The effects of increased labour market flexibility in the United Kingdom: theory and practice

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Abstract

This paper uses the increase in labour market flexibility in the United Kingdom in recent years to see how well the predictions of a couple of recently developed labour market models can account for data. I am chiefly concerned with the flexibility to make wage and employment adjustments at the microeconomic (firm or plant) level. The two models I examine are an 'equilibrium business cycle' model of the labour market and a 'search' model. They predict that an increase in labour market flexibility will lead to an increase in output and consumption and a fall in unemployment and hours. They also predict that employment and unemployment will become less volatile. Since about 1985, the level and persistence of the unemployment rate have fallen, as predicted by the theory. But this has been accompanied by a fall in unemployment incidence and not much change in duration: the reverse of what we would have expected, given the theory. Average hours worked have fallen, as predicted by the theory. In terms of cyclical behaviour, we can note that the volatilities of output, consumption, employment and unemployment have all increased in the most recent cycle, though the volatility of hours worked relative to output has fallen, as suggested by the models. Finally, a graph of trend (HP-filtered) output and consumption reveals a 'step jump', which we could take as some evidence for the models (though we could imagine other plausible explanations for such a change).

1 Introduction

It is often claimed that the United Kingdom has greatly increased the flexibility of its labour markets, relative both to ten years ago within the United Kingdom and to other European countries today. Indeed, commentators in the United Kingdom and on the Continent have suggested that this is why UK unemployment is lower than in continental Europe. In light of this, other countries in Europe have attempted to increase the flexibility of their labour markets. For example, Spain and Italy have both passed laws making it easier to use 'fixed-term' contracts to avoid the inflexibility in hiring and firing associated with permanent workers.

As suggested by Beatson (1995), the increase in flexibility has come about in many ways. It is possible to dichotomise the increase in flexibility microeconomic and macroeconomic effects and flexibility in wages and employment, illustrated in Table A below:

Table A: Types of flexibility

	Microeconomic level	Macroeconomic level
Wage flexibility	Wage determination Relative wage flexibility at a regional, industrial and human capital level	Aggregate real wage flexibility
Employment flexibility	Use of part-time, temporary and self-employment Ease of hiring and firing Working time Functional flexibility Labour mobility	Aggregate employment and hours worked

This paper concentrates on the macroeconomic effects of increased microeconomic flexibility. In particular, we shall investigate the effects of those government policies that have lowered the fixed costs (both pecuniary and non-pecuniary) employers have to pay whenever they create or destroy jobs, as well as those designed to increase wage flexibility by weakening the power of trade unions. Intuitively, we would suggest that greater employment flexibility would result in less use of changes in hours to increase output, and more job destruction and job creation. But the effect on average hours is unclear, since we would expect to see more hiring of part-time workers. The effect on the unemployment rate would be unclear, as unemployment incidence would be increased while unemployment duration would be reduced. The effect of greater wage flexibility on aggregate employment and wages is also unclear *a priori*, though we would expect to see greater volatility in wages and less volatility in employment. This ambiguity of the effects of increased flexibility on employment suggests that calibrated models should be used to predict what will happen to employment. In this paper, we use an 'equilibrium business cycle' model and a 'search' model to examine these issues and assess their ability to account for recent labour market data. The paper examines the effects of increased labour market flexibility on the steady state (long-run equilibrium) of the economy and its cyclical properties. It first examines the evidence on changes in the UK labour market in the 1980s that have affected the ability of employers to change wages and/or employment levels. This evidence suggests that during the 1980s, the structure of the labour market altered in a way that we could model, enabling us to assess how far different models can account for the observed changes in endogenous variables. The paper then considers what the models predict should have happened at the macroeconomic level as a result. Finally, it examines actual UK macroeconomic data between 1979 Q3 and 1996 Q2 to see whether or not these predictions actually came through.

2 Recent changes in the UK labour market

In this section, I examine evidence on changes in the UK labour market in the 1980s. This brief exercise sets the stage for our analysis of the effects of increased flexibility in the labour market, by providing evidence that during the 1980s the structure of the labour market changed significantly. Much of the change in labour market flexibility that has been commented upon has come about as a result of changes in legislation, and so I concentrate on these.

Unfortunately, there is very little evidence on the size of recruiting and training costs. We can say, however, that the joint regulation of recruitment between trade unions and employers decreased through the 1980s. (See Beatson (1995), Table 3.1.) To the extent that this acts as a psychological cost on employers, this change would correspond to a reduction in hiring costs. In addition, joint regulation of employment levels (which would act as a cost on both hiring and firing) has also fallen in the 1980s. (See Beatson (1995), Table 3.2.) An additional source of hiring restriction used to be the 'pre-entry closed shop'. The *Employment Act* of 1988 removed the 'closed shop' by making it illegal to take industrial action to enforce trade union membership. This allowed firms to hire any workers, not only those who were members of the union; this reduced hiring costs for firms. The *Employment Act* of 1989 repealed several restrictions on the employment of women and young people. In addition, in 1988 *Family Credit* replaced *Family Income Support* as the main benefit for low-income families in work. This benefit rose with each child, thus making work more attractive for women who had just had children. (See Evans (1998).) Both these changes lowered hiring costs, by widening the potential pool of workers from which firms could hire.

