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DISCUSSION PAPERS

INCORPORATING INTERNATIONAL COMPETITIVENESS
INTO THE DEMAND FOR LABOUR FUNCTION:
SOME ISSUES OF SPECIFICATION
AND INTERPRETATION*

P.K. Trivedi and J.N. Alexander

DISCUSSION PAPER NO. 151

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**INCORPORATING INTERNATIONAL COMPETITIVENESS INTO
THE DEMAND FOR LABOUR FUNCTION: SOME ISSUES OF
SPECIFICATION AND INTERPRETATION***

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Abstract

This paper is an attempt to clarify and discuss the theoretical status and the empirical role of measures of international competitiveness that have featured in aggregate models of labour demand. It is argued that the practice of using the real exchange rate as a measure of international competitiveness raises a number of difficulties. Several other approaches which are empirically feasible are discussed. At the empirical level we have compared the contributions of real wages, aggregate demand and international competitiveness as contributors to aggregate employment changes in Australia between 1970 and 1983. Although it is found that the so-called "Classical" mechanism was indeed operating on aggregate employment through this period, we find a number of difficulties with an explanation of employment changes based solely on the changes in real wages and international competitiveness. First, the mechanism itself is not very powerful. Second, it neglects the role of monetary factors. It is found that contrary to the strict monetary neutrality hypothesis changes in real money exerted a powerful influence on employment. We suggest a number of mechanisms through which this effect may have operated and conclude that explanations of unemployment that emphasise only the "Classical" or the "Keynesian" mechanism are inconsistent with observation.

I. INTRODUCTION

There are two principal motives underlying this paper :

- 1) to clarify and to discuss the theoretical status and the empirical role of measures of 'international competitiveness' that have recently featured in aggregate models of labour demand; and
- 2) to econometrically estimate the contribution of real wage, international competitiveness and real aggregate demand as determinants of the demand for nonfarm labour in Australia between 1970 and 1983.

The first motivation is rooted in the casual observation that many existing empirical studies of aggregate labour demand are based on the text-book closed economy model of the competitive firm applied to economies that are manifestly 'open' to international influences. In those studies which acknowledge the existence of international markets, the issue of 'openness' has been dealt with by introduction of an 'international competitiveness' factor. This variable's link with the basic concepts in the open economy macroeconomics literature remains somewhat unclear.

The second motivation is founded in the Australian macro policy debate concerning the causes of rising unemployment in Australia since the 1970. The relative contributions of real wage and real aggregate demand movements to unemployment have been extensively discussed. Although many econometric studies have found evidence of a link between unemployment and real wages in Australia, the interpretation of this evidence is not clear¹. In particular, reduced-form type unemployment equations cannot resolve the relative contributions of the demand and supply of labour factors in explaining the observed changes in unemployment.

This paper focusses on labour demand, thereby reducing the importance

of the identification problem. However, the ambiguity regarding the relative importance of real wages and aggregate demand does not entirely disappear. On the one hand we have the view, echoing aspects of a pre-Second World War debate (Geary and Kennan (1982)), that there is little relationship between real wages and employment, a view that has received theoretical support in recent years (see, for example, McDonald and Solow (1981)). From an Australian perspective, in a recent review of monetary and fiscal policy in Australia Hewson and Nevile note :

"The results obtained by different researchers, using different time periods and different definitions of variables, are somewhat contradictory, but the majority of studies do find that real wages have some influence on unemployment. However, the effects are not large, and overall the studies do not lead one to disagree with the conclusion reached by Gregory and Duncan (1979) as a result of their own analysis. This is 'The important variable for employment, as it has always been, is the rate of growth of output' ".

On the other hand, Symons (1985) and Newell and Symons (1985) have reported employment functions for Australia which can be interpreted as unambiguous and significant evidence for the existence of a standard neoclassical labour demand function. Unlike many studies which model employment through the inverted short run production function with lags of adjustment, Symons and Newell and Symons specify a model in which employment is driven largely by relative price changes. Such a model directly addresses the issues of factor substitution and wage elasticities. In this type of model the reduction in employment brought about by either rising real wages or by a reduction in international competitiveness can be thought of as illustrating the operation of the "classical mechanism". Hence it is important to look jointly at the role of both real wages and international factors. Symons(1985) , and Newell

and Symons (1985) take account of the international factor indirectly by incorporating it as a component of aggregate demand, rather than as a relative price variable.

Some of those who have suggested that unemployment may have a significant "Keynesian" component have emphasised the role of disinflationary government policies during the 1970s. Official policy debates since 1975 have been dominated by the pros and cons of monetary disinflation. Some have suggested that the overriding objective of disinflation led policy makers to follow contractionary monetary and fiscal policies (Pitchford (1983), Hewson and Neville (1985)). One might further argue that, given the stickiness of prices and wages, the burden of short-run adjustment fell largely on output and employment. A direct test of such a hypothesis should be based on employment equations which include both relative factor price variables and demand variables. Symons' (1985) investigation of determinants of manufacturing employment led him to dismiss the role of aggregate demand as an important factor. Considering the markedly different results found in the unemployment literature, we feel that the issue needs a sharper resolution.

We begin Section II by outlining the notion of international competitiveness in several recent British demand for labour studies and go on to link this discussion to a simple version of the Salter-Swan-Dornbusch ("Australian") dependent economy model. This analysis provides a theoretical justification for including the international competitiveness variable. Section III contains the empirical results for Australian total nonfarm and manufacturing employment and associated discussion of data and specifications. In this section the role of all factors including especially the real wage elasticity is discussed in detail. Section IV then discusses the interpretation of our results and their policy implications.

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where W/P denotes the real product wage, A is the index of technological change and σ is a measure of real aggregate demand. Aggregate demand depends upon the real exchange rate, e , world trade, and the stance of fiscal policy. The real exchange rate is the product of the nominal exchange rate, denoted E , and the ratio of foreign to domestic price level, denoted P^*/P . If σ is increasing in e , as would be the case due to expenditure switching in response to a shift in relative price levels, the positive sign of f_3 follows immediately. The essential difference from Minford lies not in the mechanism through which the real exchange rate works but in the price-setting assumption used by Layard and Nickell.

Wadhvani's justification for including the real exchange rate in his model is more indirect since his model is not explicitly of the usual open economy type. Rather it is constructed to highlight the relation between employment and monetary disinflation. It includes two variables reflecting "uncertainty" and one of these is based on the volatility of e , where high volatility reflects greater uncertainty which in turn produces adverse effects on employment.

The basic issue is whether to use narrowly or broadly based price indices when calculating e . It may be the case that in econometric analysis based on short time series the results would be sensitive to the choice of index.

To obtain a theoretical justification for the real exchange rate variable consider the standard formulation of the "Australian" dependent economy model, Dornbusch (1980, chapter 6). The model has two sectors, home (nontraded) goods and traded goods, the latter taken to be a composite of exports and imports. Each sector has specific capital in fixed amount and immobile between sectors in the short run. Labour is mobile between sectors and labour market is competitive (i.e., wages are

flexible). Firms are price-takers. The demand for labour in the traded and nontraded goods sectors, given the technology and capital stock in each sector, is, respectively,

$$L_T = L_T(W/P_T; K_T) \quad L_{T,l} < 0 \quad (3)$$

and

$$L_N = L_N(W/P_N; K_N) \quad L_{N,l} < 0 \quad (4)$$

where T and N are sector subscripts for traded and nontraded goods, respectively, and K denotes the capital stock. Taking P_T and P_N as exogenous (as a consequence of the price-taking assumption) the further assumption of labour market clearing implies that the money wage rate is a function of P_T and P_N ; that is,

$$W = W(P_T, P_N; K_T, K_N) \quad (5)$$

and, invoking homogeneity, we have

$$W/P_N = W(P_T/P_N; K_T, K_N) \quad (6)$$

By substituting (6) into (3) and (4), the aggregate demand for labour function may be written in terms of the relative price of tradables in terms of nontradables as follows:

$$L = L_T(P_T/P_N; K_T, K_N) + L_N(P_T/P_N; K_T, K_N), \quad (7)$$

$$\begin{matrix} (+) & & (-) \end{matrix}$$

where the partial derivatives have the signs indicated. The aggregate effect of the change in P_T/P_N on L is ambiguous because employment in the two sectors moves in opposite directions.

If the assumption of flexible money wage in the two sectors is dropped, we may write the aggregate labour demand function as

$$L = L(W, P_T, P_N) \quad (8)$$

Let P denote the aggregate price index ;

$$P = g(P_T, P_N) \quad g_1 > 0, g_2 > 0 \quad (9)$$

Using (9) we can eliminate P_N from (8): then, invoking homogeneity, we can write the aggregate labour demand function as follows, with the real wage W/P and relative price P_T/P as arguments :

$$L = L(W/P, P_T/P; K_T, K_N) \quad (10)$$

Equivalently we could write

$$L = L(W/P_N, P_T/P_N; K_T, K_N) \quad (11)$$

In the context of the dependent economy model the ratio P_T/P_N is a plausible measure of international competitiveness in the sense that an increase in the price of nontradeables relative to the price of tradeables implies a reduction in the size of the traded goods sector and possibly also a reduction in aggregate employment if the nontraded goods sector fails to absorb the labour released from the other. In practice, we require a proxy for P_T/P_N . A common approach involves using the real exchange rate, EP^*/P . To achieve a closer correspondance between the two concepts, some authors recommend that the price ratio in the real exchange rate calculation should exclude foreign nontradeables (Pitchford (1986)) ; others (Layard and Nickell (1985a, 1985b), Newell and Symons (1985)) use the ratio of export prices to domestic price level as their price ratio.

