DISCUSSION PAPERS

Conference Papers and Proceedings

The Effect of Internal Cost and Exchange Rate Changes on The Competitiveness of Australian Industry

G. Hollander & J.S. Marsden

Discussion Paper No. 3

May 1980

P.O. Box 4, Canberra 2600, Australia
Conference Papers and Proceedings

The Effect of Internal Cost and Exchange Rate Changes on The Competitiveness of Australian Industry

G. Hollander & J.S. Maraden

Discussion Paper No. 3

May 1980

ISBN: 0 949838 02 0
TABLE OF CONTENTS

DISCUSSION PAPER NO. 3

INTRODUCTION 1

I. PRESSURES ON THE COMPETITIVENESS OF INDUSTRY 4
   Relative prices and costs 6
   Changes in protection 8
   Exchange rate movements 9
   Aggregate and industry specific movements 14

II. ANALYSES OF FACTORS AFFECTING PRICE COMPETITIVENESS 16
    Data 21
    Results 22
    Discussion 25

III. DEVALUATION, INFLATION AND COMPETITIVENESS 28
     Background 29
     International evidence 32
     Australian evidence 33
     Devaluation, trade liberalisation and competitiveness 37

SUMMARY 38

REFERENCES 39

COMMENTS BY DISCUSSION OPENERS 41
1. H. Connell
2. V.W. Fitzgerald 44

REPLY BY THE AUTHORS 52

TABLES AND FIGURES

Table 1: Factors affecting movements in manufacturing costs in own currencies; Australia and major trading partners, 1969 to 1979 7

Table 2: Movements in Australian exchange rate, 1969 to 1979 12

Table 3: Components of average change in competitiveness in manufacturing industries, 1968-69 to 1973-74 and 1973-74 to 1977-78 23

Table 4: Components of real effective exchange rate 34
Table of Contents

Figure 1: Indexes of competitiveness ........................................... 5
Figure 2: The Australian exchange rate and associated factors, 1967 to 1978 ......................................................................... 10
Figure 3: Movements in Australia's exchange rate relative to major trading partners: 1969 to 1979 ................................................................. 13
Figure 4: Movements in import-and-export-weighted exchange rates, 1968 to 1979 ................................................................. 13
Figure 5: Indexes of aggregate and industry-specific movements: Manufacturing industries ......................................................... 15
Figure 6: Relationship of competitiveness to exchange rates, prices and costs, 1969 to 1979 ................................................................. 27
THE EFFECT OF INTERNAL COST AND EXCHANGE RATE CHANGES
ON THE COMPETITIVENESS OF AUSTRALIAN INDUSTRY

J.S. Marshen and G. Hollander*

INTRODUCTION

Changes in the competitiveness of an industry or enterprise directly influence the size, share and profitability of its market. Competitiveness is therefore of major importance in determining the viability of employment of labour and capital in industry. In recent years there has been heightened concern in Australia and other developed countries over changes in the ability of industry to compete in terms of price and quality against foreign competition. In part, this new awareness of the importance of international competitiveness arises from the substantial, and sometimes sudden, changes in competitiveness that occurred during the last decade. In part, it relates to the continuation of the world-wide economic recession which has threatened the viability of many commercial enterprises and directed attention to factors, such as competitiveness and protectionism, which determine market shares — as distinct from rates of growth of markets.

International competitiveness can formally be defined as the ability of an industry, or enterprise, to compete in terms of price or cost, delivery and quality, with goods from foreign countries. Information on the non-price dimensions of competitiveness is largely unavailable and thus in this paper we will be concerned with movements in price competitiveness.

On the meaning of competitiveness three points can be noted:

First, we are concerned primarily with competition in trade between similar goods from different sources. Although similar, the goods are less than perfect substitutes. It follows that we are not concerned here with the price competitiveness of perfectly homogeneous commodities — such as wheat or minerals. Thus, we are concerned mainly — though not exclusively — with manufactures.

* Industries Assistance Commission, Canberra.

The views presented in this paper do not necessarily represent the views of the Industries Assistance Commission. We wish to acknowledge the contribution and assistance of colleagues within the Commission, particularly R.G. Gregory, K.N. Schneider, T.J. Ryan and R.S.P. White.

Second, the concept of price competitiveness can be applied to competition between different sources of supply in any product market, either the world market or the domestic market. In the Australian case the historical insignificance of manufactured exports means that discussion of the international competitiveness of Australian manufacturing industry has focused almost exclusively on the price competitiveness of manufacturing vis-a-vis imports. In contrast, discussion of the competitiveness of UK industry is more concerned with the price competitiveness of British manufacturers in the world export market.

Third, we have defined international competitiveness in terms of prices (i.e. price or cost relativities) rather than in terms of volumes (such as output, market shares, capacity utilization or similar variables).

Changes in price competitiveness result from changes in factors determining movements in Australian prices and costs relative to our trading partners. Movements in relative prices and costs reflect movements in real and monetary factors. The role of real factors, such as an exogenous shift in export supplies, or in the terms of trade, has been widely discussed and the major changes in price competitiveness of the early seventies have been seen as the response to a significant shift in comparative advantage among Australian industries. This paper is not part of that tradition. Rather the purpose of the paper is to place in perspective the relative importance of the different avenues through which price competitiveness has changed over the last decade.

In the first part of the paper we examine movements in exchange rates and movements in the prices and costs of Australian industry compared with our trading partners during the seventies. With respect to movements in relative costs, the escalation of the costs and prices of Australian industry during the seventies was rapid compared with previous decades. However, we find that although average earnings increased faster in Australia, the adverse effect on competitiveness was partially offset by the better rate of productivity growth - so that the loss of competitiveness due to the faster rate of unit labour costs in Australia compared to its trading partners was slight and more than offset by the slower increase in materials

---

2 The concept of price competitiveness may also be applied to competition between different sources of demand in factor markets. This usage of competitiveness is most familiar in terms of discussions of "the cost-price squeeze in Australian agriculture" or in terms of the profitability of mineral export ventures. In this paper we have chosen to exclude this usage.

costs. Contrary perhaps to the popular view we find that the internal cost movements of Australia and its trading partners favoured Australia during most of the decade. With respect to exchange rates, movements in the average rate of exchange between Australia and its trading partners, have, in common with all major economies, been both larger and more frequent since the Smithsonian Agreement of 1971.

It is readily apparent that exchange rate movements have been a major factor in changing the competitiveness of Australian industry during the seventies, but were they more important than the relative rates of inflation experienced by Australia and its trading partners? How important were the reductions in protection following the 25 per cent across-the-board reduction in tariffs in July 1973 and the increases in protection following the subsequent introduction of quantitative restrictions on imports? In Part II we attempt to answer these questions for manufacturing industries by examining the first round impact on competitiveness of changes in relative prices in home currencies, tariffs and freight rates, and changes in the value of the Australian dollar. We find that movements in competitiveness associated with the first round effects of exchange rate changes completely overwhelm movements in competitiveness associated with other factors.

To what extent, however, are the effects on competitiveness of movements in rates of exchange permanent? Are they quickly eroded by offsetting movements in tariffs and rates of inflation? To what degree are the exchange rate and the rate of inflation interdependent? These questions are addressed in Part III.
1. PRESSURES ON THE COMPETITIVENESS OF INDUSTRY

In Australia, movements in international competitiveness during the seventies were dramatic. Although the measurement of price competitiveness is subject to conceptual debate and constrained by the availability of data, there is broad agreement between the available indexes on the major movements. Four of the most frequently used indexes are depicted in Figure 1. Whether based on broad aggregates such as consumer prices or more narrowly on movements in unit labour costs, there is broad agreement on the major movements. Between 1968 and 1978, the common feature of the various indexes is their substantial year-to-year movement.

Prior to 1972, there was no clear movement in price competitiveness. From 1972 onwards, however, a decline in price competitiveness became firmly established, with a sharp acceleration in 1973–74. Noticeable contributions to this decline were the revaluations of the Australian dollar in December 1972 and February and September 1973, and the general reduction of tariff rates by 25 per cent in July 1973.

A marked improvement in competitiveness occurred in late 1974 following the 12 per cent devaluation of September 1974 and was sustained by all but the domestic/import price index. Since the end of 1976 there has been, by all measures of competitiveness, a large and sustained improvement.

Changes in price competitiveness reflect changes in tariffs, freight costs, exchange rates and relative prices in Australia and its trading partners. In the following sections we examine the nature of movements in each of these aggregates over the last decade.

4 For a useful description and review of the various indexes constructed to measure the International competitiveness of Australian industry, see McDonald, R., 'Indices of Relative Competitiveness', unpublished working paper, Reserve Bank of Australia, 1979.

5 It may be noted that the greatest divergence in the five measures of competitiveness occurs at this latter end of the time period under study, when the exchange rate is relatively stable and therefore a less important source of change.
Relative prices and costs

Unit costs in manufacturing more than doubled during the decade. This growth reflects the combined effects of movements in average earnings, and materials prices and the offsetting effects of productivity growth. Some developments leading to a rise in costs were unique to Australia and were not shared by its trading partners. The introduction of equal pay for women is an obvious example.

Table 1 shows the movements in the components of the unit costs of manufactures in Australia and its trading partners over the period 1969 to 1978. In interpreting this table it must be noted that costs movements in each country are expressed in terms of own currencies. That is the indexes of relative movements do not reflect the effects of exchange rate variations.

In the period to 1973 average earnings in Australian manufacturing increased less rapidly than manufacturing earnings in trading partners. In 1974, however, average earnings in Australian manufacturing increased by more than 10 per cent relative to average manufacturing earnings in trading partners and at least maintained this relativity until 1978. Taking the decade as a whole, ceteris paribus, Australian manufacturing lost competitiveness from the more rapid increase in average earnings.

Productivity growth in Australian manufacturing, however, was more rapid than its trading partners and this tended to offset part of the unfavourable movement in average earnings. Taking the decade as a whole, unit labour costs still increased rapidly in Australia but to a rather less extent than implied by the movements in average earnings.

In the period to 1976, materials costs increased much less slowly in Australia than in trading partners. Thereafter Australia's material costs increased more rapidly but by 1979 Australian manufacturing still retained some advantage in terms of an overall
<table>
<thead>
<tr>
<th>Year</th>
<th>Average earnings in manufacturing</th>
<th>Labour productivity</th>
<th>Unit labour costs</th>
<th>Materials costs</th>
<th>Unit current costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>95.2</td>
<td>90.8</td>
<td>100.8</td>
<td>98.1</td>
<td>97.0</td>
</tr>
<tr>
<td>1970</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>104.0</td>
<td>104.0</td>
</tr>
<tr>
<td>1971</td>
<td>112.1</td>
<td>110.2</td>
<td>107.7</td>
<td>105.3</td>
<td>106.4</td>
</tr>
<tr>
<td>1972</td>
<td>122.1</td>
<td>122.2</td>
<td>95.9</td>
<td>95.9</td>
<td>95.9</td>
</tr>
<tr>
<td>1973</td>
<td>131.6</td>
<td>131.8</td>
<td>98.9</td>
<td>98.9</td>
<td>98.9</td>
</tr>
<tr>
<td>1974</td>
<td>175.8</td>
<td>159.4</td>
<td>110.0</td>
<td>110.0</td>
<td>110.0</td>
</tr>
<tr>
<td>1975</td>
<td>186.2</td>
<td>159.4</td>
<td>110.0</td>
<td>110.0</td>
<td>110.0</td>
</tr>
<tr>
<td>1976</td>
<td>211.0</td>
<td>175.8</td>
<td>116.5</td>
<td>120.0</td>
<td>120.0</td>
</tr>
<tr>
<td>1977</td>
<td>216.2</td>
<td>228.9</td>
<td>114.5</td>
<td>120.0</td>
<td>120.0</td>
</tr>
<tr>
<td>1978</td>
<td>257.2</td>
<td>278.2</td>
<td>100.0</td>
<td>142.9</td>
<td>142.9</td>
</tr>
<tr>
<td>1979</td>
<td>303.5</td>
<td>278.2</td>
<td>108.6</td>
<td>103.1</td>
<td>103.1</td>
</tr>
</tbody>
</table>

a. Major trading partners includes ten out of the top twelve nations as sources for imports in 1970. These nations are all members of the OECD and accounted for 80 per cent of imports.
b. End of June 1979
c. This is materials and fuels used by manufacturing industry in Japan, US and UK. These three nations accounted for 60 per cent of Australian imports in 1970.
d. UEC = ULC + 0.5PE. These are the usual proportions in OECD countries cited in OECD(2).