Firing costs are much easier to assess, since they typically take the form of redundancy payments or other statutory restrictions on the ability of employers to lay off their workers. The main change to the laws on employment protection was to lengthen the time an employee had to work before being able to take his employer to court for unfair dismissal. It was increased from six months to one year in the *Unfair Dismissal (Variation of Qualifying Period) Order, 1979*, and then to two years in the *Unfair*

Dismissal (Variation of Qualifying Period) Order, 1985. By allowing employers more easily to dismiss workers who had been employed for less than two years, these laws reduced firing costs.[1]

Increases in wage flexibility at the microeconomic level have come about as a result of two policies: the abolition of minimum wages and the weakening of the power of trade unions. When the Conservatives were elected, minimum wages in the United Kingdom only operated in certain industries, and were set by Wage Councils. The scope and functions of Wage Councils were reduced in the *Wages Act, 1986*, and Wage Councils were abolished in all industries (except for agriculture) in the *Trade Union Reform and Employment Rights Act, 1993*.[2]

A number of acts throughout the 1980s reduced the power of trade unions. The *Employment Act, 1980*, outlawed picketing away from the workers' own place of work and secondary industrial action (strikes in support of other workers). The *Social Security Act, 1980*, deducted strike pay from the benefit entitlement of striking families. The *Employment Act, 1982*, made unions liable for damages resulting from unlawful industrial action, as well as narrowing the definition of lawful industrial action. The *Trade Union Act, 1984*, made it illegal to take industrial action without a secret ballot. The *Employment Acts* of 1988 and 1990 made the closed shop illegal, by making it unlawful to refuse to hire someone on grounds of union membership or non-membership, as well as making it unlawful to take industrial action to enforce membership. The *Trade Union Reform and Employment Rights Act, 1993*, made it necessary for unions to provide employers with seven days' notice of any industrial action, and also gave citizens a right to stop unlawful industrial action in the courts. Finally, the *Collective Redundancies and Transfer of Undertakings (Amendment)*

(1) The 'Fairness at Work' White Paper states that the qualifying period for unfair dismissal will be reduced from two years to one in forthcoming legislation. However, as this change did not occur during the period that the paper covers, it is not considered.
(2) The recently elected Government is implementing a number of additional labour market reforms, including the New Deal, the Working Families Tax Credit and a National Minimum Wage. The effects of these policies are again outside the sample period of this paper and so are not examined.

Regulations, 1995, removed the requirement to consult with trade unions about planned redundancies in a unionised workplace. All of these acts weakened the bargaining power of trade unions and, so made it easier for employers to change wages and/or employment, reducing their fixed employment costs.

Given the evidence discussed above, it seems fairly clear that changes in the UK labour market in the 1980s have made it more flexible. In particular, a number of laws were passed that reduced the costs to employers of making wage and/or employment adjustments.

3 A 'real business cycle' model of the labour market

In this section, I use a 'real business cycle' type model to predict the effect of increased labour market flexibility. The model is a combination of the models of Cho and Cooley (1994) and Gali (1995). Combining these two models enables me to consider the effects of labour market flexibility (as measured by fixed employment costs) on consumption, investment, output, employment, average hours, unemployment and inactivity.

The Gali (1995) model introduced imperfect competition in both the product and labour markets into an otherwise standard real business cycle model. Given imperfect competition, firms will make 'rents' from production. These rents are split by a wage-bargaining process, in which workers in each firm set wages and the firm then chooses employment. This contract lasts for one period, and then the process is repeated. Because the wage bargaining creates a gap between the labour workers would supply at the equilibrium wage and that which is actually employed, it is possible to talk about Keynesian involuntary unemployment within this model. In the model, the production side of the economy consists of two sectors: one producing final goods and the other producing intermediate goods. The final goods producing firm maximises profits, subject to its CES production function.

Mathematically, its problem is

$$\text{Max}\left(\int_0^1 X(z)^{\frac{s-1}{s}}dz\right)^{\frac{s}{s-1}} - \int_0^1 p(z)X(z)dz \qquad \textbf{(1)}$$

where we have normalised the price of the final good to unity, *p(z)* is the price of intermediate good *z*, *X(z)* is output of intermediate good *z*, and *s* (>1) is the elasticity of substitution among intermediate goods. The first term is revenue and the second term is costs. Solving this problem produces a set of demand curves for the intermediate goods.

The problem for the *j*th intermediate good producer is to maximise profits subject to its inverse demand function, derived from **(1)**. Mathematically,

$$\text{Max} \qquad p_{jt}X_{jt} - w_{jt}n_{jt} - q_t k_{jt-1}$$

$$\text{subject to } X_{jt} = q_t\left(k_{jt} - nq_t^{\frac{1}{1-a}}\right)^a \left(n_{jt}\right)^{1-a}$$

$$p_{jt} = \left(\frac{(m_t - 1)\bar{X}_{-jt} + X_{jt}}{\left(\int_0^1 X(z)^{\frac{s-1}{s}}dz\right)^{\frac{s}{s-1}}}\right)^{-\frac{1}{s}} \qquad \textbf{(2)}$$

$$\ln(q_t) = \ln(q_{t-1}) + g + e_t$$

where the firm takes the wage, *w*, and rental rate of capital, *q*, as given. q is a technology shock that is assumed common to all firms, $nq_t^{\frac{1}{1-a}}$ represents an overhead capital requirement for the firm that is growing at the same rate as labour-augmenting technical progress, n_{jt} represents total hours worked in firm *j* at time *t*, k_{jt} represents the capital stock rented from

the consumers by firm *j*, *m* denotes the number of active firms in the industry, and $\bar{X}_{-j}$ is the average output for the other *m*-1 firms in the industry. The first constraint is the production function for intermediate goods. The second constraint is the inverse demand curve, and the final constraint defines the path of the aggregate productivity shock. Following Gali, we assume Cournot competition in each intermediate good producing industry.

The model of Cho and Cooley (1994) attempted to examine how changes in total hours worked are split between employment and average hours worked. So incorporating this part of their model enables us to study the effect of labour market flexibility on the split between hours and employment. In this model, the representative consumer chooses consumption, average hours and employment to maximise the present discounted value of his lifetime utility streams. Fluctuations in total hours worked are explained as the result of intertemporal substitution of leisure, extended to incorporate a choice between hours and employment. Mathematically, his problem is:

$$\underset{k_t, n_t}{Max} \qquad E\sum_{0}^{\infty} b^t \left(\log(c_t) - \frac{a h_t^{1+y} e_t}{(1+y)} - \frac{b e_t^{1+g}}{(1+g)} \right) \qquad \textbf{(3)}$$

$$\text{Subject to} \qquad k_t = (1 - d + q_t) k_{t-1} + w_t h_t e_t - c_t \qquad \textbf{(4)}$$

where *c* is consumption, *e* is total employment, *h* is average hours, *k* is the total end-of-period capital stock, b is the discount factor, and $d$is the depreciation rate on capital. b here is a parameter measuring the fixed costs associated with employment. In what follows, I use this to measure the degree of microeconomic employment flexibility. Notice that utility is separable in 'total hours worked' and employment, though not in 'average hours' and employment. The consumer owns the capital stock, which is the only source of wealth in this model.

