersion, a number of participants argued that the distribution of wages in Australia was relatively compressed. An implication of this is that skilled labour in Australia is relatively cheap and that this should give Australia a competitive advantage in activities that use skilled labour intensively. However, some participants felt that Australia's wage distribution was not unusual by international standards. Others thought that while the wage distribution was relatively wide, income distribution was relatively compressed as the result of government tax and transfer payments. It was also suggested that the Japanese bonus system was a viable alternative to the 'US system' for achieving the necessary flexibility of wages.

There was general acceptance of the idea that there are powerful forces at work making for a more unequal distribution of wages. In addition to the forces of technical change and trade, immigration was mentioned. Given these forces, some participants argued that impediments to the efficient operation of the labour market were condemning groups of workers to long-term unemployment. These impediments were being exacerbated by insufficient spending on infrastructure and excessive compliance costs on small business. While improvements were being made in some areas, other countries were also tackling the competitiveness issues, in some cases, more successfully than in

Australia. Not all participants thought that increased wage dispersion would help reduce unemployment. One participant argued that the countries with the lowest rates of youth unemployment, were not those with the lowest relative wage for young workers, but rather those with the most developed apprenticeship schemes.

On a more technical front, one participant queried the definition of a 'low-wage' country used in the paper. It was suggested that countries should be re-classified as the level of wages increases. There were also a number of calls for similar analysis to that in the paper to be conducted on the service sector of the economy.

Trade, Multinationals and Labour

Robert Z. Lawrence*

1. Introduction

The theory of international trade suggests that free trade will raise national income. It does not, however, suggest that the incomes of *all* factors of production will rise. Indeed, Stolper and Samuelson (1941) showed that the removal of import barriers could lower the income of the factor of production used relatively intensively in the production of imported products. Therefore, if OECD imports are produced using unskilled labour relatively intensively, freer trade could actually reduce the wages of unskilled workers.

In a second noteworthy application, trade theory also predicts that trade can lead to 'factor-price equalisation'. Under certain highly restrictive assumptions – in particular that competitive conditions prevail and that technological capabilities are uniform worldwide in both traded and non-traded goods – returns to factors would be equalised around the world.

In principle, these theoretical results were highly relevant to US circumstances during the golden era of the post-war period (1950-1973). Over this period, the US economy reduced its trade barriers and expanded its trade with 'low-wage' nations in Europe, Japan and the developing world.[1] Nonetheless, the theory did not excite much attention among US policy makers, because real wages in the United States rose steadily and wage differentials between skilled and unskilled workers actually narrowed. Indeed, over the 1970s, although the US economy became considerably more open (trade doubled as a share of GNP) the premium earned by educated workers actually declined.

In the 1980s, however, the US experience has been different. Real wages have stagnated and relative wages have become more dispersed. In 1973, real hourly earnings of non-supervisory workers measured in 1982 US dollars by the consumer price index (CPI), were $8.55. By 1992 they had actually *declined* to $7.43 – a level that had been achieved in the late 1960s. (All subsequent references to 'dollars' are to US dollars.) Had real earnings increased at their earlier pace, they would have risen by 40 per cent to over $12 per hour. Consider real hourly compensation, a more comprehensive measure of the payments to labour because it includes fringe benefits as well as earnings. Between 1973 and 1991, real hourly compensation rose by only 5 per cent. However one measures labour's income growth, it has clearly slumped since 1973.

A second ominous development in the American economy has accompanied this slump: a dramatic increase in the inequality of earnings based on education, experience

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* This paper reflects ongoing work on a project on Globalization and Wages in the OECD that I am currently doing for the OECD Development Centre. It also draws heavily on Lawrence (1994). I thank Charles Oman for comments and Maynard Holt for research assistance. The views expressed here are, of course, purely my own.

1. In 1950, compensation in Germany and the United Kingdom was 13 and 17 per cent of that in the United States, respectively. Today, Mexican wages are about 12 per cent of US levels.

and occupation. Bound and Johnson (1992) found that between 1979 and 1988, the ratio of the average wage of a college graduate to the average wage of a high school graduate rose by 15 per cent. Davis (1992) found that between 1979 and 1987, the ratio of weekly earnings of males in their forties to weekly earnings of males in their twenties rose by 25 per cent. The employment cost index (ECI) indicates that between December 1979 and December 1992, the growth of compensation and earnings of white-collar occupations exceeded those of blue-collar occupations by 7.9 and 10.9 per cent respectively. However one distinguishes the skilled from the unskilled, the sharp rise in wage inequality between the two in the 1980s is clear.

In the 1980s, European wage performance differs from that in the United States in one crucial respect – typically, real wages *grew* by 1 to 2 per cent annually. In some countries, however, increased inequality is also evident. According to the OECD (1993), in the UK there was a substantial increase in the ratio of earnings of the highest (90th) to lowest (10th) percentile.[2] Modest increases in this measure of dispersion also occurred in France, the Netherlands and Sweden. However, in Italy and other Nordic countries no change was discernible while in Germany, low-wage workers (those in the bottom decile) actually experienced relatively more rapid growth than those in the top. Data are also available for some of these countries on wage changes by level of schooling. The premium increased in the 1980s for all countries surveyed besides Japan (where it was unchanged) and the Netherlands (where it fell). Age-earnings profiles increased for all countries in the sample besides Sweden. I have also obtained data on the ratio of wages of manual to non-manual workers in several major European countries (EuroStat 1992). These give a different picture for Germany, showing that between 1978 and 1988 the ratio of manual to non-manual wages fell by 8.1 per cent. They declined by 3 per cent in Italy, but actually rose in Belgium and Denmark.

The OECD (1993) argues that the qualitative similarity in these changes suggests ‘pervasive economic factors are at work’. An important issue in Europe, however, is the degree to which institutional and regulatory factors repressed wage adjustments and instead raised unemployment. The OECD notes that ‘those countries which did not experience an increase in dispersion over the 1980s, Denmark, Finland, Germany, Italy and Norway are countries where national institutions have a particularly strong influence on wage setting’.

What *has* distinguished European labour market performance has been high levels of unemployment, particularly of workers out of jobs for more than 12 months. In 1991 for example, such workers accounted for just 6.3 per cent of the unemployed in the US, but in Germany, France, the United Kingdom and Italy the share was typically about 40 per cent. A second feature is that European employment growth has been virtually confined to the public sector.

Also striking in Europe has been the relative decline in the employment of manual workers in industry in general, and manufacturing in particular. EuroStat data indicate that, between 1978 and 1988, the decline in the ratio of industrial employment of manual to non-manual workers in Germany (-16.1 per cent) and Ireland (-15.1 per cent) was similar to the decline in the ratio of production to non-production workers in United

2. This result is also found by Katz, Loveman and Blanchflower (1992).

States manufacturing (-18.5 per cent), while declines (in the ratio of manual to non-manual workers) were about twice as large in French (-26.8 per cent), Danish (-27.7 per cent) and Italian (-30.4 per cent) manufacturing. The data certainly suggest a trade-off between wage flexibility and employment opportunities.

In both Europe and the United States, alarms have been sounded about the role of trade in this poor labour-market performance. In the United States, the debate over the NAFTA crystallised concerns over wage performance that are best captured by Ross Perot's allusion to the 'giant sucking sound' of jobs as they move southward. One of the chief concerns about the NAFTA was its impetus for what many in the United States see as a major phenomenon – the relocation by multinationals to low-wage countries, or 'runaway plants'. In Europe, while the absorption of low-wage countries such as Spain, Portugal and Greece into the EC proceeded fairly smoothly during the growth phase in the late 1980s, the recessionary environment of the 1990s has sparked similar fears of 'delocalisation' whereby firms relocate to low-wage countries.

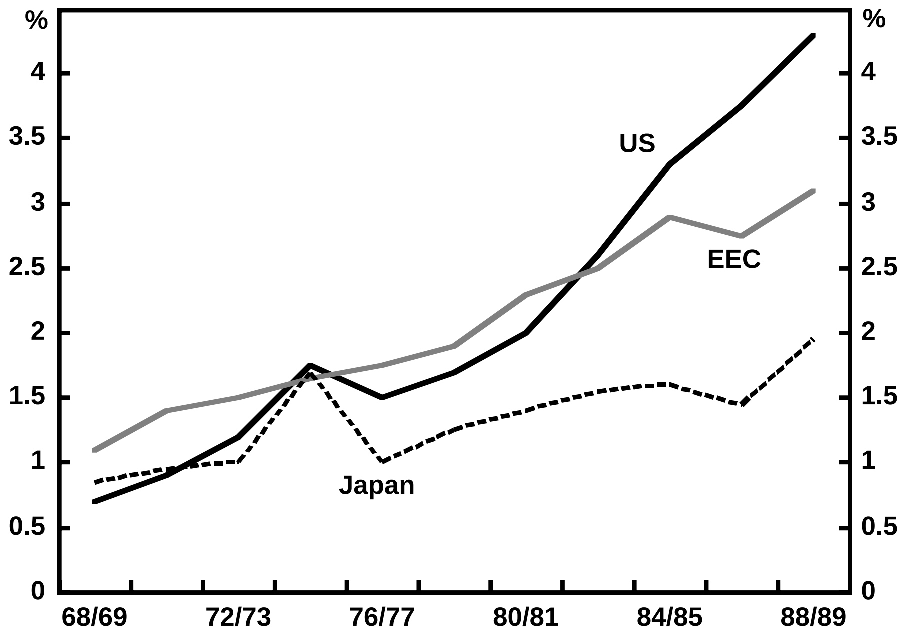
The concerns about international competition in the labour market have been voiced not simply in terms of wages, but also with regard to the regulatory environment that governs employment. In Europe, an important aspect of creating the single market has been the 'social dimension' – the effort to ensure that minimum labour standards prevail throughout the European Union. In France, a furore was raised by the shift of the Hoover corporation from France to Scotland, purportedly attracted by both lower wage costs and lower labour standards. In the European debate about freer trade with Eastern Europe and Asia, concerns have been raised, not simply about low wages, but about 'social dumping' – that is, the downward competitive pressures that are allegedly placed on labour standards as a result of trade. In the United States, concerns about workers' rights have increasingly been reflected in US international trade legislation. Indeed, both France and the US have proposed that worker rights occupy an important role in the post-Uruguay Round agenda.

From the standpoint of the developing economies, these concerns could not have appeared at a worse moment. Since the mid 1980s, these economies have almost universally shifted toward export-oriented, 'market-friendly' policies which are implicitly predicated on the assumption that global markets are available. Similarly, progress in the reconstruction of Eastern Europe and the economies of the former Soviet Union depends critically on their ability to gain access to the markets of the EC.

But is trade in general, and that with developing countries in particular, really responsible for the poor labour-market performance in developed economies? What role has been played by employment and sourcing shifts within multinationals? And what role should changes in labour standards play in addressing these concerns? These are three questions I will discuss in this paper.

The US experience is perhaps the most suitable for detailed analysis. US wages are generally more flexible than those in other countries, and as indicated in Figure 1, compared with the EC and Japan, the US share of apparent consumption of manufactured goods imported from developing countries is higher and has risen more rapidly over the 1980s. In addition, the US remains the world's largest multinational investor. In Section 2 of this paper, therefore, I will consider the impact of trade on average US wage behaviour. In Section 3, I will concentrate on relative wage behaviour in the US,

Figure 1: Manufactured Imports from LDCs
(share in apparent consumption)



although I will introduce evidence from Germany and Japan. I will argue that the role of trade has been surprisingly small. In Section 4, I will introduce evidence on wages and employment in US multinationals both at home and abroad. These data indicate remarkably similar changes taking place in US multinationals worldwide – a finding that is strongly suggestive that technology, rather than trade, is exercising a dominant influence. They also indicate that employment growth within US foreign affiliates abroad has been too small to be viewed as having displaced large numbers of jobs in the United States. The same is true of the growth in value added sourced from abroad. Finally, in Section 5, I consider the issue of labour standards. At a multilateral level, some agreement on basic minimum labour standards could be helpful, both in allaying concerns about the denial of elementary human rights and in limiting the scope for opportunistic protectionist actions. Beyond these minimum standards, however, there are strong reasons for permitting national diversity.

2. Average Wages

2.1 Measuring Compensation

Before explaining average US wage behaviour it is necessary to clarify how wages are measured. The most commonly cited statistic – real average hourly earnings of production workers – shows a *decline* of almost 11 per cent between 1979 and 1991. By contrast, a second commonly cited series – real hourly compensation in the business sector –

shows an *increase* of 1.5 per cent over the same period. These series differ because:

- the average hourly earnings series samples only production or non-supervisory workers, while the hourly compensation series includes all persons engaged in work (including the self employed); and
- the hourly earnings series reflects only wages while the compensation measure includes employers' contributions for social insurance and private benefit plans (including retirement and medical care).

Both differences are important, and the series have diverged because:

- the wages of production workers have risen more slowly than those of non-production workers; and
- for all workers, fringe benefits have increased more rapidly than wages.

The remainder of this section focuses on the aggregate compensation measure.

2.2 International Factors

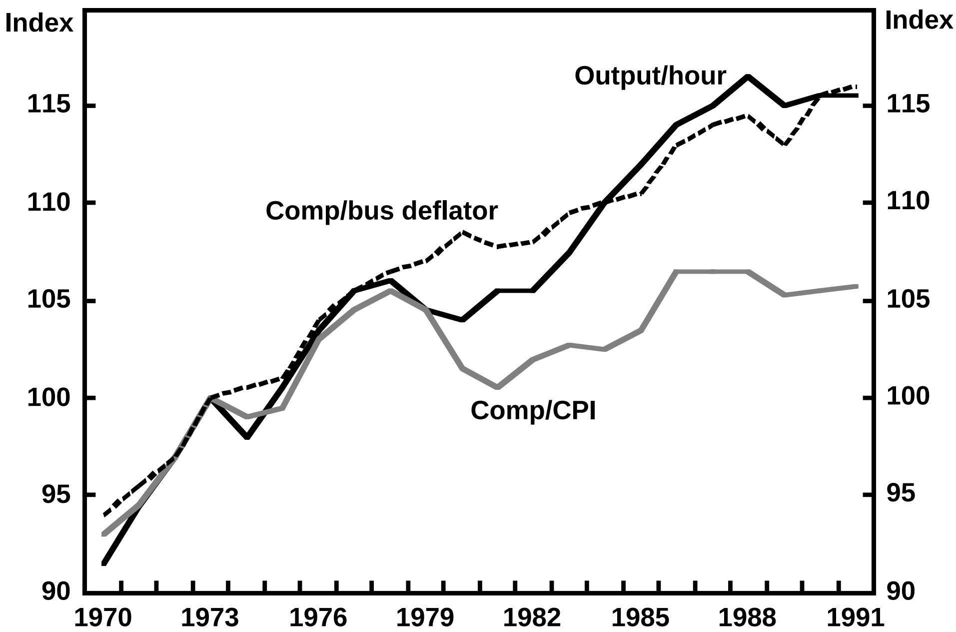
Several economists have ascribed the poor average growth in US wages over the 1980s to international factors. Lester Thurow has argued that slow growth in US manufacturing employment due to the trade deficit in manufactured goods is to blame. Leamer (1994) claims that increased capital formation abroad is leading inevitably to 'wage equalisation' in which American wage rates converge to those in other countries. According to Leamer, this convergence is not benign because it entails not simply a rise in foreign wage levels, but also a decline in average American wage levels. Johnson and Stafford (1993) argue that the erosion of high returns from American technological leadership has been the principle source of the slow rise in American real wages since 1973. However, a careful reading of the data supports none of these views.

It is easy to reject the claim that poor average US wage performance reflects the loss of high-wage manufacturing jobs because of US trade performance. Between 1981 and 1991, the US trade balance in manufactured goods did decline significantly – from a surplus of $18 billion to a deficit of $47 billion. But this shift was not large enough to provide much of an explanation for average wages in the economy as a whole. In 1991, the trade deficit was equal to about five per cent of value added in manufacturing. Average hourly earnings in manufacturing were 8.2 per cent higher than those in the private sector generally. (Average weekly earnings were 29 per cent higher.) Since manufacturing accounted for 17 per cent of total employment, shifting an additional (0.05 * 17) 0.85 per cent of employment to manufacturing would have raised average hourly and weekly wages by 0.07 and 0.25 per cent respectively – an amount scarcely large enough to explain the poor wage performance of the 1980s.

2.3 Assessing Compensation Performance

Before turning to the other explanations based on trade it is useful to examine the behaviour of US compensation more closely. As a first approximation, we expect the change in real compensation to match the change in output per worker. Since growth of output per worker in the US did slow down dramatically after 1973, it is reasonable to expect that real compensation would decline in parallel. However, the data suggest that

Figure 2: Output/Hour and Real Hourly Compensation
(1973 = 100)



real compensation failed to match even the slow improvement in average labour productivity growth.

As Figure 2 indicates, between 1973 and 1979, average real compensation (average hourly compensation deflated by the CPI for urban consumers) increased in line with output per hour in the US business sector. However, from 1979 to 1991, the two trends diverged markedly. While output per worker grew by 10.5 per cent – already a very slow pace by historical standards – real hourly compensation grew by only 1.5 per cent.

This divergence could in principle be explained by a shift in incomes from wages to profits. However, in 1991, the share of total compensation in the value added of the business sector was 65.6 per cent – less than one percentage point lower than it was in 1979 (see Table 1). If we deflate nominal compensation by production prices rather than consumption prices, we see that workers in the 1980s *were* basically compensated for the growth in output per worker. If workers had chosen to consume the products they actually produced, they could have raised their real compensation by as much as the improvement in productivity growth. This finding is inconsistent with Leamer's argument that international competition is bringing US wages down to foreign levels. If Leamer was correct, we would expect to see real product wages growing more slowly than productivity.[3]

3. In addition to arguing that trade has reduced average US wage rates, Leamer (1994) argues that trade has lowered the relative wages of unskilled workers. This claim will be discussed below.

Table 1: Real Compensation and Output

Year	Earnings/ CPI (1)	Comp/ CPI (2)	Output/ Hour (3)	Comp/ POut (4)	Comp/ POut-I (5)	Comp/ CPI-Sh (6)	FWTOT (7)	Comp Share (8)	GDP87/ Hours (9)
1970	98.0	89.4	87.5	88.5	86.1	88.1	126.5	67.0	89.3
1971	100.4	91.2	90.4	89.7	86.9	89.8	124.2	65.7	92.5
1972	104.3	93.9	93.2	91.8	89.4	92.7	120.0	65.2	93.9
1973	104.5	96.1	95.6	94.0	91.6	94.4	116.9	65.1	95.4
1974	101.4	95.1	93.9	94.3	92.0	93.2	107.1	66.5	94.7
1975	99.1	95.8	96.0	94.3	92.9	94.1	106.9	65.0	97.9
1976	100.7	98.8	98.8	97.3	96.0	96.9	107.3	65.2	100.0
1977	102.1	100.3	100.5	98.7	98.0	98.4	103.8	65.0	100.7
1978	102.7	101.4	101.1	99.4	99.2	100.3	102.0	65.1	100.6
1979	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.2	100.0
1980	95.2	97.5	99.3	101.0	100.8	99.2	91.7	67.3	100.4
1981	93.9	96.8	100.5	100.4	101.0	98.9	93.9	66.1	101.5
1982	93.8	98.0	100.7	102.1	102.1	100.6	97.6	67.1	101.8
1983	94.9	98.5	102.9	102.4	101.1	100.5	101.5	65.9	103.9
1984	94.3	98.4	105.3	102.6	101.5	100.7	104.4	64.5	104.4
1985	93.8	99.3	106.8	103.7	101.9	102.2	105.7	64.3	105.4
1986	94.1	102.4	109.0	106.6	104.7	106.2	107.6	64.7	107.8
1987	93.2	102.3	110.1	107.5	105.4	106.4	102.5	64.6	107.8
1988	92.4	102.4	111.1	108.2	105.9	106.8	102.7	64.5	108.4
1989	91.8	101.0	110.2	107.1	104.5	105.3	102.0	64.3	108.4
1990	90.3	101.1	110.5	108.8	105.6	105.4	100.2	65.2	109.2
1991	89.4	101.4	110.5	109.5	105.1	105.8	101.5	65.6	110.4

Note: Earnings = average hourly earnings
CPI = CPI for all urban consumers
Comp = Average hourly compensation
CPI-Sh = CPI minus shelter component
CompShare = share of compensation in business output value added
Output = business sector output (excludes housing)
POut = deflator for output
POut-I = deflator for output minus investment
FWTOT = ratio of fixed weight price index of exports of goods and services to price index of imports
Hours = hours worked in business sector

The wage gap illustrated in Figure 2 is thus almost totally due to a discrepancy between the production and the consumption wage. When nominal compensation is deflated by a *production* price index (in this case the business sector GNP deflator) rather than by the *consumer* price index, this 'production wage' closely tracks the growth in output per worker from 1979 to 1991.

Apparently, the prices of the products that workers consume have risen more rapidly than those which they produce. Three major differences in the composition of the deflators for production and consumption compensation merit attention. Consider first, investment goods. The consumer price index which is used to measure real earnings does not, of course, reflect the prices of investment goods. The prices of the most rapidly growing investment goods, computers, have declined precipitously. Simply subtracting gross domestic investment from business sector output provides a measure of consumption goods output. The implicit deflator from this series suggests that between 1979 and 1991, real compensation in terms of consumer goods increased by 5.1 per cent (versus 1.5 per cent using the CPI for all urban consumers). Thus about half of the shortfall between product and consumption compensation can be explained by the relative price decline in investment goods.

A second major compositional difference between the CPI and the business sector output used in measuring productivity is housing. Output of owner-occupied housing is not included in the business-sector output measure used by the Bureau of Labor Statistics (BLS) to estimate business-sector productivity growth. However, the price of shelter is a major component of the consumer price index. Between 1979 and 1991, the index of shelter prices increased by 17 per cent more rapidly than the rest of the CPI. If we deflate hourly compensation by the CPI minus shelter, we obtain an estimated increase in real compensation between 1979 and 1991 of 5.8 per cent – which is similar to the estimate using the business deflator minus investment goods.

The third major difference between production and consumption prices involves the goods and services that enter international trade. If the production wage increases match domestic productivity growth as they appear to have done, the level of real compensation will depend on the impact of import prices on total consumer price inflation. This impact can be picked up by the terms of trade (the ratio of export to import prices). The broadest measure of the terms of trade (using the GDP deflators for exports and imports of goods and services) shows an improvement of 5.2 per cent, while the fixed-weight price measures show an increase of 1.5 per cent. This finding is inconsistent with the view of Johnson and Stafford (1993) that an erosion of the rents from US technological leadership explains the slow growth in US wages over this period. If this were the case, the international buying power of US workers (as captured by the ratio of import to domestic wages) would have risen more slowly than their ability to produce domestically produced goods.

In sum, the evidence indicates that had American workers chosen to consume the products they produced, their real compensation would have increased by about ten per cent over the 1980s – about as much as output per worker in the business sector. However, real wage growth lagged behind productivity growth for two main reasons. First, much of the productivity growth occurred in industries producing capital goods such as computers, which workers do not generally buy. Second, there were increases in the relative price of housing (which workers consume but do not produce). International trade played no role in this poor average wage growth. Over the 1980s, the prices of US exports actually rose more rapidly than the prices of the goods the United States imports.

It is noteworthy that the slowdown in US productivity growth has been centred in the services sectors, most of which are *not* exposed to international competition. Productivity growth did slump throughout the economy between 1973 and 1979 but, since 1979, both multi-factor and labour productivity in manufacturing have returned to their post-war pace. By contrast, productivity in the rest of the business sector has stagnated. Indeed, between 1979 and 1988, according to the BLS, almost *all* productivity improvements, estimated on a multi-factor productivity basis, took place in manufacturing. Similarly, there was a substantial divergence between the growth of GDP per worker in the economy as a whole and in manufacturing. If demand for manufactured goods has an elasticity of less than unity, faster relative productivity in manufacturing will lead to a decline in manufacturing employment.

3. Trade and Wage Inequality

Other analysts have suggested that trade (or globalisation) helps explain the growing *inequality* in US wages. Reich (1991) has argued that global competition has bifurcated American workers, and thereby American society, into two groups: high-earning 'symbolic analysts' whose talents are rewarded by globalisation; and the mass of ordinary production workers whose earnings are depressed by it. And referring to growing wage disparity, Murphy and Welch (1993) found a correspondence between the patterns of wage growth and durable goods performance and conclude that 'the evolving pattern of international trade is perhaps a primary cause of recent wage changes'.

3.1 Factor Composition and Quantity of Trade

Studies that have tried to quantify the relationships more precisely, however, have generally concluded that the impact of trade is small. In particular, Borjas, Freeman and Katz (1991, p. 237) estimate the quantities of educated and uneducated labour embodied in US manufactured goods exports and imports. They concluded that trade flows explained at most 15 per cent (i.e. 1.9 percentage points) of the 12.4 per cent increase between 1980 and 1988 in the earnings differential between college-educated workers and their high-school-educated counterparts. Moreover, given the decline in the manufactured goods trade deficit from $106 billion in 1988 to $47 billion in 1991, their method would attribute to trade less than one percentage point of the disparity in relative wage growth by that time. (In 1993 the deficit had increased again to $91.5 billion.)

When one considers with whom America trades, it is not surprising that estimates of the factor supplies embodied in US manufacturing trade indicate relatively small effects on wages. In 1990, for example, 70 per cent of America's manufacturing imports came from OECD countries – countries with endowments and wage levels very similar to America's.[4] US imports from developing countries did increase rapidly over the decade but, again, what needs to be borne in mind is the magnitude. In 1990 for example, these imports amounted to $115.8 billion or 2.1 per cent of US GNP versus 1.2 per cent in 1981.[5] It is hard to see how a change of this magnitude (less than one per cent of GNP) could have a large impact on the overall labour market.[6] In a recent study, for example,

4. In 1980, hourly compensation in other OECD countries was 83 per cent of US levels; this dropped to 64 per cent by 1985 but then increased to 103 per cent by 1990.
5. Imports of manufactured goods into the EC in 1988/89 amounted to $89 billion, less than two per cent of GNP.
6. US exports to developing countries have also grown rapidly. Over the 1980s the US trade *deficit* in manufactured goods trade with developing countries swung by $45.55 billion or 0.8 per cent of GDP.

Sachs and Shatz (1994) estimate that trade with developing countries reduced US manufacturing employment by 5.7 per cent between 1978 and 1990, a number equal to about one per cent of employment overall.

Wood (1991, 1994) has challenged this methodology on the grounds that the use of the labour-intensity measures using developed-country production data assumes that imports and domestic products are similar products. Wood argues, on the contrary, that goods imported from developing countries are not close substitutes for those produced in developed countries and are, therefore, far more labour intensive. He therefore objects to the use of input coefficients from developed countries to estimate the job content of imports. Wood argues instead that the input coefficients of developing countries (with some adjustments) should be used. Moreover, he argues that this problem exists not only for direct manufacturing inputs, but also for indirect inputs from other sectors. In addition, he maintains it holds for both goods and services imports. Taking all these factors into account leads him to conclude that the employment, and thus wage impact, is larger than conventional estimates suggest, although he still finds that the effect of the trade of the North with the South is 'much smaller than is popularly supposed'.

But take an extreme version of Wood's hypothesis. Suppose *all* the growth in US imports over the 1980s reflects imports of products that were *not* produced in the United States in 1980 at all. Had imports from developing countries not increased, therefore, Americans would have spent their money on *other* domestic (and imported) products. This counterfactual of the Wood hypothesis suggests that imports may have displaced products that were not unusually labour intensive.

If Wood is correct, as Sachs and Shatz (1994) note, industries in which trade with developing countries have a growing share should record unusually rapid increases in skill intensity as the more unskilled-labour intensive activities move offshore. In fact, Sachs and Shatz do not find unusually large increases in the skill intensity of low-skill sectors.[7]

3.2 Prices

In any case, there is a problem in using *ex post* trade flows to make these calculations. Such flows do not necessarily capture the effect of price pressures that operate through trade.[8] If international competition forced US workers to lower their wages, for example, domestic firms might be able to prevent imports from rising. By examining only trade flows, as these calculations do, we would conclude that trade had no impact on wages. In principle, therefore, even if trade flows are small, changes in traded goods prices could have large effects on the prices (and thus factor returns) of domestically-produced substitutes. As Bhagwati (1991) has emphasised, relative price changes are the critical intervening variable in the chain of causation from trade to factor prices.

7. Wood also argues that the pressures from international competition could spur technological change that is particularly rapid in labour-intensive products. The evidence on this question is somewhat more supportive of Wood. As shown by Lawrence and Slaughter (1993, Figure 10) there is a positive slope to a regression of total-factor productivity against the ratio of production to non-production workers. Leamer(1994) and Sachs and Shatz (1994) report similar results.

8. Deardorff and Staiger (1988) demonstrate the conditions under which this methodology is appropriate. It is necessary that both preferences and production technology are Cobb-Douglas.

Some studies have estimated the impact of changes in traded goods prices on wages in particular industries. Ravenga (1992) finds statistically significant effects, although she estimates the impact on wages to be much smaller than the impact on employment. While this analysis is informative, it is really testing for the effect of trade on returns to industry-specific human capital, rather than the general attributes such as education which are of interest here. To do this it is necessary to explore general equilibrium effects.

If trade lowered the relative wages of unskilled workers, according to the Stolper-Samuelson theorem, we would expect to see a decline in the relative price of goods which are produced using unskilled labour relatively intensively. In Lawrence and Slaughter (1993), however, we find that over the 1980s, the relative import and export prices of unskilled-labour-intensive goods actually increased slightly. In addition, Lawrence and Slaughter noted that if trade were the operative factor, we would expect to see a contraction in labour-intensive industries, but we would also expect to see the remaining sectors taking advantage of this labour, by using unskilled labour relatively more intensively. In fact, we note that throughout US manufacturing, there has been a pervasive upward shift in the ratio of skilled to unskilled labour. Our conclusion, therefore, is that the simple Stolper-Samuelson process due to trade does not provide an adequate account of the growing wage inequality. Instead, we interpret the evidence as consistent with a bias in manufacturing technology towards the more intensive use of skilled labour. Our conclusion is supported by Berman, Bound and Griliches (1992) and Bound and Johnson (1992) who find that trade played basically no role in America's wage changes in the 1980s, and ascribe these changes to technological change and changes in unmeasured labour quality. I should stress, however, that our paper was designed to examine the role of trade and not, directly, to provide evidence on technological change. Moreover since we only examined data for the manufacturing sector, we could not resolve the role played by technology or other factors in economy-wide wage behaviour. In addition, I should stress that we did not argue that evidence of an increase in the ratio of skilled to non-skilled workers by itself would constitute sufficient basis to reject the claim that Stolper-Samuelson effects were reducing the wages of unskilled workers. For this purpose the price evidence is crucial.

As might have been anticipated, given its surprising conclusions, our work has been attacked by several authors. First, Leamer (1994) has argued that our use of production and non-production workers as proxies for skill levels is misleading because non-production workers includes low-skill occupations such as secretaries, while production workers could be supervisors with considerable skill. However, as Sachs and Shatz (1994) and Bound and Johnson (1992) show quite convincingly, this measure actually does fairly well in tracking other measures of skill. Moreover, the evidence indicates that in US manufacturing, the rapid increase in non-production workers was actually concentrated in the more highly educated professional and managerial categories. Between 1983 and 1990, for example, manufacturing employment of managers and administrators increased by 25.9 per cent (professionals by 12.9 per cent), while employment of non-sales white-collar workers actually declined by 3.0 per cent.

Cepii (1994) argues that our finding of a rapid increase in the ratio of skilled to unskilled workers simply reflects the fact that the relative supply of skilled workers increased rapidly in the 1980s. But, as reported in Table 2, the shift we find occurred

Table 2: Changes in Ratio of Production to Non-Production Workers

Production-worker employment to non-production-worker employment					
	Weighted average ratios			Decomposition of change (a)	
Year	Value	Change	% Change	Between industries %	Within industries %
1959	3.23	—	—	—	—
1969	3.00	(0.22)	-6.9	25.1	74.9
1979	2.79	(0.22)	-7.2	-5.9	105.9
1989	2.27	(0.51)	-18.5	30.3	69.7
Change over entire period		(0.95)	-29.6	-50.6	150.6

Note: (a) Based on the following standard decomposing formula: total change (industry x) = (change in employment share * mean production:non-production ratio in period) + (change in production:non-production ratio * mean employment share for period).

Source: NBER Databank.

within most industries and not only in the aggregate. As we know from the Rybcynski Theorem, *given product prices*, changes in relative factor supplies affect relative product supplies rather than relative factor use. Thus, given product prices, an increase in the supply of skilled workers raises the supply of skill-intensive goods, but does not change the ratios of skilled and unskilled workers employed in each industry. Moreover, if this relative supply was important in changing relative product prices it should have been associated with a *decline* in the relative wages of skilled workers – exactly the opposite of what happened. The fact that manufacturers are using more skilled labour, despite its relatively higher price, strongly supports the hypothesis that technological change in manufacturing played a role in the wage change.

Sachs and Shatz (1994) raise questions about our use of the price data. In particular, they argue that computer prices should not be included in the sample. When they drop computers, they obtain a negative but statistically insignificant relationship between import price changes and skill intensity and they note that the size of the effect is small. Similarly, if computer price changes are omitted, instead of rising slightly, the ratio of manufacturing producer prices weighted by production-worker employment, to prices weighted by non-production workers falls slightly. While we would agree that computer prices are difficult to measure, we are not convinced that this sector should be given no weight at all in the explanation.

Sachs and Shatz also claim, on the basis of their regressions omitting the computer industry, that there was a negative relationship between total-factor productivity growth and skill intensity. They conclude 'TFP growth was less on average in high-skilled than low-skilled industries' and argue, therefore, that technological change was causing wage differentials to narrow rather than widen. Again, the impact of the computer industry is important. In Lawrence and Slaughter (1993), we found that, including computers, the gap between weighted averages of high-skilled and low-skilled productivity growth was positive and thus concluded the impact was the opposite.

3.3 Additional Evidence

I have now undertaken similar investigations of the price behaviour of both German and Japanese imports and producer prices. While not as disaggregated as the US data, these data tell the same story. As shown in Table 3, when price changes over the 1980s are regressed against the ratio of unskilled to skilled employment, they indicate a *positive* rather than negative relationship (that is statistically significant in the case of wholesale prices but not import prices). Similarly, as shown in Table 4, for both countries when industry wholesale and import prices are weighted by production-worker shares, they show larger increases (or smaller declines) than when weighted by non-production workers. Questions might be raised since these data reflect industrial classification systems which include refined petroleum as a manufactured product. In addition, there are the usual issues relating to the inclusion of computers. However, as reported in Table 4 for the weighted averages, dropping these observations does not affect the results.

In the case of Germany, I was also able to obtain unit-value data that could be matched with industry data at a more disaggregated level. Again the data indicate no decline in the relative price of manual-worker-intensive products.

Table 3: Regressions of Price Changes on Ratios of Production to Non-Production Workers in Japan and Germany

Regression	Dep. variable	Constant	JP/NP	GM/NM	R^2	F-stat	No. obs
Wholesale prices (1980-90)							
1	%WP	-14.407 (-1.982)	5.919 (1.851)		0.1599	3.43	20
2	%WP	-11.197 (-1.109)		11.896 (2.871)	0.3547	8.24	17
Import prices (1980-90)							
1	%MP	-29.906 (-2.248)	6.653 (1.137)		0.067	1.29	20
2	%MP	6.399 (0.789)		3.12 (1.012)	0.045	1.02	24

Note: %WP is the percentage change in wholesale prices; %MP is the percentage change in import prices; JP/NP is the Japanese ratio of production to non-production workers; and GM/NM is the German ratio of manual to non-manual workers. Industry data generally corresponds to SITC 2-digit classification.

Sources: Eurostat Labour Costs 1988: Principal results. v1. CECA-CEE-CEEA, Luxembourg, 1992. Ministry of Labour (Japan), *December 1989 Survey*; Statistisches Bundesamt Wiesbaden, *Reihe 8: Preise und Preisindizes fuer die Ein- und Ausfuhr*, 1980, 1985, 1990; Statistisches Bundesamt Wiesbaden, *Reihe 6: Index der Grosshandelsverkaufpreise*, 1980, 1985, 1990; Research and Statistics Department, Bank of Japan, *Price Indexes Annual*, 1980, 1985, 1990.

Table 4: Employment-Weighted Percentage Changes in Wholesale and Import Prices for Japan and Germany (1980-1990)

Japan	Percentage change	
	Wholesale prices	Import prices
All manufacturing industries		
Non-production weights	-5.60	-18.23
Production weights	-3.90	-17.29
Difference (prod less non-prod)	1.70	0.94
Without Office machines		
Non-production weights	-7.09	-18.69
Production weights	-4.72	-17.50
Difference	2.37	1.19
Without Petroleum products		
Non-production weights	-5.49	-18.02
Production weights	-3.84	-17.19
Difference	1.65	0.83
Without Office mach./petroleum prod.		
Non-production weights	-6.98	-18.45
Production weights	-4.66	-17.39
Difference	2.32	1.06
Germany	Percentage change	
	Wholesale prices	Import prices
All manufacturing industries		
Non-manual weights	23.98	15.24
Manual weights	26.03	17.07
Difference (man less non-man)	2.05	1.83
Without Office machines		
Non-manual weights	24.79	15.38
Manual weights	26.21	17.11
Difference	1.42	1.73
Without Petroleum products		
Non-manual weights	24.15	15.55
Manual weights	26.11	17.20
Difference	1.96	1.65
Without Office mach./ petroleum prod.		
Non-manual weights	24.97	15.70
Manual weights	26.28	17.24
Difference	1.31	1.54

Note: Non-production and non-manual weights weigh each industry's price change by that industry's share of total manufacturing employment of non-production and non-manual labour. Production and manual weights weigh each industry's price change by that industry's share of total manufacturing employment of production and manual labour. Industry data generally correspond to SITC 2-digit classification.

Mishel and Bernstein (1994) question whether the shift towards the relatively more intensive use of skilled labour in the 1980s is any greater than it was in earlier decades. In Lawrence and Slaughter we provided a chart that shows an acceleration in the 1980s. I can report here additional evidence that supports our view. The shift towards the more intensive use of non-production workers in the 1980s was both larger and more pervasive than in the 1970s and 1960s (see Table 2).[9] The ratio of production to non-production workers decreased in 87 per cent of the three digit SIC codes in the 1980s compared with 78 per cent in the 1970s and 62 per cent in the 1960s. In addition the average decrease was 18.5 per cent in the 1980s compared with 6.9 and 7.2 per cent in the 1960s and 1970s respectively. Of course, an increase in the manufacturing average could reflect either a change in the mix of industries or in the ratio within industries. As Table 2 indicates, both factors were at work. However, 69.7 per cent of the shift occurred within industries. Since this shift occurred despite the fact that relative wages of non-production workers actually increased, it appears to be strongly suggestive of a skilled-labour-using technological shift that was concentrated in the skill-intensive sector of manufacturing. Mishel and Bernstein also raise the question of whether this change in skill intensity should be described as technological change. In particular, they find an absence of evidence indicating an association with investment and other hard measures of technical change such as R&D, capital accumulation and computerisation, and stress the importance of distinguishing developments in manufacturing from those in the rest of the economy.

I believe both the points they make are important. First, if this evidence is correct, those arguing for a major role for technology must apply a broader interpretation that includes new labour-management relations and work organisation. Second, I believe that the divergent productivity performance between the manufacturing and services sectors in the United States is a major structural feature of the US economy in the 1980s. Historically, relative productivity growth was faster in goods than in services. But this difference has widened in the 1980s when almost all the improvements in total-factor productivity in the business sector were confined to manufacturing. If the demand for manufacturing goods is inelastic, relatively rapid increases in manufacturing productivity will reduce the demand for manufactured goods workers. With no bias in this change, since production workers are relatively intensively employed in manufacturing, this will reduce the demand for production workers. In combination with a shift within manufacturing towards production-worker-saving technical change concentrated in non-production-worker sectors, the impact on relative wages could be considerable.

There remains the issue of whether technological change itself has been affected by trade. It is noteworthy, that while US productivity growth in manufacturing recovered in the 1980s, it did not exceed the pace it achieved prior to 1973. This could reflect a spur from international competition offsetting a more general slowdown, or it could simply reflect a return to previous performance. More generally however, the links between trade pressures and productivity growth have not been adequately explored. Nonetheless, since the relative price of unskilled labour has been declining, we might expect the endogenous response of technology to be a substitution towards, rather than away from, using unskilled labour.

9. Though perhaps not larger than in the 1950s. Sachs and Shatz (1994) show a rapid increase between 1947 and 1960.

Finally, an alternative interpretation of the rising ratio of non-production to production workers is that it represents increased foreign outsourcing. Indeed, if the production of labour-intensive activities were moved abroad this, rather than a change in technology, could explain the rise in the ratio of non-production to production workers found in US manufacturing. If this was the case, we would expect to find smaller shifts within industries. However, in Lawrence and Slaughter (1993) we found the shifts as pervasive at the 4-digit SIC level as at the 3-digit. Moreover, Berman, Bound and Griliches (1992) note that, according to the 1987 Census of Manufacturing, very little of the materials outsourced came from the same SIC 3-digit industry as the establishment itself. This conclusion is also supported by the evidence on multinationals introduced below.

4. US Multinationals

As reported in Table 5, US firms with foreign operations have not contributed to employment growth within the United States over the past decade – a remarkable result given the rise of about 30 per cent in US employment during this time.[10] These firms are particularly important in the US manufacturing sector – indeed they account for more than half of all manufacturing employment. However, between 1977 and 1989, their manufacturing employment in the US fell 14 per cent (from 11 to 10.13 million); considerably faster than the drop of 1.2 per cent in overall manufacturing employment over the same period.

This sluggish employment growth in US multinationals has been attributed by many Americans to the impact of their foreign operations. It is widely perceived in the US that many of the jobs formerly in these firms have moved abroad. Drawn by low labour costs and low labour standards, MNCs are seen as having relocated their production towards low-wage countries. In particular, the jobs of blue-collar workers are viewed as vulnerable to this development. Such international outsourcing could, in principle, provide an alternative explanation of the widespread decline in *both* relative blue-collar wages and in the ratio of blue to white-collar workers employed in US manufacturing.

The data on US multinational activity are collected in extensive and comprehensive benchmark surveys by the Bureau of Economic Analysis (BEA) in 1977 and 1989. These data provide an unusually comprehensive view of developments world-wide in an important group of actors. The data should, however, be treated with care, particularly because the aggregate level at which I will report them here could conceal important compositional changes by country and industry. In addition, all activities of each firm are ascribed to a single industry, which could lead to misclassification of some activity.

If outsourcing is important, the decline in blue-collar intensity in the US should be associated with an increase in blue-collar intensity abroad. In addition, as viewed through the eyes of the Stolper-Samuelson paradigm, if developing countries lower their trade barriers and increase their specialisation in unskilled-labour-intensive products, in developing countries, the relative wages of production workers should rise, while in developed countries they should fall. In addition, we might expect to see an important

10. In 1989, total non-bank multinational corporation (MNC) employment in the United States was 18.8 million, about the same as the 18.9 million in 1977.

increase in the share of sales by foreign affiliates going to the United States. On the other hand, if global changes in technology were dominant, we should see *parallel* increases in the ratio of blue to white-collar employment in the US and in the rest of the world, and similar movements in wages.