UNEC, Monthly Digest of Statistics.
OECD, Main Economic Indicators.
ABS, Price Indexes of Materials Used in Manufacturing Industry.
lower rate of increase in this component of costs.

The combined effect of the relative movements in each component is shown by the ratio of movements in unit current costs in Australia and its trading partners. Between 1969 and 1973 unit costs in Australian manufacturing fell relative to the unit costs in the manufacturing sectors of its trading partners. Thereafter, unit costs in Australia increased more rapidly. However, the effect of the increase in average earnings in 1974 was almost completely offset by favourable movements in relative productivity and material costs. Thus, relative to unit manufacturing costs in the trading partners, Australian costs were in 1976 nearly 10 per cent below the relativity of 1969. Moreover, it is significant that by the end of the decade the relative movement in unit current costs in manufacturing still favoured Australia rather than its trading partners. Perhaps even more surprising is the conclusion that - exchange rate movements aside - Australia’s internal costs increased less rapidly than the internal costs of its trading partners in the first half of the decade and more rapidly thereafter.

Changes in Protection

In July 1973, Australian tariffs were reduced by 25 per cent. This change occurred overnight. However, subsequent, more gradual changes in tariffs were also important, reducing the average rate of tariff assistance by an amount almost equal in magnitude to the 25 per cent cut.

The introduction of quotas, beginning in 1974, partially offset the trend towards lower assistance. But the effect of the quotas was uneven, substantially increasing the protection given to certain activities - particularly in the Textiles and Clothing and footwear groups and for motor vehicles and whitegoods - which already had some of the highest rates of assistance. These quantitative restrictions substantially widened the distorting influence of protection on the structure of the manufacturing sector.

Tariff reductions covering a diverse range of goods were introduced following the 17.5 per cent devaluation of November 1976 (and the subsequent partial revaluation in December of that year). These reductions were based
on recommendations contained in the IAC's report in 1976 on Multilateral Trade Negotiations (MTN). Other reductions in assistance resulted from the acceptance of IAC recommendations.

Measured in terms of the IAC's domestic weighted nominal rates, assistance available fell by some 40 per cent over the decade. However, in terms of the reduction in the effects of protection on import prices, the reduction in competitiveness due to this factor is certainly less. First, reductions in assistance to industries most dependent on assistance have been reinstated generally in the form of quota protection. Secondly, the IAC recommendations on the MTN cuts were formulated under criteria specifically designed to ensure that they had little effect on the competitiveness of domestic industry; in essence, they simply drained "water" from the tariff. Third, the MTN reductions and many other reductions have applied to goods for which imports were low, thus on an import weighted basis these reductions would have considerably less impact than on a domestic weighted basis. Taken together, these factors suggest that the effects of reductions in tariffs in reducing duty paid import prices were rather less than 60 per cent in aggregate and completely reversed in the case of some significant industries.

Exchange rate movements

The significant revaluations of the Australian dollar in 1972 and 1973 were a delayed response to the build-up of foreign exchange reserves which commenced in 1972, with the growth of capital inflow and the improvement in the balance of trade. The subsequent growth of imports and the end of the boom in commodity exports, together with the reversal in the terms of trade, led to pressures to devalue the Australian dollar in 1974 (Figure 2).

In September 1974 the Australian dollar was devalued by 12 per cent. At the same time, the authorities broke the link between the Australian dollar and the US dollar, and instead substituted a system
FIGURE 2: THE AUSTRALIAN EXCHANGE RATE AND ASSOCIATED FACTORS, 1967 TO 1976

Percentage change

Reserve assets

Trade-weighted exchange rate (1949=100)

Terms of trade (1947-73=100)

Rural exports
GDP deflator

Mining exports
GDP deflator

$7500 m

whereby the trade-weighted average of the bilateral rates of exchange for the $A (the effective exchange rate) was maintained at a constant level. 6

The Australian dollar was devalued by a further 17.5 per cent in November 1976, but was revalued the following month leaving a net devaluation of 12.5 per cent. At the same time the system of monitoring the exchange rate was changed.

Features of the current system are the smaller, more frequent adjustments; the management of the float by the heads of the Reserve Bank, the Treasury and the Department of Prime Minister and Cabinet; and the greater weight given the US dollar in the basket because of the importance of the US dollar as the principal currency of transaction. Under this system there has been, in the period from August 1977 until the latter half of 1979, a creeping devaluation against the trade weighted basket of currencies and an appreciation against the US dollar (Table 2).

Under the new regime of floating exchange rates, substantial changes can occur in bilateral rates of exchange without change of policy or apparent movement in the effective exchange rate. Moreover, to the extent to which constancy of the effective exchange rate is the policy target, the depreciation of the currency of one of Australia's trading partners implies an appreciation relative to all other currencies. Figure 3 illustrates the divergent movements of the $A against the currencies of the four major trading partners. Such divergent movements have several potentially important implications for the competitiveness of industry. These include:

- the possible incentive provided by the divergent movements in bilateral rates to change the sources of imports and the destination of exports;

6 The concept of the effective exchange rate was developed by the International Monetary Fund as a means of calculating average changes in currency values. For example, a country might maintain a fixed nominal exchange rate in terms of the $US and yet its effective exchange rate might have changed because at the same time its currency was depreciating against other currencies. The effective exchange rate, which is normally expressed in index form, is therefore a useful analytical tool in a period when most currencies are floating against each other. See Rhomberg, R.R. 'Indices of Effective Exchange Rates' IMF Staff Papers, March 1976.
### Table 2: Movements in Australian Exchange Rate, 1969 to 1979

<table>
<thead>
<tr>
<th>At end of December</th>
<th>Units SUS per $A (^a)</th>
<th>Trade-weighted Index (^b) May 1970 = 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>1.1180</td>
<td>100.0</td>
</tr>
<tr>
<td>1970</td>
<td>1.1142</td>
<td>99.3</td>
</tr>
<tr>
<td>1971</td>
<td>1.1910</td>
<td>99.8</td>
</tr>
<tr>
<td>1972</td>
<td>1.2720</td>
<td>106.5</td>
</tr>
<tr>
<td>1973</td>
<td>1.4875</td>
<td>118.1</td>
</tr>
<tr>
<td>1974</td>
<td>1.3270</td>
<td>105.3</td>
</tr>
<tr>
<td>1975</td>
<td>1.2571</td>
<td>105.3</td>
</tr>
<tr>
<td>1976</td>
<td>1.0864</td>
<td>92.2</td>
</tr>
<tr>
<td>1977</td>
<td>1.1414</td>
<td>89.4</td>
</tr>
<tr>
<td>1978</td>
<td>1.1505</td>
<td>82.7</td>
</tr>
<tr>
<td>1979</td>
<td>1.1055</td>
<td>83.3</td>
</tr>
</tbody>
</table>

\(^a\) Midpoint of the outer limits at which Australian trading banks may deal.

\(^b\) Index of average value of $A vis-a-vis currencies of Australia's trading partners.


The differential movements in the average exchange rate facing individual industries or sectors. This has led to interest in industry-specific exchange rates. Work in this field is being undertaken within the IAC under the direction of L. Martin.

Figure 4 shows movements in the average rates of exchange facing Australia's import-competing and export sectors over the period since 1970. Because the destinations of Australia's exports tend to be broadly similar to the sources of its imports, the differences between the average exchange rates facing Australia's import and export sectors are not as great as might be expected. Nevertheless, there has been a definite tendency for the import-competing sector to face a higher effective exchange rate than

---

7 These indexes, based on currency movements between Australia and its four major trading partners, give a good indication of the difference in effective exchange rates facing import-competing and export industries. However, they are not directly comparable with the trade weighted index which includes a wider range of countries.
FIGURE 3: MOVEMENTS IN AUSTRALIA'S EXCHANGE RATE RELATIVE TO MAJOR TRADING PARTNERS: 1969 TO 1979
(1970 = 100)


FIGURE 4: MOVEMENTS IN IMPORT - AND EXPORT - WEIGHTED EXCHANGE RATES, 1968 TO 1979

the export sector. Thus, the competitiveness of import-competing industries has, in general, suffered more from the revaluations of 1972 and 1973 and benefitted less from the subsequent devaluations.

Aggregate and industry specific movements

Many of the movements in costs might be expected to have quite differential effects across industries, reflecting their varying intensities of labour and materials usage or in the case of the exchange rate the differing sources of import competition. For instance, as a result of the introduction of equal pay for women, between October 1973 and October 1975 average weekly earnings for females rose by 60 per cent compared to a rise of only 43 per cent in male earnings. Industries employing a high proportion of female labour were of course affected disproportionately.

How do the movements affecting individual industries compare with the aggregate movements? Figure 5 provides some information on this question.

The first panel shows that the movement in unit costs (before allowance for productivity growth) is remarkably uniform across industries. The movement in domestic prices (second panel), however, is more dispersed, reflecting differential movements in productivity, and prices of competitive goods. The third panel shows that although the prices of all categories of imports increased over the period this movement was highly divergent. The final panel shows that the movements in competitiveness across industries over the decade were also quite divergent.

---

8 A similar divergence has occurred in the case of Italy. Because a considerable proportion of Italian exports go to appreciating currency areas (i.e. Germany and Switzerland) Italy’s export sector has benefitted from devaluation to a greater extent than the import-competing sector. It has been calculated that between December 1976 and August 1978 the lira exchange rate weighted by the pattern of Italian imports depreciated by about 8 per cent whilst the export weighted lira depreciated by about 16 per cent. OECD Survey - Italy (January 1979).
Figure 5: Indexes of aggregate and industry-specific movements in manufacturing industries (1968-69=100)

Index

Costs

Index

Domestic prices

Import prices

Competitiveness

100
150
200
250

1968-69

1977-78

100
150
200
250

1968-69

1977-78

100
150
200
250

1968-69

1977-78

a All manufacturing

Source: IAC estimates; ABS, Index of Articles Produced, Manufacturing Establishments, various issues.
II ANALYSES OF FACTORS AFFECTING PRICE COMPETITIVENESS

Changes in price competitiveness result from a variety of factors including changes in protection, freight rates, costs and prices in Australia, costs and prices in foreign currencies and changes in rates of exchange. Many of these factors are interrelated. For example, the loss of competitiveness due to exchange rate revaluations in 1972 and 1973 is seen by many economists as a direct cause of the subsequent increases in protection afforded certain industries. Similarly as outlined in Part III there is considerable debate over the link between movements in relative inflation rates and movements in rates of exchange.

As a first step in our analysis we aim to establish a perspective on the relative importance of each factor in determining competitiveness. The first round impact on competitiveness of changes in protection, freight rates, exchange rates and relative cost/price levels can be examined through identities defining price competitiveness and the landed duty paid price of imports.

We begin by defining international price competitiveness as the ratio of domestic prices to the landed duty paid price of similar imported goods. Thus, for the import-competing sector, in index number terms:

Price competitiveness in a given time period:

\[ PC = \frac{P_m}{P_d} \]  \hspace{1cm} (1)

where 

- \( P_m \) is an aggregate index of import prices, landed duty paid, in local currency
- \( P_d \) is an aggregate index of domestic prices.

