

AUSTRALIAN ECONOMIC PAPERS

JUNE, 1985

REAL WAGES, UNEMPLOYMENT AND ECONOMIC POLICY IN AUSTRALIA

MICHAEL E. BURNS and WILLIAM F. MITCHELL*

Monash University

INTRODUCTION

A number of Australian economists have argued that the level of real wages is too high and, that until this situation is reversed government attempts to induce expansion may, in fact, do more harm than good. Adherents to this view would appear to include Corden (1979, 1982), Snape (1981) and the Retiring Secretary to the Treasury, Stone (1984). In addition Davis, Lewis and Foster (1983) persuasively interpret the general Treasury position in this manner. Common to those who contend that real wages are too high are a concern as to the impact of real wage levels on international competitiveness, and a belief that their position is supported by an appropriate body of macroeconomic theory. This paper evaluates these arguments, paying particular attention to those developments in macroeconomic understanding that attempt to take into account (expected) quantity constraints and/or price rigidities inherent in the economic system.¹

In Section I we review the real wage arguments, noting inconsistencies in the simultaneous use of traditional and constrained-behaviour models. We demonstrate that appropriate use of the quantity or price constrained approach actually emphasises the importance of expectations about demand and employment opportunities. Further, application of the analysis to a situation in accord with real-wage protagonists' views of Australia's recent experience can, in fact, indicate a strong

* An earlier version of this paper entitled "Unemployment: Is there a Case against Expansion?", was presented at the 12th Conference of Economists in Hobart, August 1983. We have benefitted from the comments of Kevin Davis, Gretel Dunstan, Jim Perkins and Richard Snape. Any errors remain the responsibility of the authors.

¹We refer here to contributors such as Patinkin (1965), Clower (1965), Barro and Grossman (1971, 1976) and Malinvaud (1977, 1980, 1982).

need for demand stimulation. In Section II, drawing on recognition that both domestic competitiveness arguments and the constrained approach build on inappropriate modelling of labour market decision-processes, we present an alternative and, we believe, more realistic framework incorporating a plausible vintage capital model, and intertemporal optimisation subject to stochastic demand. This approach identifies a *fundamental connection between labour demand and (expected) product demand*, which in Section III, is shown to be broadly consistent with the most recent Australian and OECD data. Finally, in Section IV, taking some account of views expressed in the recent press, brief attention is given to defining appropriate expansionary policy and to financing considerations.

I. REAL WAGES AND EXPANSIONARY POLICY

Views that real wages have been, and maybe still are, too high appear to currently underlie the position of those economists who continue to argue against expansionary policy. Their case against expansion draws on two aspects of the literature, one relating to domestic competitiveness and the other relating to developments in macroeconomic analysis that pays particular attention to the existence and implications of constrained behaviour in labour (and goods) markets. Curiously, these latter considerations appear sometimes to have been combined with results of *traditional non-constrained analysis in generating policy prescriptions*.

The domestic competitiveness case has received significant recent attention from Snape (1979, 1983), his analysis having its origins in the earlier writings on international monetary economics of Corden (1977). Snape's conclusions, which rest upon the real wage having been increased and, through the existence of rigidities, maintained above some full employment balance-of-payments equilibrium level, are that "there is unlikely to be a solution to the resulting economic woes other than a reversal of the original cause." In other writings, Snape (1981) made it clear that he was then unsure as to whether the real wage was (still) 'too high'.² As we shall see, even if it was known that the real wage was above some equilibrium level, Snape's policy conclusions would not necessarily follow. However, for the moment we are concerned with 'competitiveness' and much here is uncontroversial.

Thus we would not deny that the increase in real wages in 1973-4 may have contributed to unemployment, and to adverse movements in the balance-of-payments current account. Particularly with respect to import-competing industries, some cost-induced unemployment may have resulted. Again, despite the difficulty in discriminating between the other contractionary impulses of the mid-1970's; monetary instability, world recession, oil price effects, credit squeeze of 1974, tariff reductions and exchange rate appreciation, we would cede the possibility that costs in some sectors may still be so high as to make balance-of-payments equilibrium inconsistent with earlier (full) employment levels, given existing productivity levels.

²The evidence and conclusions of Snape (1981) clearly leave it as an open question as to whether real wages, even if they had been too high for some periods in the mid 1970s, were still too high in 1981. Discussions at an earlier presentation of the present paper at the Economists Conference (Hobart, August 1983) confirmed the lack of any strong evidence that the real wage was then still "too high"

These matters will be returned to briefly in Section IV but we do note that in so far as these results have been derived using traditional non-constrained analysis it would be inappropriate to claim support for these results from other insights obtained with a quantity or price-constrained framework.

In fact the direction the profession has taken has been to attempt to incorporate into models these constraints, expectations and discontinuities relevant to decision-making in the real world. Thus the message of Patinkin (1965), Clower (1965), Leijonhufvud (1968) and later, the non-market clearing analyses of Barro and Grossman (1971, 1976) was that effective demand and supply curves must take into account actual (and expected) quantity constraints that may be imposed on transactions. The supply of labour is hence influenced by product market conditions and the demand for goods is influenced by labour market conditions. Similarly, the supply of goods is influenced by conditions in the labour market and the demand for labour is influenced by conditions in the product market.

The insights provided by this approach (although each contribution is by no means a replica of the last) places conventional IS-LM analysis, which is the encapsulation of the 'neoclassical synthesis,' in deep water. IS-LM analysis has been criticised because it converts the richness of Keynes' own work into an arid story about money wage rigidity, illusion and liquidity traps. Pasinetti (1975, p. 48) argues that

"... This in fact is a very basic distortion in so much of the 'Keynesian' literature: that what Keynes says with reference to an industrial society is reinterpreted as referring to something else — to a more primitive society, or sometimes to a mythical society that never existed — where it can have either no meaning or no relevance. Unfortunately, the consequences are rather serious. This misleading impression is given that all problems of our time would disappear if only the 'rigidities' were eliminated. As if the 'rigidities' were the cause and not themselves one of the many inherent consequences of the industrial society in which we live."

Pertinent to this essay is the problem IS-LM analysis has with quantity constraints. Unemployment means that workers are quantity constrained with respect to the amount of labour they can supply. When discussing employment, textbook IS-LM analysis is typically "married" to a labour market which depicts the demand side in conventional neoclassical marginal productivity terms. The marginal productivity demand schedule is an unconstrained function reflecting, for example, that a competitive firm plans its labour input on the assumption that it will be able to sell all its resulting output at the prevailing price (Patinkin, 1965, p. 319). However, if an excess supply of goods exists, then the notional demand has no relevance and effective demand for labour (being quantity constrained) depends upon sales in the product market. Thus the arid conclusion that real wages must be reduced where an excess supply of labour exists is tenuous because the existence and implications of quantity constraints are ignored. It is hard, in this light, to attach any operational significance to the solution of these unconstrained reduced form equations.³

³The consumption function in IS-LM curiously is a constrained function depending on realised income. This does not help us though. The IS-LM framework is thus inconsistent with itself because it includes both constrained and unconstrained relationships.

