The Macroeconomics of Industrial Strategy

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1. Introduction

The purpose of this paper is to explore the macroeconomics of industrial strategy. In particular, it is argued that an industrial strategy can potentially ease the constraints of capacity which lie behind inflationary pressures and the foreign trade position on the achievement of full employment. An implicit assumption behind our approach is that high levels of demand can help to underpin an industrial strategy and its promotion of investment and economic change.

There has been a general separation between macroeconomic analysis and industrial economics. At the academic level, with a few exceptions, macroeconomic analysis has proceeded with little regard to the industrial economics literature. This is not another way of saying that macroeconomics did not have microeconomic foundations. It is rather that the foundations which have been most often used have been those of atomistic competition, though there has been considerable use recently of models of imperfect competition (cf. Dixon and Rankin, 1994). It is also the case that there has been a general focus on the operation of labour markets rather than of product markets. For its part, the study industrial economics has generally ignored macroeconomic considerations.

This separation is also apparent at the level of policy discussion and policy implementation. Macroeconomic policy is a matter for the treasury and the central bank, industrial policy for the industry department. The discussion of macroeconomic policy has rarely given thought to the effects of that policy on industrial policy or strategy even though the macroeconomic stance provides the backcloth against which industrial policy must necessarily be conducted. In a similar vein, the implications of industrial policy for macroeconomic policy are rarely evaluated. An outstanding example of this separation is the granting of operational independence to the Bank of England, and the prescribed policy objective of the Bank to meet the government's inflation target. The policy instrument to be employed is the rate of interest, which is set with little, if any, regard to the effects on production and investment. But, also, no consideration is given to the effects which supply-

enhancing policies could have on the achievement of the inflation target.

We do not offer any precise definitions of industry policy or strategy or of macroeconomic policy, nor do we seek to define industrial economics and macroeconomics. However, industrial policy would be viewed in an encompassing fashion to potentially include all those microeconomic policies which impact on industrial performance. The term industrial strategy is used to signify a more strategic approach to industrial policy, where the government sets out the broad parameters of industrial development and where, in effect, a wide range of policies (including, for example, education and training, interest rate policy) are designed to underpin the achievement of the overall strategy. Macroeconomic analysis is defined here as what macroeconomists do, even though much of what is now described as macroeconomics is little more than simplified microeconomics (e.g. new classical macroeconomics, new Keynesian concerns with efficiency wages). In this chapter, we focus on two aspects of macroeconomic analysis: the idea of an inflation barrier to high levels of employment and the role of the trade sector in the determination of the rate of growth.

Three broad approaches to macroeconomics can be readily identified. First, the new classical macroeconomics (including monetarism) which views markets as being perfectly competitive and clearing rapidly at full employment in the labour market. Second, the new Keynesian approach with a focus on wage determination through efficiency wages, insider-outsider models and the like and notions that wages and prices do not adjust rapidly (if at all) to the level of demand. These two approaches share two features which are particularly relevant for this chapter. First, any occurrence of unemployment is ascribed to features of the determination of wages. In the new classical macroeconomics case, this would be problems of misperceptions, trade unions and other market 'imperfections', unemployment benefits and the like. In the new Keynesian approach, unemployment arises from a range of labour market 'imperfections' (in the sense of features which would not be present under perfect competition) but many of which are almost inevitable features of an industrialised economy. The link between wages and productivity postulated in the efficiency wage literature is not a feature of the real world which can be 'wished away'. Hence many of the so-called imperfections which are identified are intrinsic ones which cannot be removed by appropriate public policies. Second, the supply-side of the economy dominates in the determination of the level of economic activity (at least in equilibrium) and the level of aggregate demand plays, at most, a passive role in adjusting to the available supply. A related aspect of this is the general view that the

level of savings sets the constraint for the level of investment, and hence any attempts to raise capital accumulation and growth require some prior increase in savings.

The third approach, which we label as post-Keynesian, adopts a rather different general perspective and in particular a different approach to the relationship between micro-economics and macro-economics. Whilst the two approaches just referred to begin with atomistic micro units and through aggregation arrive at macro relationships, the post-Keynesian approach does not draw a distinction between the two. The level of economic activity is heavily influenced by the level of effective demand, and the market economy is subject to cycles in economic activity. In the sphere of production pricing is linked to investment: for a given level of unit costs, the higher the level of investment, the higher the price level desired by firms. Investment is related to distribution, growth and the cyclical behaviour of the economy. An economy with ambitious investment programmes will have a high growth rate, and there will be stronger upward pressure on prices than in an economy which is growing more slowly or is stagnating. The growth process brings inflationary pressures, even if the economy is operating at less than full capacity levels. In a capitalist system investment is essentially determined by expected profit rates and uncertainty. Both imply instabilities which government involvement and other institutions are thought desirable to ameliorate the degree of instability. There is an absence of self-righting mechanisms to bring the economy to full employment, and there are a range of constraints which can operate to prevent the achievement of full employment, including lack of productive capacity, and inability of the economy to balance its trade at full employment income. Disparities between regions and areas also means that even if full employment is secured in some more prosperous regions, unemployment would remain in the less prosperous. Another set of institutions are the trade unions and the monetary sector. Trade Unions are important in wage determination. Monetary institutions in creating money through bank credit, where the underlying mechanism is via the demand for bank credit to finance working capital requirements. Thus, there is an intimate link between the real sector and the monetary sector.

Our general approach is a post-Keynesian one, which has two particular implications in the context of this chapter. First, the level of aggregate demand is viewed as relevant for the level of economic activity, and also for the rate of investment, which in turn determines the future productive capacity of the economy. Second, the labour market is given little role in the determination of the level of employment (and indeed we would cast doubt on the usefulness of the notion of a labour

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market).