Using this model, we can define a concept of 'involuntary unemployment'. To do this, we calculate the quantity of labour our representative consumer would wish to supply if, he took the equilibrium law of motion for wages and interest rates, generated by the above model, as given. Call this 'notional labour supply', n^*. Then the unemployment rate at time t will be determined by the following equation

$$u_t = \ln\left(\frac{n_t^*}{n_t}\right) \qquad \textbf{(5)}$$

This unemployment rate is 'involuntary' in the sense that if there were no rigidities (in this model imperfect competition and the presence of employee bargaining power), then workers would choose to work more ($n^* > n$) at the given wage, and firms would be willing to hire them.

Before using the model to examine the quantitative effects of increased flexibility on the labour market, we need to calibrate the model. Holland and Scott (1997) estimate capital's share of income, a, at 0.44, the growth rate of the technology shock at 0.21% per quarter, and its standard deviation at 0.01. We set the discount factor, b, to 0.99 implying a steady-state real rate of interest of about 4% per annum. Following Cho and Cooley (1994), we set the elasticity of hours in the utility function at 2, and the elasticity of employment at 1.2. The depreciation rate of capital is set at 10% per annum, implying a $d$of 0.025. We set the elasticity of demand for goods with respect to their relative price, s, equal to 2, implying a mark-up of price over marginal cost equal to 2. This is within the range of estimates found by Hall (1991) for industries in the United States, and is unlikely to be wildly different from that in the United Kingdom. The remaining three parameters – the utility cost of hours, a, the utility cost of employment, b, and the fixed overhead cost, n – were set such that the steady state of the model implied a value for average hours worked of 0.3, an inactivity rate of 21.4% (the average for UK data from 1979 Q3 to 1996 Q2) and an unemployment rate of 8.7% (the average for UK data for the same period). These parameters are summarised in Table B.

Table B: Parameters for the equilibrium business cycle model

Discount rate	b	0.99
Utility weight on hours	A	41.317
Utility weight on employment	B	3.406
Elasticity of 'employment' cost in utility function	g	1.2
Elasticity of 'hours' cost in utility function	y	2
Capital's share of output	a	0.4436
Depreciation rate of capital	d	0.025
Elasticity of substitution among goods	s	2
Overhead cost	n	0.171
Growth rate of technology shock	g	0.002079
Standard deviation of technology shock	s_e	0.009253

Chart 1 shows that an increase in labour market flexibility brought about by a fall in fixed employment costs (denoted by *b*) leads to greater employment and lower average hours worked. One interpretation of this is that there would be greater use of part-time workers, possibly at the expense of full-time workers. This has indeed been seen in recent years as the labour market has become more flexible. We can also use this model to examine the effect of increased flexibility on the steady state ('natural') unemployment rate. This is shown in Chart 2. As we can see, the more flexible the labour market (the lower is *b*), in this model the lower the unemployment rate is. Finally, Chart 3 demonstrates that an inflexible labour market again carries with it a cost in terms of output, consumption and investment.