To establish a link between the theoretical and the empirical aspects of the problem assume

$$(a) \quad P = P_N^\alpha P_T^{1-\alpha} \quad \text{and} \quad P^* = P_N^{\alpha^*} P_T^{1-\alpha^*} \quad (12)$$

$$\text{and (b) } P_T = kEP_T^* \quad (13)$$

where the starred variables refer to the foreign country. Here (a) embodies the assumption of constant budget shares α and β and (b)

embodies the assumption of purchasing power parity (PPP) for tradeables up to a factor k which is introduced to absorb the deviation from strict PPP due to transport costs, tariffs and the like. Substitution of (12) and (13) into the formula for the real exchange rate, e , yields

$$e = (P_T/P_N)^{\alpha} / [k(P^*_T/P^*_N)^{\beta}] \quad (14)$$

$$\propto (P^*_N/P_N)^{\alpha} \quad \text{if } \alpha=\beta \text{ and } P_T \propto P^*_T \quad (15)$$

$$\propto (P^*/P)^{\alpha} \quad \text{if } \alpha=\beta \text{ and } P_T \propto P^*_T \quad (16)$$

From (14)-(16) one can see that movements in e can reflect movements in the theoretically more appropriate ratio P_T/P_N , but it may also reflect movements in P_N to an extent that depends upon budget shares. In practice e would also reflect movements in the factor k . Finally note that under the Ricardian assumption that the price level is determined by unit labour costs, (16) reduces to a relationship between foreign and domestic wage levels.

Let us now consider the choice of the price index for calculating the real exchange rate. The British studies quoted above have revealed a preference for the ratio of world manufacturing export price index to the adjusted GDP deflator. The resulting index of competitiveness will approximate P_T/P_N under simplifying assumptions. Pitchford (1986) uses an equally weighted sum of Australian export and import price indices as an approximation to P_T . The Australian Treasury index of competitiveness is based on domestic and foreign consumer price indices and hence includes foreign nontradeables prices which are theoretically irrelevant (Pitchford (1986, p. 6)). Likewise, in his calculation of the competitiveness index for Australia from 1890 to 1980, McKenzie (1982) has used both wholesale and consumer price indices.

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Despite the obvious appeal of a narrowly defined index, the use of general price indices can be defended, possibly more so in a long run analysis. Recall that to establish the link between e and P_T/P_N the PPP assumption was invoked. Moreover, one also relies on the so-called law of one price. The foundation of the PPP postulate is the global version of the quantity theory of money which makes both the price level and the nominal exchange rate depend upon the domestic and foreign stocks of money. Both the PPP postulate and the quantity theory from which it is derived relate to the long run and abstract from short run adjustment processes. Therefore, since in principle the PPP postulate applies to any relative price, not just P_T/P_N , the choice of a narrowly or broadly defined index is not critical.

Niehans (1984, p.37) has put forward such a viewpoint. However, he qualifies it (Niehans (1984, p. 37, footnote 4)) thus :

"The fact that individual prices, if disturbed by a monetary change, approach their new long run level with unequal speed and smoothness, may provide a criterion for the construction of appropriate price indices. One would probably want to include prices that are likely to approach their new long run levels rapidly and monotonically, while one would want to exclude prices that are particularly sluggish or subject to overshooting."

From an empirical viewpoint Niehans' advice still leaves scope for exploration and experimentation, and hence a potential for inconclusive results. But it does suggest that some indices which are well known for their sluggishness, such as the wage index, should be avoided.² One

might also infer that, at least for short run analysis, the use of export and/or import prices in place of foreign general price indices would be desirable when the assumptions of the dependent economy model apply. But no matter which index is used, sluggish price adjustment raises major problems of interpretation because such sluggishness may affect P_T and P_N unequally and these variables may in fact reflect demand influences.

III. AN EMPIRICAL ANALYSIS OF DOMESTIC AND INTERNATIONAL FACTORS WHICH AFFECT AGGREGATE EMPLOYMENT

The demand for labour has two components, employment and unfilled vacancies. We depart from the conventional practice of analysing employment alone by using a common framework to analyse both. Though, of course, unfilled vacancies are quantitatively a small fraction of aggregate employment, their behaviour is empirically interesting in an economic environment where employment growth is low and where, one suspects, there are significant adjustment costs hindering desired changes in employment. The primary focus of this paper is on total nonfarm employment. For some purposes this is too aggregative. We have carried out a secondary investigation of manufacturing employment in order to resolve some empirical puzzles and inconsistencies.

Given the motivation of the paper we seek a specification of the employment equation which would enable a separation of relative price and demand effects. This requires an exceptionally clear conceptual framework of the kind rarely achieved in empirical work. A key problem concerns the absence of a coherent microfoundation for the demand effect. To pursue the issue in detail would take up too much additional space here, so the reader will have to be content with a few remarks and references to existing literature. Almost all available justifications for

including demand variables rely on either (a) gradual price adjustment and/or a nonclearing labour market together with spillover effects into the goodsmarket or (b) imperfect competition. In Horne and McDonald (1984) a Keynesian demand mechanism based on (a) was specified and empirically validated. In Layard and Nickell (1985) firms are assumed to be monopolistic price setters in the goodsmarket and this justifies the inclusion of a demand variable. McDonald and Spindler (1985) have investigated the possibility that a customer market model may provide an explanation of gradual price adjustment, and hence a justification for Keynesian aggregate demand effects. While we may be able to provide empirical evidence consistent with the operation of these mechanisms, we have little to say on the precise interpretation of the demand variables.

Our analysis will be based on the following two equations which may be thought of as generalisations of the simple model sketched in Section II .

Employment equation

$$\ln L_t = \alpha_0 + \alpha_1 \ln L_{t-1} + \alpha_2 \ln RULC_{t-1} + \alpha_3 \ln RUCC_{t-1} + \alpha_4 \ln COMP_t + \alpha_5 \ln K_{t-1} + \alpha_6 DEMAND \quad (17)$$

Unfilled vacancies equation

$$\ln V_t = \beta_0 + \beta_1 \ln V_{t-1} + \beta_2 \ln RULC_{t-1} + \beta_3 \ln RUCC_{t-1} + \beta_4 \ln COMP_t + \beta_5 K_{t-1} + \beta_6 DEMAND \quad (18)$$

To link these equations with the earlier discussion in Section II interpret RULC, which is a measure of real unit labour cost, as real product wage; RUCC, which is a measure of real unit capital cost, was absent earlier because we assumed a fixed capital stock and utilisation rate; interpret COMP as a proxy for P_T/P_N ; interpret K as an index of technology and

where appropriate the capital stock; interpret DEMAND as including both an index of aggregate demand, which may be either an absolute measure or a relative measure, and also a variable such as the Stoikov index (ST) which measures intersectoral shifts in demand.

The equations are a generalization of the simple model in the sense that they (1) allow for lags of adjustment and expectation, (2) they allow for existence of frictions in the labour market which lead to unfilled vacancies (3) they allow for intersectoral demand shifts which can occur even when aggregate demand is constant and which in the presence of frictions can reduce aggregate employment and finally (4) they allow for the possibility, excluded from the simple model of the competitive firm, that demand shifts can affect employment other than through changes in prices. Disequilibrium theories of unemployment which emphasise stickiness in prices and wages also emphasise that employment fluctuations may be driven in the main by changes in aggregate demand. Like many other researchers we shall treat the importance of the DEMAND variable as a measure of the empirical validity of the "disequilibrium -Keynesian" view of unemployment.

Admittedly the separation of employment changes into demand and price influences is difficult within the confines of single equation analysis. A multi-equation model would be preferable. For example, it seems natural to think of e as a price variable, but if changes in e result mainly from changes in P_T , or say export prices, which in turn reflect changes in world demand, then it seems more appropriate to think of e as a demand variable as is done by Layard and Nickell. On the other hand, if changes in e only reflect differences between foreign and domestic wage inflation the price interpretation seems appropriate. Clearly without a model explaining changes in e , it is difficult to separate

employment changes into demand and price components.

The simultaneous inclusion of both the real wage and competitiveness variables needs some explanation. It was argued in the previous section that under certain circumstances movements in the competitiveness variable may simply reflect wage movements. However, in a world in which the exchange rate is neither fixed nor flexible and, moreover, tradeable and nontradeable prices adjust at different rates, the short run effects of changes in the two variables may be quite different. For example, nominal wage may rise, real wage remain unchanged, and competitiveness may be eroded.

DATA : The regressions in this paper are based on quarterly seasonally unadjusted time series for the period 1970(2) : 1983(1). Details of scope, coverage and sources are provided in the Appendix. Here we summarise the features and limitations of the data which have a bearing on the interpretation of the results.

RULC (Real unit labour cost): This measures the average hourly real wage cost inclusive of payroll tax (RWC) relative to real average labour productivity (RAPROD). It includes some but not all of the nonwage labour costs and is closer to the concept of real wage as cost of labour measured in efficiency units than are other variables such as real award wage (RAWC) or real average weekly earnings (RAWE). On the other hand, it involves deflation by RAPROD which may exhibit spurious changes arising from incorrect measurement of the labour input. In exploratory work four measures of labour cost were tried : RWC, RAWC, RAWE and RULC ($= \text{RWC}/\text{RAPROD}$). The last, suitably lagged, produced the most robust results relative to the others and was retained in the equations reported here.

RUCC (Real unit capital cost): This is the capital cost variable (RIPE) used in the NIF-10 macroeconomic model.

COMP (Competitiveness) : Eight separate real exchange rate series were calculated of which five have been used in the results reported here. See Enoch(1978) and Rhomberg (1976) for a survey of indices of e . Two of these, TWCPI and TWWPI, follow US Fed and Morgan Guaranty Trust(1976) and McKenzie (1982), in the method of construction. They are based on domestic and foreign consumer and wholesale price indices. We used 1980 as the base year, calculated bilateral real exchange rates (EP^*/P for each country) and took the geometric mean of the bilateral rates using the import share from each country (US, Japan, UK, France, Canada and West Germany). The third index, denoted EXPGDP, uses the ratio of the Australian export price deflator to the GDP deflator and the fourth, denoted EXPCPI, the ratio of the export deflator to the CPI. The fifth index is the ratio of the import price deflator to the GDP deflator. Diagrams 1-5 show the time series.

