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The Effects of Employment Protection: Learning from Variable Enforcement*

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Abstract

Employment protection legislations (EPL) are not enforced uniformly across the board. There are a number of exemptions to the coverage of these provisions: ¯rms below a given threshold scale and workers with temporary contracts are not subject to the most restrictive provisions. This within country variation in enforcement allows to make inferences on the impact of EPL which go beyond the usual cross-country approach. In this paper we develop a simple model which explains why these exemptions are in place to start with. Then we empirically assess the e®ects of EPL on dismissal probabilities, based on a double-di®erence approach. Our results are in line with the predictions of the theoretical model. Workers in ¯rms exempted from EPL are more likely to be laid-o®. We do not observe this e®ect in the case of temporary workers.

1. Introduction

The purpose of this paper is i) to explain why employment protection legislation (EPL) is typically not enforced in the case of small units and ii) provide new evidence on the relationship between strictness of EPL and job loss. Unlike previous studies drawing on cross-country variation, in this paper inferences are made by

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exploiting the within country variation in the enforcement of EPL. Regulations on dismissals typically allow for a threshold scale (generally de¯ned in terms of the number of employees) below which the most restrictive EPL provisions (e.g., the compulsory reintegration in case of unjusti¯ed dismissal) are not enforced, the legal procedures for ¯rings are eased, or severance payments are diminished. In this paper we develop a simple theoretical model to illustrate the rationale for these exemptions, and use this discontinuity in regulations(as well as the divide between ¯xed-term and permanent contracts) to infer the e®ects of EPL within a double-di®erence approach.

The advantage of our approach vis-a-vis the cross-country literature is that it disentangles the e®ects of EPL per se from the e®ects of EPL when interacted with other institutions. Previous work { i.e., [5], and [14] { suggests that the e®ects of EPL on labour market performance interact with other institutional features, such as wage compression induced by collective bargaining, unemployment bene¯ts and statutory minimum wages or the e®ects of early retirement and \soft" landing schemes. This questions many of the results of the empirical literature on EPL ([6], [11] and [16]) which are based on cross-country (and often pairwise) correlations of indicators of the strictness of EPL with measures of labour market performance. In a cross-country and multivariate regression framework it is not possible to take into account of all the di®erent institutional interactions, owing to the few degrees of freedom available (there are no time-series for many institutions), and measurement problems, which are particularly serious having to do mainly with ordinal measures (country rankings) of institutions, developed out of qualitative information on regulations. The fact of working on data referred to the same country reduces these problems given that the di®erent institutions interacting with EPL are invariant across observations or, at least, do not have the same cross-sectional variation than EPL.

Our approach is to model ¯rst the exemptions and EPL rules, and then develop accordingly our empirical framework. The model sheds light on the rationale and political support to these exemptions. In particular, we extend the standard models of adjustment costs for labour used by most of the EPL literature, allowing for imperfect monitoring of workers' e®ort. Hence, unlike previous theoretical work on EPL, we disentangle economic from disciplinary layo®s. To keep things simple we rule out adverse selection and assume that workers are homogenous, so that in equilibrium there is no-shirking.

Our main results can be summarised as follows. From a theoretical perspective, EPL has ambiguous e®ects on wages: on the one hand, employment protection

reduces the likelihood of exogenous (economic) layo®s thereby reducing the wage levels which can deter shirking; on the other hand, EPL makes it di±cult also to dismiss undisciplined workers, and this reduces the credibility of the threat of dismissal for those shirking, forcing employers to pay higher wages in order to discourage opportunistic behaviour of their workers. The ¯rst e®ect tends to dominate in large units, that ¯nd it di±cult, in any event, to monitor workers' productivity, while the wage enhancing e®ect dominates in small organisations that can better monitor workers' performance. Thus, exempting small ¯rms from EPL reduces the dis-employment e®ects of employment protection. From a political economy perspective, EPL can only be accepted in large units as therein its employment smoothing function prevails; in small units, instead, EPL stabilises employment at levels which can be lower than in a °exible regime under the bad state of the world.