The basic criticism of classical employment theory is worth restating before we examine the non-market-clearing paradigm. The appeal to conditions which are relevant in a barter economy is without valid foundation in a monetary economy. The presence of unemployment does not necessarily imply that the real wage is too high. Rather, it may suggest that the price mechanism cannot transmit appropriate signals. The offer of labour services (by the unemployed) does not constitute an exercise of purchasing power over any goods and services. It does not constitute an effective demand. It goes back to the error of analysing the labour market in real terms. Workers ask for money wages (in a non-barter economy) before they will supply labour and this purchasing power is not a specific signal to the employer to increase output. The firm will not take on additional labour unless there is a specific expectation of increased sales. This is so (in a decentralised economy) even if the money wage is less than the value productivity of the labour and/or if the money wage is equal in real terms to the conceptual "equilibrium" real wage.⁴

Let us consider whether, in fact, the application of quantity or price constraint analysis would by itself lend support to the view that demand expansion would be inappropriate in the current economic climate. As is apparent in Muellbauer and Portes' (1978) synthesis of the Barro and Grossman and Malinvaud analyses, there is some mathematical equivalence in their approaches. Behaviour constrained by expectations about product demand and employment opportunities may be adequately characterised within a number of alternative formats, and we shall follow the Barro and Grossman — Muellbauer and Portes use of the familiar wedge diagrams. A particular concern to us, referred to but not clarified in Muellbauer and Portes, will be the dependence of the analysis on the length of the time period over which employment and product demand constraints are expected to remain binding.

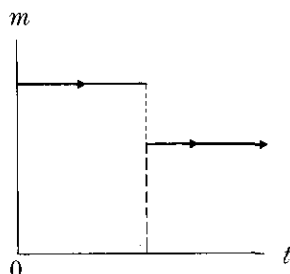
We shall illustrate this point simply, focussing on constrained household behaviour. Our analysis may also shed insight into the logical underpinnings of the wedges. Assume identical intertemporally optimising consumers faced with an expected fixed real wage. Assume also that consumption and leisure are separable in the utility function, and for expository purposes, that we have diminishing marginal utility, a zero rate of time preference and that individuals plan to work and consume over the entire planning period. These restrictive assumptions, most of which could be relaxed without qualitatively changing the results, enable a particular straightforward demonstration of the importance of the length of time for which a constraint is believed to be binding.

In Figure 1a, tastes are reflected by the indifference curves and actual consumption-leisure choices by the budget constraint through the origin, the slope of which reflects the real wage. Note however that we have followed the convention of the macro-rationing literature in showing labour, rather than leisure on the horizontal axis (Muellbauer and Portes, 1978, pp. 745, 799, 803, 807 etc). The unconstrained optimal solution would involve (planned) labour L_0 and (expected) consumption C_0 in all periods. Now suppose that individuals are unable to obtain more than L_1 labour today.

⁴The more detailed presentation of this argument by Patinkin (1965) forms the basis for many of the recent developments in macroeconomic thinking, in particular the cited contributions of Clower, Leijonhufvud, and Barro and Grossman.

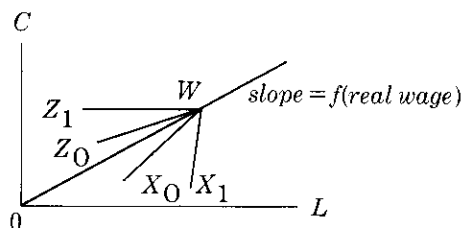
and expect this constraint to apply over the planning period. Then clearly the optimal intertemporal solution is to (expect to) consume C_1 , in the current period and all future periods. Variations in the constraint level L_1 would produce a solution locus along the budget constraint. Now suppose instead, that individuals faced a consumption constraint C_1 , which they also believed would remain binding over the planning period. Again the (constrained) optimal solution would be to select the consumption-labour combination Y for current and all future periods. Varying the consumption constraint would produce the same solution locus; there would be no wedge.

FIGURE 1a: Path of Real Money Supply



To derive a wedge, we consider the opposite extreme; that a consumption or labour constraint will be binding for only one period. If we initially constrain labour at L_1 , but can choose labour levels in the future, the optimal current consumption level (drawing on permanent income-type considerations which here would mean choosing equal consumption levels in all periods) would lie close to C_0 . Indeed, as we increase the length of the planning period the solution would tend to (in a mathematical limiting sense) that value. Varying L_1 would now produce a locus of constrained solutions that, for longer planning periods, would approach the horizontal line through Z and W . Similarly, the constrained consumption solution would produce a solution locus tending towards the vertical line through X and W . The relevance of this to the conventional wedge diagram is shown in Figure 1b, where X_0WZ_0 and X_1WZ_1 represent the relative wedge characteristics for long-period and short-period constraints respectively.

FIGURE 1b



These effects can similarly be identified for the wedges of firms, bearing in mind the equivalent roles of saving and inventories that are usually assumed in this kind of analysis. The relevance of all this for excess supply of labour and of goods situations is

abundantly clear. If workers believe unemployment is likely to persist and, relatedly, firms believe low aggregate demand is likely to persist, then this type of analysis predicts that the outcome will be much worse than otherwise. This insight apart, the point is also clear that quantity-constrained analysis of this type cannot be used for diagnosis and policy prescription unless the time framework of expectations is taken into account.

It should be mentioned that this analysis has been adapted to open-economy considerations, both in Muellbauer and Portes and in Malinvaud (1980). Muellbauer and Portes simplify the open-economy situation by considering the extreme case where the goods market is necessarily in equilibrium. This 'removes' one arm of each of the wedges, but does not render the remaining arm independent of the expectational arguments above. In fact, in the more general case open economies may well experience excess demand and supplies of goods in some sectors, in which case the wedge characteristics would be retained. As stated, Malinvaud does not use wedge diagrams but since his approach is mathematically equivalent, questions as to the time-period of expectation retain their importance.

