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Labor Market Institutions and Unemployment in France *vs.* in the UK: A Wage Posting Investigation

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Abstract

Labor market institutions have differently evolved in France and the United Kingdom since the mid-1980s. For instance, french unemployed workers benefit nowadays from high unemployment compensations proportional to earnings in the preceding employment spell, whereas in the UK all unemployed workers are entitled to a given low unemployment insurance. Our paper seeks to gain insights on the role played by these labor market institutions in explaining the unemployment rate gap between France and the UK. We use an equilibrium matching model incorporating wage posting and specific human capital investment where unemployment and the distribution of both wage and productivity are endogenous. We first show that dispersion of unemployment benefits is a primary cause of high unemployment in France. We then find that it should be optimal to implement UK labor market institutions in France despite a noticeable reduction in labor productivity.

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Introduction

It is now well understood that high unemployment insurance discourages search by decreasing the relative incentives to seek employment and adversely affects job creation by driving up wages. The interaction between shocks and this institution (among others) is often pointed as the main factor responsible for the rising level of unemployment in European countries during the last two decades (see Blanchard and Wolfers [2000] for an empirical investigation and Lunqjvist and Sargent [2002], Mortensen and Pissarides [1999] or Den Haan, Haefke and Ramey [2005] for a structural investigation in job search and matching models).

The rise in European unemployment hides also significant differences among countries. While UK unemployment rate was greater than its average European counterpart at the beginning of the 1980s, the situation was reversed at the end of the 1990s when it fell in absolute value around 5%. The opposite holds for France, where the absolute unemployment rate reached more than 10%. During the same period of time, the average replacement ratio in France increased by 60% whereas it decreased by 30% in UK, representing today 69% of the average wage in France and 34% in the UK.[1][2]

Beyond these differences on averages, unemployment insurance systems also differ in scale of heterogeneity among the benefits paid. Loosely speaking, distribution of unemployment compensations in the UK is a mass point. In contrast, french institutions allow to smooth consumption by indexing unemployed workers' compensations to their previous earned wage. In this paper, we precisely show that dispersion of unemployment benefits in France decreases unemployment and output as well.

To that end, we extend the wage posting model of Mortensen [2000] to allow for heterogeneity in unemployment benefits. In line with Burdett and Mortensen [1998] (BM hereafter), firms choose different levels of wage offers (and training), which result in a dispersed wage offers distribution

[1] See OECD summary measure of the replacement rate.

[2] On the contrary, the UK minimum wage has converged to its french level (see Eurostat [2005]).

where some of them are possibly rejected by unemployed workers. This wage posting approach is incorporated into matching theory (Pissarides [2000]) in order to determine unemployment and vacancy rates in a consistent manner.

We then compute numerical examples using differentiated unemployment insurance systems. Thank to BM's definition, we find that inefficient unemployment accounts for a sizeable part of unemployment in France. Removing minimum wage is then found to decrease employment despite the fall in the labor cost. This reflects a larger rise of inefficient unemployment. The increase in the number of vacancies and job turnover fosters also a decrease in training investment and productivity, so that aggregate output unambiguously falls. Lastly, we show that it is optimal to implement in France UK labor market institutions (minimum wage + no UB dispersion) in spite of a noticeable reduction in labor productivity.

This paper is organized as follows. Section 1 is devoted to the presentation of the theoretical model. Quantitative results for various policy experiments are provided in section 2. Section 3 concludes.

1 The Model

This paper extends the Mortensen [2000] search framework with wage posting and match specific investments by allowing unemployed workers to earn heterogenous unemployment benefits.

Let b be the opportunity cost of employment. This cost takes into account unemployment compensation and we denote $H(b) \geq 0$ the proportion of unemployed workers whose opportunity cost is no greater than b. Assume H is continuous and let $\underline{b}$ and $\overline{b}$ indicate the infimum and supremum of its support. When a job is destroyed, at an exogenous positive rate s, the employed worker is entitled to an unemployment benefit b.[3] Lastly, we consider that the arrival rate of wage offers is the same for unemployed as for employed workers, so that the reservation wage of an unemployed worker is b.