2. On the operation of market economies

The view of the operation of market economies which underpins the approach adopted here has three strands. First, competition within a market economy is a process of rivalry with winners and with losers. There are significant economic, social and political forces which generate and reinforce disparities and inequalities, whether between individuals, regions, sectors or countries. This is an application of the notion that success breeds success and the corollary that failure breeds failure. In the economic sphere, the operation of market forces generate processes of cumulative causation (Myrdal, 1957) and centrapetalism (Cowling, 1987, 1990). An economically successful region generates profits which stimulates further investment; it can attract mobile, often highly skilled, workers from other regions and it can benefits from static and dynamic economics of scale (Kaldor, 1972). Unemployment and low wages are both characteristics of relatively less prosperous regions. In the more specific areas of industrial economics, there are a variety of routes through which 'first mover advantage' spills over into cumulative causation. Frank and Cook (1995) had argued for the wide spread effects of 'winner-takes-all' situation, and they particular apply their ideas to explain the widening disparities of individual incomes. When winner-takes-all, there are no prizes for being second. Insofar as the process of competition has some 'winner-takes-all' features, then it will generate disparities but with the added ingredient that the winner can reinvest the winnings to secure future advantages.

The dynamic interplay between investment and productivity growth reinforces inequalities which are thus explained by endogenous factors in the process of historical development rather than by the exogenous 'resource endowment' (Kaldor, 1970, p. 343). Economies which are already developed enjoy competitive advantages so that the growth that takes place generates 'dynamic increasing returns' to scale (Kaldor, 1972). These induce higher productivity and rate of profit in the faster-growing countries, makes it progressively harder for the slower countries to compete. An inflow of capital and skilled labour ensues which allows still further expansion of production and the reaping of further economies of scale, higher productivity and rate of profit. These effects, labelled as 'backwash', are thought to be contained by certain advantages accruing to the slower countries. These are the 'spread' effects, which can accrue, for example, from expanded markets, the

transfer of new technology from the advanced regions, etc. The 'spread' effects are not thought to be strong enough to outweigh the negative effects emanating from 'cumulative causation'. Even if by chance the 'spread' and 'backwash' effects are in balance, this would not be a stable equilibrium for any change in the balance of the two forces would be followed by cumulative movements. 'Cumulative causation' thus creates a situation whereby the equilibrating forces of the market no longer perform the role attached to them, so that a core/periphery relationship emerges. The dependence of the periphery of the core reduces the ability of the periphery to pursue independent development policies and 'cumulative causation' generates the need for re-distributive policies. Consequently, the market mechanism reinforces regional disparities and imbalances rather than eliminating them and the continuing North/South divide is understandable in these terms. Further 'cumulative causation' in economic terms generates inequalities in non-economic terms, such as political power, cultural domination etc. (Cowling, 1985). It is, thus, expected that those economies which are relatively rich dominate, not just in the economic power sense, but also in terms of their ability to exert political superiority. In this way they are in a position to impose their policies and culture over the less powerful countries.

The operation of the forces of cumulative causation indicates that there will be disparities of employment and capacity across regions etc., and that the achievement of full employment requires policies which ensure the reduction of those disparities.

Second, many of the factors which would be labelled as 'imperfections' based on the benchmark of perfect competition (in the sense that they would be absent from perfect competition) often have a positive role to play in the operation of a market economy. A particular example would be the use of long-term contracts in the labour market, which would be absent from a so-called flexible labour market which mimics the spot market of perfect competition. Long-term contracts can help to promote training, the involvement of workers in the functioning and decision-making within the enterprise and the reduction of an adversarial relationship between employees and employers, all of which could be reasonably expected to have a positive impact on productivity. Similar arguments can be applied to trade unions, minimum wages etc. One of the 'imperfections' of particular relevance to industrial policy clearly refers to the relationship between firms. Whereas agreements between firms are often dismissed as collusion designed to raise prices (which they may well be), there may be a more positive aspect of such agreements in the promotion of, for example,

common standards, over the provision of specialised training etc.

Each of these considerations raises severe problems for competition and monopoly policy. Since competition itself generates winners and losers, and thereby a process of concentration and centralisation, an initial position of atomistic competition is generally unstable. The policy dilemma emerges as to how to deal with the market power which the successful in the competitive struggle possess. As Marris (1972) argued, monopoly policy appears to involve the notion that whilst success should be rewarded, excessive success should be punished. Relationships between firms may be mutually fruitful as well as collusive, and there is no clear way of distinguishing between them. But a further policy implication is a warning across attempts to create an economy which resembles perfect competition, destroying the supposed 'imperfections'.

Third, the perspective adopted here is that there are no automatic forces which ensure that there will be adequate aggregate demand to underpin the full utilisation of labour and of capital equipment. Unlike the first two approaches to macroeconomics identified above, we do not assume that Say's Law will operate, and that aggregate demand will adjust to the supply-side determined equilibrium. But neither do we assume that a high level of aggregate demand is sufficient for full employment of labour, which we would see as also requiring supply-enhancing measures to ensure adequate capacity (see Arestis and Sawyer, 1997, 1998).

3. Linking macroeconomic policy and industrial strategy

There are numerous possible links and interdependencies between macroeconomic policy and industrial strategy, and in this chapter we are selective and focus on two of those. Our general perspective is that there are supply-side constraints on the achievement of full employment which can be alleviated through supply-enhancing measures, many of which would be associated with an industrial strategy. There are also demand constraints which need to be addressed but fall outside of the scope of this chapter, but which we would view as crucial for the achievement of full employment (see Arestis and Sawyer, 1997, 1998).

In the next section, we discuss the non-accelerating inflation rate of unemployment (NAIRU), and argue that it can be viewed as a capacity constraint which is reflected in inflationary pressures. Industrial strategy is then seen as a mechanism by which the capacity constraint can be lifted with consequent beneficial effects on the inflationary picture. In section 5, we briefly review

the constraints on economic activity arising from balance of trade considerations.