Chart 1: Effect of fixed employment costs on employment and average hours

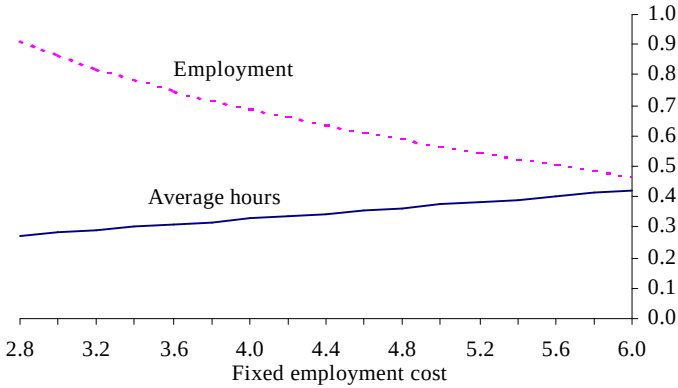


Chart 2: Effect of fixed employment cost on the unemployment rate

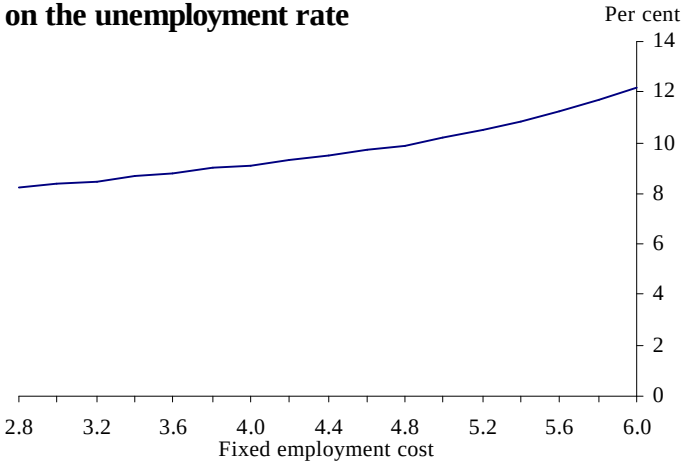


Chart 3: Effect of fixed employment costs on consumption, investment and output

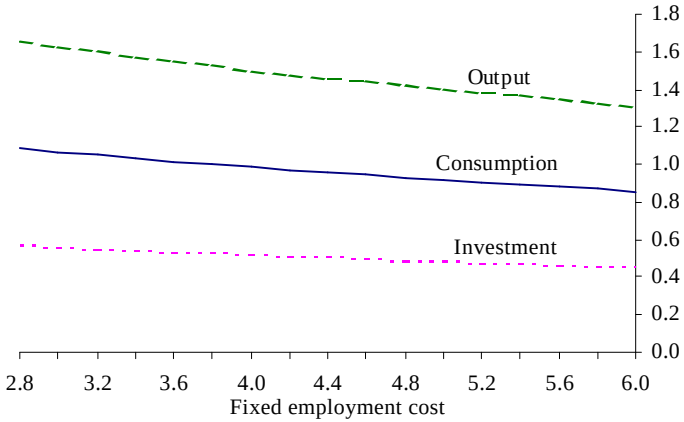


Table C shows the effects of greater labour market flexibility on the volatilities of output, consumption, hours and employment. As we can see, an increase in labour market flexibility (lower *b*) has very little impact on the volatility of any of our series. The only series that seems to be affected is that of unemployment, which becomes more volatile as the labour market becomes less flexible (though the increase is still insignificant). This perhaps surprising result is easily explained in the context of this model. What has happened is that the presence of employment costs means that when the economy is hit by shocks employment cannot adjust by as much as is desired. On the other hand, 'notional' employment is unaffected by these costs, and so will adjust by much more. So the unemployment series will become more volatile.

Table C: Results for varying labour market flexibility

	$b = 3$	$b = 3.406$	$b = 4$	$b = 5$
Std. deviation (consumption)	0.89 (0.16)	0.90 (0.15)	0.92 (0.15)	0.91 (0.12)
Std. deviation (output)	1.59 (0.32)	1.65 (0.31)	1.65 (0.33)	1.62 (0.26)
Std. deviation (employment)	1.07 (0.19)	1.02 (0.20)	1.05 (0.18)	1.05 (0.17)
Std. deviation (average hours)	0.25 (0.05)	0.25 (0.05)	0.23 (0.04)	0.23 (0.04)
Std. deviation (total hours)	1.30 (0.24)	1.25 (0.24)	1.26 (0.22)	1.26 (0.21)
Std. deviation (unemployment)	1.02 (0.19)	1.06 (0.21)	1.19 (0.22)	1.32 (0.22)

Notes: Numbers given are means, with standard errors in brackets, of 100 sample simulations, each of 66 periods. The data series from the simulations are first HP-filtered with l set at the typically used value of 1600.

4 A 'search' model of the labour market

The second model I consider is that of Mortensen and Pissarides (1994). This model concentrates on modelling the labour market: the production side of the economy is very simple. In particular, this model lets us examine the effect of varying structural parameters within the labour market on labour market flows. This was not possible using the above model. The model is based on the idea that employers are not able to find employees as soon as they want them, which generates rents about which the firm and worker bargain. As in the above model, where the rents resulted from the firms operating in imperfectly competitive markets, this bargaining results in workers being off their notional labour supply curve (which in this model is assumed to be perfectly inelastic).

Consider the production side of the economy first. We suppose that each job has productivity x, which varies across jobs. Shocks to x, or 'idiosyncratic' shocks are supposed to model technology or other shocks that only affect small areas or particular jobs (for example, a storm hitting a particular region or a new way of making stereo systems). Productivity level x follows a Poisson process, with new values arriving at rate l. These new arrivals will be drawn from a uniform distribution on the closed

interval [γ1] which we denote as $F(x)$. This captures the facts that idiosyncratic shocks can be good or bad, and arrive at random times.

A matching function relates the number of new job matches formed each quarter, m, to the average stock of vacancies, v, and unemployed workers, u, in that quarter. For concreteness, suppose that this relation can be written as

$$m(v,u) = v^{\eta} u^{1-\eta} \qquad \textbf{(6)}$$

When the firm and employer meet, they bargain about the surplus that results from being in a match. We suppose that this is split according to the Nash bargaining solution. If we let U be the value of unemployed search (which is the worker's outside option in the bargain) and suppose that the value of an open vacancy (the firm's outside option) is zero by assuming free entry in the market for vacancies, we get the following solution:

$$\beta\,(J(x) + \phi) = (1-\beta)\big(W(x) - U - \phi\big) \qquad \textbf{(7)}$$

where $J(x)$ is the value of a job with idiosyncratic productivity x to the firm, $W(x)$ is the value of the same job to the worker, β is a parameter measuring the workers' bargaining power and ϕ is a redundancy payment that firms have to make to any worker they lay off. The flow value of being employed will be given by the prevailing wage and the option value resulting from the possibility of the job being hit by an idiosyncratic shock. We assume that a proportion, δ of jobs is destroyed exogenously each period. Given 'efficient' bargaining (which we assume), the other jobs will be destroyed only if their surplus value becomes negative. This results in the following equation:

$$rW(x) = w(x) + \delta(U - W) + \lambda\left(\int \max(W(z), U)\,dF(z) - W(x)\right) \qquad \textbf{(8)}$$

where r is the real rate of interest. This can be interpreted as a standard asset-pricing equation. The present discounted value of the asset (employment in this case) is equal to the flow of dividends over the period (here, wages) plus the expected present discounted value of the asset at the end of the period. In this case, the value will be W unless the job is destroyed exogenously (which happens with probability d) in which case it will be U, or it is hit by an idiosyncratic shock (which happens with probability l). In this case, the new present discounted value will be the greater of W and U, depending on what value of x is drawn.

Similarly, the flow value of being unemployed will be given by the flow value of leisure, b, and the option value that results from the possibility of finding a job:

$$rU = b + m(v,u)\big(W(1) - U\big) \qquad \textbf{(9)}$$

Again, the present discounted value of being unemployed, U, is equal to the flow over the period, b, plus the expected present discounted value at the end of the period, which is $W(1)$ with probability m and U with probability $(1-m)$.

