

## **Employment protection and unemployment**

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The second factor often mentioned in discussions of European unemployment is *employment protection* (the first, *unemployment benefits*, was the topic of the previous note). Employment protection, the argument goes, increases the cost of doing business, leads to sclerosis of the economy, and to high unemployment. The purpose of this note is to assess both the theoretical and the empirical merits of the case.

Employment protection has two dimensions. The first, severance pay, is a transfer for the firm to the worker it wants to layoff. The second is a set of administrative restrictions and procedures that the firm has to obey if it wants to layoff a worker; these range from the need for prior authorization, to a notice period, to an appeal procedure for workers. Together, these can amount to a large cost in time and money, a cost often larger than the transfer itself.

From a theoretical point of view, the distinction between the transfer and the cost components is an important one. The transfer is not a cost to the firm-worker pair, and, in principle, its effects can be offset by the pair, in effect by a reverse transfer from the worker to the firm at the start of the employment decision, a transfer referred to “bonding” in the literature. But the effects of the cost component, which

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represents a cost to the firm-worker pair, cannot be so undone. In practice, the scope for bonding may be limited, so that the transfer and the cost components may have roughly similar effects on employment and wages.<sup>1</sup>

The cross section evidence on employment protection is summarized in Chapter 6 of the OECD Jobs Study. I reproduce their Table 6-5, Panels A and B. Panel A tries to measure the many dimensions of employment protection. Panel B gives tentative rankings. Portugal comes out with the highest degree of overall protection, followed by Spain, Italy and Austria. At the other end of the ranking, one finds Switzerland, the United Kingdom (and one would find the United States if it had been included),

The Jobs Study does not give time series for employment protection. But Lazear (1990) does construct rough time series for two measures of employment protection for 22 countries from 1956 to 1984. The first measure—the number of months of severance pay for a worker with 10 years in the firm—increases both in the 1960s and in the 1970s, and peaks in 1979, before decreasing slightly in the 1980s (The Lazear series stops in 1984. We know that employment protection has decreased since 1984 in most countries). The other measure—the number of months of notice for a worker with 10 years of service—shows a small increase since 1954, but has been roughly flat from 1970 on.

For political reasons, a number of countries have found it hard to decrease employment protection in the face of high unemployment. They have often tried since the early 1980s to introduce more flexibility by (1) allowing firms to offer fixed term contracts, at the end of which workers can be laid-off without severance pay, or at least without the need for a special authorization, (2) allowing firms to recruit from temporary work agencies, and (3) allowing firms to deal with self

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1. A nice discussion of these points is given in Lazear, in his 1990 QJE article. The theoretical distinction suggests constructing and exploring separately the role of the two components on labor market outcomes, an exercise I have not seen performed.

employed contractors. In some countries, fixed term contracts now play a central role, more than 35% in Spain. In some, their role remains much more limited. I have not found a good set of estimates of the proportion of employment under fixed term contracts for the various OECD countries.

Employment protection has three main effects on the economy.

- First, it reduces the flexibility of firms in adjusting employment, leading to a reduction of flows in the labor market.
- Second, it increases the cost of firms at a given wage, because either firms must pay the additional costs associated with layoffs, or/and they must keep workers in jobs that are no longer very productive.
- Third, it is likely to increase the bargaining power of workers: knowing that laying them off would be costly for the firm, they can ask for higher wages.

The model I present in the next section may be the simplest model that allows for these three channels, and allows for a discussion of the various effects of employment protection.<sup>2</sup> I then consider two extensions, the first looking at the potentially favorable effects of employment protection, and the second looking at the effects of employment protection on the more marginal workers in the labor market. I finally return briefly to the macro empirical evidence. (Marianne Bertrand will again discuss relevant micro empirical papers.)

## 1 Employment protection, flows and unemployment duration

The basic model developed in this section starts from the benchmark model we saw earlier. The main change is that it endogenizes the rate of job destruction; the reason is clear: we want to allow employment protection to affect the decision of firms to keep or close a job.

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2. Much of the existing literature has dealt only with the first point, the effects on employment, typically in partial equilibrium, i.e. given the capital stock and given the wage.

Think of firms as jobs. In contrast to the basic model, jobs have different productivities, both across jobs and over time. Employment protection takes the form of a firing cost. This firing cost determines the critical level of productivity under which jobs are closed, and thus the amount of turnover, employment and unemployment in the economy.

More specifically:

### 1.1 Assumptions

(1) Let  $y$  be the productivity of a job (when matched with a worker). A new job has a productivity equal to  $\bar{y}$ . The level of productivity then changes according to a Poisson process with arrival rate  $\lambda$ . Each time productivity changes, the new level of productivity  $y$  is drawn from a distribution  $F(y)$ .