4. The NAIRU and capacity constraints

One of the major constraints on the achievement of full employment is often seen as the non-accelerating inflation rate of unemployment (NAIRU). In some respects, it may not be so much whether the NAIRU does exist (whatever that might mean), but rather that policy makers and others respond as though it did.' In this section, we develop an analysis which suggests that this form of inflation barrier should be viewed as arising from a lack of capacity rather than as a labour market phenomenon. The argument advanced here is that productive capacity has a significant effect on the inflation barrier.' The policy implications of such analysis are clear: means have to be found to raise the level of capacity in the economy, even though the effect of a lack of capacity is expressed as an inflation problem rather than a capacity problem.

The key features of the usual formulations of the NAIRU are that it is a supply-side equilibrium position with an emphasis on the operations of the labour market. The usual suggestion is that either the NAIRU has to be accepted as a 'fact of life' or in so far as it can be changed that requires some policy responses directed towards the labour market (such as reducing unemployment benefits or improved training). We would wish to view the NAIRU as a theoretical representation of the idea that there may be an inflation barrier to the achievement of full employment. Where the economy operates relative to any calculated NAIRU would depend on, *inter alia,* the level of effective demand, and we would not have any presumption that the NAIRU is a 'strong attractor' for the actual rate of unemployment.

The focus of the analysis here is on the role of capacity, and as such we pay most attention to the production side and to price formation, and little to wage determination. For our purposes here, it will suffice to postulate that wage determination considerations give rise to a positive relationship between the real product wage and employment. The equilibrium wage relationship can be viewed in one of two ways, but in both cases the level of unemployment restrains wages relative to some reference level. The first alternative is an equilibrium relationship between real wages

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[1] For a critique of the concept of the NAIRU see Sawyer (1997a).
[2] The approach outlined here is more fully developed in Sawyer (1997b).

relative to some target or reference level and the level of unemployment[3], and this can be expressed as $w - p - T = g(U)$ where w is log of money wage, p is log of the relevant price level and T the log of the target real wage and U is the rate of unemployment. The second alternative is an equilibrium relationship which starts from the enterprise level where money wages is treated as a mark up over alternative income a. This alternative income is a weighted average of alternative wages if employment can be found and of unemployment benefits b if employment cannot be found, where the weights depend on the level of unemployment.[4] In equilibrium it is usually assumed that all enterprises offer the same wage, which enables a relationship to be derived which of the general form $w - b = h(U)$. When the level of unemployment benefits in real terms is set by the government, the relationship can be re-written as $(w - p) - (b - p) = h(U)$, which has the same basic form as the target real wage equation above. When the ratio of benefits to wages is fixed by the government, then the equation $w - b = h(U)$ immediately yields the level of unemployment. In each case there are a range of other variables which enter these relationships, but are not of particular relevance to the discussion here. For each of the relationships specified above, the expected sign of the relationship between real wage and unemployment is a negative one, and thereby a positive one between the real wage and employment. These relationships can be summarised as $(w - p) - T = G(L)$ and $(w - p) - (b - p) = H(L)$, respectively with G' and H' positive. In Figures 3 and 4, the curve labelled RWE (real wage employment) is a representation of either of these relationships.

In the modelling of enterprise behaviour with regard to price, real wage, employment and output determination (which are, of course, interdependent) we wish to allow for varying returns to scale (and the related possibility that the productivity of labour may vary either positively or negatively with the volume of employment). At the level of the enterprise we make explicit allowance for the capital stock, and at the aggregate level for changes in the number of enterprises. In effect, this distinction corresponds to capacity replacing (though productivity enhancing) investment and capacity enhancing investment. The general environment within which the enterprise is assumed to operate is that of imperfect competition : the position of the demand schedule facing the individual enterprise is assumed to depend on the decisions of other enterprises and on the level

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[3] See, for example, Sawyer (1982a, 1982b), for the theoretical aspects and Arestis (1986), Arestis and Skott (1993) and Arestis and Biefang-Frisancho Mariscal (1994) for further theoretical discussion and empirical estimation of the target real wage approach.

[4] See, for example, Layard, Nickell and Jackman (1991), Chapter 2.

of aggregate demand.

The short-run profit maximising decision facing the enterprise is modelled as involving the maximisation of $\Pi = p(q,Z).q - w.l$ where $q = f(l^{\alpha} k^{1-\alpha})$; Z is a vector of variables influencing the demand facing an enterprise including the level of aggregate demand, lower cases letters refer to the enterprise level. We do not include material inputs since their inclusion would complicate the analysis without being of importance to the points which we wish to explore here. Using the level of employment as the key decision variable, with the capital stock and Z held constant, the first order condition for profit maximisation yields:

$$\frac{(e - 1)}{e} \, a \, l^{a-1} \, k^{1-a} \, f' \, (l^{a} \, k^{1-a}) = \frac{w}{p \, (q, \, Z)}$$

This first order condition looks rather like a demand for labour schedule but should not be so regarded since the enterprise does not face parametric output prices, though it is assumed to face a given nominal wage (and hence sets the real product wage through its actions over its price). Further, this equation provides a 'point' outcome : it is an equation in l (k being exogenous as this point, p, q being functions of l) which can be solved to give the level of employment, from which the level of output, real product wage and price can be derived.

One way to map out a relationship between the real product wage and the level of employment is to vary the Z variable. In particular, movements in the level of aggregate demand would generate movements in employment, real product wage etc.. Making such variations in Z would lead to a relationship, labelled the p-curve, as sketched in Figure 1, where it is assumed that the function f is such that it initially displays increasing returns to labour and then diminishing ones. If there is a constant elasticity of demand then the relationship in Figure 1 is merely the inverted U-shaped short run cost curve. The significance of the role of aggregate demand here is that it provide the mechanism for the generation of a curve such as the one in Figure 1 : without that (or analogous) mechanism, the decisions of the enterprise would merely yield a point outcome (in terms of real product wage and employment). Further, any point on the p-curve has to be supported by a particular level of aggregate demand.

