

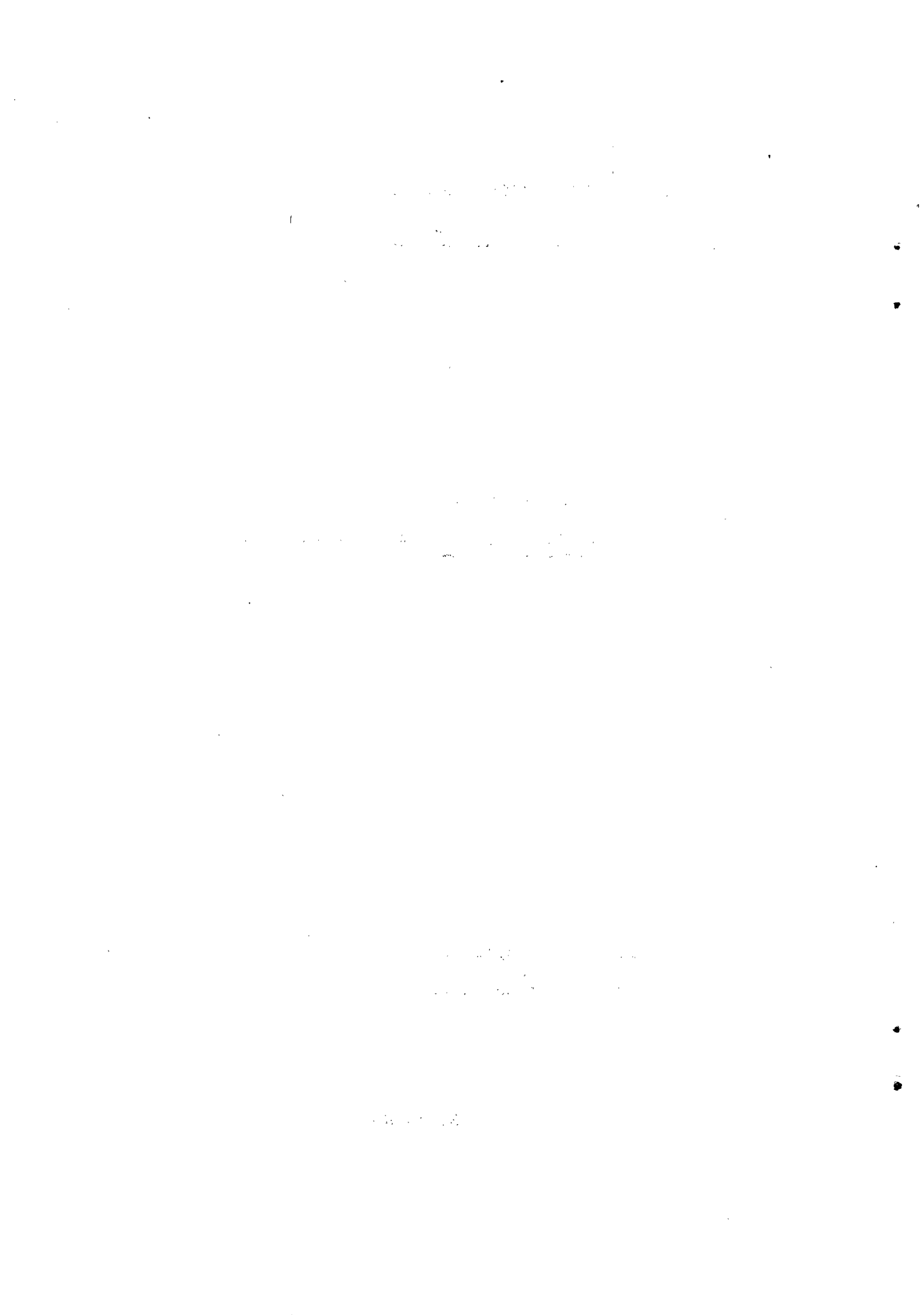
PROGRAMME OF RESEARCH AND ACTIONS ON THE DEVELOPMENT OF THE
LABOUR MARKET

SHORT-RUN EMPLOYMENT FUNCTIONS: THEIR
EVOLUTION, FAILURE AND REPLACEMENT?

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Short-run employment functions: their evolution
failure and replacement?

Introduction:

In the post-war period, macro-economic models in the major industrial countries have included a short-term employment function. It is a key stage in the analysis of the pressure of demand in the labour market, a major policy target within full employment, anti-inflation and balance of payments policy packages. The purpose of this paper is to trace their evolution, to point to their failure (both theoretical and empirical) and to suggest the way that must be followed to replace this part of the conventional model structure.

The first part of the paper traces the evolution of the short-run employment function in terms of its empirical behaviour. No attempt is made to compete with or collate existing estimates - these are already too well documented¹ - but rather to highlight the response of macro-modellers to instability in the performance of various specifications. The main conclusion of this section is that most amendments have been ad hoc and that the theoretical basis of the conventional form, and even that of the most promising recent development, is over fifteen years old.

In the second part of the paper, we suggest a set of headings to act as an outline for a framework of analysis,

1. See, for example, Henry (1979).

drawing on Tarling (1979b), and use this to explain the failure of the conventional model. The third part is an attempt to construct a theory of employment demand within the context of a structural model of the labour market which takes cognisance of the theories of labour market segmentation and draws on them to show the endogeneity of processes which rules out partial analysis presumed by previous theoretical work.

It is as well to make clear the methodology of the paper at the outset. In contrast to conventional academic procedure, no attempt is made to discriminate between alternative hypotheses or to suggest discriminatory tests. The paper sets out to tackle a particular problem - to consider the proposition that the labour market is competitive - by drawing on existing ideas and the success or failure of the attempt is to be judged by its coherence and general applicability, rather than specific comparisons of sections of the argument.

The argument draws heavily on existing studies of labour market behaviour, particularly at the macro-economic level and on the subject of low pay. The analysis reveals certain rather important gaps, such as the role of institutional organisation and its flexibility in relation to product market changes. Thus one outcome of the work is to suggest areas where research is needed. Another result of the analysis is to indicate to what extent dynamic relationships in the labour market can be captured in specifications of behaviour which can be tested using available data. This latter objective is only partially achieved since the construction of a structural model of the labour market still leaves the question of the tractability

of the model and the derivation of reduced forms compatible with existing data availability and capable of discriminating between hypotheses. An attempt is made to deal with this in the final sections of the paper.

The purpose of the paper then is to present a framework of analysis for labour market issues and its contribution lies in integrating various aspects of labour market behaviour. The conclusion is that labour markets are not in general competitive in the neo-classical sense but bear more characteristics of a Marxian labour market. The main forces of competition are felt in the product market and it is behaviour in this market, and in response to the pressures in this market, which integrates the economic, sociological and institutional aspects of the labour market.

The paper concludes with a summary of the argument and a mathematical representation of the model outlined.

A. The evolution of conventional models

1. The starting point:

There are numerous examples in the empirical literature of unsuccessful attempts at estimating production functions from time series data. Despite the relative full employment of the 1950s and 1960s, both in the UK and the US, it was accepted that one of the difficulties was a failure to cope with cyclical variability and the existence of short-run derived demand functions for inputs. This led to estimation, particularly by macro-modellers during the 1950s and early 1960s, of specifications of the derived demand for labour based on inverting the production function:

$$E = f(t, Q, E_{-1})$$

where t = time (a shift for capital and technical progress), Q = output and E = employment: the lagged term is intended to capture disequilibrium behaviour.

But the theoretical basis of the equilibrium analysis was inadequate. Brechling (1965) provided one which was extensively developed by Ball and St. Cyr (1966). The key to the breakthrough is that, although the market was atomistic so that a theory could be set up for a representative firm, the wage cost per man hour was not exogenous and hence one could achieve a short-period cost minimising solution. In simple terms, each firm operated with a production function:

$$Q_t = f(t)(E^*h)_t^\alpha$$

where E^* = desired employment and h = hours worked

$$\text{and a cost equation: } C_t = W_h(E^*h)_t + F_t$$

where W_h = effective wage per hour and F_t = fixed costs.

Because productive hours worked could be less than paid hours for a normal week and because an overtime premium was paid, it was asserted that wage cost per productive hour now fell until hours worked reached the normal week and then increased as overtime increased. Thus, W_h could be written approximately as

$$a - bh + ch^2$$

By specifying the shift term as $f(t) = Ae^{pt}$ and minimising the cost equation with respect to desired employment, it could be shown that

$$\ln E_t^* = K - (p/\alpha)t + \frac{1}{\alpha} \ln Q_t$$

To convert this expression to one for actual employment, Brechling and Ball and St. Cyr use the simple partial adjustment model:

$$\ln E_t - \ln E_{t-1} = \lambda (\ln E_t^* - \ln E_{t-1}) \quad 0 < \lambda \leq 1.$$

Most of the models estimated around this time were fitted to data for manufacturing industry. Macro-modellers needed an equation for the whole economy and most adopted the above

formulation. One exception, which became a central equation in the Treasury model in the 1960s, was that estimated by Godley and Shepherd (1964). This model postulated an asymmetric adjustment process:

$$\begin{aligned} E_t - E_{t-1} &= \gamma (E_t^* - E_{t-1}) & E_t - E_{t-1} < K \\ &= \alpha + \beta (E_t^* - E_{t-1}) & E_t - E_{t-1} > K \end{aligned}$$

with $\alpha > 0$ and $\beta < \gamma$. Godley and Shepherd employed an iterative technique; maximum likelihood estimates, together with a number of amendments to the specification¹, were provided by Pesaran (1973).

Thus the basic model which appeared in the early 1960s had three components: a) a derived demand equation for desired labour input (given by the production function), b) a behavioural relationship from which to infer the balance of input between employees and average hours (the cost equation and its minimisation), and c) a simple partial adjustment mechanism. But, in the late 1960s, this accepted, albeit very simple, specification began to show signs of instability, firstly yielding poor predictions and then (as time passed) parameter estimates which varied according to the data used.

2. Initial reactions to instability:

The main characteristic of the post-war period to the mid 1960s was that it was regarded by most economists in the UK

1. The model was specified in terms of logarithms and K put equal to $\alpha\gamma/(\gamma - \beta)$ to ensure continuity.

as a period of 'full employment'. Not surprisingly, therefore, the first reactions were to appeal to supply constraints. Attempts were made to introduce the capital stock explicitly or to appeal to accelerations in trend productivity; the rapid upswing of 1963/4 was a prominent date for the break in trend. But these did not provide more stable relationships.

The difficulty was that new observations were having a substantial impact on parameter estimates. So the next element to receive attention was the adjustment process. Instead of the simple mechanism, equations were estimated using freely-estimated lag structures, rational lags and Almon lags, all to very little avail; although these results tended all to point toward some acceleration in the adjustment process.

But now people were becoming aware of the deflationary impact of the July 1966 measures and monetarism was gaining ground in the UK. Following analyses of the rise in unemployment and the shift in the unemployment-vacancy relationship, reductions in labour hoarding (see Taylor (1976)) and voluntary reductions in the supply of labour (see for example Foster (1974)) were seen as indications of a change in labour market behaviour, the particular impact of which had been to externalize the supply of labour to individual firms.

At about the same time, the Labour Government's incomes policy broke down (1969) and inflation accelerated. This brought out a rash of analyses including the real wage and relative factor prices. Some of the analyses did not incorporate these variables directly but estimated accelerations in productivity and explained these by wage variables. These

analyses, together with those relating to changed labour market behaviour, are summarised in Hornstein and Tarling (1976).

This paper used data which included the massive upswing during 1972/73. Its findings were similar to those of many other analyses around at the time, showing that the evidence was consistent with reduced labour hoarding (the reductions being over short periods, generally downswings) and perhaps an associated increase both in the speed of adjustment and the long-run elasticity of employment to output.

3. In the deeper recession since 1974:

There are some facts which have become increasingly apparent and have an important bearing on recent developments. Firstly, changes in the number of employees have been very small given the changes in output, even over long periods, and there has been considerably more variation in short-time working and average overtime. Taken together, these pieces of evidence suggest a sluggish response of labour input to changes in output. Partly because of this, but not solely so, previous relationships (generally taken to mean estimated on data from about 1955 to 1973 or 4) produce residuals since 1974 consistent with the view that the trend growth of productivity has slowed down.

What are the explanations being put forward? Real wage changes and simple productivity trend changes are inherited from the past; institutional factors have become relevant with the introduction of the Temporary Employment Subsidy and the

Employment Protection Legislation; and a more promising area of analysis, developing recursive models for employment and hours worked (see Peterson (1978)). This latter approach to the problem seeks to give greater empirical support to the cost-minimising behaviour first suggested by Brechling. The basic hypothesis remains the original one, that is, that variations in overtime are relatively cheap when productive hours exceed normal hours but, when they are less, it is expensive to retain labour: the fixed costs of hiring and firing have increased dramatically relative to overtime rates and hence have greatly strengthened the case for this kind of argument..

These, or similar, explanations can be found in other countries where the recession has had similar effects on changes in employment-output relationships¹. One additional explanation, which has received much more attention in the US than elsewhere, is that unemployment exerts a disciplinary effect on the labour force (see, for example, Oster (1979)) through an increase in shop floor discipline and/or in the productive effort of employees.

However, all attempts to embody these explanations in explicit structural hypotheses can be seen as simple amendments to the Brechling/Ball and St. Cyr three-equation model. Take, for example, the disciplinary effect of unemployment, variations in the adjustment process associated with the pressure of demand, or changes in the long-run productivity trend associated

1. See Bolle (1979) on Germany.

with the pressure of demand. These effects can be built into the three equations: the employment-hours equation, the simple adjustment process, and the desired demand for employment equation, respectively. Given the data limitations that we face, the reduced form which we can estimate will not discriminate between these hypotheses¹, but more importantly each modification is an attempt to salvage the conventional model. Not one of them has been developed within the context of a properly specified model of the labour market - that remains the market clearing equilibrium model of neo-classical economics; there has been no challenge to the theoretical basis of the conventional model, which could offer a realistic alternative, despite major revelations about the character and operation of the labour market provided by labour market segmentation theory and a host of micro-economic studies.

1. Our ability to test dynamic specifications have been greatly improved by the work of Hendry and Mizon (1978) and Sargan (1979).

B. The failure of the conventional model

4. The structure of a labour market model:

The first attempt to develop a model was that of Holt and David (1966). This was supposed to represent the dynamics of the labour market and to show the existence of an equilibrium. The basis of the model remained the conventional neo-classical assumptions and the major flows in the market were described by functions whose derivatives with respect to endogenous arguments were well-defined. The model therefore offered no advance in terms of specifying precise behaviour nor describing disequilibrium changes. Another attempt, developed in fact along similar lines, was that of Wickens (1974). He was concerned to justify theoretically the partial adjustment model in conventional use - but this was only done for a single representative firm and again there was no advance in understanding dynamics and disequilibrium behaviour. Naderi and Rosen (1973) also attempted a behavioural explanation for factors of production within the same framework.

In a previous paper (Tarling, 1979a), I have attempted to provide a model to establish a theoretical basis for an asymmetrical adjustment process of the type suggested by Godley and Shepherd. It can be shown from that analysis that, even retaining atomistic markets and homogeneous labour, the existence of voluntary quitting and differences between gross recruitment and gross redundancies are sufficient qualities of the model to give rise to a variable adjustment process:

that is, a model of a labour market where the degree of flexibility varies with the pressure of demand for labour (see Garonna (1979)). A rather unpleasant finding of that paper was that structural models of the labour market are likely to be mathematically intractable if behaviour is governed by flows and probabilities; and that, even when simplified to become tractable, the demands on data availability are unlikely to be met.