Employment and compensation data for US multinationals are reported in Table 5. Several features are noteworthy. In 1989, US manufacturing multinationals employed over 13.3 million people, about a quarter of whom were in their foreign affiliates. The data suggest that overall multinationals are not necessarily attracted abroad simply by cheap labour; indeed only about one third of US MNC affiliate manufacturing employment is in developing countries. Nonetheless, within developing countries, MNCs do use production workers relatively more intensively than in developed countries and, on average, production workers are paid about half, rather than three-quarters, the compensation of non-production workers. It is noteworthy that the ratio of production to non-production workers in developing countries in 1989 of 1.7 was very similar to the ratios in Europe and Canada of 1.6 and 1.76 respectively in 1977.

There is a widespread view that since both technology and capital are increasingly mobile, productivity is as high in US multinationals abroad as in the United States. If this is the case, we might expect to see lower wages per worker but similar levels of output per worker. As reported in Table 6, measured in current US dollars, output per employee in developing countries in 1989 was actually about 40.3 per cent of output per employee in developed countries. By contrast compensation per employee averaged 28.5 per cent of US levels. (Production workers received 22.7 per cent of the compensation of their US counterparts; non-production workers 37 per cent, while non-wage income per worker was 49.7 per cent of US levels.) Since MNCs actually contribute their capital in the form of know-how, it should be expected that the share of non-wage income will be higher in their foreign operations. Moreover, these data certainly dispel the notion of similar productivity levels in developed and developing countries.

Consider, now, changes in the data between 1977 and 1989 reported in Table 5. These do not support the common perception that overseas employment in US-owned manufacturing foreign affiliates has increased. Indeed, employment in the majority-owned manufacturing foreign affiliates of US MNCs actually declined by 14 per cent; a decline similar to that experienced in their US parents. This decline was mainly due to shrinkage in the European operations of US MNCs where total employment fell by 23 per cent and production-worker employment plunged by 31 per cent. Employment growth in US manufacturing MNCs in developing countries was more robust. Between 1977 and 1989 an increase of 5.9 per cent was recorded. However, the overall magnitude of employment in these US foreign affiliates is relatively small. The aggregate rise in employment was just 60,000. This employment growth is small when compared with the drop of 1.7 million that occurred in US manufacturing parents over the same period and the 500,000 drop that occurred in manufacturing foreign affiliates over the same period. The overall share of developing countries in the employment of US majority-owned foreign manufacturing affiliates increased from just 27 to 34 per cent and their share in the worldwide employment of manufacturing MNCs (i.e. in both US parents and foreign affiliates) increased from just 6.8 to 8.1 per cent.

Table 5: US Multinationals

	Employment figures ('000)									Employment ratios			Compensation ratios		
	Total			Production workers			Non-production workers			Prod. workers emp/ non-prod. workers emp			Prod. workers comp/ non-prod. workers comp		
	1977	1989	Change %	1977	1989	Change %	1977	1989	Change %	1977	1989	Change %	1977	1989	Change %
United States [a]															
Total [b][c]	67,344	90,644	34.6	55,179	73,474	33.2	12,165	17,170	41.1	4.54	4.28	-5.7	—	—	-6.8
Manufacturing	19,682	19,426	-1.3	14,135	13,257	-6.2	5,547	6,169	11.2	2.55	2.15	-15.7	n.a.	n.a.	—
Multinationals [d]															
Total	18,885	18,765	-0.6	n.a.	n.a.	—	n.a.	n.a.	—	n.a.	n.a.	—	n.a.	n.a.	—
Manufacturing	11,775	10,127	-14.0	7,257	n.a.	—	4,518	n.a.	—	1.61	n.a.	—	0.78	n.a.	—
Foreign affiliates[e]															
Majority-owned															
Manufacturing affiliates in:															
Developed countries	2,754	2,167	-21.3	1,695	1,196	-29.5	1,059	971	-8.3	1.60	1.23	-23.1	0.75	0.66	-10.8
Canada	562	455	-19.2	358	274	-23.5	204	181	-11.5	1.76	1.52	-13.6	0.86	0.81	-5.2
Europe	1,951	1,509	-22.6	1,202	828	-31.1	749	681	-9 1	1.60	1.22	-24.2	0.70	0.63	-10.0
Japan	40	75	86.6	14	23	62.0	26	52	99.7	0.53	0.43	-18.9	0.75	0.69	-8.5
Aust.-New Zealand-S. Afr.	201	129	-35.8	122	71	-41.3	80	58	-27.4	1.53	1.23	-19.1	0.78	0.68	-12.5
Developing countries	1,019	1,079	5.9	675	679	0.6	344	400	16.4	1.96	1.70	-13.6	0.47	0.41	-12.8
Total	3,773	3,247	-14.0	2,371	1,875	-20.9	1,403	1,371	-2.2	1.69	1.37	-19.1	0.68	0.59	-14.2

Majority-owned															
Manufacturing affiliates in:															
Food & kindred products	377	308	-18.5	248	184	-25.9	129	124	-4.2	1.93	1.49	-22.7	0.57	0.62	9.8
Textile products & apparel	102	82	-19.5	80	59	-27.2	21	23	9.3	3.78	2.52	-33.3	0.47	0.59	23.7
Chemicals & allied products	464	475	2.2	233	227	-2.5	231	247	6.9	1.01	0.92	-8.8	0.71	0.64	-9.1
Primary & fabricated metals	229	179	-21.9	158	117	-26.1	71	62	-12.5	2.23	1.88	-15.6	0.80	0.73	-9.4
Machinery, except electrical	523	508	-2.9	270	254	-6.0	253	254	0.4	1.07	1.00	-6.4	0.61	0.59	-3.9
Electric & electronic equipment	629	455	-27.7	422	288	-31.8	207	167	-19.3	2.03	1.72	-15.5	0.56	0.54	-4.3
Transportation equipment	740	597	-19.4	507	365	-28.0	233	231	-0.9	2.17	1.58	-27.3	0.97	0.61	-37.2
Other manufacturing	709	645	-9.0	452	382	-15.5	257	263	2.3	1.76	1.45	-17.4	0.75	0.59	-21.0
Total	3,773	3,247	-14.0	2,371	1,875	-20.9	1,403	1,371	-2.2	1.69	1.37	-19.1	0.68	0.59	-14.2

Notes: (a) Labour force totals according to the US Department of Labor's *Employment, Hours, and Earnings, United States, 1909-90,* Vol. 1.

(b) Figures for private non-farm establishments. The total non-farm figures are: 1977 - 82,471 million; 1989 - 108,413 million.

(c) The compensation ratio for total US employment is a comparison of the white-collar/blue-collar cost indices in 1977 and 1989, as published by the Bureau of Labor Statistics.

(d) According to, and based on, US Department of Commerce publications: *1977 US Direct Investment Abroad,* and *1989 US Direct Investment Abroad*. Information is for non-bank US parents of non-bank US affiliates.

(e) Classified by industry affiliate. According to the Department of Commerce publications referenced above.

Table 6: US Manufacturing Foreign Affiliates: Output and Employment (1989)

	Output $USm	Employees	Comp. per worker $US	Net income per worker $US	Output per worker $US
Developed countries					
All workers	143,244	2,167,300	33,028	12,587	66,093
Production workers	—	1,196,100	26,943	—	—
Non-production workers	—	971,200	40,523	—	—
Developing countries					
All workers	28,764	1,079,400	9,404	6,250	26,648
Production workers	—	679,200	6,110	—	—
Non-production workers	—	400,200	14,955	—	—
Ratio of developing to developed countries for:					
Compensation per worker					
All workers		0.28			
Production workers		0.23			
Non-production workers		0.37			
Gross product per worker		0.40			
Net income per worker		0.50			

Sources: US Department of Commerce Publications - *US Direct Investment Abroad 1989 Benchmark Survey*, and *Survey of Current Business*, February 1994.

What about production-worker employment in these affiliates? Of the 60,000 growth in employment overall, only 4,000 occurred in the employment of production workers. As estimated by Slaughter (1994), declines in production-worker employment occurred in Europe (-370,700), Central and South America excluding Mexico (-75,300), and South-East Asia (-6,100). In Mexico, production worker employment increased by 80,900. In Asian countries, while increases were recorded, they were surprisingly small – Malaysia (15,600), Singapore (10,400) South Korea (3,900) and Thailand (11,700). There is, therefore, little evidence that on balance large numbers of production worker jobs are shifting within US multinationals away from the US towards the developing countries.

The ratio of production to non-production workers employed in US manufacturing operations worldwide has fallen precipitously. Indeed the declines are of similar magnitude in US manufacturing parents (-15.7 per cent) and in their affiliates in developing countries (-13.6 per cent). The declines were particularly large in Europe (-24.2 per cent) and in Australia, South Africa and New Zealand (-19.1 per cent). Only in Mexico did the ratio increase. There were also declines in this ratio in most major industries. According to Slaughter (1994) who estimated these changes at a 3-digit level, three industries were exceptional and did experience both rising foreign employment in production workers and falling ratios of non-production to production workers. These were tobacco products (+4,000, -15.7 per cent), the 'other' subset of chemical products (+10,900, -25.4 per cent) and computers and office equipment (+37,500, -27.4 per cent).[11]

As I noted above, if the Stolper-Samuelson story were dominant we would expect to see the relative wages of production workers moving in opposite directions in developed and developing countries. Instead, what we see is that, on the contrary, relative wages of production workers have fallen worldwide. *Together the picture that emerges appears to be far more consistent with the notion of a common shift in technology rather than of expanding trade. Worldwide, we see a rise in the relative employment of non-production workers despite the increase in their relative wage.*

More recent data, which reflect the relatively earlier occurrence of recession in the United States, show that overseas employment in US MNCs was more robust than in US parents. Between 1989 and 1991, US-based employment in multinational parents declined by 5.1 per cent (987,000). By contrast, employment in majority-owned manufacturing affiliates increased by 1.6 per cent (50,700). It would be erroneous to assume a causal connection between these developments, but even if one were to make such a connection, less than 10 per cent of US employment loss could be accounted for by jobs that were transferred abroad.

Technological change also appears to be reducing the growth prospects of very large firms. Increasingly, large US firms are downsizing, and slimming down only to those core activities which are essential to their operations; less vital activities are performed by smaller and more flexible suppliers. Figure 3 gives a picture of the quantitative importance of various forms of outsourcing. The corollary of a change in outsourcing is a change in the domestic and foreign content of MNC output, shown in Table 7.

As might be expected for a period in which the US trade deficit increased, between 1982 and 1989 there was a rapid increase in the purchases of manufactured goods by US-based MNCs from their foreign affiliates (Figure 3, upper panel). This increased from $25 billion in 1982 to $61.2 billion in 1989. Purchases from unaffiliated foreigners increased even more rapidly from $16.1 to $45.3 billion. While the increase has been rapid, these imports still represent only a small share of the total sales of US MNC parents, increasing from 4.1 per cent in 1982 to 6.8 per cent in 1989.[12] Moreover, these numbers refer to purchases from both developed and developing countries.[13] Manufactured imports from *developing* countries were roughly a third of these shares. These effects are thus simply too small to have had the alleged employment and wage-shift

11. Specifically, 'other' chemical products include SIC 285, 288 and 289.
12. Gross product in US manufacturing was $647 billion in 1982 and $1004.6 billion in 1989.
13. Sales of US foreign affiliates of manufactured goods from developing countries to all US purchasers increased from $7.5 billion in 1982 to about $20 billion in 1989.

Figure 3: Sourcing Comparison for US Multinationals and their Majority-Owned Affiliates

(manufacturing only; $US billion)

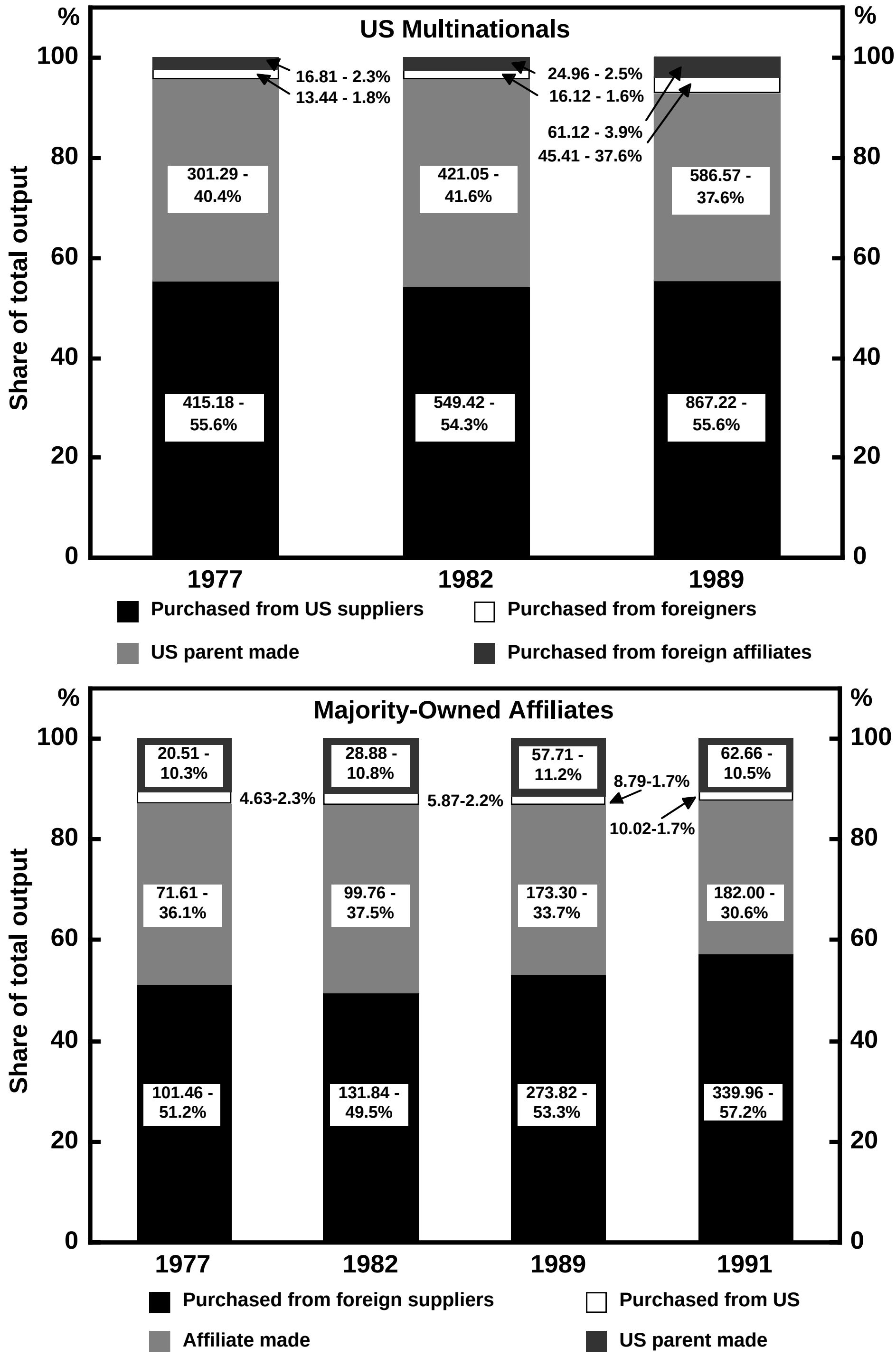


Table 7: Sourcing Comparison for US Multinationals and their Majority-Owned Affiliates
(manufacturing only)

	1977		1982		1989		1991	
	$USb	%	$USb	%	$USb	%	$USb	%
US multinationals								
Total output	746.71	100.00	1,011.55	100.00	1,560.32	100.00		
Output made	318.10	42.60	446.01	44.09	647.69	41.51		
Output purchased	428.61	57.40	565.54	55.91	912.63	58.49		
Output's foreign content	30.24	4.05	41.08	4.06	106.53	6.83		
Output's US content	716.47	95.95	970.47	95.94	1,453.79	93.17		
Majority-owned affiliates								
Total output	198.22	100.00	266.34	100.00	513.61	100.00	594.71	100.00
Output made	92.12	46.47	128.64	48.30	231.01	44.98	244.75	41.15
Output purchased	106.10	53.53	137.70	51.70	282.60	55.02	349.96	58.85
Output's foreign content	173.07	87.31	231.59	86.95	447.11	87.05	87.77	14.76
Output's US content	25.15	12.69	34.75	13.05	66.49	12.95	12.22	2.05

Source: Department of Commerce, *Survey of Current Business*, February 1994.

effects.[14] Overall value added within US multinational parents fell from 41.6 per cent of sales in 1982 to 37.6 per cent in 1989. Of this 4 point shift, almost 1.2 points represented a rise in domestic outsourcing and 2.8 per cent outsourcing from abroad.

The slimming down that is evident in US parents is even more striking in the behaviour of their foreign manufacturing affiliates (Figure 3, lower panel). Between 1982 and 1989, value added within these operations declined from 37.5 to 33.7 per cent of sales, of which almost all represented a rise in inputs sourced abroad rather than in the United States. The data for 1991 suggest that this trend has continued with the share of value added performed in-house in affiliates declining to 30.6 per cent. The share of inputs sourced by foreign affiliates from their US parents and other US sources has remained fairly constant over this period.[15]

5. Labour Standards and Deeper Integration

In most OECD countries, the government has an extensive role in the labour market. It commonly regulates work hours and the cost of overtime; mandates vacations, holidays and sick leave; sets minimum wages; restricts child and forced labour; ensures nondiscrimination; provides unemployment, disability and retirement income insurance, and in many countries health insurance; and sets and conditions for hiring and firing, unionisation and collective bargaining.

By and large, nations have taken these actions independently, although a voluntary set of international standards has been agreed to at the ILO, and the GATT does contain a fairly narrow prohibition on trade in goods made with prison labour.[16] Nonetheless, efforts to bring these issues to the international policy arena have been present in both the United States and the European Union. As early as 1953, the US proposed adding a labour standards article to GATT and it pushed unsuccessfully for the inclusion of labour standards in the Tokyo and Uruguay Rounds. The US has also tried to induce foreign compliance with worker rights in other aspects of its trade policy. Since the mid 1980s, the US Congress has passed a series of laws that directly link preferential trade and investment benefits to respect for basic worker rights.[17] In Section 301 and Super 301 of the *Omnibus Trade Act* of 1988, the 'systematic denial of internationally recognised worker rights' by foreign governments is defined as an 'unreasonable trade practice' and

14. The BEA reaches similar conclusions. In the *Survey of Current Business* of July 1993 they compared employment patterns in high and low-wage countries over the period 1982 to 1991. The low-wage share of MOFA employment increased by 3 percentage points to 34 per cent. Between 1982 and 1989 they find that the domestic content of US-parent's output in manufacturing decreased from 96 to 93 per cent.

15. Slaughter (1994) produces evidence that foreign and US labour are actually price complements rather than substitutes. A one per cent drop in foreign wages tends to raise home employment by nearly 0.1 per cent.

16. The original charter of the ITO in 1948 contained a section on labour rights although it was never ratified by the US congress for other reasons.

17. Eligibility under the *Caribbean Basin Economic Recovery Act of 1983*, the Generalised System of Preferences (GSP) in 1984, the Overseas Private Investment Corporation (OPIC) in 1985, and US participation in the Multilateral Investment Guarantee Agency in 1987, have all been conditioned on adherence to ILO standards on worker rights. These include the rights to associate and bargain collectively, the banning of forced or compulsory or child labour, the provision of reasonable conditions for worker health and safety and the existence of a national mechanism for determining a generally applicable minimum wage.

made liable for US countermeasures where ‘such denials cause a burden or restrictions on US commerce’. Labour standards were also an important issue in the recent NAFTA negotiations. While the NAFTA agreement itself did not include provisions on labour rights, one of the side agreements established an international enforcement regime for alleged violations of national minimum wage, child labour, and occupational health and safety regulations, and an oversight and evaluation mechanism (without enforcement powers) for other labour issues.[18]

The US focus has been on achieving ‘minimal standards.’ By contrast, measures within the European Community have been considerably more extensive. In 1956, according to Steil (1994), French officials argued that social legislation in Europe should be harmonised in conjunction with the reduction of tariff protection to ‘make apparent to the workers the link that must exist between the common market’s establishment and higher standards of living’. More recently, European countries who fail to provide their workers with ‘adequate social protection’ are widely viewed as guilty of ‘social dumping’. Britain, for example, was accused of social dumping when Hoover moved from Burgundy to Scotland. Within Europe, efforts have been made to raise labour standards to prevent such ‘dumping’. On 9 December 1989, all EC members besides Britain agreed to the ‘Social Charter’ that covers an extensive set of worker’s rights.[19] The European Commission has also been active in implementing this Charter.[20]

At a multilateral level, however, there are increasing calls for moving beyond the voluntary standards of the ILO and the GATT’s prohibition on forced labour (Collingsworth, Goold and Harvey 1994). The United States tried to ensure that discussions on labour standards would take place in the new WTO. French leaders have been vocal in calling for European action against other nations with lower standards of social protection. Prime Minister Balladur has demanded that Europe be protected from ‘foreign traders with different values’. President Mitterrand has called for trade sanctions against nations with ‘inadequate social protection’ and European Community President, Jacques Delors has called for a ‘global social contract’.

These recent pressures in the labour area are part of more widespread trends toward ‘deeper international integration’ as domestic policies come under increasing international scrutiny. By contrast, most post-war liberalisation efforts have involved shallow integration. They have aimed at removing national barriers to the entry of goods and capital and providing foreign products and investors with the *same* treatment accorded

18. Conspicuous by its absence, and an important reason for the opposition of organised US labour to the NAFTA were rights of association, organising and bargaining.

19. These include rights to freedom of movement; employment and remuneration; the improvement of living and working conditions – that is, the right to social protection; the right to freedom of association and collective bargaining; the right to vocational training; the right of men and women to equal treatment; the right to information, consultation and participation; the right to health and safety in the workplace; the protection of children and adolescents in employment; the protection of elderly persons; and protection of persons with disabilities.

20. The *Single European Act* allows social-policy measures relating to the health and safety of workers to be adopted by qualified majority, while requiring unanimity in other areas of social policy. The Commission has accordingly defined a working-time directive (which requires a maximum 48 hour week and 4 weeks annual paid vacation) as a ‘health and safety’ measure. Of course, in Europe a key *quid pro quo* to members with lower wage levels is access to the cohesion fund.

to their domestic counterparts. But they have not tried to constrain the domestic policies of sovereign nations.[21]

Are the calls for international labour standards justifiable? It is useful to distinguish conceptually three types of effects that labour policies might have:

- those that are purely local;
- those that operate on international markets through market spillovers; and
- those that operate on international markets through direct spillovers.[22]

5.1 Local Effects

Where nations effectively control their borders and prevent migration, most labour standards will either be confined to local effects or operate through market channels to affect international trade and investment flows. In fact, despite the widespread perception that such policies have repercussions on trade and investment flows, there are many cases in which government intervention in the labour market will have purely local impacts.

First, policies such as sick leave, maternity leave, and family leave are usually financed by payroll taxes. It is often assumed that such taxes on labour raise employment costs, thereby affecting resource allocation. However, unless all elements of the compensation package, including wages, are subject to minimum standards, when such standards are imposed, employers can adjust other elements of the package to keep their total costs from rising substantially. Indeed, the evidence suggests that, in general, the supply of labour is fairly inelastic and that over the long run, most payroll taxes are borne by labour (OECD 1993). This implies that such taxes result in lower wages rather than higher compensation costs.[23] Second, many labour measures actually reflect decisions which might have been taken in the marketplace anyway, and are thus not binding constraints. This could be the case with rules about work hours and vacation and minimum wages. In addition, in many countries compliance with binding measures is low and enforcement weak. Under some circumstances evasion takes the form of employment in the informal sector.[24]

These considerations are important since they remind us that the basic presumption that differences in labour standards will affect trade and investment flows is not necessarily valid.

21. Measures for deeper integration do not necessarily involve harmonisation of standards or policies. In some cases, 'mutual-recognition' might suffice.

22. I owe this classification scheme to Richard Cooper's analysis of global environmental policies. See Cooper (1993).

23. Actually, some labour standards may actually increase the supply of labour and enhance productivity. Thus a safer workplace, may raise workforce participation and the increased unionisation and worker participation in decision making could increase productivity.

24. Ehrenberg (1994) notes the substantial differences in benefit levels which prevail across the United States and indicates that even within an integrated market there is considerable scope for exercising local preferences. Maximum weekly UI insurance varies from $154 in Nebraska to $468 in Massachusetts.

5.2 Market Spillovers

In practice, however, many-labour market policies will not be perfectly neutral. Indeed, their impact can be quite subtle. Ehrenberg (1994) gives the example of payroll taxes with ceilings, which can shift demand towards more highly-paid workers. Similarly, some employment standards are not all fully shiftable: for example, a binding minimum wage, or child labour laws. If the value employees place on health and safety benefits are less than the employers costs of complying, only part of the costs will be shifted.

In general, therefore, groups seeking to raise labour standards will find their case becomes more difficult, the higher the costs they impose on society. It should, therefore, come as no surprise that such groups will be against trade, particularly of the kind that is with trading partners which have very different preferences. However, if labour standards reflect the legitimate preferences of a particular nation, it is unclear why others should be entitled to impose their views.

The traditional theory of international trade demonstrates that when costs differ, countries gain from free trade by specialising along the lines of comparative advantage. When Ricardo invoked the principle of comparative advantage, he referred to productive differences that were due to climate (or technology).[25] But in stating his theory, Ricardo could as easily have ascribed the productive differences between nations to the 'social climate' as to the physical climate and his conclusions would have been unchanged: *taking climactic conditions as given*, free trade will maximise global welfare.

The choices of sovereign nation states are reflected in part in their rules and regulations. These regulatory decisions influence relative costs and thus patterns of comparative advantage. Given diversity of national conditions and regulatory preferences, therefore, it will be optimal for nations to have *different* regulations and norms. A strictly level playing field, or a common set of standards, would be inappropriate.

From the standpoint of this view, therefore, the playing field of international competition will, and should never be, strictly level. Competition between firms based in different nations can never be fair in the same way as competition between firms based in the same economy. Both traditional determinants of costs such as relative factor endowments, technology and tastes and social determinants of costs such as regulations, institutions and government policies should affect competitive performance. Thus firms producing labour-intensive products *should* find it easier to operate in economies in which labour is more abundant and less costly. Similarly, firms producing in economies with lenient and less costly labour standards *should* find it easier to produce with labour-intensive production methods. If, for example, relatively unsafe activities shift away from countries that place a higher value on safe workplaces towards those with a lower value, global welfare will be enhanced.

25. These explanations for trade have been so widely invoked that it is sometimes treated as a major 'refutation' of the principle of comparative advantage when it is discovered that institutions and policies can also affect comparative advantage so that comparative advantage can actually be 'created' by governments.

In the light of this paradigm, therefore, those seeking more 'level playing fields' based on constraining domestic economic policies simply fail to understand that the benefits of international trade come from allowing nations to be different, rather than requiring them to be similar.

As with most paradigms, however, this view of the world rests on some basic assumptions. If these assumptions are violated, free trade may not be globally optimal. In particular, two assumptions are crucial. The first is that the world consists of perfectly functioning, competitive markets – that is, there are no international market failures. And the second is the normative proposition that no constraints should be imposed on sovereign national choices (an assumption analogous to consumer sovereignty).

The assumption of competitive global markets is important because it rules out the use of strategic labour-standard policies – that is, policies designed not only to achieve a given impact on the labour market but also on the nation's terms of trade. As Brown, Deardorff and Stern (1993) demonstrate, with market power, a labour standard could operate like an optimal tariff and shift the terms of trade. For example, South Africa could raise the price and reduce the supply of gold in the world by raising safety standards in its gold mines.[26] In the presence of this potential, international controls on standard setting might be required.

In the real world, however, most labour-standard policy decisions are not motivated by terms of trade considerations and accusations of the use of labour standards for such purposes are rare. Indeed, exporters of labour-intensive products are actually likely to have lower standards, and importers higher standards, because concerns about employment tend to dominate those of maximising aggregate national income.

The assumption that nations should be completely free to impose whatever policies they chose, may also be questioned. Some have tried to advocate tougher international labour standards on the grounds that these have positive economic effects. These include the alleged labour-income raising effects of capital-labour substitution, productivity enhancement effects of workforce harmony brought about by increased worker participation and the notion that a more equal distribution of income is necessary to stimulate consumer spending (Collingsworth *et al*. 1994). But the existence of these effects is controversial and in any case, it is unclear why firms and/or nations should be forced to take actions which are in their own interest.

Instead, the more compelling assaults on complete national sovereignty are based on: (a) the notion that there exist basic universal human rights; and (b) the 'psychological externalities' which occur when citizens of one country find practices in other countries morally reprehensible. But to what degree and under what circumstances should nations in one country try to change the behaviour of others, through measures involving trade?

In some cases, the policies in poor countries which offend the sensibilities of those in rich nations actually result from different income levels (i.e. income effects) rather than different preferences or values. Thus those in extreme poverty may permit activities which under other circumstances they themselves would regard as abhorrent (for example, child labour or a lack of pollution controls).

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26. Exporting countries have incentives to set standards too high globally because they receive this secondary terms of trade benefit. Importing countries would do the opposite. This counter-intuitive result implies that labour-intensive exporters should set standards too high (see Brown *et al*. (1993)).

The long-run solution to these problems is clearly to raise incomes. Indeed, refusing to trade with such nations could actually retard rather than improve their abilities to provide worker rights. In the short run, however, some of these conflicts can be dealt with through explicit compensation schemes and subsidies. For example, the EC has a set of social funds which allow poorer countries to meet the labour and social standards applied by more affluent members. Similarly, 'debt for nature' swaps allow richer nations to support environmental activities in poorer countries.

In other cases, countries may trade off their adherence to particular practices by obtaining concessions in other areas. For example, in the Uruguay Round, some developing countries agreed to the introduction of intellectual property rules in return for increased access in textiles, and agriculture. The NAFTA provides another example in which Mexico signed a (side) agreement on labour standards in return for preferential market access. As already noted, the US has conditioned access to preferential arrangements such as GSP on adherence to basic labour standards.

Where sufficient compensation is not forthcoming, however, there is danger in trying to impose such standards under conditions in which they may damage economic growth. Moreover, there will remain cases in which divergent practices reflect divergent beliefs about the desirability of such standards so that compensation will not be possible – for example, the conflicts between the United States and the Soviet Union over Jewish emigration and those between the United States and China over human rights. Under these circumstances free trade may be difficult to obtain. And indeed, by revealed preference both nations may be better off without such trade.

Trade intervention is of course not the only means of responding to labour measures found to be reprehensible in other nations. An alternative might be insistence on labelling (e.g. 'made with union workers', or 'made using ecologically sound standards') that would allow private citizens to exercise their preferences.

On the other hand, where nations actually agree on basic standards, international agreements can help make such standards more credible domestically and reduce the opportunity costs of imposing them alone. In addition, the presence of a reasonable set of mutually agreed minimum standards could help reduce the ability for political interests to exploit these concerns opportunistically for protectionist purposes.

5.3 Direct Spillovers

Labour-market regulations and programs in one country may directly affect conditions in a second country through induced labour flows. Immigration creates problems for example, when workers from one country can receive benefits, but not pay the costs of such benefits in a second. Under these circumstances, since the spillovers are not simply pecuniary, the case for an increased harmonisation (or mutual recognition) of policies is considerably stronger. It is thus perhaps not surprising that as it perfects its internal labour market, the European Union has moved to implement more extensive sets of common standards.

In sum, in general there is a strong case for allowing individual nations a wide scope for differentiation in applying labour standards, particularly when the costs and benefits of such standards are fully borne by the nation itself. Even where these standards do affect others through market forces, in principle, given diverse social preferences, the existence of diverse standards will raise global welfare. There is, however, a case for international standards where:

- there is a strong danger that nations would act strategically in their absence;
- nations can agree on what those standards should be; and/or
- nations share a common labour market.

Where the failure to maintain certain standards impinges on notions of fundamental human rights they are more difficult to deal with. One solution is to induce poor nations to comply by offering them compensation. A second is to use labelling and other forms of moral suasion. The denial of trading opportunities should probably come only as a last resort and only in the most egregious cases.

5.4 A Race to the Bottom?

If labour-market policies do not affect total labour costs, there is no reason to believe there will be economic pressures for a convergence of standards. In addition, if these standards reflect choices that nations are willing to make, they will not be changed, even if they do have allocative consequences. As Ehrenberg (1994) has pointed out, there are noteworthy differences in minimum wages, occupational standards, and other labour standards across the 50 states of the US; indeed prior to the early 1970s, the US did not have national occupational health and safety standards.

6. Concluding Comments

International trade enhances potential national welfare. It frees up resources to be put to alternative uses in which they are more productive. However, a necessary condition for these benefits to be realised, is that these resources do not remain unemployed. In several labour markets, particularly in Europe, the loss of a job is viewed with considerable anxiety. The result is that increased trade, or technological progress, is seen as a threat, rather than an opportunity. In this paper, however, I have shown that there is considerable empirical evidence that the sources of poor labour-market performance, particularly in the US are essentially domestic. They reflect ongoing technological shocks that would be present even if the US economy was closed. The role of developing-country imports and the sourcing activities of US multinationals both remain too small to account for a significant share of the relative wage changes that have occurred in the US. This evidence suggests that neither international differences in wage rates, nor in labour standards, are the major factors in OECD labour-market behaviour that many believe them to be.

These findings suggest the major challenges to policy are:

- to educate the public on the nature of the changes;
- to emphasise the need for worker training and education to take advantage of the opportunities new technologies afford; and
- to develop measures such as earned-income tax credits which redress earnings inequality while preserving and increasing wage flexibility.

Where nations share a common consensus on labour standards, as most do with respect to minimum standards, there is probably merit in reinforcing the credibility of domestic policies through international agreement. International agreement might also help to define the terms of the debate and thus limit the ability of particular interests to obtain trade protection. Nonetheless, there are also gains to be had in allowing considerable scope for the application of different policies, particularly where effects are either borne locally or operate only through international markets. Nations that share a common labour market because of free immigration flows might find a greater interest in increased harmonisation, although even in this case, as the US experience indicates, a considerable diversity in standards and practices can be sustained within a single market.

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Discussion

1. Judith Sloan

Robert Lawrence's paper on the impact of international trade on the US labour market is divided into four parts. They relate to:

- the impact of trade on the average real wage of US workers;
- the impact of trade on the distribution of wages of US workers;
- the impact of the activities of US multinational companies on the US labour market; and
- finally, the role of labour standards in trade negotiations.

Of the four aspects, the paper is strongest in its analysis of the effects of trade on average wages and the distribution of wages.

Two of the most defining features of US labour market developments over the past several decades have been the lack of growth of average earnings and the growing dispersion of earnings. In terms of the latter, the real earnings of those at the lower end of the wage dispersion actually declined over the 1980s. While the phenomenon of increasing pay inequality has been characteristic of a number of developed economies (OECD 1993), the increase in pay dispersion has been greater in the US than elsewhere. (The UK also experienced a significant rise in pay dispersion, but in association with rising real earnings, including of those at the lower end of the pay distribution.) Not surprisingly, these two features of US labour market developments have given rise to concerns, which in turn, have prompted analysts to consider their explanations.

One of the hypothesised 'culprits' is the increasing internationalisation of the US economy, in particular, the surge of elaborately transformed manufactured imports. Lawrence's central conclusions are that trade can be ruled out as a major explanation of, first, the flat path of real earnings in the US and, second, the increased dispersion of earnings. The main reasons for his findings are the relatively small size of net trade flows and the nature of those trade flows. Of course, by ruling out trade as an explanator, we are left somewhat in the air as to the real explanation of these phenomena.

Moreover, given that the analysis is by nature backward looking, we cannot be sure that the prediction of the minimal impact of trade on the labour market will persist into the future. The counterfactual is of large dynamic Asian economies, namely China and India, becoming major players on the world trade scene (in contrast with the impact of the Asian 'Tigers' which are relatively small economies) and generating huge trade flows. In this case, and in the face of less than infinite and instantaneous flexibility in the US labour market, the impact of trade could conceivably be far greater than in the past.

At the same time, Lawrence makes the telling point that the US economy is characterised by free trade between its States, but is also one in which quite divergent labour practices, including the setting of wage minima, exist. The end result has not been the transfer of all economic activity to the lowest cost States. Rather the outcomes are the result of a complex set of factors, some of which relate to the productivity of the resident workforces.

The section dealing with the impact of the activities of US multinationals outside the US (outsourcing to low-cost countries for instance) is the least convincing part of the paper, in part, because the database would appear to be deficient in a number of respects. However, again the thrust of his conclusions appear to be basically sound – that, first, the overall magnitude of US multinational activities is not sufficient to have a significant impact on job opportunities of US workers and, second, that many of the activities of US multinational companies are not in low-cost countries.

The discussion of the role of labour standards in trade negotiations is discursive but persuasive. The main point is that treaties are fundamentally means of backdoor protection. The ‘negative externality’ argument is weak in respect of labour standards; it is marginally stronger in respect of environment standards.

What are the lessons for Australia arising from Lawrence’s paper? On the face of it, the important message is that trade should not be seen as a negative force generating adverse outcomes in the labour market. This, of course, needs to be qualified by the fact that the Australian economy is more open than the US economy, and by the distinctive nature of trade flows into and out of Australia. Another point of difference is the relative inflexibility of Australian labour market arrangements arising from the workings of the system of compulsory arbitration compared with the US labour market. The significance of this latter observation is that increasing trade flows may be associated with unfavourable labour market outcomes in Australia, but these may actually be due to inflexible labour market arrangements rather than the trade flows *per se*. The case is for freeing up the labour market, not staunching trade flows through government interventions.

Notwithstanding, the increasing dispersion of earnings and the deteriorating position of the low paid are legitimate concerns of policy. A slogan that is popular with policy makers in both the US and Australia is ‘high wage/high productivity’. Clearly, delivering on this slogan has obvious appeal. Instead of low-paid workers in developed economies competing head on with low-paid workers in developing economies, the idea is that by lifting the productivity of workers through education and training, developed economies can concentrate on high-value-added, knowledge-intensive activities. One of the problems with this proposition is that it provides no useful direction to policy makers as to what should actually be done in relation to training and education. Should education be vocationally oriented? Should greater on-the-job training be promoted? In what areas should training be undertaken by workers? How should education and training be funded? These are only some of the questions which, at this stage, have no definitive answers. The role of education and training in promoting greater dynamic efficiency in the labour markets of developed economies is an under-researched area which requires more attention in the future.

Overall, Lawrence’s paper should be seen as a useful contribution to the issue of the impact of trade on the labour market. Further research using Australian data would be valuable.

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2. Kym Anderson

As we have come to expect, Robert Lawrence's paper is packed full of fresh ideas and insights drawn from a wide survey of empirical analysis and theory. The paper has a major and a minor part. The major part examines the extent to which trade in manufactures and capital is contributing to three trends in labour markets in the United States and other OECD countries: stagnation in the average real wage in the United States; increased dispersion in real wages of employed workers; and/or increased unemployment (which is a more extreme version of increased inequality). The minor part of the paper discusses the emergence of labour standards as an issue in trade negotiations and economic integration initiatives generally. This is connected with the major part of the paper insofar as differences in labour standards across countries, over and above wage differences, amplify the effect of trade on OECD labour markets (although not a lot is made of that connection in the paper).

Both parts of the paper are important for the world economy as a whole, and for Australia and other reforming small open economies in particular, not least because of the potential for protectionists to portray international trade in goods, services and capital as having undesirable labour-market effects on OECD economies.

Trade and Poor Labour-Market Performance

The stagnation in the average real wage in the United States during the past 20 years, in contrast to its rapid growth in many developing countries, is striking. Some people with a cursory understanding of the factor-price equalisation theorem from Heckscher-Ohlin trade theory are tempted to use it to draw the conclusion that the liberalisation of United States' trade is causing this convergence in wage rates.

Similarly with the increased dispersion in wage rates within several OECD countries, and the rise in unemployment of less-skilled workers in others (or the non-renewal of guest worker visas), the temptation again is to draw on Heckscher-Ohlin trade theory to explain these phenomena and thus blame trade liberalisation for the outcome. In this case it is the Stolper-Samuelson theorem that is used. By assuming just two factors, unskilled and skilled labour, that are mobile between industries, one could be drawn to the conclusion that the freeing up of trade between advanced and developing economies would cause the skill premium in wages to increase in the advanced economies with flexible labour markets. Where labour markets are more rigid and/or unskilled wage rates are not flexible downwards, an excess supply of unskilled workers would result unless that unemployment is exported by expelling guest workers.

Lawrence's paper provides a wealth of empirical data and analysis, admittedly mostly for the United States, to argue that trade in goods and services, and in capital via multinational corporations, could have contributed at most only a small part of the explanation for these features of OECD labour markets. He shows, for example, that the average real wage in the US would have grown at about the same rate as output per worker in the business sector had people chosen to consume what they produced. And since the US terms of trade trend has been upward rather than downward, he concludes that trade could not have contributed to the lack of growth of the average real wage.

With respect to the increased dispersion in real wages in several OECD countries, Lawrence points out again that Heckscher-Ohlin trade theory cannot provide an explanation because we should have seen an *increase* in the number of unskilled relative to skilled workers employed as the wage for unskilled relative to skilled work fell, whereas he observes for US manufacturing a *decline* in employment of unskilled relative to skilled workers. He interprets these data as suggesting there is a systematic bias in technical change in manufacturing toward saving unskilled labour.

I agree with Lawrence that it is much more likely to be domestic factors affecting labour supply and demand rather than trade *per se* that explain the poor performance of OECD labour markets. Why their average wages (and total-factor productivity) are growing slower than those of developing countries, and why their unemployment rates are so high, must be in part due to the rigidity government policies and trade unions have imposed on labour (and other) markets of advanced economies, of the sort emphasised by Olson (1982). As well, there is probably some underestimation in the real compensation data of the increased real welfare of workers that might be associated with rising labour standards.

Why the skill premium in wages is increasing, at the same time as the quantity of skilled relative to unskilled workers is rising in most countries, could have several explanations other than, or in addition to, the one offered in the paper, namely, an unskilled labour-saving bias in technical change. At least three other non-exclusive hypotheses are worth exploring.

One is simply that people are upgrading their skills in response to the decline in the relative wage of unskilled workers. Another hypothesis is that increased international specialisation is taking place *within* the 3-digit manufacturing industries examined in the paper. Indeed the last column of Table 2 suggests that is where much of the action is, leading to intra-industry trade specialisation in ever-more skill-intensive industries at home as the more labour-intensive processes relocate to countries with lower wage costs. A corollary to that would be faster employment growth in US multinationals in developing countries than in the parent corporation at home, as is observed to be the case in Section 4.

And a third possible explanation of why the skill premium in wages is increasing at the same time as the quantity of skilled relative to unskilled workers is rising parallels the suggested explanation by Schultz (1972) of why the ratio of wages to the rental return to natural resources is rising, despite the decline in available natural resources per worker. It is that the demand is growing sufficiently more rapidly for the factor that is becoming relatively more abundant (labour compared to natural resources in Schultz' case; skilled relative to unskilled labour in Lawrence's case) as to more than offset the effect on the factor price ratio of its relatively rapid supply expansion. The reason for the rapid increase in demand for human capital has to do with the increasing value of the ability to deal with disequilibria in a rapidly changing economy (Schultz 1975). Specifically, the demand for skills is growing rapidly because of the increasing complexity of the task of making productive use of new knowledge and lower-price sources of data and other information that research and computer technologies are providing.