It is important to note that the product mixes represented by the domestic and import indexes for a particular industry are often quite different. Therefore, in some cases, changes in price ratios may not always reveal actual
changes in competitiveness faced by Australian producers.\footnote{To determine the extent of the bias introduced into the price indexes by the different product mixes, we recalculated the indexes using "opposite" weighting patterns to those conventionally employed. At the 2-digit and sector level import price indexes were recalculated by weighting 4-digit import price indexes by value of output, while domestic price indexes were weighted by value of imports. The results were, in almost all industries, and particularly the sector as a whole, very close to those presented in this paper. This does not preclude the possibility that differences in product mix within 4-digit industries may constitute a bias, but no such measure is possible with the available data.}

The landed duty paid price of imports is determined by the price in foreign currency, the exchange rate, the average rate of duty and the costs of freight and insurance. Thus, we can define, for total imports:

\[ P_m = P_{mf} \cdot TF \cdot \$ \]  \hspace{1cm} (2)

where

- \( P_{mf} \) is an aggregate index of import prices in foreign currency;
- \( TF \) is an index of the power of the tariff (weighted by domestic output) combined with freight costs, i.e.
  \[ TF = 1 + t + f \], where \( t \) is the average ad valorem rate of duty on total imports and \( f \) is an estimate of freight costs as a proportion of fob import prices;
- \( \$ \) is the aggregate (import weighted) index of exchange rate movements (an increase in \$ indicates a devaluation of the Australian dollar).

Now, combining equations (1) and (2), we have:

\[ PC = \frac{P_{mf}}{P_d} \cdot TF \cdot \$ \]  \hspace{1cm} (3)

which can be used to examine the relative importance of each factor in changes in aggregate competitiveness which have been observed over the last decade. According to this equation, Australian competitiveness increases when, other factors remaining unchanged, import prices in foreign currency increase relative to prices of Australian-produced goods, or tariff or freight rates increase, or the Australian dollar depreciates relative to the countries providing imports.
Before examining the actual changes in each factor over the last decade we can establish an \textit{a priori} ranking of their importance given a knowledge of average tariff and freight rates. Consider the magnitude of the changes necessary in each factor to cause, \textit{ceteris paribus}, a 10 per cent change in the relative prices of domestic and imported goods in aggregate. By inspection of equation (3):

- \textit{Rates of inflation} in Australia and its trading partners as a group must differ by more than 10 percentage points
- \textit{Rates of exchange} must on average change by 10 per cent
- \textit{Rates of tariff} must on average change by almost 100 per cent
- \textit{Ad-valorem rates for insurance and freight} must change by almost 100 per cent relative to the price of imports of merchandise.

As noted in Part I, at the aggregate level only the exchange rate and relative rates of inflation are likely to be of major importance in determining movements in competitiveness during the seventies. Within the space of a year or so, only the exchange rate has shown movements of sufficient magnitude to cause competitiveness to change by 10 per cent. Of course, for some industries changes in factors other than the exchange rate may be more important at particular times. For instance, percentage changes in tariffs have greater significance relative to other factors for industries which are highly protected.

The relative importance of each factor in the changes in price competitiveness observed for each industry can be examined using a variation of equation (3). Thus, we define price competitiveness for the \( j \) th industry:

\[
PC_j = \frac{Pn_j}{Pd_j} = \frac{Pm_j}{Pd_j} \cdot \frac{TF}{Pd_j} \cdot \frac{1}{j} \tag{4}
\]

For ease of computation and clarity of exposition, we can express equation (4) in terms of average annual (exponential) growth rates:
\[ pc_j = pmf_j + t\alpha_j + \delta_j - pd_j \]  

(5)

where lower case symbols represent average annual growth rates corresponding to upper case symbols in equation (4).

Equation (5) defines the average change in price competitiveness for an industry as the sum of the average changes in foreign prices, tariffs and freight costs, and the industry-specific exchange rates, less the average change in domestic prices. All quantities, except changes in foreign prices in foreign currency, can be directly observed or estimated, so the change in foreign prices is calculated as a residual.

Exchange rate movements may vary across industries because of differential movements in bilateral exchange rates across sources of supply. In concept, therefore, we should use industry-specific exchange rates. However, in this paper we have used the more readily available effective exchange rate for total imports. This means that the movements in foreign prices in foreign currencies, as calculated, will also reflect any differential movements in industry-specific exchange rates.

Changes in the price competitiveness of manufacturing industries during the period 1968-69 to 1977-78 were analysed using equation (5). In principle we could conduct this examination on a year to year basis but this approach would quickly become unmanageable. At the other extreme we could examine differential movements over the full decade. This would be manageable but uninteresting. As noted in Part I there was a distinct reversal in trends in competitiveness of Australian Industry around 1973-74 and by the end of the decade competitiveness had returned to previous levels. We have therefore examined the sources of differential movements in competitiveness in the two sub-periods, 1968-69 to 1973-74 and 1973-74 to 1977-78.
The analysis enables us to make the following type of statement:

"For the textiles industry, over the period 1968-69 to 1973-74:

- price competitiveness of the local industry (measured by the ratio of average duty paid import prices to domestic prices) decreased by 2.4 per cent per annum;
- changes associated with tariffs decreased import prices by 0.5 per cent per annum;
- the price of imports in Australian currency decreased by 3.8 per cent as a result of exchange rate movements;
- domestic prices increased by 6.3 per cent per annum; and
- prices of imported textiles in foreign currency increased by 8.2 per cent per annum."

It is relevant to note, however, that the estimates relate only to first round effects on competitiveness, e.g., indirect effects arising from input-output linkages are not taken into account. For example, the response of domestic prices to rises in the price of imported materials is not distinguished. Thus, the analysis does not give any of the underlying causes of the changes in the individual components of competitiveness.
Data

In this analysis we make use of a comparatively new set of data on unit value indexes for imports of manufactures classified by ASIC industry between 1968-69 and 1977-78. The indexes are available for about 110 of the 170 4-digit ASIC industries; these industries cover, in value terms, approximately 75 per cent of manufactured imports into Australia. These data are a refinement and further development of indexes originally constructed for the IMPACT Project within the IAC to enable estimation of import substitution elasticities for individual industries. The indexes relate to movements in unit values at the Statistical Key level, the most detailed classification available for imports. They relate to fob prices of imports plus duty. The conceptual shortcomings of unit value indexes are well known and need no elaboration. However, for the analysis of movements in competitiveness at the industry level, we believe these indexes provide the most accurate available sources of such information.


11 The indexes used here exclude the effects of changes in freight rates and therefore slightly overstate movements in landed unit values resulting from tariff changes.

Average tariff rates by industry in 1968-69 have been estimated by the IAC from import clearances data supplied by the ABS. The rates are indexed forward by movements in the nominal rate of assistance, fixed weighted by production levels existing in 1974-75. No data are available for industry-specific freight rates. A value of 15 per cent of fob import prices, approximating the average for total imports, is used throughout. This rate appears to have been fairly stable over the past decade. The import weighted exchange rate for manufactures was estimated from bilateral exchange rates for the major source countries\(^{13}\) weighted by shares in the value of imports of manufactures over the period 1969 to 1978. Domestic price indexes were supplied by ABS. They are weighted by output in 1972-73.

**Results**

Table 3 summarises the first round contribution of each source of change in price competitiveness in broad sectors of manufacturing for the periods 1968-69 to 1973-74 and 1973-74 to 1977-78.

Column 1 shows the change in price competitiveness for each industry. In the period to 1973-74, nine of the twelve industries lost competitiveness, the largest losses in competitiveness being observed for Other machinery and equipment, Fabricated metal products and Clothing and footwear. Competitiveness increased only in Food, beverages and tobacco, Chemical products and Transport equipment.

---

13 These countries are Japan, USA, UK and W. Germany, and are the source of around 60 per cent of imports into Australia.
<table>
<thead>
<tr>
<th>Industry</th>
<th>Competitiveness: duty paid import prices/domestic prices</th>
<th>Power of the tariff (plus quotas) and freight</th>
<th>Import weighted exchange rate for manufactures</th>
<th>Domestic prices</th>
<th>Foreign currency prices of imports</th>
<th>Differential Price Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) 1968/9 to 1971/6</td>
<td>(2) 1972/3 to 1974/6</td>
<td>(3) 1968/9 to 1971/6</td>
<td>(4) 1972/3 to 1974/6</td>
<td>(5) 1968/9 to 1971/6</td>
<td>(6) (5)-(4)</td>
</tr>
<tr>
<td>21-22 Food, beverages and tobacco</td>
<td>2.2</td>
<td>4.2</td>
<td>-2.5</td>
<td>-0.5</td>
<td>-5.8</td>
<td>6.8</td>
</tr>
<tr>
<td>23 Textiles</td>
<td>-3.6</td>
<td>1.6</td>
<td>-0.5</td>
<td>0.7</td>
<td>-3.8</td>
<td>6.0</td>
</tr>
<tr>
<td>24 Clothing and footwear</td>
<td>-7.1</td>
<td>7.5</td>
<td>-1.0</td>
<td>3.5</td>
<td>-3.8</td>
<td>5.0</td>
</tr>
<tr>
<td>25 Wood, wood products and furniture</td>
<td>-2.3</td>
<td>-2.0</td>
<td>-0.2</td>
<td>-0.1</td>
<td>-3.8</td>
<td>6.0</td>
</tr>
<tr>
<td>26 Paper and paper products, printing</td>
<td>-6.9</td>
<td>9.0</td>
<td>-0.2</td>
<td>-0.2</td>
<td>-3.8</td>
<td>6.4</td>
</tr>
<tr>
<td>27 Chemicals, petroleum and coal products</td>
<td>2.1</td>
<td>5.1</td>
<td>-0.2</td>
<td>-0.2</td>
<td>-3.8</td>
<td>6.6</td>
</tr>
<tr>
<td>28 Non-ferrous metal products</td>
<td>-3.3</td>
<td>-0.2</td>
<td>-1.1</td>
<td>-1.1</td>
<td>-5.0</td>
<td>6.8</td>
</tr>
<tr>
<td>29 Basic metal products</td>
<td>-5.5</td>
<td>6.1</td>
<td>-0.2</td>
<td>0.3</td>
<td>-5.6</td>
<td>6.8</td>
</tr>
<tr>
<td>31 Fabricated metal products</td>
<td>-7.9</td>
<td>-1.9</td>
<td>-0.2</td>
<td>-0.3</td>
<td>-5.8</td>
<td>6.8</td>
</tr>
<tr>
<td>32 Transport equipment</td>
<td>2.2</td>
<td>1.6</td>
<td>-0.2</td>
<td>0.3</td>
<td>-5.0</td>
<td>6.0</td>
</tr>
<tr>
<td>33 Other machinery and equipment</td>
<td>-13.0</td>
<td>2.9</td>
<td>-0.2</td>
<td>-0.5</td>
<td>-3.8</td>
<td>6.0</td>
</tr>
<tr>
<td>34 Miscellaneous manufacturing</td>
<td>-2.6</td>
<td>3.4</td>
<td>-0.5</td>
<td>-0.1</td>
<td>-3.8</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**All Manufacturing**

-5.4  3.4  -0.1  -0.3  -3.8  6.0  5.8  11.7  6.0  9.1  -1.0  -2.4

**Source:** I.A.C. estimates.

**Notes:**
- R.H.
Column 2 shows changes in the combined effect of tariffs and freight on import prices. Since freight rates have been assumed constant through lack of data, these columns can be considered to indicate only movements in tariffs and quotas, but with their magnitudes dampened by the influence of freight. In general, changes in protection had little influence on competitiveness in either of the periods considered. In the period to 1973-74, the 25 per cent tariff cut contributed to a loss in competitiveness in all industries. However, in no case would the reinstatement of the 25 per cent tariff cut have restored the loss of competitiveness reported in Column 1. In the latter period, reductions in protection continued except for industries with significant quota protection.