But all of the papers have a common set of relationships which are highlighted as crucial. I shall set these out below as (2), (3) and (4); there is one additional set which I regard as crucial and precedes the other three. These four areas in a structural model of the labour market are:

1. The relationship between the demand for output, market structure, technology employed and the demand for labour services.
2. The relationship between the demand for labour services and the demand for employees: this is principally concerned with the restrictions imposed by technology and the buffer adjustments made through average hours of work. In fact, it is easiest to think of this relationship as that part of the adjustment to meet the aggregate demand for labour services that can be achieved by a single firm - an internal adjustment mechanism, by which each firm has a desired recruitment or redundancy flow.
3. The behaviour of that part of the labour market external to individual firms. The gross demands for employees, which comprise desired net stock changes and replacement of voluntary quits, are matched in whole or in part by the gross supply, which includes the voluntary quits, the unemployed and the new entrants: what is important is how people choose to apply for jobs, how employers choose amongst applicants and how much discrimination there is affecting these choices.

4. The determinants of the supply of labour, including the extent of concealed unemployment (potential employees) outside the observed labour force and the endogeneity of migration flows.

It is easy now to show why the conventional model of employment demand might prove to be unstable. First, remember that its theoretical basis depends on an atomistic market and either homogeneous or, at best, non-competing homogeneous groups. The theoretical basis then can be seen as containing an explanation of (1), through an inverted production function with exogenously given output, and of (2), through cost minimising behaviour providing an adjustment internal to the firm through average hours worked. There may also be an element of (3) giving some external adjustment through search behaviour of quits. But, otherwise, markets are assumed to clear - they must, given the basic assumptions of the approach. When examined closely, however, the demand for employment in the conventional model, and in subsequent expositions with more detailed adjustment costs (see, for example, Nickell (1978)), is still a desired demand; it is realised only by virtue of the fact that markets are atomistic and hence clear. Because the analysis is carried out for a single representative firm, there is no aggregation problem; friction in the realisation of desired demands can only be introduced by search models using discrete time.

There is a growing body of literature to fill this gap on implicit contracts, particularly as regards the state of employment. The fundamental proposition is that individuals seek to stabilise their income streams: wages in employment

contain a risk premium for potential unemployment and individuals are covered by unemployment insurance. Recent work in this field, see for example Grossman (1979), overlaps with other theories of non-clearing markets; they are nevertheless of the neo-classical genre.

When the assumption of atomistic markets, particularly for labour, is dropped, then there are a multitude of reasons why conventional models of employment will give unstable estimates. In terms of the framework of four areas, variations in market control under (1) could change the relationship between output and the demand for labour services; changes in internal labour market structures could, under (2), alter the relationship between the demand for labour services and the demand for employees; under (3), a change in volume of voluntary quitting could alter the relationship between desired and realised employment; and, under (4), an exogenous new entry of unskilled labour could alter the recruitment policies of firms. These are just a few examples - and they are all additional to those, summarised in section A, which appeared when the conventional models became unstable and which are a priori just as plausible.

The failure of the conventional model is therefore its inability to cope with oligopolistic market structures, with the empirical findings of labour segmentation theorists, and with the heterogeneity of firms' hiring and firing policies observed in detailed micro-economic studies. If these factors, which are now well documented in the literature, could be regarded as exogenous, in the same way as institutional and

social changes are seen by many economists, then perhaps we could modify the conventional model to meet these failings. But there is a growing body of opinion which regards many of these phenomena as endogenous, with crucial interrelationships within and between economic, social and institutional development.

Perhaps such a statement is opening a floodgate which will drown any attempt at an integrated approach in a sea of complexity. But, because of the growing body of evidence contrary to the conventional model, we must make some attempt; the alternative confines the macro-economic modeller to the role of fiddling residuals, potentially the most dangerous form of ad hocery.

C. A more general approach

5. The economic philosophy:

In this section, we will attempt to develop a wider explanation of behaviour under each of the four headings outlined for a framework in the previous section. But, before doing so, it is appropriate to question the philosophy underlying the presumptions about behaviour.

The conventional model, discussed in the previous sections, is concerned with the search for efficiency in a world in which individuals make simultaneous choices, rational, fully informed or otherwise. The profit motive (or cost minimisation in the short run) is presumed to operate the drive towards efficiency in the presence or absence of barriers to perfect competition. Monetarism is simply an alternative model of general equilibrium in this world. The polar philosophy is that of Marx, expressed in his writings as behaviour governed by power, authority and control as the means to achieve accumulation: for a recent view, see Braverman (1974). The dogmatic Marxist school is therefore asserting behaviour designed to maximise exploitation and the ensuing class struggle is caused by resistance to control.

But the world in which we live does not fit nicely into either of these paradigms. Not all firms are technologically efficient nor cost minimising and many do seek to exert control over the labour process. On the other hand, the ability to

use power, to legitimate authority and exert control is not independent of the technological and competitive environment in which firms operate. Of course, each of these paradigms has their bastards which are better approximations of the real world - but each retains its parental philosophy. None deny the centrality of the process of accumulation - but how does this process take place?

Institutions and social attitudes are generally accepted as rigidities in the competitive structure of the economy: probably as a consequence, many explanations of their effect assume that both are relatively static. But there is growing evidence that institutions evolve and social attitudes change quite quickly so that there is need to look for interaction. The main element in the following discussion is the role of the product market in explaining this interaction and governing the degree to which efficiency and exploitation can be invoked as the means in the process of accumulation. The discussion is focussed in this way on the subject of labour market segmentation: for a recent discussion of the literature, see Rubery (1978).

6. Market structure and variations in demand:

Consider first a single firm. Each firm receives from the market for its output demands for a volume of sales. These demands come either from a wholesaler, a retailer, a producer using the product as an input, or direct from the consumer market. They are met either by a change in stocks

of finished goods, a change in production, a change in price or some combination of these. Changes in the volume of production require changes in the use of inputs. In the short run, capital is a fixed cost but, in the long run, it is not and the technology employed may change: for a given technology, part of the required labour input is a fixed cost, either complementary to capital or providing administrative and marketing functions invariant with the variation in production or sales but the remainder of labour input is a variable even in the short run. Costs are therefore borne by firms either as overheads or as variable costs: variable costs, for a given production process, are given by the volume of production but overheads are a charge against profit on the current volume of production.

This very simple statement of the nature of costs (much better expressed in the classical treatises) suggests that there is no reason to doubt the rationality of short-run cost minimisation by employers. But, in oligopolistic markets, employers can spread or reduce overheads by gaining control of their markets and attempting to control the variability of the demand they face. Thus, there are examples of industries, such as footwear manufacture and food manufacture, where a few or all firms have integrated the wholesale function and in some cases the retail function as well into the enterprise (Ward (1973)). Ownership of the retail outlets, particularly with a large market share, not only eliminates wholesale and retail margins but also allows the producer to control his level of production at the expense

of the consumer. Such attempts at gaining or maintaining market control generally are associated with undercutting, price/discount wars, factoring of imports and considerable inter-firm competition within the same industry - that is, fragmented competitive behaviour between employers. But there are also examples of cohesive industry-wide action to maintain market control within a complete domestic industry: for example, the jute industry successfully protected itself against imports through the combined influence of a strong employers' association (Craig, Rubery, Tarling and Wilkinson (1979)).

When market control cannot be gained or variations in demand are too large, the behavioural assumption of cost minimisation requires that employers look for ways of shifting costs onto inputs; labour is the one input best suited to bear the costs. Such shifting of costs is achieved by increasing the elasticity of labour input and reducing the fixity of labour costs, when demand declines and reducing turnover costs when it rises. In conventional segmentation theory, this means a decrease or increase in the importance of internal labour market structures; more generally, it is a reduction or increase in the labour input adjustment achieved within an individual firm by changes in utilisation (or productivity) of employees and an increase or reduction in the net outflow of employees.

Product market control can be seen therefore as an attempt to reduce competition among producers by controlling entry and distribution. Passing the costs of adjustment

forward onto the consumer is however a risky activity since it requires the erection and maintenance of barriers to entry and control of the majority of the distribution points in the market. Such control is achieved generally by merger activity or cartelisation of a market. Merger activity gains market share over existing producers and raises the scale of output and distribution, thereby lowering unit costs through economies of scale and eliminating the threat of competitive new entry. It does however create, as a byproduct, a secondary market; one characteristic of large scale production is that it depends on large batch or continuous flow processes and hence leaves room in the industry for small firms catering for small batch or irregular specialist production orders.

Mergers can be seen as 'aggressive' or 'defensive'. Aggressive mergers are attempts to extend market control by absorbing existing producers, and may or may not be accompanied by rationalisation. Defensive mergers are, on the other hand, attempts to maintain market share, generally in the face of foreign competition in domestic markets. From the point of view of their impact on employment, it is important to know whether mergers are to achieve vertical integration, diversification of activity and/or markets, or increases in the scale of existing processes.

The major threats to market control come from changes in input costs, changes in international competition and changes in technology. Input cost changes generally affect all firms in an industry to a similar extent: when there are dramatic changes, market share gains can be made either by

being able to control average unit cost of the inputs, as possibly in the case of labour, or being able to switch away from the input, such as switching out of oil use in the early 1970s. One defence against international competition already mentioned is the defensive merger; an alternative is to diversify into other markets or specialise generally in quality products in the face of penetration of the market for mass-produced goods.

Technological advance is perhaps the one process least understood. In a neo-classical world, information is freely available and there are few if any barriers to attaining the technological frontier. In Marxist analysis, the advance of technical progress increases the control of the capitalist class over the mode of organisation of production. Historically, inventors tended to become entrepreneurs in their own right, primarily in order to retain control over their innovation and hence their market power. More recently, expenditures on research and development have increased and it is generally developments indigenous to enterprises which have the major impact; the information on the 'blueprint' is in fact probably diffused by the act of consumption (as argued by Gomulka (1971)). The initial benefit of a technological advance is a gain in market share; but there is no guarantee of maintaining the lead in the longer run.

Thus, the demand for labour services is dependent on the product market in a very complex way. It is not simply a question of the variations in the volume of demand but more the ability of the producer to maintain control over his

market share and the speed with which he can alter his average unit costs of production. Market control is achieved by merger or a technological advantage but, given that most inputs except labour are more or less complementary with the technological process and variable with the volume of production, the most important element in a firm's ability to adapt is the fixity of his labour costs.

Let us consider three cases. First, consider an expanding market for the output of an industry. It is probably worthwhile to distinguish two cases: where the expansion is due to penetration in export markets and where the expansion is due to competitive advantage in the domestic market (e.g. a relative price change due to technological advance increasing the market by attracting demand away from substitutes). Second, consider a declining market. Again, let us separate two cases, one where the decline is due to decline in the total market for the commodity and the other where the domestic market is heavily penetrated by imports. Third, we can consider a stable market, either open or closed in terms of foreign competition.

In the case of an expanding market, there will in general be a core group of firms who either made the initial advance in product design, made the breakthrough in international markets or began with an aggressive merger and rationalisation to achieve a competitive advantage. In general, unit costs will decline as a result of economies of scale and/or rationalisation and hence the demand for labour services will rise more slowly than output. But it becomes crucial to minimise labour costs to maintain the advantage. Other firms in the industry

without the competitive advantage are at least initially unlikely to face a declining level of demand as well as the decline in market share. But the threat is there. Two alternative strategies are possible (there are probably more). Either the firms attempt to compete by merging - which is unlikely to be successful given the initial gains of the core - or the firms can attempt to carve out for themselves a specialist market, either in quality products or by specialist or small batch production servicing the core firms. In either case, the level of demand is variable and uncertain; hence a need to increase the flexibility of labour costs.

The primary difference between an international and a domestic expansion lies in the effect on non-core firms: in the former case, the level of demand initially is less likely to decline than in the latter case and hence many firms remain reasonably profitable and potentially able to adapt.

For a declining market, the difference between total market decline and foreign penetration is likely to be the speed at which the domestic market decreases and hence the time available in which to adapt. Slow market declines may again generate mergers, this time defensive, and create a core and secondary sector of firms. If successful mergers are made, then the bulk of the decline may be borne in the secondary sector. Import penetration means fast decline and, particularly in recent years, very little opportunity to compete because of the enormous differences in unit costs. Mergers and other forms of rationalisation are unlikely to improve the competitive position: some firms maintain their

market control by factoring the imports, particularly where the good may be considered as inferior if marketed by country of origin, but this is not a long term strategy. Import penetration on this scale is nearly always in mass markets of bulk orders and thus does leave room for a domestic sector producing quality goods and small batches.

Once again, the secondary sector (which may be all that remains in a penetrated market) always requires flexibility of labour cost. But, in the case of declining markets, there is less obvious reason for core firms to internalise labour cost, that is, a primary sector in this case may well have less fixity of labour cost than a primary sector in an expanding market.

We have argued that changes in market size for an industry's product will tend to create a core or primary sector and a secondary sector: the former is characterised by a greater desire for labour cost fixity than the latter. Because the technology employed in the primary sector is generally more advanced, more rationalised or on a larger scale, a greater degree of labour cost fixity does not eliminate its competitive advantage, although the degree of fixity may be limited by the degree of competitive advantage held.

A stable market, with constant shares and slowly changing levels of demand, will in general have already inherited some kind of industrial structure involving a core and secondary sector of production. The level of unit costs is probably a function of concentration but there should be a fairly stable

relationship between changes in demand for the output of the industry and the aggregate demand by the firms in the industry for labour services. This will not in general be the case for an industry where market size is changing rapidly or market shares are changing.

Thus the demand for labour services in an industry is a function of the size of the primary sector (perhaps proxied by concentration) for a given technology and it can be expected to change in line with production except where market shares and market size are changing. Changes in market shares, reflecting increased concentration, will be associated with declining unit labour costs on average but the effect will be greater the more rapid is the growth of market size. Decreases in market size will tend to raise the average unit labour costs in the industry most when concentration is declining as mass producers are eliminated by foreign competition and least when there are defensive mergers.

All of this discussion has been as if we were dealing with a single industry. However, the aggregate industrial mix is important, especially as regards the balance of intermediate, capital goods and consumption goods producers. Apart from the variations in average capital intensity of production, the extent of vertical integration or disintegration in the whole production process for a commodity affects the degree of market control which each producer has and the degree to which he can pass costs forward or backwards in the process.

In the discussion of market control, little was said about cartelisation of markets or about unity of interest among

enterprises. The ability to cartelise a market or to form a strong employers association is obviously of considerable importance in determining the extent of market control. Whilst the literature contains some discussion of the formation and stresses of cartels, very little has been written on the origins and strength of employers association. One factor implied by the above discussion is that employers associations may be formed or given unity of interest by external or internal threats to market size or market shares. For example, the threat of import penetration and the technological changes resulting from the use of polypropelene caused concerted action in the Jute industry: by contrast, however, threat of import penetration led to conflicts in the employers association in Cutlery and an increase in internal competition. To some extent, the outcome may be explained by the traditional perspectives of the associations: in particular, those derived from trade associations (generally the case in Clothing and Textiles) are more concerned with market development and protection whereas those with a long history of technical change and strong trade union presence are more oriented towards industrial relations. Thus, some are relevant to the discussion in this section and influenced by the product market whereas others are perhaps more relevant to the discussion in the next section.

By defining primary and secondary sectors above in terms of market control and flexibility of unit costs of production, we have greatly simplified the wider debate of labour segmentation theory and the problem of low pay. In the study by

Craig, Rubery, Tarling and Wilkinson (1979), the following findings emerged (p. 41):

'Secondary industrial sectors in the industrial structure vary in function and character from being active and successful competitors with primary sectors (baking and cutlery), providers of complementary services and products (paper box), bearers of primary sector risk (stamped or pressed metal-wares) or the remains of a now obsolete industrial sector (jute). Secondary industrial sectors should thus not be viewed as residuals, or marginal or peripheral industries.'