Assuming free entry in the market for vacancies and that all new jobs are created at the top end of the distribution of productivity, we can derive the following condition for job creation

$$\frac{m(v,u)}{v}\big(J(1) - k\big) = c \qquad \textbf{(10)}$$

where c is a per-period recruiting cost and k is a fixed hiring cost. Here the firm balances the cost of creating a vacancy, c, against the expected benefit: the value of a filled vacancy, $J(1)-k$, multiplied by the probability of filling a vacancy in a period, m/v. Now within this model we can use hiring, k, and firing, f, costs to capture changes in the flexibility with which firms can make employment adjustments: the less flexible the labour market, the harder (costlier) it is for employers to hire and fire workers.

Before doing this, we again need to calibrate the model to match features of UK data. As in the previous model, we set the real rate of interest at 1% per quarter. The exogenous turnover rate was obtained using the following pieces of information. Akerlof *et al* (1988) report that about 80% of quits are job-to-job movements, with no intervening spell of unemployment. This implies that job-to-job movements $q = 4\,d$ Anderson and Meyer (1994) report that about 50% of all permanent separations involve less than two weeks' lost earnings among those who are eventually re-employed (ie, they represent job-to-job movements). In other words, $q = L$ (where L represents 'lay-offs'). Together, these facts imply that 20% of total job separations ($d+L$) are quits to unemployment (including retirement). Given an unemployment inflow rate of 4.23% per quarter (the average for UK data from 1979 Q3 to 1996 Q2), this implies that $d$can be set at 0.008 per quarter. q is set at 0.6, the value estimated by Blanchard and Diamond (1989) and b is set at 0.3, the value estimated by Abowd and Lemieux (1993). The arrival rate of idiosyncratic shocks, l, was set equal to 0.1, a rate consistent with available evidence.

Hamermesh (1993) suggests that $3000 and $2500 are reasonable estimates of the respective costs of recruiting and training a worker in 1990. Average wages in the model are about 90% of maximal output, implying a figure for this magnitude of about $9000 in 1990. So, we obtain values of 0.275 for k and 0.33 for c. In the United Kingdom, the size of the statutory redundancy payment depends upon the age and length of service of the employer. For the average worker, it works out at about one month's wages. So, we set f at 0.3.

The remaining two parameters — the flow value of leisure, b, and the lower bound of idiosyncratic shocks, g— were set such that the steady state of the model implied a value for unemployment incidence of 4.23% per quarter and an unemployment duration of 2.23 quarters (the average for UK data from 1979 Q3 to 1996 Q2). In other words, as we are interested in using this model to explain the effects on labour market flows, it is calibrated such that at baseline parameters, the flow of workers between employment and unemployment in the model is the same as in the data. These parameters are summarised in Table D, below.

Table D: Parameters for the equilibrium business cycle model

Real interest rate	r	0.01
Workers' bargaining power	b	0.3
Vacancy elasticity of matching	h	0.6
Lower bound of idiosyncratic shocks	g	0.80
Arrival rate of idiosyncratic shocks	l	0.1
Flow value of leisure	b	0.62
Exogenous job turnover rate	d	0.008
Redundancy payment	f	0.3
Recruiting cost	c	0.33
Fixed hiring cost	k	0.275

The effect of changes in the fixed hiring cost (denoted as k) on the steady state unemployment rate, its incidence and duration is shown in Chart 4. As expected, unemployment incidence is increased and duration is reduced by a reduction in hiring costs (an increase in labour market flexibility). The effect of increased unemployment incidence outweighs the effect on duration, and so the unemployment rate is higher for lower hiring costs. This is a different result from that produced by the real business cycle model described in Section 3 above, for two reasons: first, that model failed to capture the effect of the hiring cost on unemployment incidence and, second, the search model does not allow the firm to substitute hours for heads in order to avoid the employment cost.

However, the fact that unemployment is higher does not necessarily imply lower output, since the increase in unemployment will be accompanied by a reduction in the life of unproductive jobs and increased creation of new productive ones. Chart 5 shows this, by plotting aggregate consumption against hiring costs. As we can see, increased flexibility raises consumption.

Chart 4: Effect of hiring costs on unemployment, incidence and duration

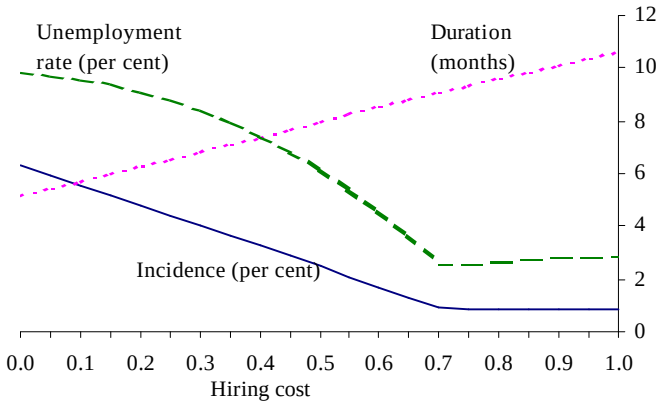
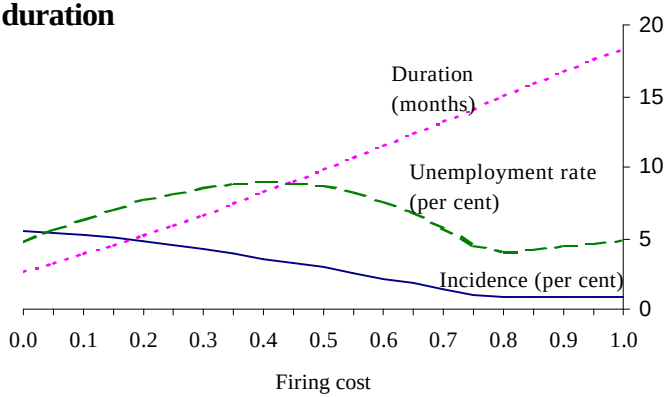


Chart 5: Effect of hiring costs on aggregate consumption

Firing costs in this model consist of a redundancy payment that is paid by the firm to the worker when a job is destroyed. Chart 6 shows that an increase in labour market flexibility brought about by a reduction in firing costs (denoted by f) again leads to an increase in unemployment incidence and a reduction in duration. In this case, however, the effect of increasing the firing cost is to raise the unemployment rate initially before lowering it and then raising it again. Again, the real business cycle model is unable to capture this ambiguous effect as the separate effects of the cost on unemployment incidence and duration are not modelled. At the baseline value of these costs ($f = 0.3$), an increase in flexibility lowers the unemployment rate. Chart 7 shows again that an increase in labour market flexibility leads to higher aggregate consumption.