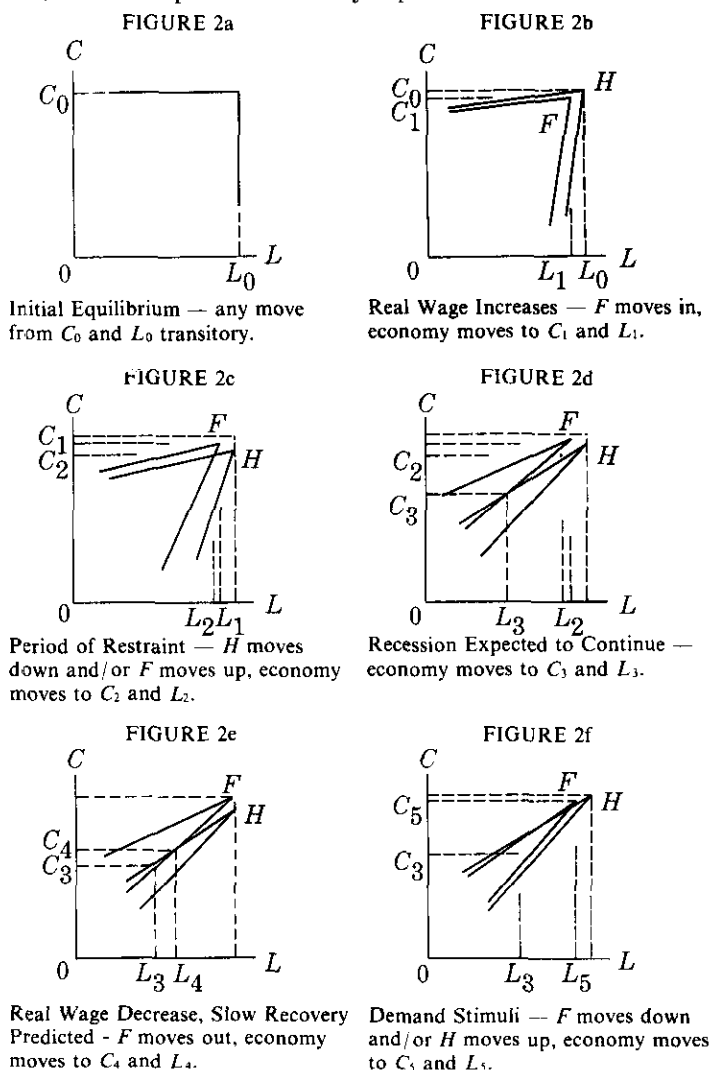
We can relate these insights to a view of the experience of the Australian economy which appears to be in accord with that held by protagonists of the real-wage argument, such as Snape (1981). Suppose that indeed real wages did at some stage reach 'too high' a level and that because of indexation or other rigidities inherent in the system, adjustment 'down' has been sluggish. Accept also, that due to concern with inflation or other factors the economy experienced deflationary stimuli, such as increased real tax burdens due to non-indexation of tax rates. Clearly, some restraint must have been applied since there appears general agreement that there are at least elements of Keynesian unemployment currently existing in the economy. Finally, add the ingredient that expectations have adapted to the prolonged period of recession, and to the monetarist message that there can be no quick way out. Following the conventions for adjustment and shifting of wedges (those in Muellbauer and Portes, plus the time-period of expectations effects described above) the progress of the economy is characterised in Figure 2a through to 2d. In Figures 2e and 2f we indicate the implications of real wage adjustment and demand stimuli respectively. Even if the real wage is currently still 'too high', the expectations of continued recession make demand stimulation the fundamentally important policy strategy.⁵

In fact, we would not base arguments for expansion on analysis of this exact form, but it is clear that such analysis does not make a case for real wage rather than demand oriented policies. It is clear in Malinvaud that the 'constrained' analysis is based in part on a conventional neoclassical theory of the firm (rising cost curves). But this depiction of the world which is associated with (typically) an industry producing some

⁵Malinvaud (1982) is one of the authors who has indicated that classical unemployment may become Keynesian in nature over time. Our own view, while partly in accord, would be that within their framework an eventual consequence of the scenario presented in this paragraph is that the induced demand-deficient employment outcome could revert to the classical case. Thus, if real wages were (and remained) "too high", the existing capital stock may not be replaced and, in time, the economy could attain a capacity-constrained high unemployment situation.

undifferentiated product via many small producers who face increasing marginal cost curves due to diminishing marginal returns is not compatible with a fixed price paradigm.

The world of price setting and rigidities is associated with manufacturing and the distribution sectors which produce an array of products and where the law of variable



proportions will often be irrelevant below full capacity. Kalecki (1971) emphasises the empirical reality of constant (if not decreasing) unit costs up to some limits of capacity. While prices are sticky, any increase in demand results in increased output, labour productivity and profits. Malinvaud's confusion of these very different worlds is striking. In the "neoclassical world" with increasing costs due to diminishing returns it would not be optimal to keep prices fixed and expand output. With the constant cost

approach used in this paper, if the firm is producing any output at a margin, given the current real wage level, then any extra orders (demand) can be translated in extra output without loss of profit or the necessity to increase prices. If we included overheads this result would be reinforced. Thus there can be no rationing of goods as implied by Malinvaud's classical case if demand is maintained.

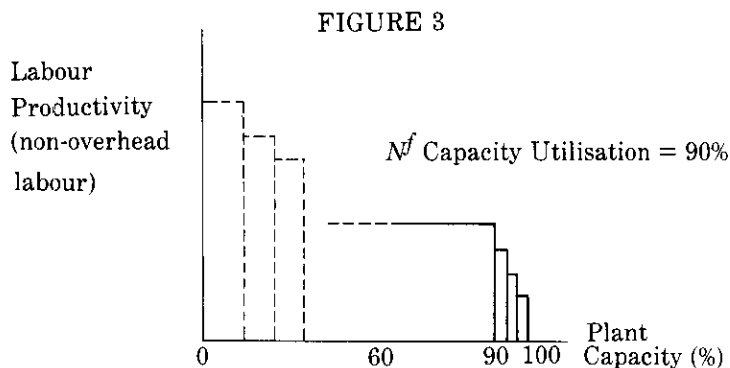
However, our conclusions here have been derived within a framework which we believe has major limitations. Indeed, both within quantity or price-constrained analysis and in the considerations of domestic competitiveness the likelihood of, and policy prescriptions for situations of 'classical' unemployment depend critically upon the manner in which the labour market decision process has been modelled. Specifically, the anti-expansionary policy implications rely upon the existence of a smooth downward-sloping aggregate demand for labour, and additionally, that this demand is not shifted by variations in expected product demand.

These characteristics are incorporated by Malinvaud (1977) in a particularly subtle manner, who is seeking a short-term explanation of unemployment takes the equipment of firms as given. He assumes that the different types of available equipment differ with respect to labour productivity (within and across firms). The use of equipment (within a firm) is considered efficient if the most productive equipment is utilised first. By assumption, any rationing (due to excess demand for labour or excess supply of goods) does not alter the allocation of labour and the distribution of sales among firms from the ideal (price flexible) outcome.

One is thinking at this point of some discrete vintage model of technology until Malinvaud (1977, p. 51) conveniently defines "a unit of equipment as having the capacity of producing just one unit of output". In one sentence we are back in a near continuous world akin to neoclassical production theory where the demand for labour curve (and supply of goods) are "decreasing functions of the real wage rate, because an increase of this rate makes utilisation of the previously marginal equipment disadvantageous" (1977, p. 52). While not being an exact rendition of marginal productivity theory, the intent and results are the same and any shortcomings of the former apply equally to the latter bar one. The principal deficiency as previously noted is the failure to consider expected demand as a principal argument of the demand for labour.