Figure 1 near here

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It is readily apparent from eqn. (1) that an increase in the capital stock would lead to an upward shift in the real product wage-employment relationship (and in the case of a Cobb-Douglas production function with f' = 1, a 1 per cent rise in k would lead to a 1 per cent rise in l for a given real product wage). However, for a given level of Z, an increase in k would lead to a combination of higher real product wage (induced by the lower price required to sell the increased output) and of employment.

Moving to the aggregate level, the real product wage-employment relationship is the horizontal summation of the individual enterprise relationship. The relationship in Figure 1 is regarded as relating to a representative enterprise, and that aggregation across enterprises does not raise any particular problems. Figure 2 sketches the aggregate relationship between the real wage and employment based on enterprise behaviour and price, output decisions, and again labelled the p-curve. An increase in the number of enterprises will shift the p-curve to the right, whereas an increase in the capital stock of the representative enterprise shifts the relationship up. In Figure 2, the shift from A to B reflects an increase in the average capital stock per enterprise and the shift from A to C an increase in the number of enterprises.

Figure 2 near here

It can readily be seen that investment will lead to rightward and upward shifts in the p-curve, and the mix of those shifts depends on the degree to which the investment leads to a rise in the average capital stock (per enterprise) and the degree to which to an increase in the number of enterprises. The distinction between average capital stock and number of enterprises corresponds to a distinction between capacity replacing investment and capacity enhancing investment : the former replaces older with newer vintage and (usually) raises the capital-labour ratio while the latter adds to capacity. This leads to the important perspective that it may be possible through appropriate macroeconomic policies to generate increases in the capital stock and its composition which can be represented as a shift in the p-curve. A sufficient shift in the p-curve can lead to a corresponding NAIRU, which is compatible with full employment : such a possibility is illustrated in Figure 3, where as noted above the RWE curve is based on wage determination considerations. The achievement of full employment would still require the appropriate level of aggregate demand (so that enterprises would choose to operate at point A), recalling that each point on the real wage

employment relationship corresponds to a specific level of aggregate demand. It is outside the scope of this chapter to discuss the determinants of the level of aggregate demand, and we confine ourselves here to making the point that there is no strong reason to think that the wages and profits generated at point A would lead to a level of expenditure which would purchase the output produced at A.

Figure 3 near here

In Figure 3, the slope of the p-curve around point A is clearly negative. However a relationship which was positively sloped would not change any significant conclusions, though it can be noted that if the real wage employment relationship has a significant portion for which the p-curve is horizontal, then moving toward full employment would require an increase in the average capital stock.

In the approach adopted here, there would be unemployment in equilibrium if there is insufficient capacity for the enterprises to be willing to employ the whole of the work force at the real wage generated by the wage equation at full employment. This can be illustrated in Figure 4, where the NAIRU would be at point B, which falls short of full employment. Even here, low levels of aggregate demand may prevent even point B being reached, and a point such as E might be reached.

Any NAIRU which falls short of full employment is viewed in terms of a lack of capacity (rather than being viewed in terms of, for example, labour market imperfections). The notion that sufficient capacity can lift the NAIRU to full employment does not, of course, mean that such capacity will be forthcoming, and in particular high levels of unemployment will provide a strong disincentive for such capacity to be built.

Figure 4 near here

However, if investment increases capital intensity (represented by an upward shift in the p-curve), then it is possible that the higher productivity which thereby results leads to an upward shift in the RWE equation (based on wage determination considerations). In terms of the two equations used above, that is $(w - p) - T = G(L)$ and $(w - p) - (b - p) = H(L)$, this would mean an increase in T or in $(b - p)$. Clearly, if a 1 per cent rise in the p-curve (as a result of increased capital stock) was

associated with a 1 per cent rise in the target real wage (real benefit level) then the NAIRU would remain unchanged. This is, in effect, the case which Layard, Jackman and Nickell (1991) examine, and to which they restrict their analysis. In such a case, it could be said that if the response of the wage equation to a shift in the real wage employment relationship arising from an increase in the aggregate capital stock, then workers (or at least those in employment) in association with employers are to that extent taking the increase in productivity in the form of higher wages rather than as an increase in employment.

It may be tempting to read Figure 4 as saying that a NAIRU below full employment is the result of the workers' demands for real wages (i.e. the target real wage is too high) or the level of real unemployment benefits are too higher. But clearly what is relevant is the interaction of the two curves, and the Figure could also be read as saying that the p-curve is too low as a result of enterprises' profit margins (and hence prices) being too high (and hence real product wage too low).

It would seem that through some apparently innocuous assumptions the models developed in the influential book by Layard, Nickell and Jackman (1991) imposed conditions to the effect that any shift in the real wage employment relationship generated a corresponding shift in the wage equation, such that the equilibrium level of unemployment did not change (and the benefits of higher productivity fed through into real wages). Layard, Nickell and Jackman use a Cobb-Douglas production function with constant returns to scale (and hence there is no significance to be given to the division of increases in the capital stock between the average per enterprise and the number of enterprises). In the Cobb-Douglas production function case, $w - p = (e-1)/e . \alpha . L^{\alpha-1} K^{1-\alpha}$ and it can readily be calculated that the employment level will be constant if the proportionate rise in the real wage (imposed on the enterprise) is equal to the proportionate rise of output following a rise in the capital stock for a given level of employment. Any mechanism which imposes that condition (whether by a rise in the target real wage, the level of unemployment benefits or some other means) would lead to constant equilibrium level of employment (and hence a constant NAIRU). In the case of a CES production function, with the elasticity of substitution less than unity, then such a proportionate rise in the real wage would be compatible with a rise in employment.