The differences in the changes in competitiveness shown by these indices suggest that the choice of the index is not a trivial matter. For example, TWCPI indicates that Australian competitiveness was deteriorating in the early 1970s, 1971(4) to 1974(1), whereas EXPGDP indicates the opposite; in the period 1974 (2) to 1975 (4). EXPGDP shows competitiveness to be deteriorating while TWCPI shows the opposite. Again in the period 1980(1) to 1983(1) the two indicators diverge and more subtle differences are present elsewhere too. A comparison of TWWPI and EXPGDP also shows divergent movements over several periods. We should expect therefore to obtain different results using the export based measures from those obtained using broader price indices. Given the concentration of Australian exports in mining and agriculture perhaps the differences were to be expected and in the case of countries with a broad export base the differences between corresponding indices may be smaller.

K (capital stock): In every regression estimated with the K variable, the results obtained were either statistically insignificant or difficult to interpret. Perhaps this is because K is smooth and trendlike and highly collinear with other variables. Its coverage is also inadequate. So we replaced it by a linear trend (T) which also acts as an index of smooth technical change.

DEMAND (Aggregate demand): We used five measures of aggregate demand in all, but the reported results include one or more of the three variables, real money supply (M3), denoted RM3, real government fixed capital expenditure (GOFCE) and an estimate of cyclically adjusted Federal government deficit expressed as a proportion of GDP, often referred to in the literature as "structural deficit" (STDEF). The first and the third are crude indicators of the stance of monetary and fiscal policy respectively. However, interpretation of RM3 as a control variable and a widely accepted indicator of the restrictiveness of monetary policy may be more reasonable only in the post-1975 period after monetary targeting of a sort was officially adopted. The issue is discussed later in Section IV.

A number of papers (Blandy and Creigh (1983), Hewson and Neville (1985)) have attempted to purge the budget deficit of cyclical influence. The adjusted measure is in principle a better measure of the stance of fiscal policy but measurement problems become complex if anything more than a simple adjustment is attempted. We have used estimates from Hewson and Neville (1985, Table 14.6, p.32). Finally we used GOFCE because we felt that it seemed closest to the exogenous demand shift variable of the Keynesian type.

As a measure of intersectoral shifts in demand the Stoikov index of demand dispersion was used. In a previous paper (Trivedi and Baker (1982)) the index and its method of construction have been described in detail. Increases in ST may be interpreted as reflecting structural change

or intersectoral demand shift.

REGRESSION RESULTS: Several sets of regression results will be presented and discussed, initially in general terms and subsequently with greater attention to the role of individual factors.

Table 1 contains estimates of employment equations using four different definitions of COMP; the first two include the export based indices EXPCPI and EXPGDP and the next two include the more general indices TWCPI and TWWPI. Generally speaking, coefficients have low t-ratios. We prefer the results obtained using export price based COMP both because EXPGDP and EXPCPI have a sounder a priori basis and because they perform better empirically.

UCC lagged two periods and RM3 lagged one period have the most stable coefficients and t-ratios followed by export-based COMP. Several of the remaining coefficients are not well determined. RULC, lagged three periods, though consistently negatively signed has a t-ratio of less than 1.66 everywhere. GOFCE, lagged, is statistically insignificant and has the 'wrong' sign for a demand variable. The Stoikov variables makes only a small negative contribution to employment.

There are several problems in doing regression analysis. First, aggregate employment exhibits great persistence, reflected in the large statistically significant coefficient on the lagged dependent variable and the average percentage change is quite small over the period 1975 to 1978. Second, the explanatory variables RULC, COMP and RM3, can be expected to be highly inter-related in this period. For instance, nominal exchange rate movements arising from the adoption of a particular monetary policy effected through changes in RM3 will be reflected in COMP; changes in labour costs arising from a high rate of wage increases will be reflected both in RULC and COMP. We can gain a limited idea of the sensitivity of results to changes in specification by leaving out of the

regression one or more of the intercorrelated variables. In Table 2 we report the results of such an exercise. The table contains four regressions in each of which one of the four main explanatory variables RM3, RULC, RUCC and EXPGDP has been dropped. Except when RUCC is omitted, the effect in every case is to improve the t-ratios without changing the signs of coefficients. The omission of RUCC does lead to a significant reduction on R^2 without much improvement in the t's of the remaining variables. However, RULC still remains a somewhat marginal variable. We shall pursue this point in greater detail below.

Table 3 contains estimates of the unfilled vacancy equation based on EXPGDP and EXPCPI. In general statistical terms these equations are better than the employment equations. Most of the coefficients (RUCC is an exception) have larger t-ratios and have a priori correct signs; RULC now has a very significant coefficient. The smaller coefficient of the lagged dependent variable reflects the faster adjustment process at work in the case of vacancies compared with employment.

We shall now turn to a more detailed discussion of individual variables.

RULC: Table 4 below gives the range of short and long run elasticities indicated by our estimated regressions including those which are not reported here in detail. Such a table is possibly more useful than the point estimates which the reader can himself extract from our tables in the sense that it gives him some idea of the uncertainty attached to those magnitudes due to pre-test and selection bias.

TABLE 4 : The range of elasticities suggested by different specifications

	<u>Short run</u>		<u>Long run**</u>
	<u>Employment</u>	<u>Vacancies</u>	<u>Employment</u>
RULC*	0.03 - 0.09	1.50 - 2.55	0.62 - 1.40
RUCC*	0.01 - 0.015	0.07 - 0.21	
EXP GDP	0.033 - 0.04	0.40 - 0.53	0.47 - 1.30
RM3	0.042 - 0.061	2.21 - 2.53	0.60 - 0.88

* : The elasticities are negatively signed.

** : Infinite elasticities implied by very small values of the coefficient of lagged dependent variable are excluded.

Focussing on the point estimates only, we find the wage elasticity to be on the low side compared with Symons (1985) and Newell and Symons (1985) who report short-term elasticities of 0.30 (manufacturing) and 0.35 (total employment), respectively, using data for a similar period. Symons' estimate of long run elasticity in manufacturing is between 0.80 and 1.00. Newell and Symons estimate the long run wage elasticity of total employment estimate at around 0.60. In contrast, our largest estimate of the short term elasticity is only 0.06. Though our long run estimate is of comparable size to Newell and Symons', dynamic adjustment is much slower in our case. Our estimated short run wage elasticity is also low in comparison with countries like the UK, US, Japan and West Germany for which Layard and Nickell (1985b) report values of, respectively, 0.18, 0.63, 0.15 and 0.26. Unfilled vacancies display a higher sensitivity to RULC with elasticities between 2.00 and 4.00. This

is an interesting and previously unreported finding. It may be explained by arguing that the adjustment costs of varying vacancies are small compared with employment. However, since vacancies as a proportion of total employment represent a small fraction of labour demand, the effect on total wage elasticity will be small.

Two not mutually exclusive explanations for the low wage elasticity may be given. Following Layard and Symons (1984) it might be argued that the employment equation has been misspecified by excluding the cost of materials and fuels. Layard and Symons showed in their study of employment functions for six O.E.C.D. countries that this led to downward biased wage elasticities. Symons (1985) included the variable in his manufacturing employment functions for Australia and estimated elasticities between -0.10 and -0.15 .

A second explanation is that there is a downward bias due to aggregation. For example, over our sample period manufacturing and nonmanufacturing employment behaved quite differently. Compare diagrams 6a and 6b. Manufacturing employment declined by just over 15 percent whereas total nonfarm employment increased by over 14 percent. A considerable part of this growth was in the public sector. It seems worth investigating the possibility that wage elasticities in different sectors, especially manufacturing and nonmanufacturing, may be rather different.

The potential importance of rising materials and fuel prices for explaining employment arises from the greater exposure of the Australian economy to the second 1979 OPEC oil price shock compared with the first in 1974, although the competitiveness measure IMP_{GDP} would capture this factor in part. The equations were reestimated after adding current or one-, two- or three-period lagged values of the real fuel price (RF).

Its estimated coefficient was usually positive but with a t-ratio of less than unity. Its inclusion made little difference to the estimated wage elasticity.

To explore the aggregation issue, we estimated a number of employment equations using manufacturing employment as the dependent variable, and different combinations of competitiveness and demand variables. Table 5 contains a selection of these, comparable to Symons (1975). Symons did not include a time trend but did include the capital stock; he also did not include a capital cost variable. The additional variables which we have included do not have a significant bearing on the size of the wage elasticity. Even RF, which has opposite sign to that in Symons' equations, is not critical to inferences about the wage elasticity (compare Layard and Symon (1984)). The upshot of this subsidiary investigation is that the wage elasticity is indeed of the order reported by him, around 0.35 to 0.40 in the short run and 0.6 to 1.0 in the long run. The estimate is relatively robust to changes in specification and has a t-ratio usually greater than 3.5. Taken in conjunction with the earlier results it appears that Australian nonmanufacturing employment displays a low wage elasticity compared with manufacturing.

COMP (competitiveness) : Significant results for this variable are obtained when EXPGDP is used. Short run elasticity is around 0.05. In manufacturing employment equations the variable does not perform consistently and the coefficient has a relatively large standard error. Positively signed coefficients of plausible magnitude are obtained when IMPGDP is used suggesting that import penetration may be an important factor; however, the t-ratios are generally small. Possibly the import deflator has too broad a coverage and better results may be obtained with a variable with greater sector specificity.

Over periods such as 1972(1)-74(2) and 1977(4)-79(4) the index EXPGDP moved up by close to 20 percentage points. Combined with an elasticity of 0.05, a change of this magnitude would generate additional employment of around one percentage point, or approximately 55 to 60 thousand jobs. In periods such as 1974(2)-75(4) and 1980(1)-82(4) EXPGDP moved down sharply, again by close to 20 percentage points and hence made a contribution to employment of the same absolute magnitude. Over the period as a whole the contribution to employment from this source would be negative.