This follows a definition of secondary sectors (p. 33) as those which

'offer low wages, insecure employment prospects, and informal payment structures; minimum rates are determined either by the market or by some system of regulation at the industry level (minimum wage laws or national voluntary collective bargaining agreements). Firms in the secondary sector are small, traditional, use labour-intensive traditional technology, and are subject to competitive product markets which are often in decline or cyclically unstable. Unionisation is weak, and there is little local bargaining.'

The simplified definition adopted earlier is appropriate as a static classification. The report quoted above shows that the wider definition must be used when analysing the dynamic and interactive process of development of market and industrial structure, and the institutional framework associated with these structures.

In particular, low pay and unstable employment conditions exist in different industries for different reasons. From the quoted definition of secondary sectors, we can pick out aspects and relate them to the product market environments described

earlier: that is, different product market environments would lay emphasis on different factors in the definition of a secondary sector. Each implies a different relationship between output, unit labour cost and employment, something which must ultimately be taken into account in a macro-economic relationship.

The foregoing discussion shows that, even in analysis of the short-run behaviour, it is not appropriate to take output as given. The conventional models do and so do the more institutional arguments based on defining employer/employee strategies. We have argued that the degree of market control, both in the short and the long run, is of crucial importance in determining the nature and flexibility of labour costs desired by the employer. Strategies by either employers or employees must therefore be placed in the context of the product market.

7. The demand for labour services and the demand for employees:

In this section, we will be primarily concerned with the behaviour of individual firms in differing market environments. The principle subject is the area generally referred to as 'work organisation' and its relationship to the fixity of labour costs and technology.

a) From the employers point of view:

In the previous section, attention was focussed on the conditions in which firms could exercise market control through the product market or through the labour market. Growth of

markets, market shares, international competition and new technology were all seen as important elements in the discussion of when firms might enhance their competitive position. Very little was said about how firms might achieve the changes. We described the different ways in which markets may change and suggested what the responses would be for individual firms and how that may alter (and determine) the industrial structure. Two responses, one by the introduction of new technology and the other by merger activity, were designed to gain a competitive advantage by lowering unit costs of production: merger activity was also seen as a potentially defensive act to mitigate the impact of increased domestic or foreign competition. The third response was by firms who were (because of unfavourable competitive conditions) without any substantial degree of control in the product market and hence were forced to maintain a competitive position, almost on a day-to-day basis, by achieving flexibility of unit input cost. But there is also an additional category of firms, who almost independently of product market conditions, can establish secondary employment conditions and hence flexible labour costs because of the existence of appropriate labour market conditions and labour supply.

b) From the employees point of view:

The view above is taken largely from the employers side, with efficiency as the motive for aggressive product market behaviour and exploitation as the motive for defensive market behaviour. What then is the response of labour? Not surprisingly, the attempts to reduce unit labour costs bring

about a more militant response the more existing employees have to lose. Thus, when new technology is introduced or mergers contemplated in static or declining markets, the implication of a net loss of jobs has a major effect in determining the degree of resistance. Resistance is not necessarily confined to the firm or firms involved but may well be industry-wide. It is unlikely that the additional earnings (if any) of those who remain in employment will be enough to secure acquiescence by the majority to the change: although the introduction of redundancy payments has undoubtedly influenced a few decisions. When the number of alternative jobs is increasing, resistance will probably be much less: this is particularly true when alternative employment can be found within the same enterprise since the costs and obstacles to mobility are much reduced in general. But the resistance also depends on the extent of plant, enterprise or industry union organisation of the affected labour force.

The ability of firms in the secondary sector of an industry to achieve the required flexibility of unit labour cost is frequently associated with the absence of unionisation of the affected section of the labour force. Although many of these firms have skilled or semi-supervisory operatives who may well be unionised, the bulk of the operative labour force is obtained from new entry to the labour force or highly mobile sections of the labour force, such as young people, married women and immigrants. There are also examples where craft-based unions have survived who, because of their aristo-

cratic pretensions, have created and perpetuated a more tenuous relationship with employers which enables a greater flexibility of employment. But the major obstacle to organised resistance to change is the fragmentation of employment and the high cost of organising the labour, reinforced by the 'family ethic' generated in many small firms.

Thus the ability to achieve change, either in the long run or in the short run, depends on the degree of unionisation. This organisation of labour may be (and generally will be) the formal trade union organisation but resistance may also be found because of a perception of community interest by the employees affected by changes. However, to appeal to trade union organisation is not constructive. We know that membership changes and that the motives and cohesion of the rank and file are not given independently of the environment. Thus we must discuss the factors which determine the degree of organisation among labour forces in different industries.

c) Bureaucratic structures and internal labour markets:

There is an abundance of literature, both in the field of industrial relations and in sociology, which discusses the structures of bureaucracies and the hierarchical control over the production and work process. But relatively little of it is concerned with its evolution and development. Most of the arguments are centred around the issue of control, for a variety of motives, but seen as ways of containing the conflicts without reference to the power and authority of specific interest groups in specific situations. And yet the relative strengths of employers and employees in

industrial conflict must be explicable in terms of the factors which underlie the unity of interest groups. For employers, we have already argued that these factors are to be found in the market structure and changing competitiveness. For employees, we must look at the previous history of the division of labour and the social history of groups of employees.

Some very interesting historical studies have been written, particularly by Zeitlin (1979) and by Elbaum and Wilkinson (1979). The broad conclusion to be drawn from these studies is that an active role is to be accredited to employers with respect to market factors and employees are passive - their underlying unity lies in the long run issue of control over the work process and it is this degree of control which becomes threatened by employers responses to market factors and stimulates a response.

Weber's theory of bureaucratic structures is of little use in this context since it does not relate to technology employed. Woodward (1970) however, has attempted a mapping between hierarchical structures and technical complexity of the activity. The hierarchical structures are characterised by

1. the levels of authority in the managerial hierarchy,
2. the span of control (number of subordinates),
3. the span of control of the chief executive,
4. the ratio of managerial and supervisory staff to total personnel,
5. the ratio of indirect and ATC labour to hourly paid labour,
6. the amount of written communication, and
7. the specialization of the functions of management.

Characteristics 1, 3, 4, 5 and 7 map in positive relation

into technical complexity of the production process whereas characteristics 2 and 6 increase and then decrease again. The production processes range from simple unit production through small batch, large batch and mass production to continuous flow production. In essence, it is being argued that more uniform inputs and routinized work flows, particularly those which can be deduced from a set of rules, are associated with more centralised and formalized structures, whereas tasks which are difficult, complex or unusual are generally associated with decentralised structures. This approach will give rise to a polymorphism of organisations such as we observe but it reads nonetheless like a management blueprint.

To some extent, the same criticism can be made against the theory of internal labour markets discussed by Doerringer and Piore (1971). Internal labour markets are characterised by limited and selective ports of entry, clearly defined promotional and career hierarchies, explicit systems of reward, commitment of employees to the enterprise and limited mobility out of the market. The characteristics of internal and external labour markets can fairly easily be amalgamated with Woodward's bureaucratic variables and technical descriptions to give a reasonable description of the wide variety of organisational forms found in practice. However, some of the arguments underpinning internal labour markets have a specific interest to the argument developed in this paper. The development of internal labour markets in order to minimise transaction costs in labour and induce more productive effort (or at least less absenteeism) can be seen as motivated by cost considerations

by employers whereas the workforce accepts the structure because of the employment stability it provides in the short run and for the future, as well as potentially higher pecuniary rewards and a greater degree of worker organisation (at least over the workforce if not over the production process).

From this discussion, we begin to see how it is possible to integrate market factors with work organisation. Technical change requires a modified bureaucratic structure which in turn seeks to create or alter institutionalised employer-employee relationships, loosely termed above as an internal labour market. The response of employees will depend on the segmentation of the internal labour market (which will be a function of the historical changes in the division of labour) measured by the absence of overlapping interests for different groups and on the extent to which the existing hierarchy of employment structure has been socialized outside the workplace as part of the social hierarchy.

According to Doerringer and Piore (1971), the main characteristics of the internal wage structure are the authority vested in it by job evaluation, the use of community wage surveys and engineered production standards. The purpose is to grade the jobs, assess whether these are reasonably competitive (at least locally) and possibly to introduce merit or payment by results schemes. The latter two are clearly motivated: reasonable wage levels ensure minimum attraction of jobs outside the internal labour market structure and PBR systems, by setting a fairly low standard output level, give satisfaction within the existing structure. However, job

grading is a major area of dispute. Whilst the purpose in general is to establish a definite and easily observed hierarchy of jobs, the system is in principle open to abuse by the employer as a means of controlling his costs. There are some good examples of job regrading in response to the Equal Pay Act in the UK, in which new grading structures have effectively maintained the division of jobs by sex and the relative pay levels. Overall, however, the internal labour market structure, so long as it remains relatively closed, provides for the employer a stable unit labour cost which can be predicted in the short run with a reasonable degree of certainty.

Doerringer and Piore pick out eleven instruments of adjustment: 1) wage and nonwage compensation, 2) internal allocative rates, 3) the job structure, 4) managerial procedure, 5) job vacancies, 6) subcontracting, 7) overtime, 8) hiring standards, 9) recruitment procedures, 10) screening procedures and 11) training. They suggest that instruments 1), 2), 3) and 4) are governed by workplace custom and 'are part of decision processes largely unrelated to the resolution of labour market imbalances'. The remaining instruments are frequently used and 'selection among these instruments approximates their relative costs and benefits'. 'This view suggests that there are limits to the rate and volume of labour force adaptations which the internal labour market can provide at any point in time, and emphasizes the costs of the adjustment process.' It should however be recognised that the difficulties of adjustment are greater than those

envisaged by Doerringer and Piore, particularly as regards reducing labour input. Action on job vacancies is limited by promotion aspirations among employees, overtime is recognised as a relatively permanent part of weekly pay and subcontracting is only feasible if the employed labour force can be reduced. The remaining elements, dealing with recruitment standards and procedures, together with training, do not allow a great deal of change in the stock of labour. Thus internal labour markets are only feasible when the demand for labour input is reasonably stable: too much strain on the structure, through attempts to increase or decrease the labour force quickly and by large numbers, will almost certainly undermine the acceptance of the rules of the structure.

We have already suggested that technical change imposes a substantial strain on employer-employee relationships, whether institutionalised or not. But, having discussed internal labour market structures, we can see that those structures contain little flexibility through which to cope with substantial technical change. It is evident from the empirical literature that technical change is not in fact used by employers either to increase the division of labour or to de-skill the workforce: these may be outcomes but the essential ingredient of the decision to implement is the standard assessment of cost savings. However, it is becoming increasingly clear that implementation of technical change in an institutionalised workplace structure is no easy matter. The provision of alternative employments for displaced workers

helps to alleviate the stresses, especially when they are to be found within the same structure. But, where a net reduction in jobs is required, there is considerable opposition to the change which frequently is ultimately met by concessions to manning levels, operating speeds or maintenance and repair schedules. That is, a part of the anticipated cost-savings are not realised in order to implement the change. Thus technical change, at least in the context of institutionalised employer-employee relationships, is likely to achieve greater competitive gains in expanding product markets where the demand for labour is rising, out of the effects of the technical change.

We have argued above that internal labour market structures are associated with a high degree of fixity in unit labour costs and that the potential gains of technical change may be reduced by concessions to achieve implementation. How do industries or firms cope with significant variations in demand which require frequent and large changes in the demand for labour input? The answer which we have suggested in an earlier section is that they either subcontract the volatile or small batch/unit production element in their product demand or they must achieve a greater degree of flexibility in their labour cost - note that this is necessary for the subcontractor.

d) Flexibility in the use of labour:

The dual labour market theory of Doerringer and Piore argues that the labour market is divided into a primary and a secondary market. Jobs in the primary market possess

several of the following characteristics: high wages, good working conditions, employment stability, chances of advancement, equity, and due process in the administration of work rules. Jobs in the secondary market, in contrast, tend to have low wages and fringe benefits, poor working conditions, high labour turnover, little chance of advancement, and often arbitrary and capricious supervision'. By introducing queuing theory, they argue that the primary sector is characterised by an overlapping hierarchy of internal labour markets feeding when necessary from the potential supply of labour employed in the secondary sector. Furthermore, they argue that 'there are distinctions between workers in the two sectors which parallel those between jobs: workers in the secondary sector, relative to those in the primary sector, exhibit greater turnover, higher rates of lateness and absenteeism, more insubordination, and engage more freely in petty theft and pilferage'. These characteristics, it is believed, are either inherent or imposed by the job practice or imposed by primary sector employers (as a form of statistical discrimination), and hence the majority of these employees are confined to the secondary sector.

This contrast, or dual market hypothesis, is much too stringent a discontinuity to have much practical significance and also draws a line between job conditions much lower down the hierarchy than is appropriate to the argument of this paper. One question which the theory does raise which is relevant is the extent to which the jobs or job practices generate the characteristics of secondary sector workers or

whether it is that the individuals already have these characteristics. It is abundantly evident that there are disadvantaged workers, particularly those with physical or mental disabilities. Beyond that, however, empirical evidence appears to be circumstantial and the employment histories of other so-called disadvantaged groups may be a consequence of statistical discrimination rather than inherent employment instability.

It is however true that certain groups in the labour market have a relatively weak attachment to the labour force or to particular jobs. The young, particularly those without educational requirements, use job mobility as a way of progressing and gaining on-the-job training; the older age groups may be near retirement or even post retirement or in receipt of an occupational pension and hence uninterested in the continuance of the job; married women, particularly those with young children, seek only part-time jobs in restricted hours and may be prepared to work at lower hourly rates; and young women, either married without children or unmarried, have a high expectancy of leaving employment either at marriage or at the first confinement. Thus there are groups of employees who, because of their personal circumstances, either have a high expectancy of quitting or are prepared to work at lower rates of pay to secure the desired hours of work.

These groups of employees, together with migrant labour, form a pool of labour whose potential mobility and acceptance of the rates of pay can be exploited by employers seeking to minimise unit labour cost variations. Subcontractors, small

batch producers and service trades are frequently found to have senior skilled operators, of whom some or all will have a concession to staff status, who effectively supervise a shop manned mainly by employees from the above-mentioned groups. The subcontracting may even be at the level of home- or out-working, and may be organised by a craftsman, as is done by the 'little master' in the cutlery trade.

These are rather obvious ways of increasing the flexibility of unit labour costs, and are achieved by the flexibility in the employment rather than the level of remuneration. Traditionally, forms of remuneration such as piece rates, sliding scales related to product prices and task-rates (see, for example, Schloss (1898) for a survey of nineteenth century systems of pay) have provided the required degree of flexibility. But the development of a national wage structure and the emergence of administered rather than market determined prices reduced the flexibility in average wages. Where piece rates survive, their downward flexibility is now restricted by the extensive use of minimum earnings levels and, in the current recession, the reduction in the gains and importance of plant level bargaining. Thus the growth of real wage resistance and the squeeze on local settlements in recessions has greatly reduced the potential of wage flexibility.

