E C O N O M I C S B U L L E T I N

Do labor market conditions affect the strictness of employment protection legislation?

Riccardo Tilli
Department of Public Economics - Sapienza - University of Rome

Enrico Saltari
Department of Public Economics - Sapienza - University of Rome

Abstract

We provide a theoretical microfoundation for the negative relationship between firing costs and labor market tightness and its effects on labor market performance. The optimal level of firing costs is chosen by the employed worker -- i.e. the insider -- by maximizing her human capital. Performing a comparative statics exercise, we analyze the effects of labor market tightness on the optimal choice of firing costs. The results are clear cut and allow to obtain a decreasing firing costs function in the labor market tightness. Moreover, we show that this negative relationship can give rise to a labor market configuration characterized by multiple equilibria: prolonged average duration of unemployment will produce a labor market with low flows and high strictness of employment protection, and vice versa.

We thank participants at seminars at the University of Padua, the Working Lunch in Labor Economics (Rome), the EALE Conference 2006 (Prague) and the IZA - World Bank Conference on Employment and Development (Boon) as well as Paolo Naticchioni, Christopher Pissarides, Pietro Reichlin, Giorgio Rodano, Antonio Scialà and Clifford Wymer for helpful comments and suggestions. The usual disclaimer applies.
Citation: Tilli, Riccardo and Enrico Saltari, (2008) "Do labor market conditions affect the strictness of employment protection legislation?." *Economics Bulletin,* Vol. 10, No. 4 pp. 1-9
Submitted: February 20, 2008. **Accepted:** March 13, 2008.
URL: http://economicsbulletin.vanderbilt.edu/2008/volume10/EB-08J60003A.pdf

1 Introduction

The "state of the art" of economic theory about the effects of employment protection legislation (EPL) on labor market performance does not seem to be of much help for policy makers. We see an ample literature producing a variety of results, not always with clear-cut conclusions.

A wide empirical evidence (Donohue and Siegelman (1995), Berger (1997), Ichino, Polo, and Rettore (2003) and Marinescu (2005)) suggests that labor market rigidity is related to the level of economic activity. When the economy is on a downturn and labor market conditions are getting worse, employed workers reckon that the probability of being hired if fired will be lower. In such a case they will resist any attempt to fire them.

The aim of this paper is to look for a negative relation between labor market conditions and the strictness of EPL. To make this relationship endogenous, we build a model where the employed worker (the insider) chooses the optimal level of firing costs by maximizing her human capital. Our theoretical model shows the existence of an inverse relation between labor market conditions and the level of firing cost under plausible hypothesis.

Moreover, different structures of the labor market may give rise to multiple equilibria: high average duration of unemployment will produce a labor market with low flows and strict employment protection. Vice versa, a short duration of the unemployment status will produce high flows and low levels of firing costs.[1]

The paper proceeds as follows. Section 2 describes the labor market. Section 3 illustrates the insider optimal choice of firing cost and the derivation of the firing cost as a function of labor market tightness. Once derived the job creation with endogenous firing costs in section 4, we show in the next section how multiple equilibria can arise. The final section concludes.

2 The labor market

The economy is made up of a continuum of risk-neutral workers and firms, which consume all of their income and discount the future at a constant interest rate r. Labor force is given by assumption. Any of the workers may be employed or unemployed. When employed, a worker receives a wage w which we assume to be exogenously given.[2] When unemployed, she enjoys

[1] The latter finding can be seen as providing a microfoundation for the result obtained in Saltari and Tilli (2004).

[2] This may reflect the characteristics of the European labor markets, where wages show marked elements of rigidity or are completely fixed through collective bargaining for a

leisure b. Every firm in the market has a job that may be either filled or vacant. If it is filled, the economic activity yields a product y. If the job is vacant, the firm incurs cost c for its maintenance.

Unemployed workers and vacancies randomly match according to a Poisson process. The matching function is: $h = h(u, v)$ where h denotes the flow of new matches, u is the unemployment rate and v is the vacancy rate. It is assumed to be increasing and concave in each argument and to have constant return to scale overall.

The average rate at which vacancies meet potential partners is $m(\theta) = \frac{h(u,v)}{v}$ with $m'(\theta) < 0$ and elasticity $-\eta(\theta) \in (-1, 0)$. Similarly, $\theta m(\theta) = \frac{h(u,v)}{u}$ (with $\frac{d(\theta m(\theta))}{d\theta} > 0$) is the probability for an unemployed worker to find a job. θ is the ratio of vacancies to unemployed workers and will be interpreted as a convenient measure of the labor market tightness.

We characterize the EPL as a cost F on job destruction which affects the flows in and out of unemployment. Thus, we do not consider the existence of severance payments. An idiosyncratic shock hits the single firm at rate s.