To distinguish between the contributions of export and import competition to employment changes we included both EXPGDP and IMPGDP in a number of specifications. The latter turned out to have negligible explanatory power in the aggregate equation whereas the former turned out to have negligible explanatory power in the manufacturing equation. Finally, we find that vacancies react positively to changes in competitiveness but the effect is not statistically significant.

The above discussion treats the competitiveness variable independently of other variables which appear in the equation, but it is misleading to do so. Interpretations of the role of competitiveness is complicated because there is a theoretical nexus between money supply, wages, prices, the nominal exchange rate and the real exchange rate. One should not treat the real exchange rate as exogenous. The implications of this point become apparent if, following Miller and Buiter (1983), we write down an equation describing the behaviour of the real exchange rate. Let D denote the differential operator d/dt , r and r^* the domestic and foreign nominal interest rates and ϵ the risk premium and E expectations operator. Then $\ln e = \ln E + \ln P^* - \ln P$ and

$$\ln e(t) = \ln e(t) + \int_t E_t [r^*(s) - r(s) - DP^*(s) + DP(s)] ds + \int_t E_t \epsilon(s) ds$$

which says that the current real exchange rate equals its long run equilibrium value plus the integral of all expected future foreign-domestic real interest rate differentials plus the integral of all future exchange rate risk premia. Ignoring $\epsilon(s)$ temporarily, we see that the variables that ultimately drive the real exchange rate are those that determine the real interest differential. This clearly depends upon monetary policy. The conclusion is that without a model of the real exchange rate, and especially its relationship to domestic monetary policy, it is difficult to interpret competitiveness as 'causing' employment.

UCC (user cost of capital) : The aggregate equation has a significant and robust negative coefficient on UCC. In the manufacturing equation UCC is insignificant. The short term elasticity is around -0.01. The changes in UCC often tend to be self-cancelling over a period of several years. However, increases in nominal interest rates since 1979 have raised UCC such that it made a net negative contribution to employment of between one quarter and one half of one percent.

DEMAND : We found no convincing evidence that the structural deficit variable had the expected positive effect on employment. Its coefficient was generally negative in the aggregate equation, and positive but with a low t-ratio in the manufacturing equation. From Tables 1, 2 and 5 one can see that GOFCE also performs poorly.

In contrast to the weak performance of fiscal variables, the real money supply (RM3) is found to be an important factor in explaining the low average growth of non-farm non-manufacturing employment. It is not easy to interpret the role of this variable. Monetary growth has been used in the literature as an indicator of aggregate demand. But its influence on aggregate demand is usually thought to be both diffuse and

subject to distributed lags so it does not seem a good proxy for current aggregate demand. It may serve as an advance indicator of future demand and/or financial conditions. In a series of papers Wadhvani (1984a, 1984b, 1986) has explored the relationship between monetary growth, nominal interest rates, bankruptcies and employment. His analysis suggests transmission mechanisms from money to employment. In McDonald and Spindler (1985) a customer market model of price determination has been used to explain a positive relationship between changes in money and changes in employment. A number of macroeconomic models have been put forward to demonstrate a relationship between anticipated changes in money and employment when price adjustment is gradual. Therefore, in general we should expect real effects from monetary changes rather than strict monetary neutrality. Since, however, our employment equations already capture the price effects operating via nominal interest rates (through UCC) and the exchange rate (through COMP), it is plausible that RM3 does pick up expenditure effects of money on liquidity constrained households and firms or the effects that arise from anticipations of future demand based on current monetary growth.

Can the observed employment changes be satisfactorily explained in terms of changes in RM3? The period 1975-79 was one of very sluggish employment growth. Real monetary growth was negative in 1973/74 and 1974/75. From the time monetary targeting came into vogue in 1975/76 until 1980 monetary policy was generally contractionary with the growth rate of RM3 varying between minus 1.5% and plus 3.0% per annum (Pitchford (1983), Hewson and Nevile (1985)). Higher growth rates in 1980/81 and 1981/82 were accompanied by stronger employment growth. Taking these facts in conjunction with the estimated coefficient of around 0.05 on logged RM3 in the employment equation, one may infer

that the direct effect of a 1% permanent increase in the growth of RM3 would have raised nonfarm employment by about 0.2% in one year and a full percentage point in the long run. (The long run response, however, is very slow.) If the annual growth in RM3 had been say 2 percentage points higher throughout from 1975 to 1982, employment would have been between 1.5% to 2.0% higher at the end. While this may not seem spectacular, a comparison with the actually achieved employment growth of 10% over this period puts it in a more favourable perspective.

IV. IMPLICATIONS FOR THE POLICY DEBATE

Private sector employment growth in Australia slowed down considerably during the 1970s - manufacturing employment alone declined by over 15% from 1970 to 1983. At the same time, unemployment rose from 1.4% to nearly 10%. Explanations of these changes have centered on whether the "Classical" or the "Keynesian" mechanism was at work, the former focussing on the causal role of the real wage and the latter on the role of deficient demand.³ There is also the issue of the contribution of official policy to the emergence of a slack labour market.

Exponents of the "Classical" interpretation often argue that wage shocks in 1973 and 1974 caused a real wage "gap" to arise, which was subsequently maintained by the adoption of wage indexation in early 1975. According to this view a higher level of unemployment was caused by the operation of the "Classical" mechanism and restoration of equilibrium in the labour market equilibrium requires real wage reductions and/or productivity increases.

Opponents of the "Classical" interpretation have questioned whether a sufficiently powerful price mechanism capable of explaining the observed changes in employment and unemployment actually operates, whether the

relevant wage elasticities are large enough to do so and, finally, whether the equilibration process can be achieved without raising real aggregate demand.

This paper has reported some evidence favourable to the "Classical" view. Though the aggregate wage elasticity of employment is of modest size by international standards, it is not zero. In fact due to aggregation bias our estimates may be downward biased. Our empirical results also suggest that the international price mechanism, operating through the real exchange rate, plays a role similar to real wages. Nonetheless, there are several difficulties with the idea that the labour market situation reflects the operation of the "Classical" mechanism.

First, real wage changes may explain the rise in unemployment in 1975 and 1976 but not its later behaviour when unemployment continued to rise but the real wage was declining. Symons (1985) explains this by appealing to the rise in materials prices and reports some empirical evidence consistent with that view. Our results are not favourable to this hypothesis.

Second, it could be argued that the competitiveness variable reflects factors which do not strictly come under the ambit of a "Classical" mechanism if by that term one means the free operation of the price mechanism unencumbered by intervention. The nominal exchange rate was neither fixed nor flexible over this period. The Australian dollar appreciated sharply by 9.5% and 8.7% respectively in 1973 and 1974; it depreciated sharply by 10.2% in 1975, by 12.2% in 1977 and by smaller amounts in 1978 and 1979. Table 6a shows that from 1972 to 1980 the real exchange rate stayed at a higher level than in 1971. It is widely thought to have been maintained at a relatively high level by intervention and the pursuit of a tight monetary policy. To obtain some idea of factors contributing to these movements, it may be useful to decompose

the changes in the real exchange rate into the nominal exchange rate and price level components. By carrying out such an exercise, Pagan (1984) has shown that the changes in the real exchange rate are dominated by the change in the nominal exchange rate. This leads him to the following conclusion:

"From the last quarter of 1972 to the fourth quarter of 1974 there was an 18 percent real appreciation, of which 16 percent can be attributed to a nominal appreciation in the trade-weighted index. Policy was therefore actively engaged in switching expenditure from domestic to foreign sources. In doing so it placed the import competing (and export) sectors under severe competitive pressure. This pressure resulted in yearly growth in nonfarm GDP for each of the three quarters of less than half the growth in gross national expenditure, while the yearly growth in imports was over 25 percent for the full year 1973/74", Pagan (1984, p.20).

A comparison of columns (1) and (2) in Table 6b confirms this observation. Here the real exchange rate is based on the CPI index, TWCPi, as was Pagan's; but we have already shown that TWCPi behaves rather differently from other possibly preferable indices of competitiveness such as EXPGDP. Hence the conclusion is sensitive to the price index used in the definition of the real exchange rate. To see how sensitive, compare columns (1) and (4), which show annual percentage changes in competitiveness. Subtracting column (2) from column (1) produces numbers very different from those obtained by subtracting column (2) from column (4). Arguably, the changes in the real exchange rate reflect something more than just the exchange rate policy. On the other hand, one can also argue that the strong appreciation of the Australian dollar in 1973 and 1974 did not help employment growth.

Given the possibility that the aggregate real wage elasticities is low,

the existence of a substantial "Keynesian" component in aggregate unemployment has to be considered. Our attempts at finding an explanatory role for several fiscal variables were unsuccessful. Taken in conjunction with similar negative findings of Symons (1985) and Pitchford (1983), this may indicate the inappropriateness of simplistic Keynesian ideas. Our results, however, do give a major role to real money supply as a factor in the poor employment growth in the 1970s. By raising nominal and real interest rates and the user cost of capital, by maintaining the nominal exchange rate at a higher level and quite possibly by lowering aggregate expenditure, the tight deflation-oriented monetary policy contributed to low employment growth. Such an interpretation is not unfavourable to the "Keynesian" view especially if one thinks of real money supply as a demand variable and that in turn depends on the view of the transmission mechanism involved. Inclusion of RM3 in our regressions is not based on strong theoretical grounds and, in the absence of some justification, may be regarded as a mere correlation. Several justifications additional to those already suggested may be advanced. One possible hypothesis might be that real money supply is a proxy for expected future aggregate demand which would be an important determinant of aggregate private investment, itself an important engine of employment growth. Another hypothesis could be that current real money supply is an important determinant of some components of current expenditure of liquidity constrained households and firms. A third hypothesis might be that at least in Australia over this period growth in real money supply essentially reflects the growth in the public sector (employment) and has little to do with changes in private sector employment.