Although contrary to the spirit of Malinvaud's analysis it is possible "by pushing his concept of productive capacity to the limit" to develop a much more plausible theory of the firm and thus use an idea which was previously compatible with neoclassical results to produce insights contrary to orthodox conclusions. The analysis appears in the next section but the preliminary ideas follow here. Once we leave the continuous world of malleable capital and consider that any available capacity is comprised of a number of vintages the question then is raised as to what percentage of capacity does one vintage account for. Malinvaud's step function is the closest approximation of continuity possible. Our approach goes to the other bound. The simple model outlined in the next section assumes that unit costs are constant (roughly) in the relevant range of unutilised capacity. This does not negate a vintage conception of the economy's

capital stock. It simply argues that the "steps" are much wider than Malinvaud cares to assume, as we have characterised in Figure 3. In this case, with most if not all firms in the manufacturing sector operating at least 60 per cent of available capacity any expansion in output would result in increased profits subject to the qualifications described in Section Four.



N^f — is full employment of the available labour force at wage level.

Each block corresponds to some vintage of capital. Production capacity is determined by the installed equipment and within each "step" labour requirements per unit of output are constant. The profit maximising behaviour requires that the revenue from the marginal vintage cover its unit cost if that vintage is to be kept in operation. If real labour costs are constant (or fall, if overhead labour is included) then the economic lifespan of the marginal vintage is increased.

Snape (1981) also makes clear that the traditional simplifying assumptions regarding the demand for labour are an integral part of the domestic-competitiveness analysis. However, perhaps in recognition of concern as to the validity of such a framework, he attempts to justify the approach.⁶ His first claim, that the traditionally assumed labour demand characteristics may be due to decreasing returns to labour, is clearly not in itself a justification. Conceivably, this argument could relate to the rather special vintage model discussed above. However, with normal vintage models, a range of considerations; labour hoarding practices, optimal capital maintenance policies, the practices of management to utilise capacity through (two or even three) shifts, leasing arrangements, make more reasonable an assumption of approximately constant returns for most capacity levels. New projects would in any case normally involve vintage capacity.

The second justification referred to by Snape in fact addresses this possibility that constant returns might exist over a significant range. It is suggested that if different

⁶Our interpretation here is that Snape is summarising widely-held views justifying traditionally assumed characteristics of labour demand behaviour. Our comments are aimed at the traditional beliefs.

constant-returns processes have different average productivity, aggregate demand for labour may still be inversely related to the real wage. However, except in the most unlikely circumstances, this actually results in individual and aggregate labour demand functions that depend upon expected product demand. As is shown below, realisation of the role of expected product demand leads directly to the demand-stimulus policy stance. Other justifications also mentioned by Snape relate to non-homogeneity of labour (which is not obviously relevant at existing employment levels) and the possible consequences of international terms of trade adjustments on the values of marginal and average product.

II. THE ROLE OF EXPECTED DEMAND IN EMPLOYMENT DECISIONS

Bliss (1983), pp. 1-2) argues that "Keynesian unemployment arises because of the way in which the labour market functions. Given the way that the labour market functions, speculative views about the future and the shapes of various demand and supply functions will importantly influence what exactly the outcome will be. But these last factors, important though they are, are not the *causa causa* of unemployment ... [and] ... the functioning of the labour market remains the central question of macroeconomic theory."

It is to this matter that we turn. Very little explicit attention is given to the labour market in macroeconomic models which have been developed to explain unemployment, neutrality and other important issues. The disequilibrium theorists impose rigid or sticky prices on otherwise neoclassical models without telling us the origin of the non-market clearing price vectors while the continuous market clearing approaches, such as to be found in Lucas and Rapping (1970), imply that the labour market is efficient or will be in the long-run. Solow (1980) on the latter approaches says that "they argue that one cannot believe in the failure of markets to clear without having an acceptable theory to explain why that happens. That is a remarkable precept when you think about it. I remember reading once that it is still not understood how the giraffe manages to pump an adequate blood supply up to its head; but it is hard to imagine that anyone would therefore conclude that giraffes do not have long necks".

In this section we elaborate upon a model which attempts to redress this deficiency in the literature. It should be noted that several branches of literature are implied in this alternative approach.

The constant cost-markup world was considered by Kalecki (1971) among others. The contracting literature, particularly the work of Okun (1975) is helpful in explaining the existence of rigid (sticky) prices. The implied dualism of the productive sector and the emphasis on permanent and marginal workers is a development of the segmentation literature which has provided some rich, non-orthodox insights into the operations of labour markets.⁷ A full exposition of the manner in which these influences interplay and add coherence (perspective) to our model is not relevant to this paper and is left for another essay.

⁷For example, Doeringer and Piore (1971).

A range of manufacturing processes would involve fixed and relatively simple technologies. Typically, each unit of output from a particular process might involve approximately constant amounts of raw materials, of power input to, and labour usage of machinery.⁸ Up to some full capacity constraint the technical aspects of such a process clearly should be approximated by a fixed coefficient Leontief relationship. Within this framework, an entrepreneur's decision-making process would involve considerations of: current and expected future parameters of demand, of the wage structure pertaining to alternative forms of labour input and other input prices, as well as to questions of optimal plant size and inventory strategies. All of this can be modelled within a rational, intertemporal stochastic optimisation framework. However the essential characteristics of labour demand strategy resulting from such an approach can be illustrated more clearly within a simplified expository framework.

First, we limit consideration to a fixed plant/machinery case, ignoring the possibility of (almost) instantaneous plant adjustment through hire or purchase. This assumption has little effect other than to ensure the existence of a fixed full capacity constraint. Secondly we assume that no inventories can be held. This greatly simplifies exposition, permitting a geometric interpretation of a stochastic optimisation problem and possibly exaggerates aspects of optimal labour market behaviour. Incorporating inventories would dampen responses but not alter the direction of the effects identified. Thirdly, we limit the labour input options by excluding the casual worker alternative. Thus, in facing stochastic demand, the firm's central problem is to choose an optimal permanent workforce, L^* . The relevant time period for the firm's intertemporal optimisation problem is therefore that period, determined by explicit or implicit contract or other considerations, over which a firm will regard a current decision on L^* as being binding on itself. For a given workforce L^* the firm will have upward flexibility on output through overtime labour, available at a penalty rate. In slack times the permanent workforce receives payment for a standard working week even though it is not fully utilised in such times. Note here, that even with inventories, permanent employees would not always be fully utilised.

Turning to the question of wages and prices, numerous rational arguments have been advanced to support the observed practice of these variables being fixed for certain periods, time periods that may be longer than that relevant to permanent workforce decisions. The practices of wage indexation and mark-ups would lend plausibility to a framework adopting fixed relative prices for a given planning period. Finally, planning over time may sensibly be based upon expected prices or relative prices being regarded as fixed parameters for the period concerned. Our presentation here will focus on the competitive case, although extension to oligopolistic and monopolistic frameworks is straightforward.⁹ To encompass these alternative market structures, exposition is aided by working in a fixed nominal (expected) price framework. This will therefore be our approach, although at least for the competitive

⁸In fact, the general flavour of the results that we derive would persist in many cases without the 'constant returns' assumption.

⁹Even in the non-stochastic case, individual firms' demand for labour behaviour will in most such cases be correctly modelled as depending on factor prices, and on expected demand.

case, the analysis would be unchanged had fixed (expected) relative prices been assumed.