Column 3 shows that the manufacturing sector lost competitiveness as a result of the exchange rate movements of the early seventies; this was more than regained in the latter period. In all cases, changes in competitiveness due to movements in exchange rates completely overwhelm movements due to protection changes (compare Columns (2) and (3)).

Columns (4) and (5) show the changes in competitiveness associated with movements in domestic prices and the prices of imports in foreign currency. General inflation is evident in both Australia and its trading partners, particularly from 1973-74. Movements in domestic prices are relatively uniform across industries. In contrast, movements in import prices in foreign currency are much more varied and are an important source of the variation across industries in the total change in competitiveness.

Column (6), the difference between Columns (4) and (5), shows the changes in competitiveness due to divergent movements in domestic prices and import prices in foreign currency. In the period to 1973-74, nearly half of the 12 industries lost competitiveness because of this divergent movement. However, the sector as a whole showed a slight gain due to the generally faster rate of inflation in other countries.
In contrast, the latter period showed a slower increase in foreign prices except for Paper products but the losses of competitiveness from this source were more than offset by the devaluations in all industries except Wood products and Fabricated metal products (compare Column (6) and (3)).

**Discussion**

In the period to 1973-74 the largest decline in competitiveness occurred in Other machinery and equipment, Fabricated metal products and Clothing and footwear. For the machinery group there was an absolute decrease in import prices, while for the other two industries, currency movements kept import prices almost steady in Australian dollars while domestic prices increased at a faster than average rate. The adverse competitive movement in Clothing and footwear was exacerbated by the largest decrease in protection of any industry.

Between 1973-74 and 1977-78 there were some dramatic reversals in trends in competitiveness, with almost all industries improving their position. The most important influence on this reversal was the favourable movement of the exchange rate. Particularly strong increases in competitiveness occurred for Clothing and footwear — as the result of the introduction of import quotas — and in Paper products — because of large import price increases. However, in both cases these influences were less than exchange rate effects which worked in the same direction. The only decreases in competitiveness occurred in the Wood products and Fabricated metal products industries, because exchange rate movements were not sufficient to outweigh the combined influence of higher than average domestic price increases and lower than average increases in import prices.

In both periods, the major component of the change in competitiveness was the exchange rate. In the earlier period, the slower increase in domestic prices compared with foreign currency import prices was roughly balanced by tariff decreases. The latter period saw rapid increases in import prices in foreign currency
and the prices of domestically produced goods, with the foreign import prices in foreign currency increasing at a slightly slower rate. There was also a small further decline in average tariffs. However, the large devaluation of the Australian dollar, after 1973-74, more than offset these disadvantages and was again the major component in the increasing competitiveness of Australian industry during the period.

The estimates in Table 2 reinforce the conclusion that the exchange rate has been the single most important factor contributing to changes in competitiveness over the past decade, usually reversing price movements resulting from differential rates of inflation between Australia and its trading partners. Changes in protection have played only a minor role for most industries.

This conclusion does not appear to be dependent upon the particular data used in the analysis reported in Table 3. Inspection of movements both in relative unit costs in own currencies and in relative rates of inflation (Figure 6) tell the same basic story: if the exchange rate had remained fixed, ceteris paribus, at its 1968-69 level, Australian industry would have either retained or gained competitiveness in the period when competitiveness declined, and lost in the latter period when competitiveness was in fact regained.

The next part of this paper examines relationships between the exchange rate and relative inflation rates.
III DEVALUATION, INFLATION AND COMPETITIVENESS

The previous section described the direct first-round effects of changes in competitiveness, assuming that each factor adjusted to this change independently of all other relevant factors. These first-round effects may, however, be only short-lived and be rapidly taken over by second-round effects due to the links, or dependence, between the various factors. For example, one school of thought argues that movements in differential rates of inflation and movements in exchange rates eventually offset one another so that it is not possible for exchange rate movements to have a long-term effect on competitiveness.

The exchange rate is a price. It measures the number of $A required to buy a unit of foreign currency. Like other prices the exchange rate is influenced by expectations and adjusts to changes in real factors in the market. Thus, the effect of a change in real factors such as an expansion in mineral exports would, ceteris paribus, tend to appreciate the value of the Australian dollar, provided that it was allowed to adjust freely. The exchange rate appreciation in this case is part of the market mechanism in moving toward a new equilibrium point. Thus, Government decisions to revalue may simply have resulted from pressures exerted on the exchange rate by market forces. In other cases, however, exchange rate movements may be administered by governments for other reasons, so that they no longer reflect real movements in the market. In such cases the effects of revaluation or devaluation will depend upon whether the exchange rate was initially — and finally — under or over valued. It is therefore important to distinguish in the analysis of the second-round effects of exchange rate changes that follow, between movements caused by shifts in the underlying supply and demand curves and movements due simply to a change in the administered price.

This section describes the empirical evidence on these effects relating to both overseas countries and Australia.
Background

The purchasing power parity theory of exchange focuses on the role of the exchange rate in equating the prices of goods in alternative currencies. That is, movements in a country's rate of exchange tend to be inversely proportional to the relative movement of its price level, vis a vis its trading partners.

This view has general support amongst the international economic institutions. Thus, GATT states:

"There is ... a strong presumption that over longer periods, the effective exchange rate will move so as to offset the relative differences in inflation rates. This relation need not hold in the short run, nor in the long run in every particular case". [emphasis added]

And:

"In a world of high but varied inflation, market rates of exchange must be changing constantly in order to maintain a reasonably stable real effective exchange rate and, thus a stable pattern of international competitiveness".14

This school of thought asserts the law of one price as a long run tendency, recognizing the possibility of short run deviations.

However, there is a considerable body of opinion which would argue that the link between movements in effective exchange rates and movements in rates of inflation between trading partners is even stronger, so that exchange rate movements away from equilibrium can have only a very transitory short term effect on competitiveness. That is, that the purchasing power parity theory applies not only as a long run tendency, but also as a strong short term response.

For instance, the Laffer-Mundell argument emphasises the influence of exchange movements (particularly devaluations) on the general rate of inflation. This version states that any movement of the exchange rate from its equilibrium level will immediately induce a compensating inflationary or deflationary process, thereby restoring the previous price relativity between traded and non-traded goods to the previous level of competitiveness. That is, although the price of imports is raised by the devaluation, the inflationary process induced by the depreciation very quickly restores the previous relativity.

Kasper (1977) provides a rationale and mechanism for this view:

"... sooner or later many prices of domestic inputs will also go up after a devaluation, because they are sales prices of import-substituting producers or because the costs of these producers have been affected by devaluation. This is a particularly important channel of price transmission in an economy like the Australian, where 80% of all imports are cost goods for industry. And in so far as monetary policy is loose and as previous devaluations lead capital-market speculators to expect further devaluations, capital interest rates are likely to go up. Capital goods prices tend to be pushed up directly by devaluation. And finally, as the devaluation raises the prices of imported petrol, house interest rates, manufactured goods, etc. and the profits of manufacturers are temporarily boosted, so wage rates will go up. One can no longer consider the money wage as set independently of the exchange rate. End results in the extreme: real profits may - after a while - be unchanged and a devaluation may hence have no quantity effect, but only the effect of lifting the price and cost level. Indeed, the impetus of the devaluation may set an inflationary flywheel into motion that is impossible to contain with deflation leading to inflation to devaluation to inflation etc."

The speed and extent to which currency movements are offset by movements in differential rates of inflation is a major issue in

16 Kasper, W., 'Recent International Monetary Developments : A Subjective Interpretation'. In Exchange Rate Changes and the Australian Economy, Corden, W.M., et al, proceedings of a workshop organised by the Centre for Applied Economic Research, University of New South Wales, 3 March 1977, p.3.
discussions of monetary and fiscal policy. Following the large devaluation of November/December 1976, Neville (1977) commented:

"When one puts all these immediate, flow-on and indirect effects together it seems to me that under present circumstances an exchange rate change is likely to have an effect on the domestic price level of virtually the same number of percentage points as the size of the exchange rate change within two to three years. At the end of a period as short as this exchange rate changes will probably have had little effect on the domestic/foreign price ratio. Moreover, nearly half the effect of an exchange rate change on the domestic price level is likely to occur within one year.

"There is general agreement among economists that, in Australia today, devaluation is inflationary ceteris paribus, and revaluation will reduce inflationary pressures. There is substantial evidence that, in the long run, exchange rate changes will not alter the ratio of domestic to foreign prices so that an exchange rate change of a given percentage size will raise or lower the domestic price level by the same percentage amount..." "...how quickly does an exchange rate change cause corresponding changes in the Australian domestic price level? After weighing the evidence surveyed in this paper, my judgement is that in present circumstances about half the effects of an exchange rate change on domestic prices will occur within one year and a further 1/4 quarter in the second year after the exchange rate change...."

Corden (1977) summarised the prevailing view at the time by concluding that from a longer-run inflation point of view the 1976 devaluation (at least) was unwise. The general view at the time was that the 1976 devaluation was either unnecessary or at least unnecessarily large. However, Norman (1976) was one notable - and possibly influential - exception. 18

Both views on the link between devaluation and inflation rates relate to the adjustment of prices following the disturbance of either the nominal exchange rate or the equilibrium exchange rate level. Such a disturbance could be, for example, a change in the administered price of exchange resulting from intervention of governments in the market, or, as is more familiar, a change in the equilibrium rate without a change in the nominal exchange rate. Furthermore, the above arguments rely on the 'ceteris paribus' assumption and thus take no account of the state of the economy, complementary policy initiatives, or the likely rate of inflation in the absence of any exchange rate adjustments. 19

17 See Neville, J., 'The Exchange Rate, Inflation & Unemployment' in Corden N. et al., op.cit.
18 See Norman, N.R., Uncompetitive Australian Industry, Consequences and Options for Policy, a report to the Australian Mining Industry Council, September 1976.
19 Norman, op.cit., pp.18-19 points out that in the face of declining price competitiveness, alternative inflationary policies such as increases in tariff or quota protection are likely to be implemented in the absence of a devaluation.
Is there a conflict between the two schools of thought? In this context the purchasing power parity theory, in broad form, emphasises long term tendencies while the monetarist version emphasises the speed and completeness of the link between exchange rates and inflation. It is relevant to examine the available empirical evidence on the extent to which inflation has actually moved to offset exchange rate movements in particular cases.

International evidence

GATT has recently stated that:

"Observed over the long run, real effective exchange rates [i.e. the indexes of international competitiveness] of most countries have indeed exhibited a high degree of stability." 20

GATT did, however, note the exceptional movements in the competitiveness of the Swiss franc, the Australian dollar and the Austrian schilling. Despite these exceptions, GATT concluded:

"This long term analysis thus gives little reason to believe that a currency's exchange rate can move for a prolonged period significantly out of line with its real international cost-price relationship in an economically interdependent world. If it does so temporarily, there are two forces to bring it back to its proper alignment. Either trade and capital flows will induce a corrective movement of the nominal exchange rate, or the movement of the domestic price level will adjust so as to make a given nominal rate realistic again." 21

However an IMF review of movements in competitiveness of 14 major industrial countries over the period 1963 to 1976 concluded that:

- Improvements or losses in competitiveness can be maintained for relatively long periods of time.
- Significant movements in competitiveness occurred throughout the period, but have been greater in the period since 1971 when exchange rates have been floating. 22

20 GATT op. cit. p.18
21 GATT op. cit. p.20
The first conclusion in particular is corroborated by the OECD's study of movements in price competitiveness of the same countries over the same period.23

The link between inflation and exchange rate movements has been explored by Krueger (1978) in the context of strategies for trade liberalisation in developing countries. Her survey, *Liberalisation Attempts and Consequences*, covers ten developing countries over the post-war period. With respect to the fear that devaluation results in inflation, Krueger finds that inflation in such cases is usually the result of expansionary monetary policy, although occasionally the success of the devaluation in producing balance of payments surplus and the subsequent failure of some governments to offset the effect of these surpluses on the money supply did result in inflation. Krueger's survey suggests that although devaluation may lead to inflation, devaluation is neither a necessary nor sufficient condition for inflation. She concludes that among the many inflationary forces in developing countries, devaluation was a minor one.