Empirically, we show that exemptions from EPL are indeed e®ective in that they induce a discontinuity in the relation between size of ¯rms and likelihood of being dismissed. To test the robustness of our results we compare the estimated layo® probabilities with the probability of having a temporary contract renewed. Workers under temporary contracts are not covered by standard EPL, independently of the ¯rm size. In this case the threshold scale dummy variable turns out not to be statistically signi¯cant. Our empirical results, coupled with the implications of the model, also suggest that we should not observe a concentration of ¯rms just below the threshold insofar as the latter is placed at a level which is accepted by the workers. Italy is one of such cases. Proposals to increase the exemption area above the 15 employees threshold have met strong opposition among the workforce. At the same time, left-wing parties campaining for extending EPL below the threshold have not been particularly successful in gaining support from employees of small units. Thus, the 15 employees threshold would seem to be a stable politico-economic equilibrium. From a normative standpoint, however, there may be e±ciency and welfare gains by allowing the threshold scale to vary across industries, to better re°ect sector-speci¯c technologies in their interaction with EPL.

The plan is as follows. Section 2 reviews the literature. Section 3 develops a simple model rationalising exemptions from EPL based on threshold scales of plants. Section 4 provides details on exemptions from EPL in Italy. Section 5 describes the data and displays our estimates. Finally, Section 6 concludes.

2. (Cross-country) Empirical Ambiguities

Table 2.1 reviews the empirical literature on the e®ects of EPL on the labour market. As shown by the Table, a few studies found signi¯cant e®ects of employment protection (generally measured using the OECD cross-country ranking) on employment and unemployment stocks, while a common ¯nding of this literature is that EPL negatively a®ects unemployment in°ows and out°ows. No unambiguous result is obtained concerning the impact of EPL on labour and job turnover, while economic theory unambiguously predicts a negative e®ect of the strictness of employment protection on this type of labour market °ows. Explanations of this discrepancy between theory and facts { e.g., [5] and [6] { typically calls into play the interaction of EPL with other institutional features as well as measurement problems. For instance, it is argued that institutions compressing wage structures tend to counteract the negative e®ects of EPL on labour market °ows because they reduce the scope of price-driven adjustment mechanisms. These potential interactions with other institutional features question the relevance of many ¯ndings, which are all based on pairwise correlations. Measurement problems stem from the fact that there is a quite substantial within country variation in the actual enforcement of regulations, which is not captured by cross-country analyses.

>From the above it follows that empirical work should preferably use data referred to the same country and exploit any time-series available in regulations. No reform of EPL was carried out on a stock basis, adjusting regulations for all workers with regular contracts. The type of reforms of EPL which have been carried out have only been enforced at the margin, adding new °exible contractual types to the existing \rigid" ones. These asymmetric reforms yield dual labour market regimes in which a °exible segment of the workforce coexists with a rigid one. Contrasting the behaviour of the two segments is not su±cient to identify the e®ects of EPL because there are rather obvious links between the two components of the workforce, which have been investigated by the literature. In particular, [2] argue that °exible contracts provide a bu®er stock to ¯rms, which insulates permanent workers from employment adjustment in response to exogenous shocks. Studying the e®ects of EPL under dual regimes may then induce one to overstate the impact of these regulations. However dual regimes can be used in di®erence-in-di®erence policy evaluation studies.[1]

[1] As, for example, in [13].

The Effects of Employment Protection on the Labour Market: Empirical Results

	STOCKS		FLOWS	
Author(s)	*Employment*	*Unemployment*	*Employment*	*Unemployment*
Emerson (1988)	?	?	-	-
Lazear (1990)	-	+		
Bertola (1990)	?	?		
Grubb & Wells (1993)	-			
Garibaldi,Konings,Pissarides(1994)	?	?	?	-
Addison & Grosso (1996)	?	?		
Jackman,Layard,Nickell(1996)	?	?	-	-
Gregg & Manning (1997)	?	?		-
Boeri (1998)	?	?	+	-
Di Tella & McCulloch (1998)	-	+		
OECD (1998)	?	?	?	-
Kugler & StPaul (2000)			+	-

Figure 2.1: Survey of empirical evidence on EPL from cross-country data

Another dimension of within-country variation which has surprisingly not been used by the literature is the one involved by exemptions to EPL which are conditional on firm size. Many countries have granted to small firms exemptions from procedural obligations and, more broadly, from the most restrictive features of EPL. In order to empirically exploit this cross-country variation we need first to understand why these exemptions are in place to start with. This is the task set out for the next section.