Let us denote marginal variable (non-labour) cost as b , product price by p , normal time and overtime wage rates per hour as w and aw respectively. For illustrative purposes we shall define a unit of output as that amount produced by one individual working for one hour and assume that penalty rates apply after n hours. Final simplifying assumptions will be that firms regard as negligible any labour-income effects of its employment decisions on its own expected demand, and that the stochastic component of this demand has particularly simple properties. Ideally one might have preferred to model this component according to something like the adaptive-regressive process of Cooley and Prescott (1973), or at least as a stationary normal variable. In fact we assume that the levels of demand resulting over time are random drawings from a stationary uniform distribution bounded by Q_0 and Q_1 . This enables us, by focussing on expected total revenue and cost relations, to provide in Figures 4a and 4b particularly simple illustrations of the nature of, and solutions to the competitive firm's static and intertemporal employment-decision problem.

FIGURE 4a

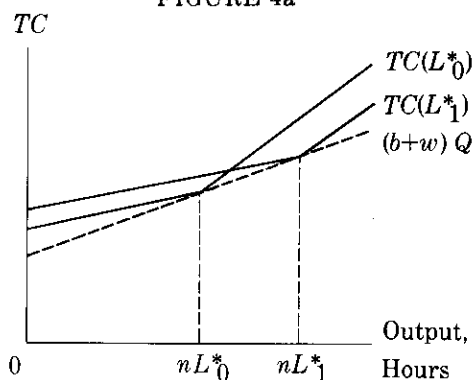
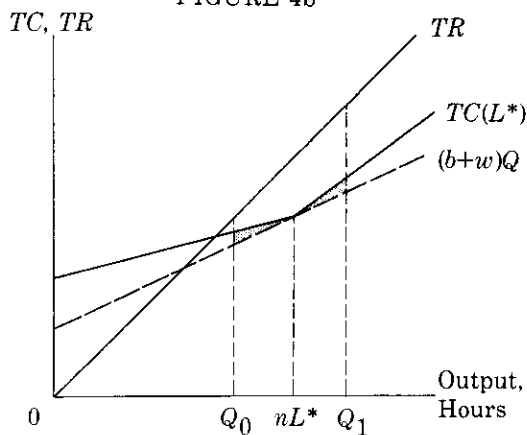


FIGURE 4b



In both figures (expected) total revenues and cost are measured on the vertical axis with (expected) output on the horizontal axis. In Figure 4a the nature of the problem is demonstrated by showing total cost functions dependent upon alternative permanent workforce levels L_0^* and L_1^* . These cost functions assume a fixed cost component per period. Total costs for outputs exactly consistent with a particular permanent workforce reflect the marginal variable non-labour costs of b and standard wage rate w . The slope of the cost curves for outputs less than nL^* is simply b , reflecting that only non-labour costs can be saved. For outputs greater than nL^* the slope of the cost curves ($b + aw$) reflect non-labour costs and penalty wage rates. Too high a permanent workforce raises the average cost for lower output levels, and *vice versa*. The problem is to choose the L^* that maximises the expected profits for a given distribution of possible demand outcomes.

In Figure 4b we characterise the solution to this stochastic optimisation problem. Given that all demand levels in the range Q_0 to Q_1 are equally probable, this amounts to choosing L^* so that the area between the associated cost curve and the total revenue curve, and bounded by Q_0 and Q_1 , is maximised. Straightforwardly, this is equivalent to choosing L^* to minimise a loss function whose magnitude is given by the sum of the shaded areas.

Algebraic derivation of the demand for permanent workers is straightforward. The loss function, F is given by

$$F(Q_0, Q_1) = \frac{1}{2} (nL^* - Q_0)^2 w + \frac{1}{2} (Q_1 - nL^*)^2 ((a-1)w)$$

which yields a demand function

$$L^* = \frac{Q_0 + (a-1)Q_1}{na}$$

which has the properties:

- (i) the elasticity of L^* with respect to expected demand is unity,
- (ii) as long as a process remains viable the elasticity of L^* with respect to wage and to product price is zero, reflecting the central role of expected demand in determining permanent workforce size,
- (iii) even at low levels of expected demand, the optimal L^* will involve normal use of overtime; of course, during a period of rising wages (or falling expected demand) normal overtime may not be observed because of the lags in adjustment of the permanent workforce.

In (ii) we refer to the viability of a process and note that this has the normal short-run interpretation of covering variable costs. In the longer term, and in consideration of the question of making an initial investment in such a process, viability decisions would be based upon present values of expected future returns. Where there is an initial fixed cost clearly the discount rate would affect intertemporal decisions in the usual way. *Ceteris paribus*, a higher interest rate will encourage less investment. For a

viable firm, it should be noted that L^* is an optimal intertemporal workforce, it guaranteeing maximal expected profits in all periods that the demand, wage and prices parameters are expected to remain constant.

A final point concerning viability. Suppose a marginally viable process were to expect a wage increase or price fall. Within the present framework there clearly exists a compensatory increase in expected demand that would enable continued operation of the process. The approximate compensations for such wage and price effects are:-

$$\frac{dQ^e}{Q} = \frac{w/p}{1 - (b+w)/p} \cdot \frac{dw}{w}; \quad \frac{dQ^e}{Q} = \frac{1}{1 - (b+w)/p} \cdot \frac{dp}{p}$$

Here the important denominator components represent the mark-up over (standard) marginal costs. The greater the mark-up, the smaller the required increase in expected demand to retain viability.

We shall comment briefly on the extension of this approach to situations where entrepreneurs are faced with downward-sloping (but still stochastic) demands for their products. The characterisation of intertemporal stochastic optimisation in simple geometry involves far more demanding subtleties than does the 'competitive' treatment above. However, the approach and the results are fundamentally similar. Accordingly we shall limit ourselves here to the more significant conclusions:

- (i) the elasticity of demand for permanent labour with respect to expected product demand remains approximately unity;
- (ii) where the expected total revenue function is smooth (corresponding to traditional monopoly analysis) an increase in wage rates will result in an increased price and lower the optimal L^* , but
- (iii) where the expected total revenue functions are not smooth (corresponding to kinked demand curve oligopoly analysis) or, where some price stability is otherwise important to firms, an increase in wage rates will have effects more similar to the 'competitive' case.

Thus, the greater the 'non-competitive' component of the economy, the more likely it is that an increase in wages relative to the general price level will lead to some reduction in employment and output, and in due course, therefore, to reductions in expected demand. However, whatever the level of wages relative to the general price level, providing spare capacity exists a *ceteribus paribus* increase in expected demand would lead to a similar percentage increase in output and permanent employment. None of this denies that in periods of maintained low expected demand some firms would let their full capacity levels decline. This leads us to consider the most recent evidence available on this matter.

III. THE POTENTIAL PROBLEM OF CAPACITY CONSTRAINTS

The recent *OECD Observer* (July 1983) examines the role of investment in any likely recovery.