**Australian evidence**

Some evidence on the Australian experience is presented in Table 4 which show substantial movement in the effective exchange rate and Australia's rate of inflation in relation to the OECD nations. The trade-weighted exchange rate shown in column 4 shows clearly the effects of the major devaluations of September 1974 and November 1976.

The first devaluation was large, some 12 per cent in terms of the trade weighted exchange rate. It occurred following the period of very rapid inflation during late 1973 and calendar year 1974. By the September quarter 1974 the ratio of Australian consumer prices to the consumer prices the OECD countries was already 5 points above the base (1969) level.

Subsequently, Australia's price level did rise relative to that of its trading partners. Approximately two years later, in 1976, Australia's

---

**TABLE 4: COMPONENTS OF REAL EFFECTIVE EXCHANGE RATE**
*(1969 1 = 100)*

<table>
<thead>
<tr>
<th>Consumer Price Index</th>
<th>Australia</th>
<th>OECD Ratio</th>
<th>Effective exchange rate</th>
<th>Real effective exchange rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1969 M</td>
<td>101.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>J</td>
<td>100.7</td>
<td>101.1</td>
<td>99.6</td>
<td>100.0</td>
</tr>
<tr>
<td>S</td>
<td>101.4</td>
<td>102.2</td>
<td>99.2</td>
<td>100.0</td>
</tr>
<tr>
<td>D</td>
<td>102.2</td>
<td>104.4</td>
<td>98.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1970 M</td>
<td>103.2</td>
<td>103.3</td>
<td>98.0</td>
<td>100.1</td>
</tr>
<tr>
<td>J</td>
<td>104.6</td>
<td>107.6</td>
<td>97.3</td>
<td>99.9</td>
</tr>
<tr>
<td>S</td>
<td>103.2</td>
<td>108.6</td>
<td>97.0</td>
<td>98.9</td>
</tr>
<tr>
<td>D</td>
<td>107.2</td>
<td>110.0</td>
<td>97.8</td>
<td>98.9</td>
</tr>
<tr>
<td>1971 M</td>
<td>103.4</td>
<td>110.8</td>
<td>97.8</td>
<td>99.8</td>
</tr>
<tr>
<td>J</td>
<td>110.2</td>
<td>112.9</td>
<td>97.6</td>
<td>99.7</td>
</tr>
<tr>
<td>S</td>
<td>112.2</td>
<td>114.0</td>
<td>98.5</td>
<td>99.3</td>
</tr>
<tr>
<td>D</td>
<td>115.0</td>
<td>115.0</td>
<td>100.0</td>
<td>99.2</td>
</tr>
<tr>
<td>1972 M</td>
<td>116.1</td>
<td>116.2</td>
<td>100.0</td>
<td>97.9</td>
</tr>
<tr>
<td>J</td>
<td>117.1</td>
<td>118.3</td>
<td>99.0</td>
<td>97.8</td>
</tr>
<tr>
<td>S</td>
<td>118.7</td>
<td>119.4</td>
<td>99.5</td>
<td>98.5</td>
</tr>
<tr>
<td>D</td>
<td>120.1</td>
<td>120.5</td>
<td>99.7</td>
<td>101.6</td>
</tr>
<tr>
<td>1973 M</td>
<td>122.6</td>
<td>122.6</td>
<td>100.1</td>
<td>108.9</td>
</tr>
<tr>
<td>J</td>
<td>126.7</td>
<td>125.8</td>
<td>100.7</td>
<td>108.9</td>
</tr>
<tr>
<td>S</td>
<td>131.3</td>
<td>129.1</td>
<td>101.7</td>
<td>110.0</td>
</tr>
<tr>
<td>D</td>
<td>135.9</td>
<td>137.3</td>
<td>102.8</td>
<td>116.1</td>
</tr>
<tr>
<td>1974 M</td>
<td>139.5</td>
<td>137.6</td>
<td>101.2</td>
<td>118.3</td>
</tr>
<tr>
<td>J</td>
<td>144.9</td>
<td>142.0</td>
<td>102.1</td>
<td>116.0</td>
</tr>
<tr>
<td>S</td>
<td>152.4</td>
<td>146.2</td>
<td>104.2</td>
<td>119.5</td>
</tr>
<tr>
<td>D</td>
<td>158.1</td>
<td>157.7</td>
<td>105.2</td>
<td>105.0</td>
</tr>
<tr>
<td>1975 M</td>
<td>163.7</td>
<td>155.9</td>
<td>105.0</td>
<td>105.0</td>
</tr>
<tr>
<td>J</td>
<td>169.5</td>
<td>159.2</td>
<td>106.5</td>
<td>105.0</td>
</tr>
<tr>
<td>S</td>
<td>170.8</td>
<td>162.4</td>
<td>105.2</td>
<td>105.0</td>
</tr>
<tr>
<td>D</td>
<td>180.3</td>
<td>166.7</td>
<td>108.1</td>
<td>105.0</td>
</tr>
<tr>
<td>1976 M</td>
<td>185.7</td>
<td>169.9</td>
<td>109.2</td>
<td>103.0</td>
</tr>
<tr>
<td>J</td>
<td>190.3</td>
<td>173.2</td>
<td>109.9</td>
<td>105.0</td>
</tr>
<tr>
<td>S</td>
<td>194.5</td>
<td>178.4</td>
<td>110.3</td>
<td>105.0</td>
</tr>
<tr>
<td>D</td>
<td>206.2</td>
<td>180.8</td>
<td>114.2</td>
<td>96.6</td>
</tr>
<tr>
<td>1977 M</td>
<td>211.0</td>
<td>185.0</td>
<td>114.1</td>
<td>92.2</td>
</tr>
<tr>
<td>J</td>
<td>216.0</td>
<td>185.3</td>
<td>114.1</td>
<td>92.3</td>
</tr>
<tr>
<td>S</td>
<td>220.1</td>
<td>192.6</td>
<td>113.6</td>
<td>91.6</td>
</tr>
<tr>
<td>D</td>
<td>225.3</td>
<td>196.8</td>
<td>114.6</td>
<td>89.9</td>
</tr>
<tr>
<td>1978 M</td>
<td>226.2</td>
<td>200.0</td>
<td>114.2</td>
<td>88.2</td>
</tr>
<tr>
<td>J</td>
<td>232.9</td>
<td>205.1</td>
<td>113.7</td>
<td>86.8</td>
</tr>
<tr>
<td>S</td>
<td>237.4</td>
<td>209.9</td>
<td>113.3</td>
<td>83.9</td>
</tr>
<tr>
<td>D</td>
<td>242.8</td>
<td>214.6</td>
<td>113.4</td>
<td>82.6</td>
</tr>
<tr>
<td>1979 M</td>
<td>246.9</td>
<td>218.0</td>
<td>113.6</td>
<td>82.2</td>
</tr>
<tr>
<td>J</td>
<td>253.5</td>
<td>226.1</td>
<td>112.3</td>
<td>83.0</td>
</tr>
<tr>
<td>S</td>
<td>264.6</td>
<td>235.0</td>
<td>113.4</td>
<td>83.1</td>
</tr>
<tr>
<td>D</td>
<td>272.7</td>
<td>241.1</td>
<td>113.1</td>
<td>83.2</td>
</tr>
</tbody>
</table>

**SOURCE:** Based upon unpublished RBA data.
price level — as measured by consumer prices — had increased relative to its trading partners, but only by 5 per cent. Thus, even if it were assumed that the increase in Australia’s rate of inflation compared to its trading partners between 1974 and 1976 was totally attributable to the September 1974 devaluation, the elasticity of Australian prices with respect to a devaluation is less than 50 per cent, \( \frac{5}{12} \times 100 \). This is more than the direct effects of the devaluation on the Australian price level, calculated by assuming that import prices rise by the extent of the devaluation but that domestic producers only raise prices to the extent dictated by increased costs. However, it is rather less than the estimates made at the time.

The second major devaluation in November/December 1976 was even larger than that of September 1974. However, the relative rates of inflation since that date have in fact declined very slightly. Thus, some three years after the 1976 devaluation the ratio of consumer prices in Australia and overseas remains at approximately the same level as it was at the time of devaluation.

An examination of the circumstances in which these devaluation decisions occurred indicates that the devaluations were more than likely the result of market forces adjusting toward a new equilibrium point.

Furthermore, the introduction of wage indexation in 1974 has brought with it a new dimension to the influence of wage determination on the rate of growth of inflation. In the period up to the end of 1978 there was substantial compliance with the indexation guidelines. Indexation has several partially offsetting effects on the price competitiveness of industries producing traded goods.

On the one hand, because wage indexation decisions are based on rates of inflation in previous periods, indexation causes an acceleration (or deceleration) of the rate of increase in nominal wages to lag behind the acceleration (or deceleration) of the rate of inflation. Thus, improvements in competitiveness arising from the slowing of Australia’s rate of inflation tend to be delayed by the process of indexation.

On the other hand, because wage indexation prevents the striking of precautionary bargains when changes in the rate of inflation are anticipated, wage indexation can aid the effectiveness of devaluation as a method of improving competitiveness. If, in the absence of indexation, the expectation of unions and employers is that devaluation would lead to inflation, then market forces

\[24\] The length of the lag between inflation and its incorporation into wages through indexation can exceed two quarters. For instance, the January 1980 indexation decision related to the June and September quarters the previous year.
operating through the collective bargaining process would, in themselves, lead to a rise in wages - even if the devaluation provides no actual rise in prices. Thus, the indexation process removes this element of expectation from the inflationary process.

Third, indexation has had a further beneficial effect in that it enhances the effectiveness of devaluation as a method for improving competitiveness. This occurs because the Commonwealth Government has generally been successful in persuading the Arbitration Commission that the first-round impact of devaluation (and other policy decisions) on the consumer price index should be excluded from the indexation. The operation of such a mechanism is important in that it allows real wages to fall, thus permitting a sought after rise in the price of traded goods relative to non-traded goods. The fact that this has occurred through the Arbitration Commission indicates a degree of consensus on wage movements which would have been difficult to achieve through the process of collective bargaining.

Thus, it is possible that the failure, in the Australian context, to observe strong offsetting movements between exchange rate movements and rates of inflation could, in part, be due to the dampening effect on inflation of the wage setting mechanism. However, this is a red herring; the important conclusion is that the exchange rate policy has, since 1974, been able to achieve substantial improvements in competitiveness. Between September 1974 and June 1979 the depreciation in the trade-weighted exchange rate was 30 per cent compared with a fall of 25 per cent in the real effective exchange over the same period (Table 4). Thus, very little of the potential gain in competitiveness was lost through inflation.

Most overseas countries do not have a wage indexation system, and a number of developing countries surveyed in the Krueger studies have openly engaged in exchange rate intervention policies with protectionist intent. Yet, the IMF, OECD and Krueger case studies would all appear to give support to the proposition, confirmed by the recent Australian experience, that exchange rate movements can lead to changes in price competitiveness which are both substantial and sustained.
Devaluation, Trade Liberalisation and Competitiveness

The relevance of exchange rate movements and policy to the allocation of resources in the economy has recently been explored more formally by Corden (1980) in the context of the theory of exchange rate protection. Exchange rate protection refers to exchange rate intervention policies which are protectionist in intent rather than being concerned with achieving optimal levels of foreign exchange reserves or with smoothing out fluctuations. In contrast to assistance to import-competing industries through the tariff or quotas, which stimulate the import-competing sector at the expense of the production of exports, the maintenance of an undervalued exchange rate assists the production of both exports and import-competing goods, at the expense of goods - such as services - which are not internationally traded.