In conclusion, we find that, contrary to the strict monetary neutrality propositions, monetary variables are helpful in explaining employment

growth over the period 1970-83. This might be interpreted as supporting the "Keynesian" case, but additional evidence on the demand effects of monetary policy needs to be adduced to make that case more convincing. With that qualification we agree with those, such as Horne and McDonald (1984, p. 90) who argue that both "Classical" and "Keynesian" forces have been operative.

Notes:

1 : Recent studies dealing with unemployment and real wages include Pitchford (1983), Trivedi and Baker (1985) , Trivedi and Kapuscinski (1985) and Trivedi and Hui (1986). Also see Dornbusch and Fischer (1985) for an overview of the debate.

2 : Scherer (1985) has advocated the use of an index of competitiveness based on domestic wage movements relative to foreign movements. Also see Whitelaw (1983).

3 : See Dornbusch and Fischer (1985) for an exposition of this point.

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APPENDIXDATA DEFINITIONS AND SOURCES

- AGFCE Australian government fixed capital expenditure; seasonally adjusted (millions \$). Source NIF-10 Data Base.
- AHE Average weekly hours worked by employed persons. Source: The Labour Force, Australia, ABS Catalogue 6203,0,6204.0.
- AHWSE Average weekly hours worked by wage and salary earners
Source: The Labour Force, Australia, ABS Catalogue 6203,0, 6204.0.
- AWE Average weekly earnings. Source: NIF-10 Data Base
- AWP Award wage - all persons. Source: NIF-10 Data Base
- CPI Consumer price index -weighted average of six capital cities
Source: Consumer Price Index, ABS Cat 6401.0, and Monthly Review of Business Statistics, ABS Cat 1.4
- FUELS Price index of electricity, gas and fuels used in manufacturing (base 1968/69). Source: Price Index of Materials Used in Manufacturing Industry, Australia, ABS 6411.0
- IPDEX Implicit price deflator for exports. Source: Quarterly Estimates of National Income and Expenditure, ABS 5206.0, and Historical Series of Quarterly Estimates of National Income and Expenditure, Australia, 5207.0.
- IPDIM Implicit price deflator for imports. Source: Quarterly Estimates of National Income and Expenditure, ABS 5206.0, and Historical Series of Quarterly Estimates of National Income and Expenditure, Australia, 5207.0.
- IPDNF Implicit deflator for nonfarm GDP.
- K A measure of capital stock defined as $K = KOB + KPE$ where KOB is the stock of buildings and structures and KPE is the stock

of plant and equipment. Source: NIF-19 Data Base.

LEXPCPI	Log (IPDEX/CPI)
LGOFCE	Log(AGFCE + SGFCE)
LIMPGDP	Log(IPDIM/IPDNF)
LRAPROD	Log (RAPROD) where $RAPROD = [NFGDPC * 1000] / [NFEMP * AHE]$
LMANU	Log (MANU)
LNFEMPS	Log (NFEMPS)
LRF	Log (FUELS/NFGDPD)
LRM31	Log (M3/NFGDPD)
LRULC	Log (RULC)
LTWCPI	Log (TWCPI)
LTWWPI	Log (TWWPI)
LUCC	Log (UCC)
LVS	Log (VS)
MANU	Manufacturing employment ('000s) Source: <u>The Labour Force, Australia</u> , ABS 6203.0, 6204.0.
NFEMPS	Nonfarm employed persons ('000s). Source: <u>The Labour Force, Australia</u> , ABS 6203.0, 6204.0.
NFGDP	Nonfarm GDP at current prices. Source: <u>Historical Series of Quarterly Estimates of National Income and Expenditure, Australia</u> , 5207.0.
NFGDPC	Nonfarm GDP at constant prices (base 1979/80). Source: <u>Historical Series of Quarterly Estimates of National Income and Expenditure, Australia</u> , 5207.0.
NFGDPD	NFGDP/NFGDPC
NFWSE	Non-farm wage and salary earners ('000s). Source: <u>The Labour Force, Australia</u> , ABS 6203.0, 6204.0.
PAYTAX	Payroll tax. Source: <u>Historical Series of Quarterly Estimates</u>

of National Income and Expenditure, Australia, 5207.0. and
Quarterly Estimates of National Income and Expenditure,
 ABS 5206.0.

- RAWC Award wage costs adjusted for hours worked.
 $\text{Log}(\text{AWP}/(\text{NFGDPD} * \text{AHWSE}))$
- RAWE Real average weekly earnings (per employed male) adjusted for hours worked. $\text{Log}(\text{AWE}/(\text{NFGDPD} * \text{AHWSE}))$.
- RULC Real unit costs. $\text{EXP}(\text{RWC})/\text{LRAPROD}$.
- RWC Real wage costs based on the National Accounts data.
 $\text{Log}[(\text{WSE} + \text{PAYTAX}) * 1000 / (\text{NFGDPD} * \text{NFWSE} * \text{AHWSE})]$
- Si $i=1,2,3$; quarter i dummy variable.
- ST1,ST2 Employment dispersion indices for two parts of the sample period. The sample split occurs at 1972(4). For full description see Trivedi and Baker (1982).
- T time trend, $1971(2) = 1$.
- TWCPI A real exchange rate index defined in terms of the CPI
 $(1980(4) = 100)$. $\text{TCPI} = \prod R_i^{w_i}$, $\sum w_i = 1$, where
 R_i is the bilateral real exchange rate between Australia and trading partner i and w_i is the proportion of total imports that Australia imports from trading partner i . $R_i = E_i P^* / P$, $P = \text{CPI}$.
 Source: OECD Main Economic Indicators, CPI and Nominal Exchange Rates.
- TWVPI A real exchange rate defined in terms of the wholesale price index. Definition parallels that for TCPI. Source: OECD Main Economic Indicators, WPI.
- UCC Real user cost of capital. NIF-10 variable RIPE deflated by NFGDPD.

- VS Unfilled job vacancies; seasonally adjusted ('000s). Source: Commonwealth Employment Service.
- WSE Nonfarm wages, salaries and supplements. Source: Historical Series of Quarterly Estimates of National Income and Expenditure, Australia, 5207.0. and Quarterly Estimates of National Income and Expenditure, ABS 5206.0.