"... if experience is any guide it is unlikely that recovery will be *led* by business investment. The GDP components which have most frequently led total demand out of major cyclical troughs have been private consumption and residential investment ... spending on machinery and equipment typically rises and capacity utilization increases, inventory-to-sales ratios fall, and expectations about the durability of the economic upturn become more confident" (1983, pp.29-30).

We can outline two problems which may hinder expansion or make it futile. First, following Malinvaud (1980, 1982), it may be that capacity constraints will create bottlenecks in production before unemployment has been significantly reduced (this would be exacerbated if there are significant procyclical labour supply responses). In this case any expansion in government demand may have insignificant real effects and the crowding out argument has some validity. Second, there is the question surrounding the profitability of investment. While recovery need not be investment led it must quickly stimulate new investment so that its durability is guaranteed. The urgency of this depends on how much capital has been lost in the downturn through shedding, on the utilisation rates and the state of health of the retained capital. The thorny issue here if higher rates of return are required for new investment to occur, is whether careful expansion will guarantee this (via a cyclical recovery in profit margins) or whether higher profit rates must necessarily precede expansion. We examine these points in turn.

Two essential assumptions underlie our analysis and policy stance. First, that at the going wage rate there is a pool of involuntarily unemployed workers who would work if there was sufficient demand and second, that enough capacity exists to absorb significant numbers of these unemployed so that real output increases in response to a nominal boost in aggregate demand. With approaching a million unemployed (recorded and hidden) the first assumption does not seem unreasonable.¹⁰ The second assumption depends on both the level of capacity utilization and the absolute level of capacity. The former becomes a constraint only when the utilization rate is maximised and may have relevance in the medium term.¹¹

¹⁰ Regard must also be given to the composition as well as the level of unemployment. We must be careful to identify the structural component of unemployment. It is well known that aggregate demand policies are not effective measures against unemployment due to the mismatching of supply and demand. However, in as far as adjustment problems are exacerbated by a recessed economy, a careful mix of demand policies and micro initiatives would help both cyclical and structural unemployments.

¹¹ Given the likelihood that in the course of a lengthy recession capital shrinkage may occur then expansionary policies will be constrained as utilisation rates improve (see footnote 5). In our view, this theoretical possibility would in no way negate the current case for demand stimulation. The alternative characterisation of the firm's production technology and decision-making framework presented in Section II below, which clarified the connection between "expected demand" and profitability suggests that demand stimulation would itself encourage capital renewal and new investment. Further, the possibility of medium-term capacity constraints indicates a role for Government in improving the conditions for capital expansion rather than passively allowing the economy to deflate slowly and exacerbate the capacity situation.

In the recent May 1983 Victorian Chamber of Manufactures Survey (released 16/8/83) some valuable information concerning utilization rates for Victorian manufacturing is published.¹² The following table summarises the results of the survey with respect to utilization rates.

TABLE I
Levels of Capacity Utilization

	Current Levels ⁺			
	70%	70-80%	80-90%	90%
June 82	23.3	35.3	23.7	12.6
August 82	29.5	38.2	15.5	10.6
November 82	34.0	33.0	17.0	9.7
February 83	36.0	37.6	13.2	8.6
May 83	42.3	32.3	14.4	6.0

Source: Economic Analysis and Research Services, The Victorian Chamber of Manufactures, Pulse Survey of Victorian Manufacturing, May 1983, p. 14.

Note: + percent of survey respondents in each category.

At the present time then, 42 per cent of companies in the survey are operating at below 70 per cent of capacity and a further 32 per cent of firms at between 70 and 80 per cent. Given this parlous state, expectations are still positive among manufacturers in part, because "... forward orders are showing clear signs of a turnaround" (VCM, 1983, p. 1). The survey suggests "that declines in production levels ... [and hence rates of utilisation are] ... largely due to depressed levels of consumer and industrial demand" (VCM, 1983, p. 2). Further, since inventories have been run down to extremely low levels the survey concludes that "any increase in orders will swiftly be translated into increased production".

With regard to there being a pool of available workers, the Survey provides some useful insights. The data on labour requirements indicates the most significant increase in the number of vacancies was for unskilled workers. "Generally,

¹²The general results are entirely consistent with other reported surveys for other states and can therefore be regarded as reasonably representative. However, some methodological problems prevent a completely unambiguous interpretation being placed on the data. The survey somewhat judgementally determines the percentage utilization rates in various cases. For example, if a plant is capable of working three shifts per day then 100 percent utilization would appear to involve three such shifts. However, if that plant normally, given the state of demand, works two shifts, does this represent only 66 percent capacity utilization? According to the survey organisers the last case would be interpreted as being full capacity, if in normal times, two shifts were required, and if all equipment was operating at full "speed". Thus, figures revealing less than full capacity are likely to understate the amount of spare capacity and hence output that could be squeezed from the existing capital stock. Offsetting this is the fact that 90 percent utilization is considered "good". Some processes find it physically impossible to operate all their equipment at once.

manufacturers found it relatively easy to fill vacancies, especially for unskilled positions, having an overwhelming response to any newspaper advertisements" (VCM, 1983, p. 53). In a climate of declining real wage rates (due to the pause) it would be hard to interpret this as being indicative of voluntary unemployment. Recall there is a strong emphasis placed by neoclassicists on the distortions that unemployment benefits introduce into the choice set of individuals. The typical point is that the existence of a positive endowment which accrues if no work is performed biases the choice towards leisure. We should expect the distortion to be more biased the lower the wage rate as the income effect is likely to be weak. In this context unskilled vacancies should be hard to fill if voluntary unemployment is widespread at the existing wage rates. This is patently counterfactual.¹³

Without any claim to full scientific validation the results in the survey are supportive and certainly not inconsistent with our approach. To put a finer point on it, the data is strongly inconsistent with a neoclassical world and also Malinvaud's classical unemployment. In Malinvaud (1977) classical unemployment must preclude an excess supply for goods. One can sensibly ask how an excess demand for goods can coexist with large amounts of excess productive capacity and declining utilisation rates. It could be argued that it is profitable capacity rather than technical capacity which is relevant. We return to the medium term implications of profitability later but to reiterate the important point made in section one, if it is profitable to produce any output at current unit prime costs then up to some high level of capacity utilisation it is also profitable. "Inappropriate" rates of remuneration do not negate this.¹⁴

A further point is worth noting in this regard. Given excess capacity, even if money wages are fully indexed (CPI), perhaps to allow the "incomes accord" its best chance of survival, unit labour costs are likely to fall with expansion. This is because productivity gains will accrue as the permanent workforce (L^*) and the existing capital stock are more fully deployed. With historically infrequent "productivity hearings" firms benefit for the period while these gains are outstanding. This cyclical phenomenon also offsets to some extent the problem suggested by Malinvaud (1980, 1982) that expansion might be shortlived if real wages are too high because present capacity becomes unprofitable to maintain, or, more relevant, to renew.