The form of subcontracting and labour organisation in Construction is an interesting example of the achievement of labour cost flexibility. Traditionally, the establishment of craft-based unions created a system of information about

job availability within a specified occupational range. In the nineteenth century, there was a 'tramping' system for carpenters and a number of related craftsmen whereby the union provided support and information for an individual who moved from district to district in search of work. Although many craft-based unions have ceased to exist or been absorbed into general or industrial unions, internal labour market types of structure exist across firms within a specified occupational range and its origins can be traced back to the old tramping system. What these structures allow is a flexibility for the employer, and information about alternative employment in a market which has restricted rates of new entry. Thus, again, except for large changes in demand, such a craft-based system can provide greater flexibility to the employer and a semi-independent status for the employee. This has not prevented the creation of industrial internal labour market structures in Construction but these only tend to occur with sufficient guarantees of market demand for construction services, and very much seems to have depended on the growth of public expenditure.

Labour-only subcontracting, that is mobile workgroups, have recently become subject to criticism and attempted control as a result of apparent increases in evasion of tax and social security contributions. But evasion seems to have provided the incentive for the development of informal markets in both production and service sectors in a number of countries in recent years. The incentives are obvious: by evading the full cost of employees and any contractual commitment, the

employer achieves unit cost reductions and greater flexibility; by avoiding statutory deductions, the employees can increase their take-home pay, offer their services at lower gross rates and accept intermittent spells of unemployment.

e) Flexibility through hours worked:

The most usual form of adjusting labour input, particularly for small changes, is variation in hours worked - either changes in overtime or short-time working. The naive view of overtime is that it is a few hours added on at the end of the day, and perhaps a little weekend work. Whilst this is common amongst small-sized firms, it is replaced in medium and large-sized firms by shift systems, sometimes predicated by the technology (as in continuous flow processes or multi-staged production activities) or sometimes just a traditional form of working. There are numerous types of shifts, varying from the simple day/night shift through 3-shift systems, double-day shift systems and twilight shifts to the continental shift system. Except where demanded by the technology, the shift system is not a permanent and rigid feature but it is generally not possible to switch to and from a shift system because of the attitudes of the workforce. The size of the shifts (that is, numbers employed on each shift) can be varied, depending on the extent to which they are compatible with required work-group organisation, but in general the length of shifts are fixed, with the exception of the day shift.

Most of the overtime found among firms operating shift systems appears to be for maintenance and repair of machinery, although overtime may occur among warehouse and dispatch

personnel. In Engineering, for example, there is considerable need for machine maintenance and, even in small firms, this together with tool setting tends to be undertaken as overtime. Overtime, therefore, may well be a much less flexible instrument among large and medium firms, and hence in practice operates as an extra degree of flexibility in small firms and those bearing a disproportionate share of market variations.

There is a considerable amount of empirical work on overtime in aggregate - see, for example, Peterson (1978) and Coutts, Godley and Nordhaus (1978). These analyses show a cyclical sensitivity, albeit generally rather weak, and a compensation for a 1 hour reduction in normal hours by an additional $\frac{1}{2}$ hour overtime. Overtime therefore is not entirely an unrestricted instrument of the employer: it enters into the wage bargain where that is based on weekly earnings.

Furthermore, overtime may be a function of the level of technology employed. There are substantial differences in the amount of overtime in different industries which are presumed to reflect differences in technical processes. Thus changes in technology may change the required amount of overtime, either less because of more automation or more because of greater complexity. But the relationship between investment and overtime is ambiguous for an additional reason. Above, we have picked on an ambiguity for new investment: it is quite likely that a reduction in replacement investment may lead to a rise in overtime despite a decline in demand because of an additional need for maintenance and repair. Thus, overall there is no clear relationship between

technological change, investment or the variations in demand and variations in overtime. It is, however, fairly clear that it provides a greater degree of flexibility in the secondary than in the primary sector.

8. Differences between manufacturing, private services and the public sector:

The foregoing discussion on the flexibility of labour costs, and to a lesser extent the effect of product market changes, has been given mainly in terms of the manufacturing sector. It is now necessary to broaden the discussion to encompass the private service sector and the public sector. This we shall do in a rather circumspect way since such an extension of the debate raises a number of major theoretical debates; however, it seems better as an approach than the conventional one of assuming (asserting?) that the model, pragmatically defined for the manufacturing sector, is equally applicable to the economy as a whole.

a) The public sector:

In the service sector, either public or private, measured productivity change is dependent on a measure of output which in general does not reflect variation in the quality of service. Indeed, in the public sector, output is measured in terms of a constant price real wage bill, that is in direct relation to labour input. The growth of public sector services is a function of the ability of the public sector to appropriate resources whilst meeting certain monetary and balance of

payments targets. The precise way in which expenditure is varied depends more on the economic philosophy of the government than on the needs and improvement of social infrastructure. Thus, in the current UK climate, the emphasis is on cash limits, forcing a choice between employment and income. But, in general in the post war period, the fact that expenditure policy has not been related directly and uniquely to a measured need means that the quality of service has varied substantially.

Whatever policy is adopted towards expenditure, however, a demand for labour services is created which can be accommodated by specific groups within the labour force. Expansion of the armed forces creates a demand for young men in a period of their life when they would normally be training for private sector employment. Expansion of the health service either absorbs young unmarried women as nurses or older, frequently married, women as part-time employees on social welfare work. Expansion of the education sector required special training and hence reduced future mobility of prospective employees. And expansion of the administrative and executive grades absorbs potential executives and clerical employees from the private sector market and, it is argued, locks them into a career structure in the public sector.

Therefore, substantial changes in recruitment by the public sector will greatly affect the availability of certain types of labour (particularly young ones) to the private sector if the public sector is able to establish a prior claim or to offer more attractive employment conditions. On average, public sector employment is more secure, for both full-time and part-

time employees, than private sector employment. For part-time employees, the earnings are probably higher in the public sector because of the greater degree of union organisation and recognition, and the wider application of collective agreements. But, for full-time employees, public sector earnings may well be lower although varying significantly with the product market conditions in manufacturing insofar as that contributes to earnings in manufacturing: see Tarling and Wilkinson (1979) for a discussion of changes in the public sector/private sector earnings differential. On balance, there is probably always excess supply of part-time labour to the public sector but only excess supply of full-time labour during recessions. Thus the public sector can pre-empt supplies of part-time labour (as happened during the expansion of health and education in the early 1970s) but is likely to face recruitment problems for full-time employees when private sector jobs are available (as evidenced by shortages of teachers and police in the 1960s).

b) The private service sector:

Kaldor (1966) has expressed the view that a substantial proportion of employment in the service sector should be treated as overhead labour. This view clearly excludes occupations such as window-cleaning where labour input is direct and where demand is income elastic and price is market determined. Since price effectively equates to earnings, the supply of labour to these occupations may also be market determined.

The Kaldor view of the service sector postulates imperfect

competition with barriers to entry and a price which is a mark-up on the wholesale price of goods which are inputs to the service industry (the theory is best read as applicable to the retailing sector but does have a wider applicability). The gross mark-up on wholesale price, together with the throughput of goods, creates a gross margin out of which labour costs and other operating costs are to be met. This mark-up can be easily shown to be a simple function of the income elasticity of demand (Cripps and Tarling (1975)). In this sense, labour is an overhead and the volume of labour input depends on the throughput of demand and on average wage costs. In particular, variations in wage costs per unit of labour input are accommodated, *ceteris paribus*, by variations in the quality of service.

The difference between this view of the service sector and the view of the manufacturing sector is the absence of any technological complementarity between the level of activity and the demand for labour services over a wide range of variation. In the absence of changes in the relationship between unit wage cost and price, variations in throughput lead directly to variations in the amount of labour input. Throughput tends to vary positively with manufacturing production, although its more direct relationship to consumers' expenditure means that much of the cyclical variation is damped by savings behaviour and by sales of imports of finished goods.

It is now of crucial importance to explain the determination of wage cost per unit of labour input in the service sector since this will contribute significantly to the demand for labour input. In Tarling and Wilkinson (1979), we have

explained the importance of real wage resistance as the major factor in national bargaining. To the extent that there are collective bargaining agreements, most of which in fact are statutory wage council orders, wage rates will tend to move in line with the cost of living. But real wage increases should impose a squeeze on labour in the service sector unless collective agreements are not widely enforced, are not operative, or cheaper labour units are available. Thus the volume of labour input should vary positively with demand for the services but inversely with the rate of increase of real earnings. The exception to this is where marginal increments in labour input can be obtained at lower unit rates. Hence, in general, and especially if competition between services depends on the quality of service, the service sector as a whole will continually be seeking to employ increasing numbers of low cost labour. When the manufacturing sector is expanding, its demand for these low cost groups of labour is unlikely to rise, but in recession both manufacturing and service sectors will be seeking to employ low cost labour. Thus, it is not surprising that the characteristics of the unemployed in recessions are more akin to those of individuals normally employed in primary sector firms.

It is however important to remember that the primary/secondary sector distribution is essentially a product market one, based in large part on market control. It does not necessarily imply a 1 - 1 relationship with a similar division in the labour market. The relative absence of a technologically determined skill in the service sector may be adequate to explain

the greater preponderance of secondary employment conditions but these do not imply an absence of primary sector firms. A particularly important example is the retail food trade in which the development of supermarkets (and multiple chain stores in other trades) have obtained primary sector market control. It is possible that the greater opportunity for union organisation has increased the primary characteristics of employment but there is no evidence of a major switch away from the traditional sources of labour supply.

c) The informal sector:

Because of its very nature, there is little evidence of the extent and nature of the informal sector. Nevertheless, it is recognised to be of growing importance in most European economies. Its principal characteristics are the absence of recorded transactions, avoidance of tax and social security payments, and labour used where possible on a piece-rate subcontracting arrangement. Such activities in the construction and miscellaneous service sectors are well known and have been known for many years. In general, they have been seen as 'moonlighting': that is, a second job undertaken as a supplementary activity outside normal working hours or even in addition to drawing social security benefits. But the belief during the current recession is that a large number of people are involved now on a full-time basis.

To some extent, the development was explicable as a consequence of full employment. Each task was an individual agreement and generally involved the negotiation of a price for each new task. This small unit activity rarely attracted

much attention except when it became observable in a decline in administrative records. This was, for example, the case in construction where, mainly as a result of the Selective Employment Tax, there was a sudden surge in labour only subcontracting which the Government sought to control through legislative means.

But recent developments appear to differ in two major respects: labour is organised into workgroups and the activities are in direct competition with recorded activities. On this scale, it is difficult to discriminate between such activity and the more traditional activities of homeworking, outworking, sweatshops and subcontracting. There can be no doubt that the informal sector is simply an extension of secondary employment conditions and that this extension is to be found not only in service industries but also in the manufacturing sector (this is known to be the case in Italy: see, for example, Bruno (1979)). The employment conditions may be somewhat worse than for employment in recorded activities but this can largely be accounted for as the risk borne by taking the activity underground.

The avoidance of tax and social security payments is likely to give rise to higher take-home pay for the employee (perhaps describable as containing a risk premium?) and lower unit labour costs to the employer. The fact that gross unit labour costs are lower than for recorded activities means that employers do not necessarily seek even lower wage cost groups of employees in the informal sector. In practice, they will be in direct competition with employers in the

formal sector for the traditional low cost groups and may even be able to draw on groups higher up the hierarchy of the employment structure.

The extension of the secondary sector by the informal sector does not therefore necessarily imply any new sources of low cost labour. The lower cost is achieved by avoidance of costs borne in the formal sector and not through lower wages. Whether the growth of the informal sector is in addition to the existing formal sector with secondary employment conditions or simply part of it going 'underground' is not known: that is, we do not know if the demand for low cost labour is increasing faster or not. Nor is there any evidence on the origins of the informal sector: are primary sector firms involved or is it simply the result of employees' individual choices? Whatever its origins, the motive is clearly lower and more flexible unit labour cost and, once in existence, it is difficult to believe that those with sufficient control over their activities will have enough risk-aversion to revert to the formal sector when market conditions improve. It is not necessarily the case either that employees are insufficiently compensated at present for the risks and insecurity of working in the informal sector.

9. The supply of labour:

The traditional view of labour supply is that labour has a supply price. The foregoing sections have argued that the demand price for labour is reflected by average unit labour

costs, not by wage rates. But we must now decide whether those wage rates can in any sense be seen as the supply price of labour: that is, whether the segments of the labour market are created and cemented by demand factors or employer strategies only.

The neoclassical version essentially begins with the view that individuals have a utility function through which they trade leisure for income. Human capital theory adds new dimensions but the philosophy remains the same. On the other hand, there is the Marxist view of the reserve army, which is the result of capitalist division of work, deskilling of jobs and the homogenisation of labour.

In a study of wage determination (Tarling and Wilkinson (1979)), it is proposed that real wage resistance provides a floor to wage increases: thus real wage resistance can be said to reflect the increase in the supply price of labour already employed. But it neither sets the absolute supply price of the employed (except in an historical sense) nor does it provide any indication of the supply price of the unemployed and new entrants.

Primary conditions of employment provide for the employee some security of employment and potential mobility along promotion lines which have associated with them a wage hierarchy. For this reason, we could characterise these wage hierarchies by the wages at the ports of entry: this is not wholly satisfactory since differentials do change. To the extent that these hierarchies (at least the bottom level) are the outcome of collective bargaining, the floor to

increases is given by real wage resistance. Above the lowest level, expectations of promotion and the acquisition of employment-related benefits (including wage differentials) form the aspirations of employees and presumably determine the supply price of labour (in a wider sense).

Secondary employment conditions do not include these benefits and in general aspirations of wage change are formed without regard to the current job. Improvements in rates of pay are to be achieved by mobility rather than intra-firm promotion and with aspirations being determined by potential access to jobs with primary employment conditions.

The supply price of labour thus differs under the two conditions and, given collective bargaining and/or minimum wage legislation which reflects real wage resistance, the difference should generate greater mobility among secondary sector employees than among primary sector employees. It would seem on this argument that the rate at which aspirations are fulfilled (and revised upwards) will be a function of job opportunities in the secondary sector and of successful collective bargaining (such as under favourable product market conditions) in the primary sector.

The interesting question is what happens when real wages are cut and/or differentials are squeezed in the primary sector or when there is a shortage of secondary sector jobs so that aspirations cannot be met. Of course, someone will be unemployed - but the question is whether that unemployment will (in the sense of a well-defined supply price) be voluntary. The alternative is that aspirations are revised downwards, in

which case the underlying role of a supply price is of little operational use. We have couched the argument this way round because a situation of expanding job opportunities does not provide a test of the supply price: it is perfectly rational for individuals to seek to improve their lot. It is in a situation when earnings fall below the supply price that we have a test.

The evidence, such as it is, would suggest relatively little voluntary unemployment, and relatively little voluntary mobility when the pressure of demand falls¹. In the literature, there are explanations for this. The analysis presented above is a short-period one: by allowing individuals to look beyond a single period, and thus widening the concept of a supply price to be a flow of incomes, the absence of voluntary mobility when short-period aspirations cannot be met is no longer a puzzle. But the post-war period hardly provides the conditions required for a test of the supply price hypothesis. Recently there have been decreases in real wages and these have not generated additional voluntary mobility (perhaps because of rank and file acquiescence to incomes policy targets).

This discussion of the supply price of labour for the employed (which applies equally to the unemployed) argues that a well-defined supply price does not exist: as long as aspirations are flexible and the rational choice of employment rather than unemployment dominates, the supply of labour does not decrease for economic reasons, although it might

1. Tarling (1978): note that benefit-induced voluntary unemployment is again rational with the benefit level providing a floor to the supply price.

well do so for social, institutional or demographic reasons.

There are three categories of the employed for whom the above conclusion may not hold. These are potential migrants, either from the indigenous population or recent in-migrants, near/post retirement employees, and married women. Potential migrants do not necessarily have to reduce their aspirations because of current domestic employment conditions: employees with alternative incomes (pensions or household income) may decide that, at current rates of remuneration, the net benefits from employment are very limited.