Corden's theoretical framework provides insights into the policies adopted by the developing countries covered in Krueger's survey. Devaluation of the currency raises the price of both exports and imports relative to non-traded goods; this offsets the effects on the import-competing sector of simultaneous measures such as the removal of quantitative restrictions on imports. The success of such a policy clearly depends on (a) the relative extent of the shift of prices in favour of the trading sectors and the lowering of tariff and non-tariff barriers, and (b) ensuring that inflation, if any, does not erode the consequent shifts in competitiveness.

Krueger argues that countries such as Brazil, Colombia, Israel and South Korea, have already reaped substantial benefits by choosing a successful exchange rate/tariff policy combination in their moves to liberalise trade.

To pursue the relevance of this argument further here, would be to extend the paper beyond its bounds, and possibly to pre-empt parts of Professor Krueger's own paper for this conference.
SUMMARY

The price competitiveness of Australian industry has varied dramatically during the seventies, declining in the period up to 1973-74 and increasing thereafter. These movements are common to most industry groups.

For the decade as a whole, unit cost movements in manufacturing were slower in Australia than in its trading partners. Although Australian manufacturing lost competitiveness as a result of the more rapid rise in average earnings, this was offset by better productivity growth and a slower rate of increase in materials costs.

The Australian dollar appreciated by almost 30 per cent in the period 1968-69 to the September quarter 1974. Since that date the Australian dollar has depreciated by over 30 per cent.

The major influence on movements in price competitiveness was the exchange rate. Relative rates of inflation in Australia and other countries were also important, but these were more than offset by changes in the exchange rate. Protection had little influence on competitiveness in aggregate.

In contrast to movements in relative rates of inflation, changes in exchange rates were sudden, leading frequently to significant movements in competitiveness.

Movements in competitiveness in individual industries tended to follow the aggregate movement. Of the components of competitiveness, costs showed the most uniform movement across industries, with the greatest variation across industries being observed in import prices.

A considerable body of opinion stresses the interrelationship between exchange rate movements and rates of inflation amongst trading partners. Although changes in competitiveness through exchange rate devaluations can be negated by subsequent inflation, evidence from a number of countries suggests that the effects of a devaluation on relative prices can be made to stick, given appropriate fiscal and monetary policies. The major devaluations of 1974 and 1976 appear to have resulted in sustained increases in price competitiveness.
REFERENCES


Corden, W.M., "The Theory of Exchange Rate Protection", unpublished paper, Department of Economics, R.S.Pac.S., Australian National University, April.


References


Norman, N.R., Uncompetitive Australian Industry, Consequences and Options for Policy, a report to the Australian Mining Council, September 1976.


The authors have set themselves a formidable task in endeavouring to unravel the forces which have been influencing the competitiveness of Australian Manufacturing Industry during the 1970's. At the outset they clearly delimit their task to measurement rather than seeking to provide us with a full explanation of these forces.

The paper has three distinct though related sections:

- Section I disassembles the changes in competitiveness of Australian Manufacturing over the 1970's;
- Section II analyses changes in competitiveness for 12 industry sub-divisions; and
- Section III examines the question of whether sustained improvements in competitiveness can be obtained through devaluations.

Much has been said of late about improvements in the competitiveness of Australian industry but little by way of detailed analysis has been forthcoming. In this sense the paper is very timely.

Many economists and other economic commentators have tended to rely on single measures of competitiveness. The authors kindly supply us with four indexes (Figure 1). What is immediately apparent is that while the authors suggest there is "broad agreement" between the indexes in terms of trend (especially Flinders, Syntec and RBA), there is also a substantial and widening dispersion between the measures. This presents us with a problem of choice - what is the appropriate measure of competitiveness?

All are familiar with the acceleration of costs during the decade. The data provided (Table 1) shows the turn around in the growth rate of average earnings from the early 1970's when our earnings growth was slightly below that of our trading partners to the post 1974 situation of substantially higher growth in earnings. This deterioration in the
earnings position was largely offset by more favourable productivity performance and a substantially slower rate of increase in materials prices. This raises several questions. The first concerns sources of productivity improvement. The timing suggests that much of these gains have been associated with a period of labour shedding. If the causation runs in this direction we would not necessarily view these gains as a "positive". Second, while Australia has emerged from the 1970's in a reasonable state of competitiveness there are some uncertainties associated with future earnings growth and materials cost. The wage indexation system is coming under increasing pressure. What would be the implications for average earnings growth of a complete breakdown? The effects of oil price rises are beginning to be captured in the 1979 materials cost index and we would expect the 1980 index to further reflect these cost movements. In brief we may be entering the 1980's without the favourable offsets which were operating in the second half of the 1970's.

We have another difficulty with Table 1. The authors indicate (p.6) that cost movements are expressed in "own currencies" and hence abstract from exchange rate movements. However, because of the importance of imported inputs into Australian manufacturing materials cost will be influenced by exchange rate movements. As a consequence how meaningful is the unit current cost measure?

The remainder of Section I provides a useful discussion of changes in protection and exchange rate movements. With regard to the latter the authors show that the existing exchange rate regime allows for the possibility of divergent movements in bilateral exchange rates. This together with the evidence provided in Figure 5 concerning divergent industry movements in domestic prices, import prices and competitiveness leads us into the analysis of Section II.
We agree with the authors that there is a need to examine disaggregated industries. However, this decomposition presents some problems in terms of both model specifications and data availability. Equation 2 ($P_m = P_m \cdot T_F$) will broadly hold where the only small country assumption can be made and hence may apply when manufacturing industry in aggregate is being considered. When we start aggregating the small country assumption may no longer apply. Our other problem is with the use of a constant freight rate across all industries. While appreciating the data problems, at the individual industry/commodity level differential freight costs may be an important element in price competitiveness.

Section III provides a useful discussion of exchange rate changes and inflation. We have no real problems with the authors' conclusions that with an appropriate policy mix it is possible to secure sustained improvements in competitiveness through the exchange rate. In their explanation too much stress is placed on wage indexation mechanisms. Wage indexation may have dampened inflation but in the explanation of price movements post 1976 greater weight should be placed on the settings of macroeconomic policy. The tight monetary and fiscal policies inhibited the ability of producers to pass on cost increases and served to dampen price expectations.

In summary, the paper has increased our understanding of the factors influencing the competitiveness of Australian industry and drawn our attention to the need to consider competitiveness at the individual industry level. We are, however, a little worried about whether the data is robust enough to support such an analysis.
I note at the outset that this is a paper with limited aims. As the paper notes, much of the discussion in the literature of the major changes in the price competitiveness of Australian industry over the early 1970’s has been conducted in terms of shifts in the terms of trade. The work of Gregory on this is perhaps best known. This paper, however, is not meant as a contribution to that debate but rather it is essentially a "measurement" paper, aimed at assigning magnitudes to the different avenues through which price competitiveness has changed (other, non-price, dimensions of competitiveness are outside the paper’s scope). While the paper consciously puts some of the fundamental issues to one side, however, its results of themselves raise a number of interesting questions. I have therefore felt free to offer some interpretive comments on the results.

The clearest message which the paper aims to communicate is that changes in competitiveness associated with the first round effects of exchange rate changes "completely overwhelm" movements associated with other factors, such as changes in tariffs.

As the paper does, let us proceed by looking first at broad measures of competitiveness. Figure 1 depicts movements in four measures:
- labour earnings relative to our four major trading partners;
- CPI movements relative to our four major trading partners;
- CPI movements relative to all OECD countries;
- import prices relative to domestic prices.

The question immediately arises of which is the appropriate measure of the price competitiveness of Australian industry. Perhaps this would not be so important if, as the paper suggests, all of the measures show much the same movement. However, I am not sure that they do: taking the
1968/69 base year, the dispersion of movements over ten years among the
different measures is about as great as the largest movement in any one of
the measures within the period. It is true, though, that all four measures
show much the same cyclical pattern (in a qualitative sense) around the
middle of the decade of the 1970's: a sharp loss of competitiveness in the
period 1972-74 and good gains over the period 1976-78.

What then is the appropriate measure? It depends on which sector of
the economy and which market (the domestic market or export markets) we are
interested in. The paper states that it is concerned mainly with the
competitiveness of the Australian manufacturing sector in the domestic
market, so we may take that as a provisional starting point.

In that light, I think that Table 1 properly focuses on unit costs for
the manufacturing sector (although I am not so sure of the appropriateness
of the 75/25 weighting between labour and materials costs). Reasons for
preferring cost-based measures, even at the broad level of this first part
of the paper (dealing with the manufacturing sector as a whole), to either
relative CPI movements or to movements of import prices relative to
domestic prices seem to me to be:

- where goods are more or less close substitutes, prices of both
  imported and home-produced goods in the domestic market will tend to
  show similar movements and not fully reflect movements in underlying
  factors affecting competitiveness - i.e. the "law of one price" will
  tend to apply, if not in its pure form then at least to some degree;

- profitability and short-term rents, market shares and capacity
  utilisation will tend to absorb changes in cost competitiveness in the
  short run.

Continuing in this vein, perhaps we should be looking at normal unit
costs rather than actual unit costs, to remove the effects of changes in
capacity utilisation and attendant variations in productivity. Looking at
Table 1, we see that Australia made rapid gains in average labour
productivity over 1973-75 relative to other countries. But these rapid
gains in productivity represent labour shedding which, it can be argued,
was to a large extent induced by losses of competitiveness due to other factors. It seems a little odd, therefore, to count these productivity changes as improvements in competitiveness. No doubt labour-shedding made manufacturing firms which stayed in business more competitive on cost, but it seems to me that if we are interested in factors impinging on the competitiveness of the pre-existing industry structure, it is better to use normal unit labour cost (at trend productivity) for the purpose.

Taking an overall look at the movements shown in Table 1, we see that while there were movements in the relative position on unit current costs within the period in the order of 10 per cent (gain followed by loss), there was little or no net change over the period as a whole. The fact that this is not true of the individual components of current unit costs, however, tempts me to offer some comments about possible future movements.

First, it is interesting to speculate on whether the gradual loss of ground on labour productivity relative to other countries in recent years, not quite eroding earlier gains, will continue. I am disposed to think that it may. Our trend productivity performance has in the past been inferior to that of many of our trading partners and, if the national accounts can be believed, Australia's productivity performance over the last couple of years has been unspectacular even by earlier Australian standards.

Australia's relative advantage on materials costs improve significantly in the mid 1970's, then deteriorated sharply, particularly between 1978 and 1979, with the accelerated move to import parity pricing for domestic crude oil. However net movements since 1970 are still in Australia's favour. While it seems to me likely that Australia may retain an absolute comparative advantage in materials costs well into the future, it seems less likely that there will be continuing further gains relative
to other countries. Questions of materials costs are of course bound up with factors producing shifts in the intersectoral terms of trade.

On average earnings, Australia lost ground rapidly between 1973 and 1974 and the relative position deteriorated further until 1977, since when there has been an improving movement. Given current wage pressures in the Australian economy there must be some doubt that this will continue.

Overall, it is difficult to see a basis for future Australian gains on relative current costs; rather, the odds seem to be in favour of an adverse drift.

Having looked at relative unit costs, the paper proceeds to look first at the effects of tariff changes and then at those of exchange rate movements on the competitiveness of the manufacturing sector.

On the first of these, the paper's conclusion is that the effects of tariff changes since 1973 on the average nominal tariff for the sector were rather less than 40 per cent - corresponding to an effect of something less than 10 per cent on average duty-paid import prices. I would comment that however it compared with effects of exchange rate changes, this effect is certainly of comparable magnitude with changes during the decade of the 1970's relative unit costs (as shown in Table 1).