3. A Simple Model of EPL and the Size of Firms

Standard models of EPL do not disentangle economic from disciplinary layoffs. Thus, they cannot capture a key asymmetry between small and large units in the effects of EPL.

Our theoretical framework is a partial equilibrium and dynamic efficiency wage model, inspired by [18]. We distinguish between layoffs justified on economic grounds and firings for disciplinary reasons. Firm size is relevant for monitoring and, hence, for the probability of being laid-off because of disciplinary reasons.

EPL, however, applies to both types of dismissal, as the burden of the proof rests on the ¯rm and it is generally much easier to support layo®s on economic than on disciplinary grounds. Thus the EPL restrictions which ultimately matter for employers are those on individual layo®s.

3.1. The model without EPL

3.1.1. Labour supply

All workers are alike. Their utility is linear in earnings and e®ort, namely

$$u_t = w_t - e_t \tag{3.1}$$

where w is the wage and e is e®ort, which, for simplicity, is assumed to be a discrete variable ($e = 0; 1$). If a worker hired in ¯rm of size l chooses to exert e®ort, its value function is given by

$$V_t^{ns}(l) = w_t(l) - e_t + \pm[(1 - p_t^{ns})E_t V_{t+1}(l) + p_t^{ns} U_{t+1}] \tag{3.2}$$

where p_t^{ns} is the layo® probability when the worker is exerting e®ort (thus, it is the probability of being dismissed because of economic reasons), ± is the discount factor and U_t is the asset value of unemployment, which is equal to

$$U_t = b + \pm[½_t E_t V_{t+1}(l) + (1 - ½_t)U_{t+1}] \tag{3.3}$$

being b unemployment bene¯ts and ½ the (exogenous) out°ow probability from unemployment into employment[2].

The asset value of being employed and shirking is given by

$$V_t^s(l) = w_t(l) + \pm[(1 - p_t^s(l))E_t V_{t+1}(l) + p_t^s(l)U_{t+1}] \tag{3.4}$$

where $p_t^s(l) > p_t^{ns}$ is the probability of being laid-o® if not exerting e®ort in a ¯rm of size l.

Let $0 < d(l) \cdot 1$ be the probability of being caught shirking (the detection-cum-¯ring probability) in a ¯rm of size l. Hence, we have:

$$p_t^s(l) = p_t^{ns} + (1 - p_t^{ns})d(l) \tag{3.5}$$

[2]One may think of workers being randomly \assigned" to ¯rms of a given sector-region. We are not interested in modelling job search in this model (which would necessarily involve also on-the-job search since the wage distribution is non-degenerate).

As is apparent from [3.5], detection technologies are a®ected by the number of employees in the ¯rm, l. In particular, we assume that d(1) = 1; so that no unique employee shirks, and d` < 0 and d\ > 0: In words, in large ¯rms monitoring is more di±cult, but, above a given threshold, the detection probability becomes less elastic to the scale of plants.

The no-shirking condition ($V_t^{ns}(l) = V_t^s(l)$) for a worker is given[3] by

$$E_t V_{t+1}(l) - U_{t+1} = \frac{1}{\pm(p_t^s(l_t) - p_t^{ns})} = \frac{1}{\pm d(l_t)(1 - p_t^{ns})} \tag{3.6}$$

In words, the expected surplus of employment over the reservation wage is decreasing in the detection probability.