All three categories have a supply price determined by alternative incomes. If, however, external conditions are not attractive to potential migrants, it is unlikely that they will behave any different from the rest of the workforce. But the other two groups, people over pensionable age and married women, may simply be in employment to earn 'pin money': that is, they make rational decisions about employment. However, for all three categories, a definition of the potential labour force (possibly conditional on the supply price) would include these groups so that they should conceptually be regarded as economically active in a complete set of demographic accounts.

The major class of new entry is young people, nearly all of whom are the output of the different levels of the educational system. To them, we might add older women entering the labour force for the first time - although most labour force entry of older women is by married women who worked prior to marriage or the first or subsequent confinements. A household decision model is generally used to allow deferred labour market entry

for married women and hence for them a supply price is assumed to exist. But for single women and men, each age cohort beyond the maximum age of compulsory education can be almost totally covered by the options of employment, unemployment and further full-time education¹, so that the existence of a supply price does not defer entry.

A supply price for new entry (leaving aside one supported by alternative activity) is assumed to govern the point of entry into employment. Human capital theory has made the major contribution here but the introduction of screening by employers using education qualifications, especially as an instrument for varying the levels of recruitment, leads to consideration of the response of potential recruits. Again, we need to look at periods of relatively limited job opportunities. In the UK, at least, there is quite a lot of evidence of applicants (especially with good educational qualifications) lowering their aspirations (dropping their supply price?) and taking lesser jobs. Furthermore, the proportion of new entry going to services relative to manufacturing varies counter-cyclically: for a constant distribution of applicants by educational standard, there must be some flexibility in aspirations.

The main evidence against the notion of a supply price, or a hierarchy of supply prices, is downward mobility within the employment hierarchy when aspirations for earnings or jobs are not met. Despite the explanation of segmentation offered by human capital theory, only a description of the cross-

1. only about 95% for women in the age range 16-19.

section of employment can be achieved and upward mobility chains drawn. There is no mechanism for downward mobility other than a fall in supply price and the theory is very much weakened by the empirical observation that large numbers of the low paid are equally productive and frequently as highly skilled as large numbers of higher paid employees.

Thus there seems to be no sense in asserting supply prices for labour without reference to a theory of pay and to the social origins and values of members of the labour force, because the evidence points towards flexible supply prices. By a theory of pay is meant a theory determining rates of pay for different jobs and the changes in those rates through time. Collective bargaining, strikes and other forms of collective action are frequently discussed as if they were little more than overt demonstrations of the supply prices of the participants. However, the origins of collective action (mainly to be found in the nineteenth century) would ascribe a greater role to the protection of the membership against exploitation and the vicissitudes of market variations, rather than a maintained pressure to obtain or hold to a gradually increasing supply price.

But the attempts at unionisation and, in particular, attempts to gain some worker control over pay pre-1914 were relatively unsuccessful. The substantial variations in market demand, which frequently led to substantial movements in both directions of product prices, frequently caused real wages to decline and, indeed, the fairly common linking of wage rates to product prices (particularly in larger establishments) gave

rise to some large falls in nominal wages as well. Employers managed to contain the growing opposition to this balance of power, particularly after a number of judicial cases in defence of their position. It is not clear that the growing opposition had much to do with increasing aspiration: the timing of conflict is more explicable in relation to perceived shares of the burden of recessions. However, through the late nineteenth century, the terms of trade were improving, with the price of food falling relative to prices of manufactures. This tended to undermine the support for union participation, culminating in the Taff Vale judgment just after the turn of the century; the reversal came after the early 1900s when the terms of trade deteriorated and raw material prices accelerated with the advent of war. The consequence was sustained opposition and the emergence of national collective bargaining.

Thus major changes in institutional arrangements for the determination of pay arose as a result of the threat to real wage levels, not real wage aspiration targets. National collective bargaining was consolidated during the struggles of the early 1920s and remained throughout the inter-war period to fix sliding scale lists relating wage rates to product prices. The immediate post-war period began with the commodity price explosion during the Korean War boom but, from then until the mid to late 1960s, the terms of trade moved in favour of industrialists. The sliding scales for wages together with the growth of wages relative to commodity prices generalised the swing towards administered prices which had begun (e.g. in Steel) during the 1930s. Thus national

agreements effectively achieved compensation for cost of living changes even if still tying wages to own product prices.

The growth of real national income in the post-war period was very much based on the success of manufacturing in the 1950s. Administered prices left employers somewhat less concerned about wage rates and that provided an environment in which collective bargaining could develop with national bargaining becoming increasingly redundant. Thus, we find the growth of plant level bargaining creating workplace margins over national minimum rates, and its logical extension to company bargaining and productivity bargaining totally replacing national bargaining. But the 1970s have posed a new threat to real incomes and that has seen a swing back to support for national voluntary collective bargaining.

It is evident therefore that real wage resistance does provide a floor to the change in the supply price of labour and that this can be demonstrated historically in the emergence and cohesion of collective action. But the most important question is whether the emergence of decentralised bargaining is a reflection of growing aspirations (or rising supply price) or not. The evidence of history suggests not. The absence of cohesive action, the bolstering of real incomes by favourable world terms of trade, and the swing away from decentralised bargaining (and return to real wage resistance) in the 1970s would suggest simply that aspirations are flexible upwards but not downwards.

The social values which underlie the collective action, particularly the militancy and institutionalisation of certain

methods of pay determination, do undoubtedly contain rising aspiration levels through time. However, there is no direct evidence that individuals have rising aspirations: for the explanation to be consistent, it is only necessary that they resist falls in real incomes. Rising aspirations can, on the other hand, appear on an inter-generational or cohort basis. If there is in any sense an age-related wage structure, even if only an experience related job ladder for the first 10 or 15 years of working life, wages may increase because of pressure from the young as well as being dragged up by concessionary awards gained when market conditions are favourable. Rising real wages over time are not therefore proof of rising individual aspirations.

Throughout this discussion of pay determination, we have ignored two escape valves. One way in which individuals may maintain their aspirations despite falling real wages is to lower their productivity or, for that matter, engage in more or less subtle forms of industrial sabotage. However, if the major basis for real wage resistance is weekly rather than hourly pay, employee responses of this nature achieve rather little except as a form or expression of militancy. The second escape valve is the existence of low cost labour, whereby employers can continually shift the burden of adverse market conditions away from organised labour and acquiesce to their real wage resistance.

This is then the crux to the question of the supply price of labour. We have argued that the resistance to real wage declines is the principal feature of collective bargaining and

as such can be operationally thought of as governing movements in an individual's supply price. And, historically, it is not evident that this has been substantially under threat during the twentieth century. Faced by employee opposition to real wage cuts, employers have managed to find ways of adjusting unit labour costs so that they are lower: militancy arises during the adjustment and has generally been resolved on average by improved market conditions, the emergence of an alternative supply of low cost labour or a restructuring of production, perhaps facilitated by the closure of one factory and the opening of another. In the UK, there is rather little evidence of collective action having been defeated and the employers advantage sustained. But there are examples in the US (particularly in Steel: see Elbaum and Wilkinson (1979)) and in Germany where such changes have occurred. But generally competitiveness is maintained not by lowering individuals aspirations but rather by adjusting labour input towards lower cost units. To continue to be able to do so depends on the continuance of supplies of labour willing to accept lower rates of pay or to work in unorganised sectors of industries.

Thus the continuation of the capitalist mode of production in the face of collective action based on real wage resistance depends either on favourable market conditions or on the ability of employers to create and/or reproduce sources of low cost labour or modes of production with lower unit labour costs. Immigrant labour and married women are probably the most well known source at present but both almost certainly have a relatively short life span. Existing immigrant groups gradually

become indigenised and social attitudes have moved against substantial numbers of new inflow. Activity rates among married women have risen dramatically in the UK in the post-war period but largely by virtue of an expansion of part-time job opportunities¹. As low cost labour, full-time employment of married women has less possibility of survival because of the likelihood of unionisation (as, for example, in the Jute industry) and there is very little room for continuing increases from this source as activity rates rise to the demographic limit. Thus the continuation depends on the ability of the small firm sectors, present in nearly every industry, to survive. But their survival must depend on labour at similar rates of pay to current relative rates. Discussions with employers in small establishments (see Craig, Rubery, Tarling and Wilkinson (1979)) have revealed some disquiet over the high rates of turnover among the young, an apparent lack of commitment to work or the firm in particular, and (they claim) an increasing dependence on their older employees - now more readily converted to staff status. However, there was no way of checking whether this was a new and growing problem in the post-war period or an age-old problem facing a new generation.

Historical experience suggests that small firms will continue because they have, because labour has been available and because market conditions favour their development. To what extent have social values changed, or, put another way, have the aspirations of younger generations begun to force a

1. for a discussion of cohort and demographic effects, see Tarling and Zighera (1979) and Joshi, Owen and Layard (1979).

squeeze on the small firm sector? The one piece of evidence which suggests that this is unlikely is that there currently exists a robust small firm sector despite the post-war rise in real incomes and the fact that earnings in small firms have shown no apparent tendency to lag further and further behind average earnings. Just as with proposed minimum wage legislation, so one would expect rising wages to impose a squeeze on small firms, and potentially reduce the number of firms. The real pressure on the sector however comes during expansions when real wages rise but also when job opportunities are increasing and new small firms appearing. The explanation of the survival of the sector lies in its success at surviving and indeed capturing market share during recessions, this at a time when primary sector firms are facing collective action for real wage protection.

To summarize, a supply price may be said to exist for which changes are induced by real wage resistance. Inter-generational growth of real income aspirations may gradually reduce the ability of employers to attract low cost labour, particularly as traditional sources are depleted by social attitudes. But small firms and secondary employment conditions exist by virtue of product market conditions as well as labour market conditions, and as such are not necessarily wholly disadvantaged by likely decreases in the supplies of new low cost labour. The maintenance of secondary employment conditions has undoubtedly been getting more difficult during the industrialization process and employers abilities to reproduce low cost labour more restricted. However, the most potent

force to eliminate secondary employment conditions is fast growth of national income - and nobody will worry too much then. Opportunities for exploitation will continue to exist - some groups of labour do have lower 'supply prices' - and recession will in fact facilitate the recreation of secondary employment conditions, not however that this sector would be expected to be dynamically competitive.

10. The dynamics of adjustment in the labour market:

Having discussed the nature of the demand for labour and the supply of labour, it is necessary now to consider the dynamics of the labour market. This means spelling out in some detail the flows in the labour market and assigning probabilities to transitions between different labour market states.

Let us consider first a single firm. Employers face a reduction in the stock of employees because of deaths, retirements and emigrations among all employees, and because of outflows at marriage and confinement for women. All of these outflows are reductions in the supply of labour to the whole economy as well as to a particular firm. In addition, the employer may dismiss certain employees for disciplinary reasons and may face a loss through voluntary quitting. These two flows, however, remain in the labour force. All of these outflows, with the exception of voluntary quits, will be more or less independent of the state of demand in the labour market, and in order to maintain his stock of employment the

employer must replace these employees. Maintaining the distinction as ideal types of employment in primary and secondary conditions, we would expect secondary jobs to be filled from outside the firm as they became vacant with relatively little internal promotion but primary jobs would frequently be filled by internal recruitment for promotion with new entry coming at or near the bottom of the promotion ladder. This approach to primary jobs would tend to deny the inter-firm flows at higher rungs of the promotion ladder if the 'internal labour market structure' is applied too rigourously: it is now generally accepted that these structures apply to clusters of firms with external inflow to the cluster being limited to the lower ranking jobs. Thus, overall, replacement demand is generally for less 'well-qualified' applicants than the employees who have left.

The employer may not however seek to replace in full these departures. If he desires to reduce his stock of employment, he may choose to limit the extent of replacement and, if necessary (and, these days, probably as a last resort), may lay-off employees or make redundancies. If he goes this far, he will increase the stock of employees available to other firms, although there has been some debate during the 1970s as to whether redundancy pay and social security payments (at least initially limited to these involuntary outflows only) may lead to some withdrawal of labour (voluntary unemployment) for a period of time determined by the benefits payable relative to potential earnings in employment.

Some recruitment for replacing outflows may be undertaken

by a firm as part of formal training schemes which they operate. This is more likely to be a characteristic of firms offering primary employment conditions, and may even be restricted to certain occupations. For other occupations and among firms offering jobs with secondary employment conditions, training will be more informal and on-the-job where the training programme is not planned in advance and the degree of training varies with the experience of new recruits. Inflows of trainees, even to formal schemes, are not however independent of the state of labour market: the evidence of the 1970s suggests that this is one way of cutting recruitment levels and one of the first options taken.

A desired expansion in the stock of employment means that a firm must not only meet its replacement targets but will also be seeking to fill new jobs. As with vacancies created by outflows, some of the new jobs (at least the more desirable) may be filled internally so that vacancies created by new jobs may be on average lower ranking than the new jobs themselves.

The sources of labour from which a firm may receive applicants for any vacancies offered are numerous and worth distinguishing. From within the labour force, new recruits can come from voluntary quits, dismissals, lay-offs and redundancies from other firms, from employees in occupations with early retirement (e.g. the armed forces) and from the unemployed. Alternatively, new recruits may be drawn from new entry into the labour force, comprising leavers from higher full-time education, school leavers, married women

re-entering the labour force and from immigrants (ex-patriot or otherwise).

The reasons for outflows from individual firms and the origins of inflows are thus numerous and we must now extend the analysis to consider how the various flows resolve themselves as net changes in the various stocks of total labour supply, unemployment and employment by firms. To do this, we must consider how each employee searches for jobs and how and when he chooses to make an application, and how each employer selects new recruits from among applicants for each job.

Before doing so, we should establish whether all of the flows may be occurring simultaneously and whether mobility is limited. One of the major difficulties faced by all those who have attempted to model labour market flows has been how to deal with the concept of gross flows as an aggregation over many firms, each behaving in a different way. One of the first attempts was that of Holt and David (1966) in an article published in conference proceedings entitled 'The concept and measurement of job vacancies'. More recent attempts, such as Wickens (1974) and Tarling (1979a), have also failed to resolve the question of how one can model co-existent vacancies and redundancies. In these papers, it has been assumed that gross vacancies or redundancies can be measured as the desired net stock change plus replacement recruitment. But this clearly nets out all the flows generated by the distribution of different firms desired net stock changes. There is however no reason to believe that this gross stock of excluded vacancies would remain constant. The excluded

element would be zero if all firms were desiring a net increase or a net decrease and positive as long as some firms desire a net increase and others a net decrease. In general, therefore, we must accept that vacancies and redundancies co-exist and that all the flows identified will need to be modelled.

Although we are not concerned in this section with the precise way in which a model would be defined (that issue is discussed in part D of the paper), it is necessary to resolve the problem of aggregation over firms with differing desired and actual flows. Given the discussion of the previous sections, it would be a retrograde step to choose here to adopt the representative firm approach. In the conventional approach, vacancies or redundancies are defined as the sum of net desired stock change and replacement demand (a sum which will be positive or negative), with each firm a microcosm of the aggregate. Using a simple queue concept of the labour market, enhanced in more advanced models by the distribution of earnings, voluntary quits are derived as a function of vacancies and a simultaneous solution is found.