[3]To simplify the analysis, this unemployment benefit does not depend on workers' previous wage bill. Heterogeneity in unemployment benefits is exogenously introduced by assuming a given distribution of opportunity costs of employment (see also Burdett and Mortensen [1998].

This rate is denoted $\lambda(v)$, where v stands for the number of job vacancies.

1.1 Search and Matching

The steady-state measure of unemployed workers of type b, denoted $u'(b)$, is derived from a conventional condition equalizing outflows and inflows from unemployment of that type:

$$u'(b)\lambda(v)[1 - F(b)] = s(H'(b) - u'(b))$$

so that the measure of unemployed workers willing to accept a wage offer lower or equal to x conditional on the wage offer distribution F is:

$$u(x|F) = \int_{\underline{b}}^{x} \left(\frac{s}{s + \lambda(v)[1 - F(b)]} \right) H'(b)db \tag{1}$$

Accordingly, $u \equiv u(\bar{b}|F)$ is total unemployment.

We denote the steady-state number of employed workers being paid a wage no greater than w by $G(w)(1-u)$, where G is the distribution of wage rates across employed workers. In a steady-state the flow of workers leaving employers offering a wage no greater than w equals the flow of workers hired by such employers:

$$\lambda(v) \int_{\underline{b}}^{w} [F(w) - F(x)]du(x|F) = (s + \lambda(v)[1 - F(w)])(1 - u)G(w) \tag{2}$$

where $F(w) - F(x)$ is the probability that an offer received by a type b unemployed worker is acceptable and less than or equal to w.

1.2 Wage Posting, Job Creation and Match Specific Capital Investments

Each employer commits to both the wage offered and the extent of its specific investment in the match so as to maximize the value of posting a vacancy. A free entry condition eliminates pure profit in vacancy creation, from which the number of vacancies is derived.

Let r be the real interest rate, as jobs are destroyed at rate s and employed workers quit at rate $\lambda(v)[1 - F(w)]$ when they receive a higher alternative

wage offer, the expected discounted present value of the employer's future flow of quasi-rents once a worker is hired at wage w is $\frac{f(k)-w}{r+s+\lambda(v)[1-F(w)]}$ where k represents the match specific investment per worker and the value of productivity $f(k)$ is an increasing and concave function of this investment. Because investments are made after the worker and the employer meet, the asset value associated to an open vacancy is:

$$rV = \max_{w \geq \underline{w}, k \geq 0} \left\{ -\gamma + \frac{\lambda(v)}{v} h(w) \left(\frac{f(k) - w}{r + s + \lambda(v)[1 - F(w)]} - k - V \right) \right\}$$

where $\lambda(v)/v$ is the average rate at which vacancies are filled and $\gamma > 0$ is the flow cost of recruiting per vacancy. $h(w)$ stands for the probability that the contacted worker accepts the wage offer w, that is:

$$\begin{aligned} h(w) &= (1-u)G(w) + \int_{\underline{b}}^{w} du(x|F) \\ &= \frac{sH(w)}{s + \lambda(v)[1 - F(w)]} \quad \text{from (1) and (2)} \end{aligned}$$

For any wage offer w, the optimal training investment policy is fully characterized by the first order condition:

$$f'(k) = r + s + \lambda(v)[1 - F(w)] \implies k = k(w) \quad \forall w \tag{3}$$

Since the expected duration of a job is positively related with the level of the wage offer, employers proposing higher wages invest more in match specific capital, *i.e.*, $k'(w) > 0$ (see Mortensen [2000] for more details).