Now, using equations [3.4] and [3.6], we solve for the wage to obtain[4]:

$$E_t w_{t+1}(l) = (1 - \pm)(U_{t+1}) + \frac{[1 - \pm(1 - d(l_t))(1 - p_t^{ns})]}{\pm d(l_t)(1 - p_t^{ns})} \tag{3.7}$$

As we are interested in the steady-state properties of the model, we will focus on the case of static expectations ($V_t = V_{t+1} = V$), where from (3.7) we have that:

$$w(l) = (1 - \pm)U + \frac{[1 - \pm(1 - d(l))(1 - p^{ns})]}{\pm d(l)(1 - p^{ns})} \tag{3.8}$$

As is apparent from [3.8], wages are increasing and concave in ¯rm size via the d term. The economics behind this result is that a lower detection probability has to be compensated by higher wages: the penalty on shirking, the wage loss, should be su±ciently strong as to deter opportunistic behaviour. Notice further that wages are increasing (and convex!) in the exogenous (for the worker) probability of being dismissed for economic reasons, p_t^{ns}: This can be better appreciated by considering the case of l = 1, where equation (3.8) reduces to:

[3] Both for a shirker and a non-shirker we have that $E_t V_{t+1} = \max(E_t V_{t+1}^s; E_t V_{t+1}^{ns})$. Since workers are homogeneous $E_t V_{t+1}$ should be independent of the decision at t, provided that there is in¯nite horizon and there is no serial correlation in the parameters conditioned on decisions at t. The detection probability is an exogenous parameter in our model, which does not depend on the worker's past shirking behaviour.

[4] In addition to the no-shirking condition, the value of being employed and exerting e®ort should exceed the value of being unemployed, so that wages must also satisfy

$$w_t > b + e - \pm(1 - \tfrac{1}{2} - p_t^{ns})(E_t V_{t+1} - U)$$

By appropriate choice of b, we can make sure that this is not binding.

$$w = (1 - \pm)U + \frac{1}{\pm(1 - p^{ns})}$$

While p_t^{ns} is exogenous for the individual workers, it is endogenously determined in our model, as discussed below. The value of being unemployed is given by

$$U = \frac{b}{1 - \pm} + \frac{\frac{1}{2}}{(1 - \pm)(1 - p^{ns})d(l)}$$

Finally we assume that workers' mobility cannot arbitrage away wage differentials across small and large units through search. This may happen because there are sufficiently large costs of mobility of workers across regions or sectors.

3.1.2. Labour demand

Plants belong to different industries (or regions) denoted by the subscript i. They all produce using labour as the only input. Their instantaneous profits are given by:

$$\frac{1}{4}_{it} = \mu_{it} f_i(l_{it}) - l_{it}w_i(l_{it}) \text{ where } f' > 0; \; f'' < 0$$

being μ_i the market value of the good observable by the employer. We assume that prices as a first-order, discrete-space, Markov process[5]. Suppose, in particular, that there are just two states, "high", μ_i^h; and "low" $\mu_i^l < \mu_i^h$; and that the transition matrix is symmetric and its stayer coefficients are given by $\, > \frac{1}{2}$ so that there is some degree of persistence. Realisations of μ_i are common knowledge. Whenever a shock occurs, firms revise employment plans accordingly. We will consider later adjustment costs in labour. Call the two optimal levels of employment l_i^h and l_i^l : they maximise the value of firms in sector i when the states of the world are μ^h and μ^l respectively. Given the symmetry of the process, at the steady state, each plant will have for half of its time l_i^h employees and for the other half l_i^l Thus the exogenous ex-ante economic layoff probability at the steady state will be simply given by $\frac{1}{2}\frac{l_i^h - l_i^l}{l_i^h} = p_i^{ns}$.

3.1.3. Equilibrium

Wages are set having as reference the long-term layoff probability in the industry and the size-specific detection-cum-firing probability. In other words, firms decide

[5]Generalisations to continuous time Markov processes (e.g., in continuous time and contonuous state space) would not affect our results, while they would greatly complicate algebra.

l_i^h and l_i^l by having in mind the effects of d(l) on the no-shirking condition, but assuming that p_i^{ns} is independent of the current size of the plant. In the numerical simulations below we relax this assumption, which greatly simplifies algebra without affecting our conclusions. One may think that decisions on economic layoffs are made centrally within multi-plan firms so that the probability of dismissal is independent of the size of the single plant, while disciplinary layoffs can only be implemented when workers are detected shirking, on the basis of plant-specific monitoring.