In Layard, Nickell and Jackman (1991), there are a number of reasons why the capital-labour ratio does not influence the equilibrium level of unemployment. In the union bargaining model deployed in their Chapter 2, they conclude that 'if the production function is Cobb-Douglas (not a

bad assumption) and benefit replacement ratios are kept stable, then unemployment in the long run is independent of capital accumulation and technical progress. .... If, however, the elasticity of substitution is less than one, capital accumulation (with no technical progress) raises the share of labour and reduces unemployment' (p. 107). Rowthorn (1998) argues that the estimates of the elasticity of substitution between labour and capital are considerably below unity, and hence that a rising capital-labour ratio reduces the equilibrium level of unemployment.

In Layard, Nickell and Jackman (1991) Chapter 2, the mark-up of the wage over alternative income (a weighted average of wages elsewhere and the unemployment benefits) in a bilateral bargaining model does not depend on the capital-labour ratio, whereas Rowthorn (1998) shows that with a CES production function, that mark-up does depend on the capital-labour ratio. The equilibrium level of unemployment depends on the relationship between actual wage and the alternative wage. In the case of the Cobb-Douglas production function with a constant wage to benefit ratio, the level of equilibrium unemployment remains unchanged in the face of changes in the capital-labour ratio since the relationship between the wage-alternative wage and the level of unemployment remains unchanged. In the case of the CES production function, that relationship changes when the capital-labour ratio changes permitting a change in the equilibrium level of unemployment (and specifically if the elasticity of substitution is below unity, the equilibrium level of unemployment falls when the capital-labour ratio rises).

These considerations would appear more relevant when investment takes the form of increasing the average capital stock per enterprise (equivalent to capacity-replacing investment) for then labour productivity would rise, whereas in the case of increasing number of enterprises (equivalent to capacity enhancing investment) the main effect is on capacity.

We would conclude from this discussion that when capital investment takes the form of increasing the average capital stock per enterprise, and where the elasticity of substitution is unity and the wage equation shifts up in line with the rise in output (and hence the labour share in national income remains a constant) then the NAIRU may become stuck below the full employment level, and it cannot be shifted through the expansion of the capital stock. But when the elasticity of substitution is below unity, or when the wage equation does not shift up in line with the rise in output, or when capital investment takes the form of more enterprises, then the NAIRU can be guided into compatibility with full employment through capital investment.

There are two conclusions from this analysis which are relevant for economic policy. The first is that, in general, an expansion of capacity would help to push back any inflation barrier. This point would be reinforced if spatial aspects were taken into account in that the spatial distribution of capacity has to match with the corresponding distribution of workers. Policies to create capacity become anti-inflation policies and in particular an industrial strategy which has capacity expansion as one of its objectives links with macroeconomic policy designed to constrain inflation.

The second is that when an economy has a capital stock (and the related p-curve) which cannot readily support the real wage claims being made, then the NAIRU will appear to be relatively high. The reduction in the NAIRU requires a sustained increase in the level of aggregate demand to stimulate investment (and also to underpin higher levels of employment). According to the NAIRU approach, unemployment below the current NAIRU stimulates inflation, which often leads to policies that tend to abort the higher levels of demand. But unless the higher levels of demand are sustained, the lower NAIRU cannot be reached.

The usual discussion on the NAIRU provides a strong suggestion of the restoration of the classical dichotomy between the real side and the nominal sides of the economy. It is often specifically argued that the reduction of inflation (through control of the growth of the money supply) can be achieved without detriment to the real side of the economy, and that there is no long run trade off between inflation and unemployment. The discussion here suggests that the nature of any association between inflation and unemployment will be heavily dependent on the time path of unemployment and its effects on the level of the capital stock.

Finally, it can just be noted that capacity should be viewed as having other dimensions, including the skills of the work force and the regional distribution of the capital stock. Insufficient capacity in either of these respects may be sufficient to prevent the achievement of full employment.[5]

5. Balance of trade constraint[6]

While there is some debate over the degree to which and the period for which a country can run a

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[5] See Arestis and Biefang-Frisancho Mariscal (1997) and Arestis and Biefang-Frisancho Mariscal (1998) for some empirical support.

[6] This section draws on Arestis (1997, ch. 3) where more details may be found.

trade deficit[7], there is little doubt that there is some eventual limit. The importance of the balance of payments as a constraint to growth has been discussed extensively (see, for example, Thirlwall, 1979, McCombie and Thirlwall, 1997a, 1997b). The argument is that countries with high income elasticity of demand for imports and low income elasticity of demand for exports experience balance of payment difficulties which restrict governments in their attempt to expand aggregate demand. The equality of exports and imports would give $X(e, Y_w) = M(e, Y_d)$ where e is the real exchange rate, Y_w is world income and Y_d is domestic income with exports are negatively related to the real exchange rate and imports positively related. In growth terms, this gives $-\eta_x g_e + \eta_w g_w = \eta_M g_e + \eta_d g_d$ where η refers to elasticities and g to growth rate of the variable indicated by the relevant subscript. The domestic growth rate is then given by $g_d = \dfrac{\eta_w g_w - (\eta_x + \eta_M)g_e}{\eta_d}$. Clearly if the responsiveness of the demand for imports and exports to price changes is small or if the real exchange rate does not change to any significant degree, then domestic growth would be largely determined by world growth and the ratio of η_w / η_d (which is often now termed 'Thirlwall's Law').

This analysis can be modified in a number of respects, and two are of some relevance. First, the exchange rate may continuously change to enable the domestic growth rate to diverge from $\eta_w g_w / \eta_d$, but there are some obvious limits to that. Second, it may be possible to run a substantial trade deficit for a significant period of time. But the borrowing required to cover the deficit implies a future stream of interest (or equivalent) payments. It can readily be shown that a trade deficit would lead to a foreign debt to domestic income ratio which increases over time without limit if the rate of interest on borrowing exceeds the domestic rate of growth, a condition which we would see as generally fulfilled (though the United States appears to have been something of an exception in recent years).