DIAGRAM 1
GEOMETRIC WEIGHTED CPI-BASED COMPETITIVENESS INDEX

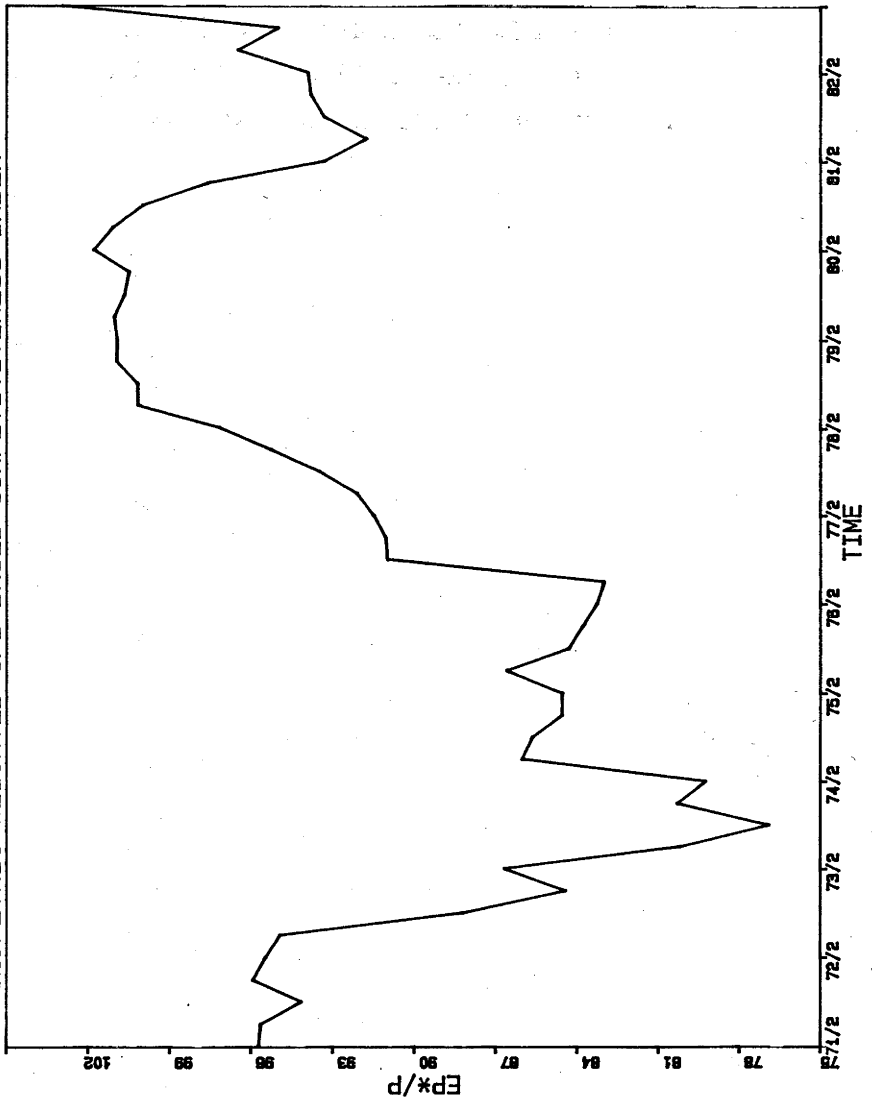


DIAGRAM 2

GEOMETRIC WEIGHTED WPI-BASED COMPETITIVENESS INDEX

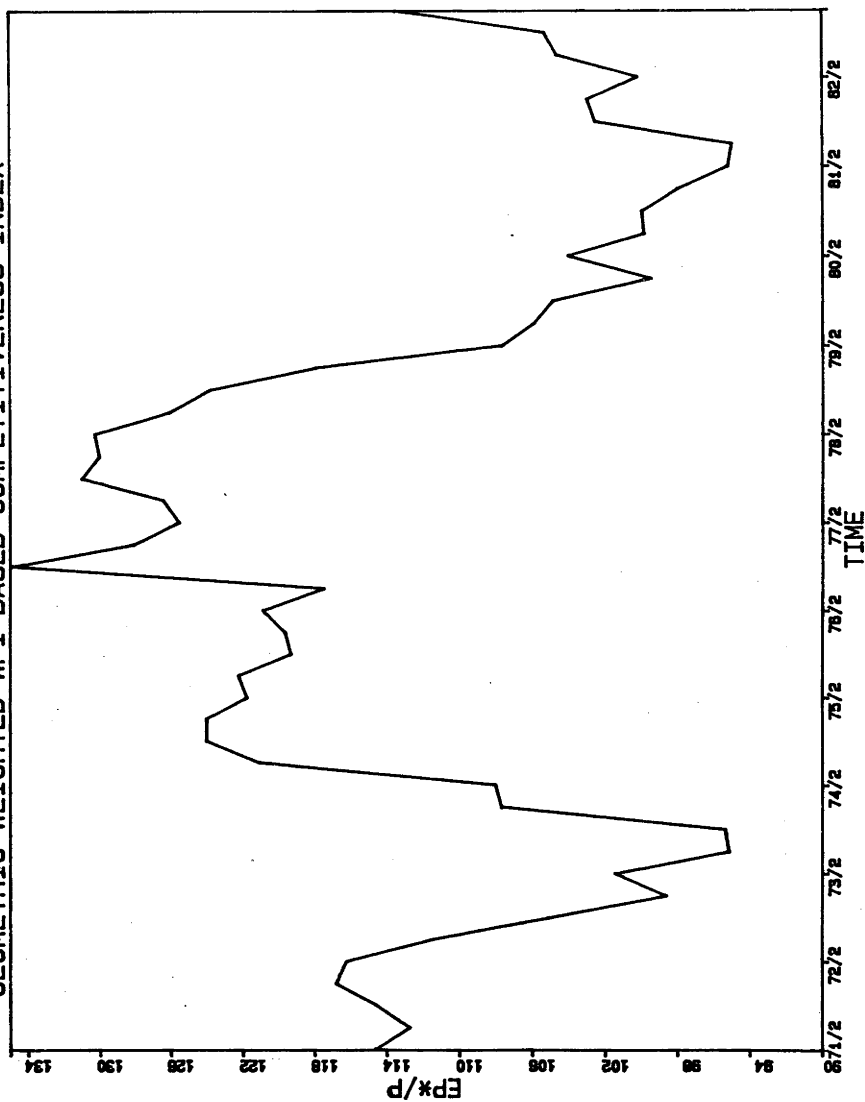


DIAGRAM 3

RATIO OF EXPORT PRICE DEFLATOR TO CONSUMER PRICE INDEX

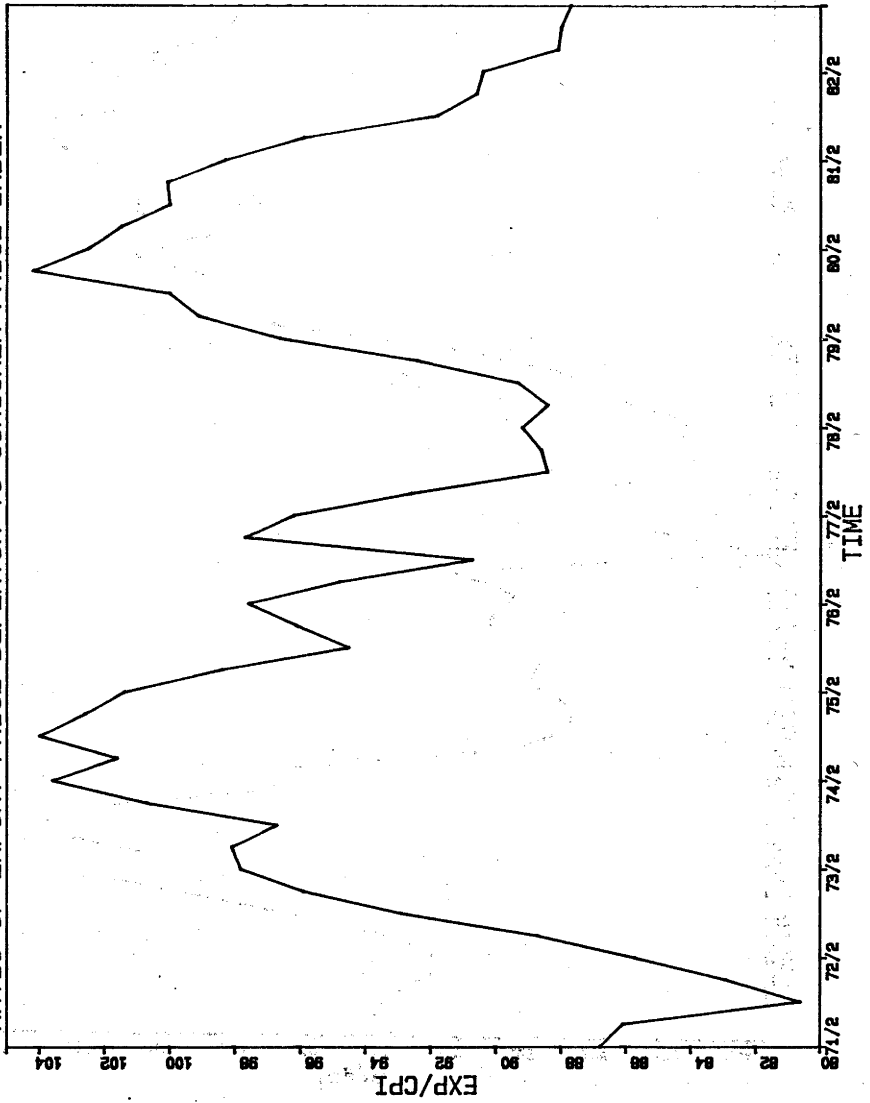


DIAGRAM 4

RATIO OF EXPORT PRICE DEFLATOR TO GDP DEFLATOR

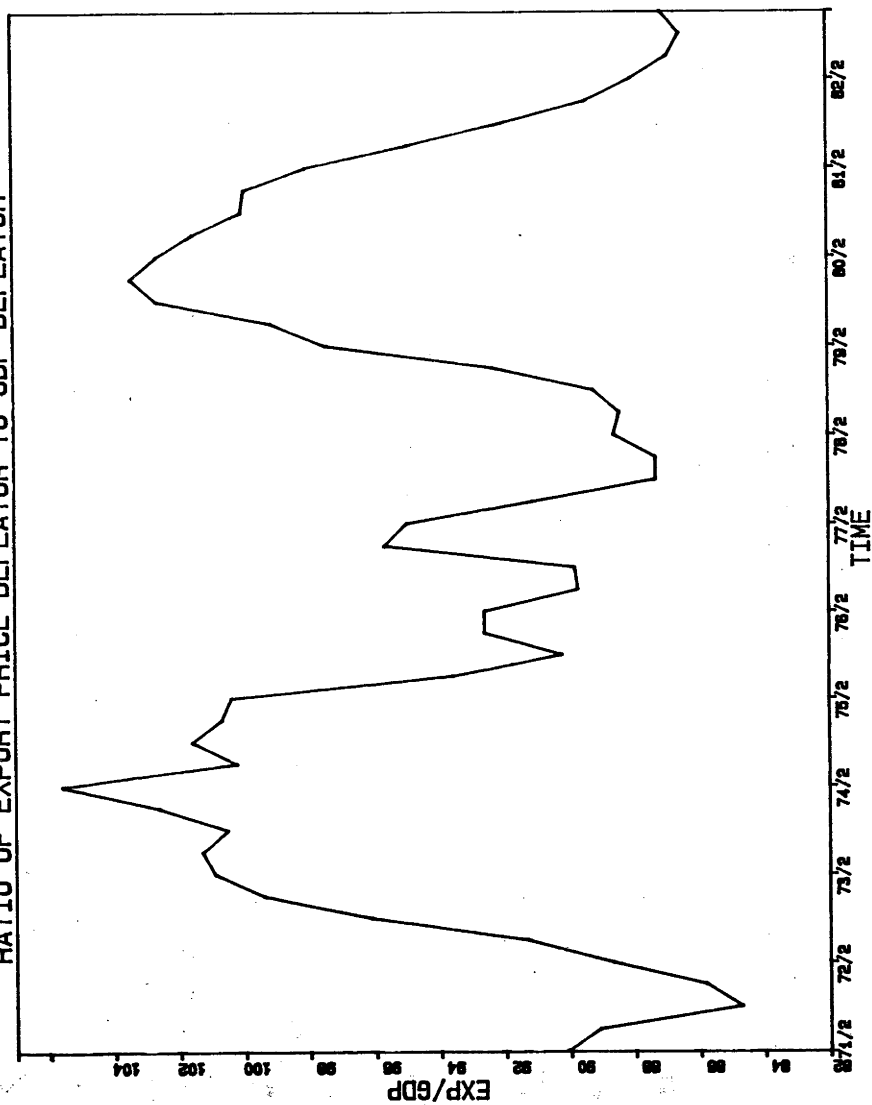
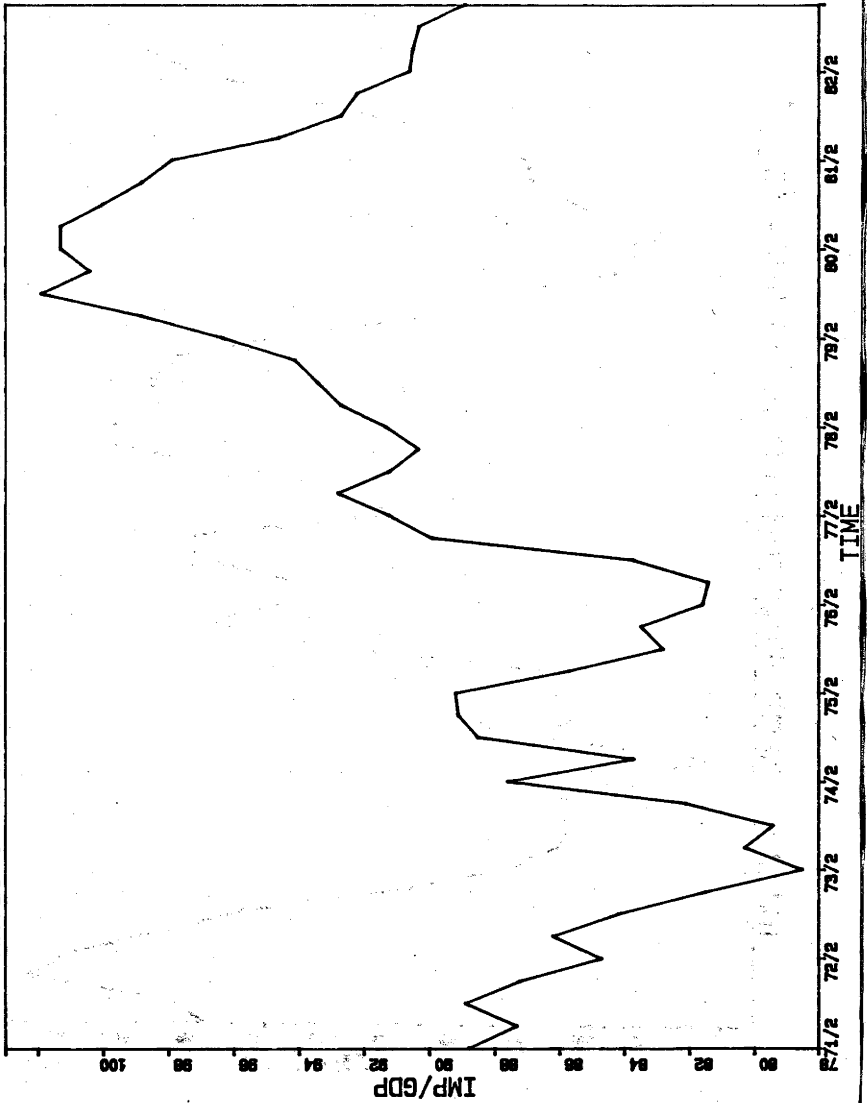