Chart 6: Effect of firing costs on unemployment rate, incidence and duration



To examine the predictions of the model about the effect of increased flexibility on the cyclical properties of unemployment and consumption, I simulate a stochastic version of the model. In the stochastic version of the models I follow Mortensen and Pissarides (1994), and assume that in addition to the idiosyncratic shocks all jobs are hit by a mean unity aggregate productivity shock, y. Thus, the total productivity of any job will be xy, where we recall that x will vary across jobs. The aggregate productivity shock follows an AR(1) process, the parameters of which are estimated such that it matches the process followed by (HP-filtered) average productivity in the United Kingdom for the period 1979 Q3 to 1996 Q2, where this was measured by dividing GDP by the 'total hours' series described in Section 5, below.

Each simulation consists of 66 periods and we run 100 simulations. We use the following five parameter settings: baseline ($k = 0.275$, $f = 0.3$), low hiring costs ($k = 0.15$, $f = 0.3$), Zero hiring costs ($k = 0$, $f = 0.3$), low firing costs ($k = 0.275$, $f = 0.15$) and Zero firing costs ($k = 0.275$, $f = 0$). The results are shown in Tables E and F. As we can see, an increase in labour market flexibility has no effect on the variance of consumption, but reduces the variance of unemployment. The effects on average consumption, the average unemployment rate, incidence and duration basically repeat those shown above for the steady state.

Table E: Results for different levels of hiring costs

	Model		
	baseline	low hiring costs	zero hiring costs
Mean (u)	8.60 (0.73)	9.35 (0.73)	9.79 (0.69)
Std. deviation(u)	0.80 (0.28)	0.80 (0.27)	0.78 (0.25)
Mean (cons.)	0.92 (0.02)	0.93 (0.02)	0.94 (0.02)
Std. dev.(cons)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
Mean (incidence)	4.23 (0.10)	5.18 (0.10)	6.29 (0.10)
Mean (duration)	2.22 (0.16)	1.99 (0.13)	1.73 (0.11)

Note: Numbers given are means, with standard errors in brackets, of 100 sample simulations, each 66 periods long.

Table F: Results for different levels of firing costs

	Model		
	baseline	low firing costs	zero firing costs
Mean (u)	8.60 (0.73)	7.07 (0.56)	4.72 (0.34)
Std. deviation(u)	0.80 (0.28)	0.66 (0.21)	0.46 (0.17)
Mean (cons.)	0.92 (0.02)	0.93 (0.02)	0.93 (0.02)
Std. dev.(cons)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
Mean (incidence)	4.23 (0.10)	5.03 (0.11)	5.45 (0.13)
Mean (duration)	2.22 (0.16)	1.51 (0.10)	0.91 (0.05)

Note: Numbers given are means, with standard errors in brackets, of 100 sample simulations, each 66 periods long.

In addition, this model allows us to examine directly the effect of a weakening of the 'bargaining power' of workers *vis-à-vis* the firms. The relevant parameter is b. Chart 8 plots the effect of changing b on the steady-state unemployment rate, incidence and duration and Chart 9 does the same for steady-state consumption. Looking at Chart 8, we see that reducing bargaining power increases unemployment incidence (as workers are less able to protect their jobs) but lowers unemployment duration. In particular, as workers increase their power, employers simply stop hiring people—as they can only extract a small amount of any rent that accrues from job creation, it is less worth their while to spend money on recruiting (posting vacancies). There is a clear case of 'insider-outsider' conflict in this models, with the insiders obtaining higher wages at the expense of outsiders who remain unemployed for longer periods of time. Chart 9, however, suggests that a reduction in union power, such as in the 1980s, leads to an unambiguous rise in consumption in this model. These results are qualitatively similar to the predicted effects of a fall in hiring and firing costs.

Chart 8: Effect of bargaining power on the unemployment rate, incidence and duration

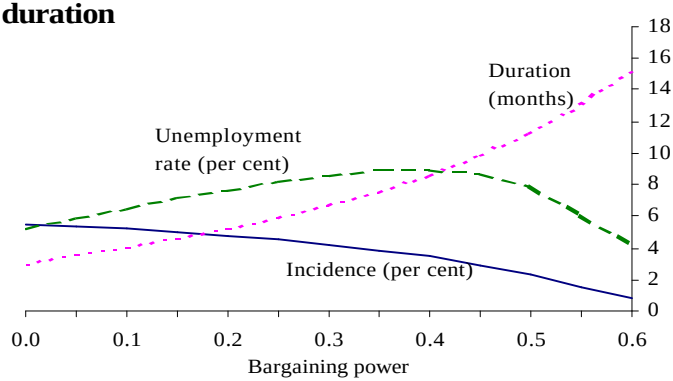


Chart 9: Effect of bargaining power on aggregate consumption

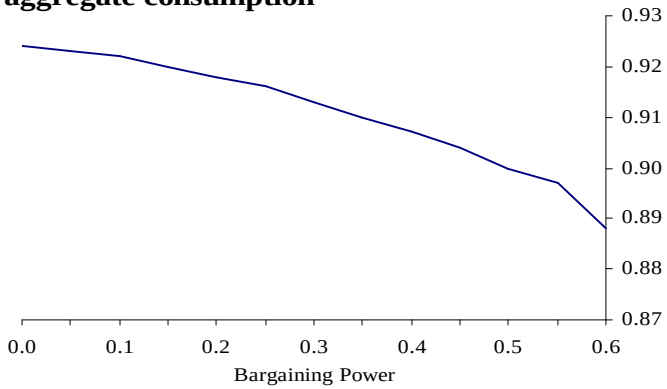


Table G looks at the cyclical effects of a change in the bargaining power of workers. We see that a reduction in worker bargaining power will reduce the volatility of unemployment without any effect on the volatility of consumption. The results on the means of the unemployment rate, unemployment incidence, unemployment duration, and consumption are

the same as suggested by our steady-state analysis, and so I do not discuss them further.