The focus on this trade constraint appears to be one on the conditions of demand. But there are obviously supply-side factors underlying the income elasticities of demand which feature so prominently in the above formula. It is here again evident that the factors limiting the performance

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[7] Any trade deficit requires borrowing to finance it, whether of the form of short-term borrowing, long-term borrowing or inward investment, on which interest payments or profits have to be paid. The foreign debt to national income ratio (and hence the interest and other payments relative to national income) will spiral upwards for an initial trade deficit if the rate of interest exceeds the rate of growth of national income : in general we would expect that condition to apply (though there are exceptions and the USA for the past decade appears to have been one).

of the economy lie with the conditions of production and not with the labour market. The role of industrial strategy at a general level is here perhaps self-evident, namely the creation and support of industries which supply or will be able to supply products for which there is a high income elasticity of demand in world markets. A successful industrial strategy in those terms would have considerable externalities in the sense that the growth of sectors which enable the growth of exports to rise thereby permits the faster growth of the economy.

6. Conclusions

This chapter has sought to begin an exploration of the links between macroeconomic policy and industrial strategy. The debates over economic policy in recent years have often focused on the role of the labour market in the determination of macroeconomic performance : whether through attempts to reduce trade union power, reduce social security benefits, or to improve training and skill formation, the emphasis has been on the labour market. The perspective of the present paper is rather different, and seeks to emphasis the role of the output and investment activities of enterprises. We have explored this aspect in some detail in connection with the inflation barrier, and have argued that such a barrier should be viewed in terms of a lack of capacity. We have briefly reviewed the balance of trade constraint on growth and employment. The over-all implications of those two sets of analyses is that macroeconomic performance would be enhance by appropriate industrial strategy, and that inappropriate macroeconomic policies will damage industrial performance. Policies designed to restrain inflation by lowering the level of aggregate demand will tend to depress investment and harm capacity. Improved industrial performance requires a climate conducive to investment and research and development, which in turn depends on, *inter alia*, high and stable levels of aggregate demand.

Appendix

This appendix provides the formal algebra for the figures in the text. Lower case letters are used to signify enterprise (plant) level and upper case aggregates.

Suppose the typical enterprise has capital stock of k, and for that typical enterprise $q = f(l, k)$ where f_1 (the first partial derivative of f with respect to l) > 0 and f_{11} is seen as initially positive and then negative (so that the marginal productivity of labour initially increases with the amount of labour and then declines)

We can write $Q = nq = n f(l, k)$ where n is number of enterprises (plants). The capacity of enterprise is denoted by q^*, and this is not to be thought of as physical capacity necessarily but some 'normal' level. Capacity utilisation is then defined as $u = q/q^*$, and the mark-up of price over marginal costs is taken to be a function of u. Then $w/p = b(u) f_1(l,k)$ where b is the inverse of the mark-up of price over marginal labour costs and it is expected that b' may be positive (i.e., mark-up falls) for low values of u but negative for relatively high values. Then $u = q/q^* = f(l, k)/q^*$ and $L = nl$ and hence $w/p = b(f(L/n, k)/q^* f_1'(L/n,k)$.

An increase in n would reduce L/n. At high levels of L/n when $f_{11} < 0$ this would raise f_1, and reduce f thereby raising the value of b. Hence real wage (at a given level of total employment) would rise for increase in n. However at low levels of L/n, $f_{11} > 0$, and the effect on the real wage would depend on the net effect on the inverse of the mark-up b and on f_1.

An increase in the average capital stock k would have lead to a rise in f_1, and it can be postulated that the effect of increased k is that q rises by the same proportion for all levels of employment, then $f(l,k)/q^*$ would not be affected. Then rise in k would lead to higher real wage (for given employment).

The real wage equation given above suggests that the real wage can be viewed as a function of the rate of capacity utilisation, average employment per enterprise and the average capital stock (per enterprise).