There are three ways which come to mind of introducing the missing gross element of vacancies. Firstly, they could be added in on the right hand side of the conventional expression for vacancies by making them a function of total conventionally defined vacancies: that is, the larger is the conventionally defined vacancy or redundancy total the more likely it is that the co-existence of vacancies and redundancies will be limited and hence the smaller will be the excluded stock of vacancies. Second, it would be possible to assert that there

was a fixed distribution, fixed that is in range, of vacancies or redundancies across all firms for any aggregate level. Both of these are simple mappings from a net aggregate to a distribution across firms. The third approach is therefore an explicit mapping from a net aggregate to a range of individual firm behaviour. The approach which we shall adopt, the justification for which will hopefully become clearer later, is a combination of the two above. Assuming some differentiation between net demands for labour by firms in different product market conditions, using different methods of labour market adjustment and offering alternative forms of conditions of employment, a differentiation which may vary through time, we can impose a fixed distribution about the net overall figure for each differentiated demand.

The question of whether or not mobility is limited is one which has challenged economists for a long time. Empirical investigation of the degree of mobility between different occupations, industries or income levels has often in fact been used to establish the existence of segmentation. Most studies of occupational mobility have shown quite a high degree of mobility which is not restricted to specific clusters or systematically forming chains of mobility: for a recent study showing this result, see Metcalf and Nickell (1980) using data from the National Training Survey. However, there is more evidence of intra-cluster mobility using an industry classification. Using data from National Insurance card exchanges during the 1960s, Cripps and Tarling (1972) show fairly well defined industry mobility chains. In addition, patterns of

new entry among 15-17 year olds in the UK are relatively stable by industry suggesting that both entry and progression are relatively determinate.

The apparent inconsistency probably lies in the lack of specificity in the definition of an occupation compared to the job content and skill requirements of an industry classification. Inter-occupational mobility may be substantial even within a firm but not between firms, and inter-industry mobility may be restricted to clusters even within specific occupations. Given that this paper has concentrated on product markets, industrial structure and derived conditions of employment, it seems more appropriate to view mobility in an industry rather than occupational dimension, and thus accept limitations on the range of mobility such as clustering by industry group and probably also by conditions of employment associated with different jobs in different firms. The question which we must now address is how far it is the factors determining employee search and how far it is those affecting employer screening which are creating these mobility chains and segmentation in the labour market.

Apart from voluntary quits, all other applicants for jobs do not currently hold a job (although they may be serving notice of dismissal or redundancy) and hence are free to search full-time for employment. Jobs are advertised in a variety of ways, only some of which are accessible to every potential applicant. Those jobs which are advertised through the local employment office or job centre, those advertised in the local press and those indicated by signs on the factory gates are

readily accessible for application by anyone with the time to find out that they exist. But it is probably only those advertised on factory gates that are difficult to find out about for voluntary quits. Other sources of information about job opportunities which have been recognised (see, for example, DE Gazette (1975)) include workplace and union contacts, family contacts, and other social contacts, the first of which is mainly accessible to the potential voluntary quit. Thus employee search depends on the distribution of vacancies by source of and access to information. The less vacancies are concentrated on freely accessible sources the more likely it is that the bulk of applications will come from voluntary quits.

On the employee side, we can identify frequency of search and access to information about vacancies as important factors. When an individual first becomes unemployed, there exists a stock of vacancies which he may be able to consider but, when that is exhausted, he must rely on the flow of new vacancies only. Thus the probability of an individual finding a job depends initially on the stock to which he has access and his frequency of search, but it declines sharply when the rate at which he acquires information about vacancies becomes limited by the flow of new vacancies.

The vacancies for which an employee may choose to apply may be limited by access to information, by a 'reservation' wage which he imposes (or other 'reservation' characteristics, such as status of job), or by his perception of those for which he thinks an employer may find him suitable. We have suggested

above that the operation of an internal labour market, either within a firm or between a cluster of firms, may lead to vacancies being offered for 'lower status' jobs than those vacated. Thus, if employees impose or face a 'status floor', applicants for 'lower status' jobs are (cet. par.) likely to have higher probabilities of finding jobs than those who vacated high status jobs.

Conventional wisdom supposes quite the opposite. Assuming that individuals are willing to accept lower status jobs than the one they vacated, one can explain why unemployment composition is biased towards the unskilled. Whilst such is indeed likely to be operative, the mechanism suggested above would offset it to a large extent. Then we must appeal to other factors to explain the composition of the unemployment stock. This we can do by differentiating between the method of job search, the access to information on vacancies and the reasons for vacating jobs. Employees in high status jobs are more likely to engage in on-the-job search, would appear to have wider and better access to vacancies and are less likely to quit jobs through dissatisfaction or to be dismissed.

Segmentation, or limitations on potential mobility, can therefore be suggested through the presence of status floors (reservations) and access to information of vacancies.

It is generally supposed that employers screen applicants through their educational qualifications and/or their employment histories. This is equivalent to imposing ceilings on the status of vacancies available to different applicants. Apart from this, there is relatively little that the employer

can do other than try to influence the volume and 'quality' of applicants. To achieve this, the employer may widen the channels of outlet which he uses to advertise the vacancies or redefine the characteristics of the job, such as increasing the wage rate. The extent to which he can do this is limited, not only because of pre and post entry closed shops but also because of the general recognition of collective bargaining at least in some form at local level.

The employer is clearly in a stronger position to segment the market: he defines the job vacancies, selects the channels of outlet and screens the applicants - all that he does not control directly is the volume and quality of applicants. It is not surprising therefore that recent analysis has moved towards the view that jobs, not units of labour, are segmented.

Recent theories of labour market adjustment which highlight the role of costs of adjustment in determining the flexibility of employment stocks have some implications for employee and employer actions described above. But they should be seen as in addition to them, not as alternative explanations. Rationally, such costs would be expected to affect decisions mainly in the past decade or so. They may well explain a greater reluctance by employees to quit voluntarily and a greater willingness to lower their intensity of job search and they may also explain a reluctance by employers to hire or fire employees. At the same time as the balance of these costs shifts from employee to employer as the pressure of demand varies, employees and employers may be altering their strategies in the labour market, changing intensities of search, varying the information channels

used or the level of discrimination or screening.

11. Segmentation in the labour market:

Segmentation in this context is then caused by employers decisions about what jobs are offered (and the associated conditions of employment), from which sources applicants are sought (internal or external) and what kind of screening is applied: and by employees who become locked in by employment histories, pushed to seek advancement on external rather than internal markets, and by access to information. Mobility chains are created by the limitations to mobility rather than by positive preferences for the chains which appear. Voluntary quitting from a firm or a cluster of firms declines as the status of the job increases and they tend to create jobs of an increasingly relatively lower status. This primary market behaviour is heavily conditioned by the pressure of demand, particularly in the product market, with net new labour demand and replacement demand being quite highly elastic to the pressure of demand.

This shrinkage of primary market jobs occurs not only absolutely but also relatively as the secondary market opportunities, whilst also declining as a direct result of a decline in the pressure of demand, are not so elastic because of the switching of some product demand away from the primary market as primary sector employers attempt to shift the burden of risk. Within the secondary market, however, applicants per job increase as some displaced primary sector employees

join frustrated potential primary sector entrants in the competition for secondary sector jobs. Job and career enhancement in the secondary sector therefore decrease more rapidly than in the primary sector. Voluntary quitting may then be more elastic to changes in the pressure of demand in the secondary sector, despite being on average more prevalent than in the primary sector.

Thus, primary sector employers may also show a more elastic response in the number of net vacancies offered as the pressure of demand varies and secondary sector employees may show a more elastic response in their propensity to quit voluntarily. The consequence of this is that the pressure of demand for labour (from the employers point of view) falls more rapidly in the primary sector, thus increasing the downward tendency of secondary sector voluntary mobility. Given an excess demand for primary sector jobs (a high pressure of demand from the employees point of view), this will give the impression that primary sector behaviour by employees is rational whilst that among secondary sector employees must at least in part be accounted for by job dissatisfaction and inherent instability.

While it is almost a tautology to claim that secondary sector jobs have the less desirable conditions of employment¹, it does not necessarily follow that the origin and explanation of segmentation must lie with the employees and their apparently higher voluntary mobility. The discussion of the whole of this

1. not quite, since there is not a 1-1 correspondence between conditions of employment and conditions in the product market.

part of the paper has been aimed at showing that agents (both employers and employees) acting rationally within the constraints they face in the labour market, constraints caused by rational behaviour on the part of other agents, can create segmentation in the sense of limited mobility and an apparent correlation between the status of jobs and the qualifications of those who fill them. It is important however to recognise that the statement that behaviour is individually rational is not necessarily equivalent to the neo-classical view of rational behaviour: that depends on the motives (maximands or minimands) of the agents. The theory expressed here is also consistent with radical or Marxian view of strategy and class conflict. The evolution and actions of the institutions (trade and employers associations, trade unions and the State) are as much a part of the theory as the behaviour of the individual employers and employees.

12. The role of expectations:

The difficulty in modelling a theory such as that expressed above is that it is in general unsatisfactory to assume perfect foresight at the same time as limited information in the current period. Employers expectations of output levels, and the state of the labour market which they might face, will not always prove to be correct and, since we must drop the assumption of a single representative firm, it must be supposed that unfilled expectations are destabilising in the sense that contingent plans by other agents are falsified. The particular emphasis

in the paper has been on the conflict of interest between employers and employees in the labour market and we have drawn out an important asymmetry in the response of employers and employees to changes in the pressure of demand. But great care is needed in modelling this asymmetry because it depends on the absence of full information and perfect foresight. It is not so much the stochastic nature of the process suggested by the use of probabilities - these indeed may be close to identities - but rather the stochastic process of confronting expectations and reality and the consequent distribution of behaviour over firms facing similar states of the world.

Most of the foregoing discussion has avoided the issue of expectations and it is possible (as has been common practice: see Holt and David (1966), Wickens (1974), Tarling (1979a)) to construct the model without recourse to expectations. This, perhaps, is the first step which can then be developed by introducing expectations into the model. This introduces two major difficulties: firstly, the analytic complexity of the model increases rapidly and, secondly, the task of estimating parameter values requires some of the most recent econometric techniques.

In the final part of the paper, we shall summarise the argument of this second part and put down an outline of a model incorporating the principal ideas. Where appropriate, an expectational form will be indicated. But some limitation must be imposed since it is desired to achieve some insight into the dynamics of the labour market (and hence the model should be at least partially mathematically tractable) and

to provide some indications of how to improve econometric estimation of employment levels and changes with reference to the limitations of data availability, particularly on flows within the labour market.

D. A summary and mathematical representation of the model

13. The main points of the argument:

Conventional short-run employment functions are derived on the assumption of cost-minimising behaviour by the employer, with a passively responding role assigned to employees. The repeated attempts to estimate such functions, even those using some of the most sophisticated techniques of econometrics, have failed to provide parameter estimates which have remained stable. The main criticisms levelled at this approach are the failure to define in a precise way employer behaviour, by developing the implications of cost-minimising behaviour; a seeming lack of concern for the implications of using a single representative firm, thereby ignoring interactive elements within the labour market and failing to define more than an actual demand for labour; and, finally, a failure to incorporate the dynamics of labour market segmentation theory.

Employers face a market where demands are met by sales to different buyers, such as distributors, intermediate producers and final buyers. Cost-minimisation is achieved either by exerting some degree of control over market demands or by retaining control of unit production costs. Market control in the long run depends on competitive improvements or losses through technological change or foreign competition and may be gained aggressively or defensively through merger activity, but in the short run employers seek to minimise the risk burden implicit in cyclical market variations by increasing flexibility

of unit production costs or by use of subcontracting arrangements to reduce the variations in production relative to demand. But firms may find it rational, with relatively fixed capital costs, to internalise unit labour costs for a number of reasons (see Doerringer and Piore (1971)); then we are likely to see the emergence of a primary set of producers with market control and a relatively high degree of labour cost fixity.

Remaining employers in the industry survive by having labour cost flexibility but must face disproportionate variations in market demand, the variations in demand originating with consumers being compounded by the market control of primary producers.

Thus producers for each product market are segmented by their ability to control either their market share or their unit costs of production: the segmentation is a cumulative process through time, which responds to competitive factors in the product market, such as the introduction of new technology, foreign competition and merger activity, and which is likely to change more rapidly with international expansion or competition than when the trend in domestic demand alters or domestic competitiveness shifts.

A single 'representative' firm assumption would be inappropriate because it would ignore this diversity of behaviour. But, when allowing a multiplicity of firms, we must introduce employers associations into the analysis. These associations may have had their origins either as trade associations, concerned primarily with events in the product market, or may have recent origins, set up as a part of a framework for industrial relations in the industry, at the minimum as a

counter-veiling power to trade unionism. The operation of these associations is governed in large part by the cohesion (or otherwise) afforded them by the presence (or absence) of a community of interest. Insofar as they seek to exploit factors of production or consumers, a unity of interest may be taken for granted but this unity is easily shattered by technological discovery or the emergence of low cost foreign competition. Those firms which have effective control of the associations may be able to increase their market control through it or establish internal labour market clusters of firms; failure of the associations is generally associated with greater product and labour market competitiveness.

It should be evident by this point in the discussion that the economic argument based on cost-minimising behaviour is mixing the economic philosophies of efficiency and exploitation. Efficiency leads to aggressive product market behaviour, through technical progress and organisation, and associated with, in general, internalised cost control. Defensive product market behaviour requires relative exploitation of factors of production, particularly labour, and is generally to be associated with the creation of secondary employment conditions. It should be noted, however, that there is not a 1-1 relationship between product market and labour market segmentation. Effective product market control may be established through the ability to create and/or retain secondary conditions of employment: secondary producers (facing substantial variability in demand) may nonetheless provide primary conditions of employment.

Duality in the labour market has become popularised because of the apparent distinction to be drawn between price and quantity adjustments, the former in the primary sector and the latter in the secondary sectors. But this is a misplaced concept. The ability to reduce quantity adjustments in the primary market is based on product market control and, to the extent that quantity adjustments take place, they are internalised as much as possible. The main distinction then between primary and secondary labour markets is the need to internalise or externalise labour cost adjustment. At least in the post-war period, this is a distinction between the nature of quantity adjustments of the input of labour services in the two sectors, the changes in the wage fixing process having greatly reduced the potential for labour cost flexibility through price changes. Furthermore, duality in this redefined sense is a characteristic one would expect to find within every narrowly-defined sector of the economy and not simply between the manufacturing and service sectors.

The ability of employers to create and sustain secondary conditions of employment depends on the sources of the supply of labour, on their individual values and actions, and on their degree of organisation. Conventional theory would ascribe to each unit of labour a supply price: note the misuse of this concept to generate theories of voluntary unemployment. But individual behaviour depends on their aspirations, and on whether they can be realised internal or external to the 'firm', that is within an internal labour cluster or externally through voluntary quitting and engaging in job search. The answer to

the existence of a supply price hinges on labour's response to a cut in real wages below the aspiration level of wages. This leads to the conclusion that there is no well-defined supply price because of apparent flexible aspirations and the general choice of employment rather than unemployment. But we must then back up this theory with a theory of pay and social values.

It is evident however that the continuance of the capitalist mode of production in the face of real wage resistance, and cohesive labour and social militancy, depends on the ability of employers to create and/or reproduce low cost labour or modes of production with lower unit costs. The conventional sources of low cost labour (migrants, near or post retirement employees and married women) are in diminishing supply but, if the definition of segmentation given above is correct, do not exhaust the sources of supply. But, even if we include those employees locked into secondary conditions of employment by their commitment to the work ethic or by the paternalism of their employers, changes in social values may be reducing the secondary sources of supply: these changes in social values may take place without the expected growth in employee organisation through a spread of trade unionism.