All of this suggests a rich agenda for further research in which Lawrence is already engaged and to which others, both here in Australia and elsewhere, will be attracted by this stimulating paper. By way of illustration, let me mention just two areas.

First, what type of investment in human capital formation is needed? In particular, if the main reason for the skill premium in the wages structure is found to be the rapid growth in new knowledge and data, what type of training best enhances a worker's ability to adapt to, and make productive use of, the information explosion? My guess is a broad-based general education that enhances lateral thinking, rather than narrowly defined training that focuses on skills required for a specific task – which is exactly the opposite of what Australia's Department of Employment Education and Training has been promoting.

Second, what can be learnt from more precise theorising and empirical estimation? Certainly the factor-price equalisation and Stolper-Samuelson theorems need to be modified somewhat when the standard two-factor model is expanded to include sector-specific factors such as natural resources; to allow for international capital and other factor mobility; to include non-manufacturing sectors and especially non-tradeables; and to allow for economies of scale, differentiated products, intra-industry trade and imperfect competition. Doing all that may sound like a tall order, but in principle at least it is manageable these days with global CGE models such as the GTAP model at Purdue, which is based on the SALTER model developed in Australia (Hertel 1994; Jomini *et al.* 1991). That type of simulation model has the potential to give some quantitative indication of the relative contribution of trade to the labour market phenomena mentioned in the paper, and of the extent to which different industries are affected. Dynamic versions such as the G-CUBED model (McKibbin and Wilcoxen 1993) could offer even more insights. And were they to include endogenous growth features with investment in human capital enhancing workers' skill levels, it would be even easier to illustrate how the vast majority of people are better off as a result of trade liberalisation.

Trade Policy and Labour Standards

Finally, a brief comment on Section 5 to do with labour standards. The issue of entwining trade policy with labour standards is very similar to the entwining of trade policy and environmental standards, only with even less economic justification. In the case of the environment, there are physical international spillovers (e.g., global warming, ozone depletion) in addition to psychological spillovers (e.g., animal rights), whereas in the labour case there is only the latter (worker rights) which has any economic justification for action at the international level. And, again as with the environment (or human rights), trade sanctions are potentially worthy of consideration, as sticks or carrots for encouraging other countries to raise their standards to one's own, only in very limited circumstances. One is when there are no lower-cost ways for a country, or group of countries, to influence the policies of other countries (and even there the benefits may be insufficient to warrant the costs); the other is when there might otherwise be a 'race to the bottom' in terms of lowering (or delaying a rise in) national standards, to improve the competitive edge of domestic firms, and/or a successful call by trade unions (or environmental groups) for import duties against what is claimed to be social (or eco-) dumping.

This development is important for small opening economies like Australia's for at least three reasons. The first is that it could lead directly to reduced market access for Australian exports in the United States and other OECD countries. This is of little consequence in the case of labour standards since those are already high (too high?) here. Second, and much more importantly, is the risk it poses for exports of products from East Asia and elsewhere which embody a considerable quantity of Australian primary products. And third, and perhaps most importantly, is the threat this development poses for the multilateral trading system, in two ways: by potentially overloading the agenda of the World Trade Organisation (WTO) in its infancy, and/or by encouraging small economies to seek refuge from anti-dumping duties via accession to the Western European or North American trading blocs (Anderson and Snape 1994).

As Lawrence warns, the solution does not necessarily lie in negotiating minimum standards, at least not in the WTO; a more appropriate place for that is the United Nations (e.g. the International Labour Office). Rather, more effort by researchers needs to be put into convincing the policy community (a) that trade growth, rather than being the cause of a social problem, can be part of the solution, and (b) that other, more efficient ways can be found to resolve such social problems. In the case of both the labour-market problems raised in Lawrence's paper and the environment, it is especially important to demonstrate sooner rather than later the inappropriateness of entwining them with trade policy, for otherwise the new-found but still fragile enthusiasm of developing and former centrally planned economies for unilaterally liberalising their trade regimes could be quickly reversed.

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3. General Discussion

The discussion focussed on the following two questions:

- What is the relationship between technical change and the demand for unskilled labour?
- What types of training policies promote both increased employment and wages for relatively unskilled workers?

Reflecting the complexity of the issue, there was no general agreement that technical change was driving an increase in the dispersion of wages. Amongst those who did assign an important role to technology, there was little agreement as to the nature of the technical change.

One participant suggested that rising wage inequality in the US can be explained by a reduction in the relative supply of skilled workers. It was argued that the average level of education attainment peaked in 1980. It was also suggested that the lack of control over health costs was increasing the wages paid to skilled workers in the health industry.

Other participants, while noting the appeal of the technology story, found it difficult to pin down exactly what form the technological change has taken. It was argued that there is little evidence that the degree of task complexity in most manufacturing jobs is higher in 1994 than it was in 1960. The technology story also needs to confront the Japanese experience, in which the relative wages of unskilled wages have tended to increase. One participant suggested that the Japanese experience can be explained in terms of an increase in the relative supply of skilled workers as the result of greater within-firm training of individual workers. It was also argued by some that for the technology explanation to be convincing, similar research to that reported in Lawrence's paper needed to be undertaken for a range of countries. In addition, it was felt that greater attention needs to be paid to technological developments in the service sector of the economy.

Those who saw a central role for technology in explaining changes in relative wages argued that, over the past decade, technological change, by changing the nature of jobs, has allowed people with skills to demonstrate those skills more easily. If a worker has above-average computer skills it is easier to demonstrate these superior skills than if one has above-average skill with a hammer. It was also suggested that the computer revolution had both reduced the number of unskilled jobs, and increased the demand for people who can adapt easily to new ways of doing things and who can manage the new technology. This has led to an increase in the relative and absolute wages of workers with these skills. As computers become more widespread, more and more workers will be able to manage the technology and the premium paid to workers with computer skills may decline.

As in the discussion of the previous paper, there was general agreement that increased training was essential in a world of ongoing technical change, but little consensus on what type of training is appropriate. Turning unskilled workers into skilled workers holds out the attractive possibility of increasing economic growth and narrowing wage dispersion. Some participants argued that management and leadership skills were critical in achieving this. Others argued that the emphasis should be on providing a generalist education, to allow workers to adjust to technical change more easily. A third view was that vocational education should be encouraged with particular emphasis on the apprenticeship system. This type of training came under attack from those who felt that in a world of rapidly changing technology, the emphasis should be on creating adaptable, innovative workers who are capable of working in a number of different industries. Given this variety of options, the question was asked whether the government's ability to pick winning training initiatives was any greater than the government's ability to pick winning industries.

Finally, the point was raised that even the best-designed training schemes may not deliver a smaller dispersion of wages. Perhaps the current nature of technological change creates a limited number of ‘superstars’ who earn very high wages. The ‘winner-take-all’ example of software designers was given. The best software design may earn its inventor a large return, while the designer of the second-best software may earn almost nothing, despite being well trained and extremely competent. While increased training may make more superstars and increase economic growth, it is far from clear that it will lead to a narrower wage distribution.

Experiences with Current Account Deficits Among Asian Economies: Lessons for Australia?

Susan Collins*

1. Introduction

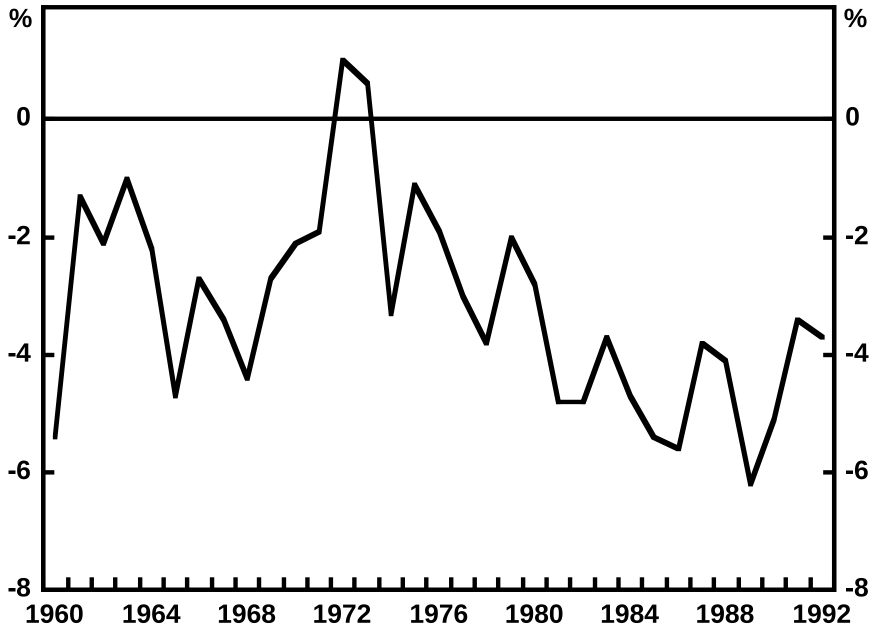
Australia has had current account deficits for most of the post-war period. The deficit averaged 2.4 per cent of GDP during 1960-80 (Figure 1). It exceeded 4 per cent of GDP in only three years in this period. Much of the deficit was financed through direct foreign investment. Since 1980, however, Australia's current account deficit has increased sharply. It averaged 4.6 per cent of GDP during 1981-92, stubbornly remaining above 4 per cent for eight of the years in this period. Furthermore, the financing has shifted from equity towards debt and rising external indebtedness has accompanied the persistent current account deficits. Australia's net foreign debt has jumped from less than $A8 billion (roughly 6 per cent of GDP) at the beginning of the decade, to $A168.8 billion (41.6 per cent of GDP) by 1993.

The large and persistent external deficits evident since the 1980s have fuelled a debate, which became especially active during the late 1980s. On one side are those, such as Moore (1989) and Arndt (1989), who perceive the external imbalances as a 'problem' and advocate some type of policy response – in particular, a tightening of monetary policy. On the opposing side, Pitchford (1989a, 1989b) has been perhaps the most vocal champion of the view that external deficits represent optimal saving and investment decisions of domestic residents, so that macroeconomic policy intervention is inappropriate. Tease (1990) stakes out a middle ground. Looking to the (near) future, analysts are forecasting continued recovery of Australian economic activity. A resurgence in private investment may raise the current account deficit again, reigniting concerns that abated somewhat during the 1991/92 moderation of the imbalance, associated with Australia's growth slowdown. In all likelihood, there will be a resurgence of the debate about whether the deficits are 'bad' and, if so, what if anything should be done about them.

The purpose of this paper is to try to shed some light on the Australian debate about external imbalances by examining the experiences of other countries in the Asia-Pacific region. In fact, a large number of these countries have had persistent and large deficits. However, these deficits have frequently not been perceived as problems. In cases where problems did emerge (notably, South Korea, but also Indonesia), the situation has since been resolved quite successfully. Finally, other Asian economies (such as Japan during the 1960s) appear to have actively managed macroeconomic policy so as to avoid persistent or large external deficits. What lessons can be drawn from these experiences?

* I would like to thank Philip Lowe, Rick Mishkin and Conference participants for helpful comments, and Kathleen McDill and especially Kirsten Wallenstein for excellent research assistance.

Figure 1: Australia – Current Account
(percentage of GDP)



Source: IMF, *International Financial Statistics.*

The paper is composed of four remaining sections. Section 2 provides an overview of recent experiences in a number of Asian and Pacific economies. From this group, the Korean experience stands out as particularly interesting for Australia because of its impressive reversal from persistent external deficits to large surpluses in the 1980s. Indonesia emerges as a second example of a country undergoing an impressive improvement in its external balance. Interestingly, however, external balance has not been a primary target of monetary policy in these experiences. This is in stark contrast to the policies undertaken in Japan during the 1950 and 1960s. Section 3 focuses on the Japanese experience and its relevance for Australia in the 1990s. Section 4 provides some background information about Australia's recent experience with external imbalances. It then turns to a discussion, in light of the Asian country experiences. Section 5 contains concluding remarks.

2. An Overview of Recent Country Experiences

Many countries in Asia and the Pacific have gone through periods of persistent, often large, current account imbalances. However, such a statement masks considerable diversity. This section provides a brief overview of some of the experiences. The countries considered can be divided into two groups. The first group contains four countries that have primarily experienced current account surpluses. These are China, Hong Kong, Japan and Taiwan. The other countries all experienced a significant period of current account deficits.

The discussion will refer to key economic indicators, given in Tables 1 to 3. Table 1 provides information about country size, per capita income level, recent growth rates and saving and investment as shares of GDP.[1] Table 2 provides information about the average current account balance as a share of GDP for three periods: 1976-80, 1981-86 and 1986-92. Table 3 provides key indicators of the burden of external debt.

This is quite a mixed bag of countries, and some of the experiences may be of limited interest from the Australian perspective. Many are substantially poorer and less well developed. Arguably, such economies enjoy a greater scope for rapid growth, fuelled by capital accumulation and the adoption of state-of-the-art technologies developed abroad.

Table 1: Economic Indicators – 1991
(Asia and the Pacific: selected countries)

	Population (millions)	GDP per capita (US=100)	GDP growth (1980-91)	Gross domestic investment/ GDP	Gross national saving/ GDP
OECD					
Australia	17.3	75.4	3.1	18.9	16.0
Japan	123.9	87.6	4.2	32.2	34.7
New Zealand	3.4	63.1	1.5	17.6	16.0
4 Tigers					
Hong Kong	5.8	83.7	6.9	28.7	31.8
Korea, Rep.	43.3	37.6	9.6	39.1	35.8
Singapore	2.8	71.2	6.6	37.4	48.3
Taiwan	20.6	—	11.0	22.2	29.5
NIEs					
Indonesia	181.3	12.3	5.6	35.1	31.1
Malaysia	18.2	33.4	5.7	35.9	26.3
Thailand	57.2	23.8	7.9	38.9	30.4
Other Asia					
China	1149.5	7.6	9.4	35.8	39.3
India	866.5	5.2	5.4	24.1	22.6
Philippines	62.9	11.0	1.1	20.0	21.1

Note: Gross investment and saving figures for Taiwan are shares of GNP.
Sources: IRBD, *World Development Report*, 1993; World Bank, *World Tables*, 1993; *Taiwan Statistical Data Book*, 1993.

1. Recall that the current account balance includes net factor income and transfers from abroad. It is approximately equal to national saving (which also includes these terms) less domestic investment plus a statistical discrepancy. Thus, Table 1 shows gross domestic investment and gross national saving as percentages of GDP.

Table 2: Current Account Balance
(Asia and the Pacific: selected countries)

	Current account balance[(a)] (percentage of GDP) 1976-80	1981-86	1987-92
OECD			
Australia	-2.7	-4.8	-4.4
Japan	0.4	2.3	2.5
New Zealand	-4.3	-6.3	-2.7
4 Tigers			
Hong Kong	—	—	—
Korea, Rep.	-3.6	-1.7	2.1
Singapore	-8.2	-3.8	5.7
Taiwan[(b)]	2.1	10.2	9.1
NIEs			
Indonesia	0.2	-3.8	-2.5
Malaysia	2.5	-7.0	-0.4
Thailand	-5.4	-4.4	-4.1
Other Asia			
China[(c)]	—	-0.6	1.2
India	0.6	-1.5	-2.3
Philippines	-5.0	-4.0	-2.7

Notes: (a) Current account/GDP ratios are from the world tables in the IMF, *International Financial Statistics*, *Yearbook*, 1993. The following countries are updated through the country pages: New Zealand (1991/92), Singapore (1992), Indonesia (1992), and Malaysia (1992). Data for India and Thailand end in 1989 and 1990, respectively.
(b) Taiwan data begin in 1977.
(c) China data run from 1982 through 1991.

Sources: IMF, *International Financial Statistics Yearbook*, 1993 and April 1994; *Taiwan Statistical Data Book*, 1993.

These factors may suggest greater potential for attracting capital inflows to finance external imbalances. However, some of these countries as a group may be perceived as relatively risky investments.

2.1 External Surplus Countries

Consider first the countries I have labelled Group 1 (China, Hong Kong, Taiwan and Japan). As shown in Table 1, these countries saved extremely large shares of GDP in 1991, enabling them to undertake very high rates of capital accumulation without relying on external resources. But they are not really set apart from the other countries in the table by these high saving rates. Many other Asian economies had comparably high saving in 1991. One distinguishing feature is that these countries have, in general, maintained the extremely high rates of national saving for longer than the other economies. As discussed

Table 3: External Debt Ratios
(Asia and the Pacific: selected countries)

	Debt/GNP		Debt service/exports	
	1991	peak[(a)]	1991	peak[(a)]
Australia[(b)]	39.4	39.4 (1991)	16.0	21.0 (1989)
4 Tigers[(c)]				
Korea, Rep.[(d)]	14.4	52.5 (1985)	7.1	27.3 (1985)
Singapore[(e)]	21.9	21.9 (1987)	2.4	3.5 (1985)
NIEs				
Indonesia	66.4	69.0 (1987)	33.0	40.4 (1988)
Malaysia	47.6	86.5 (1986)	8.4	30.6 (1985)
Thailand	39.0	47.8 (1985)	13.1	31.9 (1985)
Other Asia				
China	16.4	16.4 (1991)	12.0	12.0 (1991)
India	29.3	29.3 (1991)	30.6	30.9 (1986)
Philippines	70.2	94.6 (1986)	23.2	36.4 (1983)

Notes: (a) Peak taken from the period of 1983 through 1991.

(b) For Australia the numbers reflect net debt/GDP and net debt service/exports. In 1992, Austrailia's net debt-to-GNP ratio rose to 41.6 per cent and net debt service ratio declined to 12.4 per cent.

(c) Data unavailable for Hong Kong and Taiwan.

(d) Korea's debt service ratios rose in 1986-88, reflecting voluntary prepayment of foreign debt.

(e) Most recent debt ratios found for Singapore are from 1987 (used in place of 1991 figures).

Sources: IRBD, *World Debt Tables*, 1991-92 and 1992-93 (for all countries except Australia); Reserve Bank of Australia (for data on Australia).

below, many of the economies with histories of external imbalances had significantly lower saving rates during previous years. A second distinguishing feature is that, with the exception of China, these countries invest less than a third of their GDP. In contrast, a number of the external deficit countries invest substantially more than a third of GDP.

Even though concern about external deficits is far from the minds of policy makers in Group 1 countries today, this was not always the case. In particular, during the 1950s and 1960s, Japanese authorities focused considerable attention on ensuring that any current account deficits were small and short lived. Policy, especially monetary policy, appears to have been actively managed to this end. This post-war experience is discussed further in Section 3.

2.2 Experiences with External Imbalances

The remaining economies have all experienced current account deficits at some point since 1970. In some cases, notably that of Singapore, these deficits never emerged as a 'problem' for domestic policy makers. No stabilisation or structural reform was undertaken as a result of concern about external imbalance, nor has there been difficulty in financing imbalances. In other cases, notably South Korea and Indonesia, large external deficits and/or heavy debt burdens were important reasons for major policy reforms. Experiences in other economies, such as Malaysia and Thailand, have fallen somewhere in the middle. Overall, these experiences illustrate the general point that deficits, even large, persistent ones, may be part of a 'virtuous cycle' of investment and growth.

The small, very open economy of Singapore ran current account deficits every year from 1970 to 1985. The external balance has since reversed, and the country has had large surpluses since 1989. This experience has reflected investment rates at consistently high levels (at least 34 per cent of GDP) and a national saving rate that has risen continuously from just 10 per cent in 1965 to 45 per cent by 1991. Even during the period of deficits, Singapore never had a debt problem. Rapid growth in exports has kept the debt-service ratio below 4 per cent. Furthermore, since 1980, the economy has attracted large inflows of foreign investment.

Malaysia's current account was in deficit every year from 1980 through 1986, averaging 11.6 per cent of GDP during 1981-83. After three years of surpluses (1987-89), deficits emerged again in 1990. Much of the imbalance has been financed by external borrowing, and Malaysia's debt-to-GDP ratio rose from 28 per cent in 1980 to 48 per cent by 1991. However, Malaysian exports have also grown very rapidly (reaching 78 per cent of GDP by 1990). As shown in Table 3, the ratio of debt service to exports peaked at 31 per cent in 1985, but has since declined to less than 10 per cent. A recent surge in direct foreign investment ($US12.5 billion during 1989-92 compared with $US2.3 billion during 1985-88) has enabled the country to finance recent deficits and to accumulate foreign exchange reserves.

Thailand has also had persistent and often large current account deficits. In fact, its external balance registered a (small) surplus in only one year during 1976-90, while its deficits exceeded 7 per cent of GDP in four years during this period. Like Malaysia, although the debt-to-GDP ratio has risen, the ratio of debt service to exports has been declining. Since 1988, Thailand has also enjoyed large inflows of direct foreign investment.

Among the countries that have had difficulties associated with external deficits, Indonesia and Korea are of particular interest. Both countries were able to implement comprehensive adjustment programs during the 1980s, and appear to have successfully allayed concerns about debt and deficits. These two experiences offer potentially useful lessons for other countries with large and persistent deficits. While I will argue that some of the lessons are general, other lessons are more appropriate for countries at similar stages of development.

2.3 South Korea

Recent performance makes it easy to forget that Korea experienced large and persistent external imbalances, financed by heavy foreign borrowing. Korea's current account was in deficit every year from 1978 to 1985, including an average deficit of 7.3 per cent of GDP during 1979-81 (see Table 4). In 1983, Korea had the fourth largest external debt – behind Brazil, Mexico and Argentina. The debt-to-GDP ratio peaked at 52.6 per cent of GDP in 1985, while the ratio of debt service to exports rose to 21 per cent.[2] However, during 1986-88, the country ran current account surpluses, averaging 6.7 per cent of GDP. It had pre-paid much of the previously accumulated external debts, and by most accounts, had become a net creditor in the world financial market. Although the external balance has since turned negative, the sustainability of current account deficits is certainly not a major worry of Korean policy makers, or of the international community.

This transition raises a series of interesting questions. In particular, how was Korea able to reverse its external deficits, while maintaining rapid economic growth? What role did macroeconomic policy play? Before turning to these questions, it is useful to provide a little background on Korea's earlier transition from the early 1960s to the late 1970s.[3] In the early 1960s, Korea was a small, developing economy, devastated by war and heavily dependent on foreign aid. In 1963, the country embarked on an export-oriented strategy and managed to record real rates of GDP growth averaging 10 per cent during 1963-78. Investment in export industries was a top priority in the government's plan. This was promoted through active government policies, often targeting specific firms

Table 4: South Korea – Economic Indicators

	1978	1979	1980	1981	1982	1983	1984	1985
Real GDP growth	9.7	7.4	-2.0	6.7	7.3	11.8	9.4	6.9
CPI inflation	14.2	18.2	28.5	21.3	7.3	3.6	2.2	2.5
Current account/GDP	-4.8	-8.5	-11.2	-9.5	-7.0	-3.9	-3.6	-2.2
Saving/GDP								
Total [(a)]	27.5	26.6	20.5	19.8	20.9	25.3	26.9	27.3
Government [(b)]	5.8	6.0	5.6	5.7	5.9	6.9	6.6	6.0
Private [(c)]	21.7	20.6	14.8	14.0	15.0	18.4	20.3	21.3
Investment/GDP [(d)]	33.1	36.0	31.7	29.5	28.6	28.8	29.8	29.3
Budget balance/GNP	-1.7	-1.6	-2.6	-4.0	-3.3	-0.9	-1.1	-1.4
Domestic credit growth	45.9	35.6	41.9	31.2	25.0	15.7	13.2	18.0
Real exchange rate [(e)]	108.9	118.1	115.4	119.5	120.8	115.2	113.8	105.0
Debt/GNP	33.7	37.3	48.9	49.8	53.9	50.8	48.4	52.6

Notes: (a) Total domestic saving is calculated as GDP less private and government consumption.
(b) Government saving is calculated as current revenues less current expenditures.
(c) Private saving is a residual.
(d) Investment includes gross fixed capital formation plus change in stocks.
(e) Real broad effective exchange rate from Morgan Guaranty Trust Co. with 1990=100.

Sources: IMF, *International Financial Statistics*; *Korean Statistical Yearbook*, various issues; Morgan Guaranty Trust Co.; IRBD, *World Debt Tables*, various issues.

2. Debt service to export ratios rose above 21 per cent during 1986-88, reflecting the voluntary pre-payment of external debt.
3. For further discussion of Korea's experience, see Collins and Park (1989) and Haggard *et al.* (1994).

and projects. Investment rose from less than 15 per cent of GNP, to over 25 per cent of GDP in the mid 1970s.

However, initial saving rates were also very low (less than 10 per cent of GDP in the early 1960s). The plan called for increasing national saving, and financing investment through foreign saving in the meantime. Government guarantees significantly reduced borrowing risks for approved loans. Private saving did rise dramatically (so that the current account rose to near balance by 1977), but private saving has also been subject to large swings (Collins 1994). The government chose to 'borrow through' periods in which private saving declined (for example during the 1974-75 aftermath of the first oil price shock) rather than implementing policies to reduce investment. Although relatively tight overall (Korean government saving has been consistently positive), fiscal policy was counter-cyclical, at least until the late 1970s. Monetary policy was simply accommodating during this period.

Overall, the strategy proved to be quite successful in promoting rapid growth and industrial transformation. However, by 1978, economic indicators were beginning to look less favourable; productivity growth was slowing, and inflation rates were rising. In large part, these developments were attributed to increasingly interventionist credit and other policies (associated with the 1973 'Big Push' to develop heavy and chemical industries) as well as to the overvalued (fixed) exchange rate.

In fact, 1980 was a year of crisis for Korea, with real output declining by 3 per cent. Saving plummeted. The country borrowed heavily to finance investment, much of it short-term. The crisis was generated by a combination of internal and external factors. Internal factors included the assassination of President Park, extremely poor agricultural harvests and the growing domestic distortions associated with the Big Push as discussed above. External factors included the oil price rise, and subsequent increases in world interest rates. However, the rapidity of Korea's economic recovery and improvement in external balances is striking. Economic policy certainly played a role. But in order to draw realistic lessons, the special circumstances must be recognised as well.

During the 1980s, Korea undertook an impressive array of economic reforms, including fiscal consolidation and trade and financial market liberalisation. Direct government intervention was markedly reduced. The 1980s is also a period in which Korea succeeded in reducing inflation, reversing persistent external deficits and recording strong real growth. However, before attempting to draw lessons about how to 'do it all', it is important to point out that Korea did not do everything at once.

The years from 1980-88 can be divided into three periods. From 1980-1982, Korea was weathering the economic crisis. In fact, monetary and fiscal policies were quite expansionary during this period, and there was little economic liberalisation (Table 4). Thus the improvements in the current account imbalance and inflation during these years must be attributed to factors other than macroeconomic policy. These include improvements in Korea's terms of trade, the decline in domestic real wages and improved agricultural harvests. It was not until 1983-85 that authorities resumed macroeconomic stabilisation efforts and re-initiated structural reforms. Arguably, such adjustments are less painful when initiated during a period of economic growth. A third stage comes after 1986, as lower oil prices and interest rates helped to improve the current account. The country also made the transition to democratic rule.

Thus, Korea maintained relatively high rates of fixed capital formation, even during the crisis years and the early adjustment period (Table 4). This is true despite the sharp drop in national saving from 21 per cent to 15 per cent of GDP. Borrowing abroad remained part of the strategy for maintaining investment and growth.

Korea did go through a period in which some expressed concern about the large volume of foreign borrowing (Cooper 1994).[4] In 1984, Yung Chul Park claimed that the strategy of borrowing through the 1980/81 crisis had not been a 'viable option' due to the 'questionable availability of external finance'. Further, he argued that 'it is rather obvious that any further deterioration in the current account could seriously undermine Korea's credit standing in international financial markets' (Park 1984, p. 307). After the Mexican debt crisis in August 1982, which put foreign debt on the front pages of newspapers around the world, it not surprising that debt became a hot topic in Korea as well. It emerged as a major issue for the opposition party in the February 1985 parliamentary elections.

However, there is little evidence that Korea ever actually experienced difficulty in borrowing during 1979-85. One indicator is the premium over LIBOR that the Korean Development Bank paid for syndicated bank loans. After rising to 1.875 per cent following the first oil price shock, it remained below 1.0 per cent during 1978-85, falling to a low of 0.5 per cent in 1982, prior to the surfacing of the Mexican debt crisis. (It is true that by 1984, Korean officials had to travel to financial centres, whereas previously, international bankers had gone to Korea. This change may reflect the overall change in the climate of international borrowing after 1982). Talk of a borrowing constraint, voiced by some in the Korean Ministry of Finance, may simply reflect the Korean prudence which also caused policy makers to describe periods in which real growth slowed to 'only' 5 per cent of GDP as major economic crises.

2.4 Indonesia

Indonesia provides a second interesting example. Large and persistent external deficits emerged as a result of unfavourable terms of trade shocks in the 1980s. The country has implemented a major restructuring effort, reviving growth and reducing these imbalances.[5] In 1965, Indonesia was one of the world's poorest countries. Furthermore, it was recovering from a severe economic crisis in which inflation had reached 1,000 per cent and service due on external debts exceeded foreign exchange earnings. Following a coup in 1965, the Soeharto government undertook major stabilisation and liberalisation measures. Especially noteworthy is the 1967 passage of a 'balanced budget' law prohibiting the domestic financing of budget imbalances through debt or money creation. More generally, a clear legacy of this crisis has been a commitment to

4. McFadden *et al.* (1984) estimate that Korea's probability of debt repayment difficulties rose to 50 per cent in 1981. This is above their estimated 1981 probability for Brazil, but below corresponding probabilities for Argentina, Chile, Mexico, Peru, the Philippines and Venezuela. By 1984, the Korean probability of repayment difficulties had fallen to 37 per cent, below the corresponding probability for all of the countries listed above except Venezuela. It should be noted that these authors define repayment difficulties as a rescheduling or restructuring of debt, arrears on principal or interest (above a small percentage of outstanding debt) or support under a higher-tranche IMF facility.

5. See Woo (1994) and Bhattacharya and Pangestu (1993) for further discussion and references.

prudent macroeconomic policy. The economy also received substantial foreign aid inflows, and a favourable rescheduling of existing debts. Since 1965, the country has registered an impressive performance overall, with GDP growth of 6.5 per cent during 1965-91.

Indonesia is rich in natural resources, including oil, and much of the subsequent story revolves around these sectors. The rise in oil (and other commodity) prices in the 1970s fuelled development efforts and rapid economic growth. Unlike many other oil exporters, however, Indonesia managed the resource inflow quite well, channelling resources into needed human and physical investments and maintaining relatively conservative monetary and fiscal policies. By 1979/80, the current account had moved into surplus and the debt burden was modest.[6] However, trade, industrial and credit market policies became increasingly interventionist during this period. The real exchange rate was allowed to appreciate, reflecting in part the rise in oil prices, but creating a substantial bias against non-oil exports. World Bank estimates point to a slowdown in total-factor productivity from 2.1 per cent per annum during 1967-73 to 0.9 per cent during 1973-81 (Bhattacharya and Pangestu 1993).

Indonesia was hit by major external shocks during the 1980s. Oil and other commodity prices dropped in 1982, and then more sharply in 1986. Further, the depreciation of the $US after 1985 increased the country's debt burden. Indonesia's current account deteriorated to a deficit of 7.5 per cent of GDP in 1982. It has been in deficit each year since then, averaging 3.5 per cent of GDP during 1982-92 (Table 5).

In response, Indonesia has implemented a comprehensive adjustment package. The first phase (1982-85) included a large devaluation and a reduction in public expenditure together with tax and financial sector reforms. However, trade and industrial policies became even more inward oriented. The macroeconomic measures helped to reduce the current account deficit and inflation, but real investment and output growth slowed as well. As oil prices dropped further after 1986, Indonesia saw its debt service rise from 25 per cent of exports in 1985 to 40 per cent in 1986. The government undertook a new set of stabilisation measures (including devaluation and a reduction in public investment), this time combined with a major program of trade and industrial policy liberalisation. Economic performance has been surprisingly strong, in light of the magnitude of the external shocks. In particular, non-oil exports have grown by 20 per cent per year during 1987-89. After 15 years of export disincentives, why did the non-oil sector respond so rapidly to the post 1986 liberalisation? Part of the explanation must lie in Indonesia's history of relatively stable macroeconomic policy (discussed above), the aggressive exchange rate policies undertaken after 1982 and the persistently high investment.

Since 1982, Indonesian authorities have sought to maintain the exchange rate at relatively competitive levels. It is interesting that, in addition to the desire to promote non-oil exports, one of the arguments given for their aggressive exchange rate management has focused on their open capital account. (Indonesia has had full capital account liberalisation since 1967. This policy stems, in part, from the difficulty of controlling international capital movements in an economy composed of more than 13,000 islands.)

6. Following excessive borrowing by the State oil company (Pertamina) during the mid 1970s, strict controls were imposed on borrowing by public enterprises.

Table 5: Indonesia – Economic Indicators

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
GDP growth	7.4	-0.3	8.9	6.7	2.6	5.8	4.9	5.8	7.4	7.0	6.7
CPI inflation	12.2	9.5	11.8	10.5	4.7	5.9	9.2	8.0	6.4	7.5	9.2
Current acount/ GDP	-0.9	-5.8	-7.5	-2.2	-2.2	-5.1	-3.0	-1.8	-1.4	-3.1	-3.6
Saving/GDP(a)	30.4	23.1	24.9	25.1	25.8	23.3	28.2	29.2	32.9	31.9	30.8
Investment/GDP(b)	29.6	27.5	28.7	26.2	28.0	28.3	31.4	31.5	35.2	36.1	35.0
Real exchange rate(c)	—	111.7	96.2	96.0	94.7	53.6	56.1	54.0	55.7	54.8	54.8
Non-oil export growth(d)	—	-0.5	—	10.4	10.4	4.1	25.3	14.2	21.5	6.7	12.2
Budget balance/GDP	-2.0	-1.9	-2.4	1.4	-1.0	-3.5	-0.8	-3.1	-2.0	0.4	0.4
Money growth	29.1	10.0	6.5	13.2	18.0	14.9	9.2	13.3	42.9	15.9	12.0
Debt/GNP	25.4	29.4	36.7	38.1	41.0	52.2	69.0	64.3	59.7	66.1	66.4
Debt service ratio(d)	—	16.8	—	24.6	24.6	39.7	34.8	34.4	31.6	27.3	31.2

Notes: (a) Gross national savings/gross domestic product.

(b) Gross domestic investment/ gross domestic product.

(c) Real broad effective exchange rate from Morgan Guaranty Trust Co., 1980-82 average = 100.

(d) Data from Bhattacharya and Pangestu (1993). 1984 and 1985 are an average of the two years. Debt service ratio excludes prepayments.

Sources: World Bank, *World Tables*, 1994; IMF, *International Financial Statistics*; IRBD, *World Debt Tables*, various issues; Morgan Guaranty Trust Co.; Bhattacharya and Pangestu (1993).

The view is that a somewhat undervalued exchange rate will lessen the risk of a disruptive speculative capital outflow (Woo 1994).

In Indonesia, as in other high-growth Asian economies, the behaviour of national saving and investment is striking.[7] In 1965, both investment and saving were less than 10 per cent of GDP. Following the oil boom of the 1970s, gross domestic investment rose to an average of 27 per cent of GDP during 1979-81. National saving increased even more sharply, to 31 per cent of GDP during the same period. This impressive rise in saving, particularly private saving, is one of the key features that distinguishes high growth Asian economies from most other (developed and developing) economies. I return to this issue below.

Although investment rates did decline during Indonesia's adjustment years, it is important to note that they remained at relatively high levels throughout. Gross domestic investment did not fall below 26 per cent of GDP after 1982, and averaged 28 per cent of GDP during 1982-87. Arguably, the fact that Indonesia did not undergo a major depletion of its capital stock helps to explain the quick revival of growth rates following the external shocks and adjustment measures.

While the current account deficit improved to 1.6 per cent of GDP during 1988-89, it has risen above 3 per cent of GDP since 1990 as private investment has surged. This investment boom appears to have been triggered by relaxation of monetary policy during late 1989-early 1990. Indonesian authorities have since 'put the breaks' on monetary policy, helping to reign in private investment.

3. Post-War Japan: Monetary Policy and External Imbalances

Since the late 1960s, Japan has consistently registered (often large) current account surpluses. Even during the early post-war adjustment years 1953-1964, the average current account was a deficit of just 0.2 per cent of GNP. The deficit exceeded 1 per cent of GNP in only three years (1954, 1957 and 1961). Nonetheless, post-war Japan was an economy in which policy makers were extremely focused on the external balance. Elimination of deficits, when they emerged, was perhaps the primary objective of short-run macroeconomic policy, particularly monetary policy. This section describes the linkage between external balance and monetary policy, and overall economic performance from the mid 1950s to the mid 1960s, the period in which this link appears to be the most pronounced. The discussion draws from the excellent study of post-war Japanese macroeconomic policy in Ackley and Ishi (1976) as well as from Kosai (1987). These sources provide more detailed analyses of the period.

As laid out in the first multi-year plan (in 1955) the goals of the post-war government were growth, investment and exports. Investment was seen as essential for sustained growth, while exports were critical to generate foreign exchange to pay for the capital goods and other import needs of a war-devastated economy with few natural resources and relatively little arable land. At the same time, few resources other than those generated by exports, were effectively available to pay for imports. Foreign exchange

7. For further discussion of saving behaviour in Asian economies, see Collins (1991) and Nelson (1993).

reserves were initially absent. The decision had been made to severely limit foreign direct investment. The government was also unwilling to borrow abroad. The fact that the plan had been named a ‘Plan for Economic Independence’ was no accident. (It is not clear how available foreign capital would have been, had Japanese policy been different.) Furthermore, exchange rate devaluations were precluded by the government commitment to keep the yen at the value established in 1949.

Policy initiatives were consistent with the overall objectives. Private saving (already quite high) was encouraged by tax and other policy measures. Tight fiscal policy generated positive government saving throughout. Overall, however, monetary policy was relatively expansionary, so as to keep interest rates low and help to encourage private investment.

In fact, Japanese aggregate demand was surprisingly and persistently strong during the period. Demand growth appears to have been led by private investment, and to some extent by exports.[8] Private saving did indeed rise, pulling gross domestic saving from 24 per cent of GNP during 1952-54, to 36 per cent of GNP during 1960-64. However, imports proved to be strongly pro-cyclical, increasing significantly faster than income and exports during economic booms. Thus, periods of rapid economic expansion tended to generate trade deficits.

In the early post-war years, the major means for financing external deficits had been precluded, as discussed above. A remaining option was to eliminate the deficit domestically, by reducing domestic investment relative to saving. This was achieved through tightening monetary policy which effectively reduced first inventory accumulation, and then fixed investment and output growth. Moderation of investment and other components of demand reigned in import growth, pushing the trade balance back into surplus.

As convincingly argued in Ackley and Ishi (1976), external imbalance appears to have been the primary motivation for short-term macroeconomic policy, at least until the late 1960s, and monetary policy was the short-term policy tool. Every recession was preceded by monetary restraint, and every expansion began with, or soon after, a relaxation of monetary policy. (Table 6 provides information about the timing of monetary policy and business cycles during 1954-64. It also shows the behaviour of exports and imports.) Net exports fell from positive to negative levels during each expansion. Following the monetary contraction, net exports improved significantly, apparently prompting a relaxation of policy and a resurgence of rapid economic activity. In contrast, indicators of whether the domestic economy was overheating prior to monetary contractions (a competing explanation) tell no consistent story.

This early Japanese period provides an interesting contrast with the role of policy in Korea during its high growth period (Collins 1988). As we have seen, in Korea, policy was geared to maintaining investment. External debt was accumulated as needed in the face of low or volatile national saving. Japanese policy appears to have been geared to managing private investment so as to ensure that it did not outstrip saving. But it is important to stress that private investment was very strong during this period. The recurrent external deficits can be attributed to surges in aggregate demand (especially

8. See Ackley and Ishi (1976) for an analysis of the likely reasons for the very strong private investment in plant, equipment and inventories.

Table 6: Business Cycles, Monetary Policy and External Imbalance in Japan (1954-1965)

Dates of expansion or contraction	Change in monetary policy	Annual growth rates[(a)]				Net exports of goods and services[(b)] (Yb)
		GNP (%)	Business fixed investment (%)	Exports (%)	Imports (%)	
Expansion of 1954:4-1957:2	Restraint – March 1957	10.3	19.2	13.4	35.6	-430
Contraction of 1957:2-1958:2	Ease – June 1958	4.4	-10.2	7.5	-26.4	475
Expansion of 1958:2-1961:4	Moderate restraint – September 1959	12.9	29.0	11.9	25.7	-646
	Ease – August 1960 Restraint – July 1961					
Contraction of 1961:4-1962:4	Ease – October 1962	2.4	-2.5	15.2	-7.2	474
Expansion of 1962:4-1964:4	Restraint – December 1963	12.9	13.6	19.0	17.9	106

Notes: (a) Percentage change at annual rates during the expansion and contraction periods.

(b) Change in net exports over the expansion and contraction periods.

Source: Ackley and Ishi (1976, pp. 182, 185 and 187).

investment), so that demand management was arguably the appropriate policy response, given the objective of 'independence'.

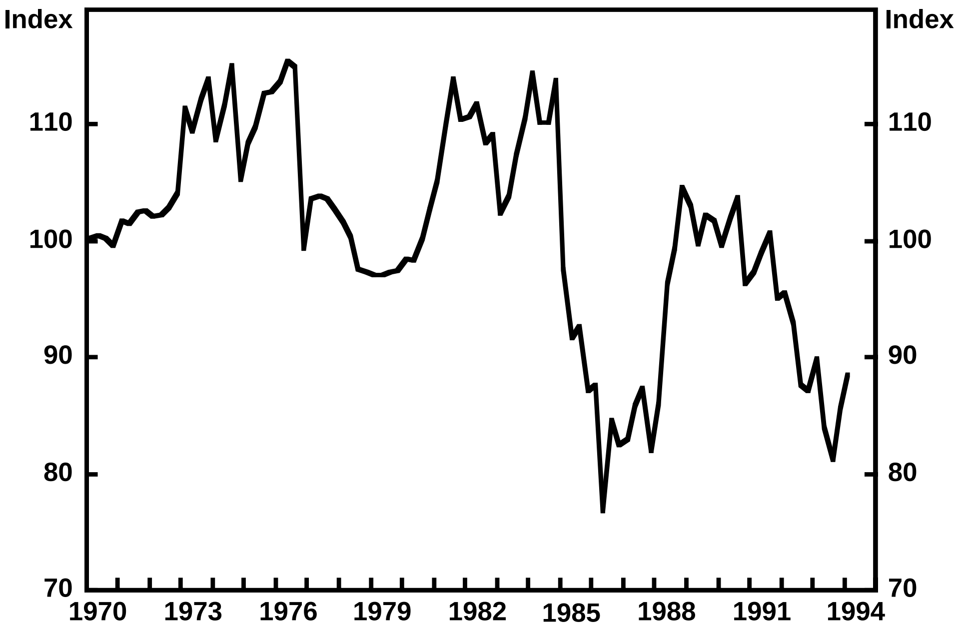
The Japanese experience illustrates that a country may have legitimate reasons for deciding to limit external imbalances, even ones that appear relatively small. However, such a policy is likely to be costly in terms of foregone growth. How costly depends in part on its ability to finance, through national saving, enough investment to sustain growth. Japan apparently did reduce real growth through its activist monetary policy. However, saving was high enough to support high levels of investment, and growth rates were very rapid despite the periodic restraint. Arguably, the cost was low.