Certainly, if firms can cover costs in the short-run but rates of remuneration are inappropriate, expansion could be short-lived. Once the given equipment ages, it may not appear profitable for it to be replaced. However, support for our judgement that

¹³It has been noted that while unskilled vacancies do not appear to be hard to fill, retention of employees is a problem. This does not provide support for the dole-induced voluntary unemployment hypothesis either because an individual who re-enters the workforce does not have automatic benefits if they "turn over" quickly. The job instability information supports more consistently the existence of a segmented labour market where individuals from specific demographic groups are (disproportionately) locked into bad, demoralising jobs, low wages and subsequent poverty and have minimal choice. Certainly the turnover does not coincide with career advancement as search theory would imply.

¹⁴The compilers of the VCM survey suggested that if sufficient orders were received and real wages did not rise significantly (especially non wage components) then manufacturers would expand output and employment. This is also not inconsistent with our approach.

the impact of current real wages on profitability is one of the less important dimensions of current investment behaviour is supported by the OECD report "... studies of business investment suggest that changes in output tend to be the dominant short-run determinant" (p. 30). The report's focus on the role of expected demand, on orders received, and its emphasis on the durability of recovery are consistent with the view of the world put forward in this paper.

A final point is in order here. Discussions of the role of profitability often focus on the question as to whether the real wage is, is expected to be or has been too high. However, the question of 'appropriate' returns to factors is more general. While Trade Unions have been criticised for inappropriately carrying expectations of wage increases derived in the boom years of the sixties into the current recession years, a similar point could be made with respect to investors. The OECD says:

"There is hope in some countries that, ..., entrepreneurs may lengthen their planning horizons and accept lower rates of return than in the past. This is more likely in countries where gross rates of return were high during the period of rapid growth, so that despite subsequent declines the rate may nevertheless still be adequate" (p. 31).

IV. THE NATURE AND FINANCING OF EXPANSIONARY POLICY

Our analysis identifies that the level of current and expected future product demand is a fundamental determinant of labour demand. Recent empirical evidence is consistent with our view of the world that, given the existing wage-price structure, an increase in demand would result in increased employment. In addition, in so far as there are Keynesian elements of unemployment, maintained higher government expenditure levels or a less restraining tax structure may be essential to the complete restoration of employment levels. Finally, an important element of recovery appears to be to break the expectations deadlock which is characterised by gloomy views as to future employment possibilities as well as by producer pessimism of future demand.

In part increased demand could be achieved by current and maintained increased government purchases of goods and services, but particularly in the interests of achieving an expected stable pattern of demand, expansion should be substantially based on increasing the current and expected future incomes of consumers, particularly those currently unemployed. The options here for an induced stimulus, if one rules out reductions in excise and income tax, include increased government employment and/or substantially increased unemployment benefits. Providing there was some expected maintenance of the increased real incomes, private expansion would in due course reduce the necessary scale of this intervention.

For public employment, the nature of employment is not a trivial matter. Capital works, particularly such as in transport areas that would contribute to a reduction in expected future costs, or those such as embody a public goods and community welfare-increasing aspect can clearly be justified. However, those employment schemes which create subsidised competition to existing enterprises should be avoided (or

abandoned). In so far as it is possible that projects in the suggested areas can be found, productive application of the skills of the unemployed would be superior to (but not exclude) increased unemployment benefit payments. The magnitude of government intervention justified in the existing circumstances would depend upon the degree of underutilisation of the existing employed labour force, but might reasonably be estimated as that necessary to maintain expected private demand at least two percent higher than that which could be satisfied by full utilisation of the existing workforce.

Clearly, a significant government budget deficit is involved, it would be even if stimulatory initiatives were not to be pursued because of the decrease in revenues and increase in expenditures consequent on the recession. The whole subject of the antagonism towards the budget deficit is interesting in its own right, particularly in a historical context. This will be dealt with in detail in another paper, but it should be made clear that the issue of government involvement has always had a political or moral component in addition to (and sometimes, in the absence of) economic considerations. Given that there is (and would be expected to be) a significant budget deficit in the current economic conditions, two questions arise. How should such a deficit be financed, and does it make any sense to choose to linger in recession until 'market forces' sort things out?

With regard to the method of financing there is clearly no need to dwell on the well-understood questions regarding the possibility of bond-induced crowding out. Some of the discussion of those opposed to fiscal stimulus, in linking bond-financing of increased deficits with higher interest rates, appears to have neglected the open economy aspects of this kind of operation. Clearly the domestic pressure on interest rates would be dampened by capital inflows, provided downward movements of the exchange rate were not anticipated. Thus the degree of crowding out may be relatively insignificant.

Of course, part of the deficit would be financed through monetary expansion and here we would be less concerned than the Treasurer, who dismissed all opportunity of reasoned academic debate on the matter with his characterisation "a sort of world inflationary policy of having a non-financed deficit, that's printing money..." (*Age*, 8 August, 1983). In fact, those who do consider a role for money creation in these recession situations are usually more cautious than the Treasurer with regard to the potential for increases in velocity and as a rule of thumb would probably equate monetary growth rates to the sum of the (expected) output growth rate plus the (expected) rate of inflation. Given the tendency of expectations to be self-fulfilling, those endorsing sensible money creation would probably have had in mind a monetary growth rate no greater than 11-13 percent for the coming year. This would have been based on expected inflation of about 8 percent and an induced output increase no greater than 5 percent.

This leads to the question of how long a government should choose to restrain output growth. Logically, if one rules out induced expansion, monetary growth rates should approximate expected inflation rates and the residual deficit (which would not clearly be less than the present one) would be entirely bond financed, this year and the next. The accumulated debt (including the foreign component) would continue to grow,

increasing the budget burden in future years. Whatever one's analytical perspective there are ever-present reminders of the costs of maintaining existing unemployment levels. Behind this lies a fundamental truth, independent of debt financing and reasonably independent of exchange rate adjustment. The real living standards of Australians depend in the end on the amount Australians produce, and accordingly, on the number of them who are employed. Even the belief that output expansion may bring pressure on the exchange rate would not alter this basic conclusion.

CONCLUSIONS

In our paper "Unemployment: What Have Economists to Say", (Burns and Mitchell (1983)), after a thorough examination of many strands of the macroeconomic labour market literature, we concluded that no case can be made, based on rigorous and analytical considerations, for an inactive countercyclical stabilisation policy. We indicated that at that stage the dimensions of policy design (rather than the specification of a complete policy package) that appeared to be supported by this literature. The relevant conclusions of that paper still hold and these are summarised as follows:

Contrary to a position held by some economists, there is an effective role for countercyclical stabilisation policy — short run real effects can be achieved.

Too much fine-tuning can be destabilising, and given the importance of expectations, could contribute to uncertainty. An ingredient of policy must be to reduce uncertainty about future relative prices, and relatedly, about future policy parameter settings.

Particularly with regard to expectations, a desirable consequence of policy would be to achieve an expectation by the public that, in due course, stable (and lower) monetary growth rates are likely to be maintained.

The direct relation between inflation and monetary growth rates draws on long-run equilibrium considerations. Particularly in states of significant disequilibrium and high unemployment, there is no necessary connection between monetary growth and inflation. Excess monetary growth in such states of the economy, particularly if a component of a consistent long-term strategy, can have real rather than nominal impacts.