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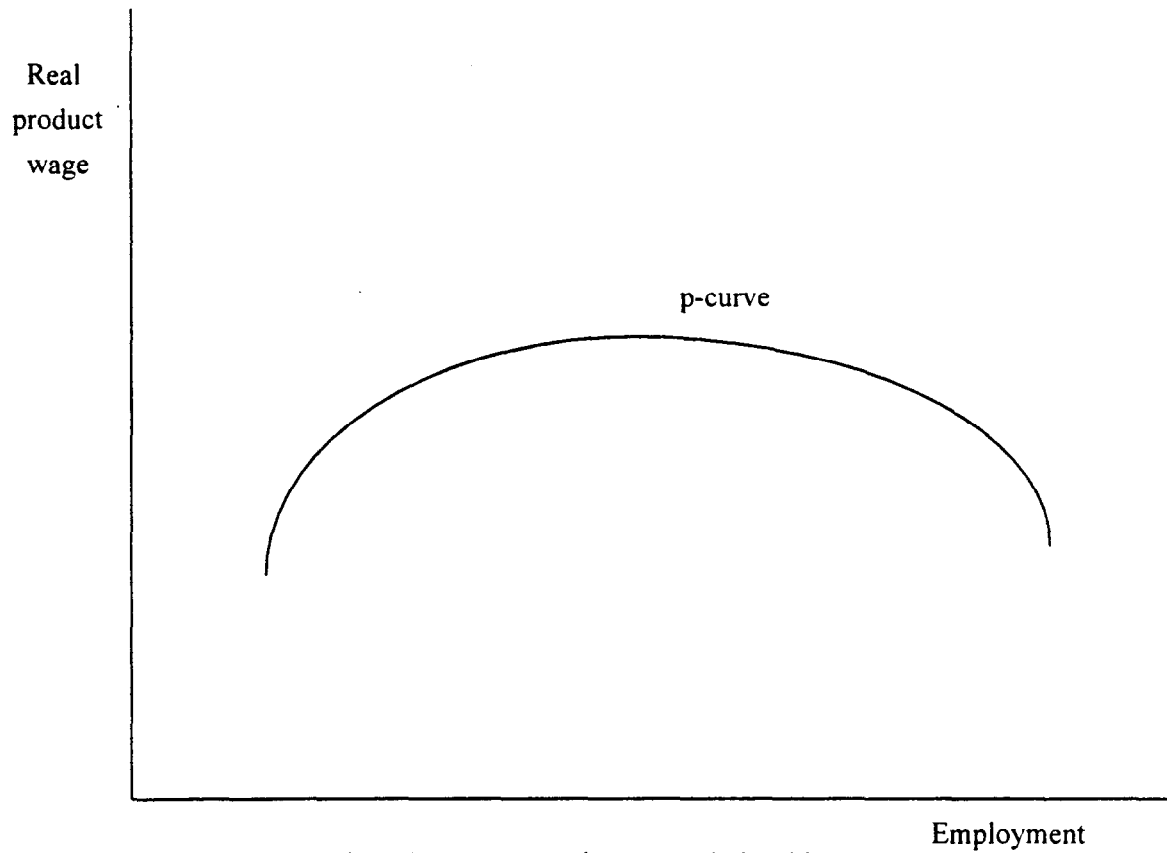
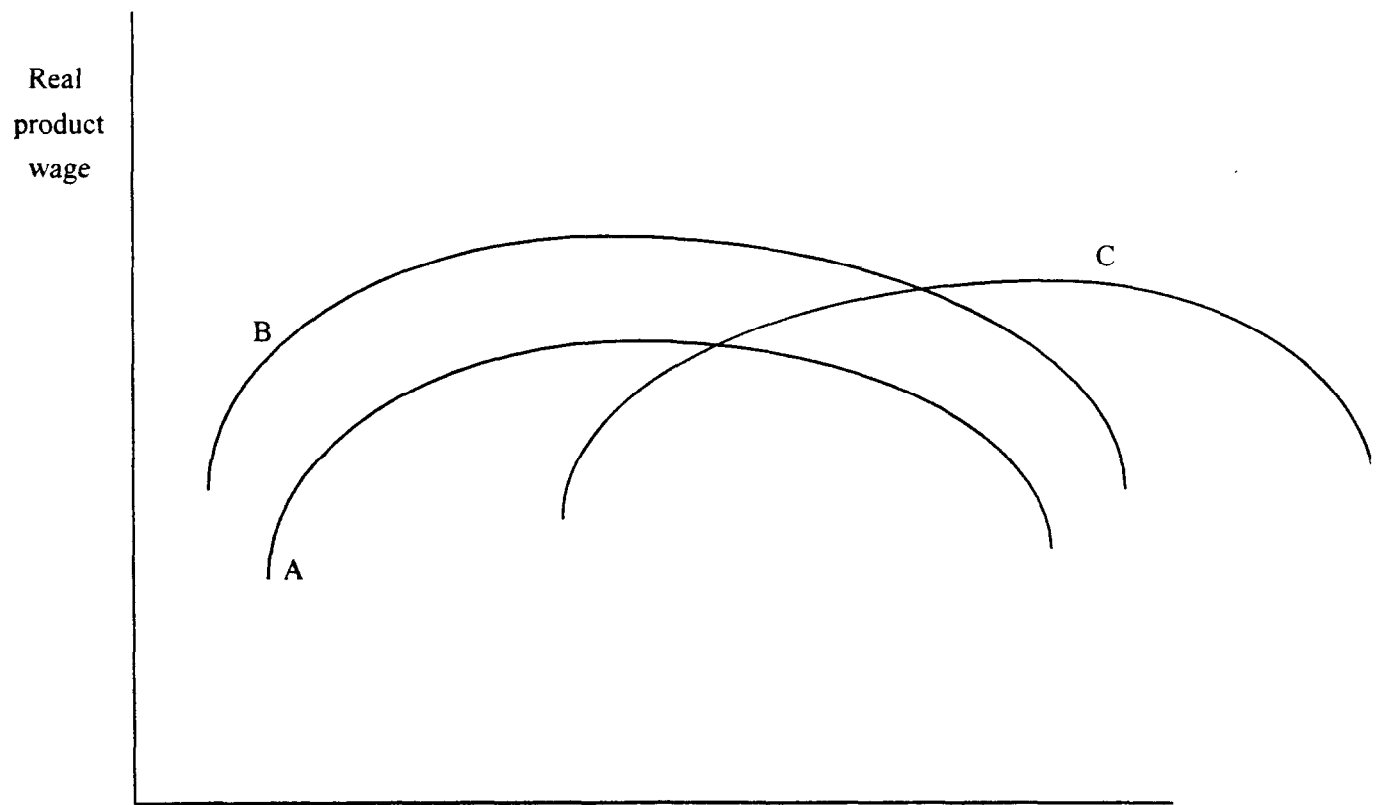Figure 1 Real product wage-employment relationship
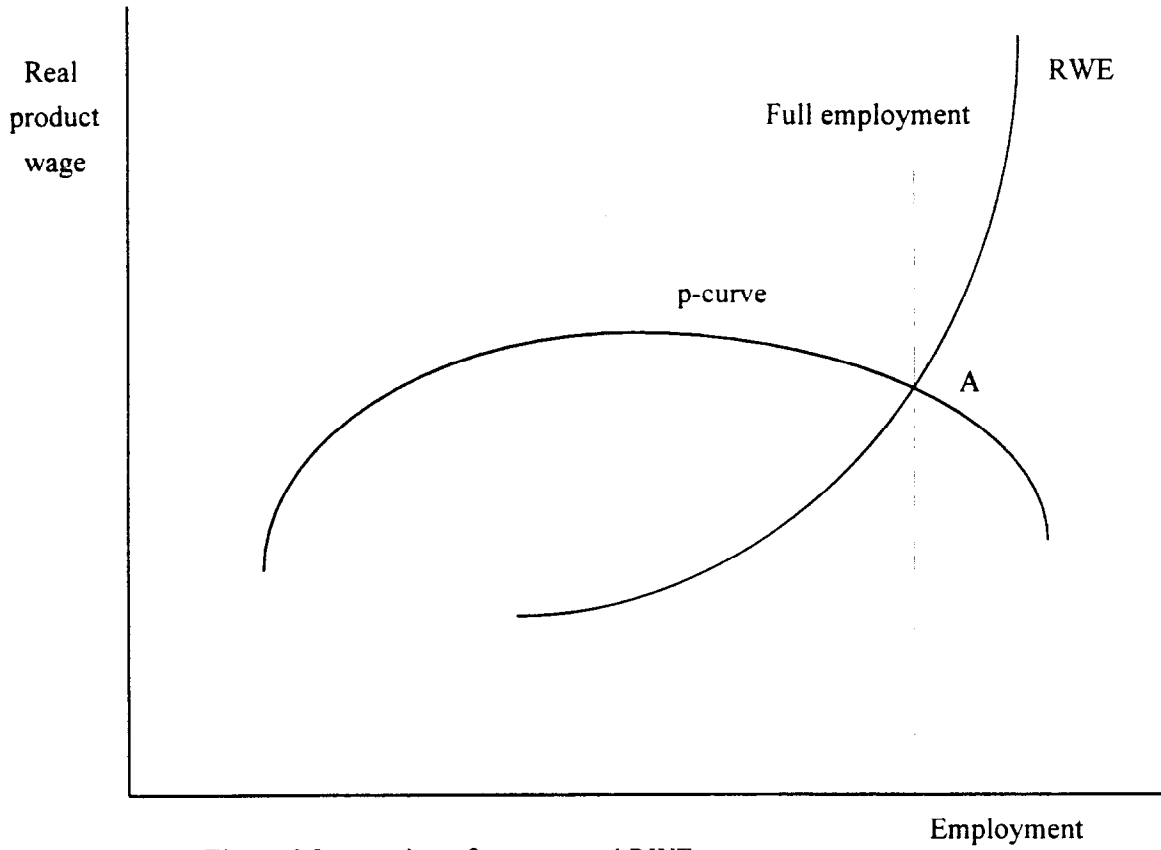