DIAGRAM 5

RATIO OF IMPORT PRICE DEFLATOR TO GDP DEFLATOR



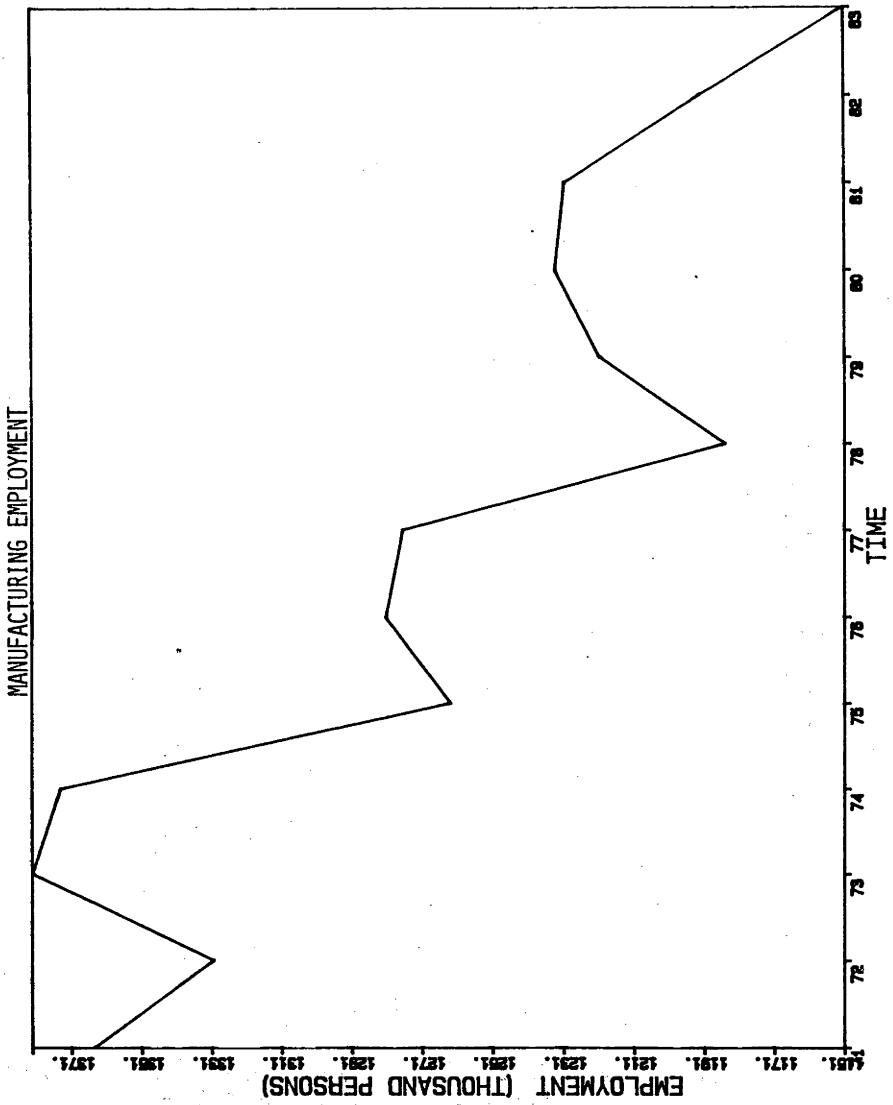


DIAGRAM 6B
TOTAL NONFARM EMPLOYMENT

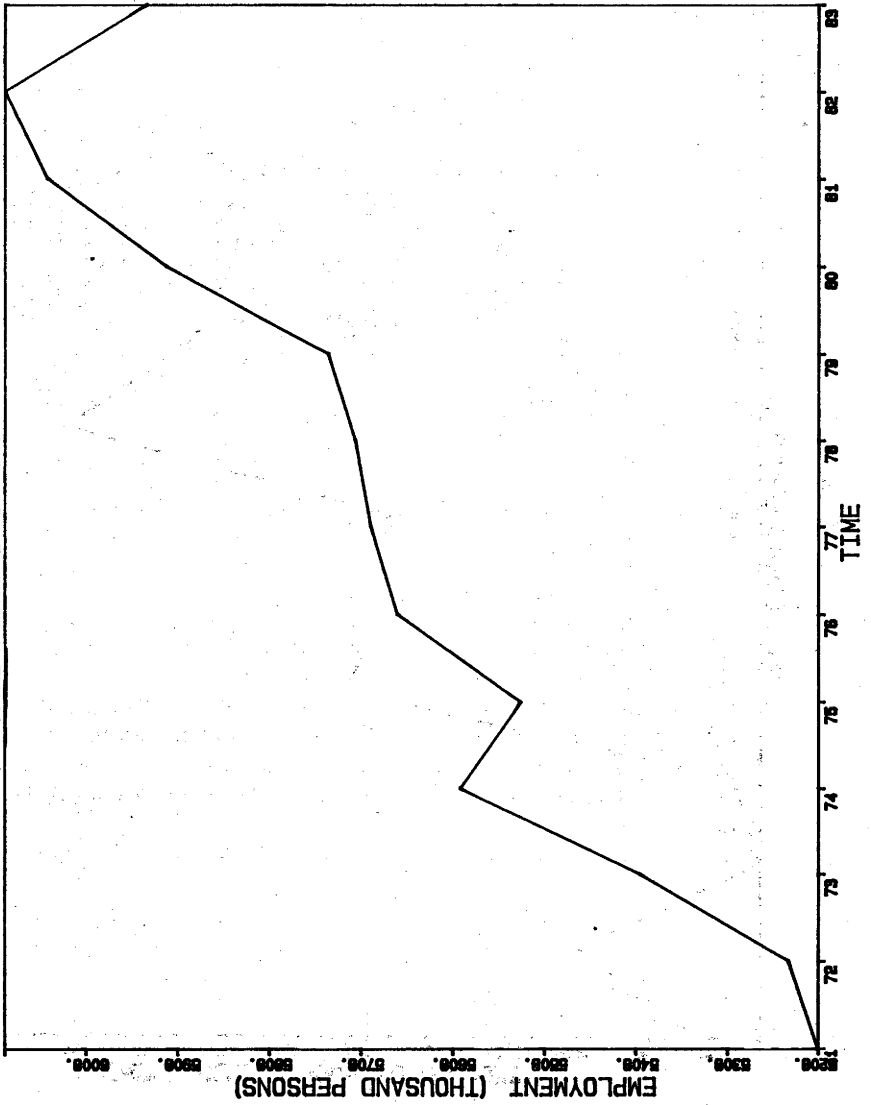


Table 1
Employment Equation for Australia: 1971:2-1983:1

Explanatory Variables	(1)	(2)	(3)	(4)
S1	-0.0033 (1.71)	-0.0029 (1.48)	-0.0028 (1.35)	-0.0028 (1.33)
S2	-0.0014 (0.70)	-0.0008 (0.39)	-0.0009 (0.43)	-0.0005 (0.21)
S3	-0.0035 (1.55)	-0.0027 (1.20)	-0.0036 (1.50)	-0.0026 (1.00)
LRULC3	-0.0440 (1.29)	-0.0323 (0.92)	-0.0630 (1.65)	-0.0301 (0.66)
LUCC2	-0.0113 (2.74)	-0.0121 (2.93)	-0.0141 (3.31)	-0.0131 (3.00)
COMP	0.0334 (2.34)	0.0302 (2.09)	0.0246 (1.13)	0.0084 (0.65)
LGOFCE1	-0.0248 (1.70)	-0.0241 (1.63)	-0.0278 (1.80)	-0.0257 (1.64)
LRM31	0.0467 (2.17)	0.0425 (1.87)	0.0489 (2.01)	0.0520 (2.03)
T	0.0001 (0.33)	-0.0001 (0.08)	0.0002 (0.41)	-0.0002 (0.55)
ST1	0.0005 (0.22)	0.0004 (0.17)	-0.0005 (0.25)	-0.0008 (0.36)
ST2	-0.0028 (1.91)	-0.0028 (1.85)	-0.0031 (1.94)	-0.0029 (1.83)
LDV	0.9306 (8.90)	0.9771 (9.63)	0.9286 (7.29)	1.0003 (9.36)
CONSTANT	0.1111 (0.13)	-0.2287 (0.28)	0.1517 (0.14)	-0.4200 (0.47)
LM1	0.5947	0.7248	0.2726	0.6586
LM2	1.2223	1.1318	1.0230	1.4197
LM3	1.2143	1.2251	0.9315	1.1010
LM4	0.3739	0.2979	0.2701	0.1762
$\chi^2_{(11)}$	6.7860	6.9630	8.6230	10.0650
R ²	0.9914	0.9911	0.9904	0.9901
S.E.E.	0.0044	0.0044	0.0046	0.0047