We have discussed above the nature of the demand for labour and of the supply of labour, and the role of organisation among both employers and employees. We turn now to the dynamics of the adjustment process. Outflows from firms are either voluntary or involuntary: the latter are either lay-offs or demographically determined. Inflows are to replace losses or

to make net stock changes. Employers have the choice of which jobs to fill and how to fill them (or indeed whether or not to make redundancies) and can employ screening devices in selection of applicants, alternative channels for attracting potential applicants (different ways of advertising vacancies) and can redefine the characteristics of the job. The sources of labour from which they can recruit are the potential voluntary quits (who are currently employed), the unemployed and new entry. These employees are differentiated by their frequency of search and by their access to information on new vacancies. Thus most of the factors which constrain the mobility chains of employees lie in the hands of the employers: it is not necessary to appeal to the characteristics of the individual employees. Put another way, it is the jobs which are segmented and not the employees. Although employees may place a lower bound on the probability of applying for, and accepting, a job by having a reservation set of conditions of employment, it is the employer who principally can control the volume of applicants and sets the upper limit to the probability of successful application for a job.

We are therefore arguing that segmentation is caused primarily by employer actions, although employees may become locked into a segment by his own employment history and access to information. Mobility chains are the result of limitations to mobility rather than the outcome of positive preferences by employers. This is reinforced by the finding (Cripps and Tarling (1972)) that there is substantial two-way mobility even when net flows are quite large.

By examining in detail the behaviour underlying the changes in jobs and the potential mobility of groups of employees, it is possible to conclude that vacancies in the primary sector are relatively elastic whereas the probability of getting a job (and voluntary quitting) are more elastic in the secondary sector, and a principal cause of this is the fairly permanent presence of an excess supply of labour to the primary sector.

But it is important to recognise that the origins and evolution of agent institutions and institutionalised relationships are as much a part of this theory as the predicated individual behaviour. Without that, labour is reduced to a passively responding role by the apparent primacy of employers motivations. The theory can be complicated by introducing expectations and aspirations where appropriate, both for individuals and their institutional collectivity. This however is not simply a problem engendered by the stochastic nature of individual response (most probabilities are almost identities) but rather a problem of aggregation and the reconciliation of individual and institutional behaviour when all expectations cannot be jointly satisfied.

14. An outline of the model:

In this section, we shall not attempt to construct a mathematically tractable model. The intention is rather to set down in a more rigorous way the propositions made in the previous section. It will then be possible to ascertain what factors should enter into the explanation of aggregate employment

change and give a priori expectations of the co-efficient origins and magnitudes. The discussion which follows is in four parts: the first is concerned with employer behaviour, the second with employee behaviour, the third with organisation of employers and employees and other aspects of aggregation, and the fourth sets out the implications for empirical analysis of the aggregates.

(i) employer behaviour:

Employers' behaviour is assumed to be directed towards cost minimisation and motivated by efficiency targets (aggressive market behaviour) or exploitation (defensive market behaviour). Which motivation is dominant in the medium term depends in large part on the employer's current and intended market control and, in particular, on the degree and nature of external competition facing him either within the domestic market or from abroad. Thus the two primary factors which concern the employer are his planned or anticipated production levels and the unit labour costs of that level of production. In the following presentation, we shall assume that the pricing policy adopted is a markup on normal cost, that non-labour variable costs are proportionate to labour cost and that productivity per man hour is measured net of capital costs.

Then, for a single firm, we can write:

$$UC = (\sum E_k W_k) / (\sum E_k H_k P_k)$$

where subscript k = a particular job

E_k = employment in job k

W_k = weekly earnings in job k

H_k = weekly hours worked in job k

and P_k = productivity per man hour in job k

Weekly earnings are a complicated function of hours worked (overtime and shift work included) with the basic hourly rate given a floor to its level and increase by collective bargaining and supplemented by job-related bonuses. Productivity per man hour is assumed to be independent of the incumbent of the job and to depend on the stock of machinery of various vintages:

$$P_k = C \sum_v e^{-rv} I_{-kv}$$

where C is a constant, v = vintage, r = rate of embodied technical progress and I_{-kv} = equipment of vintage v used in job k. This provides a steady shift in the technological frontier with investment levels measuring the rate of implementation of new technology.

Planned or anticipated production (Y) is governed by market control and external competition. To the extent that a firm has a competitive advantage, in this model through lower unit labour costs, it can in a sense exert a prior claim on the market and produce to planned levels. This may include increases gained by innovating (lowering productivity by higher investment and hence lowering unit labour costs) or achieving the same ends by merger or rationalisation; or it may include decreases in the face of low cost competition. Thus planned output levels will be a major factor determining the movement of unit labour costs.

Given a planned level of output, a firm can plan its

unit labour costs appropriate to that level of output. The notion of planning introduces the need for a medium term view so that recruitment decisions should take into account training requirements and potential firing costs (mainly redundancy pay). The employer seeks to minimise the change in his unit labour costs necessary to meet the planned level of output, not only in the current period but also in the medium term. Thus an employer may offer vacancies or make redundancies on the basis of his desired (planned) unit labour costs, conditional on his planned output level.

The notion of a planned output level is not, in this context, very precise. It is possible to conceive of planned unit labour costs which, for a given stock of employees (the primary unit of the plan, given wages), can produce a range of output levels by varying hours worked with consequent adjustments to unit labour costs. Thus a planned stock of labour associated with a planned unit labour cost can produce a range of output and hence absorb some deviation of actual from planned output without further adjustment in the stock of employees.

But the notion of a planned activity and associated input is very much tied to the idea of market control and is typical of the primary sector firms referred to in previous sections. It requires the ability to achieve planned levels (more or less) even though the total market demand may vary. With sufficient competitive advantage, this is possible, but without it we move towards the secondary sector firm which competes in the residual market and for whom planned output levels are much less feasible: their strategy is to operate with flexible total labour costs to meet whatever demand they may

face, much of which will be unanticipated.

It should be noted here that the expectation is that the primary sector firms (primary, that is, within the product market) will generally be market leaders in the mass production segment of the market, either relatively large in size or of recent origin: they will however include smaller firms who are producing for the quality end of the market or in specialist products.

The market, defined for the purposes of the above, is an international market for a product or a protected domestic market, either behind tariff barriers or because the commodity or service is not traded. Competitive advantage depends (in this formulation) on unit labour costs of production. For most products the competition is international: the more competitive a firm is the more protected it is against short-run variations in demand (through its ability to pass costs forward or backward) but the more internalised (fixed) will be its labour costs and hence the greater will be the eventual redundancy and closure impact of a collapse in effective demand or the emergence of new competition.

Secondary sector firms survive by their ability to achieve flexibility in their unit labour costs of production, particularly through greater variations in the stock of labour. Competition in the product market is greater and thus flexibility depends partly on the existence of a supply of low cost labour, which may be retained as overheads when demand declines, or a supply of labour which is either voluntarily more mobile (such as married women) or unorganised in the sense that they can be hired and fired more or less at will.

Thus demand in the product market is met by two types of firms, those who can plan their output and those who cannot. Those who plan their output will also plan their employment input and will always attempt to minimise the change in unit labour costs. But those who cannot plan output levels are more dependent on competing with relatively low unit labour costs and hence must minimise the levels of unit labour cost each period, necessarily resorting to greater variations in the stock of employment. Thus:

a) Primary: $\hat{E} - \hat{E}_{-1} = f_p (\hat{Y} - \hat{Y}_{-1})$ subject to min
 $(\hat{u}c - \hat{u}c_{-1}) + C(I, R)$

where C = unit cost of hires (I) and redundancies (R).

b) Secondary $E' = f_s (Y')$ subject to min uc' .
with $E = \hat{E} + E'$ and $Y = \hat{Y} + Y'$.

It is expected that $0 < f_p' < f_s'$.

These are desired demands for stocks of employees. Each segment must also satisfy the following relationships:

$$\text{Outflow } F = Q + R + X$$

where Q = voluntary quits into the labour market,
R = redundancies, X = demographic and voluntary departures from the labour force.

Desired inflow I^* = desired vacancies
 $= \max [(E - (E_{-1} - F)), \gamma]$

Redundancies R = $\min [(E - (E_{-1} - F)), \gamma]$

where $\lambda > 0$ is a factor to represent the aggregation over firms and hence the coexistence of vacancies and redundancies.

(ii) employee behaviour:

Employees are assumed to undertake job change to satisfy real wage aspirations, but the period over which the aspirations are relevant may vary from the next job to the full employment cycle for an individual. Thus an individual has in mind an earnings profile over his working life which may be truncated and from which he may deviate either because the real wage in his current job declines relative to aspiration or because the 'next move' is not open to him. These earnings profiles will probably have attached to them an employment profile in the sense of a career progression or sequence of job moves which will be restricted in occupational or industry range. That is, over long periods of time, there is an expected pattern of job change which could be described loosely as 'career progressive': in the short period, there may be job mobility but over a much more limited occupational or industrial range. When the earnings profile is truncated, as would be the case for employees who are marginal labour force participants, the employment profile will be similarly truncated or even non-existent.

The above formulation of the incentive to job mobility has been couched entirely in terms of real wages (or earnings). If it were not for the difficulty of measurement, other attributes of the job could be easily included so that an earnings profile is replaced by a 'job package' profile which includes the individual's valuation (in some sense) of all

the attributes which he considers relevant, which may of course differ between individuals, and the trade-offs that he is prepared to make. Despite a fairly extensive literature on non-pecuniary attributes of jobs, very little can be said other than that it is unlikely that the non-pecuniary attributes correlate with earnings (either positively or negatively). It will suffice for this discussion that jobs can be represented by earnings but it is acknowledged that application to the real world would be more appropriate if non-pecuniary attributes were also included.

The profiles, either for earnings or for employment, have in general social rather than economic origins. Education and pure ambition provide methods of breaking away but, in each case, the new avenues opened up are simply alternative profiles: there are limitations to the earnings/employment profiles attached to the various educational outlets and pure ambition frequently necessitates a period of self-employment. The one sense, however, in which the profiles are conditioned or even generated by economic rather than social factors is through the provision, within a firm or enterprise, of formal promotional or career progression ladders. Although these too may have social origins, they are generally defined in broad terms by employers and offered to the employee as a profile segment. This does not deny the role of trade unions in establishing these 'internal labour market structures' nor the possibility of individuals leaving at any stage. But the important feature is that they may alter at different times and for different reasons to the profiles on entry which are more completely conditioned by

social origins. In particular, their creation or destruction may be initiated by the competitive pressures on the employer in the product market.

Collective action by employees, taking the form of an industrial dispute, is a well-known expression of conflict. Militant action of this kind is based on the community of interest for the two sides, but with particular emphasis on the employees cohesion. What we have suggested above is the concept of voluntary mobility seen as an individual rather than collective expression of militancy. Such action is taken when collective action fails, either because it was ineffective against employers resistance or because there is no community of interest between a particular employee and the remainder of the workforce.

Voluntary mobility is limited by aspirations and these limitations are reinforced by restricted access to information about vacancies. Voluntary job search by the already employed is a function of the incentive, given by the deviation of real wages from an aspiration level, and the opportunity, given by access to information. There is clearly a difficult aggregation problem here since it is not obvious what the average profile would look like, what the average access to information is, and indeed whether average behaviour is of much use in this context. Some operational value can be given to these ideas in the following way. Let Q be voluntary quitting, W_i the wage in industry i , σ_i the variance of wage levels across firms in industry i , \bar{W} the overall average wage (across industries between which there are significant mobility flows or across all industries), and V_i the number of vacancies

in industry i . Then we can write the number of voluntary quits generated in industry i as:

$$Q_i = f(a_i, W_i/\bar{W}, \sigma_i, V_i)$$

with $f'(W_i/\bar{W}) > 0$, $f'(\sigma_i) < 0$, $f'(V_i) > 0^1$.

The cohort career-progression element is captured by the average age of employee (a_i) but with no clear presumption on the sign of $f'(a_i)$ except that it is probably negative for low values of a_i . In each case, a voluntary quit generates an applicant for a vacancy so long as he remains in the labour force.

Job search by the unemployed (registered or unregistered) is assumed to be automatic for males but will depend on the view taken of labour supply factors for marginal labour force participants: for example, the earnings profile may no longer be attached to the individual but to the household. For any group of job searchers, the unemployed may attempt to regain the earnings profile they were on prior to becoming unemployed or they may adopt (voluntarily or involuntarily) a new profile. Clearly for some groups, such as unskilled labour in depressed areas and married women, the original (life cycle) earnings or employment profiles may include anticipated spells of unemployment whilst for others it will not.

The applicants for jobs from among the unemployed are generated by vacancies but, since search eliminates part of

1. At this stage of development of the model, it is easier to conceive of the level of voluntary quits in each segment (primary or secondary) rather than in each industry.

the stock of vacancies for any individual, the number of applicants per unemployed person is a decreasing function of the duration of unemployment. Hence we can write:

$$\frac{A_x}{u} = g(V, d)$$

with $g'(V) > 0$, $g'(d) < 0$ where $\frac{A_x}{u}$ is number of applicants per unemployed, V is total vacancies and d is the average duration of unemployment. Note that $g'(V) < f'(V)$ because of greater restrictions on the access to vacancies for the unemployed.

The remaining group of potential applicants are new entrants to the labour force. These comprise young people (specifically, the output of the education system at all stages), married women and immigrants. The bulk of these will be applicants in the secondary labour market, with only a limited number of those who have left education having aspirations to primary sector jobs, through training programmes and other formal entrance channels established with the education system. Entry to the labour force is presumed to be signalled by an application and hence the only question is to define the volume of new entry. Whilst the entry from the education system can be taken as more or less demographically determined¹, labour force participation by married women is only partly demographically determined and immigration mostly not so. Participation by married women has been the subject of many studies and the weight of

1. although decisions to remain in full-time education may depend on the current state of the labour market.

the evidence favours a household decision model, dependent on the level of real wages, relative pay of women and the availability of suitable jobs, complemented by certain demographic factors such as family size and number of children in different age ranges (pre-school, school age etc.).

Immigration from the Commonwealth into the U.K. has been politically controlled since the Commonwealth Immigration Acts of 1962 and 1968: but other immigration, particularly from the Irish Republic, has been relatively free. Studies of these net migrant flows have shown a dependence on relative earnings levels and relative activity levels (as proxied by unemployment rates). In summary, therefore, we can write:

$$N = XE + h(\bar{W}, W_f/W_m, V)$$

where N = new entry, XE = entry from education, W = real wage¹, W_f/W_m = the female/male relativity for wages and V = total vacancies. The derivatives of the function h are, respectively, negative, positive and positive.

(iii) aggregation and collective action:

The model so far described has included a number of references to collective action, both among employers and employees. The institutional forms are employers organisations and the trade union movement, with recognition of the fact that these have spatial and hierarchical subgroups. Employers organisation has in general one of two origins: either it has

1. It is probably appropriate, given a household decision, that this be the real wage for adult men.

evolved from a trade association, concerned primarily with events in the product market and the nature and level of competition, or it has become established perhaps as a response to or simultaneously with the emergence of trade union organisation as a counterbalance in the area of industrial relations with emphasis on the formal employer-employee relationships. Neither of these groupings replaces the less formal links of cartelisation of markets or company bargaining. But the effectiveness of the organisation among employers depends markedly on the intensity and nature of competition. A trade association defending against external competition can be highly effective (e.g. the British Textile Association) or an employers association can cope with the unit cost implications of collective bargaining across the breadth of its industry (e.g. the Engineering Employers Federation). But trade associations cannot cope with certain labour market phenomenon (e.g. the re-emergence of sweat-shops in Clothing) nor can employers associations necessarily cope with external competition (e.g. the fragmentation of the Cutlery industry).