Figure 2 Real product wage-employment relationships
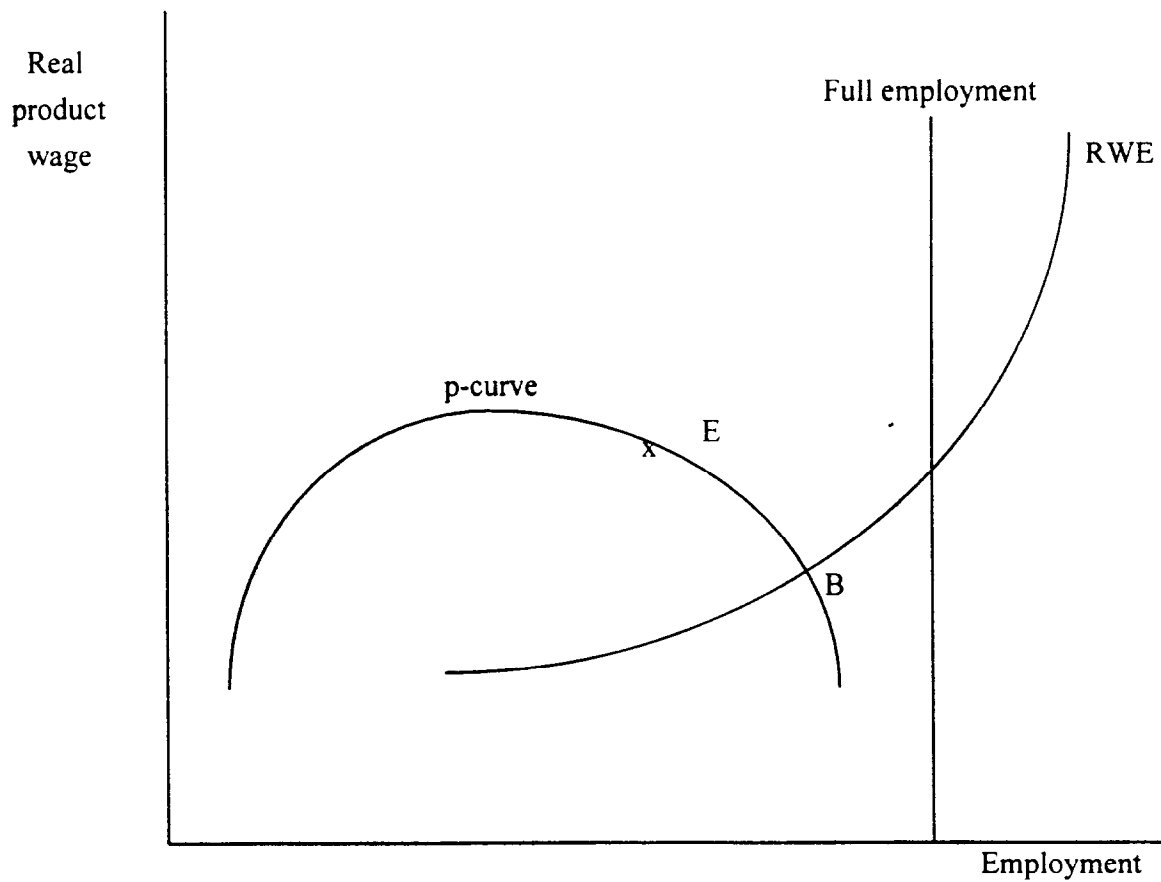
Figure 3 Interaction of p-curve and RWE

Figure 4 Unemployment from inadequate capacity