Moving on to exchange rates, the paper presents (in Table 2) the movements in the rate against the US dollar and that against the usual trade-weighted "basket". The size of the latter movements - 15-20 per cent over the period and up to 30 per cent within it - do tend to support the paper's conclusion that exchange rate movements dominated other factors. However, I will return to that point later.
The paper also discusses the dispersion of movements in bilateral exchange rates and notes a divergence over the 1970's between the import- and export-weighted rates. I would only comment that the latter divergence has not changed greatly since 1974 (see Figure 4) and that the gap may now be going to close somewhat - e.g. with the weakness of the Yen in the wake of the second oil shock. More generally, I am not sure that there is a long-run tendency for our exports to go to currency areas appreciating relative to those from which our imports are sourced.

The discussion of movements in the components of manufacturing sector competitiveness concludes with a brief presentation of the differential movements over the 1970's across industries within the sector (see Figure 5). The paper's point about the dispersion of movements in bilateral exchange rates is reflected here (with other factors) in the wide dispersion of competing import prices across industries. To me, however, the interesting point about Figure 5 is that there was a very wide dispersion of industry-specific competitiveness movements over the 1970's, (including some quite large movements in either direction) while at the same time the competitiveness of the manufacturing sector as a whole showed little net change. This suggests that the interesting questions concern the factors underlying sustained shifts of comparative advantage among industries. The middle section of the paper sheds some light on this as it turns to an analysis of competitiveness components for two-digit manufacturing industries.

Competitiveness movements for individual industries are analysed in terms of an identity (equation (5)) equating a change in competitiveness to the sum of changes in foreign currency import prices, the power of the tariff (plus quotas) and freight and the import-weighted exchange rate, less the change in the domestic price. It is a little odd to see the implication that an increase in protection leads to an increase in
competitiveness, but that does follow from the paper's focus on competitiveness of import-competing manufacturing industries in the domestic market.

Of more concern is that the analysis here is in terms of foreign currency import prices relative to domestic selling prices rather than in terms of costs. As I indicated earlier, I believe that relative costs are more appropriate for the purpose. Presumably, relative prices are used here because it was more difficult to obtain cost data for individual industries and their counterparts abroad. But if so, what cost data were the specific industry items in Figure 5 based upon?

The main results of this section are presented in Table 3, corresponding (more or less) to the results presented in Table 1 for the manufacturing sector as a whole. Table 3 raises some puzzles, for example:

- It seems strange that the transport equipment industry shows a significant rise in competitiveness over each half period, when the net contribution of protection to the industry's competitiveness is shown as negative in the first half period and only a very small positive figure in the second.

- It also seems to go against conventional wisdom that the rise in the competitiveness of the basic metal products industry in the second half period is only just sufficient to regain the ground lost in the first half period.

While Table 3 generally supports the conclusion that the quite pronounced movements in the (overall) exchange rate within the decade dominated the effects of protection changes on competitiveness, it doesn't show that in all cases exchange rate changes dominated the effects for particular industries of changes in foreign currency import prices relative to domestic prices. The textiles, wood and related products and fabricated metal products industries show substantial differential price movements within the period, and indeed over the decade as a whole. Similarly, movements in protection over the decade as a whole had a major impact on some of the industries, notably clothing and footwear, the principal
beneficiary of increases in protection since 1974.

These observations lead to the question of what is the relevant time frame for concluding that the exchange rate has been the major factor in changes in competitiveness. The last section of the paper is in fact devoted to a discussion of issues relevant to this question. The literature cited in this section certainly seems to dispose of the extreme view that exchange rate changes necessarily lead to commensurate price level changes within a relatively short period of time. Certainly the post-1976 experience of Australia confounded the diagnoses of many of us in the profession, among whom Kasper and Neville have the honour of being quoted in the paper.

Perhaps the "missing" inflation consequences of the 1976 devaluation are less of a mystery if the up and down movements of the exchange rate in the mid-1970's are looked at together. Looking at Figure 6, the lack of stability in the exchange rate over that period certainly stands out. Two years during which there were sharp appreciations were followed closely by a sharp devaluation, a delay, then another sharp devaluation.

Given the short time span within which these events occurred (about 4 years in all), the following sort of story seems plausible to me. The appreciations of 1972-73 may have set in train "Keynesian" disequilibrium quantity adjustments, especially in the import-competing sector, with price effects not emerging significantly before the depreciations of 1974 and 1976 reversed the process. The depreciations then begin to look like equilibrating adjustments, and with the advantage of hindsight the "missing" inflation consequences seem easier to understand.

Certainly partial wage indexation, the slack labour market and the restrictive stance of macroeconomic policies must have been important in restraining prices after the 1976 devaluation - but, it seems to me, with
the outcome conditioned significantly by the initial disequilibrium situation at mid-decade.

The discussion in this part of the paper doesn't settle the question of whether exchange rate policy (possibly in conjunction with other macroeconomic policies) can change the real exchange rate and competitiveness over the long term. There has been some debate recently on this and on the question of whether the recent gains (or restoration) of competitiveness can be maintained against the scenario of substantial inflows of capital for resource-based development, and related increases in exports. It seems to me likely that the increased command over real resources which that scenario implies may be incompatible with holding the real exchange rate at about the present level. The potential would therefore seem to be there for further pressure on the competitiveness of at least some traditional import-competing and exporting industries - unless we are willing to scale down somewhat our aspirations for resource-based development.
REPLY BY THE AUTHORS

Comments on the paper provided by the Discussion Openers fall into two groups:

1. those raising questions on the paper itself; and
2. interpretive comments and speculation on the likelihood of the continuation of the trends and developments outlined in the paper.

This latter set of comments complements the paper and we will confine our reply to the former group.

WHAT IS THE APPROPRIATE MEASURE OF COMPETITIVENESS?

The paper defines competitiveness as the ability to compete in markets against foreign sources of supply. This implies that (in addition to quality, delivery times and after sales service) we are concerned with relative price and cost levels and their role in determining flows of exports and imports and the share of each market held by domestic producers.

The question of what is the appropriate measure of competitiveness can be examined at three levels: 1

1. theoretical
2. qualitative review of available statistical measures
3. quantitative assessment of the predictive power of each measure in explaining flows of imports and exports.

The published econometric work does not permit a reasonable assessment of different measures. Hence we shall confine our comments to theoretical considerations and a review of the available measure of the competitiveness of import-competing activities. The arguments can, of course, be generalized to export activities.

1 In writing the paper itself we felt constrained - perhaps unduly - not to repeat unnecessarily the work and arguments of others on international competitiveness, in particular Enoch's comprehensive discussion in the Bank of England Quarterly on the meaning and measurement of international competitiveness and the more recent and largely unpublished Australian work by MacFarlane and McDonald at the Reserve Bank. The discussion here follows Enoch's format.
Theoretical Considerations

It is apparent that the appropriate measure of competitiveness must depend on the type of market and the degree of substitution between imported and domestic goods. Fitzgerald suggests, for example, that where goods are more or less close substitutes, the appropriate measure should be based on relative costs. This argument obviously has greatest validity for narrowly defined commodities where the "law of one price" can be expected to hold. It is unconvincing however, at the industry level: if only through the aggregation of commodities and the differences between commodity mix of imported and domestic goods, the degree of substitution between imports and domestic goods aggregated to the industry is far from perfect. This point is, of course, recognized in Dixon's specification of the ORANI model\(^2\) and has generally been confirmed by the econometric work undertaken independently and within the IMPACT project.\(^3\)

Recent empirical work by Gregory and Marsden is also relevant here. In their view, roughly a third of Australia's imports are responsive to changes in price relativities but the bulk of imports are not responsive. Thus the degree of substitution between imports and domestic goods seems best described as very low, rather than very high, as implied by arguments appealing to the "law of one price". For industry-based aggregates, therefore, relative prices would appear to be the most appropriate measure of competitiveness between foreign and domestic suppliers in the local market.

---


Qualitative Assessment of the Available Statistical Measures

Some qualitative assessment of the available statistical measures can be made to reveal their advantages and shortcomings. We must caution, however, that such an assessment cannot provide an unequivocal ranking of the various measures since personal judgements must vary on the trade-offs between differences in the coverage, relevance, and up-to-dateness of weighting patterns and so on.

Measures Based on Prices

Relative movements in consumer prices have been a popular measure of international competitiveness, particularly associated with the monetarist view of exchange rates and inflation. Such measures have at least one shortcoming. The regime of prices included in consumer price indexes includes the prices of rent and services (which are generally not imported) and food, where imports are essentially non-competitive with local production. Approximately 85% of Australian imports are manufactures other than food and more than half of these are used as inputs into the manufacturing sector. Machinery and equipment alone account for more than 30% of merchandise imports.4 Thus, while information on relative movements in consumer prices in Australia and overseas is readily available as an indicator of movement and price competitiveness affecting Australian imports, it may be seriously deficient because of its much broader coverage and different weighting pattern.

National accounts based measures of competitiveness such as the ratio of implicit deflators for imports and non-farm GDP could also be considered. Such measures are readily available. Johnston and Murphy in a forthcoming paper5 reviewed the usefulness of these measures, which they reject, because of its systematic downward bias. They suggest this bias arises from the

5 Johnston, H.N. and C. Murphy, International Competitiveness, Stock Dis-equilibrium and Imports, Mimeo, Treasury.
steady shift in the composition of imports in favour of lower priced goods. We will return to the Johnston and Murphy contribution below.

Finally, there are commodity-based measures of the relative prices of foreign and domestically produced goods. We shall confine our comments to competition in the domestic market. For the period beginning 1968-69 the ABS has provided indexes of prices of articles produced in the manufacturing sector and these are available at, at least, the 2-digit ASIC level.

Indexes of import prices are less satisfactory. The traditional source has been the Reserve Bank's Import Price Indexes. As is well known, these are based on wholesale prices in trading partner countries which are then adjusted by movements in official exchange rates. At the aggregate level of the manufacturing sector as a whole, these indexes probably continue to be reasonably accurate, but for disaggregated analysis they suffer from a relatively high level of aggregation and an increasingly out-dated weighting pattern. Until the ABS assumes its responsibility for indexes in this area, there seems little alternative but to use unit value based indexes. This approach has been followed by the Industries Assistance Commission in support of the IMPACT Project's econometric work on import substitution and a revised, updated version of these indexes is used here.

Cost Based Measure

Indexes based on relative labour earnings have also gained some prominence as indicators of price competitiveness. The obvious criticism of this measure is that it does not allow for divergent movements in other costs. Particularly in the 1970s when the price of oil and other commodities has shown a substantial relative movement, this criticism is perhaps becoming more important. As a cost based measure, indexes of relative earnings

---

do not allow for changes in profitability and, again, during the 1970s there has been considerable concern over the involuntary squeeze on the profits in the Australian manufacturing sector. However, in the short term, firms may willingly accommodate a reduction in profits to obtain a larger market share. Thus, there may be an advantage in the concentration on relative movements in labour (and other variable) costs as a predictor of import flows and export flows. Whether there is such an advantage is an empirical question on which there is currently little or no information.

In part this is due to the difficulty in obtaining cost data for individual industries, especially for their counterparts abroad. Moreover, the importance of trading partners differs substantially between industries, and appropriate weighting patterns become a matter of some concern. Hence, although the paper provides information on cost movements in individual industries in Australia we do not have corresponding information for their trading partners. Thus, the industry-specific movements in competitiveness shown in Figure 5 and in Table 3 are based on the relative movements in the prices of articles produced in manufacturing and import indexes of unit value.