In turn, because all jobs are identically productive, every wage in the support of the equilibrium wage distribution must yield the same profit (see BM). At the same time, the expected cost of filling a vacancy equals the expected present value of the future profit attributable to filling one, so that $V = 0$. In a search equilibrium, v and $F(w)$ must then satisfy the two following conditions:

$$\frac{\gamma v}{\lambda(v)} = \left(\frac{sH(\underline{w})}{s + \lambda(v)} \right) \left[\frac{f(k(\underline{w})) - \underline{w} - k(\underline{w})(r + s + \lambda(v))}{r + s + \lambda(v)} \right] \tag{4}$$

$$\frac{\gamma v}{\lambda(v)} = \left(\frac{sH(w)}{s+\lambda(v)[1-F(w)]}\right)\left[\frac{f(k(w))-w-k(w)(r+s+\lambda(v)[1-F(w)])}{r+s+\lambda(v)[1-F(w)]}\right] \tag{5}$$

where $F(\underline{b}) = 0$ and $k(w) \ \ \forall w \geq \underline{b}$ solves (3). In addition, it is straightforward to derive $\overline{w}$ by evaluating (5) at $F(\overline{w}) = 1$.

Remark that, depending on a minimum wage legislation, we have $\underline{w} = \max\{\underline{b}, mw\}$ where mw represents the minimum wage. The number of job vacancies then heavily depends (negatively) on this lower value permitted for the labor cost (see equation (4)).

1.3 Alternative Criteria for Policy Analysis

To examine the incidence of unemployment compensation schemes, *i.e.* alternative distribution functions of b, and minimum wage legislation, we do not only focus on total unemployment:

- Firstly, we decompose total unemployment into frictional (u_f) and inefficient unemployment (u_{in}). Frictional unemployment is defined as the level that prevails if every employer wage offers were accepted. Total unemployment minus frictional unemployment is then a measure of inefficient in the sense that it reflects failures to capture all gains from trade (see also BM).

$$\begin{aligned} u_f &= \int_{\underline{b}}^{\overline{b}} \frac{s}{s+\lambda(v)} dH(b) = \frac{s}{s+\lambda(v)} \\ u_{in} &= u - u_f \\ &= \int_{\underline{b}}^{\overline{b}} \left[\left(\frac{s}{s+\lambda(v)[1-F(b)]}\right) - \left(\frac{s}{s+\lambda(v)}\right)\right] dH(b) \end{aligned}$$

  with $\{v, F(w)\}$ defined by (4)-(5).

Contrary to BM, labor market institutions not only affect unemployment through their inefficient component but also through the frictional one. This is due to the fact that the free entry condition allows the arrival rate of job

offers to depend on these institutions. As a consequence, one can observe a reduction of inefficient unemployment and an increase in total unemployment at the same time.

- Secondly, we follow Chéron, Hairault and Langot [2004] by calculating the steady state aggregate output flow net of turn-over costs to measure efficiency:

$$\begin{aligned}\mathcal{Y} &= \underbrace{(1-u)\int_{\underline{w}}^{\overline{w}} f(k(w))dG(w)}_{\text{Output}} - \underbrace{\gamma v}_{\substack{\text{Hiring}\\ \text{costs}}} \\ &- \underbrace{\lambda(v)\int_{\underline{w}}^{\overline{w}} k(w)u(w|F)dF(w)}_{\substack{\text{training costs}\\ \text{unemployed workers}}} \\ &- \underbrace{\lambda(v)(1-u)\int_{\underline{w}}^{\overline{w}}\left(\int_{w}^{\overline{w}} k(w)dF(w)\right)dG(w)}_{\substack{\text{training costs}\\ \text{job-to-job mobility}}}\end{aligned}$$

Beyond unemployment, this measure first takes into account of search and congestion externalities, as well as their incidence on turn-over costs (job advertising and training costs). It also reflects the impact of changes in the labor productivity. A trade-off between employment and productivity adjustments can then exist. For instance, any policy designed to increase employment is likely to reduce labor productivity, implying that it can be the case that this policy is not optimal.

2 Quantitative Illustration

This section addresses two issues:

- What is the potential role played by differences in unemployment compensations and the minimum wage in explaining the unemployment rate gap between France and the UK?

- Would the adoption of UK labor market institutions in France improve $\mathcal{Y}$?