What we have described in the above and in the previous sections is a wide range of alternative actions which are in principle open to employers, enabling them to lower their unit costs in the face of competition or to lower the costs of adjustment by internalising their labour costs. Trade unionism is in part a response to the social inequity or deprivation which may result from these actions and collective bargaining, represented through trade unions, leads to restrictions on the options open to employers. There is of

course a strong development of social action in trade unionism which is more positive than represented above and which in turn leads to new conflicts, possibly totally unrelated to the current economic environment or market pressures on employers: nevertheless the primary source of restriction on employers options has the more defensive origin.

Collective bargaining, particularly on wages, leads to the growth of national bargaining in the interwar period, the emergence of local and company bargaining in the 1950s and 1960s, and a resurgence of nationally formed agreements in the weaker economic environment of the 1970s. In general, the responses have been such as to protect real wages against terms of trade shifts or general recession or to share the spoils of increases in real national income. But, since collective action is neither feasible nor desirable to all relevant employees for certain groups in the labour force¹, the employer may still achieve lower unit costs through changing the composition of their workforce: this will be a viable option so long as productivity is less widely dispersed than associated earnings levels.

In aggregate, however, we can make rather little use of these ideas. We cannot argue, for example, that highly organised industries are more or less susceptible to disruption without more detailed study nor that unit labour costs bear a direct relationship to collective bargaining. However, the emergence of foreign competition is likely to have a disproportionate effect on the mass production sector

1. such as immigrants, who might otherwise have no job.

of industry and a higher degree of unionisation should eliminate certain employer options. Thus we would expect faster import penetration to lower average productivity levels, shift production towards the secondary sector firms (proportionately) and increase the flexibility of unit costs, and more trade union organisation should lower the flexibility of unit labour costs.

In terms of the formulation given on page 90 above, we can add the two following expressions:

$$\hat{E}/E = S(TU)$$

$$\hat{Y}/Y = h(Y_w, \hat{UC}/UCF)$$

where TU = trade union density and $S' > 0$;

Y_w = world trade or market, UCF = foreign unit labour costs denoted in a common currency, and $h'(Y_w) > 0$, $h'(\hat{UC}/UCF) < 0$.

It would be possible to replace \hat{UC}/UCF by an ex post measure such as the level of import penetration of the home market:

$M = M/(Y - X + M)$. This leaves peripheral production (Y')

to be determined as a residual, given total production.

However, it is possible that Y' may be at least partly determined by its ability to achieve low enough unit costs to maintain production.

(iv) the model and its closure:

In order to close the model, we need the following relationships:

$$\begin{aligned}
 A &= \text{total applicants} = A_x + \sum Q_i + N \\
 \hat{E} &= \hat{I} - \hat{F} + \hat{E}_{-1} \\
 E' &= I' - F' + E'_{-1} \\
 L &= \text{labour force} = L_{-1} + N - X \\
 U &= \text{unemployment} = L - E
 \end{aligned}$$

These are all identities. In addition, we have to specify the relationship between actual and desired inflow (I and I*) for each segment. This we do in the following way:

Let \hat{P} = probability of filling a vacancy in the primary sector.

$$\text{Then } \hat{P} = \theta \frac{(\alpha_1 A_x + \hat{Q} + \alpha_2 XE)}{\hat{V}I} \quad \text{such that } 0 \leq \hat{P} \leq 1.$$

Denoting the exponent of θ as x and noting that $0 \leq x \leq \infty$, we can write $\ln(1 - \hat{P}) = -\hat{x}$.

α_1, α_2 are such that $\alpha_k = f(W_k/\hat{W})$ where W_k = average wage of the labour force group k and $f' > 0$.

$$\ln(1 - P') = - (A - \hat{V}I \hat{x}) / VI'$$

Then we can write:

$$\begin{aligned}
 \hat{I} &= \hat{P} \hat{I}^* \\
 I' &= P' I'^*
 \end{aligned}$$

The full model is given in Table 1a and Table 1b contains a complete glossary of the variables used in Table 1a. The model contains a large number of equations, of which many are identities, and some non-linearities. Nevertheless, it is in principal tractable with one major exception. The simple function for the desired level of employment is no longer an easily derived relation, depending on a cost minimisation. This section of the model is not fully defined since employers desired employment levels are permitted to depend on the

Table 1a: The model

In the following, a superscript (^) refers to the primary sector and a superscript (') refers to the secondary sector.

$$\left. \begin{aligned} UC &= \left(\sum_k E_k W_k \right) / \left(\sum_k E_k H_k P_k \right) \\ P_k &= C \sum_v e^{-rv} I_{-kv} \end{aligned} \right\} \begin{array}{l} \text{for primary and} \\ \text{secondary sectors} \end{array}$$

$$\hat{Y} = h (Y_w, \hat{UC}/UCF)$$

$$Y' = Y - \hat{Y}$$

$$\hat{E}^* - \hat{E}_{-1} = \hat{f} (\hat{Y} - \hat{Y}_{-1}) \text{ s.t. } \min \hat{UC} - \hat{UC}_{-1} + C (I, R)$$

$$E'^* = f' (Y') \text{ s.t. } \min UC'$$

$$\hat{E}/E = S (TU)$$

$$E = \hat{E} + E'$$

$$\hat{F} = \hat{Q} + \hat{R} + \hat{X}$$

$$F' = Q' + R' + X'$$

$$\hat{I}^* = \hat{VI} = \max [\hat{E}^* - (\hat{E}_{-1} - \hat{F}), \hat{\gamma}]$$

$$I'^* = VI' = \max [E'^* - (E'_{-1} - F'), \gamma']$$

$$\hat{R} = \min [\hat{E}^* - (\hat{E}_{-1} - \hat{F}), \hat{\gamma}]$$

$$R' = \min [E'^* - (E'_{-1} - F'), \gamma']$$

$$\hat{Q} = \hat{f} (\hat{a}, \hat{W}/\bar{W}, \hat{\sigma}, \hat{VI})$$

$$Q' = f' (a', W'/\bar{W}, \sigma', VI')$$

$$\frac{A_x}{u} = g (V, d)$$

$$N = XE + h (\bar{W}, W_f/W_m, V)$$

$$V = \hat{VI} + VI'$$

Table 1a cont.

$$A = A_x + \hat{Q} + Q' + N$$
$$\ln(1 - \hat{p}) = - \left(\frac{\alpha_1 A_x + \hat{Q} + \alpha_2 XE}{VI} \right)$$
$$\ln(1 - p) = - \left(\frac{A + \hat{VI} \cdot \ln(1 - \hat{p})}{VI'} \right)$$
$$\hat{I} = \hat{p} \hat{I}^*$$
$$I' = p' I'^*$$
$$\alpha_k = f(W_k/\hat{W}) \text{ for } k = 1, 2.$$
$$\hat{E} = \hat{I} - \hat{F} + \hat{E}_{-1}$$
$$E' = I' - F' + E'_{-1}$$
$$L = L_{-1} + N - X$$
$$U = L - E$$

Table 1b: A glossary of the variables

UC = unit labour costs

E = employment (superscript (*)
represents desired
demands

H = average hours worked

P = productivity per man hour .

I_{-v} = investment in machinery of
vintage v

r = discount rate

} subscript k refers
to job classification

Superscript (^) refers to primary sector and (') to
secondary sector variables.

Y = domestic production

Y_W = total world market

UCF = foreign unit labour costs, denoted in common currency

TU = trade union density

F = outflow

Q = voluntary quits into the labour market

R = redundancies

X = demographic or voluntary departure from the
labour force

I* = desired inflow

VI = vacancies offered

Y = co-existent vacancies and redundancies

a = average age of employee

W = real wage of employee (W refers to the whole economy)

σ = dispersion of wage distribution

d = average duration of unemployment

A_x = unemployed applicants for vacancies

N = total new entry into the labour force

XE = entry from full-time education

W_f, W_m = female, male real wages

p = probability of filling a vacancy

L = total labour force

U = unemployment

composition of employment, a choice which will be affected by the level and distribution of wages, productivity per man hour and average hours worked. There would be no difficulty in making average hours and wages endogenous: certainly, bearing in mind the possibility of collective action, on either side, there should be some simultaneity.

In respect of the composition of employment, the model is not fully specified. While the productivity per man hour may be treated as either exogenous or (as specified) dependent on investment in plant and machinery, the choice of labour composition should be endogenous and could depend on the supply of labour: that is, voluntary quits, the unemployed, new entry and redundancies all have career progressive earnings profiles which could be used to give some idea of the supplies of labour at various wages. However, as discussed in the main text, the notion of a supply price of labour is not a clear cut one and hence the concept of a reservation wage (as defined in job search theory) cannot be applied as an ex ante concept but only as an ex post one. In this sense, there must be simultaneity in employment and wage policy, both for employer and employee.

Although no attempt is made here to solve the model analytically, some observations can be made about what variables might affect the relationship between actual employment and output and how this might appear. Unit labour costs determine competitiveness and, in the primary sectors, determines the performance in world or domestic markets. Thus improvements in competitiveness should increase the dominance of the primary sector and reduce the elasticity

of employment with respect to output in the short period. Accelerating wage claims would of course reduce competitiveness and switch the demand for labour towards the secondary sector. It would also increase the flows of labour in the labour market (relative to net new job creation) and thus lead to greater flexibility of unit labour costs with less frictional adjustment difficulties, that is a higher probability of filling vacancies¹. But this necessarily depends on the absence of fixed supply prices for individual employees: the notion of career profiles generates aspirational or militant mobility but is overridden (ex post) by the need to maintain a place in the employment hierarchy.

There is, however, no clear presumption that higher wages would depress employment for any given level of output. In fact, for a given level of output, higher wages relative to competition may shift production away from the primary sector towards the secondary sector where productivity is lower and hence employment per unit of output higher. Higher wages, if they lead to loss of competitiveness, are associated with smaller markets, but that element is already captured in the level of total output (Y).

Increased mobility, for exogenous reasons, in either sector should lead to a rise in the elasticity of employment with respect to output. But there is a potentially strong multiplier effect operating between quits and vacancies. A rise in voluntary quits would generate more vacancies and

1. One offsetting factor here would operate through the ability through trade unions (or through other forms of collective action) to impose primary conditions of employment.

hence again increase voluntary quits, and possibly also new entry. At the same time, especially if there is no effect on new entry, the probability of filling a vacancy declines so that actual recruitment lags behind desired recruitment and an increasing proportion of desired moves are unsatisfied. This process, therefore, slows down the adjustment of actual employment to its desired level for any given level or change of total output: there is reason to introduce turnover data (at least, abnormal movements in turnover) as an additional variable in the relationship between employment and output.

15. Conclusions

The failure of the conventional model lies in its unsuitability for encompassing the possibility of changes in the elasticity of employment with respect to output and distinguishing this from changes in the speed of adjustment. When employer behaviour, and particularly the implications of cost-minimising behaviour, are thought through, the whole question of the competitive nature of the labour market is called into question and it becomes necessary to incorporate labour market segmentation theory.

The purpose of the paper has been to draw attention to the proposition that cost-minimisation may be derived either from the efficiency motive or from an ability to exploit. The major variable, and the most complex to understand, in the model is unit labour cost: in the product market, competitive advantage affords a degree of market control whereas, in the labour market, competitive advantage can be

achieved by retaining control of unit production costs. Because of competitive gains and losses, there are shifts of production between sectors which leads to a reallocation of the demand for employees between the groups in the labour force. Adding to the model a series of relationships for the flows brings out the dynamic properties of adjustment to these changes and also demonstrates the impact of exogenous changes in voluntary mobility and demographic changes in the pattern of new entry. The introduction of career-progressive or truncated earnings/employment profiles provides some explanation for voluntary mobility in terms of individual aspirations and an expression of individual militant action. Collective action by employer organisation or trade unions can consolidate or even initiate advantages within the product or labour markets.

But perhaps the most important element of the argument is the proposition that there exist groups in the labour force who are in work with different rates of pay, and prepared to remain in work at those rates of pay¹, for whom productivity differentials are comparatively narrow. On this basis, it is possible to have core and peripheral production units in the same product markets, although possibly in different labour markets, who are competitive or complementary. The coexistence is achieved by the fact that differential wages compensate for technological differences and that the burden of demand variation is more easily passed on to the factors of production in peripheral units.

The model remains incomplete, since certain elements of

1. This of course is not the same as imputing a supply price to different groups of labour.

behaviour (particularly cost-minimisation) need further study, and it is not easily tractable. Nevertheless, it is possible to draw some inferences about the aggregate relationship between employment and output from the model. We begin with a conventional model in which changes in desired employment respond to changes in output and actual employment levels adjust towards desired employment levels: the two key parameters are the elasticity of employment to output and the rate of adjustment.

The two new factors to be introduced are competitive advantage in the product market and labour turnover rates. Competitive advantage may be measured in one of two ways: firstly, to reflect the advantage in international markets (or the emergence of import penetration in the domestic market), we can measure the relative unit costs of domestic against foreign producers, and, secondly, we can measure the unit labour costs of the largest firms relative to the average (using Census of Production data) to reflect domestic market dominance. In the second case, we also need a measure, such as the share of employment in the competitive firms, to reflect the importance of primary employment conditions. The hypothesis is that the greater is the competitive advantage the more widespread are primary conditions of employment and the lower the response of employment to output change.

Labour turnover, particularly voluntary mobility (which cannot be measured separately), which is not stimulated directly by changes in the pattern of desired employment, is expected to raise initially the response of employment to output change but, through the multiplier effect on

vacancies, to increase the gap between actual and desired recruitment, slowing down the adjustment of actual to desired employment. We have measures of total turnover (engagements and discharges) in manufacturing but not for the whole economy. To cover all sectors, the only information available (and that only for the 1970s) is the proportion of employees with their employer for less than 12 months from the New Earnings Survey.

It is finally worth considering whether there is any evidence to suggest that these hypotheses might work. During the late 1960s, the period normally referred to as the period of labour 'shake-out' or 'disharding', empirical evidence showed that the elasticity of employment responses rose but the speed of adjustment slowed down. At the same time, the evidence points to unusually high labour turnover. The 1970s have been characterised by low levels of labour turnover, almost certainly a reduction in voluntary mobility as a result of increased redundancies and an awareness of redundancy pay as well as fewer employment opportunities, and by accelerating import penetration, especially in markets for finished manufactures. The high import penetration should raise the response of employment to output change at the margin, but be accompanied by a shift towards lower productivity levels: the lower turnover levels should reduce the response of employment to output but increase the speed. The evidence points towards a decline in the response in the early 1970s and to a slowing down in the average productivity trend.

This paper has been intended to set out some ideas to improve our understanding of the relationship between employment and output change. Some suggestions have been made

which a priori may find some empirical support. But two substantial gaps remain in the analysis. Firstly, the model needs more development and to be taken to the point at which analytical solutions can be obtained and reduced forms, compatible with available data, derived. Second, the whole area of the role of management, as opposed to the unitary concept of employer organisation, needs to be introduced to complete the explanation of primary sector behaviour and the transmission of motives into behaviour. It is easy enough to place product markets in a fundamental role operating on employers who are then opposed by trade union organisation or employee resistance; it is much more difficult to incorporate the interplay between management and workforce, where the forces operating cannot be modelled in the unidirectional manner.

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1. These papers were presented to a conference on 'Low pay and labour market segmentation in advanced industrial countries' in Cambridge during September 1979: the collection of papers, of which these are a part, are available from the Department of Applied Economics, Cambridge.
2. These papers were presented to a conference on 'The labour market' at Magdalen College, Oxford in September 1979. The conference was organised by H.M. Treasury, Department of Employment and Manpower Services Commission and the papers and proceedings will be published during 1980.