In order to capture the effects of firing costs on hirings and layoffs, we assume that $\theta m(\theta)$, is affected in a multiplicative way by a function $\phi(F)$, decreasing and convex in F. Similarly, since firing costs also affect layoffs, we assume that the separation rate is a decreasing function of F, $s(F)$, also decreasing and convex in F.[3]

The dynamics of unemployment is given by the difference between inflows and outflows: $\dot{u} = s(F)(1-u) - \phi(F)\theta m(\theta)u$. The steady state value of the unemployment rate (the Beveridge curve) is $\frac{s(F)}{s(F)+\phi(F)\theta m(\theta)}$, showing the dependence of the unemployment rate on the equilibrium values of F and θ.

Consider the "asset value" E and U of being an employed or unemployed worker, respectively. These are defined by the following equations:

$$rE = w - s(F)(E - U) \tag{1}$$

$$rU = b + \phi(F)\theta m(\theta)(E - U) \tag{2}$$

As for the firm, when it posts a new vacancy, the following equation must be satisfied:

$$rV = -c + \phi(F)m(\theta)(J - V) \tag{3}$$

number of years. For a recent theoretical justification of wage stickiness, see Hall (2005).

[3]The assumptions on the second derivative of $\phi(F)$ and $s(F)$ are consistent with the empirical evidence. See Boeri, Ruiz, and Galasso (2003).

where V is the value of a vacant job.

In turn, the value of a filled job J satisfies:

$$rJ = y - w - s(F)(J + F - V) \tag{4}$$

3 The insider problem and the relationship between firing costs and labor tightness

The choice of the employed worker is made with the objective to maximize the profile of her intertemporal consumption with respect to F, that is to maximize E.

Subtracting (2) from (1) and substituting into (1), we get:

$$E = \frac{1}{r}\left[(1 - \alpha(\theta, F))\, w + \alpha(\theta, F)\, b\right] \tag{5}$$

where:

$$\alpha(\theta, F) = \frac{s(F)}{r + \phi(F)\,\theta m(\theta) + s(F)}$$

is the proportion of time a worker will spend unemployed during her lifetime when currently employed.

Let us now study the relationship between firing costs and labor tightness.

From the first order condition for problem (5) the optimal level of firing cost, say F^*,is implicitly defined by:

$$s'(F)\left[r + \phi(F)\,\theta m(\theta)\right] = s(F)\,\phi'(F)\,\theta m(\theta) \tag{6}$$

To sign the relationship between F and θ, we use of the implicit function theorem:

$$\frac{dF}{d\theta} = -\frac{\alpha_{\theta F}}{\alpha_{FF}}$$

Thus, to show that there is negative relationship between the optimal level of firing costs and the labor market tightness, we have to show that the two derivatives $\alpha_{\theta F}$ and α_{FF} have the same sign.

Writing out the two derivatives, we get:

$$\alpha_{FF}(\theta, F) = \frac{s''(F)\left[r + \phi(F)\,\theta m(\theta)\right]}{\left[r + s(F) + \phi(F)\,\theta m(\theta)\right]^2} > 0 \tag{7}$$

which is positive by the convexity of $s(F)$. Moreover, the cross derivative:

$$\alpha_{F\theta}(\theta, F) = \left[\theta m'(\theta) + m(\theta)\right] \frac{s'(F)\,\phi(F) - \phi'(F)\,s(F)}{\left[r + s(F) + \phi(F)\,\theta m(\theta)\right]^3} \tag{8}$$

is positive. This is because the numerator is positive.

To see this, rewrite the first order condition as follows:

$$s'(F)\,\phi(F)\,\theta m(\theta) - s(F)\,\phi'(F)\,\theta m(\theta) = -s'(F)\,r > 0$$

which is positive since $s'(F) < 0$. This implies that:

$$s'(F)\,\phi(F) - s(F)\,\phi'(F) < 0$$

is positive.

Using this result in (8), we see that $\alpha_{F\theta}(\theta, F)$ is positive. In turn, this implies a decreasing relation between θ and F.

To put it in words: Suppose firing costs are at the optimum and that labor market tightness increases. As a consequence the unemployment duration increases too because we have just seen that $\alpha_{F\theta} > 0$. To return to the optimum, F must decrease (since $\alpha_{FF}(\theta, F) > 0$).

Let us see a simple example. Assume that: *a*) the exit rate is $\theta m(\theta) = \theta^{\gamma}$ (a constant return to scale Cobb-Douglas matching function); *b*) the hiring rate is $\phi(F) = 1 - F$; *c*) the separation rate is $s(F) = \frac{\lambda}{1+F}$, with λ is positive but less than unity.