We next deal with these two questions successively. To that end, we run illustrative simulations by successively removing each specificity of french labor market institutions.

Our benchmark calibration reflects french labor market institutions. Unemployment benefits in France are highly dispersed. This comes from the fact that unemployment compensations are digressive and proportional to earnings in the preceding employment spell[4]. The OECD calculates that in 2002 the average net replacement rate of a french representative household without social assistance was equal to 69%, which approximately corresponds to the value of the gross minimum wage.

The model is then calibrated by using the following functional forms. The production function is Cobb-Douglas, $f(k) = k^{\alpha}$ with $0 < \alpha < 1$. We consider also that $\lambda(v) = v^{\psi}$ with $\psi \in [0, 1]$. Lastly, the distribution of unemployment benefits is log-normal, as observed in France[5], where σ_b stands for the standard deviation and $\tilde{b}$ for the average. Parameters are reported in the table 1.

Table 1: Parameters Calibration

s	γ	α	ψ	σ_b	$\tilde{b} = mw$	$\underline{b}$
0.01	0.0683	0.73	0.5	0.45	1	0.52

It should be stressed that:

- We set $\tilde{b} = mw = 1$ as a normalization, and $\underline{b} = 0.52$ reflects the value of minimum income (rmi).

[4]Since 2002, the new unemployed workers are entitled to a non-digressive system, but their unemployment benefits are still indexed to their preceding wages.

[5]Recall indeed that unemployment benefits are proportional to earnings on the preceding employment. It is clearly established that the distribution of wages in France is log-normal.

- σ_b is chosen as mean to replicate the observed value of skilled and unskilled manual workers unemployment rate in 1995.
- The exogenous destruction rate is 1% by month, so that it implies an average duration of the highest paid job of 8 years.[6]
- α is taken from the estimation by Chéron, Hairault and Langot [2004] (to match distribution of wages).
- γ gives a probability to get a wage offer of 16% by month as also estimated by Chéron, Hairault and Langot [2004] for unemployed workers.

2.1 On the Difference between French and UK Unemployment Rates

In our french benchmark economy, dispersion of unemployment benefits fosters inefficient unemployment. In turn, the prevailing minimum wage not only increases frictional unemployment by increasing labor cost, but also decreases inefficient unemployment by reducing the number of job rejections (u_{in}). At our starting point (see the first line of table 2), this inefficient component is responsible for approximately half of the overall unemployment of low-skilled workers.

The removal of the minimum wage reduces the frictional unemployment component and increases the inefficient one (second line of table 2). However, since the latter effect more than offsets the former, unemployment raises. In other words, the positive variation of jobs refusals exceeds the growth in the number of vacancies, suggesting that in France the minimum wage legislation allows to reduce unemployment.

We now consider the role of unemployment benefits. Compared to the french system, the UK alternative system presents two particular characteristics. Grossly speaking, there is no dispersion in unemployment benefits and the average replacement ratio is twice lower than in France. Actually, in the United Kingdom, most unemployed workers get GBP 53.95 by week (in 2002), whatever their preceding employed position. This compensation

[6]When $w = \overline{w}$, there is indeed no voluntary quit.

Table 2: The role of labor market institutions on unemployment

	u	u_f	u_{in}
France institutions (ref.)	15.38	8.25	7.13
No MW	17.98	5.88	12.1
No MW + $H(\underline{b}) = 1$	5.88	5.88	0
UK institutions in France (MW + $H(\underline{b}) = 1$)	8.25	8.25	0

is payable for up to 182 days. The OECD calculates that the average net replacement rate in UK is equal to 34% (instead of 69% for France) which approximately corresponds to the ratio of french minimum income (rmi) over the average wage.

To illustrate the mechanisms at work, we consider french labor market equilibrium when the distribution of unemployment benefits is a mass point at its UK level ($\approx$ the french minimum income), and in the absence of minimum wage (third line of table 2). Since we still have (as for the second line) $\underline{w} = \underline{b} > mw(= 0)$, this virtual reform leaves frictional unemployment unchanged. This stems from the fact that the number of vacancies depends on this infimum and not on the average (see equation (4)). In turn, inefficient unemployment is falling to zero, because in the absence of unemployment benefits' dispersion any wage offer is accepted by all unemployed workers. As a consequence, unemployment corresponds only to its frictional component.