Narrowing the Divergence

In the context of our paper, the question of the appropriate measure of competitiveness arose in connection with the movements of the four indexes shown in Figure 1. We chose to emphasise the similarities, focussing on the major movements between periods. In contrast, Fitzgerald stresses the divergence in long-term trends between the different indexes. As noted by Connell, however, the main source of divergence is the relative price measure on the National Accounts deflators for imports and non-farm GDP. As has already been noted, this particular measure has been reviewed and rejected by Johnston and Murphy because of its systematic downward bias. Thus, if the divergent index is faulty, there is a reasonable
reconciliation between the different positions. We maintain, however, an a priori strong preference for a measure of competitiveness based on the relative prices of imports and comparable domestic production. Too such measures are the relative movements of:

(a) the RBA's imports price index (excluding oil) and the CPI, and

(b) the aggregate import index for unit values and the ABS index of prices of articles produced in manufacturing.

This latter variant is, of course, the competitiveness index used in Table 3 of the paper. Figure A compares the two additional measures with the original three indexes shown in Figure 1. On this revised basis we are strengthened in our assessment that:

"...whether based on broad aggregates... or more narrowly... there is broad agreement on the major movements."

THE DIRECTION OF CAUSATION BETWEEN PRODUCTIVITY GROWTH AND CHANGES IN COST COMPETITIVENESS

Productivity growth in the Australian manufacturing sector was faster than its competitive partners in each year between 1970 and 1975 with the largest relative rises in the period 1973-75. This later period coincides with the dramatic rise in average earnings. FitzGerald and Connell expressed a widely held concern about our treatment of these productivity gains as a source of improvement in competitiveness on the grounds that a substantial portion of these productivity gains represent labour shedding. There are two issues here:

- How should productivity growth associated with labour shedding be treated in measures of cost competitiveness?
- How much of the observed productivity growth was in fact due to labour shedding?

On the first question there is little disagreement. We would, of course, agree that to include productivity growth caused by labour shedding would be incorrect - in general. It should be noted, however, that depending on the purpose of the index of cost competitiveness, some parts of such productivity growth should still legitimately be counted as a source of improvement in competitiveness. It depends on whether the index is used
to measure pressures on the pre-existing structure of industry and employment or whether the competitiveness index is to be used to predict changes in the product market, that is, in trade flows and market shares.

We need to be clear on the mechanisms which operate in the product and labour markets. Presumably they are something like this: in the product markets for two imperfect substitutes, the supply curve for the imported product shifts downward resulting in an expansion in demand for the imported product and an inward shift of the demand curve for the domestic produced products. The shift inward along the domestic supply curve causes infra-marginal firms and activities to become extra-marginal. If there is a slack in domestic industry, management may be stimulated to seek more actively to minimize costs, that is, to increase the "x-efficiency" of their operation. The source of efficiency gain may lie in reducing labour or material inputs or a search for cheaper input prices. The effect, however, is the same: the domestic supply curve shifts outwards to the right and the reduction in the quantity of domestic goods demanded is partially offset.

In the Australian experience of the seventies, there is an additional feature. This is, of course, the rapid rise in real wages. Since in the short term, capital and labour are imperfect substitutes, the effect of the rise in real wages is to shift the domestic supply curve upwards to the left. However, with the passage of time, capital can be increasingly substituted for labour and the supply curve again shifts slightly downwards as labour inputs are economised.

In this situation, clearly the structure of the industry has changed: marginal firms and activities ceased production and labour inputs have been reduced. How does this affect our measures of competitiveness? This would seem to depend on the purpose at hand. If we are interested in measuring the pressure of the pre-existing structure of activity and
employment, then productivity gains associated with both the shift to the left along the domestic supply curve and the downward shift of the supply curve itself should be excluded from the measure of competitiveness.

If our purpose is to predict changes in trade flows and market shares then productivity gains associated with shifts down along the domestic supply curve should again be excluded from the measure of competitiveness efficiency, but reduction in labour input per unit associated with downward shifts of the supply curve to the right should be included in the measure.

It should be noted that the focus of our paper is towards this latter purpose, that is, it is to predict changes in trade flows and in the share of markets.

On the second question, it may be noted that productivity growth as shown in Table 1 relates to the growth in real product per head, that is, labour input is measured in terms of the number of employees rather than in terms of hours. This distinction is important because the available evidence on labour shedding suggests that there has been little or no shedding in terms of number of employees, although there is evidence that labour shedding has occurred through the reduction in the number of hours for employees. Thus the estimates of productivity growth shown in Table 2

7 To test for significant differences in the performance of Australian manufacturing industries in reducing the labour requirement in recent years, Heraden and Anderson examined, in a regression framework, the annual indexes of real product per head in 2-digit ASIC manufacturing industries over the period 1949 to 1976-77. They conclude that for the manufacturing sector as a whole, labour productivity as measured by real product per head appears to have increased at a constant rate since 1949-50. That is, their results provide no evidence to suggest that the rate of productivity growth has been significantly higher in the 1970s compared to the 1960s. They find no evidence to suggest that the decrease in the labour productivity growth expected as activity turns down has not occurred in recent years: that is, they find that the extent of labour shedding which has occurred as a result of the increase led to a faster growth of productivity as measured by real product per head employed.

Gregory and Duncan in their recent paper do, however, find some evidence for labour shedding in terms of a reduction of hours per employee. See Gregory, R.G. and R.C. Duncan, "The Australian Labour Market in the Seventies", in: Key Issues of the Seventies, Reserve Bank Conference in Applied Economics, December 1979.
do not appear to include productivity growth associated with labour shedding and, in this regard at least, our treatment is free of the problem of reverse causation.

Data and Methodological Considerations

Connell notes correctly that we have failed, in Table 1, to exclude completely the effects of exchange rate movements since the ABS Index of prices of materials used in manufacturing includes imported materials whose prices will be influenced by exchange rate movements. It seems unlikely, however, that it would invalidate the main conclusions based on unit current costs. According to OECD modal figures, materials comprise only 25 per cent or so of unit current costs, and according to the ABS, imports comprise approximately 27 per cent of total materials inputs into manufacturing industry. Thus, the exchange rate movements, while large, would only operate on about 7% (25% of 27%) of unit current costs.

There was also some concern over the validity of the small country consumption which is implicit in the analysis based on the decomposition based on Equation 2 (Pm = Pm*. TP). Certainly at 2-digit ASIC level it seems, in general, that the quantity of imports purchased by Australia is unlikely to affect the price of these goods traded on the Australian or the world market. As a generalisation, it probably also holds true at the 3-digit level. There is, however, at least one notable exception - motor vehicles. The failure of the prices of Japanese motor vehicles to follow - even in the longer term - movements in the Yen vis-à-vis Australian dollar is well documented in IAC reports on the motor vehicle industry. FitzGerald has a different problem with our analysis of the transport sector which on inspection appears to have been confounded by the frequent and complicated changes in tariff classification and a tendency

to classify CKDs as completely built up motor vehicles. Further work on these questions in the motor vehicle industry may need to proceed on a case study basis rather than in the context of the broad framework used in the paper.

We are much less worried about Fitzgerald's concern over the conflict between conventional wisdom and the price index movements for basic metal products. Imports of basic metal products are very small and can generally be considered non-competitive with domestic production. 9

A Speculative Comment

In terms of the speculative comments about the continuation of recent trends into the next decades or so, we would disagree with Fitzgerald's pessimistic prognosis on productivity growth. As taught by Salter, 10 productivity growth arises from two sources: (a) shifts in the efficiency of resources within established industries; (b) structural change, i.e. shifts in resources between industries. Salter stressed the importance of structural change as the prime source of productivity growth and his case studies - based on US and UK experiences in the inter-war and immediate post-war period - strongly support this view. The Australian post-war experience has been quite different.

Shifts in resource use between industries have been a very minor source of productivity growth in Australian manufacturing during the post-war period. Table 1 compares actual productivity growth for the sector with estimates of the productivity growth that would have occurred had the industry structure been fixed. There is very little difference. During the post-war period, virtually all of the low rate of productivity growth

---

9 Imports comprised 1% of sales of basic metal products in 1977-78, not more than 4% of sales. See IAC, Approaches to General Reductions in Assistance, Information Paper No. 7: Trends in the Structure of Assistance (May 1968).

...costs. Contrary perhaps to the popular view we find that the internal cost movements of Australia and its trading partners favoured Australia during most of the decade. With respect to exchange rates, movements in the average rate of exchange between Australia and its trading partners, have, in common with all major economies, been both larger and more frequent since the Smithsonian Agreement of 1971.

It is readily apparent that exchange rate movements have been a major factor in changing the competitiveness of Australian industry during the seventies, but were they more important than the relative rates of inflation experienced by Australia and its trading partners? How important were the reductions in protection following the 25 per cent across-the-board reduction in tariffs in July 1973 and the increases in protection following the subsequent introduction of quantitative restrictions on imports? In Part II we attempt to answer these questions for manufacturing industries by examining the first round impact on competitiveness of changes in relative prices in home currencies, tariffs and freight rates, and changes in the value of the Australian dollar. We find that movements in competitiveness associated with the first round effects of exchange rate changes completely overwhelm movements in competitiveness associated with other factors.

To what extent, however, are the effects on competitiveness of movements in rates of exchange permanent? Are they quickly eroded by offsetting movements in tariffs and rates of inflation? To what degree are the exchange rate and the rate of inflation interdependent? These questions are addressed in Part III.
of the existing structure of industry and employment, a time frame
significantly shorter than a decade is clearly relevant. These are
empirical questions, which particularly on the export side need further
quantitative analysis.

Since the empirical evidence suggests that exchange rate changes can
have a sustained effect on price competitiveness, the discussion on the
question of the relevant period of observation for changes in competitiveness
touches directly on the possibility of using the
exchange rate as an instrument of industry policy. Here we must share
Gruen's regret that this question was not further explored in the Conference
discussion.
# Table of Contents

**Discussion Paper No. 3**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>1</td>
</tr>
<tr>
<td>I. Pressures on the Competitiveness of Industry</td>
<td>4</td>
</tr>
<tr>
<td>Relative prices and costs</td>
<td>6</td>
</tr>
<tr>
<td>Changes in protection</td>
<td>8</td>
</tr>
<tr>
<td>Exchange rate movements</td>
<td>9</td>
</tr>
<tr>
<td>Aggregate and industry specific movements</td>
<td>14</td>
</tr>
<tr>
<td>II. Analyses of Factors Affecting Price Competitiveness</td>
<td>16</td>
</tr>
<tr>
<td>Data</td>
<td>21</td>
</tr>
<tr>
<td>Results</td>
<td>22</td>
</tr>
<tr>
<td>Discussion</td>
<td>25</td>
</tr>
<tr>
<td>III. Devaluation, Inflation and Competitiveness</td>
<td>28</td>
</tr>
<tr>
<td>Background</td>
<td>29</td>
</tr>
<tr>
<td>International evidence</td>
<td>32</td>
</tr>
<tr>
<td>Australian evidence</td>
<td>33</td>
</tr>
<tr>
<td>Devaluation, trade liberalisation and competitiveness</td>
<td>37</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td>38</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>39</td>
</tr>
<tr>
<td>Comments by Discussion Openers</td>
<td></td>
</tr>
<tr>
<td>1. M. Connell</td>
<td>41</td>
</tr>
<tr>
<td>2. V.W. Fitzgerald</td>
<td>44</td>
</tr>
<tr>
<td><strong>Reply by the Authors</strong></td>
<td>52</td>
</tr>
<tr>
<td><strong>Tables and Figures</strong></td>
<td></td>
</tr>
<tr>
<td>Table 1: Factors affecting movements in manufacturing costs in own currencies; Australia and major trading partners, 1969 to 1979</td>
<td>7</td>
</tr>
<tr>
<td>Table 2: Movements in Australian exchange rate, 1969 to 1979</td>
<td>12</td>
</tr>
<tr>
<td>Table 3: Components of average change in competitiveness in manufacturing industries, 1968-69 to 1973-74 and 1973-74 to 1977-78</td>
<td>23</td>
</tr>
<tr>
<td>Table 4: Components of real effective exchange rate</td>
<td>34</td>
</tr>
</tbody>
</table>