However, monetary policy in post-war Japan is likely to have had a much simpler relationship with the external imbalance than is true for Australia in the 1990s. As discussed, Japan had a fixed exchange rate and basically a closed capital market. In this setting, a monetary contraction that raises domestic interest rates should stifle demand and improve the external balance. In contrast, rising interest rates in Australia relative to interest rates abroad will cause a net capital inflow, and a tendency for the exchange rate to appreciate. The effect of monetary policy on external imbalance is ambiguous. A tight monetary policy may well cause a deterioration of the current account, if the capital flow channel is relatively strong. As Australia's linkage with the rest of the world expands (in terms of capital and goods markets) the current account implications of monetary policy adjustment may evolve. This is an interesting and important issue for future study.

4. Australian External Imbalances

With the experiences in Asian economies as a backdrop, I turn now to developments in Australia. Some economic indicators are given in Table 7. As mentioned above, Australia has a long history of external deficits. However, after averaging 3 per cent of GDP in the 1960s and 1.8 per cent in the 1970s, the deficit has risen to average 4.6 per cent of GDP during 1981-92 (Figure 1). The deficit has been described as 'persistent' because it did not come down in the mid 1980s despite a significant real exchange rate depreciation (Figure 2), or in the late 1980s despite a significant fiscal consolidation that raised public saving. Furthermore, financing shifted towards debt, substantially increasing debt service obligations. During the recession of 1990/91, the deficit declined somewhat. But it is likely to increase again, if private investment picks up as anticipated. So far, however, investment has remained surprisingly low during the current recovery, low enough to suggest some depletion of the Australian capital stock. This section looks more closely at aspects of these developments, drawing contrasts with the other countries discussed above.[9]

Figure 2: Australia – Real Broad Effective Exchange Rate
(quarterly data)



Note: Trade weighted index, 1990=100.

Source: Morgan Guaranty Trust Co.

9. Tease (1990) provides an excellent study of the Australian balance of payments during the 1980s.

Table 7: Australia – Economic Indicators

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Real GDP growth	2.5	3.4	-0.1	0.7	7.5	4.8	1.9	4.4	4.4	4.6	1.4	-0.8	2.0
CPI inflation	10.1	9.7	11.1	10.1	4.0	6.7	9.1	8.5	7.2	7.6	7.3	3.2	1.0
Current account/GDP	-2.8	-4.8	-4.8	-3.7	-4.7	-5.4	-5.6	-3.8	-4.1	-6.2	-5.1	-3.4	-3.7
Saving/GDP	21.4	20.3	17.2	19.4	19.2	18.6	19.1	20.7	22.6	21.0	18.4	16.1	16.0
Investment/GDP	25.4	27.2	22.5	23.4	24.1	25.2	23.8	23.8	26.3	25.4	21.2	19.0	19.5
Budget balance/GDP	-0.6	0.4	0.5	-2.8	-1.4	-0.8	-0.6	2.2	3.1	3.3	2.5	-1.4	-3.1
Money growth	14.6	9.7	1.7	6.6	10.8	10.8	4.7	17.1	24.0	19.8	3.5	8.5	18.1
Real exchange rate	99.3	109.3	110.1	106.7	112.0	94.5	83.2	83.9	94.5	102.1	100.0	98.6	91.0

Sources: IMF, *International Financial Statistics*, *Yearbook*, 1993; OECD, *National Accounts*, Vol. 2; OECD, *Economic Outlook*, December, 1993; Morgan Guaranty Trust Co.

Table 8: Australia – Financing of Current Account
(figures as shares of total)

	Direct investment	Portfolio investment	Other capital[a]	Reserves	Net errors and omissions	Memo: Current account/ GDP
Period averages						
1973-77	32.6	24.4	19.1	29.2	-5.3	-2.0
1978-82	30.1	17.6	50.9	-9.2	10.5	-3.6
1983-87	3.4	24.6	70.0	-4.4	6.3	-4.6
1988-92	33.7	22.0	59.6	-3.6	-11.8	-4.5

Note: (a) Other capital includes resident official sector plus deposit money banks plus other sectors.
Source: IMF, *International Financial Statistics*.

4.1 Overview of Developments

4.1.1 Debt, deficits and financing

Table 8 shows how the current account deficits have been financed. For each 5-year time period since 1973, it shows the share of financing accounted for by a variety of sources. In particular, the table shows that foreign direct investment (FDI) has accounted for roughly a third of total financing, with the notable exception of the mid 1980s, when FDI accounted for just 3 per cent of total financing. Between 1973-77 and 1978-82, the average current account deficit rose from 2 per cent to 3.6 per cent of GDP. There was a shift in financing from reserve outflows to other capital flows. The deficit rose by an additional 1 per cent of GDP during 1983-87. During this period, the sharp decline in FDI was offset by an increase in other capital flows to over 3 per cent of GDP. As FDI has recovered since 1988, the role of foreign borrowing has receded.

We have already seen the rapid increase in Australia's outstanding foreign debt during the 1980s. The net debt soared from 6 per cent of GDP in 1981 to 31 per cent in 1986. It has since risen above 42 per cent of GDP. Although interest payments on (net) debt rose to a high of 21 per cent of exports in 1989, this ratio had fallen to 12.4 per cent by 1992, reflecting the decline in world interest rates as well as strong growth in Australian exports.

4.1.2 Longer-term factors

Recent current account developments reflect longer-term or structural changes in the Australian economy as well as cyclical factors. It is useful to provide a summary of key elements on the structural side. I highlight three: productivity enhancing measures; fiscal consolidation; and a renewed commitment to price stability.

Australia has seen a long-term decline in its relative standard of living, which is reflected in slower growth in productivity. Table 9 shows average growth in two productivity measures for Australia and comparator countries since 1961. One measure

Table 9: Trend Productivity Growth[(a)]

	Labour productivity[(b)]					TFP[(c)]				
	1961-73 [(d)]	1974-79	1980-86	1987-92	1980-92	1961-73 [(d)]	1974-79	1980-86	1987-92	1980-92
Australia	3.0	2.1	1.6	0.9	1.3	2.5	1.2	1.0	0.7	0.8
United States	1.9	0.3	0.6	0.8	0.7	1.3	-0.2	0.2	0.5	0.3
Japan	8.2	3.7	2.8	2.9	2.9	5.5	2.0	1.8	1.9	1.9
EC[(e)]	4.9	3.0	2.2	2.0	2.1	3.2	1.7	1.4	1.5	1.4
Total OECD[(f)]	4.0	1.9	1.6	1.6	1.6	2.6	0.9	0.9	1.1	1.0

Notes: (a) Business Sector. Trend productivity has been calculated by running actual productivity data through a Hodrick-Prescott filter.

(b) Output per employed person.

(c) TFP growth is equal to a weighted average of the growth in labour and capital productivity. The sample-period averages for capital and labour shares are used as weights.

(d) Or earliest available year; 1963 for Japan.

(e) Excluding Eastern Germany and Portugal in all periods. Excluding Belgium, Luxembourg and the Netherlands before 1971, Spain before 1965, France before 1964 and the United Kingdom, Greece and Ireland in 1961. Aggregates were calculated using country-weights based on 1990 GDP for the business sector expressed in 1990 purchasing power parities.

(f) Excluding Iceland and Turkey in all periods. Also excluding Canada and Norway before 1967, Sweden before 1964, Japan and New Zealand before 1963 and Finland in 1961.

Source: OECD, *Economic Surveys, Australia 1994*, p. 56.

is labour productivity (output per employed person). The second is a measure of total-factor productivity (TFP) constructed by the OECD. (Note that labour productivity is equal to the sum of total-factor productivity and the contribution to growth of capital deepening. See OECD (1994).) Australian labour-productivity growth was just 3 per cent per annum during 1961-73, compared with the OECD average of 4 per cent. Little of this initial gap appears to come from lower TFP growth in Australia. Instead, it reflects a significantly smaller contribution from capital accumulation (0.6 per cent per year in Australia versus 1.3 per cent in the OECD). After the first oil shock, there was a general decline in labor-productivity growth.[10] During 1973-79, the decline was less severe in Australia than other OECD countries on average. But unlike other industrial countries, Australian labour-productivity growth has continued to decline, dropping in 1987-92 to less than 60 per cent of the (slow) 1.6 per cent productivity growth for the OECD overall. For the OECD, most of the post-1973 decline reflects a slowdown in TFP growth. For Australia, it is all explained by slower TFP growth until 1987-92 when there is a sharp drop in the contribution from capital to just 0.2 per cent per year.

Appropriately, Australia has undertaken a series of initiatives to address the long-term productivity problem. Since the diagnosis has focused on the deleterious implications of a legacy of protection, inadequate intra-national competition and labor market institutions which restricted wage flexibility, initiatives have addressed these three areas over the past decade.[11] First, high tariff and other border barriers have been reduced. The average effective rate of protection in manufacturing has fallen from 25 per cent in 1980 to 15 per cent in 1990 (bringing it in line with average rates in most other OECD countries) and is slated to be reduced to 5 per cent by the year 2000. There has also been extensive liberalisation of foreign investment. A second area of reform has focused on increasing competition among Australian states, for example through moving towards unification of regulations and product standards, and extending the coverage of domestic competition policies.

Third, Australia has embarked on a program of labour-market reform. In particular, since 1987, the country has begun to shift from a system of centralised to enterprise-level wage bargaining. (However, this shift is proceeding slowly, especially among small and medium enterprises. Only about one out of eight wage and salary earners were covered by enterprise-level bargains as of the end of 1993.) The reform also seeks to simplify the system of ‘wage awards’ by identifying job categories by skill level instead of specific job descriptions. While these and other reforms promise to increase competition and labour market flexibility, it may take some time for them to bear fruit. Further there is some disagreement about how much additional flexibility has actually been achieved.[12] In this sense, it may be overly optimistic to expect the very rapid response of productivity growth to reform observed in Korea and some other Asian countries.

Two other longer-term developments in Australia involve macroeconomic policy. The monetary authorities have demonstrated a sustained commitment to price stability,

10. As noted in OECD (1994), TFP growth among OECD countries of roughly 1 per cent per year is in line with long term historical trends.

11. See OECD (1994) from which this discussion is drawn, for additional details.

12. See the critical assessment by Sloan (1994).

even during the recent business cycle. As a result, inflationary expectations appear to have declined significantly. In addition, the government has made a renewed commitment to fiscal consolidation. After increasing sharply from the 1970s to 1983, the fiscal deficit was reduced during the remainder of the decade, pulling up national saving as further discussed below. Expansionary fiscal policy, primarily at the Commonwealth government level, led to a deterioration in the budget during 1990-92. However, a four-year plan has been announced to reduce the Commonwealth government deficit from 3.8 per cent of GDP in 1993-94 to just 1.2 per cent in 1996-97. Future tax increases, critical to achieving this improvement, have already been legislated. (Here again, there appears to be some disagreement about whether the deficit reduction has gone far enough.) Of course, the relationship between fiscal deficits and external deficits is not one-to-one. As noted by Tease (1990), various studies for Australia conclude that the elasticity of the current account to changes in the fiscal deficit is between one-half and one, and that much of the response occurs over a period of between two and five years. Thus, in response to the planned fiscal retrenchment, one might expect an improvement in the current account deficit in the range of 2 per cent of GDP by the end of the decade. These aspects of macroeconomic policy, as well as the structural changes now underway, should be taken into consideration in evaluating the recent external imbalances.

4.1.3 Saving and investment decomposition

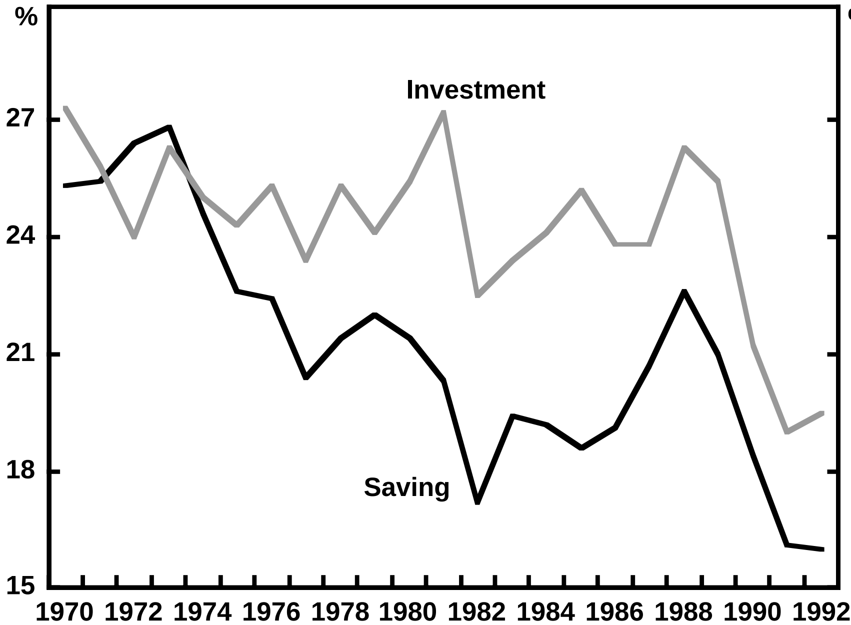
Figure 3 illustrates the behaviour of saving and investment (as per cent of GDP) since 1970. Gross domestic investment fluctuated around 25 per cent of GDP until the 1990s when it plummeted to just 19 per cent of GDP. Gross domestic saving fell from roughly 25 per cent of GDP in the mid 1970s to a low of 19 per cent in 1982, hence the saving-investment gap that is the domestic counterpart of the increased current account deficits. Saving recovered during 1983-88, before plummeting to just 16 per cent of GDP in 1991-92. Thus, although the external deficit has narrowed during the 1990s, it reflects extremely low levels of both saving and investment.

It is interesting to look at the sectoral decomposition of saving and investment. Table 10 shows that there has been a trend decline in public sector investment from 3.8 per cent of GDP in 1976 to 2.1 per cent by 1990. This fall was offset by gradually rising private investment. However, the sharp drop in investment since 1989 is all due to a drop in private investment. The table also shows that the (5 per cent of GDP) decline in government saving accounts for most of the roughly 7 per cent of GDP decline in aggregate saving during 1973-83. As discussed above, public saving was increased during 1983-89, however, there was little improvement on the private sector side. Since 1990, first private saving, then public saving have fallen off. The government's fiscal consolidation plan implies a significant increase in public saving over the next few years.

It is largely on the basis of such a saving-investment decomposition of Australia's external balance that Tease (1990) concludes that:

> 'A case can be made that the deficits experienced between the mid-1970s and the mid-1980s were generally bad … the increase in foreign borrowing during this period did not finance a large increase in the capital stock: rather it financed increased public consumption. On the other hand, it can be argued that the most recent deficits can be classified as good. The public sector accounts have moved into surplus and ... the deficits have financed a substantial rise in private investment expenditure' (pp. 55-56).

Figure 3: Australia – Gross Saving and Investment
(percentage of GDP)



Sources: OECD, *National Accounts*, Vol. 2 and Computer Tape Version; World Bank, *World Tables,* 1994.

4.2 External Deficits: Reasons for Concern?

One set of concerns about large current account deficits relates to their linkage to real exchange rates. There are a number of interrelated issues. I tackle three in the remainder of this section. First, do persistent external deficits cause a country's real exchange rate to depreciate?[13] Second, if such a channel is in operation, should we be concerned? Third, is a country with large external deficits vulnerable to capital account shocks, and if so, what are the policy implications?

4.2.1 Cumulative deficits and real exchange rates

The effect of external deficits on the real exchange rate is ambiguous. On the one hand, the counterpart to external deficits is an increase in net foreign liabilities, often foreign debts. Servicing these obligations requires a surplus in the balance in trade and non-factor services, which may necessitate a real depreciation. From this perspective, one might expect growing (net) foreign liabilities to be associated with real depreciation. Of course, such a depreciation will tend to reduce the real living standards of domestic residents.

13. Of course the link between exchange rates and external imbalance could run in both directions. The discussion above focuses on the likely implications of outstanding net asset stocks on the level of the real exchange rate. The level of the real exchange rate is also likely to feed back to the external imbalance. There is a large literature that examines this relationship. (For example, see Tease (1990) for a discussion of this link in Australia.)

Table 10: Australia – Decomposition of Saving and Investment
(percentage of GDP)

	Gross domestic saving[a]			Gross domestic investment[b]			Overall imbalances		
	Total	General government	Private	Total	General government	Private	Saving – investment	Current account	Statistical discrepancy
1976/77	22.4	1.8	20.7	25.3	3.8	21.5	-2.9	-2.2	0.8
1977/78	20.4	0.9	19.5	23.4	3.7	19.7	-2.9	-2.6	0.4
1978/79	21.4	0.4	21.0	25.3	3.3	22.0	-3.8	-2.7	1.1
1979/80	22.0	1.6	20.3	24.1	3.0	21.2	-2.2	-1.0	1.2
1980/81	21.4	1.8	19.6	25.4	2.7	22.7	-4.0	-3.5	0.5
1981/82	20.3	2.3	17.9	27.2	2.6	24.6	-6.9	-5.4	1.5
1982/83	17.2	0.6	16.6	22.5	2.7	19.8	-5.3	-4.3	1.0
1983/84	19.4	-0.5	19.8	23.4	2.7	20.7	-4.1	-3.7	0.4
1984/85	19.2	0.3	18.9	24.1	2.9	21.2	-4.9	-4.9	-0.0
1985/86	18.6	0.7	17.9	25.2	3.0	22.2	-6.6	-6.1	0.5
1986/87	19.1	1.8	17.4	23.8	2.9	20.8	-4.6	-4.5	0.1
1987/88	20.7	3.1	17.6	23.8	2.5	21.4	-3.2	-3.5	-0.3
1988/89	22.6	4.2	18.4	26.3	2.2	24.1	-3.7	-5.3	-1.6
1989/90	21.0	3.9	17.1	25.4	2.3	23.2	-4.4	-6.0	-1.6
1990/91	18.4	2.3	16.1	21.2	2.3	19.0	-2.9	-4.1	-1.2
1991/92	16.1	-1.1	17.2	19.0	2.3	16.7	-2.9	-3.2	-0.3
1992/93[c]	16.0	—	—	19.5	—	—	-3.5	-3.9	-0.4

Notes: (a) Gross saving includes net saving plus consumption of fixed capital.
(b) Gross investment includes gross fixed capital formation plus change in stocks.
(c) The 1992/93 saving and investment figures are from the World Bank, *World Tables*, 1994. General government and private sector figures were unavailable. The 1992/93 current account figure is from the Reserve Bank of Australia. The 1992/93 statistical discrepancy is a residual.

Sources: OECD, *National Accounts*, Vol. 2 (1979-1991 & 1976-1988); Reserve Bank of Australia; and World Bank, *World Tables*, 1994.

On the other hand, external deficits reflecting high domestic investment should be expected to increase future output. South Korea provides one example in which investment concentrated in export industries paid off handsomely, with rapid export growth, enabling the country to meet initially heavy debt service obligations quite easily. In this scenario, one would not expect the foreign liabilities to have been associated with real depreciations, and may even imply real appreciations.

The remainder of this section empirically examines the real exchange rate-external liability linkage for Australia as well as for Korea. The analysis is based on a version of the familiar portfolio-balance framework, which provides a theoretical rationale for such a linkage.

I begin with the following definitions:

s	(the log of) the nominal exchange rate (defined as units of foreign currency per Australian dollar)
p, p^*	(the logs of) domestic and foreign price indices
π, π^*	domestic and foreign inflation rates
q	(the log of) the real effective exchange rate where: $q = s + p - p^*$
i, i^*	nominal interest rates on (T period) assets denominated in domestic and foreign currencies
r, r^*	corresponding domestic and foreign real interest rates where: $i = r + E(\pi)$, $i^* = r^* + E(\pi^*)$
$E(x)$	is the current expectation of x
B, B^*	supplies of assets denominated in the domestic and foreign currencies

Assume that domestic (Australian) and foreign bonds are imperfect substitutes, and that investors are not risk neutral. Then a relationship can be derived between the expected yield differential between domestic and foreign assets, and relative asset supplies:[14]

$$\gamma\left(\frac{B}{sB^*}\right) = i - i^* + \left[E(s) - s\right] \qquad (1)$$

As shown in equation (1), an increase in the relative supply of Australian bonds, B, should be associated with an increase in their expected relative yield. (Recall that the exchange rate is defined here so that a rise is an appreciation.)

Assume further that the expected change in the nominal exchange rate is a linear function of the difference between the current spot rate and s^e, the 'equilibrium' exchange rate, as shown in equation (2):

$$E(s) - s = \alpha\left(s^e - s\right) \qquad (2)$$

14. See Bosworth (1993) for a recent discussion of this literature, and additional references.

Combining equations (1) and (2), the nominal exchange rate can be expressed as a function of the equilibrium exchange rate, nominal interest differentials and relative asset supplies. This is shown in equation (3). Similarly, substituting in for real exchange rates and interest rates, equation (4) expresses the real exchange rate as a function of the real interest differential and relative asset supplies. I will focus on the relationship between real variables.

$$s = s^e + (1/\alpha)(i - i^*) + (\gamma/\alpha)\left(\frac{B}{sB^*}\right) \tag{3}$$

$$q = q^e + (1/\alpha)(r - r^*) + (\gamma/\alpha)\left(\frac{B}{sB^*}\right) \tag{4}$$

Suppose there is an increase in the net supply of domestic bonds that must be held by the rest of the world. To induce investors to hold a larger share of their portfolio in these bonds requires some combination of a real exchange rate depreciation (decline in q), an increase in the expected real return on Australian relative to foreign bonds, or an appreciation of the equilibrium real exchange rate, q^e.

One traditional way to proxy the relative asset supplies is by cumulating a country's current account. (The rationale is that the current account balance is equivalent to the change in a country's net foreign asset position.) The equilibrium real exchange rate is often modelled as a constant plus a linear time trend, to capture trend changes in productivity. But notice that current account imbalances (which reflect strong investment) could also be correlated with changes in domestic productivity and thus with movements in the underlying equilibrium exchange rate. Thus, cumulated external imbalances may affect the real exchange rate through two channels:

- a portfolio-balance channel which suggests a *positive* relationship (cumulated deficits result in real depreciations); and
- a productivity channel which suggests an offsetting relationship.

The next step is to explore this relationship empirically.[15] The real exchange rate (RER) chosen is (the log of) the Morgan Guaranty trade-weighted index of exchange rates, adjusted for differences in producer prices, excluding food and fuel.[16] The augmented Dickey-Fuller procedure was used to test the real exchange rate series for the presence of unit roots. The hypothesis of a unit root can be strongly rejected for the annual Australian RER, and weakly rejected for annual Korean data.[17] Interestingly, there is

15. Previous studies have used similar 'portfolio-balance' frameworks to study real exchange rate behaviour. In particular, Bosworth (1993) finds a significant positive relationship between cumulated current account surpluses and real exchange rates in 13 of 16 OECD countries, including Australia. Blundell-Wignall *et al.* (1993) have also found a positive relationship for Australia, using cointegration techniques on quarterly data.

16. Real exchange rate measures based on non-food, non-fuel producer prices appear to out-perform series based on broader price measures (CPI, GDP deflator) in terms of explaining trade flows (Bosworth 1993). The Morgan Guaranty real exchange rate index weights the value of the domestic currency against 18 industrial country currencies and 22 emerging-market currencies.

17. The Dickey-Fuller test statistic (p-value) are -3.96 (0.028) for Australia and -3.20 (0.10) for Korea. For both countries, the annual real exchange rate exhibits a statistically significant deterministic time trend.

evidence of unit roots in higher frequency series (quarterly and monthly). I focus on the annual data here because I am most interested in capturing longer-term, not cyclical, relationships between series.[18]

Other data used are as follows. The current account series were cumulated beginning in 1960. (Note that the 1960 asset position was treated as zero, which may induce a trend in the regression.) The cumulated series are then scaled by GDP.[19] Additional variables were found not to enter the regressions significantly. These were measures of the real interest rate differential,[20] an OECD index of productivity relative to the OECD average, and surprisingly in the case of Australia, the log of the terms of trade.

The results for both Australia and Korea are reported in Table 11. The first column shows that, in Australia, there is a significant positive relationship between the RER and cumulated current account surpluses during 1979-92, consistent with the portfolio-balance channel. The figures imply that a 10 per cent rise in Australia's net foreign liabilities, as a share of GDP, tends to result in an 11 per cent real depreciation. In stark contrast, there is no evidence of a similar relationship for Korea. In fact, the estimated coefficient on the cumulated current account is tiny. One interpretation is that for Korea, a negative productivity effect offsets any positive portfolio-balance effect.[21]

Table 11: Real Exchange Rates and External Imbalance
(dependent variable: log real exchange rate)

	Australia	Korea
Constant	476.46 (88.55)	492.28 (49.36)
Current account accumulation	1.1272 (3.85)	0.0125 (0.05)
Trend	1.3375 (2.24)	-1.7405 (-3.68)
Rho	0.6369 (3.95)	0.4641 (2.34)
$\bar{R}^2$	0.6708	0.6956
Sample	1970-92	1970-92

Note: AR(1) regression results. See text for explanation of variables. All coefficients (except rho) are rescaled by 100. t-statistics are in parentheses. These regressions use a maximum likelihood iterative technique to correct for first order serial correlation. Reported statistics are based on the original data.

18. It would be interesting to study the higher frequency data for temporary versus permanent relationships between real exchange rates and cumulated current account imbalances.

19. Both series were obtained from the IMF, *International Financial Statistics*.

20. Many other studies have also been unable to find a clear relationship between various measures of real interest rates and real exchange rates.

21. The estimated trend real depreciation for the Korean won is surprising. This could reflect government intervention during some of the sample period that helped to keep the won competitive.

4.2.2 Real exchange rates and adjustment

If, indeed, real depreciation is associated with growing foreign liabilities, a second issue is whether that real depreciation is 'a good thing'? Should we care? One response is that we should be reassured, because the real depreciation is an integral part of the adjustment process to growing (net) external liabilities that are not reflected in growing domestic productivity. If the adjustment process is to work, relative price adjustments should play an important role.[22] This perspective is related to the concern about external deficits increasing a country's 'vulnerability' to capital market shocks, as discussed further below.

Another also appropriate response to whether we should care about such real depreciations is that the answer depends on whether the real depreciation reflects 'optimal' external imbalances – that is, optimal saving and investment decisions by domestic residents. If these decisions were not socially optimal, then we should certainly be concerned about domestic levels of saving and investment, and perhaps trend real exchange rate movements are one useful indicator to look at.[23] Notice that the appropriate policy response is one that targets particular distortions, and that is desirable regardless of the existence of an external imbalance or of a trend depreciation.

4.2.3 External imbalance and 'vulnerability'

A sudden decline in net capital inflows can cause a sudden drop in the (nominal) exchange rate and, hence, in at least the short run, a real depreciation. (The potential for such sudden exchange rate movements is certainly present, as recent developments in the US dollar market demonstrate.) Even if a relative price change is called for, a sharp, sudden change may cause a more difficult economic adjustment than a gradual change, particularly one that is anticipated. For example, if a sharp price change causes many now unprofitable enterprises to go under, but it takes time for new activities to come on stream, there may be more unemployment along the adjustment path than would occur with a gradual price adjustment. These issues would clearly benefit from additional analysis. My own view, however, is that such crises can be very costly, relative to alternative adjustment paths.

However, increasing internationalisation implies both large downside risks and large upside potential. The potential for a crisis associated with a sudden decline in net capital inflows is one of the key risks. An important potential benefit is the growth that may result from the ability to finance investments in excess of national saving. It seems to me that both sides of this coin should be discussed together. Recognition of the risks raises the stakes for taking advantage of the potential capital inflows prudently, with an emphasis on getting one's own economic house in order.

In this regard, I find the following recent developments striking. There appears to be a growing convergence of views about the components of a sensible policy program for

22. Krugman (1991) makes this point very nicely in the US context.

23. There are a variety of reasons why saving and investment outcomes may not be socially optimal. For example, these decisions may be influenced by distortionary policies or may not reflect cross-sectoral externalities.

economic adjustment and promoting growth. Williamson (1990) refers to a 'Washington consensus' that calls for macroeconomic prudence, outward orientation and domestic liberalisation. There is perhaps most consensus on the macroeconomic pieces of the program.[24] A related point is that there has been a widespread move towards outward oriented economic reform, particularly among developing economies,[25] and notably in Australia. The convergence of views about *what* are sensible policies to undertake has contributed to the recent attention to the political economy issues of *how* to implement and to sustain these policies.

5. Concluding Remarks

The objectives of this paper have been to review experiences with external deficits among Asian and Pacific economies, focusing on the high-performing economies, and to use these experiences to take another look at Australia's recent performance. I conclude by highlighting the key points that have emerged.

The review of country experiences highlighted the fact that external deficits can be part of a virtuous cycle of investment and growth, and are not a reason for concern *per se*. Both Korea and Indonesia have managed to achieve a significant improvement in external balances, together with major structural reforms during the 1980s. Lessons emerge in four areas. First, both countries maintained relatively high levels of investment, even during crisis periods, and the subsequent adjustment. Clearly, some of the strong investment is a result of activist government policy. But much of it, especially since the early 1980s, reflects on-going structural-reform efforts and a stable macroeconomic environment for economic activity.

Second, both countries borrowed heavily during their adjustment periods, enabling them to maintain relatively high levels of investment in the face of relatively low domestic saving. (Korea in particular had followed a similar strategy for financing investment during the 1960s and 1970s as national saving rates rose from initially low levels.) The ability to borrow appears to have smoothed the adjustment phase, helping to maintain real growth rates.

Third, authorities in the high-performing Asian economies have maintained relatively prudent macroeconomic policies. In particular, this has meant relatively low budget deficits, and significantly positive levels of public saving. It has also meant being willing to adjust policies quite early in response to a downturn in economic indicators. This has helped them to avoid recent balance of payments crises. At the same time, as discussed above, they have been willing to use capital inflows to provide 'breathing space' for undertaking domestic policy reforms. Monetary policy has at times been used to help reduce current account imbalances. But the examples of this occur during periods of clearly booming private investment (Japan in the 1950s and 1960s, Indonesia in the late 1980s). Overall, monetary policy has been used to help create a favourable environment for strong private investment.

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24. Note that there remains a debate about the efficacy of the types of intervention pursued in many high-performing Asian economies. This topic motivated a recent World Bank (1993) study, but many aspects of this study have received considerable criticism. See for example Fishlow *et al.* (1994).

25. See Haggard (1994).

Finally, the Asian country experiences highlight the role of national saving. While Japan began its high growth with initially high saving rates, Korea, Indonesia, Malaysia and other high performing Asian economies did not. A striking achievement of the initially low savers has been the dramatic increase in private saving rates since the 1960s. These saving rates appear to have lagged the rapid rise in real growth, and not to have 'come first'. The experiences suggest the initial rise in investment (financed largely by foreign saving) raised economic growth, which pulled up saving and triggered a virtuous cycle in which the dependence on foreign borrowing was reduced.

With this back-drop, the Australian experience with external imbalance was examined. Over the past two decades, Australia's external deficits do not appear to have been associated with market perceptions that the underlying equilibrium exchange rate was appreciating. Thus, unlike for Korea, these deficits have in fact been associated with a trend real exchange rate depreciation. But most of the period studied was characterised by high trade barriers, stifled intra-national competition and low flexibility in Australian labour markets.

During the 1980s, Australia has embarked on an ambitious program of structural reform that is still underway. In the mid 1980s, the country also undertook fiscal reform, boosting the level of public saving, but there was little immediate impact on the aggregate saving rate. Thus, the current account deteriorated in the late 1980s. Concern about this development contributed to a decision to tighten monetary policy, so as to reign in investment. There was some deterioration in the current account, although it should be noted that other developments, such as terms of trade changes, make it difficult to identify how sensitive the external balance was to monetary contraction. Australia went into recession during 1990/91, characterised by extremely low levels of both private investment and saving. During this period, the government budget deteriorated significantly, offsetting the earlier consolidation. The early part of the economic recovery (1992/93) saw uncharacteristically low investment levels, and persistently low saving.

In light of the Asian country experiences, suggestions of tightening monetary policy to reign in private investment once it begins to recover (and the current account deteriorates) are surprising. These experiences would point to the efficacy of a very different policy package, made up of four pieces:

- renewed efforts at fiscal consolidation to raise public saving (some progress has been made in this regard);
- continued efforts on structural reform;
- willingness to borrow to finance private investment during the adjustment phases, and to maintain strong levels of private investment; and
- a sustained effort to promote private saving. While existing research does not point to a magic pill for increasing private saving rates, it is often possible to identify factors (for example, through the tax system) that impose disincentives to private saving.

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Discussion

1. Frederic S. Mishkin

The issue that Susan Collins addresses in her paper is whether the buildup of net foreign indebtedness from current account deficits requires a policy response to eliminate these deficits. I am an outsider to this debate with my area of expertise focussing on issues of how monetary policy should be best conducted. In the past, I have committed in print to the proposition that the two main goals that a central bank should pursue are price stability and financial stability. One question raised by Susan's paper is whether a central bank should pursue a third goal in the conduct of monetary policy: the elimination of current account deficits. Susan's answer for Australia is no, although she does hedge her bets a little bit by indicating that in some situations, as in the case of Japan during the postwar adjustment years from 1953-1964, using monetary policy to manipulate the current account may not have been a bad policy. I, on the other hand, want to come down much stronger against the use of monetary policy to manipulate the current account: under no conditions should the monetary authority focus on the current account as a target of its policy.

Before I go on to discuss how policy makers should respond to current account deficits, I do want to discuss some methodological issues about the approach used by Susan in her paper.

The Case Study Approach

Susan's paper uses the case study approach to look at whether persistent current account deficits for other countries in Asia have created serious problems for their economies. The evidence in Susan's paper indicates that the answer is no. Her studies of Asian countries, particularly South Korea and Indonesia, show that current account deficits are often necessary to keep domestic investment high, even when there is a shortfall in domestic savings, and can therefore be an important part of a virtuous cycle which promotes investment and growth.

I found Susan's case study evidence to be extremely informative and useful, and I think that it convincingly demonstrates that current account deficits do not have to lead to problems. My only criticism of her analysis is that by focussing on Asia, she only has looked at countries that have been a success story. To fully assess what problems might arise from persistent current account deficits, we would also want to look at countries with high deficits who eventually ran into difficulties. Specifically, it would have been worthwhile for the paper to have contained some discussion of the Latin American experience. As we know, Latin American countries incurred large current account deficits in the 1970s, but were unable to repay their foreign debt in the 1980s, leading to severe dislocations for their economies. The Latin American episodes suggest that there is not always a happy ending when a country has a large buildup of its foreign indebtedness.

My impression is that the key element of the Latin American debt problem was that the foreign debt was incurred by the government and not the private sector. Thus the incentives to borrow only for productive investment opportunities were not strong and, at least on an *ex post* basis, over borrowing resulted. Since Australia's foreign debt has been primarily incurred by the private sector, it is not at all clear that Australia's situation is at all comparable to that in Latin America. Nonetheless, I would have liked the paper to contrast what happened in Latin America with what occurred in Asia, thereby helping us to see when persistent current account deficits might get a country into trouble.

Are Current Account Deficits a Problem for Australia?

Many economists, politicians and members of the media have a knee-jerk reaction that current account deficits which lead to substantial net foreign indebtedness must be bad. However, taking the view that foreign indebtedness is bad is like taking the view that any indebtedness is bad. Clearly borrowing can be a bad thing if there are the wrong incentives (bad tax policy, government guarantees, etc.) encouraging individuals and firms to borrow too much. Nonetheless, it must always be remembered that borrowing helps drive economic growth. The key role of financial markets in a successful economy is to promote borrowing: that is, financial markets move funds from those with a surplus to those with a deficit who have productive investment opportunities. If the borrowing channel were to be cut off, these productive investment opportunities would never see the light of day, thus making for an inefficient and slow growing economy.

This view of borrowing leads me to the following position. In order to make the case that current account deficits are a problem, you must demonstrate which incentives are wrong that either promote too much investment or too little saving. The standard criticism of current account deficits is that the net indebtedness they create will have to be paid back by lowering standards of living in the future. However, if foreign borrowing was used to make a productive investment, the result will be that output will grow so much that consumption in the future will rise even after the loans are paid back. Susan's discussion indicates that this seems to be the case for South Korea. However, current account deficits may be a problem for Australia. Susan finds that, in contrast to South Korea, net foreign indebtedness for Australia is associated with a future real depreciation of the Australian dollar. Because, in contrast to the Latin American countries who experienced a debt crisis, Australia's foreign debt has been incurred by private firms rather than the government, it is not obvious that there are distortions that have promoted overborrowing and over investment. Indeed, looking at the recent figures for Australian investment, it seems far more likely that there is a problem of under investment rather than over-investment.

However, there is reason to be concerned that Australia is undersaving. Australian savings rates are well below the other countries in Asia that Susan has looked at and there are reasons to believe that government policies have not given consumers the right incentives to save. For example, while the Australian government pension scheme may be highly justifiable on equity considerations, because it is given to old people only if they do not have enough income or assets, it discourages private saving. Also the reliance on income tax rather than a consumption tax to raise revenue also produces disincentives for private saving. There is also concern that Australian government budget deficits may remain high even after the economy strengthens, thus leading to government dissaving which also contributes to undersaving.

Implications for Policy

The key conclusion from Susan's paper and from the above discussion is that current account deficits do not automatically indicate that there is a problem that requires changes in government policy. Yet, this does not mean that current account deficits should be ignored because they might signal that incentives to save and investment may be incorrect, requiring a change in policy. The key point for policy making is that once a government's fiscal house is in order, the solution to a problem of an inappropriately high current account deficit is to create the right private incentives for savings and investment. This requires focussing on what distortions in private markets might be leading to non-optimal amounts of savings or investment, and then deciding how these distortions can be eliminated or, alternatively, offset by other microeconomic policies.

For example, evaluation of the incentives for dissaving arising from the Australian government pension system might indicate that superannuation contributions should be raised in order to get people to save the appropriate amount for retirement. By using superannuation to compensate for the distortion created by the government pension system, private saving would be closer to the optimal level and the current account deficit would shrink. Forced savings for retirement indeed has been part of the policy package in Singapore which raised savings rates and helped reduce current account deficits. An important point about this kind of policy response is that it does not focus on the current account deficit *per se*. Instead it identifies a distortion in the market and then tries to correct the distortion with microeconomic policies.

An inappropriate policy response to current account deficits is one which assumes that all such deficits are bad and thus require policies to either directly lower investment or raise savings to hit a target for the current account deficit. The use of monetary policy to hit current account deficit targets is exactly one such inappropriate policy response. Susan points out that using monetary policy to eliminate current account deficits wouldn't work very well for an open economy with flexible exchange rates like Australia. The usual story is that a tighter monetary policy reduces the current account deficit by raising saving and lowering investment. However, in an open economy with flexible exchange rates, the tighter monetary policy leads to an appreciation of the domestic currency which has offsetting effects on the current account. The result is that it is not clear whether a tightening of monetary policy will lower or raise the current account deficit.

I want to make the case against using monetary policy to deal with current account deficits even stronger. Under no conditions should monetary policy be used to eliminate current account deficits. The case against using monetary policy to reduce current account deficits applies equally well to closed economies with fixed exchange rates like Japan in the 1953-64 years as it does to an open economy with flexible exchange rates. Indeed, I feel that Susan gives too charitable a view of Japanese monetary policy in this period.

The idea that monetary policy can be used to deal with current account deficits is based on an old Keynesian fixed-price framework which is now thoroughly discredited. In this framework, tight money raises both nominal and real interest rates (because prices are fixed) which lead to a decrease in investment and an increase in savings that lowers the current account. However, in a world of flexible prices, although monetary policy can control real interest rates in the short run, it cannot control real interest rates in the long run.

The inability of monetary policy to control real interest rates in the long run is just an implication of long-run monetary neutrality in most standard flexible price macro models. Since monetary policy cannot control real interest rates in the long run, it cannot be used to correct a long-run structural problem of an imbalance between savings and investment.

The attempt to use a policy which only works in the short run but not in the long run only results in a stop-go policy like the one pursued by Japan in the 1953-64 period. It should be said that although Japanese monetary policy was based on inappropriate principles, it did not do too much damage to the economy. Luckily, Japan developed high savings during this period so that there was no large structural imbalance between savings and investment which required a permanent contraction of investment and the economy in order to satisfy the current account target.

Although I have criticised the use of monetary policy to reduce current account deficits, I want to be careful to point out that inappropriate monetary policy which produces inflation may create distortions in the economy which lead to large current account deficits. Thus, I am wholeheartedly in agreement with Susan's conclusion that prudent macroeconomic policies are an important element in keeping current account deficits from becoming a problem for a country. Keeping its fiscal house in order and not running large budget deficits is one element of prudent macroeconomic policies. The other elements are maintaining price stability and financial stability so that financial markets function properly, with the result that private investment and savings are optimal. Thus I am left holding to my earlier position that the monetary authorities should not focus on the current account but should stick to preserving price and financial stability.

2. General Discussion

The discussion centred on various aspects of Australia's current account experience, but also touched on some of the examples from Asian countries discussed in the paper.

For Australia the focus was on two related issues. The first was whether the size of the current account deficit, and the level of foreign debt, were problems. The second concerned the causes of the imbalance between savings and investment.

One participant argued that Australia's level of foreign liabilities, and its continuing current account deficits, represented a serious problem. If the international market becomes reluctant to continue financing investment in Australia, the low level of Australian savings was thought to condemn future generations to declining relative, and perhaps absolute, living standards. Even if Australia continues to attract foreign savings, the increased foreign debt will cause the real exchange rate to depreciate in order to generate the trade surpluses necessary to service the foreign liabilities.

This pessimism was not universal. One participant argued that Australia typically devotes a higher share of GDP to investment than many OECD countries. While Australia's relatively fast population growth accounts for part of its high investment, it does not account for it entirely. This investment is being used to create the productive capacity to service the debt without the need for real depreciation. In addition, the process of internationalisation is probably increasing the economy's growth rate, so that there is little reason to believe that the current foreign debt is going to saddle future generations with stagnant or declining living standards.

Most participants suggested that the current imbalance between domestic savings and investment was probably not optimal. Three reasons were cited. First, some saw government savings as too low. An increase in the structural budget deficit may have been warranted in the early 1990s, but there was a feeling that the government was not winding back the budget deficit quickly enough. However, it was also remarked that it might be difficult to maintain the quality of government spending, while reducing the deficit, so that there was a trade-off between quality and size. Nevertheless as investment levels rise, the failure of government savings to increase significantly may lead to a substantial increase in the current account deficit.