It is worth noting that the third line of table 2 is not showing the impact of UK institutions in France. Indeed, in the UK, the minimum wage has converged to the same level as in France (see Eurostat [2005]). When keeping the minimum wage at its french level and using the same unemployment benefit system as in the UK, frictional unemployment increased due to a rise of the labor cost (with respect to the third line) while the inefficient one is unchanged. The comparison with the first line then clearly suggests

that the adoption of the UK unemployment benefit system could significantly decrease unemployment by annihilating its inefficient part.

2.2 Beyond Unemployment: Efficiency

It is well known that in a matching model a decrease in unemployment might be over-compensated in terms of efficiency by the associated increase in vacancies, hence in turn-over costs. A higher vacancy rate induces the traditional congestion effect and potentially too high hiring costs. More specifically, in our model, an upturn in the number of job vacancies implies also an increase in the employed probability to quit. The associated decrease in the expected duration of jobs lead to under-investment in human capital. As a consequence, labor productivity falls.

To show the impact of labor market institutions on efficiency, as measured by $\mathcal{Y}$, we look at the three numerical experiments summarized in table 3. The benchmark simulation corresponds to the french economy, and we then consider the steady-state impact of two scenarios. The percentages reported in table 3 stand for relative deviations with respect to the benchmark situation ($\mathcal{K}$ is average training investment).

Table 3: The role of labor market institutions on efficiency

	$\Delta\mathcal{Y}$	Δu	$\Delta\mathcal{K}$
No MW	-7.8%	+17%	-7%
UK institutions in France (MW + $H(\underline{b}) = 1$)	+4.2%	-47%	-2.8%

The first line of table 3 reports the incidence of removing the minimum wage. This does not only increase unemployment (raise of u_{in} higher in absolute value than the fall in u_f) but it also reduces average training investments. This mainly reflects the fact that a higher vacancy rate decreases the expected duration of jobs and thus the incentives to invest in costly human capital. Obviously, removing the minimum wage is not an optimal policy in France since it both reduces employment and productivity. A similar result

was obtained in Chéron, Hairault, and Langot [2004], but it is here enhanced by the rise of inefficient unemployment.

On the opposite, adopting the UK system, that is a minimum wage together with a low no-dispersed unemployment benefits insurance, is found to be optimal. The significant reduction of unemployment (due to the fall in u_{in}) is not offset by the decrease in productivity. Actually, the vacancy rate, and frictional unemployment remains unchanged (to recall see table 2). The reduction in labor productivity is thus simply the outcome of a composition effect: since distribution in unemployment benefits is a mass point, this leads firms to post wage offers closer to the minimum wage. Otherwise stated, distribution of wage offers is less dispersed. This translates into a reduction in voluntary quits.

Although there is potentially a trade-off between employment and labor productivity, our simulations suggest that the composition effect on labor productivity is not large enough to exceed the social gain related to the decrease in inefficient unemployment

3 Concluding comments

Our study emphasizes that the high level of unemployment rate in France not only relies on high average level of unemployment benefits but also on the scale of heterogeneity among unemployed workers. In that context, a high minimum wage is a useful tool to partially offset the negative effects of the unemployment benefit system in France. A higher net aggregate output could however be reached by implementing UK labor market institutions.

These conclusions actually apply to most of European continental countries. For instance, Ireland who faces one of the lowest unemployment rate in Europe does not allow unemployment benefits to depend on the preceding employment spell. On the contrary, Spain, Germany, Italy and Belgium adopt unemployment benefit systems similar to the french one (see OECD [2004]). In these countries, observed unemployment rates are clearly higher than the european average. Of course, this qualitative assessment would require a precise quantitative investigation in order to disentangle the role played by differences in other institutions such as employment protection and

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