These functional forms can be justified as follows. First, assume that the firing cost F is normalized to be in the unit range, $F \in [0, 1]$. When $F = 0$, the labor market is fully "flexible"; if instead $F = 1$, the labor market is "rigid". This is because when the firing cost is equal to unity, the hiring rate is $\phi(1)\,\theta m(\theta) = 0$, while in contrast full flexibility implies $\phi(0)\,\theta m(\theta) = \theta m(\theta)$. Finally, note that the separation rate is $s(0) = \lambda$ if there is no firing cost, while it is $s(1) = \lambda/2$ at the other extreme.

Substituting these functional forms into equation (6), the firing cost level chosen by the worker is given by $F = \frac{r}{2\theta^{\gamma}}$ which is of course a decreasing relationship between firing costs and the labor market tightness.

4 Job creation

We now derive the job creation condition, that is the demand side of the model. Recalling the free entry condition $V = 0$ and making use of equation (4), the job creation condition is:

$$\frac{[r + s(F)]\,c}{\phi(F)\,m(\theta)} = y - w - s(F)\,F \tag{9}$$

This equation states that the cost of creating and maintaining a vacancy in equilibrium must be equal to the profits the firm expects to obtain from the job once created, equal to the operating profits net of the (expected) firing costs.

The sign of the relationship between of the F and θ for job creation may again be derived using the implicit function theorem. Equation (9) gives:

$$\frac{dF}{d\theta}=\frac{[r+s(F)]\,\phi(F)\,m'(\theta)\,c}{m(\theta)\,c\frac{s(F)\phi(F)}{F}\left[\epsilon_{\phi}(F)-\epsilon_{s}(F)\right]+\left[\phi(F)\,m(\theta)\right]^{2}s(F)\left[1-\epsilon_{s}(F)\right]-m(\theta)\,cr\phi'(F)} \tag{10}$$

where $\epsilon_s(F) = -F\frac{s'(F)}{s(F)}$ and $\epsilon_\phi(F) = -F\frac{\phi'(F)}{\phi(F)}$ are the elasticities of the separation and hiring rates.

Since $m'(\theta) < 0$, the sign of the derivative in (10) depends on the sign of the denominator. As $\phi'(F)$ is negative, this sign depends on the particular functional forms assumed for $s(F)$ and $\phi(F)$. The first term in the denominator depends on the difference between the separating and hiring elasticities, while the second depends on the elasticity of separation being greater or less than 1. Hence, the sign of the relationship between F and θ as far as the job creation is concerned cannot be determined *a priori*. This indeterminacy raises the possibility of multiple equilibria.

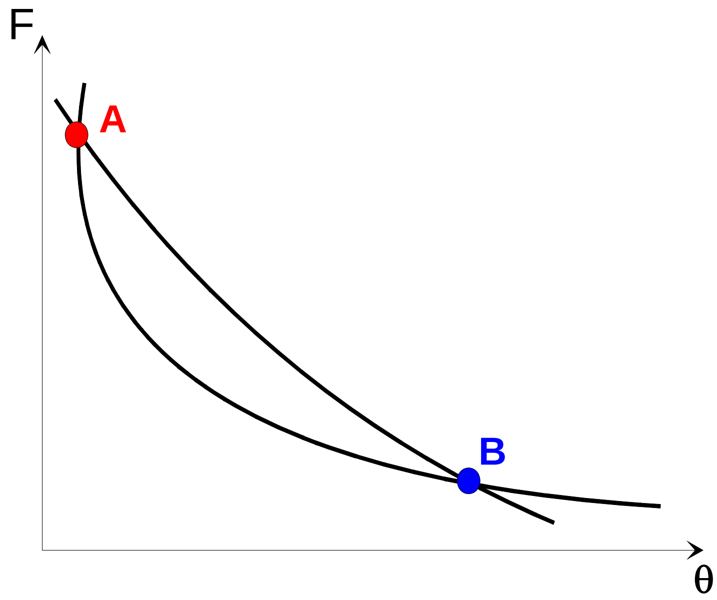
An example may help fix ideas. Consider the functional forms used above. As for the hiring rate, the elasticity of is $\epsilon_\phi(F) = \frac{F}{1-F}$, which is increasing in F and is zero if firing costs are equal to zero. As for the separation rate, the elasticity is $\epsilon_s(F) = \frac{F}{1+F}$: it is equal to zero if firing costs are zero and it is decreasing in F. Substituting these functional forms in (10) gives a decreasing relationship between F and θ for the job creation.