Second, when taking account of opportunity costs, the private savings rate can be too low. Even if this is not caused by policy-induced distortions, it is a policy problem. The existence of policy-induced distortions affecting private saving was seen as the third reason why the savings-investment imbalance may not be optimal. While one way to increase total savings was to remove the distortions, in some cases the distortions were important tools of social policy. Here, the pension system was seen as very important. By guaranteeing payments from the government after retirement, the pension system discouraged individuals from saving sufficiently. Given that removing the social safety net was undesirable, the discussion turned to other policies that could be used to prevent the pension system from unduly distorting the aggregate savings outcome. Here, compulsory superannuation was thought to be particularly important. Changes in taxation were generally seen to be less effective in generating additional saving, as most saving was done for retirement. Given the continued existence of the safety net, changing incentives through taxation was thought to be inferior to compulsion. However, not all participants were in favour of compulsion, as it restricted individuals' rights to make their own decisions. There was no disagreement with the proposition that monetary policy was an inappropriate tool to target the current account deficit.

In reference to the Japanese experience, it was argued that the combination of a fixed exchange rate and a lack of access to world capital markets forced the authorities to use monetary policy to keep the current account in balance. There was also some discussion as to whether increased growth led to higher savings, or higher savings led to faster growth. A number of participants made the case that various countries experienced high investment rates and high current account deficits initially but then, as the growth dividend from the investment began to be realised, savings rates rose. In addition, in a number of countries, policies designed specifically to increase savings were initiated. There was some question as to whether these schemes did in fact increase savings rates. The example of Singapore was given where the Central Provident Fund appears to have contributed to the national savings rate of over 40 per cent of GDP, though it is not the only policy. In Malaysia, savings may have also been strengthened by policy measures, while the effects of such measures in Thailand were said to be uncertain.

Internationalisation and the Macroeconomy

David Gruen and Geoffrey Shuetrim*

1. Introduction

Australia has been a small open economy since at least 1788. In the subsequent two hundred years, trade and financial links with the rest of the world have been of crucial importance. In other words, internationalisation of the Australian economy is not a recent phenomenon.

What is a recent phenomenon, however, is the development of a widespread view within the Australian political/economic community that there are substantial gains for Australia from becoming more outwardly oriented. This view evolved, primarily, as the Australian counterpart of a world-wide appreciation that economies with an outward focus, like those in East Asia, generate more impressive economic outcomes than those with an inward focus. In Australia, there was growing disillusionment with the performance of the domestic economy under insular policies largely inherited from the days of Federation (colourfully summarised by Henderson (1990) as the 'Federation Trifecta' of the White Australia Policy, 'protection all round' and centralised industrial relations).

In this paper, we examine some of the macroeconomic implications of the increasing outward orientation of the Australian economy. From the perspective of internationalisation, three key changes to the economic landscape have had (and will continue to have) a significant impact on the behaviour of the Australian macroeconomy.

The first key change is the substantial fall in protection that has taken place over the past twenty five years and particularly in the 1980s (see Figure 7 in Fahrer and Pease, this Volume). This fall in protection has been one of the factors responsible for a strongly rising trade share of GDP since the early 1980s. With further falls in protection projected to the year 2000, the trade share should continue to rise. A consequence of this rising trade share is that the exchange rate has an increasingly important influence on both domestic inflation and activity. Falling levels of protection have also contributed to a diversification of Australia's export base, both by convincing many Australian firms that they could not survive solely with domestic sales, as well as by re-directing domestic factors of production from import competition and the non-traded sector to the export sector.

The second key economic change is the gradual transition from a fixed exchange rate under the Bretton Woods System, via a crawling peg, to a floating exchange rate in December 1983. With a floating exchange rate and a rising trade share, monetary policy acts increasingly through the external sector, by altering the nominal exchange rate and thereby influencing the domestic prices of traded goods. With a floating exchange rate, Australia should also gain independent control of its domestic inflation rate; a proposition supported by experience in the decade since the float. As we shall discuss, floating the

* Our paper has benefited from detailed comments from Palle Andersen, Jacqui Dwyer, Phil Lowe and Rick Mishkin to whom we are very grateful.

exchange rate also significantly changes the response of the macroeconomy to one of Australia's most important external shocks, namely, terms of trade shocks.

The final key change is deregulation and technological advance in financial markets. Together, these changes have allowed Australians and foreigners to exchange claims to both real and financial assets with very low transaction costs. With open capital markets and low transaction costs, arbitrage and the flow of information between Australian and foreign asset markets is now rapid and continuous. Shocks to world asset markets (like the stockmarket crash in October, 1987 and the rise in long bond yields in 1994) now translate rapidly to Australian asset markets and may, as a consequence, have a relatively quick impact on the Australian macroeconomy.

In this paper, we discuss the impact of these three key aspects of internationalisation on both inflation and the domestic business cycle. The effects of internationalisation on unemployment and the labour market, however, are not discussed since this topic is dealt with by Fahrer and Pease in this Volume.

Our paper is organised as follows. In Section 2, we describe an 'Australian macro-model' which provides a simple and convenient framework for thinking about the Australian macroeconomy with a floating exchange rate and deregulated financial markets. Section 3 discusses the implications of internationalisation for domestic inflation. It begins with a brief discussion of the range of ways in which internationalisation may affect the incentives facing public policy makers as well as the behaviour of price and wage setters in the Australian economy.

As mentioned above, the behaviour of the exchange rate becomes an increasingly important influence on domestic prices as the trade share rises. Further, as has been widely recognised, the predominant medium-term influence on the Australian exchange rate is the terms of trade. These two observations provide the motivation for the rest of Section 3 which examines the changing inflationary impact of terms of trade shocks. Two key issues are examined: how the impact changes with a floating exchange rate compared with a fixed exchange rate and how, with a floating exchange rate, the impact changes as the economy's trade share rises.

Section 4 turns to the implications of internationalisation for the domestic business cycle. This section's main contribution is to estimate a series of models of Australian output growth with the aim of elucidating the important channels by which foreign influences are transmitted to domestic real activity. Finally, Section 5 draws policy conclusions and summarises the paper.

2. An Australian Macro-Model

Paul Krugman argues that most economists on the United States policy circuit carry around in their heads some variant of a generic macro-model of the international economy (Krugman 1991, 1993). Krugman calls this generic model either the 'Massachusetts Avenue' model (since its main contemporary adherents in the United States work on or near a Massachusetts Avenue in either Cambridge, Massachusetts or Washington, DC) or the modified-Mundell-Fleming model (which describes its pedigree).

In this section, we outline a variant of this generic macro-model that is relevant for Australia, especially in the decade since the float of the dollar and the deregulation of the Australian financial system.

The model can be expressed in a few key relationships. (An algebraic summary is provided in Appendix A.) The first relationship embodies the Keynesian idea that output is demand determined in the short run. Demand for domestic goods is the sum of domestic demand and net exports. In Krugman's generic model, domestic demand depends on both real income and the real interest rate, while net exports depend on domestic income, foreign income and the real exchange rate. Given the importance of the terms of trade for the Australian economy, both domestic demand and net exports also depend on the terms of trade in the Australian macro-model.

The second relationship determines the domestic short-term nominal interest rate. Traditionally, the nominal interest rate is determined by equilibrium in the money market (the LM curve) and Krugman follows this tradition. Largely as a consequence of financial deregulation, however, the world-wide experience since the early 1980s has been that such equations are unstable. Therefore, rather than modelling equilibrium in the money market, it is more straightforward to recognise that the short-term nominal interest rate is set by the central bank. The Australian macro-model makes this assumption.

The third element in the model is an exchange rate equation. It is derived assuming that investors equalise expected returns on domestic and foreign interest-bearing assets. To do so, investors assume that the real exchange rate gradually adjusts towards its long-run equilibrium level.

The fourth element of the model is the assumption that the long-run equilibrium real exchange rate depends on the terms of trade. This assumption is motivated both by the importance of terms of trade shocks to Australia and by their strong relationship with the Australian real exchange rate (Gruen and Wilkinson 1991; Blundell-Wignall, Fahrer and Heath 1993). In some formulations, the equilibrium real exchange rate also depends on the level of net external assets (or liabilities) of the domestic economy, but we abstract from this complication.

To complete the model, we need a description of the evolution of domestic consumer prices. At any point in time, the consumer price level is pre-determined. The rate of inflation is determined by the combination of an expectations-augmented Phillips curve and by the rate of change of the domestic price of imports. Expected or core inflation in the Phillips curve relationship is adaptive, adjusting slowly in response to actual inflation.[1]

To summarise, the Australian macro-model differs from the framework discussed by Krugman in three distinct ways. First, the Australian model explicitly includes the effect of the terms of trade as a determinant of domestic demand, net exports and the

1. To contribute to the theory of gravitation, one must invoke Einstein's General Theory of Relativity while for most practical purposes (including guiding rockets to the moon) the older, more prosaic Newtonian Theory of Gravity suffices. Similarly, while rational expectations is *de rigueur* in modern theoretical macroeconomics, for many policy purposes, the older, more prosaic assumption of adaptive inflationary expectations is probably a good one, especially in goods and labour markets.

equilibrium real exchange rate. Second, rather than modelling equilibrium in the domestic money market, the short-term nominal interest rate is assumed to be set by the central bank. Finally, in the determination of domestic consumer price inflation, the Australian model allows for the influence of changes in the real exchange rate on the domestic price of imports.

In common with all variants of the original Mundell-Fleming model, the Australian macro-model is a short-run model. Thus, it provides useful insights into the effects of shocks over the business cycle while being of limited use for examining longer-term issues. In the next section of the paper, we use it to examine the inflationary impact of terms of trade shocks.

3. Internationalisation and Inflation

The process of internationalisation fundamentally alters the price-setting strategies of domestic economic agents. This is true for agents operating in product markets, factor markets and financial markets. At a micro level, internationalisation directly alters pricing behaviour by deepening product and factor markets. More potential buyers and sellers implies greater competition and a reduction in excess returns. At a macro level, internationalisation also has the potential to change the incentives faced by public policy makers.

Looking first at the consequences for public policy, Grattan (1994) and Macfarlane (1994), amongst others, argue that public policy is now constrained by the reactions of financial markets. By inducing big changes in financial asset prices, financial markets can now signal concern about the direction of public policy. The desire to avoid a backlash in financial markets then becomes a consideration in policy decisions. This developing power of financial markets to dictate the limits of 'reasonable' policy may even constrain Australia's ability to maintain an inflation rate different to its trading partners: an ironic implication of the move to a floating exchange rate.[2]

Two additional factors suggest that internationalisation may reduce the incentive to pursue short-run output gains through expansionary monetary policy. First, expansionary monetary policy operates by increasing demand. As imports become a larger share of the economy, more of the increased demand spills overseas, reducing the domestic benefits of expansion. Second, the flexibility of a floating exchange rate translates into increased flexibility of domestic prices in sectors that compete on world markets. As the trade share rises, this price flexibility applies to a rising share of the domestic economy. Since the output effect of monetary policy arises from the sluggish adjustment of goods prices, the output-payoff from expansionary monetary policy is again reduced when the economy is more open. Therefore, actual inflation in open economies should be lower than in more insulated economies (Rogoff 1985). While this argument seems theoretically appealing,

2. The discipline of financial markets has a wider influence than monetary policy. Fiscal policy, market-based policy reforms and even changes in political leadership are regularly judged by the reaction of financial markets. Grattan (1994, p. 43) suggests that 'the dollar's float and the consequent market signals gave impetus to other key policy changes. These included the new emphasis on competitiveness and on export orientation, the drive to microeconomic reform, and of course the push into Asia. In this way, taking a somewhat long bow, one could relate Australia's initiatives on the Cairns Group and on APEC to the policy stimulus given by the float.'

evidence for this consequence of internationalisation is hard to find, at least for industrial countries. Romer (1991) finds a strong and significant negative relationship between openness and inflation, but the relationship does not hold for OECD countries, casting doubt on its relevance for Australia.

While clearly having the potential to influence public policy, internationalisation also has direct consequences for the pricing strategies of private agents. We now explore these consequences, dealing first with the view of imports as a market discipline. Helpman and Krugman (1989) refer to this hypothesis as the oldest insight in trade policy with imperfect competition. International trade, by raising the level of competition, reduces the ability of domestic producers to extract surplus rents. The move towards marginal-cost pricing should directly reduce domestic price levels. The impact on inflation then depends upon how drawn out and how complete is the transition to a competitive market. In a study of the 'imports as a market discipline' hypothesis, Levinsohn (1993) uses data on Turkish manufacturing plants to demonstrate that the ratio of price to marginal cost declines in imperfectly competitive industries undergoing trade liberalisation.

In the Australian context, evidence is anecdotal. Interviews with manufacturing exporters conducted in 1994 reveal that the annual tariff reductions in the automobile industry are explicitly taken into account in contracts written with domestic component suppliers through what is known as a 'cost-down' policy (personal communication, Gordon Menzies who conducted the survey). Thus, competition at the final product level can flow through to factor suppliers. Pressure can also be applied in factor markets by producers, like multinational corporations, who conduct similar operations in a variety of countries. For example, Heinz operates similar plants in Australia and New Zealand to service their expanding Pacific Rim markets. After an agreement reached with unions, their chief executive commented about their Australian plant:

> 'We are in Dandenong to stay, *provided Dandenong is efficient and competitive*.'
> Dr O'Reilly (*Australian Financial Review*, 11 October 1993, p. 22, italics added)

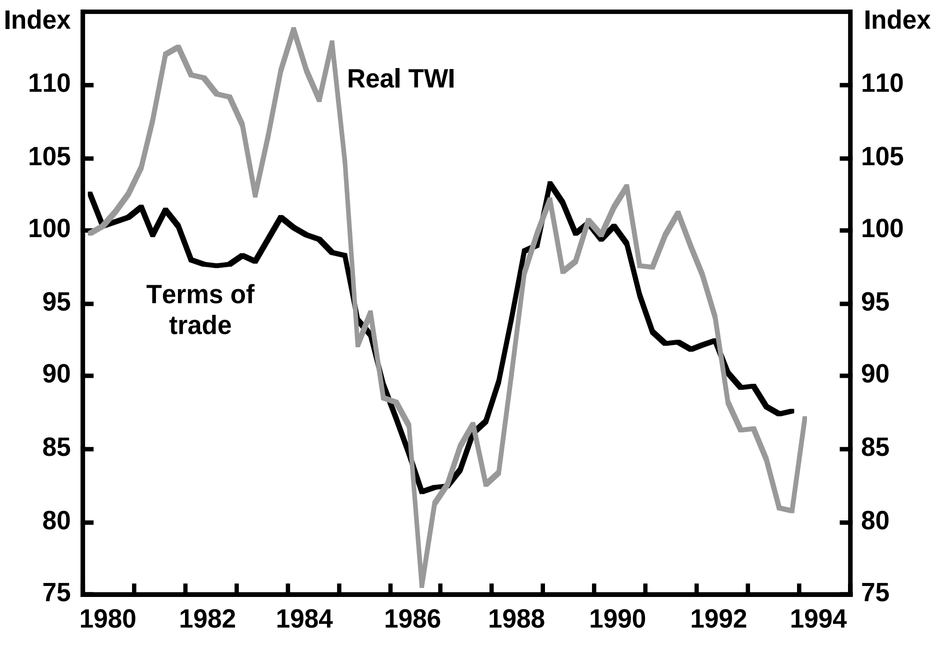
Such considerations may be partly responsible for the willingness of the union movement to accept real wage cuts through the 1980s. Unions' recent commitment to keeping price inflation comparable with Australia's trading partners is also an example of the increased relevance of the world economy in domestic wage-setting behaviour (ACTU 1987, pp. 46-47). With external constraints perceived both by labour and by the suppliers of other inputs, there should be less potential for supply-side inflationary pressure than in a closed economy. Similarly, capacity constraints pose less of an inflationary threat when international substitutes are available.

Increased competition has wider ramifications than a loss of market power for domestic producers. Much of the motivation for turning Australia's focus to global markets is the promise of accelerated economic growth over an extended period, if not in the long run (see papers by Dowrick and by Ergas and Wright in this Volume). If this eventuates, we may observe the reverse of some of the influences which contributed to the rise in global inflation in the early 1970s. World-wide inflationary problems arose then at the same time as a widespread slowdown in productivity growth. At least partly, when workers demanded the wage increases to which they had become accustomed in the 1960s, it fed inflationary pressures because productivity growth did not underpin their claims. In the 1990s, if productivity growth accelerates, wage claims are more likely to be underpinned by real increases in the value of labour. Such an outcome would clearly reduce supply side inflationary pressures.

As well as putting downward pressure on prices by squeezing margins, internationalisation also makes more of the prices in the economy sensitive to movements in the exchange rate. As Figure 1 shows, medium-term movements in the Australian real exchange rate are driven largely by the terms of trade. Indeed, a strong rationale for floating the Australian dollar was that it would insulate the domestic economy, to some extent, from terms of trade shocks. In the following sub-sections therefore, we analyse the transmission mechanisms from the terms of trade to domestic prices (and income) and estimate how these relationships change as the trade share rises.

Figure 1: The Terms of Trade and the Real Exchange Rate

(1989/90=100)

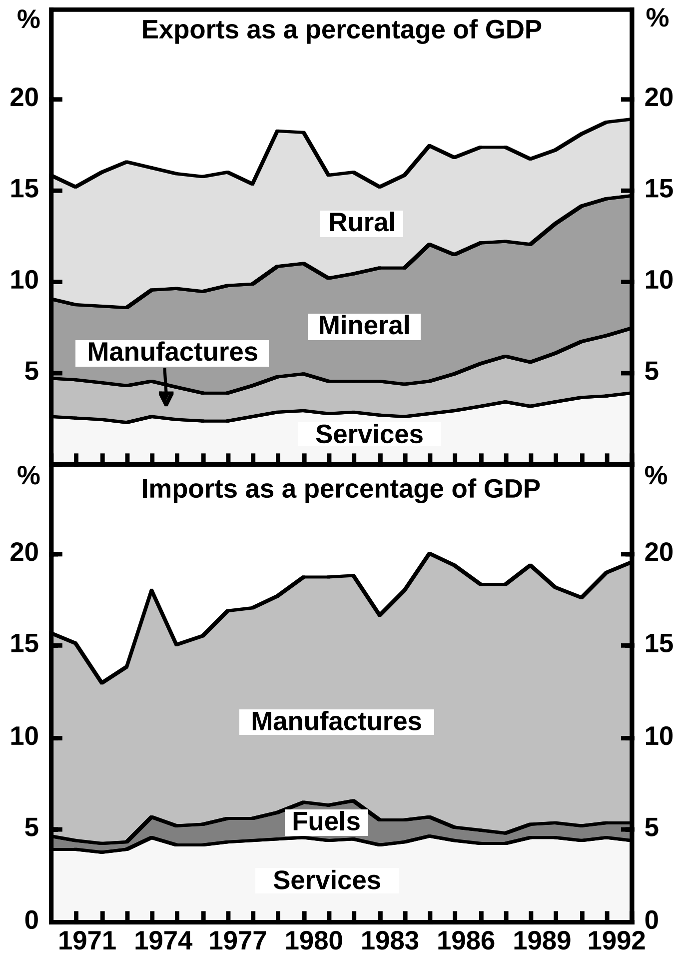


Note: The figure shows the terms of trade for goods and services and the real trade-weighted exchange rate (real TWI).

3.1 The Terms of Trade

Among industrialised countries, Australia has a fairly low share of exports and imports to national income. Indeed, by these measures, every country in Western Europe is more open to trade than Australia. Australia is also unusual in another important respect. By contrast with most industrial countries, the mix of Australian exports is very different from the mix of its imports. As Figure 2 shows, a high proportion of Australia's

Figure 2: Components of Australian Exports and Imports
(current prices)



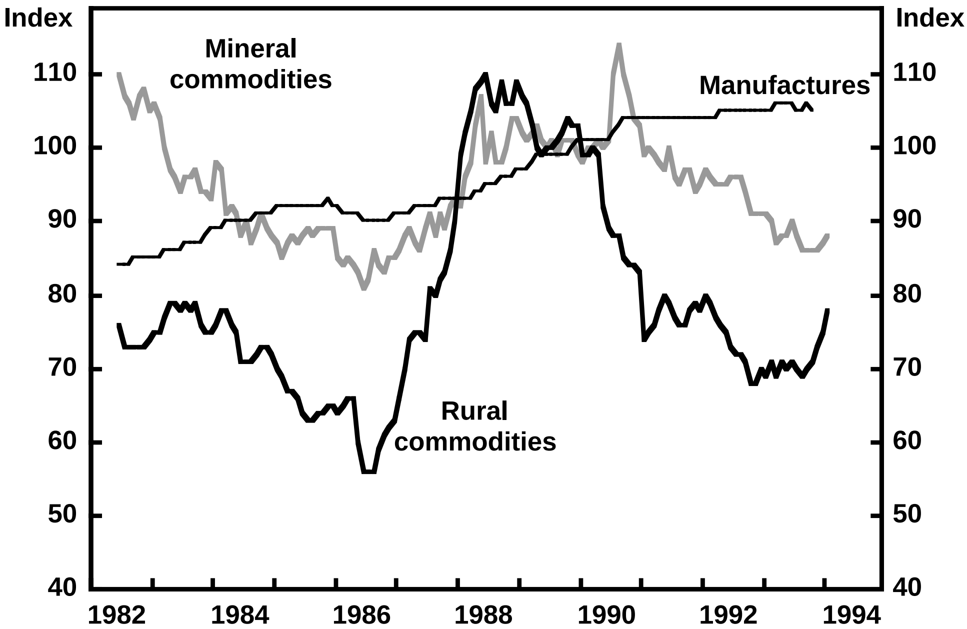
exports are commodities (both rural and mineral) while Australian imports are almost exclusively manufactures and services.

Figure 3 shows the US dollar prices of a broad basket of manufactures and of Australia's mineral and rural commodities. The difference in their volatility is striking. Given Australia's exports of commodities and imports of manufactures and services, one should expect the Australian terms of trade (the ratio of export prices to import prices) to be more volatile than the terms of trade of those industrial countries that export and import similar types of goods.

Figure 4 confirms this expectation. It shows an international comparison of terms of trade changes for sixteen industrial countries and five less-developed countries. Among the industrial countries, Australia has relatively big terms of trade changes. The few

Figure 3: Prices of Australia's Mineral and Rural Commodity Exports and of Manufactures

(1989/90=100)



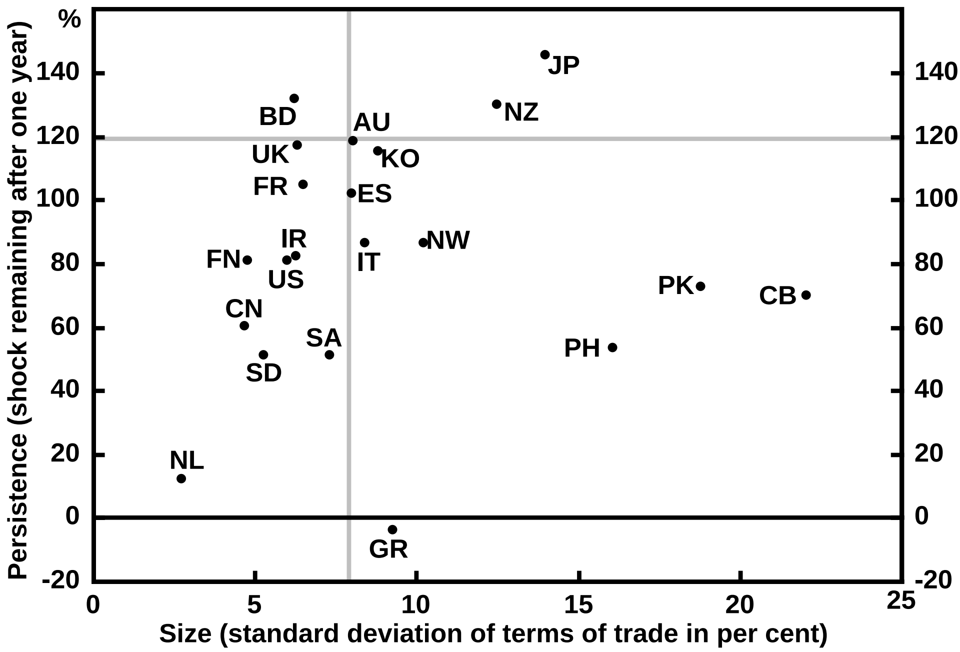
Note: The figure shows the RBA commodity price series and the OECD producer price index, all in $US.

industrial countries with more volatile terms of trade than Australia are either commodity exporters (like New Zealand) or countries with a high share of oil exports (like Norway) or oil imports (like Japan). Four of the five less-developed countries in Figure 4 (Colombia, Philippines, Pakistan and South Korea) also have more volatile terms of trade than Australia. All but South Korea export a high proportion of commodities. In general, their exports are also relatively undiversified which contributes to their terms of trade volatility.

Figure 4 also shows that Australia has relatively persistent terms of trade shocks, with an estimated 120 per cent of a shock remaining after one year (that is, the shock grows in magnitude for the first year.) A more refined model of the Australian terms of trade suggests that, although relatively persistent, shocks *do not appear to have a permanent effect*. About 85 per cent of a shock remains after two years, but the effect falls rapidly in the third year (see Appendix C).

From the perspective of macroeconomic management, both the persistence and the size of terms of trade changes are important. For given persistence, larger changes clearly have a greater influence on the domestic economy. However, if changes of a given size are known to be short-lived, they induce consumption smoothing on the part of individuals and provide little incentive for resource reallocation in the economy. By contrast, more persistent changes induce larger responses in both consumption and production patterns. These considerations, combined with the evidence in Figure 4,

Figure 4: International Comparison of Terms of Trade Changes
(persistence vs size)



Notes: (a) The countries included in Figure 4 are, in alphabetical order of mnemonic:

AU	Australia	BD	West Germany	CB	Colombia
CN	Canada	ES	Spain	FN	Finland
FR	France	GR	Greece	IR	Ireland
IT	Italy	JP	Japan	KO	South Korea
NL	Netherlands	NW	Norway	NZ	New Zealand
PH	Philippines	PK	Pakistan	SA	South Africa
SD	Sweden	US	United States	UK	United Kingdom

(b) The measure of persistence is derived from an AR(4) model, including intercept and trend, for the quarterly log terms of trade for each country and indicates the percentage of a shock remaining after one year.

(c) The size of each country's terms of trade changes is measured by the standard deviation of four-quarter-ended percentage changes.

(d) In each case, the sample period is from 1972:1 to 1991:4.

(e) The terms of trade measures differ between countries. For most countries, including Australia, the national accounts measure of the terms of trade is used. However, in some cases, where such data are not available, the ratio of export unit values to import unit values is used. See Appendix D for further details.

explain why terms of trade movements are of considerable concern to Australian policy makers but of less relevance to policy makers in many other industrialised countries.

Given the importance of terms of trade shocks, we turn to a detailed analysis of their impact on domestic inflation and, in particular, on how this impact changes as the economy integrates with the rest of the world. There are two interesting questions here:

- How does the impact of a *given* terms of trade shock change as the economy becomes more open?
- What are the implications of the changing mix of Australia's exports on the average size of terms of trade shocks and hence on their average impact on the Australian economy?

We address these questions in turn in the following two sub-sections.

3.2 The Inflationary Impact of a Given Terms of Trade Shock

> 'We have had a surge of income which is drifting into expenditure. I mean, basically, the glass is too full and the effervescence is spilling over the sides. ... Too much of a good thing can still be too much of a good thing.'
>
> Paul Keating, in the aftermath of a favourable terms of trade shock (quoted in *Australian Financial Review,* 17 February 1989, p. 1).

Figure 5 shows domestic inflation around the time of three large shocks to the Australian terms of trade. The largest shock occurred in the early 1950s when the Korean War temporarily drove up the price of wool by 250 per cent (panel I). With a fixed nominal exchange rate, the accompanying surge in income and money balances translated quickly into record inflation. When wool prices and the terms of trade subsequently collapsed, there was a corresponding fall in the rate of inflation.

A similar relationship between the terms of trade and inflation occurred during the 1970s, although the magnitude of the changes was less than in the 1950s (panel II). This time, the terms of trade rise was driven by a broadly-based commodity price boom including a quadrupling of the US dollar oil price. Again, with a fixed nominal exchange rate, the resultant increase in income and money balances fed into domestic inflation and as the terms of trade fell, so did domestic inflation.[3]

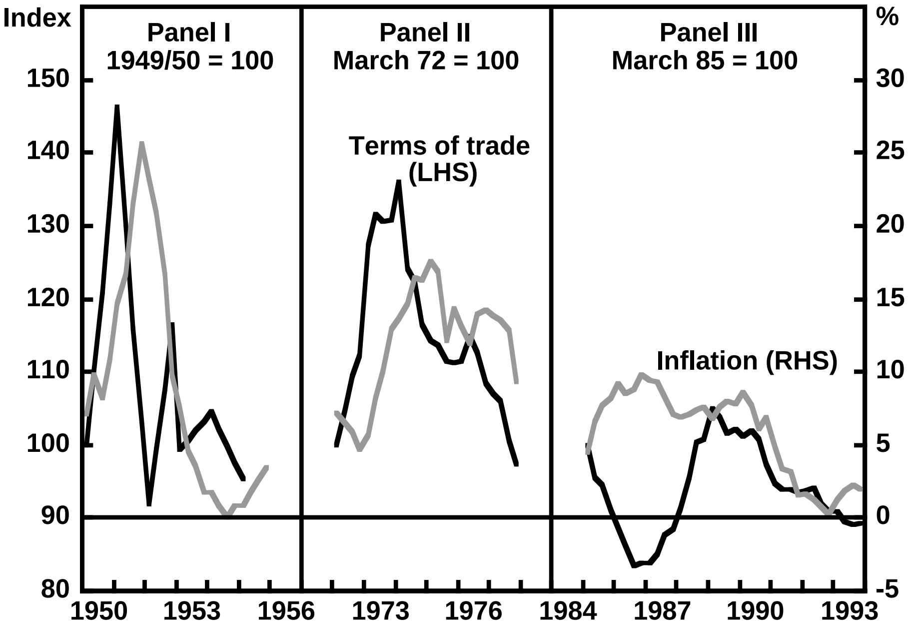
These two experiences established a piece of conventional wisdom, namely, that the Australian terms of trade and domestic inflation are strongly positively correlated, with rising terms of trade leading to a surge in inflation. However, with the floating of the exchange rate in December 1983, this conventional relationship appeared to break down.

In the mid 1980s, the terms of trade fell sharply but, for the first time, the fall was not deflationary. Instead, the currency depreciated rapidly (see Figure 1), increasing the domestic price of imports and leading to an acceleration of domestic inflation (panel III of Figure 5). This negative correlation between the terms of trade and inflation clearly distinguishes this episode from the earlier ones.

Most recently, the terms of trade and inflation have again moved in line with each other, with both series falling. This suggests that the mid 1980s may have been an aberration with speculative market dynamics causing the exchange rate to fall by more than was justified by fundamentals. However, despite a return to the historical norm, it is premature to conclude that, as a general rule, a fall in the terms of trade is deflationary.

3. During the 1970s, the nominal exchange rate was not, in fact, fixed. Instead, it was revalued several times as the terms of trade rose, and devalued as the terms of trade fell. These currency realignments were insufficient, however, to insulate the economy from the big changes in the world price of commodities.

Figure 5: Terms of Trade Shocks and Inflation



Note: Inflation is measured as the four-quarter-ended percentage change in the consumer price index.

As ever, it is difficult to disentangle the influence of the terms of trade on inflation from the effect of the business cycle and domestic policy settings. Thus the question remains: with a floating exchange rate, what is the impact of terms of trade changes on inflation?

This section addresses this question by analysing the changing inflationary impact of a once-off 10 per cent *rise* in the terms of trade as the Australian economy becomes more open. For the sake of exposition, we defer until later the issue of when this rise is unwound. (Recall our evidence, reported in Appendix C, that terms of trade shocks are persistent but not permanent.) It should also be noted, in passing, that all the analysis in this section applies, with signs reversed, to a 10 per cent terms of trade *fall*.

Throughout, we assume that the exchange rate floats and that short-term real interest rates are kept constant. Thus, we make no allowance for policy reaction to the terms of trade shock. Rather, the aim is to discover the 'impact effect' of the terms of trade shock on the domestic inflation rate.

The 10 per cent terms of trade rise has two effects on the economy that are relevant to the domestic inflation outcome. First, there is a *demand effect* on the prices of non-traded goods. The terms of trade rise increases Australian real income and hence domestic demand. This extra demand falls, at least partly, on non-traded goods, driving up their prices. The terms of trade rise is also associated with a real exchange rate appreciation (see Figure 1) which lowers the price of imports relative to non-traded goods. This lower relative price of imports induces substitution towards imports and so reduces the magnitude of the demand effect on the prices of non-traded goods.

The second effect is a *direct price effect*. The real exchange rate appreciation makes imports cheaper. Since imports form part of the domestic consumption basket, cheaper imports imply a lower average price for the whole consumption basket. Clearly, the demand effect acts to increase domestic inflation while the direct price effect acts to reduce it.[4]

We use the Australian macro-model to quantify these two effects as the degree of openness of the economy changes (see Appendix B for technical details). To do so, we need to calibrate the model with estimates of the effect of the terms of trade rise on domestic demand and national income. Over the period 1980-93, when the trade share (defined as the mean of the import and export shares) averaged 18 per cent of GDP, our estimate (standard error) is that a 10 per cent terms of trade rise led to a rise in domestic demand of 2.3 (1.1) per cent-years, cumulated over two years. The corresponding figure for the rise in national income is 0.03 (0.95) per cent-years (see Appendix C for further details).[5]

We now estimate the effect both on demand in the economy and on inflation of the 10 per cent terms of trade rise. Figure 6 shows the estimated effects on domestic demand and non-traded demand as a function of the economy's trade share. The effect on domestic demand is a straight line from the origin, reflecting the fact that, as the trade share rises, the terms of trade rise applies to a progressively larger proportion of the economy.[6]

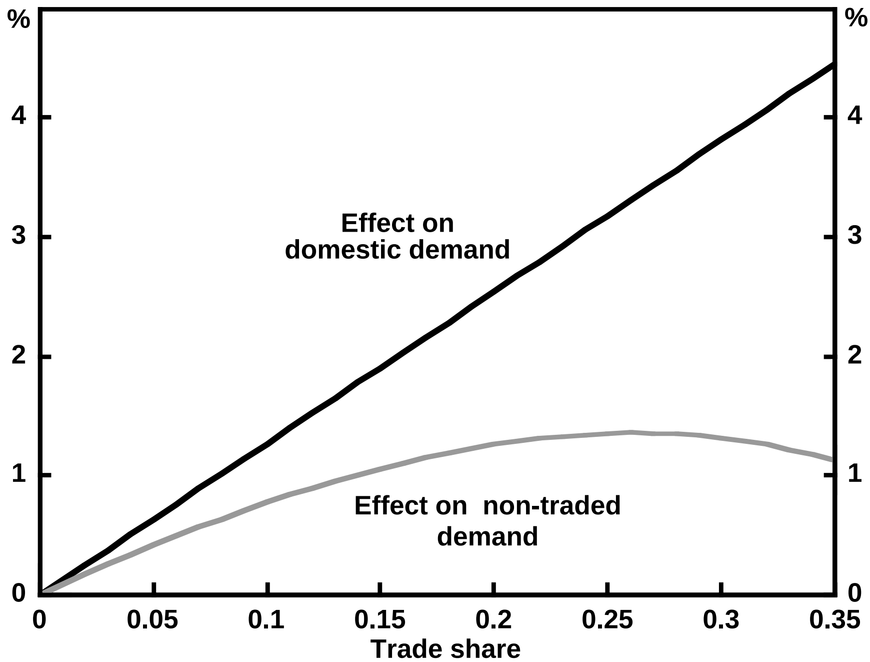
The effect on non-traded demand, shown in Figure 6, is more interesting but requires some explanation. Recall that domestic demand is satisfied by non-traded and imported goods. That is, we assume that domestic demand for exportables is small enough to be ignored. Now, for the sake of the argument, assume *counterfactually* that the income

4. We briefly mention a third effect of the terms of trade rise that is also relevant to the inflation outcome. As we have seen, a terms of trade rise is typically caused by a rise in the foreign price of Australian commodity exports. These commodities, particularly energy, are inputs into the domestic production process. Therefore, a rise in their prices adds to domestic costs which puts upward pressure on prices (particularly in the non-traded sector). While this effect is hard to quantify, we have the following reasons for expecting it to be small in general. First, we have an estimate of the indirect price effect of a rise in petrol prices (which seems particularly relevant since petrol and oil are important inputs). Each 1 per cent permanent rise in the domestic price of petrol raises underlying consumer prices by 0.06 per cent in the long run (de Brouwer, Ericsson and Flood 1994). Second, commodity price rises are usually broadly-based and are associated with substantial exchange rate appreciation (see Figure 1). It follows that even a substantial rise in the foreign prices of commodities translates into a quite small rise in their domestic prices. Taken together, these two strands of evidence imply that, for a typical terms of trade rise, the direct effect of commodity input costs on the general price level should be small. We will not consider it further.

5. Our focus for estimating the demand effect is on a time-span over which there is excess demand, and hence inflationary pressure, in the non-traded sector. Two years seems a plausible time-span for this. In the numerical work to follow, we therefore use the point estimates of these two-year rises to estimate the *total* inflationary impact on non-traded goods prices. Of course, changing this two-year cut-off changes our numerical estimates. However, it does not change the qualitative features of the results. We have also derived results assuming that the rise in domestic demand (and/or national income) is two standard errors either above or below the point estimate. Again, this does not overturn our conclusions about the inflationary impact of a terms of trade rise.

6. A terms of trade rise has a positive impact effect on real domestic purchasing power over domestic and imported goods. For a given percentage increase in the terms of trade, this impact effect rises linearly with the trade share. The estimated effect on domestic demand shown in Figure 6 is derived assuming simply that it is proportional to this impact effect and hence also rises linearly with trade share (see Appendix B).

Figure 6: Demand Effects of a 10 per cent Rise in the Terms of Trade
(per cent-years)



Note: For both domestic demand and non-traded demand, the units are per cent-years. A 1 per cent-year increase in demand for non-traded goods leads to an increase in inflation of an estimated 0.4 per cent per annum (see Appendix B for further details).

elasticity of demand for imports is unity and that the terms of trade rise induces no change in the relative price of imports to non-traded goods. In that case, the percentage rise in demand for non-traded goods would be the same as the percentage rise in domestic demand and the two lines in Figure 6 would lie on top of each other.

The *actual* change in demand for non-traded goods, shown in Figure 6, differs from the change in domestic demand for two reasons. First, the income elasticity of demand for imports is estimated to be *higher* than unity. Second, the real appreciation caused by the rise in the terms of trade substantially reduces the relative price of imports, further increasing demand for them. (See Appendix B for the income and price elasticities used for the results in Figure 6.) Since domestic demand is satisfied by either imports or non-traded goods, a disproportionate rise in import demand implies that the proportional rise in demand for non-traded goods is less than the rise in domestic demand.

These effects become more important as the trade share rises. To see why, consider a given rise in domestic demand. If the import share is small, even a disproportionate rise in import demand satisfies only a small part of this extra demand. Most of the extra demand must still be satisfied by domestic non-traded goods. With a larger import share, however, a disproportionate rise in import demand can satisfy much more of the rise in domestic demand. As Figure 6 shows, the induced rise in demand for non-traded goods does not continue to increase as the trade share rises.

We now turn to the overall impact of the 10 per cent terms of trade rise on domestic consumer price inflation, including both the demand effect on the prices of non-traded goods and the direct price effect of cheaper imports. Figure 7 shows the results of two sets of calculations, a standard model (which we have discussed thus far) and an alternative model.[7] The alternative model involves these three plausible refinements to the standard model:

- the import share of consumption is assumed to be less than (and to rise more slowly than) the trade share;
- domestically-produced import substitutes, whose prices are influenced by the domestic price of imports, are introduced; and
- second stage pass-through of shocks from over-the-dock import prices to prices faced by consumers are allowed to be incomplete.[8]

As Figure 7 makes clear, using either model, the terms of trade rise *reduces* domestic inflation. This counter-intuitive result occurs because the associated exchange rate appreciation is so big. The 10 per cent terms of trade rise is associated with an estimated real appreciation of nearly 9 per cent (see Appendix B). As a consequence, the disinflationary effect of cheaper importables overwhelms the inflationary effect of higher demand for non-traded goods.

Further, using either model, the magnitude of the disinflationary effect rises as the trade share rises. In both models, this occurs, predominantly, because cheaper importables make up a rising share of consumption as the trade share rises. Not surprisingly, the effect on inflation of the terms of trade rise is less sensitive to the trade share in the alternative model because the share of importables in consumption in this model is assumed to rise more slowly than the trade share. Nevertheless, it remains true that internationalisation tends to magnify the impact on domestic inflation of a given percentage change in the terms of trade.

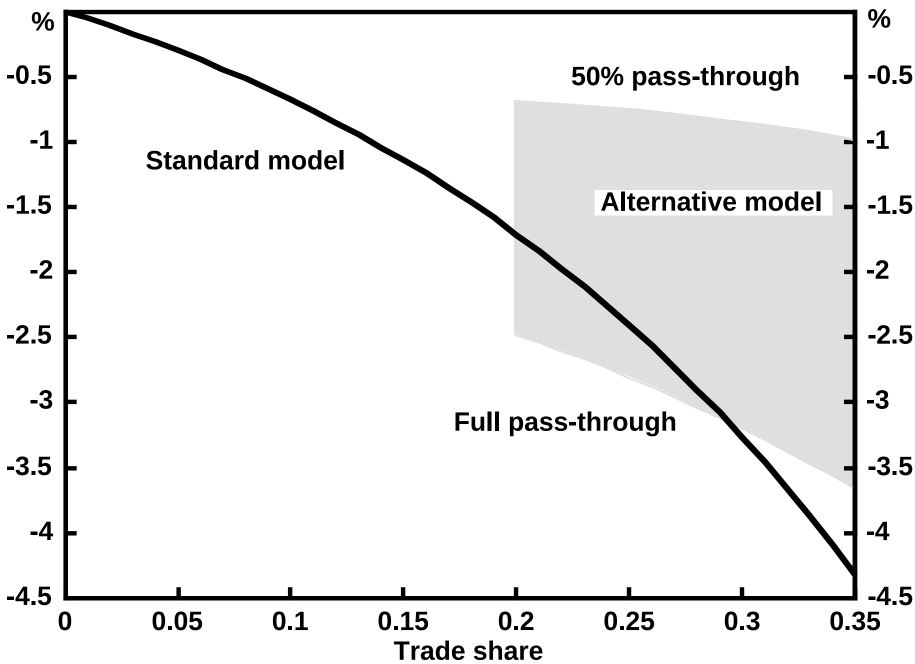
We conclude this sub-section with three final points.

- First stage pass-through from exchange rate changes to over-the-docks import prices is rapid and virtually complete (Dwyer, Kent and Pease 1993). By contrast, although apparently complete in the long run, second stage pass-through to consumer prices appears to be only about a third (half) complete within one (two) years (de Brouwer *et al.* 1994). This slow pass-through to consumer prices implies

7. We show results from two models because, especially when extrapolating future trends, there are several assumptions about which we can only guess. The results in Figure 7 do not include the effects of any monetary policy response to the changed inflationary environment. In the longer run, of course, the stance of domestic monetary policy determines the inflation rate.