Table G: Results for different levels of bargaining power (Mortensen and Pissarides (1994) model)

	Bargaining power (b)		
	0	0.15	0.3
Mean (u)	5.23 (0.46)	7.13 (0.59)	8.60 (0.73)
Std. deviation(u)	0.57 (0.17)	0.68 (0.22)	0.80 (0.28)
Mean (cons.)	0.93 (0.02)	0.93 (0.02)	0.92 (0.02)
Std. dev.(cons)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
Mean (incidence)	5.41 (0.12)	5.01 (0.10)	4.23 (0.10)
Mean (duration)	1.02 (0.07)	1.53 (0.11)	2.22 (0.16)

Note: Numbers given are means, with standard errors in brackets, of 100 sample simulations, each 66 periods long.

5 The effects of increased flexibility: macroeconomic evidence

The models in the previous two sections gave us the following theoretical predictions for the effects of an increase in labour market flexibility, such as we believe has been observed in the United Kingdom in the past ten years:

- Greater output and consumption.
- Lower unemployment and average hours.
- Not much change in output and consumption volatility.
- Less volatility in employment and unemployment.

The last result is the most surprising, but seems to be very robust to the model used. The same result has also been found by Valdivia (1995) using a variant of the search model, and has become standard wisdom in the search literature.

The final section of this paper examines actual macroeconomic data on the labour market for the United Kingdom, in order to see whether or not the predictions of the models have been born out in the data. Table H shows labour market data for the United Kingdom for the period 1979 Q3 to 1997 Q1. This data is split into three sub-periods: the first two are complete CSO reference cycles from peak to peak, the third is from the most recent peak (1988 Q4) to the end of my sample (1997 Q1).(3) The series for total hours in the economy was based on the Labour Force Survey series which is annual from 1984-91 and quarterly thereafter. For 1984-91, it was assumed that the figures given in the Labour Force Survey were for the first quarter, and linear interpolation was used to produce figures for the other three quarters. The following regression was then run over this period:

$$\frac{AS_t}{AM_t} = a + b_1 \Delta GDP_t + b_2 MASH_t + b_3 PTSH_t + b_4 t \qquad \textbf{(11)}$$

where *AS* is average hours worked in non-manufacturing, *AM* is average hours worked in manufacturing, *GDP* is Gross Domestic Product, *MASH* is the share of manufacturing workers in total employment and *PTSH* is the share of part-time workers in total employment. The fitted values of this regression for the period 1979 Q3 to 1983 Q4, together with data on average hours worked in manufacturing, workforce in manufacturing employment and whole-economy workforce in employment, were used to construct the total hours series for this period.

(3) In response to a comment from an anonymous referee, I examined what would happen if, instead, I looked at 'employment' cycles. Using the HP-filtered 'total hours' series as a guide suggests the following periods: 1979 Q3 to 1985 Q1, 1985 Q1 to 1989 Q1 and 1989 Q1 onwards. As these time periods are so similar to those used in Table H, it is not altogether surprising that the results are qualitatively the same. Hence, they are not reported.

Table H: Actual UK labour market data

	1979 Q3-1996 Q2	1979 Q3-1984 Q1	1984 Q1-1988 Q4	1988 Q4-1996 Q2	1979 Q3-1988 Q4
St.dev (*Y*)	1.69	1.70	1.45	1.84	1.61
St.dev(*C*)	1.79	1.48	1.95	1.96	1.74
St.dev(*n*)	2.00	2.28	1.37	2.12	1.92
St.dev(*emp*)	1.55	1.79	0.90	1.70	1.40
St.dev(*hrs*)	1.01	1.47	0.61	0.73	1.20
St.dev(*n*) / St.dev(*Y*)	1.18	1.34	0.94	1.15	1.19
St.dev(*w*)	0.94	0.92	1.18	0.73	1.07
St.dev(*u*)	14.02	16.30	5.26	15.50	12.33

Notes: *Y* denotes real non-oil gross domestic product (GDP), *C* denotes real consumption, *emp* denotes workforce in employment, *n* denotes total hours worked in the whole economy as constructed according to the text, *hours* denotes average hours worked and is given by *n* divided by *emp*, *w* denotes real wages, and *u* denotes the 'claimant-count' unemployment rate. For the calculation of standard deviations (which are given in percentage terms), all variables are first logged and then detrended using the HP filter. When using this filter, I set the smoothing parameter, l, to the commonly used value of 1600.

Table H shows that between the previous cycle and this one, the variance of every series I examined, has risen with the exception of wages. Our models cannot explain these changes as a consequence of increased labour market flexibility. In the data, the volatility of employment and the unemployment rate has increased, contrary to what the models predicted. However, this fact could be explained within our models, by the coincidence of more flexible labour markets together with higher incidence or variance of regional or industry level shocks. We might expect this to raise the volatilities of consumption, output and the unemployment rate: that of the unemployment rate much more substantially. But we do find that the volatility of total hours relative to output has fallen. This suggests that abstracting from the sorts of shocks that make all series more volatile, we do get the predicted effect of increased labour market flexibility: a fall in the variance of total hours, employment and average hours relative to output.

Alternatively, it could be that the 1984 Q1 to 1988 Q4 cycle was characterised by unusually smooth series for employment, hours and unemployment. The CSO's index of coincident indicators defines a cyclical trough in 1984 Q1, but, in terms of labour market data, the 'correct' cycle to use should be 1979 Q3 to 1988 Q4, as employment did not pick up between 1979 Q3 and 1984 Q1. If we do this, we find that the volatilities of employment and unemployment have still increased (though much less dramatically), but that of hours has fallen. The volatility of total hours relative to output fell.