The wages and employment levels prevailing in plants under good and bad demand conditions are depicted in figure 3.1. Under good times, both wages and employment levels are higher than under $\mu_i = \mu_i^l$. Notice that the relative size of employment and wage variations depends on the curvature of the non-shirking condition in the relevant region: the steeper the curve, the stronger the effect of shocks on wages, the lower the employment variation. Formally the two optimal employment and wage levels are given by the first-order conditions:

$$f_i'\mu_i^l = w_i(l_i^l) + w_i'(l_i^l)l_i^l$$

and

$$f_i'\mu_i^h = w_i(l_i^h) + w_i'(l_i^h)l_i^h$$

which spell out the effect of employment adjustment on wages, hence on the marginal costs of labour, via changes in detection-cum-firing probabilities.

3.2. Introducing EPL

We are now ready to introduce EPL. For simplicity, we model EPL as a cost on layoffs[6] which makes it unprofitable for firms to layoff workers in response to shocks. In other words, under EPL the plant enters an "inactivity corridor" (Bertola, 1990) where it is optimal to keep employment fixed over the "cycle". Inevitably EPL constrains also disciplinary layoffs. In the real world this happens via the costs of judicial procedures required to implement the dismissals. EPL usually establishes that either economic or disciplinary reasons for the dismissal have to be provided by the employer, who has the burden of the proof. Layoffs are

[6] Furthermore, our notion of EPL is one inflicting red-tape costs on employers rather than forcing them to implement transfers to the worker being dismissed. Red tape costs cannot be internalised in the employer-employee relationship, hence cannot be undone even under flexible wages.

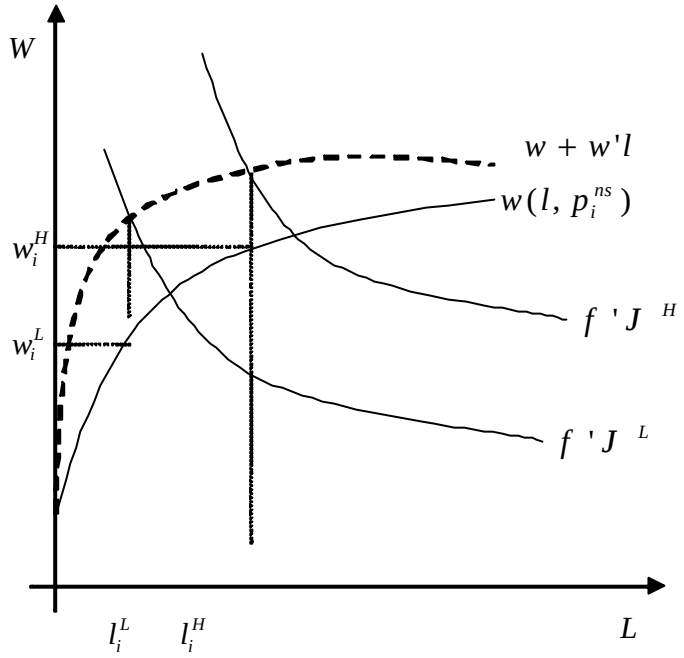


Figure 3.1: Employment and wage adjustment without EPL

considered to be unfair in most countries when there are neither subjective (misconduct) nor objective (economic) grounds for the interruption of the relationship. As noted above, penalties applied to employers implementing unfair dismissals do not discriminate among the two types of justi¯cations (disciplinary and economic) for the dismissal (see [4]) and the employer ¯nding it hard to prove the misconduct can always try to justify the dismissal on economic grounds. Thus, the costs of disciplinary layo®s are inevitably interrelated to those of economic dismissals.

Summarising, under the \rigid regime", for ¯rms of any size and industry it is not convenient to implement economic dismissals, employment is kept at a given level independently of the realisation of the costs. At the same time, disciplinary layo®s become more costly.