8. Results using the alternative model are shown only for trade shares higher than the current trade share of the Australian economy ($\beta \approx 0.2$). The first refinement is introduced because some imports are used in the production of exports, rather than being either consumed domestically, or used in the production of domestically-consumed goods. This alternative use of imports becomes increasingly important as the trade share rises. (In some countries like Singapore, both export and import shares of GDP are larger than 100 per cent while the import share of domestic consumption is clearly less than 100 per cent.) We assume the same degree of pass-through for both imports and domestically-produced import substitutes. For further details on each of the refinements, see Appendix B. Finally, we use the terms ‘over-the-dock’ and ‘free-on-board’ interchangeably.

Figure 7: Inflationary Effect of a 10 per cent Rise in the Terms of Trade



Note: The units for the inflationary effect are percentage points of annual inflation. The standard model assumes that the import share of consumption is the same as the trade share. It makes no allowance for domestically-produced import substitutes and assumes full pass-through to consumer prices. The alternative model introduces three refinements to this standard model. These are: the import share of consumption is less than (and rises more slowly than) the trade share; domestically-produced import substitutes are allowed for, and pass-through to consumer prices is assumed to be in the range 50 per cent to 100 per cent complete (see the text and Appendix B).

that the disinflationary effect of a terms of trade rise only becomes apparent gradually.

- Since terms of trade shocks are not permanent, all shocks are eventually unwound (after about two or three years on average – see Appendix C). Combined with the last point, this suggests that estimates that assume partial second stage pass-through may be the more relevant ones.
- The share of importables in consumption (including indirect effects via intermediate inputs) may be *much larger* than assumed in the alternative model (the results of de Brouwer *et al*. (1994) imply a current share of 0.49 rather than 0.26). If so, this implies a bigger disinflationary effect than shown by the alternative model.

Although these three points further complicate accurate estimation of the inflationary effect of a terms of trade rise, they do not change the direction of the relationship. To summarise, floating the exchange rate profoundly altered the impact of terms of trade changes on domestic inflation. Before the float, a terms of trade rise translated rapidly into a surge in domestic inflation. By contrast, with a floating exchange rate, it takes some time for a terms of trade shock to have a noticeable impact on domestic inflation. After two years, however, terms of trade rises (falls) appear to have a favourable (adverse) impact on domestic inflation. Finally, these effects will probably become more pronounced as the Australian economy continues to internationalise.

3.3 The Effect of the Changing Mix of Australian Exports

We have previously noted the unbalanced composition of Australia's trade with exports dominated by commodities and imports dominated by manufactures and services (see Figure 2). As the Australian economy continues to internationalise, we should expect the composition of exports to change. We now address the implications of this changing mix of exports for the average size of terms of trade shocks and hence for their average impact on domestic inflation.

Given the volatility of commodity prices, the key to predicting how Australian terms of trade volatility will change as the economy continues to open, is to capture expected changes both in the composition of Australia's commodity exports and in commodities' share of total exports. We presume that other compositional changes (e.g., between manufactures and services) have much less impact on terms of trade volatility and we therefore ignore them.

For our purposes, there have been two important trends in commodity exports. First, the share of rural commodity exports has been falling as the overall trade share has risen (see Figure 2). From 1975 to 1980 the trade share averaged 16.7 per cent and rural exports averaged 52.8 per cent of total commodity exports. By 1993, when the trade share had risen to 19.2 per cent, rural exports had fallen to 36.8 per cent of commodity exports. Second, total commodity exports have been a falling share of total exports, although their share of GDP has been almost constant for over twenty years (see Figure 8).

With these two trends in mind, we assume the following:

- Australia exports three types of goods (rural commodities, mineral commodities, and manufactures) but imports only manufactures.[9]
- Measured in a common currency, the prices of exported and imported manufactures are identical.
- As the trade share rises, Australia's commodity exports remain a constant share of GDP (which implies, of course, that the rising export share occurs because of rising exports of manufactures).
- As the trade share rises, there is a continuing trend fall in the rural share of commodity exports.

Given these assumptions, Figure 9 shows the estimated volatility of the Australian terms of trade as the trade share rises from the current value of about 0.2.[10] Terms of trade volatility is predicted to fall substantially as the trade share rises. There are two reasons for this fall. First, there is a falling share of commodities in total exports. Since, by assumption, commodities are the source of the volatility, the falling commodity share

9. 'Manufactures' should be thought of as a composite of manufactures and services.

10. We use disaggregated data on the ten rural and seven mineral commodities in the Reserve Bank commodity price index to estimate the variance-covariance matrix for the relative prices of a composite rural commodity to a composite manufacture, and a composite mineral commodity to a composite manufacture. (Details of the calculation are available on request.)

Figure 8: Australian Commodity Exports
(current prices)

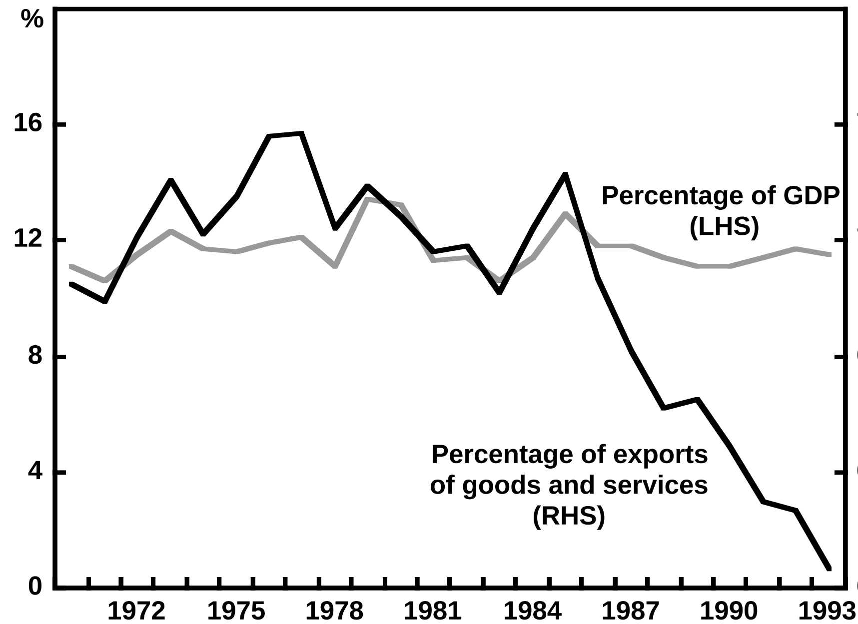
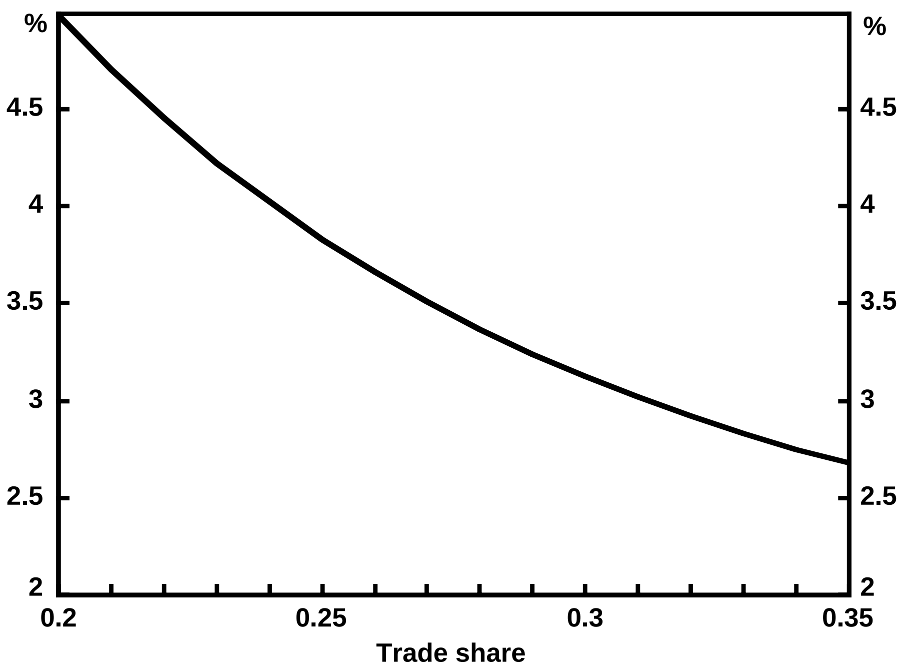


Figure 9: Estimated Volatility of the Terms of Trade vs Trade Share



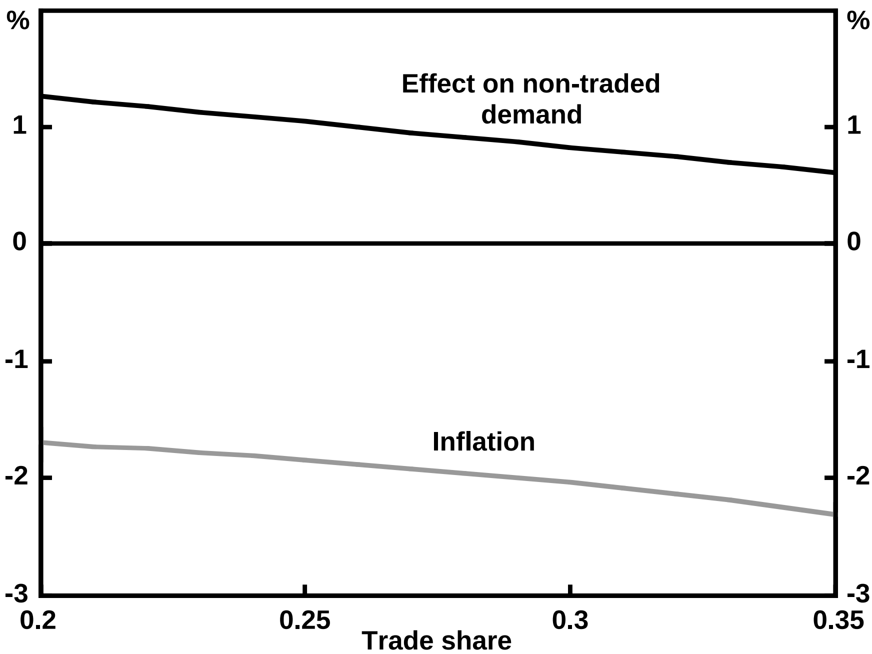
Note: Volatility is measured as the standard deviation of annual changes.

reduces the estimated volatility of the terms of trade. Second, for commodities relevant to Australia, mineral commodity prices are about 40 per cent less volatile than rural commodity prices. With mineral exports rising as a proportion of total commodity exports, this volatility differential leads to further reductions in the estimated volatility of the terms of trade.

The combined effect of these two influences is substantial. At the current trade share ($\beta \approx 0.2$), the estimated standard deviation of annual terms of trade changes is 5.0 per cent (see Figure 9). When the trade share rises to $\beta = 0.30$, this standard deviation is estimated to fall to 3.1 per cent; that is, a fall in volatility of almost 40 per cent.[11]

We now link these results with those of the last section. In that section, we showed that terms of trade shocks of a given size have an increasing impact on inflation as the trade

Figure 10: Income and Inflationary Effects of an Average Terms of Trade Rise
(two standard deviations rise, standard model)



Notes: (a) The units are per cent-years for the effect on non-traded demand and, for inflation, percentage points of annual inflation.

(b) The standard model assumes that the import share of consumption is the same as the trade share. It makes no allowance for domestically-produced import substitutes and assumes full pass-through to consumer prices.

11. This probably overstates the extent of the fall in terms of trade volatility, for two reasons. First, we have assumed no contribution to volatility from non-commodity exports which become more important as the trade share rises. As Barry Hughes highlights in his comments on the paper, this may not be a good assumption. Second, the fall in the rural share of commodity exports as the trade share rises, although very clear in Figure 2, is statistically insignificant. If this effect is ignored, there is again a smaller fall in estimated volatility as the trade share rises.

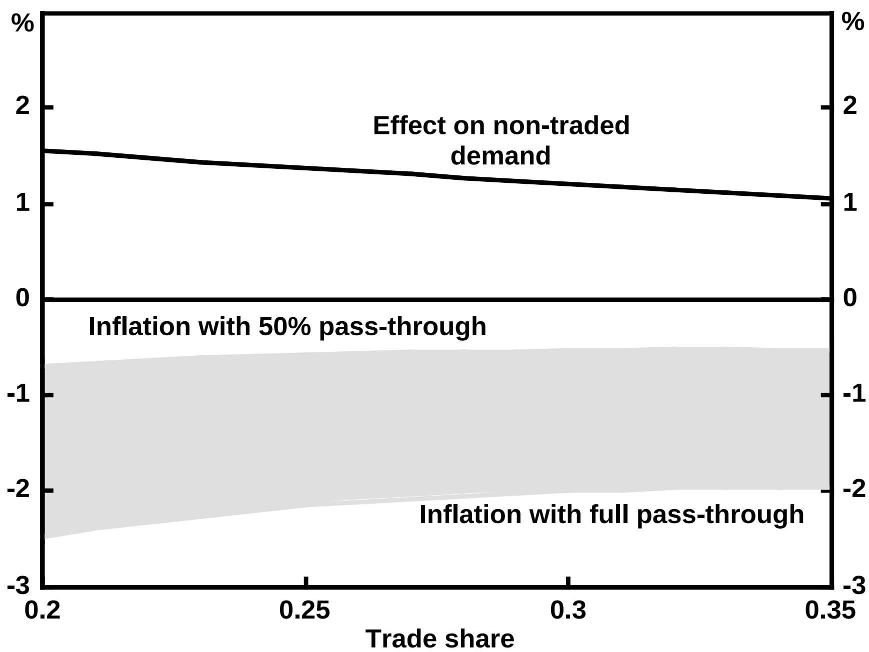
share rises – with rising terms of trade reducing inflation and falling terms of trade exacerbating it. Here we have shown that terms of trade shocks are smaller on average as the trade share rises. These two results raise an interesting question. As the economy opens up, what is the inflationary effect of an 'average' terms of trade shock, taking into account the fact that this average shock should get smaller as the trade share rises?

Figures 10 and 11 answer this question, using the standard and the alternative models respectively. Both figures show the effect on non-traded demand (as in Figure 6) and the overall effect on inflation of a two-standard-deviation rise in the terms of trade (where, for given trade share, the standard deviation is given in Figure 9).

Allowing for the changing composition of Australian exports, the impact on domestic inflation of an 'average' terms of trade shock either becomes gradually more pronounced (from the standard model results in Figure 10) or remains roughly unchanged (from the alternative model results in Figure 11) as the trade share rises. It remains true, however, that an average terms of trade rise always has a favourable impact on inflation, while an average terms of trade fall exacerbates it. As before, this occurs because of the large

Figure 11: Income and Inflationary Effects of Average Terms of Trade Rise

(two standard deviations rise, alternative model)



Notes: (a) The units are per cent-years for the effect on non-traded demand and, for inflation, percentage points of annual inflation.

(b) The alternative model assumes that the import share of consumption is less than (and rises more slowly than) the trade share. It also allows for domestically-produced import substitutes and assumes that pass-through to consumer prices is between 50 per cent and 100 per cent complete (see Appendix B).

exchange rate change associated with the terms of trade shock. Again, because of slow pass-through to consumer prices, these effects only become apparent with a substantial lag.

4. International Influences on the Australian Business Cycle

This section explores international influences on the domestic business cycle. It begins by examining the correlation between Australian output growth and various measures of foreign growth over the past thirty years and by analysing the extent to which the Australian terms of trade can be explained by measures of foreign activity. The section's main contribution, however, is to estimate a series of models of Australian output growth with the aim of elucidating the important channels by which foreign influences are transmitted to domestic real activity. One of our tentative conclusions is that trade and information flows between foreign and Australian *asset markets* may be one of the important ways in which foreign shocks are now transmitted to the domestic business cycle. Given this tentative conclusion, we complete the section with an examination of the correlations between Australian and foreign bond, stock and property markets.

Casual observation suggests that the influence of the world economy on the Australian business cycle has long been a profound one. Thus, for example, in recent history, the Australian economy suffered recessions in the mid 1970s, the early 1980s and the early 1990s. On each occasion, the world economy was also in recession.

While there are several possible measures of world activity that could be used to examine foreign influences on the Australian business cycle, we concentrate on three measures. The first of these is the output of the US economy, partly because, as the world's largest economy, US output is often used as a proxy for world activity, but also because the Australian and US business cycles have been particularly well correlated recently. The second measure is OECD output since this provides a reasonably broad measure of world output. The third and final measure is the output of Australia's export markets.[12] Analysis of this final measure of world output should help determine whether changing demand for Australian exports is a major foreign influence on the domestic business cycle.

Figure 12 shows Australian GDP growth compared with the growth of these three measures of foreign output over the past thirty years. There are clear correlations

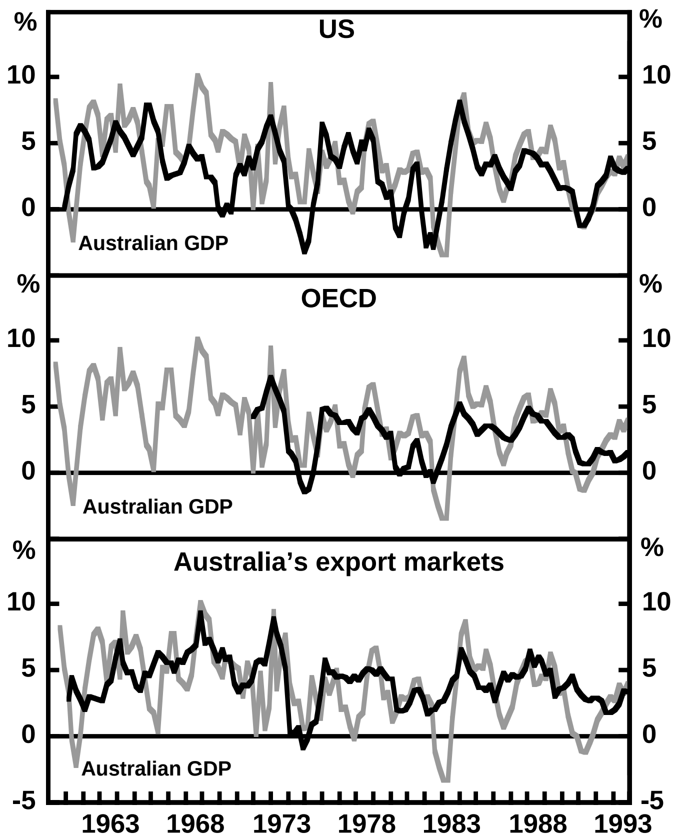
12. OECD output is available on a quarterly basis while a measure of the output of the whole world (from the IMF) is available only on an annual basis. For our econometric analysis to follow, we need the extra degrees of freedom afforded by quarterly data, which explains the focus on OECD output. Given available data, the number of countries in our measure of the output of Australia's export markets rises over time. Over the period 1960-93, it is the output of an average of 11 countries (which together make up an average of 60 per cent of Australia's exports) weighted by Australian export shares. Our econometric analysis to follow uses the estimation period 1980-93, over which time the coverage is 15 countries and an average of 70 per cent of Australia's exports. These 15 countries are, by region: Canada and US; France, Italy, Netherlands, Sweden, Switzerland, UK and West Germany; Hong Kong, Japan, New Zealand, Singapore, South Korea, and Taiwan.

between Australian and foreign output growth, and these correlations are apparent whichever measure of foreign output is used. All three measures of foreign output show a slowdown in growth, or a brief period of negative growth, in the mid 1970s, the early 1980s and the early 1990s and, at each of these times, the Australian economy was in recession. Furthermore, the strongest four quarters of growth in the past twenty years, both for Australia and for each of the measures of foreign output, occurred in 1983/84. It is also clear from Figure 12 that the Australian and US business cycles have been particularly closely synchronised over the past five years.

In the polar case of a closed economy with no links whatsoever with the rest of the world, there is no reason for its business cycle to be influenced by, or correlated with, the world business cycle. At the other extreme, an economy with strong trade and financial links with the world should presumably have a business cycle that is strongly correlated with the world cycle. It follows that, during a period in which a country substantially increases its trade and financial links with the rest of the world, we should expect a rising correlation between the domestic and foreign business cycles.

Figure 13 examines empirical evidence for Australia over the past thirty years. It shows the changing correlation between Australian growth and seven measures of

Figure 12: Australian and Foreign Gross Domestic Product
(four-quarter-ended percentage changes)



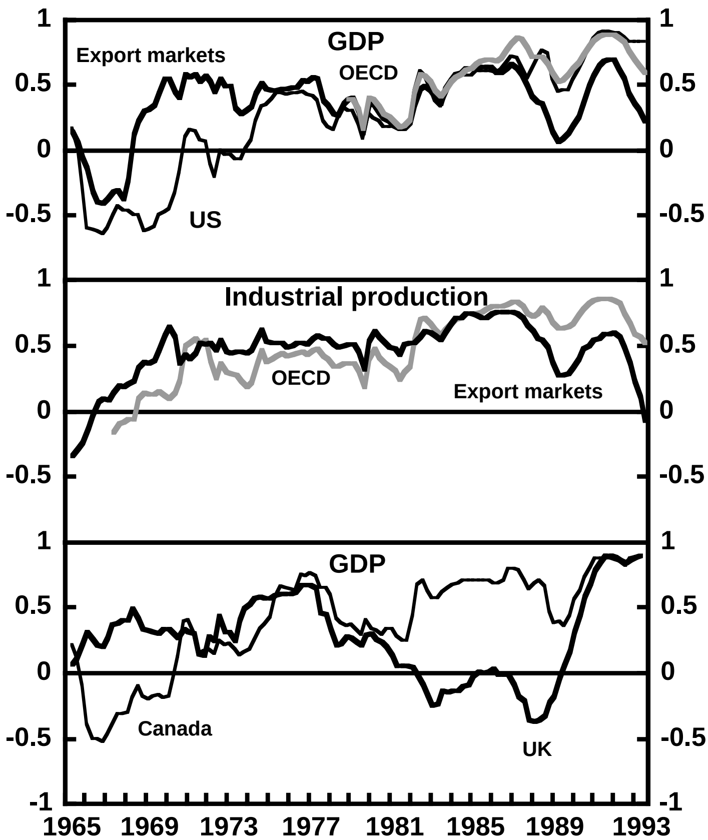
foreign growth (the three measures already introduced, as well as industrial production in the OECD and in Australia's export markets and, finally, output growth in the UK and Canada). For each date, the figure plots the correlation between Australian and foreign four-quarter-ended growth over the previous five years. Thus, for example, the number plotted for the United States at 1993:4 is the correlation coefficient between Australian and US four-quarter-ended growth from 1989:1 to 1993:4.

The general pattern to emerge from Figure 13 confirms the argument presented above. The past thirty years have been characterised by increasing trade and financial integration between Australia and the world, and there has been a rising correlation over time between Australian and foreign growth. For every foreign growth measure, with the exception of the UK, the correlation with Australian growth is stronger in the second half of the sample than in the first half and, in many cases, there is a trend rise in correlation throughout the sample.

The exception of the UK is revealing. The share of Australian exports going to the UK fell from 27 per cent in 1960 to just 4 per cent in 1979, and stabilised at around this level

Figure 13: Growth Rate Correlations

(four-quarter-ended percentage changes)



Note: At each date, the figure plots the correlation between Australian and foreign four-quarter-ended growth over the previous five years.

thereafter. This may help explain the quite strong correlation between Australian and UK growth before 1980 and the much weaker correlation in the 1980s. The trend fall in the share of Australian exports to the UK clearly cannot explain why the Australian and UK business cycles have again become highly correlated in the late 1980s and early 1990s.

Of course, this recent high correlation between the business cycles in Australia and the UK (as well as those in Canada and the US) may be a coincidence. Alternatively, it may suggest that there are links other than trade links between Australia and the rest of the world that are of increasing importance for the Australian business cycle. We will return to this idea at the end of this section. However, we now turn to a discussion of the well-known correlation between the Australian terms of trade and measures of foreign activity. Figure 14 shows the four-quarter-ended percentage change in the terms of trade and four measures of foreign activity.

For each measure of foreign activity, there appears to be a positive correlation between changes in foreign activity and changes in the Australian terms of trade.

Figure 14: Terms of Trade and Foreign Activity Comparisons
(four-quarter-ended percentage changes)

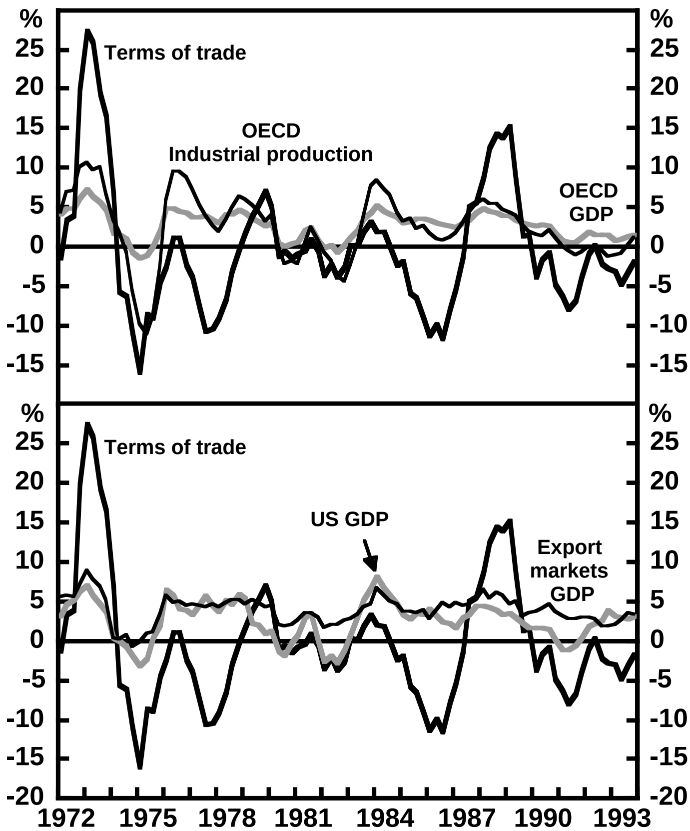


Figure 14 also makes clear, however, that this correlation is relatively weak. Thus, for example, the big fall in the terms of trade in 1986 occurred when foreign activity was not particularly weak. (OECD industrial production was weak, but still much stronger than in the early 1980s or early 1990s.)

To explore the relationship more fully, a model relating Australia's terms of trade to foreign economic activity is estimated. The model allows both for a secular trend decline in the terms of trade (probably arising from a trend decline in commodity prices relative to the prices of manufactures) and for the tendency of the terms of trade to return to this trend after a shock. Contemporaneous and lagged growth in foreign activity, Δw_{t-j}, are also included in the model (see Appendix C for further details). However, as pointed out by Barry Hughes in his comments on the paper, supply-side influences on the terms of trade are ignored. The model is estimated with quarterly data and takes the form:

$$\Delta tot_t = \alpha + \beta\, t + \gamma\, tot_{t-1} + \sum_{j=1}^{3} \delta_j\, \Delta tot_{t-j} + \sum_{j=0}^{3} \pi_j\, \Delta w_{t-j} + \varepsilon_t \tag{1}$$

For each measure of foreign activity, Table 1 shows two types of information. First, it shows the extent to which the variation in the terms of trade is explained by the estimated equations (measured by the $\bar{R}^2$). In all cases, including the foreign activity variables generates little improvement in explanatory power compared to the base case. Thus, for example, adding OECD industrial production to the base case model over the period 1980:1 to 1993:4 increases the $\bar{R}^2$ by only 0.05. Second, Table 1 also shows in which models foreign activity makes a statistically significant contribution to explaining the change in the terms of trade (measured by the p-value relating to the joint significance of the foreign activity terms). As the table shows, this only occurs for models estimated over the more recent sample period. Thus, while measures of foreign activity do help to explain the behaviour of the Australian terms of trade, much of the terms of trade movement is not simply a response to the world business cycle, an observation we will return to shortly.

Table 1: Terms of Trade Models
(comparison of foreign activity measures)

Foreign activity measure	1980:1 to 1993:4		1972:1 to 1993:4	
	$\bar{R}^2$	p-value	$\bar{R}^2$	p-value
Base case (no foreign measure)	0.32		0.31	
OECD GDP	0.32	0.02	0.34	0.11
USA GDP	0.36	0.00	0.34	0.08
Export markets GDP	0.37	0.00	0.33	0.30
OECD industrial production	0.37	0.00	0.30	0.49
Export markets industrial production	0.31	0.43	0.32	0.50

Note: The p-values refer to the joint significance of the foreign activity terms. Thus, for example, a p-value less than 0.05 implies joint significance at the 5 per cent level.

4.1 Models of the Australian Business Cycle

We now turn to econometric models of the Australian business cycle. We are particularly interested in foreign influences on the domestic business cycle and in examining the importance of the terms of trade as a foreign shock to Australian activity. Before discussing the models, we should register a note of caution. All the estimated models are very simple. They ignore aspects of the Australian economy which, arguably, had an important influence on growth during the period under study. Fiscal policy and the effect of the centralised wage-fixing system are two aspects that come to mind. Unfortunately, it is not straightforward to include either of them in a model of growth.[13]

Despite these limitations, the estimated models yield interesting insights. The results are presented in Table 2. The estimated models are all specific versions of the general form:

$$\begin{aligned}\Delta y_t = \alpha + \sum_{j=2}^{6}\beta_j r_{t-j} + \sum_{j=1}^{2}\gamma_j\, SOI_{t-j} + \sum_{j=0}^{7}\delta_j \Delta tot_{t-j} \\ + \sum_{j=0}^{7}\kappa_j\ \Delta rtwi_{t-j} + \phi y_{t-1} + \theta w_{t-1} + \pi\Delta w_t + \varepsilon_t\end{aligned} \qquad (2)$$

where Δy_t is Australian quarterly GDP growth, r_t is the real short-term interest rate, SOI_t is a weather variable (see below), tot_t is the log terms of trade, $rtwi_t$ is the log real exchange rate and y_{t-1} and w_{t-1} are the lagged log levels of Australian and foreign GDP.[14]

The first two sets of independent variables control for domestic conditions. We use lags 2 to 6 of the real short-term interest rate to control for the influence of domestic monetary policy because we have prior evidence that monetary policy acts with a lag of roughly six to eighteen months (see, for example, Lowe (1992)). In all the regressions, the mean of the real interest rate coefficients is negative, as expected, and highly significant.[15]

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13. For Keynesian reasons, 'contractionary' fiscal policy probably worsens a recession, while at a different stage of the business cycle, it may add to private sector confidence and lead to little or no reduction in output growth. This makes it difficult to estimate empirically the influence of fiscal policy on growth. (During the long expansion of the 1980s, the six countries in the OECD which reduced their general government fiscal deficits by the largest fraction of GDP, experienced output growth only slightly slower than the OECD average. See Alesina, Gruen and Jones (1991)). Likewise, although there is good evidence that the Prices and Incomes Accord reduced real wage outcomes and thereby contributed to real growth in the 1980s (Chapman 1990; Stevens 1992) it is not easy to include the effects of the Accord in an empirical model.

14. We are faced with the common difficulty in econometrics that we require a time-span of data long enough to generate meaningful results but not so long that the underlying economic relationships change substantially during the estimation period. With this in mind, we omit the more financially-regulated 1970s, and estimate from the beginning of 1980 to the end of 1993, giving fourteen years of data. For these regressions, the float was not an important regime change, because, between 1980 and 1983, the exchange rate was still fairly flexible (it was adjusted daily via a crawling peg with the $US).

15. For the real short-term interest rate, we use the cash rate set by the Reserve Bank deflated by underlying consumer price inflation (Treasury series) over the past four quarters. Changing the lag structure makes minimal difference, with one exception. If the first lag of the real cash rate is included, it is of the wrong sign and significant, which we presume is a consequence of policy reaction to domestic growth shocks. As a check of robustness, we also repeated all the regressions in the table using the yield spread (the cash rate minus the 10-year bond rate) instead of the real cash rate to control for the influence of monetary policy (we again used lags 2 to 6). The results are qualitatively similar, although both the significance of these variables and the explanatory power of the regressions are mostly reduced.

Table 2: Australian GDP Growth Regressions (1980:1 to 1993:4)[(a)]

$$\Delta y_t = \alpha + \sum_{j=2}^{6}\beta_j r_{t-j} + \sum_{j=1}^{2}\gamma_j SOI_{t-j} + \sum_{j=0}^{7}\delta_j \Delta tot_{t-j}$$

$$+\sum_{j=0}^{7}\kappa_j \Delta rtwi_{t-j} + \phi y_{t-1} + \theta w_{t-1} + \pi \Delta w_t + \varepsilon_t$$

Variable	Model: 1	2 (OECD)	3 (OECD)	4 (US)	5 (US)	6 (Export markets)	7 (Export markets)
Constant	1.61** (3.70)	-27.25** (-3.90)	-15.42** (-2.86)	-31.71** (-4.01)	-17.32** (-3.24)	15.20 (1.91)	9.75 (1.11)
Real cash rate[(b)]	-0.027 {0.00}	-0.057 {0.00}	-0.035 {0.00}	-0.033 {0.00}	-0.021 {0.01}	-0.035 {0.00}	-0.037 {0.00}
SOI[(b)(c)]	0.011 {0.04}	0.017 {0.08}	0.011 {0.04}	0.010 {0.19}	0.007 {0.05}	0.017 {0.05}	0.012 {0.01}
Terms of trade[(b)] % change	0.030 {0.17}	-0.060 {0.10}		-0.069 {0.06}		0.004 {0.82}	
Real TWI[(b)] % change	-0.023 {0.07}	0.022 {0.03}		0.047 {0.03}		-0.012 {0.30}	
Lagged Australian GDP log level		-0.29** (-3.69)	-0.20* (-2.31)	-0.31** (-4.12)	-0.19** (-2.58)	-0.19* (-2.49)	-0.14 (-1.53)
Lagged foreign GDP log level		0.35** (3.84)	0.24* (2.43)	0.38** (4.21)	0.23** (2.76)	0.16** (2.65)	0.12 (1.67)
Foreign GDP % change		1.22** (5.16)	0.84** (4.90)	0.60** (5.22)	0.40** (4.96)	0.50* (2.55)	0.55** (4.27)
R^2	0.47	0.65	0.56	0.67	0.56	0.53	0.47
$\overline{R}^2$	0.09	0.34	0.46	0.37	0.47	0.10	0.35
Joint significance of terms of trade and real TWI	85.24 {0.00}	45.58 {0.00}		86.68 {0.00}		39.94 {0.00}	
Autocorrelation test AR(4)	6.79 {0.15}	11.80 {0.02}	3.50 {0.48}	15.07 {0.00}	9.91 {0.04}	10.34 {0.04}	3.02 {0.55}
ARCH test ARCH(4)	16.92 {0.00}	18.85 {0.00}	22.26 {0.00}	17.32 {0.00}	23.71 {0.00}	17.25 {0.00}	20.02 {0.00}
Jarque Bera test (Normality)	0.16 {0.93}	0.28 {0.87}	2.44 {0.29}	0.59 {0.74}	3.26 {0.20}	0.17 {0.92}	0.46 {0.80}

Notes: (a) Numbers in parentheses () are t-statistics. Numbers in brackets {} are p-values. Individual coefficients marked with *(**) imply that the coefficient is significantly different from zero at the 5%(1%) level. Standard errors are estimated using a Newey-West correction allowing for fourth order residual correlation. All variables in log levels and their differences are multiplied by 100 (so growth rates are in percentages).

(b) The mean coefficient is reported for the real cash rate, the Southern Oscillation Index, the terms of trade and the real TWI to summarise the coefficients on these variables. The p-values are derived from chi-squared tests of the joint significance of the lags.

(c) The SOI (Southern Oscillation Index) measures the sea level barometric pressure differential between Darwin and Tahiti. If the index is positive, trade winds are stronger and rainfall in Australia is more plentiful. If the index is negative, the trade winds are weaker and less rain occurs. The quarterly figures are the average daily value of the index throughout that quarter.

Further, following McTaggart and Hall (1993), we include the Southern Oscillation Index (SOI) to capture the influence of weather on agricultural production and hence on growth in the wider economy. This variable also has the expected impact on domestic growth. A positive SOI is associated with widespread rainfall over eastern Australia, and, according to the regressions in Table 2, is also associated with stronger growth in the Australian economy.[16]

The seven regressions in Table 2 model the foreign influence on the domestic business cycle in different ways. The first regression assumes that this foreign influence can be completely captured by changes in the terms of trade and the real exchange rate. This regression does, however, allow quite long lags (up to two years) in the transmission from terms of trade and real exchange rate changes to domestic growth.[17]

In this first regression, although the significance levels are low, the point estimates imply economically-meaningful relationships, i.e., that a rise in the terms of trade increases the growth rate, while an appreciation of the real exchange rate (a rise in the real TWI) reduces it.[18]

The rest of Table 2 includes, in turn, each of the three measures of foreign activity introduced in Figure 12. Thus, regressions 2 and 3 include OECD GDP, 4 and 5 include US GDP, while 6 and 7 include the GDP of Australia's export markets. In each regression, the contemporaneous foreign quarterly growth rate is included, as are lagged log levels of the Australian and foreign GDP. Including lagged log levels in the regression allows for a possible long-run (cointegrating) relationship between the log levels of Australian and foreign GDP. The table suggests that there is a long-run relationship between Australian and either OECD or US GDP. However, the evidence for a long-run relationship between Australian and export markets' GDP is much less compelling.[19]

Turning to the implications of the results in the table, we begin with a discussion of the importance of the terms of trade. Earlier in the paper, we discussed the big terms of

16. For reasons we will come to, model 3 is our preferred model. For this model, the first lag of the SOI is significant, the second lag is border-line significant, while further lags and the contemporaneous variable are jointly insignificant. We therefore include the first and second lags of the SOI in each model.

17. We examined an alternative specification including lags 0 to 11 on the quarterly change in both variables. With this specification, the coefficients on the longer lags are *larger in magnitude* than those on shorter lags; a result sufficiently at variance with our priors that we rejected this alternative specification.

18. One must distinguish between the longer-run trend of the real exchange rate, and its shorter-run behaviour. Relatively strong productivity growth in the domestic traded-goods sector is associated with both an appreciating real exchange rate and strong output growth in the longer run. However, a shorter-run real exchange rate appreciation (an appreciation above trend) reduces demand for net exports, and hence, reduces growth. In our regression, the former correlation is captured by the constant term, while the latter one is relevant for the coefficients on the real exchange rate variables. On another point, for both variables, individual lags are mostly of the correct sign (although mostly insignificant). Together, all the lags on Δtot and $\Delta rtwi$ are jointly highly significant (see the table). There is no evidence of a co-integrating relationship between the log levels of Australian GDP and the terms of trade and/or the real exchange rate (not shown).

19. The evidence suggests that these log levels of GDP are stochastically non-stationary I(1) variables (see Appendix C). For each measure of foreign growth, lags of both Australian and foreign growth are not statistically significant and the reported specifications are the preferred ones. In each regression, the t-statistic on the lagged log level of Australian GDP can be used to test for cointegration, although it has a non-standard distribution somewhere between the N(0,1) and Dickey-Fuller distributions (Kremers, Ericsson and Dolado 1992).

trade rises in the early 1950s and 1970s. Given the relatively fixed nominal exchange rate at those times, these big terms of trade rises led to large rises in domestic activity and money balances, which, in turn, translated quickly into surges in domestic inflation (see Figure 5 and the associated discussion).

For the purposes of the current discussion, it is worth drawing attention to the size of the booms in domestic activity which accompanied these terms of trade rises. Over the two years 1949/50 and 1950/51, real Australian GDP rose by 17 per cent (Stevens 1992), while over the year to March 1973, it rose by nearly 11 per cent. On these two occasions, terms of trade rises had a big impact on domestic real activity. The evidence from Table 2 is that internationalisation and financial deregulation of the Australian economy since the early 1980s, including floating the Australian dollar, has significantly weakened this relationship between the terms of trade and domestic real activity.

There are two interesting aspects of this weakened relationship. First, while a terms of trade rise still appears to lead to a rise in real Australian output, the rapid real appreciation that now accompanies the terms of trade rise has significantly reduced the strength of this link. Thus, a 10 per cent rise in the terms of trade increases Australian GDP over the subsequent two years by an estimated 1.6 per cent when there is no associated real exchange rate change. However, with the average associated post-float real appreciation, the increase in output is a much smaller 0.5 per cent.[20]

The second interesting aspect to emerge from the table is that foreign influences on the domestic real economy are not well captured by changes in the terms of trade and the real exchange rate. Two pieces of evidence support this argument. First, including only terms of trade and real exchange rate changes in the regression (model 1) explains less of Australian growth than any other regression in the table. Second, once foreign activity is explicitly included in the regression, changes in the terms of trade and the real exchange rate make no economically meaningful contribution to Australian growth – a conclusion supported using all three measures of foreign activity.[21]

On this point, it is worth recalling the evidence from Figure 14 and Table 1. While terms of trade changes are correlated with changes in foreign activity, much of the movement in the Australian terms of trade is not simply a response to the foreign business cycle. This makes the evidence from Table 2 even more interesting. Foreign activity is not simply a proxy for the Australian terms of trade. A shock to foreign activity appears to have a strong (and as we shall see, rapid) impact on Australian growth even when it

20. The numerical estimates are derived from model 1 in Table 2. The real appreciation associated with a floating exchange rate is assumed to occur immediately. Dynamic simulation of the Blundell-Wignall *et al.* (1993) post-float exchange rate equation implies that this is quite a good approximation. The forward-looking foreign exchange market may sometimes induce a real appreciation *in anticipation of* a terms of trade rise, which is the widespread interpretation of the real appreciation in early 1994 (see Figure 1). If the appreciation occurs before a terms of trade rise, this further offsets the rise in domestic output growth associated with the terms of trade rise. With a fixed nominal exchange rate, a terms of trade rise still leads to real appreciation, but the timing is different. The terms of trade rise then leads to domestic inflation which, in turn, implies real appreciation. However, with domestic prices adjusting sluggishly, the real appreciation occurs significantly after the terms of trade rise. (With a fixed exchange rate, the central bank must also sterilise any accompanying capital inflow or the domestic money supply will increase, adding to the domestic boom and the accompanying inflation.)

21. The relevant regressions are 2, 4 and 6. In 2 and 4, the average coefficients on both the terms of trade and the real TWI are quite significant but *of the wrong sign*, while in 6, they are very small in magnitude.