Chart 10 examines the evidence on average hours. As we can see, a rise in average hours during the early and mid 1980s was reversed during the most recent cycle. The reversal during this cycle certainly accords with the predictions of the model studied above, that more flexible labour markets should be associated with lower average hours. However, they fail to explain the rise in average hours during the 1980s.

Chart 10: Average hours worked (whole economy)

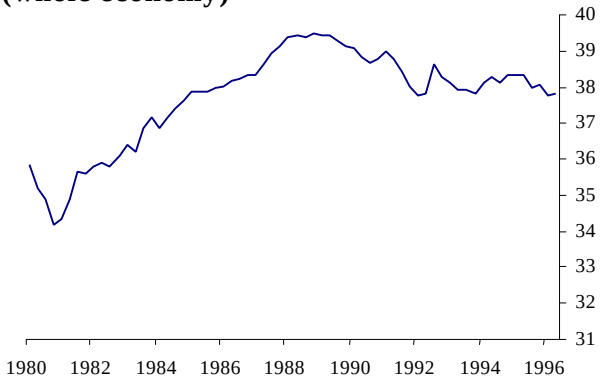
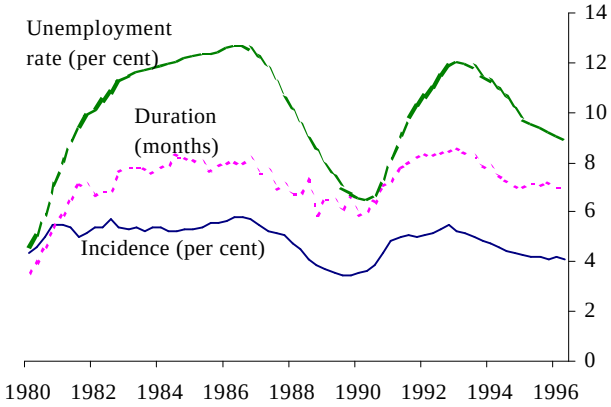


Chart 11 examines the evidence on the unemployment rate, incidence and duration. We can see clearly the build-up in unemployment in the early 1980s, which was associated with a large rise in unemployment duration.

Since about 1985, we have seen a slight fall in the average unemployment rate, associated with a slight fall in unemployment incidence. Not much change can be noticed in unemployment duration, except that it has stopped rising. Recall that the models predicted that an increase in flexibility would reduce the unemployment rate and unemployment duration, though it would increase unemployment incidence. The evidence in Chart 11 is not particularly favourable on this count. However, the models also predicted a fall in the persistence of the unemployment rate as a result of increased flexibility, and this certainly seems to have happened since 1985.

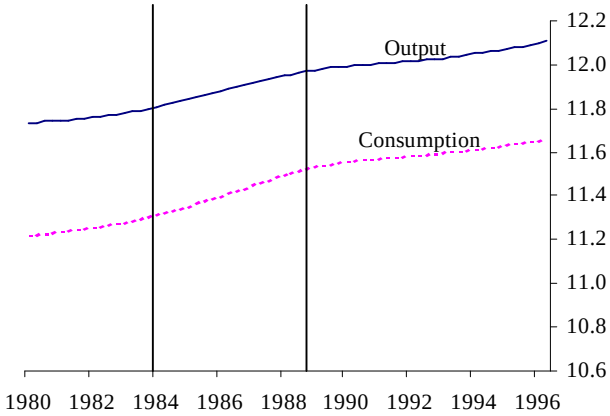
Chart 11: Unemployment rate, incidence and duration



Examining the consumption, investment and output level effects of increasing labour market flexibility is hard to do in the data. This is because of the upward trend in these series and the fact that their growth rates will be unaffected by these changes (at least if we believe that growth rates are determined by exogenous technical progress). The best way of examining this issue is to see whether or not we can detect 'jumps' in these series. Chart 12 plots trend output and consumption (where the data has

first been logged and then filtered using the HP filter with the smoothing parameter, l, set to its normal value of 1600). The vertical lines are the peaks of the two cycles, 1984 Q1 and 1988 Q4. From the graph, there would appear to be a step increase in consumption and output during the second of the three cycles in my data. The models presented above would have predicted that would this result from increased labour market flexibility during this period. Of course, many other things were going on in the 1980s. In particular, financial liberalisation may well have been responsible for the marked rise in consumption growth in the middle of the three cycles. However, this evidence can be thought of as being tentatively favourable to the models' predictions of step increases in output and consumption resulting from increased flexibility in labour markets.

Chart 12: Trend output and consumption



6 Conclusions

This paper has attempted to use the increase in flexibility in labour markets as a 'natural experiment' with which to examine the predictions of two popular models of the labour market. I have considered a real business cycle model and a search model, and examined within them the steady-state and cyclical behaviour of economies with different levels of microeconomic labour market flexibility. The models predicted greater output, consumption and employment and lower average hours in a more flexible economy. The data presented above would tentatively support these predictions. The models predicted not much change in the volatility of output or consumptions and lower volatility in employment. However, the volatilities of output, consumption, employment and hours have all increased since the previous cycle, although the volatility of total hours relative to output reduced. This would suggest that, in order to explain these changes, we need to think of other shocks that occurred over this period that increased the volatility of all our series. This is beyond the scope of this paper.

Of course, this whole approach has ignored the potentially important question of what happens during the transition period between low and high flexibility. If the transition period is long, then the United Kingdom may not yet have settled in its new equilibrium, and the data would be disagreeing with the models because of this. Unfortunately, a full examination of this question is beyond the scope of this paper.

Of course, there are many aspects of labour market flexibility that these models are unable to examine. In particular, it would be very interesting to examine the effects of increasing part-time and temporary employment, as much has been made of the increase in such employment in the United Kingdom. Continental countries such as Spain and the Netherlands have relied on this approach to bring about greater flexibility within their labour markets. That is an avenue for future research.

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