(2) Faced with a new level of productivity for a job, a firm can decide to close the job and fire the worker on that job. The cost to the firm of ending a job and firing a worker is equal to  $G$ . (Thus, in relation to the discussion above, I think of  $G$  as a cost, not as a transfer to the worker).

If fired, the worker becomes unemployed. The firm can open a new job at productivity level  $\bar{y}$ , and hire a worker instantaneously from the pool of unemployed (Thus, firms do not face a matching problem, an assumption we explored in the benchmark model, and, as we know, simplifies the analysis. Given our focus on firing costs, adding hiring frictions is not essential).

(3) The wage for each job and each worker is set by Nash bargaining between the worker and the firm. For simplicity of exposition and derivation, I assume that the wage is set once at the beginning of a job (but just after the worker has been hired, so that if no agreement takes place, the firm has to pay the firing cost  $G$ ), and not renegotiated thereafter. The wage will therefore be the same for all

jobs. (this comes from the additional assumption that all jobs start with the same productivity, and face the same future distribution of productivity).

This fixed-wage assumption simplifies the analysis considerably, but, compared to continuous renegotiation, introduces the possibility of inefficient (from the point of view of the worker-job pair) terminations. The qualitative conclusions below hold also under continuous renegotiation. I shall let you work it out (I give you a hint about the form of the solution below).

(4) The labor force is fixed and normalized to one, so that  $n = 1 - u$ . A firm needs  $k$  units of capital to create a job; if it decides to close the job, it can use the capital to open a new one. (This is again a slightly different formalization than in the benchmark model, where capital died when the job ended. Here capital, once put in place, goes on forever. The reason is that I want to focus on the effect of firing costs, not of the potential loss of capital associated with the closing of a job.)

The nature of the equilibrium in this economy is clear: Firms keep jobs open as long as productivity is not too low. The critical level of productivity, call it  $y^*$ , depends on firing costs, and  $y^*$  in turn determines turnover. Together,  $y^*$  and the wage -which also depends on firing costs- determine the number of jobs in operation, and employment and unemployment in the economy.

Start with the case where there are no firing costs. As they can costlessly close a job and open a new one with productivity level  $\bar{y}$ , and operate it at the same wage as before, firms will only keep jobs open if they have a level of productivity equal to or higher than  $\bar{y}$ . Under Nash bargaining, and the twin assumptions that firms can fire a worker costlessly and find a new worker instantaneously, workers have no bargaining power, and wages will be low enough to maintain full employment. And under the free entry condition, wages will be high enough to insure that the

expected value of creating and posting (and reposting) a job is equal to its cost, namely one.

Thus, the model is such that, absent firing costs, there is full employment. Let us now see what happens when there are firing costs.

## 1.2 Value functions

Let  $V(y)$  be the value to a firm of having a job with current productivity equal to  $y$ . In steady state,  $V(y)$  satisfies the following arbitrage equation (I shall limit my analysis to the steady state, although I think that much of the interesting action, once wage determination is introduced, is in the dynamics. But, not surprisingly, these are substantially more difficult to characterize):

$$rV(y) = (y - w) + \lambda F(y^*)(V(\bar{y}) - V(y) - G) + \lambda \int_{y^*}^{\infty} ((V(y') - V(y))dF(y')) \quad (1.1)$$

The interpretation of equation (1.1) is as follows. The annuity value of the value of a job with current productivity  $y$ ,  $rV(y)$  (the left-hand side of the equation) must be equal to the sum of the three terms on the right-hand side. The first is profit, productivity minus the wage. The second is the probability that there is a change in productivity ( $\lambda$ ) and that the new level is low enough to lead to the closing of the job and the creation of a new one ( $F(y^*)$ ), times the change in value in that case, which is equal to  $V(\bar{y}) - V(y)$  minus the cost of firing the worker on the existing job ( $G$ ). The third is the probability that there is a change in productivity ( $\lambda$ ) but that the new level is high enough to lead the firm to continue operating the job, times the change in value in that case. The change in value, conditional on the new level of productivity being above the threshold, is equal to  $\int_{y^*}^{\infty} ((V(y') - V(y))dF(y')$ .

Let  $V_E$  be the value to a worker of being employed (which under the assumption that the wage is set once and for all when the job is created, is independent of the current level of productivity).  $V_E$  is given by:

$$rV_E = w + \lambda F(y^*)(V_U - V_E) \quad (1.2)$$

The annuity value of being employed is equal to the wage plus the probability that a low productivity shock leads to the termination of the job and firing, times the change in value from being employed to becoming unemployed. The value to a worker of being unemployed is in turn given by:

$$rV_U = b + (h/u)(V_E - V_U) \quad (1.3)$$

where  $(h/u)$  is the exit rate out of unemployment. The annuity value of being unemployed is equal to  $b$ , plus the exit rate from unemployment times the change in value from being unemployed to becoming employed.