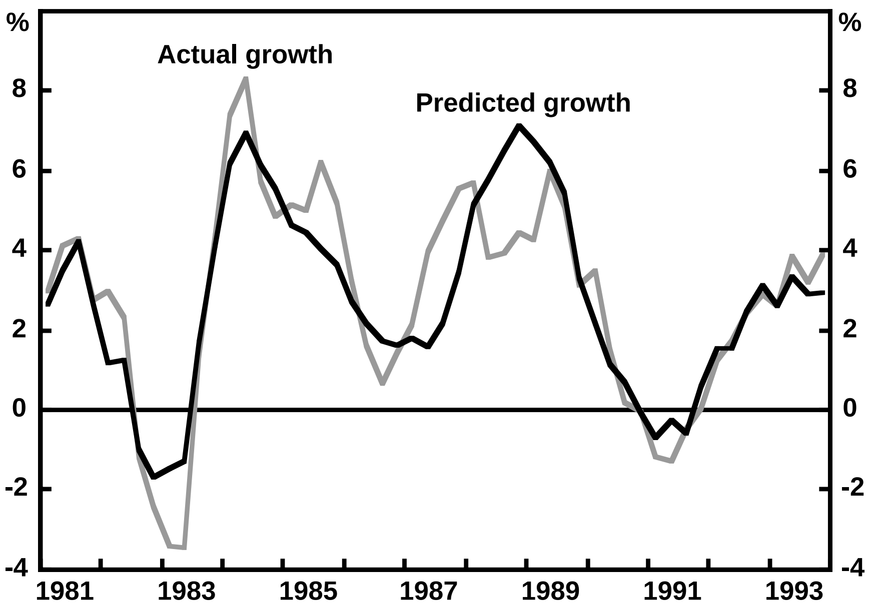
does not lead to a shock to Australia's terms of trade. By contrast, a terms of trade shock does not appear to have a big impact on Australian growth *as long as* it is not accompanied by a significant change in foreign activity.

As an example, Australia experienced the biggest terms of trade fall in the estimation period in 1985/86. At the time, OECD growth was relatively buoyant, as Figure 14 shows. While output growth in Australia did slow briefly in 1986 (see Figure 15), the model which includes OECD output growth *but not* terms of trade changes (model 3 in Table 2) captures this slowing and subsequent acceleration of Australian growth quite well (Figure 15).

Moving beyond the terms of trade, we turn to discussion of the three different foreign activity measures. Of these measures, the models which include OECD or US GDP provide much better empirical descriptions of Australian growth than the models which include the GDP of Australia's export markets (judged by R^2 or $\bar{R}^2$ measures). Furthermore, as previously mentioned, there is much stronger evidence for a stable long-run relationship between the log levels of Australian and either OECD or US GDP than between Australian and export markets GDP. This evidence therefore suggests that the strong growth of Australia's export markets (particularly in Asia) does not appear to have had much impact on Australian output growth – at least, not yet.

These results are quite a surprise. In Australian economic debate, terms of trade shocks and changes in demand for Australian exports are perhaps the two most commonly discussed ways in which the rest of the world has an influence on the domestic

Figure 15: Actual and Predicted Australian GDP Growth
(four-quarter-ended growth)



Note: Predicted growth is derived by dynamically simulating model 3 in Table 2 and deriving the implied four-quarter-ended growth.

business cycle. Nevertheless, our evidence provides little support for either of them as *dominant* channels of foreign influence. As we have seen, since 1980, foreign influences on the domestic real economy are not well explained, either by changes in the terms of trade and the real exchange rate or by growth in Australia's export markets. This suggests that there are links between Australia and the rest of the world that have an important influence on Australian real activity but are not revealed (at least not over a period of a year or two) by changes in either demand or prices for Australian exports. Possible candidates are international links between bond, share and property markets, as well, perhaps, as the international transmission of new ideas and new technologies. We will briefly discuss these links in more detail below. Before doing so, however, we complete our discussion of the results in Table 2.

In terms of goodness of fit, there is not much difference between the models using OECD GDP and those using US GDP. However, the discussion in the last paragraph suggests that measures of foreign output may be acting, at least partly, as proxies for the effects on the Australian real economy of links between Australian and foreign asset markets (or, possibly, the introduction of new foreign technologies or ideas). If so, we presume that broader measures of world output are to be preferred. Hence, we favour model 3, which uses the domestic real cash rate, the weather variable and OECD GDP to explain real Australian growth.

Figure 15 compares actual Australian output growth with growth predicted by this model. The model does an impressive job of tracking the growth of the Australian economy over the estimation period. According to the model, the predominant influences on Australian growth are the stance of domestic monetary policy as well as the level, and the rate of growth, of output in the OECD. To quantify these influences, if the domestic short-term real interest rate is raised by one percentage point (say, from 3 to 4 per cent per annum) for eighteen months, the *level* of Australian output falls by 0.4 per cent by the end of this time. The largest effect on domestic output *growth* occurs at the end of the interest rate rise when the four-quarter-ended growth rate has been reduced by about 0.3 percentage points. Monetary policy has a strong, though temporary and substantially lagged, effect on the real economy.[22]

By contrast, a permanent change in OECD output has a rapid and permanent effect on Australian output. A one per cent rise in OECD output raises Australian output by 1.2 per cent in the long run, with *over two-thirds* of this rise occurring in the same quarter as the rise in OECD output. What explains this extremely rapid transmission from the OECD to Australia? The short answer is that we do not know. It again suggests a possible role for asset markets since it is these markets that respond rapidly to actual or expected changes in the economy.

During the period of estimation (1980 to 1993) the Australian economy has become more open and both deregulation and technological change have strengthened financial links with the rest of the world. Given these changes, it is interesting to see if (or how) the coefficient estimates in the model have changed over time. To this end, the model is estimated initially over the sub-period 1980:1 to 1988:1, then re-estimated after adding each new quarter of data, ending finally with estimates using the whole sample,

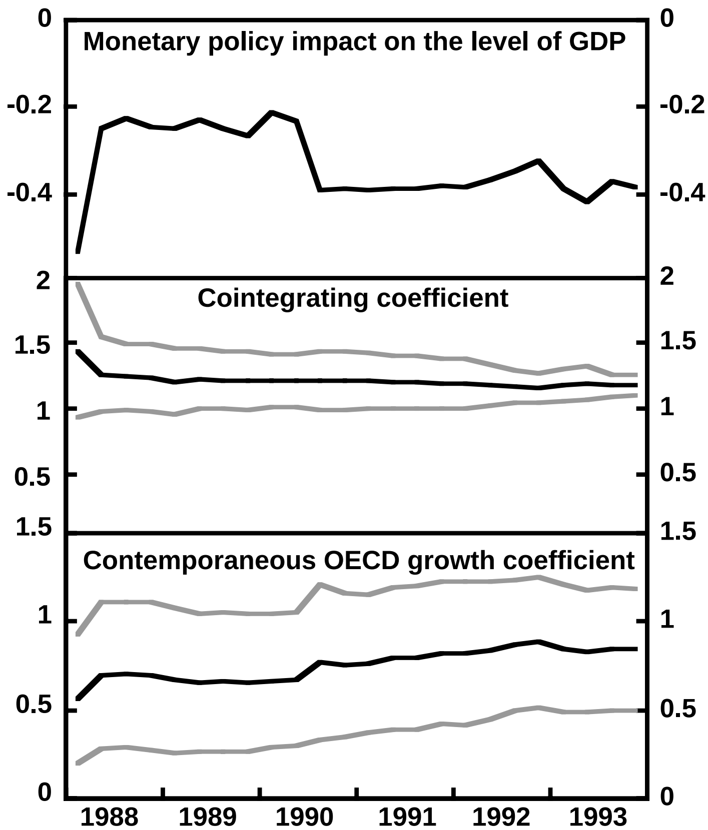
22. In the model, the effect of monetary policy on the real economy is temporary provided monetary policy can change the short-term real interest rate only temporarily. This is the usual assumption.

1980:1 to 1993:4. (Starting with a shorter sub-period than 1980:1 to 1988:1 generates coefficient estimates with very large standard errors.) The results of this exercise are presented in Figure 16, where each panel of the figure shows a point estimate and the lower two panels show two standard errors either side of the estimate.

The top panel shows the percentage change in the level of Australian output eighteen months after a one per cent rise in the short-term real interest rate.[23] There is no obvious systematic change in this estimate as the estimation period is lengthened. Thus, changes in the economy in the late 1980s and early 1990s do not appear to have substantially altered the influence of monetary policy on real activity.

The middle panel in Figure 16 shows the estimated ratio of the log levels of Australian and OECD output in the model's long-run equilibrium.[24] For given OECD output *growth*, this ratio determines the long-run growth rate of the Australian economy. Given the standard errors, there is no obvious change in this estimate as the estimation period

Figure 16: Evidence of Parameter Stability



23. This is a non-linear function of the model coefficients and we have not estimated the associated standard errors.

24. This ratio is estimated using a Bewley (1979) transformation. The results of Inder (1991) suggest that the associated standard errors are approximately valid.

is lengthened. This suggests that the changes that have occurred in the Australian economy in the late 1980s and early 1990s have had no obvious impact on the ratio of Australian to OECD long-run growth – at least, not yet. We should, however, register a note of caution. Empirically important changes in the Australian long-run growth rate would be very hard to detect using this analysis.

The bottom panel in the figure shows the estimated coefficient on the contemporaneous growth in the OECD. It therefore shows how much of a shock to OECD output is 'transmitted' to domestic growth in the same quarter. Although the standard error bands are wide, the point estimate of this coefficient trends up as the estimation period lengthens from an initial value of 0.57 to a final value of 0.84. While there is no apparent change in the *long-run* impact on Australian output of an OECD output shock (from the middle panel of the figure), it may be that shocks are now transmitted more rapidly to the domestic economy. This again suggests a possible role for asset markets.

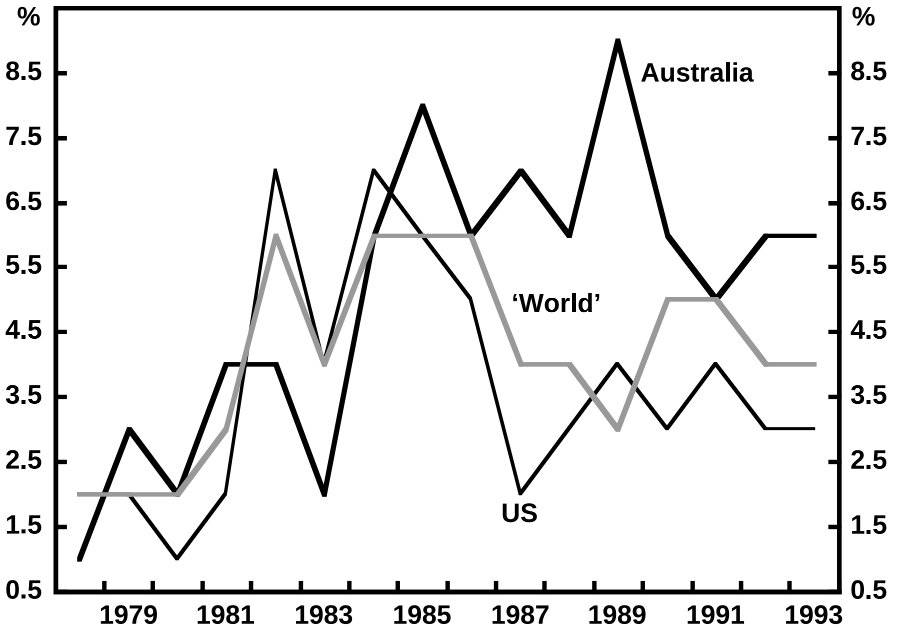
4.2 International Links between Bond, Stock and Property Markets

Our interest in international links between bond, stock and property markets arises from the following implications of our earlier empirical results. Foreign activity plays an important role in explaining the Australian business cycle over the past fourteen years, but neither terms of trade shocks nor changes in demand for Australian exports seem to be dominant foreign influences. Changes in foreign output translate rapidly into changes in Australian output, suggesting a role for asset market links between Australia and the rest of the world. Both deregulation and technological change have strengthened these links, implying that they may be of increased importance for the domestic business cycle. This evidence suggests that, in our preferred model of Australian output growth, foreign output may be acting, at least partly, as a proxy for the effects on the Australian real economy of links between Australian and foreign asset markets.

This sub-section therefore provides evidence on correlations in bond, share and property markets between Australia and the rest of the world. We begin with the most difficult comparison, namely, a comparison between real bond rates in Australia, the US and the 'world'. To estimate real bond rates requires an estimate of inflationary expectations over the life of the bond. Figure 17 shows US and 'world' real bond rates from Blanchard (1993) as well as Australian real bond rates which we have constructed. Blanchard uses inflation forecasts from Data Resources Inc. over the relevant horizon (which, in most cases, is five years) to construct real bond rates. The Australian real bond rates shown in Figure 17 are also for 5-year bonds. Unfortunately, we have inflation forecasts for only the next year (from the OECD) so we use these as forecasts for the average annual inflation rate over the life of the Australian bonds.

Using these measures, Australian and foreign real bond rates are moderately well correlated. Over the whole period, the correlation between Australian and US real bond rates is 0.37 while between Australian and world real long bond rates, it is 0.41. Alternatively, deriving Australian real bond rates using past four-quarters inflation as an estimate of expected future inflation, gives correlations over the whole period of 0.43 with the Blanchard estimate of the US real bond rate and 0.59 with the estimated world real bond rate.

Figure 17: Real Bond Yields



Notes: (a) The real bond yields for the US and for the 'world' are taken from Table A2 in Blanchard (1993). The US real yield is for government bonds with a five year maturity deflated by DRI forecasts of inflation for the US over the lifetime of the bonds. The nominal rates are reported for January in each year and the inflation forecasts are as of December in the previous year.

(b) The world measure is an arithmetically weighted average of the real bond yields for the US, the UK, Germany, France and Italy. Weights are constructed by Blanchard using GDP at current exchange rates. 5-year nominal bond rates are used for all countries except France for which 10-year bonds are used. Nominal interest rates are taken from the IMF's International Financial Statistics publications. The nominal rates are deflated by DRI forecasts of inflation over the lifetimes of the bonds.

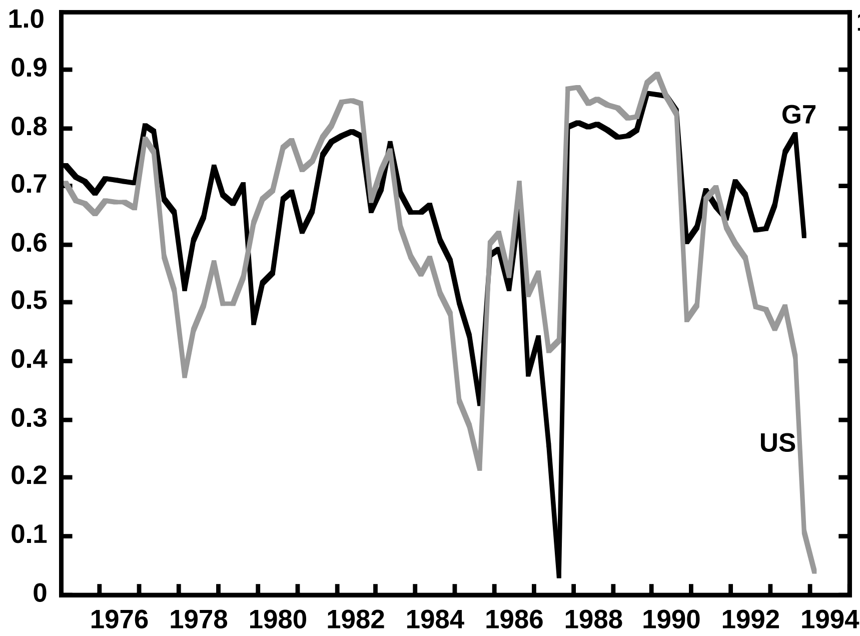
(c) The real bond yield for Australia is the 5-year Treasury bond yield reported for the month of January in the RBA *Bulletin*, Table F2. The 5-year bond yield is deflated by the previous December OECD forecast of Australian inflation for the coming calendar year.

Turning to stockmarkets, Figure 18 shows the correlation between changes in the Australian stockmarket and two measures of the 'world' stockmarket (the US stockmarket and the GDP-weighted stockmarkets of the G7 countries). At each date, the figure plots the correlation between quarterly percentage changes in the Australian and foreign stockmarket indices over the previous three years. We focus on quarterly stockmarket changes because we presume that stockmarket changes over shorter spans of time are of less relevance for the macroeconomy.

Australian and foreign stockmarket changes are strongly correlated. On average, a substantial part of any change in foreign stockmarkets translates into a change in the Australian stockmarket *in the same quarter*. As we will see in Table 3 below, the correlation between annual changes in foreign and Australian stockmarkets is even stronger than the correlation between quarterly changes. There are two further interesting aspects of these correlations. First, there is no evidence in these data that the US stockmarket is of disproportionate importance for Australia. The Australian/US correlation between quarterly stockmarket changes over the whole period from 1972:2 to 1993:4 is 0.67 while the Australian/G7 correlation is a slightly larger 0.71. Second, there is no convincing evidence that the correlation between the Australian and foreign stockmarkets has become stronger over time. While the strongest observed correlation in Figure 18 occurs in the late 1980s, this high correlation is explained by the world-wide stockmarket crash in the December quarter, 1987. Once this quarterly change disappears from the three-year correlations plotted in Figure 18 (which occurs in the December quarter 1990) the correlation falls substantially.

The results in Table 3 confirm those in Figure 18. The contemporaneous correlation between quarterly changes in the Australian and foreign stockmarkets is marginally

Figure 18: Correlations Between Quarterly Changes in Australian and Foreign Stockmarket Indices



Notes: (a) The figure shows moving three-year correlations between quarterly percentage changes in Australian stock prices and both US and G7 stock prices. The correlation reported in each period is the correlation over the preceding three years.

(b) The All Ordinaries Index is used for Australian stock prices. For the US, the share price index in the IMF's *International Financial Statistics* publication is used. The stock prices for the countries in the G7 are also drawn from the IMF database. For more details, see Appendix D.

(c) The G7 index is an arithmetically weighted average of the local-currency stock price indices for each country in the G7. GDP in US dollars is used to construct the weights, allowing for both GDP and exchange rate movements from quarter to quarter. The percentage changes are aggregated using these GDP weights to generate the aggregate percentage changes.

stronger after 1980 than before 1980, but only because of the stockmarket crash. Excluding the December quarter, 1987, the contemporaneous correlation between the Australian and foreign stockmarkets is *weaker* after 1980 than before 1980. Table 3 also shows correlations between annual changes in Australian and foreign stockmarkets. While these are always stronger than the quarterly-change correlations, they have also become slightly weaker over time.

Table 3: Correlations Between Stockmarket Changes

Period	Australia/G7		Australia/US	
	Quarterly	Annual	Quarterly	Annual
1972:2-1979:4	0.70	0.89	0.64	0.88
1980:1-1993:4	0.72	0.78	0.68	0.73
1980:1-1993:4 excluding the crash	0.61	0.75	0.56	0.69

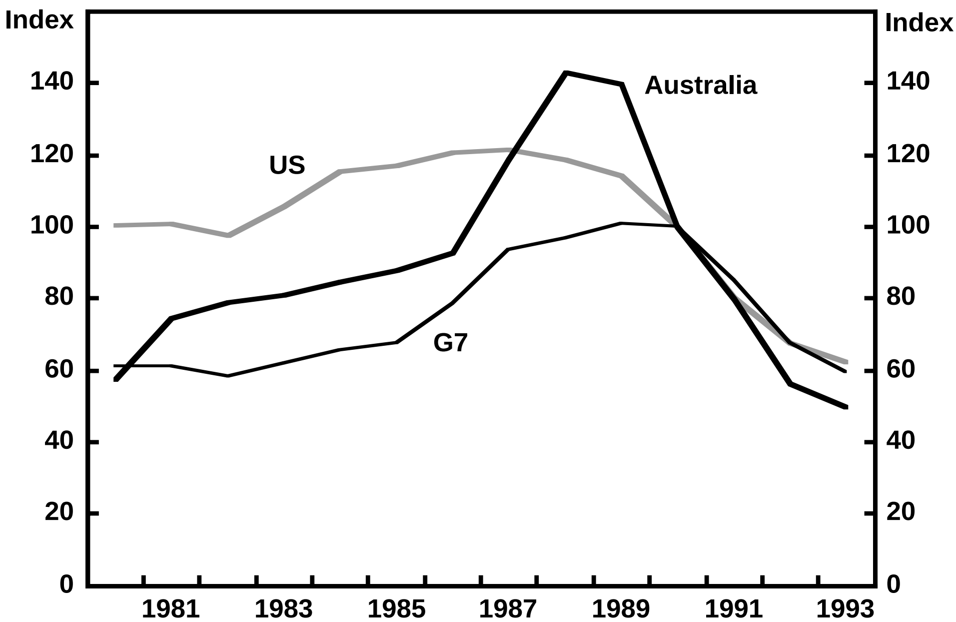
Finally, we turn to the movements of property market prices. Given data limitations, we restrict ourselves to examining the level of property prices rather than deriving time-varying correlations between them. Figure 19 shows commercial property prices deflated by consumer prices for Australia, the US and a GDP-weighted average of the G7.

As is the case for stockmarkets, these real commercial property prices show quite strong correlations. Each series rises through the 1980s, peaks between 1987 and 1990 and falls for the rest of the sample. Over the whole sample, the correlation between the real commercial property prices in Australia and the US is 0.70 while between Australia and the G7, it is 0.83.

We turn to the relevance of these correlations between bond, share and property prices. While asset prices are clearly driven by changes in economic fundamentals, they also appear to be influenced by speculative market dynamics (Shiller 1989; Shleifer and Summers 1990). Further, at times, domestic and foreign asset prices may simply be responding to common contemporaneous changes (or shocks) in Australia and overseas (like, for example, financial deregulation). At such times, the asset price correlation does not imply causation. However, with open capital markets, there is also the possibility of *transmission* of foreign asset price shocks to Australian asset prices by asset trading and the flow of information. This was surely the case in both the stockmarket crash in 1987, and the sell-off of long bonds in 1994. It may also have contributed to both the formation and collapse of the speculative bubble in the Australian commercial property market in the late 1980s and early 1990s.

How does the rapid propagation of price shocks between asset markets translate into a strong contemporaneous correlation between the domestic and foreign business cycles? There are obvious ways in which changing bond, stock and property prices affect real activity. Changing real bond rates alter the real cost of borrowing, changing stock prices influence the cost of equity-financing for firms and changing property prices affect collateral, thus altering firms' and individuals' access to credit. If asset price

Figure 19: Real Commercial Property Price Indices
(1990=100)



Notes: (a) Nominal commercial property prices are obtained from the Bank for International Settlements. Sources are detailed in Table A1.1 in Borio, Kennedy and Prowse (1994).

(b) The nominal commercial property prices are deflated by the consumer price indices in the IMF's *International Financial Statistics* database.

(c) The G7 index is a GDP (in US dollars) weighted average of the real commercial property prices of the G7.

shocks in different countries take a similar length of time to have an effect on their respective domestic real economies, then rapid transmission of asset price movements between countries will help to synchronise business cycles. Support for the important role of asset prices in general, and property prices in particular, in the boom of the late 1980s as well as the subsequent slow recovery from recession has been widely commented upon (see Blundell-Wignall and Bullock (1992), Lowe and Rohling (1993) and Borio, Kennedy and Prowse (1994)). This is at least suggestive evidence that international links between asset markets may now have an important influence on the domestic business cycle.

5. Policy Implications and Conclusions

Integration with the rest of the world has wide-ranging implications for the Australian macroeconomy. In this paper, we have examined some of these implications for both inflation and the business cycle.

Internationalisation affects domestic inflation in many ways, both by altering the incentives facing the public sector, and by increasing competition in the private sector.

With increasing openness, more prices in the economy become sensitive to movements in the exchange rate. Given the importance of the terms of trade for the Australian exchange rate, our analysis concentrated on the changing inflationary impact of terms of trade shocks as the economy becomes more open and the export base is diversified.

The policy implications of terms of trade shocks were profoundly changed by the float of the Australian dollar. Before the float, macroeconomic policy making had great difficulty dealing with terms of trade shocks, particularly terms of trade rises. The problem, however, was one of political economy rather than a lack of understanding of the relevant links in the economy. With a fixed nominal exchange rate regime, it was very difficult for the Federal government to make an explicit decision to revalue the currency, even when the terms of trade were rising strongly. In the short run, such a decision generated a concentrated group of losers in export and import-competing industries. By contrast, the winners from the decision, who would have enjoyed cheaper imports and avoided the inflationary boom, were diffused throughout the wider community. Given this distribution of winners and losers, it is perhaps no surprise that the policy responses to large terms of trade rises were inadequate under a fixed exchange rate regime.[25]

With a floating exchange rate, however, a terms of trade rise leads to rapid nominal and real appreciation. Indeed, since the foreign exchange market is forward looking, the appreciation sometimes occurs in anticipation of future rises in the terms of trade. There may well be adverse micro-efficiency consequences arising from the substantial nominal appreciation that now accompanies terms of trade rises (see Ergas and Wright, this Volume). From a macroeconomic perspective, however, the fact that the appreciation is now delivered by the market seems to be a vital institutional improvement for dealing with terms of trade rises.

The rapid appreciation also implies that the expansionary effect on domestic real activity of the terms of trade rise is reduced substantially (by an estimated 70 per cent over the first two years). Finally, and surprisingly, the appreciation seems to be so large that the net effect of a terms of trade rise is to gradually reduce domestic inflation.

Thus, terms of trade rises now seem to have a favourable impact on both inflation and real activity. Allowing for the diversification of the Australian export base, the magnitude of these favourable impacts may remain roughly stable as internationalisation continues. Thus, terms of trade rises should be much less of a problem for Australian macroeconomic management in the future than they were under a fixed exchange rate regime. The other

25. At the time of the two large terms of trade shocks before the float, mainstream economic advice put the case for an appropriate macroeconomic response. In a memo to the Treasurer in May 1950, the governor of the central bank, H.C. Coombs, argued that: 'to prevent Australian prices rising dangerously it would be necessary to limit public development works, to budget for a substantial surplus, to free interest rates and to tighten the supply of bank loans, and to increase the flow of imported goods by reductions in the protective tariff, by dollar borrowing and by an appreciation of the Australian pound' (Coombs 1981, p. 149). Twenty years later, when the terms of trade were again rising, the OECD reported that: '…there was intense public discussion of foreign exchange policy in Australia [in late 1971]. Export and import-competing industries (rural, mining and manufacturing) *urged devaluation with the US dollar*. A group of academic economists urged substantial appreciation relative to the US dollar, primarily to exert downward pressure on domestic prices. … In December, the Australian Government decided [on] an appreciation against the US dollar of only 6.3 per cent [which implied] *an overall devaluation of about 2 per cent against the weighted average of currencies of Australia's main trading partners*' (OECD 1972, pp. 52-55, italics added).

side of the coin, of course, is that falling terms of trade now appear to have both a contractionary effect on domestic output and an unfavourable impact on inflation. Thus, in contrast to the situation before the float of the Australian dollar, falling terms of trade may present the greater problem for macroeconomic management in the future.[26]

The strong link between the terms of trade and the Australian exchange rate is actually quite a puzzle. While shocks to the terms of trade are quite persistent, they do not seem to be permanent (Appendix C). It is, therefore, not clear why the floating exchange rate responds as much as it does to these shocks. An example makes the point. When the OECD economies slowed in the early 1990s, the Australian terms of trade fell significantly. There is presumably little doubt that the OECD economies will recover, and that, when they do, the Australian terms of trade should be expected to also recover. When this apparently predictable event occurs, the Australian dollar should be expected to appreciate in real terms by almost as much as the terms of trade rise.

Thus, at a time when the Australian terms of trade are low relative to trend, there appears to be an expected excess real return available on assets denominated in Australian dollars. This does not look like the behaviour of an efficient foreign exchange market.[27] Note, however, that it is between two and five years from a terms of trade peak to the next trough. Thus, to exploit this apparent foreign exchange market inefficiency, one must invest with such a time horizon in mind. It may be that central banks are among the few active portfolio managers in the market with an investment horizon this long.

We turn now to our examination of international influences on the domestic business cycle. The past thirty years have been characterised by increasing trade and financial integration between Australia and the world. We have solid evidence that this process of internationalisation has created strong links between Australian and foreign business cycles (Figure 13 and Table 2). Our evidence also suggests that the increasing foreign influence on domestic activity (along with financial market deregulation) has not weakened the influence of monetary policy on the business cycle. However, discovering how foreign influences are now transmitted to the domestic business cycle is far less straightforward. In fact, it is easier to find evidence *against* obvious channels of transmission than it is to find convincing evidence *in favour* of other channels!

Two of the most commonly discussed channels by which foreign influences are transmitted to the domestic business cycle are via the terms of trade and via changes in demand for Australian exports. Changes in both the terms of trade and demand for exports do appear to have an impact on domestic real activity in the expected direction. Nevertheless, it is worth summarising the evidence that these channels of transmission do not appear to be the dominant ones. We start with four pieces of evidence concerning the terms of trade.

26. One should not overstate the problem of coping with terms of trade falls. Given slow pass-through to consumer prices, the inflationary impact takes some time to appear and should therefore be easier to cope with. Further, the associated real depreciation substantially cushions the real economy from the terms of trade fall.

27. Of course, to examine this issue carefully, one should also look at foreign/domestic real interest differentials. At the relevant times, these have been in Australia's favour, which only deepens the puzzle. Finally, risk premia could explain the phenomenon if, for some reason, Australian interest-bearing assets are much more risky when the terms of trade are low relative to trend (but expected to improve) and much less risky when the terms of trade are high (but expected to fall).

First, terms of trade shocks now have a muted effect on domestic real activity for the same reason that they seem to have a perverse influence on domestic inflation, namely, because of the large and rapid adjustment of the floating exchange rate. Second, foreign influences on the domestic economy are poorly explained by changes in the terms of trade and the real exchange rate. Third, once foreign activity is explicitly allowed for, terms of trade and real exchange rate changes make no economically meaningful contribution to Australian growth. Fourth, our preferred model of Australian growth (model 3 in Table 2) includes OECD growth but not changes in the terms of trade or the real exchange rate. Nevertheless, this model does a good job of tracking Australian growth over the past fourteen years, including at the time of the big fall in the terms of trade in 1985/86 (Figure 15).

Turning to the second obvious transmission channel, there are two main pieces of evidence suggesting that changes in demand for Australia's exports are not the dominant foreign influence on the domestic business cycle. First, output growth in Australia's main export markets provides a substantially worse explanation for the Australian business cycle than does US or OECD output growth. Second, using our preferred model of Australian growth, shocks to OECD output are rapidly transmitted to domestic activity, with over two-thirds of the long-run impact of a shock on domestic activity occurring in the same quarter as the shock. Changes in demand for exports are unlikely to translate so rapidly into changes in Australian output growth.

Thus, we are left with a puzzle. Foreign output plays an important role in explaining the Australian business cycle since 1980, but we cannot be sure how. Neither terms of trade shocks nor changes in demand for Australian exports seem to be dominant foreign influences. A role for asset market links between Australia and the rest of the world is suggested by the speed with which changes in foreign output translate to Australian output. Further, these international asset links have been strengthened by deregulation and technological change.

To some extent, a process of elimination leads us to the possibility that trade and information flows between Australian and foreign asset markets (bond, share and property markets) may be important channels by which foreign shocks are now transmitted to the domestic business cycle. Strong correlations between these asset-market prices certainly support this suggestion. Further, there are clear ways in which changes in these prices affect real activity (by altering the cost of debt and equity as well as the value of collateral used to secure loans). Continuing international integration will only increase the importance of these asset market links for the domestic business cycle.

Glossary

The following symbols are used in the models in Appendices A and B:

y	log real income (GDP)
y_n	log real 'full-employment' income
Δy_I	impact effect on the log of Australian real income
d	log real domestic demand (GNE)
m	log real imports
n	log real non-traded goods
i	nominal short-term interest rate
π	expected inflation
q (q^e)	actual (equilibrium) log real exchange rate (units of foreign currency per unit of domestic currency, adjusted for relative consumer prices)
tot	log terms of trade
A	domestic absorption
NX	net exports
p_x, p_m, p_n	log prices of exportables, importables and non-traded goods
p	log consumer price level
β	the import share of GDP (assumed equal to the export share of GDP in the initial period and, except for the alternative model, also equal to the import share of domestic consumption)
y^*, ...	all foreign variables are denoted with a star

Appendix A: The Australian Macro-Model

The first equation in the model determines domestic real income as a sum of domestic and net foreign demand:

$$y = A(y, i - \pi, tot) + NX(y, y^*, q, tot). \tag{A1}$$

The second equation determines the nominal interest rate. It replaces an equilibrium condition in the money market (the LM curve) in the Mundell-Fleming model:

$$i \qquad \text{set by the Reserve Bank}. \tag{A2}$$

The third equation determines the exchange rate. Expected returns on domestic and foreign interest-bearing assets are assumed to be equalised, with expected depreciation equal to the expected inflation differential plus some reversion of the real exchange rate to an expected equilibrium level:

$$i = i^* + \pi - \pi^* + \theta(q - q^e). \tag{A3}$$

The equilibrium real exchange rate is a function of the terms of trade, which are assumed exogenous to the Australian economy since Australia is a small open economy:

$$q^e = \delta \ tot. \tag{A4}$$

The model is completed with determination of domestic prices. The rate of inflation is governed by the combination of an expectations-augmented Phillips curve and the change in the domestic price of imports (note that a rise in q is a real appreciation):[28]

$$\Delta p = \pi + \phi(y - y_n) - \frac{\beta}{1-\beta}\Delta q. \tag{A5}$$

Finally, inflationary expectations adapt gradually towards actual inflation:

$$\Delta\pi = \lambda(\Delta p - \pi). \tag{A6}$$

All the key parameters in the model, β, δ, ϕ, θ and λ, are positive.

28. To derive this equation, start with the more intuitive equations: $\Delta p = (1-\beta)\Delta p_n + \beta \Delta p_m$ and $\Delta p_n = \pi + \phi(y - y_n)$. Then assume the law of one price for imports and that the world price of imports rises at the world inflation rate, π^*. Finally, with Δe defined as the change in the nominal exchange rate, the change in the real exchange rate is $\Delta q = \Delta e + \Delta p - \pi^*$.

Appendix B: The Demand and Price Effects of a Terms of Trade Shock

In this appendix, we use the Australian macro-model to analyse the effect of a 10 per cent rise in the terms of trade (though all the analysis applies, with the signs reversed, to a terms of trade fall). The terms of trade rise is:

$$\Delta tot \equiv \Delta p_x - \Delta p_m \equiv \Delta p_x^* - \Delta p_m^* \qquad \text{(B1)}$$

where the second identity follows from assuming the law of one price for both exports and imports. We derive expressions for the two effects described in the text so that both the increase in demand for non-traded goods and the overall inflationary effect of the terms of trade rise can be quantified. We make the following simplifying assumptions:

- there are three goods in the economy: an import good, an export good, and a non-traded good;
- domestic production is confined to the non-traded and export goods, and, over the time span of interest, supply of the export good is fixed; and
- domestic demand is confined to the non-traded and import goods.

The economy is initially in an equilibrium characterised by:

- real income at its 'full employment' level, $y = y_n$;
- the real exchange rate at its equilibrium level, $q = q^e$;
- consumer price inflation at its expected value, $\Delta p = \pi$;
- the real interest rate, $i - \pi$, set consistent with full-employment output; and
- balanced trade, with the value of exports and imports both equal to a fraction β of nominal national income.

The terms of trade rise induces a real appreciation of:

$$\Delta q = \delta \, \Delta tot \qquad \text{(B2)}$$

which implies a change in the relative price of consumption goods to imports of:[29]

$$\Delta\left(p - p_m\right) = \delta \, \Delta tot\,. \qquad \text{(B3)}$$

The impact effect on the log of Australian real income, Δy_I, is the product of the increase in the log of Australia's terms of trade and the export share of GDP:

$$\Delta y_I = \beta \, \Delta tot \qquad \text{(B4)}$$

which we assume is associated with a proportionate rise in domestic demand:

$$\Delta d = \chi \Delta y_I = \chi \beta \Delta tot \qquad \text{(B5)}$$

29. Assuming the law of one price, that the world price of imports rises at the world inflation rate and given the definition $\Delta q = \Delta e + \Delta p - \pi^*$, it follows that $\Delta p_m = \Delta p_m^* - \Delta e = \pi^* - \Delta e = \Delta p - \Delta q$. Hence, $\Delta\left(p - p_m\right) = \Delta q = \delta \, \Delta tot$. We use the relative price of consumption goods to imports because it most closely matches the relative price used in estimation of the income and price elasticities of imports. (In estimation, the relative price is the difference between the log GNE deflator and the log import deflator – see below).

where χ is estimated econometrically. The associated rise in demand for imports is therefore:

$$\Delta m = \varepsilon_y \Delta d + \varepsilon_p \Delta(p - p_m) = \Delta tot\left[\chi\beta\varepsilon_y + \delta\varepsilon_p\right], \tag{B6}$$

where ε_y and ε_p are the income elasticity and the absolute value of the price elasticity of imports, respectively. By assumption, domestic demand falls on either imported or non-traded goods. The increase in demand for the non-traded good is therefore:[30]

$$\Delta n = \left(\Delta d - \beta\Delta m\right) / \left(1-\beta\right) = \frac{\beta}{1-\beta}\Delta tot\left[\chi\left(1-\beta\varepsilon_y\right) - \delta\varepsilon_p\right]. \tag{B7}$$

Finally, the overall impact on domestic consumer price inflation is derived from equation (A5) in the Australian macro-model:

$$\begin{aligned}\Delta p - \pi &= \phi\left(y - y_n\right) - \beta\Delta q / \left(1-\beta\right)\\ &= \phi^*\Delta n - \beta\delta\Delta tot / \left(1-\beta\right)\\ &= \frac{\beta}{1-\beta}\Delta tot\left[\phi^*\left\{\chi\left(1-\beta\varepsilon_y\right) - \delta\varepsilon_p\right\} - \delta\right]\end{aligned} \tag{B8}$$

where ϕ^* is the slope of the Phillips curve taking into account the change in variable from an increase in national income ($\Delta y = y - y_n$ in equation (A5)) to an increase in demand for the non-traded good, Δn.

We use the following parameter values:

- δ = 0.885, from Blundell-Wignall *et al*. (1993) for the post-float period;
- χ = 1.27 (see below);
- ε_y = 1.55, ε_p = 0.42 from the 'traditional model' in Table 1 of Dwyer and Kent (1993);[31]
- ϕ = 0.4 from Table 6 of Stevens (1992) (ϕ is the reciprocal of the GDP sacrifice ratio); and
- ϕ^* $= \phi \times \overline{\Delta y / \Delta n}$ = 0.4, where $\overline{\Delta y / \Delta n}$ is the estimated ratio of Δy to Δn for a 10 per cent terms of trade rise at a given trade share. We assume $\overline{\Delta y / \Delta n}$ = 1 (see below).

The cumulated two-year rises in GNE and GDP from a 10 per cent terms of trade rise are estimated in Appendix C. The point estimates (standard errors) are, for GNE, Δd = 2.26 (1.08) per cent-years and, for GDP, Δy = 0.03 (0.95) per cent-years.

To derive the estimate for χ, we use the estimated rise in GNE. It follows from equation (B5) that $\chi = \Delta d / (\beta^*\Delta tot) = 2.26 / (0.178 \times 10) = 1.27$, because the average value of β over the estimation period 1980-93 is $\beta^* = 0.178$.

30. Real domestic demand D satisfies $P_M^{\beta} P_N^{1-\beta} D = P_M M + P_N N$ where M and N are levels of demand for real imports and for the non-traded good and P_M and P_N are the respective price levels. It follows that $N = DR^{\beta} - MR$ where $R = P_M / P_N$. Taking logs and the total derivative of this expression and noting that in the initial equilibrium, $MR = \beta DR^{\beta}$ by assumption, gives the first equality in equation (B7).

31. While these are long-run elasticities, the evidence from Wilkinson (1992) for both income and price elasticities is that most of the effect occurs within two or three quarters.

Given the other parameter values, equation (B7) implies that Δn = 1.19 per cent-years for a 10 per cent terms of trade rise at $\beta = \beta^*$. Using the point estimate of Δy above, implies that $\overline{\Delta y / \Delta n} = 0.03 / 1.19 = 0.03$. Given the standard error, this point estimate of Δy is very imprecise and it makes no sense that the boost to GDP is smaller than the boost to the output of the non-traded sector. We therefore assume that $\overline{\Delta y / \Delta n} = 1$. Importantly, the qualitative features of the results are not changed if the estimated rise in GDP is assumed to be Δy = 0.03 + (two standard errors) = 1.93 which would imply that $\overline{\Delta y / \Delta n} = 1.93 / 1.19 = 1.62$ and hence that $\phi^* = \phi \; \overline{\Delta y / \Delta n} = 0.65$.

B1. Alternative Model Assumptions

We again assume β is the trade share of GDP, but now λ_1 is the share of imports and λ the share of importables (imports plus domestically-produced import substitutes) in domestic consumption. We assume, at present, with $\beta \approx 0.20$, that:

- the share of imports in consumption (i.e., not re-exported) is $\lambda_1 = \beta(1-\beta) = 0.16$; and
- domestically-produced import substitutes form 10 per cent of total consumption implying that $\lambda = \lambda_1 + 0.10 = 0.26$ (based on personal communication with Jacqui Dwyer, based on Dwyer (1992)).

Next, to characterise the change of the shares of both imports and importables as the trade share rises, we make the following two (arbitrary but plausible) assumptions:

- as the economy continues to open up (i.e., for $\beta > 0.20$), the share of importables in consumption rises only half as fast as the trade share of GDP; and
- the share of domestically-produced import substitutes in consumption falls from 0.10 (current estimate) to 0.05 as the trade share rises from 0.2 to 0.35.

It follows that $\lambda_1 = 0.16 + (\beta - 0.20) \times 5/6$ and $\lambda = 0.26 + (\beta - 0.20)/2$ over the range $0.2 \le \beta \le 0.35$. In this alternative model, equation (B7) becomes:

$$\Delta n(\lambda_1) = (\Delta d - \lambda_1 \Delta m)/(1-\lambda_1) = \Delta tot\left[\chi\beta(1-\lambda_1\varepsilon_y) - \delta\lambda_1\varepsilon_p\right]/(1-\lambda_1) \qquad \text{(B9)}$$

For the same reasons as before, we assume that $\overline{\Delta y / \Delta n}$ = 1 and hence that $\phi^* = \phi = 0.4$. To model incomplete pass-through of over-the-dock import price shocks to consumer prices, let Δp_m be over-the-dock import price inflation and Δp_m^c the *importable* component of consumer price inflation. We assume $\Delta p_m^c - \Delta p_n = \alpha(\Delta p_m - \Delta p_n)$, $\alpha \le 1$, where $\Delta p_m = \Delta p_m^* - \Delta e$ and $\alpha = 1$ represents complete pass-through and reduces to the original equation $\Delta p_m^c = \Delta p_m = \Delta p_m^* - \Delta e$. Incomplete pass-through does not alter the expression for the increase in non-traded demand (equation (B9)) because ε_y and ε_p are estimated using over-the-dock import prices which are unaffected by incomplete pass-through. However, equation (B8) now becomes:

$$\Delta p - \pi = \phi * \Delta n(\lambda_1) - \frac{\alpha\lambda\ \delta\ \Delta tot}{1-\alpha\lambda} \qquad \text{(B10)}$$

The alternative model results presented in Figures 7 and 11 use equation (B10) with both $\alpha = 0.5$ and $\alpha = 1.0$ to estimate the range of inflation outcomes depending upon the extent of second stage pass-through.

Appendix C: Linking Australia to the World through the Terms of Trade

This appendix explores more fully the relationships between foreign activity and the terms of trade and between the terms of trade and domestic economic activity. It does so in three parts. First, the time series properties of the data are explored. Second, evidence is provided of the relationship between Australia's terms of trade and foreign activity. Finally, the appendix presents estimates of the impact of terms of trade shocks on both GDP and GNE. These models are used in Section 3 of the paper to provide estimates of the effects of a terms of trade shock on the domestic economy.