Notes: A. Competitiveness Variables: (1) LEXPCPI (2) LEXPGDP (3) LTWCPI (4) LTWWPI. B. Dependent Variable: LNFEMPS. C. T-ratios are given in parenthesis. D. LDV=lagged dependent variable. E. The number after a (non-seasonal) variable denotes the order of the lag. F. Variable Means: LNFEMPS (8.6430) LRULC3 (-0.3654) LUCC2 (-1.3901) LEXPCPI (4.5465) LEXPGDP (4.5457) LTWCPI (4.6891) LTWWPI (4.4921) LGOFCE1 (7.7242) LRM31 (10.7400) ST1 (0.2346) ST2 (1.3745). E. LMi is the Lagrange Multiplier test statistic for the presence of ith-order residual autocorrelation. F. For a complete description of all variables, see the Appendix.

Table 2
Sensitivity Analysis: Employment Equation

Variable	(1)	(2)	(3)	(4)
S1	-0.0031 (1.62)	-0.0026 (1.20)	-0.0032 (1.54)	-0.0017 (0.89)
S2	-0.0003 (0.17)	-0.0003 (0.12)	-0.0010 (0.49)	0.0001 (0.05)
S3	-0.0016 (0.84)	-0.0001 (0.04)	-0.0032 (1.34)	-0.0035 (1.50)
LRULC3		-0.0047 (0.13)	-0.0479 (1.33)	-0.0469 (1.32)
LUCC2	-0.0108 (2.79)		-0.0137 (3.23)	-0.0126 (2.95)
LEXP GDP	0.0330 (2.34)	0.0380 (2.44)		0.0409 (2.98)
LGO FCE1	-0.0292 (2.12)	-0.0095 (0.62)	-0.0262 (1.69)	-0.0264 (1.72)
LRM31	0.0471 (2.13)	0.0465 (1.87)	0.0613 (2.81)	
T	0.0001 (0.16)	0.0006 (2.19)	0.0002 (0.63)	-0.0001 (0.24)
ST1	0.0010 (0.49)	-0.0001 (0.01)	-0.0005 (0.24)	-0.0001 (0.32)
ST2	-0.0030 (1.97)	-0.0028 (1.71)	-0.0030 (1.88)	-0.0024 (1.55)
LDV	0.9542 (9.72)	0.7880 (9.14)	1.0110 (9.65)	1.0205 (9.99)
CONSTANT	-0.0433 (0.05)	1.2218 (1.68)	-0.5711 (0.67)	-0.1838 (0.22)
LM1	0.6676	1.4491	0.6588	0.1033
LM2	1.0092	0.3303	1.3467	0.9808
LM3	1.1735	1.1736	0.9557	1.8298
LM4	0.1075	1.8424	0.3114	1.5012
$\chi^2(11)$	5.1480	6.6180	10.0100	8.7760
R ²	0.9912	0.9892	0.9903	0.9905
S.E.E.	0.0044	0.0049	0.0047	0.0046

Notes: A. All symbols are defined as in Table 1.

Table 3
Vacancy Equation for Australia: 1971:2-1983:1

Variable	(1)	(2)
S1	-0.0991 (1.91)	-0.0941 (1.82)
S2	-0.1249 (2.79)	-0.1167 (2.67)
S3	-0.0877 (1.71)	-0.0750 (1.49)
LRULC3	-1.7454 (2.84)	-1.5024 (2.52)
LUCC2	-0.0716 (0.96)	-0.0620 (0.84)
COMP	0.4013 (1.25)	0.5282 (1.62)
LGOFCE1	-0.4998 (1.60)	-0.4730 (1.52)
LRM31	2.5314 (4.79)	2.3853 (4.46)
T	-0.0237 (5.70)	-0.0233 (5.86)
ST1	-0.1481 (3.59)	-0.1495 (3.73)
ST2	-0.0697 (2.17)	-0.0676 (2.12)
LDV	0.4296 (3.89)	0.4265 (4.03)
CONSTANT	-22.7200 (3.73)	-21.8400 (3.68)
LM1	0.7097	0.6288
LM2	0.8907	0.5435
LM3	0.4568	0.5296
LM4	0.5985	0.6599
$\chi^2(11)$	11.3960	12.4740
R^2	0.9679	0.9687
S.E.E.	0.0895	0.0884
Error	$\epsilon_t - 0.5462 \epsilon_{t-5}$ (4.10) t-5	$\epsilon_t - 0.5667 \epsilon_{t-5}$ (4.30) t-5

Notes: A. Competitiveness Variables: (1) EXPGDP (2) LTWCPI. B. Dependent Variable: LVS. C. Variable Means: LVS (3.8272). See Table 1 for other means.

Table 5
Manufacturing Employment Equation
for Australia: 1971:2-1983:1

Variable	(1)	(2)	(3)	(4)
S1	0.0051 (0.83)	0.0034 (0.56)	0.0050 (0.82)	0.0030 (0.52)
S2	0.0024 (0.387)	0.0043 (0.70)	0.0025 (0.40)	0.0040 (0.67)
S3	-0.0157 (2.31)	-0.0135 (1.99)	-0.0151 (2.18)	-0.0114 (1.67)
LRULC3	-0.4204 (3.79)	-0.3870 (3.97)	-0.4074 (3.60)	-0.3461 (3.47)
LUCC2	0.0087 (0.66)	0.0101 (0.91)	0.0107 (0.79)	0.0155 (1.30)
COMP	-0.0112 (0.25)	-0.0105 (0.24)	0.1613 (0.34)	0.0601 (1.28)
LRF3		0.0464 (1.93)		0.0532 (2.20)
LGOFCE1	0.0413 (0.89)		0.0419 (0.91)	
LRM31	0.0097 (0.14)	0.0288 (0.40)	0.0071 (0.11)	0.0444 (0.72)
T	-0.0009 (2.50)	-0.0028 (3.04)	-0.0010 (2.14)	-0.0034 (3.36)
ST1	-0.0094 (1.21)		-0.0083 (1.09)	
ST2	-0.0099 (2.09)		-0.0095 (1.98)	
LDV	0.6329 (4.53)	0.4373 (3.43)	0.6179 (4.36)	0.4027 (3.15)
CONSTANT	2.1573 (1.51)	3.4579 (2.77)	2.1742 (1.54)	3.2181 (2.62)
LM1	0.1546	1.5741	0.0208	1.3476
LM2	0.7119	1.2696	0.5462	0.7343
LM3	0.3755	1.4685	0.4621	1.6418
LM4	1.0742	2.1025	1.1806	2.1332
$\chi^2(11)$	7.7920	12.7100	8.0690	14.5420
R^2	0.9420	0.9421	0.9421	0.9445
S.E.E.	0.0139	0.0139	0.0139	0.0136

Notes: A. Competitiveness Variables: (1),(2): LEXPGDP (3),(4): LIMPGDP
 B. Dependent Variable: LMANU. C. Variable Means: LMANU (7.1500); see Table 1
 for other means.

Table 6a
Nominal and Real Exchange Rates
and Money Supply Growth Rate

Year Ending	(1) TWEXCH	(2) Competitiveness LTWCPI	(3) LEXPGRP	(4) M3 Growth Rate
71(2)	83.71	95.73	90.1	6.61
72(2)	84.73	95.48	88.7	9.94
73(2)	77.22	86.68	100.9	22.84
74(2)	70.40	79.23	105.6	11.60
75(2)	77.66	84.52	100.4	14.49
76(2)	79.04	83.27	92.6	13.46
77(2)	90.19	91.48	95.0	10.43
78(2)	97.50	97.14	88.6	7.66
79(2)	102.34	100.92	97.4	11.17
80(2)	101.37	101.80	102.6	11.59
81(2)	93.22	93.28	98.0	11.93
82(2)	97.97	93.89	88.0	10.72

Notes: A. TWEXCH is the nominal exchange rate and has units (\$Aus/\$Foreign). B. LTWCPI has units (EP*/P).

Table 6b
Real Exchange Rate Decompositions

Year Ending	(1) $\Delta \ln$ TWCP	(2) $\Delta \ln$ E	(3) $\Delta \ln$ (P*/P)	(4) $\Delta \ln$ EXPGRP
72(2)	-0.0027	0.0121	-0.0148	-0.0157
73(2)	-0.0967	-0.0928	-0.0039	0.1289
74(2)	-0.0899	-0.0925	0.0026	0.0455
75(2)	0.0647	0.0982	-0.0335	-0.0505
76(2)	-0.0149	0.0176	-0.0326	-0.0809
77(2)	0.0940	0.1321	-0.0381	0.0256
78(2)	0.0601	0.0780	-0.0179	-0.0698
79(2)	0.0383	0.0485	-0.0102	0.0947
80(2)	0.0086	-0.0096	0.0182	0.0520
81(2)	-0.0874	-0.0309	-0.0037	-0.0459
82(2)	0.0066	0.0497	-0.0431	-0.1076