Insights from contracting and wage relativities literatures endorse a strategy of demand expansion rather than wage cuts and accordingly, further justify short-run (but not long-run) budget deficit increases as a long-term strategy component.

No theoretical or empirical case has been successfully made for anti-trade-union legislation. Aspects of the literature concerned with incomes policies, expectations and adjustment and contracting, and wider perspectives on roles of unions, endorse the potential contribution of trade unions to incomes policies.

This contribution could reinforce the real rather than nominal impacts of initial expansionary measures.

Suggestions, particularly from the search literature, for reduced dole payment to increase work incentives, are weakened by the inadequacies of supporting theoretical and empirical evidence. If anything, there are stronger arguments for increasing dole payments, subject to stricter work tests.

There is scope for sectoral and regional initiatives, and perhaps relatedly to redistributive policies, based on 'optimal distribution' arguments.

An appropriate return for temporary diminishment of union power, as part of an incomes policy, may include increases in the social wage and a return to central wage-fixation.

In this present work we have considered the arguments of the orthodox economists who urge governments to restrain their expenditure and to wait for a prophesied supply-side recovery. An essential part of this recovery involves a prior reduction in the real wage rate. How this reduction is to take place is unspecified. We reject this conclusion and policy advice on two grounds. First, even within the framework employed by these economists, an initial decrease in real wages may have insignificant effects on employment. Certainly these economists must explain, in the face of logical asymmetries in any possible substitution response, how the adjustment process will guarantee their conclusions. Secondly, we have a more fundamental criticism which questions the adequacy of the neoclassical conception of the labour market and the operations of a typical firm. Using what we believe is a more plausible and consistent framework it is expected and actual demand which has a fundamental influence on the level of activity and employment.

Whether the real wage is at present "too high" or "too low", we do not claim to know. We are uncertain as to the appropriate reference mark to which such relative assessments can be applied. However, this uncertainty has also been admitted by those who prescribe a real wage reduction as a prerequisite for economic recovery. In fact, a careful appraisal of the major strands in recent macroeconomic literature (particularly that concerned with the labour market) combined with a willingness to consider the realities of production and labour organisation, leads to the conclusion that the question as to whether the real wage is somewhat "too high" is substantially irrelevant to the current economic situation.

The tools of analysis developed by economists all have their uses and highly simplified models can, in certain circumstances, generate valuable insights. However, there is an onus on economists to choose which of the tools available is appropriate to a given situation. Thus there may be a simple and useful framework of analysis whereby doctors in the Antarctic on the basis of the discolouration of extremities, can usefully be guided as to whether frostbite has occurred and a limb requires to be amputated. We would be critical of a doctor in the tropics applying the same discolouration test to sufferers of sunburn. Perhaps the economic doctors who prescribe real wage decreases rather than demand stimulation would have less willing patients if they made clear that their diagnosis rested on the beliefs that *ceteris paribus*, the expected volume of

sales has no independent effect on employment decisions and accordingly, at the current time with the current wage-price structure firms would not respond to a maintained increase in their orders received.

First version received 14th October, 1983

Final version accepted 30th October, 1984

[Editors]

REFERENCES

- Barro, R.J. and Grossman, H.I. (1971), "A General Disequilibrium Model of Income and Employment", *American Economic Review*, vol. 61.
- Barro, R.J. and Grossman, H.I. (1976), *Money, Employment and Inflation* (Cambridge: Cambridge University Press).
- Bliss, C. (1983), "Two Views of Macroeconomics", *Oxford Economic Papers*, vol. 35, no. 1
- Burns, M.E. and Mitchell, W.F. (1983), "Unemployment: What Have Economists to Say?", presented to ANZAAS Congress, May, mimeo, Department of Economics, Monash University.
- Clower, R.W. (1965), "The Keynesian Counterrevolution: A Theoretical Appraisal" in F.H. Hahn and F. Brechling (eds.), *The Theory of Interest Rates* (London: MacMillan).
- Cooley, T. et al. (1973) in "Symposium", *NBER Annals*.
- Corden, W.M. (1977), *Inflation, Exchange Rates and the World Economy* (Oxford: Clarendon Press).
- Corden, W.M. (1979), "Wages and Unemployment in Australia", *Economic Record*, vol. 55.
- Corden, W.M. (1982), "The Wage Push and Macroeconomic Policy: The Dilemmas Ahead", *Economic Record*, vol. 58.
- Davis, K., Lewis, M. and Foster, J. (1983), "A Member's Guide to Monetarism and Keynesianism" Legislative Research Service Discussion Paper No. 11, Department of the Parliamentary Library, Canberra.
- Doeringer, P.B. and Piore, M.J. (1971), *Internal Labour Markets and Manpower Analysis* (Lexington: Heath).
- Kalecki, M. (1971), *Selected Essays on the Dynamics of the Capitalist Economy* (Cambridge: Cambridge University Press).
- Leijonhufvud, A. (1968), *On Keynesian Economics and the Economics of Keynes* (London: Oxford University Press).
- Lucas, R.E. Jr. and Rapping, L.A. (1970), "Real Wages, Employment and Inflation" in E.S. Phelps (ed.), *Microeconomic Foundations of Employment and Inflation Theory* (New York: Norton).
- Malinvaud, E. (1977), *The Theory of Unemployment Reconsidered* (New York: Wiley).
- Malinvaud, E. (1980), *Profitability and Unemployment* (Cambridge: Cambridge University Press).
- Malinvaud, E. (1982), "Wages and Unemployment", *Economic Journal*, vol. 92.
- Muellbauer, J. and Fortes, R. (1978), "Macroeconomic Models with Quantity Rationing", *Economic Journal*, vol. 88.

- Okun, A.M. (1975), "Inflation: Its Mechanics and Welfare Costs", *Brookings Papers on Economic Activity*, no. 2.
- OECD (1983), *Observer*, July.
- Pasinetti, L. (1975), *Growth and Income Distribution, Essays in Economic Theory* (Cambridge: Cambridge University Press).
- Patinkin, D. (1975), *Money, Interest and Prices*, second edition (Harper: New York).
- Snape, R.H. (1979), "Productivity, Costs and Employment", *Australian Economic Review*, Second Quarter.
- Snape, R.H. (1981), "Australian Unemployment — Is it Created by Cost or Demand?", *Growth 31: Inflation and Unemployment*, Committee for Economic Development for Australia, April.
- Snape, R.H. (1983), "Domestic Costs and International Competitiveness: An Australian Approach", paper presented at Economic Society of Australia Autumn Forum, *Economic Papers*.
- Solow, R.M. (1980), "On Theories of Unemployment", *American Economic Review*, vol. 70.
- Stone, J.O. (1984), "1929 and all that...", 1984 Shann Memorial Lecture, University of Western Australia.
- Victorian Chamber of Manufactures (1983), *Pulse Survey of Victorian Manufacturing*, Economic Analysis and Research Services, May.

Copyright of Australian Economic Papers is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.