C1. Univariate Tests of the Data's Time Series Properties

This sub-section examines each series' time series properties. To this end, the following model is estimated for each time series z_t:

$$\Delta z_t = \alpha + \beta t + (\rho - 1) z_{t-1} + \sum_{j=1}^{P} \gamma_j \Delta z_{t-j} + \varepsilon_t \tag{C1}$$

The testing strategy is as follows. Initially, the null hypothesis $\beta = \rho - 1 = 0$ is tested. Rejecting this null implies that either the trend is significant or the series is stationary or both. Results for this test are reported in column 1 of Table C1. As can be seen, even at the 1 per cent level of significance this null can be rejected for Australia's terms of trade and for Australian GNE. If the null is rejected, we must determine if the series is integrated around a deterministic trend. To this end, column 2 of Table C1 reports tests of the null hypothesis $\rho - 1 = 0$. It can be seen that this null is again strongly rejected for both the terms of trade and GNE suggesting that both series are stationary around a deterministic trend.

If we fail to reject the null that there is no trend and the series is integrated of order one then we move to a restricted model in which β is set to zero. Then the joint null $\alpha = \rho - 1 = 0$ is tested. Rejection implies either a significant intercept or 'drift' or stationarity or both. Results given in column 3 of Table C1 indicate rejection for all of the GDP measures. It is interesting to note that the null is accepted for the terms of trade suggesting that the invalid omission of the deterministic trend reduces the power of the test for a unit root. This lack of power explains the evidence of terms of trade integration presented in Gruen and Wilkinson (1991) and Blundell-Wignall *et al.* (1993). Again, rejection of the joint null raises the question of whether rejection is caused by stationarity or by a significant drift (or both). Column 4 of Table C1 examines the final hypothesis that $\rho - 1 = 0$ given that $\beta = 0$. In all cases we fail to reject the null, even at the 10 per cent level of significance.

To summarise, we have reasonably strong evidence that the terms of trade, the real TWI and Australian GNE can be adequately represented as stationary series around a linear trend. The evidence for all of the GDP series suggests that they are integrated after allowing for a drift term.

Table C1: Augmented Dickey Fuller Tests[(a)]
(testing integration using data from 1972:1 to 1993:4)

Null Hypotheses	Unit root and no trend[(b)]	Unit root given trend[(c)]	Unit root and no drift[(d)]	Unit root given drift[(e)]
Australian GDP[(f)]	3.14	-2.26	8.63**	-0.79
Australian GNE	9.64**	-4.21**	3.56	-0.99
Terms of trade[(f)]	8.96**	-3.70*	0.68	-1.03
Real TWI	7.14*	-3.53*	2.10	-1.86
OECD GDP[(f)]	1.77	-1.75	11.99**	-0.27
USA GDP[(f)]	4.17	-2.66	8.03**	-0.69
Export markets GDP[(f)]	2.82	-2.12	13.94**	-0.74

Notes: (a) *(**) implies rejection of the null hypothesis at the 5%(1%) level of significance respectively.
(b) Critical values of 5.47, 6.49 and 8.73 at the 10 per cent, 5 per cent and 1 per cent levels respectively are tabled in Perron (1988) for the test statistic ϕ_3.
(c) Critical values of -3.16, -3.46 and -4.06 at the 10 per cent, 5 per cent and 1 per cent levels respectively are tabled in MacKinnon (1991) using 88 observations.
(d) Critical values of 3.86, 4.71 and 6.70 at the 10 per cent, 5 per cent and 1 per cent levels respectively are tabled in Perron (1988) for the test statistic ϕ_1.
(e) Critical values of -2.58, -2.89 and -3.51 at the 10 per cent, 5 per cent and 1 per cent levels respectively are tabled in MacKinnon (1991) using 88 observations.
(f) Enough lags of the dependent variable were retained to eliminate autocorrelation at the 5 per cent level of significance. For the series marked, this could not be achieved, even by including up to 8 lags. Thus, 8 lagged changes are used in these cases.

C2. Modelling Australia's Terms of Trade

Given that the terms of trade appear to be stationary around a deterministic trend, it makes little sense to search for cointegrating relationships with foreign activity.[32] Instead, we estimate the following model, allowing foreign activity to enter in quarterly percentage changes.

$$\Delta tot_t = \alpha + \beta\, t + \gamma\, tot_{t-1} + \sum_{j=1}^{3} \delta_j\, \Delta tot_{t-j} + \sum_{j=0}^{3} \pi_j\, \Delta w_{t-j} + \varepsilon_t \qquad \text{(C2)}$$

Table C2 shows estimates with and without the foreign growth terms over the period March 1972 to December 1993 and March 1980 to December 1993. It is apparent that, over the shorter sample period, world activity is more significant and that the linear trend is less pronounced (though still significant).

Note that while foreign activity is a significant determinant of Australia's terms of trade (at least over the more recent sample), it does not explain very much of the variation

32. If one omits a deterministic trend one can find weak evidence of cointegration. However, the sign is perverse, implying that increases in foreign activity are associated with declines in Australia's terms of trade. This spurious relationship appears to be generated by the secular decline in Australia's terms of trade and the steady growth of foreign activity.

Table C2: Australian Terms of Trade Models Using OECD GDP

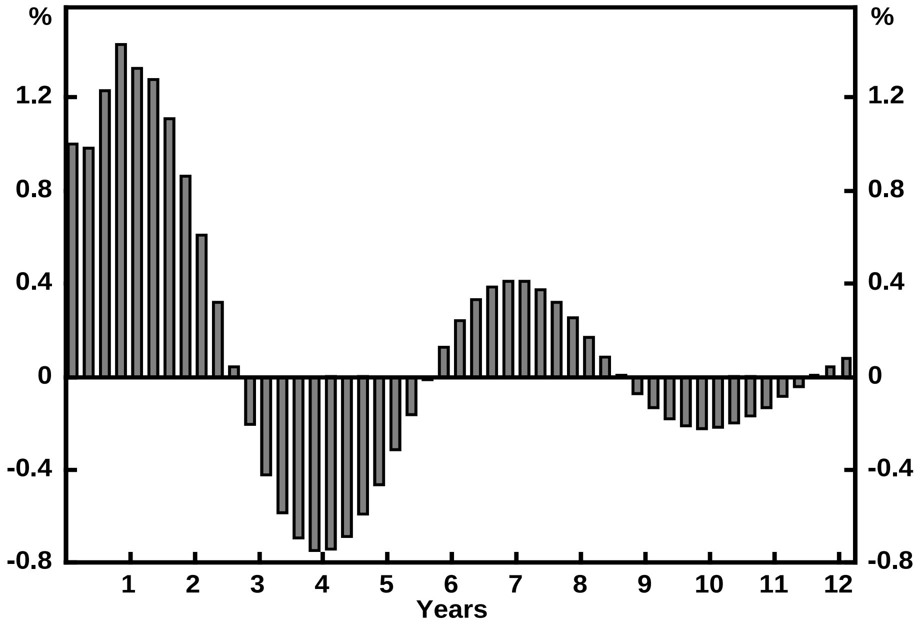
	1980:1–1993:4		1972:1–1993:4	
	1	2	3	4
Constant	75.42** (5.30)	72.64** (4.76)	97.86** (5.08)	81.75** (4.84)
Linear trend	-0.03* (-2.24)	-0.02* (-2.43)	-0.07** (-3.64)	-0.06** (-3.68)
Terms of trade Lagged level	-0.16** (-5.39)	-0.15** (-4.81)	-0.20** (-5.16)	-0.17** (-4.91)
% change terms of trade$_{t-1}$	0.16 (1.92)	0.13 (1.52)	0.18** (2.62)	0.14 (1.88)
% change terms of trade$_{t-2}$	0.37** (3.29)	0.40** (3.27)	0.27** (4.19)	0.29** (4.27)
% change terms of trade$_{t-3}$	0.32** (3.34)	0.36** (3.77)	0.27** (4.26)	0.27** (3.47)
% change OECD GDP$_t$		0.75* (2.22)		0.78 (1.32)
% change OECD GDP$_{t-1}$		-0.003 (-0.01)		0.78 (1.02)
% change OECD GDP$_{t-2}$		-0.54 (-1.75)		-0.84 (-1.88)
% change OECD GDP$_{t-3}$		-0.47 (-1.11)		-0.22 (-0.52)
R^2	0.38	0.43	0.35	0.41
$\overline{R}^2$	0.32	0.32	0.31	0.34
Autocorrelation AR(4)	1.46 {0.83}	5.34 {0.25}	15.19 {0.00}	19.04 {0.00}
Joint significance of Δw_t to Δw_{t-3}		12.32 {0.02}		7.55 {0.11}

Note: Numbers in parentheses () are t-statistics. Numbers in brackets {} are p-values. *(**) implies that the coefficient is significant at the 5%(1%) level. Standard errors are estimated using a Newey-West correction allowing for fourth order residual correlation.

judging by the R^2. Clearly foreign activity does not explain the secular decline in the terms of trade that probably arises from a gradual fall in the relative price of commodities to manufactures world-wide. Nor does it explain the magnitude of the terms of trade swings through the 1980s.

Also, while Table C2 suggests that terms of trade shocks are not permanent, the specification including OECD growth terms and estimated using data from 1980 (model 2) indicates that only 14 per cent of a shock has been eliminated after two years. The impulse response function in Figure C1, using model 2, suggests that the remaining shock is quickly eliminated thereafter.

Figure C1: Terms of Trade, Impulse Response Function
(initial 1 per cent shock in quarter 1)



C3. GDP and GNE Responses to Terms of Trade Shocks

In Section 3 in the text, we estimate the inflationary impact of a terms of trade shock. To do so requires estimates of the 'typical' GDP and GNE responses to a 'typical' terms of trade shock. These can be obtained from a variant of the most general GDP model presented as equation (2) in Section 4. That model suggests that we must take foreign activity, the terms of trade, the real TWI, domestic monetary policy and the weather variable, SOI, into account. For our current purposes, it is not straightforward to use this model because it controls for both real TWI movements and changes in foreign activity. By contrast, in this Appendix we wish to estimate the GDP and GNE response to a terms of trade shock *allowing the real TWI and foreign activity to change in their 'typical' way*. We use a simpler version of this general specification that omits both foreign activity terms and the real TWI terms to arrive at equation (C3).

$$\Delta y_t = \alpha + \sum_{j=2}^{6} \beta_j r_{t-j} + \sum_{j=1}^{2} \gamma_j \, SOI_{t-j} + \sum_{j=0}^{7} \delta_j \, \Delta tot_{t-j} + \varepsilon_t \tag{C3}$$

An alternative approach to estimating the GDP (or GNE) impact of a terms of trade shock would be to separately estimate the relationship between foreign activity and the terms of trade and the relationship between the terms of trade and the real TWI. These estimated relationships could then be used in equation (2) in Section 4 to determine the change in GDP associated with a ‘typical’ terms of trade shock.[33] The advantage of the approach outlined in this Appendix is that we can also estimate the standard errors of our estimates of the GDP and GNE responses to a terms of trade shock. For this reason, we prefer to work with the ‘misspecified’ model defined by equation (C3). Estimates of equation (C3) are reported in Table C3.

The per cent-years of GDP and GNE that are gained (lost) within two years of a positive (negative) terms of trade change are given by:

$$\Delta tot \sum_{j=0}^{7}\left\{\left(\frac{8-j}{4}\right)\delta_j\right\} \qquad \text{(C4)}$$

This formula cumulates the impact on the level of GDP(GNE) in each quarter over two years (for which we require coefficient estimates for quarterly lags 0 to 7). Dividing by 4 converts from per cent-quarters to per cent-years. This calculation implies that a 10 per cent rise in the terms of trade results in a estimated rise of 0.03 per cent-years of GDP and 2.26 per cent-years of GNE over two years. However, these are imprecise estimates, carrying standard errors of 0.95 and 1.08 respectively.

Table C3: Terms of Trade Shock: GDP and GNE Models
(1980:1 to 1993:4)

Variable	y = Domestic output (GDP)	y = Domestic demand (GNE)
Constant	1.76** (4.71)	2.11** (5.67)
Real cash rate[b]	-0.032 {0.02}	-0.043 {0.00}
SOI[b]	0.009 {0.01}	0.012 {0.00}
Terms of trade[b] % Change	0.002 {0.46}	0.017 {0.14}
R^2	0.41	0.59
$\bar{R}^2$	0.19	0.43
Rise in GDP/GNE over two years from a 10 per cent terms of trade rise (per cent-years)	0.03 (0.03)	2.26* (2.11)

Notes: (a) Numbers in parentheses () are t-statistics. Numbers in brackets {} are p-values. Statistics marked with *(**) imply that the coefficient or the average of the coefficients is significantly different from zero at the 5%(1%) level. Standard errors are estimated using a Newey-West correction allowing for fourth order residual correlation.
(b) The mean coefficient is reported for each of the real interest rate, the Southern Oscillation Index and the terms of trade to summarise the coefficients on their lags. The p-values refer to chi-squared tests of the joint significance of the lags.

33. We could also obtain estimates of the GDP effect of a 10 per cent terms of trade rise from model 1 of Table 2 which includes the terms of trade and the real TWI but excludes foreign activity. If we assume that the terms of trade rise generates an immediate real TWI response of 8.85 per cent (based upon the estimate in Blundell-Wignall *et al.* (1993)), we estimate that the shock results in a 1.0 per cent years increase in GDP cumulated over two years which lies within 2 standard deviations of the estimate derived in this appendix.

Appendix D: Data Sources

Data	Source	Freq.	Sample
Real Output			
Gross Domestic Product (Average)	ABS Cat. No. 5206.0, Table 1.	Q	59:3-94:1
Gross National Product	ABS Cat. No. 5206.0; calculated series.	Q	59:3-94:1
Gross National Expenditure	ABS Cat. No. 5206.0, Table 26.	Q	59:3-94:1
Prices			
Consumer Price Indices	ABS Cat. No. 6401.0, Table 1.	Q	59:3-94:1
Underlying Consumer Price Indices	Treasury Series.	Q	71:1-94:1
Australian Exchange Rates			
Nominal $US	RBA, *Bulletin*, Table F9.	M	69:7-94:2
Nominal TWI	RBA, *Bulletin*, Table F9.	M	70:5-94:2
Real TWI	RBA 22 country Real TWI.	Q	70:1-93:4
International Exchange Rates			
Nominal Domestic Currency / $US	Datastream, **I..RF.	M	72:1-94:2
Export Shares Data			
Export Shares	Currently obtained from ABS Cat. No. 5410.0. Previous data have been collected from ABS Cat. No. 5424.0 which ends in 92/93 and from ABS Annual Yearbooks and the ABS Overseas Trade Statistics.	A	59-93
Commercial Property Prices			
All Countries	Bank for International Settlements, Internal Sources.	A	80-93
G7 Commercial Property Prices	Average commercial property price index for the G7 members, weighting by GDP expressed in $US.	A	80-93
Real Medium/Long Bond Yields			
Australia	Nominal 5 year bond yield average for January in each year less the OECD December forecasts of inflation for the upcoming calendar year.	A	77-94
US, Japan, Germany, France, UK, Italy, Canada and the GDP weighted average of the G7	Blanchard (1993), Table A2.	A	78-93

Data	Source	Freq.	Sample
Stock Price Indices			
Australia	Datastream, AUSTALL. All Ordinaries Price Index.	M	70:1-94:3
US	Datastream, USI62…F. IMF *International Financial Statistics* share prices of commons shares traded on national or overseas stock exchanges. Indices are base weighted arithmetic averages with market value of outstanding shares as weights.	M	72:1-93:12
Japan	Datastream, JPI62…F. See US source description.	M	72:1-93:12
Germany	Datastream, BDI62…F. See US source description.	M	72:1-93:12
France	Datastream, FRI62…F. See US source description.	M	72:1-93:12
UK	Datastream, UKI62…F. See US source description.	M	72:1-93:12
Italy	Datastream, ITI62…F. See US source description.	M	72:1-93:12
Canada	Datastream CNI62…F where possible. Otherwise Datastream TTOCOMP, which is a composite price index for the Toronto Stock Exchange has been spliced onto the data series.	M	70:1-94:3
G7	Average stock price index for the G7 members, weighting by GDP expressed in $US.	Q	72:1-93:4
Interest Rates			
Australian Cash Rate	RBA, *Bulletin,* Table F1. Unofficial market 11am call (official cash rate spliced on to generate observations before 1982:6).	M	69:7-94:4
Real Australian Cash Rate	Australian cash rate less underlying inflation over the previous 12 months.	Q	72:1-93:4
Nominal Australian 10 year Bond Yield	RBA Bulletin Table F2 10 year treasury bonds.	M	69:7-94:4

Data	Source	Freq.	Sample
Foreign Activity Measures			
US GDP	Datastream, USGDP…D.	Q	60:1-94:1
OECD GDP	Datastream, OCDGDP..D.	Q	71:1-93:4
IMF World GDP	*International Financial Statistics Yearbook*, 1993.	A	64-91
Export Markets GDP	This series has been constructed from quarterly GDP figures for Australia's major trading partners where available on Datastream. Quarterly percentage changes are constructed for each country and these are aggregated using an export share weighted arithmetic average. The GDP index is then derived from the weighted average growth rate. Up to 15 countries are included in the index.	Q	60:1-93:4
OECD Industrial Production	Datastream, OCDOCIPDG.	Q	62:1-93:4
Export Markets Industrial Production	Internal RBA Sources. Constructed using export shares to weight together percentage changes in the industrial production of up to 19 countries.	Q	60:1-93:4
Terms of Trade			
Australian Terms of Trade	ABS Cat. No. 5206.0, Table 23.	Q	59:3-94:1
Import Unit Values	Datastream, **I75…F.	M or Q	72:1-91:4
Export Unit Values	Datastream, **I74…F.	M or Q	72:1-91:4
International Terms of Trade	Datastream. Where possible, the individual countries' national accounts terms of trade was used. Otherwise, the ratio of export unit values to import unit values was used. This was the case for Colombia, Finland, Greece, Ireland, South Korea, New Zealand, Norway, Philippines, Pakistan and South Africa.	Q	72:3-91:4

Data	Source	Freq.	Sample
World Prices			
Mineral Commodity Price Index	RBA Commodity Price Index.	M	82:7-94:5
Rural Commodity Price Index	RBA Commodity Price Index.	M	82:7-94:5
Aggregate Commodity Price Index	RBA Commodity Price Index.	M	82:7-94:5
Weights for Commodity Price Index	RBA Commodity Price Index from 82:7 onwards. Previous weights have been interpolated from aggregated export values of each main commodity type in the Monthly Bulletin of Overseas Trade Statistics that were calculated every five years.	A	55-93
Manufactures Price Series	Datastream, OCDCPPXF. Producer Price Index for manufactured goods for the OECD excluding Turkey.	M	78:1-94:2
Australian Trade Components			
Rural Exports	ABS Cat. No. 5302.0, Table 11.	Q	69:3-94:1
Mineral Exports	ABS Cat. No. 5302.0, Table 11.	Q	69:3-94:1
Manufactured Exports	ABS Cat. No. 5302.0, Table 11.	Q	69:3-94:1
Service Exports (Credits)	ABS Cat. No. 5302.0, Table 24.	Q	69:3-94:1
Fuel Imports	ABS Cat. No. 5302.0, Table 12.	Q	69:3-94:1
Manufactured Imports	ABS Cat. No. 5302.0, Table 12.	Q	69:3-94:1
Service Imports (Debits)	ABS Cat. No. 5302.0, Table 25.	Q	69:3-94:1
Weather			
Southern Oscillation Index	Bureau of Meteorology. The Southern Oscillation Index measures the sea level barometric pressure differential between Darwin and Tahiti.	M	59:9-93:12

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Discussion

1. Barry Hughes

It is a considerable pleasure to be given the opportunity to comment on what will become a frequently-cited Australian paper. Gruen and Shuetrim have examined methodically the empirical links between global trading conditions, the changing structure of the goods and services balance and the Australian inflation and output condition, relying at times heavily on an impressive RBA research team effort on these and related subjects over recent years. At various points they describe their results as 'surprising'. I hope they will not think that I am denigrating the importance of their work by suggesting that the principal results are not especially surprising. Many in the markets have similar notions in their heads. For example, I led my CS First Boston 'fortnightly' a month ago with a chart showing the very strong correlation between annual GDP growth in the US and Australia over the past 30-odd years (*Australian Economic Digest*, June 6, 1994), and nobody involved in the headaches of 1986 could have maintained faith in the notion that commodity price declines were still disinflationary. Rather, the value of, and the surprise in, the present paper is that the results come through so clearly in their empirics. I leave to others more competent the task of an econometric critique, and to those of a more pedantic bent the bowling down of the numerous quibbles that arise inevitably from such an ambitious effort in an area devoid of complete data. What struck me as being most useful for initial comment were two aspects of their work: first, their efforts to modify the disinflationary effects of terms of trade improvements for changes in the structure of goods and services exports; and second, their discussion of GDP connections.

The Volatility of the Terms of Trade

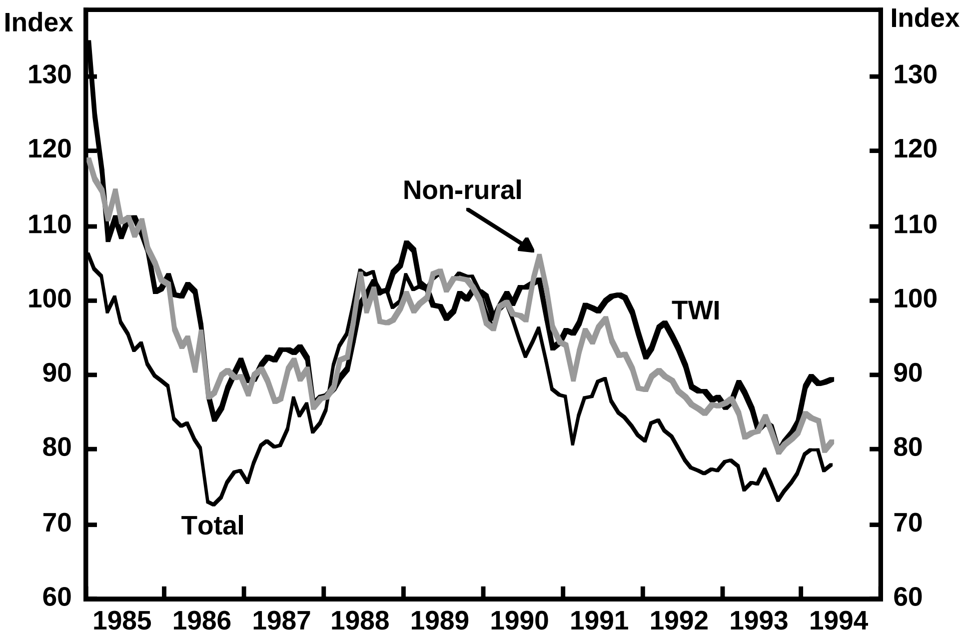
It is by now commonplace in the econometrics, as well as in market folklore, that the Australian dollar ($A) is dominated by commodity price movements. Whatever the international textbooks say about the determinants of exchange rates (and whatever the remaining shelf life, be it decades or years), for the time being, commodity prices appear to hold sway over the $A far beyond any simple effects coming through the trade balance. The efforts of Adrian Blundell-Wignall *et al.* in last year's Volume clearly documented the power of the relationship, though their econometrics run off the terms of trade rather than commodity prices as such. In our work, conducted independently of that in the Bank, we have found it more useful to play with commodity price indices, and the non-rural component in particular, than the terms of trade. However, the two are reasonably closely related, so that my point will stand up under either interpretation. But the piece of self-advertisement might help you to follow my preoccupations.

Given the extreme power of commodity price movements in shaping the TWI, with an elasticity close to unity, it is not surprising that increases in the former generate important disinflationary effects on landed import prices and wipe out most of the average commodity exporter's gains from improved global prices. As Gruen and Shuetrim observe, compared with the cemented peg position existing up to the mid 1970s, a commodity currency reduces the demand effect of higher resources prices as import substitutions are induced. Whatever directly-imported inflation (from the effect of global commodity price increases) that used to occur is blunted by the exchange rate, and, more importantly, a sizeable disinflation is inserted into the spiral through the higher currency's effect on landed (and, to a considerably lesser extent, retail) import prices. Nowadays a useful net disinflation should be expected over the first couple of years.

So far, so good. My problems start when the authors begin in Section 3.3 to modify their expectations of the size of the net disinflation for the changing mix of our exports. They argue that both the falling share of rural exports and the rising shares of manufactures and services exports will reduce volatility of the terms of trade, *ceteris paribus*, because the former items are typically more volatile, and the latter two less so, than non-rural commodities. As these structural changes unwind further, a given surge in global commodity prices should be expected to have less impact on the dollar (changing weights) and less disinflationary leverage. I am not at all sure about either modification.

The first presupposes that rural prices enter equally, pound for pound, with non-rural commodities in driving the dollar, whether the explanatory variable is the terms of trade or commodity prices. A simple glance at Figure 1 shows a much better correlation between non-rural commodity prices and the TWI than with commodities overall. In my rudimentary cointegration efforts to explain the TWI since the mid 1980s, I experience a lot of trouble getting rural prices to work. I do not know why this is so, but have rationalised the result

Figure 1: The TWI and RBA Commodity Price Indices
(1989/90 = 100)



Note: The RBA commodity price indices are in SDR terms.

in terms of the dominant rural commodity, wool, being little understood by foreigners. It is not in the CRB index, for example. I have even heard it said, by a foreign energy company chief, that coal prices alone drive the $A! Whatever the truth of these matters, I would feel a lot more confident about the authors' procedures if they had not placed rather more weight on the Blundell-Wignall *et al.* selection of the terms of trade variable as *the* exchange-rate driver than it might be capable of bearing in this application. It suggests also that the RBA research effort might be extended fruitfully to determine which parts of the terms of trade seem to matter for the dollar under current circumstances. It is possible that not quite enough of the textbook has yet been jettisoned.

My second problem with this section is the assumption that manufactures and services do not contribute much to terms of trade volatility and 'we [Gruen and Shuetrim] therefore ignore them'. To date, this has not been a safe assumption to make. In SDR prices received, there has been almost as much volatility in ETM and services exports as in non-rural commodities, as illustrated in Figure 2 by the implicit price deflators from the quarterly balance of payments. One possible explanation is the J-curve assumption that ETM and services prices are quoted in Australian terms *ex works* or *ex hotel* according to domestic cost movements, so that their global price movements embody exchange rate fluctuations driven by other factors (quite possibly non-rural commodity prices). In any event, the 'law of one price' is a dangerous assumption to make in these areas. The final figure, again drawn from deflators in the quarterly balance of payments, shows terms of trade variations for the services trades. There has been very substantial volatility.

Figure 2: Implicit Price Deflators for Selected Exports
(1989/90 = 100)

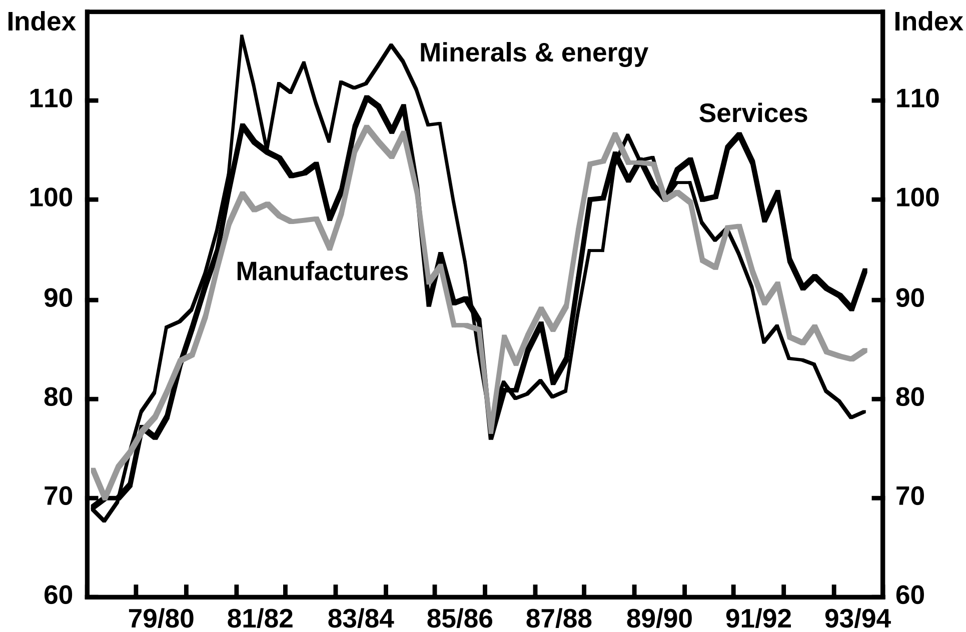
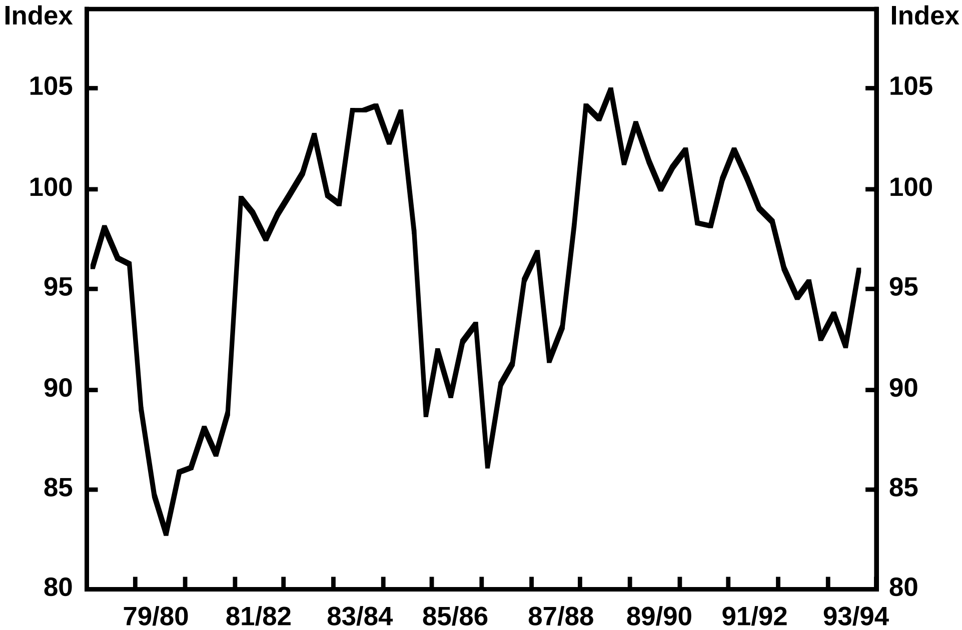


Figure 3: Services Terms of Trade
(1989/90 = 100)



My point in both cases is that Gruen and Shuetrim are making strong assumptions, possibly innocently, on which to base their modifications. In the fullness of time, when the commodities' contribution to export earnings (already below 60 per cent in nominal terms) declines well below half, it would be astonishing if the results of global auction markets continued to drive the world prices of our manufactured and services exports. But for the next several years, perhaps for the rest of this century, I am not so sure that the past will suddenly cease being a useful guide to the future. In any event, there is more research work to be done before we can accept the Gruen and Shuetrim modifications, at least as baldly as stated here.

The Foreign GDP Connection

The most challenging result in the paper is the strength of the correlations between the Australian and either the US or the OECD business cycle. While the paper's equations are *ad hoc*, the correlations are sufficiently 'big picture' stuff that we need not dwell on econometric questions. Indeed, despite all the difficulties statisticians encounter in allocating GDP between quarters, the econometric links are so strong that they come through very clearly even when the dependent variable, as here, is *quarterly* GDP growth! These are stronger results than a casual reading of the paper might convey. That there should be links between the business cycles of trading partners is, of course, unexceptionable. But what the authors' first-cut econometrics firm-up from previous graphical and anecdotal evidence is an impression of the sheer *speed* and *size* of the links. To confirm these latter points by further probing, and hence to explore transmission mechanisms, is a challenge of the first order for both macroeconomic theory and policy.

The authors dispell any notion that simple links through the terms of trade will do the trick. If these links exist, they are of small order, and not part of the 'big picture', contrary to what has been commonly asserted even in recent policy discussions. They are less persuasive when it comes to positive explanation of the cyclical connections. The truth of the matter is that we have a major puzzle on our hands without a ready answer.

Apart from the graphical evidence of business cycle synchronisation hitting one between the eyeballs, we are all aware of contagious behaviour sweeping across countries. For example, late last and early this year a number of leading economies (US, Germany and Australia to name three) appeared to be displaying stronger consumption than their disposable income trends might have indicated. We do not know why this was so. The obvious first step in examining further the business cycle synchronisation, as Richard Whitelaw has suggested, is to disaggregate the comparisons into the component parts of GDP to see which, if any, are the mainstays of the aggregate link. To assume, as the authors do perhaps in astonishment, that the links are entirely asset market links is to 'put the cart before the horse'.

In any event, there are some problems with the financial markets story. For a start, for there to be a strong similarity of contemporaneous quarterly GDP patterns, there would need to be *both* roughly equivalent sizes of financial shocks across countries *and* similar patterns of lagged repercussions, or at least deviations in either that cancelled out that in the other. At least as to size of the impact, that is *not* what has been happening in bond markets this year. Moreover, the shape of yield curves has been changing, steepening in Europe and Australia, but until very recently moving upwards in roughly parallel fashion in the US. Shades of the old monetarist argument come back. Do we take short rates to be important? In which case, so far there is a clear divergence between Australia, Japan and Europe on the one hand, and the US on the other. Or, do we take long rates? In this case the Australian deterioration is far greater than the others. Or, do we take the rates that seem to matter in individual countries for financing patterns (e.g. short rates in Australia and long rates in the US)?

If a direct cost-of-credit story were to be the explanation, synchronisation should be strongest in housing and other interest-sensitive expenditures. But, as the authors acknowledge fleetingly at various stages before casting aside the thought, there are other candidates. We have lived in the 'global village' since the 1960s, though nowadays we might call it the 'Reuters' or the 'CNN village'. Information, including general economic information, is liberally sprayed around the world. A lot of it is confusing, although what happens in the US, and particularly in their stock markets, probably still helps to distil general impressions or spirits from this cacophonous ether. One alternative possibility is that this information helps simultaneously to determine the exercise or otherwise of call options on whether to go ahead or delay expansion decisions. In any given quarter some decisions have moved already to the committed stage, but, as Dixit and Pindyck remind us, many can be postponed. If this possibility has merit, the international contagion should be seen in a wider category of expenditures than the primarily interest-sensitive (e.g. employment-overtime decisions, consumption and production for stocks).

The authors have done a great service by forcing us to recognise that we have a major puzzle on our hands that is capable of altering the way we think about policy. But we are still scratching around for explanations and transmission mechanisms. Another extension of the RBA research agenda is called for.

Terms of Trade

A final short comment is called for on the authors' terms of trade model in Section 4. Although probably not their intention, both equation (1) and their written comments imply that there is only a demand side to commodity prices in the short-to-medium run. Supply-side influences are mentioned nowhere. With these latter incorporated, it is not difficult to understand why commodity prices were sicker in 1986 than 1982, despite stronger industrial production in the former year. A quantum of supply had been induced onto the market in the interim in the initially-unfulfilled expectation of good returns. And surely the Soviet metal floods of the early 1990s were very important to particular markets (e.g. aluminium, nickel). The supply side matters, even to the commodity cycle.

2. General Discussion

The discussion covered a wide range of issues. Amongst these, the most important were:

- the relationship between the terms of trade, the real exchange rate and the rate of inflation;
- the importance of international financial markets to the Australian economy; and
- the links between the Australian business cycle and foreign business cycles.

There was general agreement that identifying the relationship between terms of trade and the real exchange rate was crucial to understanding the link between the world economy and the Australian economy. There was also agreement that a strong exchange rate response to an increase in commodity prices was necessary to turn what is an inflationary shock for the rest of the world, into lower inflation for Australia, but some questioned the foundations and the robustness of this result. It was also asked whether terms of trade changes had effects on just the price level, or also on the rate of inflation. In response, it was suggested that for practical purposes the distinction is of little relevance, as price level shocks often turn into inflation shocks.

A number of participants noted that given the persistent, but temporary movements in the terms of trade, exchange rate movements often appeared excessive. It was also felt that the foreign exchange market sometimes places too much emphasis on 'news' which does not directly relate to Australia's 'fundamentals'; for example, daily movements in the Commodity Research Bureau (CRB) index. (This index includes a number of commodities that are of little relevance to Australia.) Further, it was suggested that many traders in the market had relatively short horizons, and found it difficult to hold positions for long periods of time. On the other hand, the central bank with its long horizon was ideally placed to take advantage of swings in the exchange rate, and by doing so, earn considerable profits. Others wondered whether such a strong relationship between the terms of trade and the real exchange rate could be justified on theoretical grounds, and whether the relationship observed over the past decade would continue in future.

Although most participants recognised that movements in foreign asset prices are often transmitted rapidly to Australia, there was disagreement as to the impact that this has on domestic activity. A number of participants noted that unless a strong internal link could be established between Australian financial markets and domestic activity, there was no reason to believe that a strong link exists with external financial conditions. Others argued that in the late 1980s, increases in property prices as the result of widespread financial liberalisation created additional collateral which was used to underwrite bank lending. The wash-out from these developments in asset markets has been a protracted recession in a number of countries. This suggests that the high correlations between Australian and world GDP over recent years may be driven, in part, by the deregulation of financial markets undertaken in the 1980s.

In attempting to understand the correlation between the Australian and world business cycles, one participant was suspicious of the very strong short-run effects while another suggested that it would be useful to consider the international transmission of policy ideas. It was argued that in the past decade, policy ideas were exchanged between governments more actively than in previous decades. It was suggested that a good example of this was the common approach of monetary authorities to the stock market crash in 1987. On the other hand, it was argued that this story was far from complete, as the strong correlation between the Australian and world business cycles remains in the econometric exercise, despite controlling for the effects of monetary policy.

Finally, on more technical issues, several participants expressed concern over the treatment of the real exchange rate and cash rates as exogenous variables. It was argued that both of these variables may be endogenous, and as a result, the interpretation placed on the coefficients may be subject to qualification. It was also suggested that using multilateral trade weights or production weights, as opposed to bilateral trade weights, may be more appropriate in constructing an index of foreign demand and a real exchange rate index.

Final Discussion

The discussion in the final session centred around three issues: the political economy of trade reform, the importance of the service sector and the links between openness and other policies.

The Political Economy of Trade Reform

Given that the intellectual debate concerning openness had been won by the advocates of liberalisation, a number of speakers thought that the principal challenge now was to prevent a reversal of this victory. One participant noted that there were two universal propositions that made this task difficult. The first is that ‘when things get bad enough, you change what you are doing’. The second is that ‘when you are in trouble, you blame foreigners’. The first proposition had been important in adopting a more outward-oriented strategy in the first place, but it now risked, in combination with the second proposition, generating pressure for a reversal. Resisting this pressure was difficult when groups in society blame international trade for developments they dislike, even when it is inappropriate to do so. To prevent such attacks from being successful requires the building of strong political coalitions in favour of an outward orientation.

Some speakers saw political considerations as important in determining the sequencing of liberalisation in Australia. In generating the political consensus for trade reform, it was important that the labour leaders did not play an obstructionist role. If the labour market had been deregulated prior to significant trade reform, some doubted that the political consensus to reduce tariffs could have been built. Increased labour market flexibility may now more easily be sold as part of a bundle of measures necessary to give the economy the flexibility that it needs to deal with its integration into the world economy. It was also suggested that the increased competition associated with trade reform was starting to break down employer associations. This was adding to the pressures on the centralised wage-fixation system.

The observation was made that in the past, increases in openness tended to be positively correlated with increases in the size of the public sector. This association probably arose because the more open the economy, the greater is the need to engage in income redistribution policies. If this is correct, then it is ironic that just at the time that government might naturally be playing a larger role, there were significant pressures limiting the size of government.

Others thought that the largest problem facing Australian trade policy was the potential corruption of the multilateral trading system by the establishment of regional trading arrangements. Open world trade has been an essential ingredient in the East Asian success stories and is important to Australia’s continuing successful integration into the world economy. The case was made by one participant that significant changes to this system could be very costly for the Asian-Pacific area.

The Services Sector

A number of speakers mentioned that the discussion at the conference was heavily weighted towards manufacturing and away from services. They reiterated the conclusion from earlier discussions that increased integration had important direct and indirect implications for the markets for services as well as goods markets. Outward foreign direct investment, together with the direct provision of Australian services abroad, represented important channels through which Australia could exploit its considerable comparative advantage in many service industries. Inward foreign direct investment was seen as important in generating increased domestic competition, initially in goods markets but subsequently also in services. A number of participants also called for more rapid implementation of the recommendations in the Hilmer Report.

There was also a more general discussion of various aspects of the services sector. It was argued that, in many important cases, the output of services was not determined by market decisions, but rather reflected political and social decisions. Education and health services were offered as examples. Given the importance of these activities, some participants wondered whether the pressure on government to downsize was restricting the output of these services, and whether there were alternative equitable and efficient ways of providing and funding the services. It was also noted that analysis of the service industry was complicated by the problem of obtaining a satisfactory split of the change in nominal output between changes in real output and prices.

Trade and Other Policies

There was general agreement that increased openness, in itself, was insufficient to significantly increase the economy's growth rate. Much of the economy will always remain non-traded, and thus policies affecting the non-traded part of the economy are also important. One participant noted that in the past twenty years many countries had doubled their trade shares of GDP, while growth rates had been halved. In response, it was argued that it was difficult to draw conclusions concerning the growth-enhancing effects of trade, as the counterfactual was not clearly defined. In addition, increased openness was typically just one part of a wider program of reform.

There was general acceptance of the idea that strong, sustained economic growth still depends on appropriate training and education policies, the existence of competitive markets with limited distortions and the maintenance of low inflation and a sound fiscal balance. The critical point is that greater openness increases the incentives to get these policies right. These increased incentives come from a higher return to well-designed policies and greater costs to inappropriate policies. One participant suggested that the causation may also run the other way – that is, good domestic policies may encourage greater openness by making the economy more competitive.

The discussion then turned to what type of domestic policies maximised the returns to Australia's increased integration with the world economy. A number of participants agreed with the proposition that an important difference between those who are optimistic about Australia's future, and those who are pessimistic, rests on the judgment of whether the political obstacles to issues such as labour market reform and increased savings can be overcome. The optimists think that these obstacles are being broken down and that the improved domestic policy, in conjunction with a greater outward orientation, will deliver faster growth.

On the issue of training, again there were no clear answers. While no-one disputed the general notion that training and learning were 'good', there were few concrete suggestions. It was noted that the evidence is unclear as to whether particular products or industries generated more learning than others. It was also suggested that the level of research and development was a relatively poor indicator of firm performance. In response, it was argued that a critical element in maximising firm performance was 'good management'. Exactly how good management skills should be developed was not addressed. There were also a number of calls for more attention to be given to the microeconomics of the training market. In particular, what are the distortions leading to sub-optimal training and what is the relationship between the social and private returns to training?

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