Intuitively, the sign of this relation can be understood if we remember that the job creation must satisfy equation (9). When θ increases, the expected cost of maintaining a vacancy increases since it has now become more difficult to fill it. This implies a decrease in profits. Since condition (9) states that in equilibrium profits must be equal to zero, the increase in θ should be followed by a decrease in F. This is because, given the functional forms, the decrease in F reduces both the expected firing costs (since $\frac{ds(F)F}{dF} \geq 0$, so that $\epsilon_s(F) \leq 1$) and the expected cost of creating and maintaining a vacancy decrease (since $\epsilon_\phi(F) \geq \epsilon_s(F)$).

5 Multiple equilibria

Three equations describe the equilibrium: the job creation condition (9), the firing cost function implicitly defined by the insider first order condition (6) and the Beveridge curve.

FIGURE 1
Multiple equilibria in the labor market



These equations determine the equilibrium values of θ, F and u. Note that the first two equations form an independent subset from which we obtain the equilibrium values of the labor market tightness and of firing costs. Plugging these two values into the Beveridge curve, we get the equilibrium unemployment rate. Figure 1 illustrates a situation with two equilibria.

Note that equilibrium A is characterized by a high level of firing costs and lesser market tightness, while equilibrium B features a low level of firing costs and a high level of marked tightness. We can interpret the two equilibria as reflecting two different characteristics of the labor market. The endogeneity of firing costs implies that when the labor market is thin (the level of labor market tightness is low), the average duration of a filled job $\frac{1}{s(F)}$ is high (because firing costs are high), but the average duration of unemployment $\frac{1}{\theta m(\theta)}$ is also high . When, on the other hand, the labor market is thick (the level of labor market tightness is high), the average duration of a filled job is low but the worker has a high duration of a filled job (because firing costs are low) but also a high probability of finding a new job when unemployed.

Given the two equilibrium values of F and θ, we derive the equilibrium unemployment level from the Beveridge curve.

Which are the implications and the meaning of these multiple equilibria? The most remarkable thing to consider is about the Pareto efficiency.

Consider first the situation of the worker. In equilibrium A, if the worker is unemployed she has to bear a higher unemployment duration (because θ is low). If instead she is employed, the average duration of a filled job is greater. This is because the dismissal cost is high, thus giving rise to a reduction of the separation rate. In B, the worker has a lower unemployment duration, but also a lower stability of her job.

From the firm's point of view, in equilibrium A it has a high probability to cover a vacancy, but at the same time it also has a high level of the firing cost to pay. In equilibrium B we have a symmetric situation. In B, the firm pays a lower dismissal cost, but it has to wait longer to cover a vacant job.

Hence, we have two symmetric structures of the labor market, with two equilibria which *a priori* are not rankable on the basis of Pareto efficiency considerations. A rigid labor market can produce results similar to a flexible one. This is because the strictness of the EPL is determined by the labor market tightness; in turn, this is influenced by the EPL, but it also affects the choice of the insider.

Finally, it is interesting to notice that, if the firing cost affects hirings and firings, the two equilibria can potentially produce similar unemployment rates. Thus, different labor market configurations may give rise to not too much different unemployment rates.

6 Concluding remarks

Institutions change and evolve over time and space. In this paper, we account for such an evolution providing a theoretical microfoundation for the relationship between EPL and the tightness of the labor market. On the basis of this result we are able to study the macroeconomic implications for unemployment equilibrium.

We have shown that the insider choice of the optimal level of firing costs gives rise to a decreasing firing costs function. Moreover, different configurations of the labor market deriving from the optimal behavior of the economic agents give rise to multiple equilibria: prolonged average duration of unemployment will produce a labor market with low flows and wages and marked strictness of employment protection. Vice versa, short duration in the unemployment status will produce high flows and wages and low levels of firing costs.

References

Berger, H. (1997). Regulation in Germany: Some stylised facts about its time path, causes and consequences. IMPE Conference on Institutions and (Economic) Performance: Deregulation and its Consequences, Utrecht, December 11-12, 1997.

Boeri, T., J. C. Ruiz, and V. Galasso (2003). Protectiong against labour market risk: Employment protection or unemployment benefits? *IZA Discussion Paper* (834).

Donohue, J. J. and P. Siegelman (1995). The selection of employment discrimination disputes for litigation: Using businness cycle effects to test the Priest-Klein hypotesis. *Journal of Legal Studies 24*, 427–462.

Hall, R. E. (2005). Employment fluctuations with equilibrium wage stickiness. *American Economic Review 95*, 50–65.

Ichino, A., M. Polo, and E. Rettore (2003). Are judges biased by labor market conditions? *European Economic Review 47*(5), 913–944.

Marinescu, I. (2005). Are judges sensitive to economic conditions? Evidence from U.K. employment tribunals. Working Paper.

Saltari, E. and R. Tilli (2004). Labor market performance and flexibility: Which comes first? *Topics in Macroeconomics 4*(1). http://www.bepress.com/bejm/topics/vol4/iss1/art5.