### 1.3 A characterization of the solution

The equilibrium can be characterized recursively.

(1) Starting with the *cut-off level of productivity*,  $y^*$ . As firms always have the choice of closing a job, at firing cost  $G$ , and opening a new one with productivity  $\bar{y}$ , the cut-off level of productivity must be such that:

$$V(y^*) = V(\bar{y}) - G$$

From equation (1.1), this implies

$$y^* = \bar{y} - (\tau + \lambda)G \quad (1.4)$$

The higher the firing cost, the lower the cut-off level of productivity. Note that the

rate of job destruction is equal to  $\lambda F(y^*)$ . Thus, from equation (1.4), the effect of firing costs on the rate of job destruction is given by:

$$d \text{ (rate of job destruction)} = -\lambda(r + \lambda)f(y^*)dG \quad (1.5)$$

The higher the firing cost, the lower the rate of job destruction (and in steady state, the lower the rate of job creation, as the two must be equal in steady state).

(2) The free entry condition in turn determines the *feasible* wage, the wage that firms can afford to pay workers and still be willing to enter.

Given that newly opened jobs have productivity  $\bar{y}$ , the free entry condition is simply that:

$$V(\bar{y}) = k$$

where, from equation (1.1) and the characterization of the cut-off level of productivity:

$$rV(\bar{y}) = \bar{y} - w - \lambda F(y^*)G + \lambda \int_{y^*}^{\infty} ((V(y') - V(y))dF(y')$$

Solving out for the feasible wage gives:

$$w = \bar{y} - rk - \lambda F(y^*)G + \lambda \int_{y^*}^{\infty} \left( \frac{y' - \bar{y}}{r + \lambda} \right) dF(y') \quad (1.6)$$

Differentiating with respect to  $G$ , taking into account the effect of  $G$  on  $y^*$  gives:

$$dw = -\lambda F(y^*)dG \quad (1.7)$$

The feasible wage is, not surprisingly, a decreasing function of firing costs. The higher the firing cost, the lower the wage firms can afford to pay workers and still break even. This is a reflection of the fact that higher firing costs both decrease average productivity and increase the cost of labor through the payment of firing

costs; both effects shift the factor price frontier inwards,.

(3) Nash bargaining in turn determines *the bargained wage* as a function of labor market conditions. Recall that, by assumption, bargaining takes place just after the worker has been hired, so that, if a match does not take place, the firm has to incur the firing cost  $G$ . Assuming equal division of the surplus between the firm and the worker implies:

$$V_E - V_U = V(\bar{y}) - (V(\bar{y}) - G)$$

The increase in value to the worker of remaining employed is the difference between the value of being employed and the value of being unemployed, and is thus equal to  $V_E - V_U$ . The increase in value to the firm in keeping the worker is avoiding the firing cost and is thus equal to  $G$ .

Using the equation above, together with equations (1.2) and (1.3) gives the following expression for the wage:

$$w = b + (r + (h/u) + \lambda F(y^*))G \quad (1.8)$$

The bargained wage depends on market conditions through  $(h/u)$ , the exit rate from unemployment. The lower the exit rate, the longer workers can expect to remain unemployed if they become unemployed, the lower the bargained wage.

Given labor market conditions, an increase in firing costs leads to an increase in the bargained wage. The reason is that a higher firing cost increases the cost of replacing the current worker, making in effect the unemployed worse substitutes for the current worker.<sup>3</sup>

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3. If we allowed instead for continuous renegotiation, the wage would not be constant, but depend instead on the the level of productivity of the job. Check that the solution would then be of the form  $w = \alpha + \beta y$ , with the parameters  $\alpha$  and  $\beta$  being functions of the underlying structural parameters.

### 1.4 Implications for turnover and unemployment

We can now draw the implications of firing costs on the labor market:

(1) Higher firing costs decrease turnover in the labor market. This follows from equation (1.5), which gives the effect of firing costs on the rate of job destruction (and, by implication, in steady state on the rate of job creation.) In that sense, firing costs make the labor market more sclerotic.

(2) Higher firing costs lead to a longer duration of unemployment. To see why, note that, from (1.6) higher firing costs decrease the feasible wage, and that, from (1.8) for given labor market conditions, they increase the bargained wage. Thus, to reconcile the bargained wage with what firms can afford to pay, labor market conditions must worsen: the exit rate from unemployment,  $(h/u)$  must be lower. Equivalently, its inverse, unemployment duration must increase.

(3) Higher firing costs therefore have an ambiguous effect on the unemployment rate.

Recall that, in steady state, the unemployment rate is equal to the flow into unemployment times unemployment duration. As we have just seen, firing costs decrease the rate of job destruction, and thus the flow in and out of unemployment. But they also increase the duration of unemployment.

Which of the two effects dominate is ambiguous.<sup>4</sup> Higher firing costs may reduce turnover so much as to lead to a smaller unemployment rate, despite the increase in duration. In that case, the labor market will be characterized by low unemployment, but high duration. Higher firing costs may instead have little effect on

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The analysis would be more involved, but the conclusions below would still go through.

4. Starting from zero firing cost, we know that unemployment, which is equal to zero absent firing costs, will increase. But, starting from positive firing costs, the effect becomes ambiguous.

turnover, but lead, through wage pressure, to higher unemployment.

More formally, equations (1.5) and (1.7) show that what matters for the effect on turnover is the density of shocks at the cut-off value of productivity, but what matters for the effect on the feasible wage depends on the distribution of shocks up to the cut-off value. It is easy to construct cases where unemployment goes one way or the other. Take for example the case where adverse productivity shocks decrease productivity to zero, so that there is no reason for the firm to keep the job open. In this case, firing costs will have no effect on turnover, but will still both decrease the feasible wage, and increase the bargained wage for given labor market conditions, leading to an increase in duration. Unemployment will then unambiguously increase.

To summarize, this model delivers three implications which are likely to be robust to more refined treatments: Higher employment protection decreases turnover in the labor market. It increases unemployment duration. As a result, it may decrease or increase unemployment.

## 2 Two extensions

(1) Employment protection and the incidence of unemployment.

A likely effect of employment protection is to further deteriorate the labor market conditions for marginal workers. One way to think about this is the following.

Take the model we just developed. Suppose that all matches start at productivity  $\bar{y}$ , but, with instantaneous probability  $\lambda$ , become fully unproductive.

With no firing costs, firms will get rid of workers when they become unproductive, and replace them by new workers. There will be no unemployment, and the flow in and out of unemployment will be equal to  $\lambda$ .

If there are firing costs, then firms will still get rid of workers, and pay the firing cost (unless the firing costs are so large that firms keep the unproductive workers, a case we shall simply rule out). The flow in and out of unemployment will be the same, and unemployment duration will be such that workers accept the now lower feasible wage.

Suppose now that there are two types of workers. Workers A are known to be “reliable”, that is to have a small probability of turning bad, a small value of  $\lambda$ . Workers B are known to be potentially “less reliable”, to have a higher value of  $\lambda$ . Firms observe the type of each worker and can choose freely between the two.

Absent firing costs, firms will hire both types, and fire them when they become unproductive. Unemployment will be zero for both groups. The flow into and out of unemployment will be higher for the less reliable workers.

If there are firing costs, firms will only hire type B workers if their expected cost to the firm is the same as that of type A. Expected firing costs being higher for less reliable workers, firms will be willing to hire them only if their relative wage decreases. To get them to accept this lower relative wage requires them to face worse labor market conditions. Equilibrium unemployment duration will therefore be relatively higher for less reliable workers.

Under our assumption that productivity is either  $\bar{y}$  or zero, flows into unemployment are unaffected by firing costs. Thus, relatively higher unemployment duration will translate into relatively higher unemployment rates for the less reliable workers. If we had assumed instead that productivity could take any value between  $\bar{y}$  and zero, we would face the same ambiguity as in the basic model: Higher firing costs would lead to both a more sclerotic market and longer unemployment duration for less reliable workers. The effect on relative unemployment rates would be however ambiguous.

This discussion has assumed that wages were determined by bargaining between firms and workers. In combination with a minimum wage, it is clear that employ-

ment protection may be deadly for marginal workers. At the minimum wage, firms may not be willing to take the risk to hire them at all.

The lesson from this informal discussion is simple. Employment protection may lead to a deterioration of the relative labor market prospects for the more marginal, harder to assess, workers: these may be new entrants to the labor force, women who may take time off to have children, the long-term unemployed themselves, and so on. This deterioration may however show up as higher unemployment duration, not necessarily as higher unemployment.

(2) What if employment protection is justified?

In the model above, employment protection is bad. It yields lower average productivity, a lower feasible wage, and lower utility for workers. But there are some respectable arguments in favor of (some) employment protection. One in particular is based on incomplete contracts. If workers sink some cost in the relation, say to spend some time and money training for job specific skills, firms, once the cost is sunk, may have excessive bargaining power. Firing costs may then reestablish the balance, and lead workers to invest the right amount in the relation.<sup>5</sup>

The question is how the results would change, were we to construct a model where employment protection plays, at least in part, a useful role. I suspect that the qualitative implications for duration and flows would remain very much unchanged, but the welfare and efficiency implications may look like quite different.

### **3 A first pass at the evidence**

(1) The empirical macro literature has typically looked at the relation between employment protection measures and either the unemployment rate, or the ratio

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5. See for example Caballero Hammour, Macroeconomics of specificity, proposition 2.

of employment to the population of working age. (for example, Lazear 1990, or the OECD Jobs Study). This literature has typically found a small adverse effect of employment protection on the unemployment rate, or on the employment ratio. But the relation is far from strong, and far from robust.

The basic model suggests that these findings should not come as a surprise. The theory makes strong predictions about the nature of unemployment (smaller flows, longer duration), but no prediction about the effect on the unemployment rate. Thus, more recent studies have looked at composition effects.

(2) One puzzle has however arisen. One would have expected that measures of job creation and job destruction, measured a la Davis-Haltiwanger, would show lower creation/destruction, the higher the degree of employment protection. A first pass at the data has not confirmed this hypothesis. I include as an example table 2-2 of Davis-Haltiwanger, that reports numbers for job creation and destruction for a number of countries. Job creation/destruction do not appear lower in, say France and Sweden, than in the United States. (see also Bertola-Rogerson for a discussion)

This comes with a second puzzle, that the flows in and out of unemployment (which we can measure from the largely comparable labor force surveys in each country) are indeed much larger (relative to the labor force) in the United States than in Continental Europe.

To resolve these puzzles will require a more careful examination of the differences between the data sources across countries than has been done in these early studies. I have tried to do such a careful comparison in my study of Portugal versus the United States (Blanchard and Portugal 1998, on the reading list). In that study, I conclude that job creation/destruction, and movements of workers not due to job creation and destruction are in fact both much lower in Portugal than in the United States. Whether these conclusions will extend to other countries and therefore resolve the two puzzles remains to be seen.



(3) The theory predicts that higher employment protection should lead to lower flows in and out of unemployment, and longer unemployment duration. In my paper mentioned above, I have looked at these two relations. The results of this exercise are presented in Figure 1.

Flows into unemployment are constructed as the average number of workers unemployed for less than one month, for the period 1985-1994, divided by the average labor force during the same period, for each OECD country. The source for these data is the OECD duration data base.

Unemployment duration is constructed as the ratio of the average unemployment rate for the period 1985-1994 to the flow into unemployment constructed above.

The employment protection index, "EPL", is taken from the OECD Jobs Study, Table 6-7, column 5; this index is a ranking of 21 countries, going from low to high protection, and constructed as an average of indices constructed by the OECD and other researchers. The value of the index is 1 for the United States and 19 for Portugal, 20 for Spain, 21 for Italy.

The top part of the figure shows a clear negative relation between the flow into unemployment and employment protection. The bottom figure shows a clear positive relation between unemployment duration and employment protection. The points corresponding to Portugal and the United States are indicated by black squares.

Regressions of the log flow and the log duration on the employment protection index give:<sup>6</sup>

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6. The results using levels are very similar. I report regressions using logs because it makes it easier for the reader to infer what happens to the log of the unemployment rate, which is just the sum of log flow and log duration.

$$\begin{aligned} \log \text{ flow} &= 0.50 - 0.074 \text{ EPL} & \bar{R}^2 &= 0.55 \\ & (t = -4.8) \\ \log \text{ duration} &= 1.26 + 0.098 \text{ EPL} & \bar{R}^2 &= 0.54 \\ & (t = 4.7) \end{aligned}$$

Thus, an increase in employment protection leads to a decrease in flows, and a decrease in duration. But the two effects largely cancel each other when looking at unemployment. The implied coefficient in a regression of log unemployment on EPL is only .023, with a t-statistic of 1.3.

In summary, I read the evidence as saying that employment protection has a very strong effect on the labor market. It increases duration, and decreases flows. In isolation, its effect on the unemployment rate appears however largely ambiguous. But there are still two potential ways out.

The first is that, in combination with other labor market distortions, for example a minimum wage, it may help a large effect on the unemployment rate of some groups, and thus in turn on aggregate unemployment.

The second is that it may lead to a labor market where the effects of various shocks on equilibrium unemployment are more long lasting. In this case, different histories may explain different unemployment rates today. This remains however to be explored.