3.2.1. A geometric illustration

For simplicity let us just take the extreme case where in small units disciplinary dismissals become as di±cult as in large units, so that the wage schedule is °at as depicted in Figures 3.2 and 3.3. This °at wage schedule will be somewhere below the asymptote of the no-shirking condition because EPL reduces the probability of exogenous dismissals, depressing wages at any level of employment.

For small units, however, the main e®ect on wages comes from the decline in the monitoring-cum-¯ring probability which plays in the opposite direction, that is, it increases wages.

The e®ects of EPL is to stabilise labour demand at a level which is consistent with the maximisation of average pro¯ts (as opposed to instantaneous pro¯ts as under the °exible regime). Thus we have that for any realisation of the shock, the optimal employment level satis¯es the ¯rst-order condition

$$\frac{1}{2}\left[\mu_i^h f_i'(\bar{l}_i) + \mu_i^l f_i'(\bar{l}_i)\right] = \bar{w}_i(l_i)$$

this equilibrium level of employment is depicted in Figures 3.2 and 3.3 having as reference, respectively, large and small units. Hereafter variables denoted by a bar represent the rigid wage regime.

As shown by the Chart, EPL has di®erent implications for small and large units. For the latter, it implies a stabilisation of employment above l^l: the largest the plant, the more likely that employment may actually stabilise at a level which is close to l^h, the level attainable under good demand conditions in a °exible regime. At the same time, for the largest units, wages may decline below

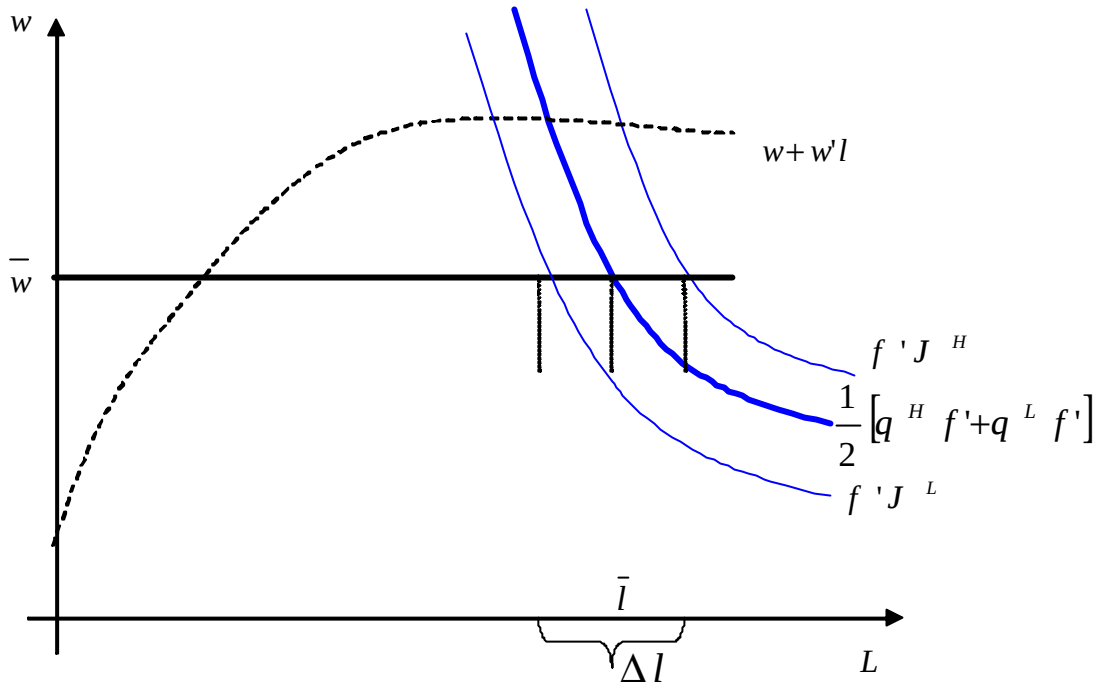


Figure 3.2: Employment and wage adjustment with and without EPL: large ¯rms

the level in the bad state of the world. In the case of small units, EPL involves instead an increase of wages even with respect to the good state of the world, but is likely to involve also a decline of employment below the level prevailing in a °exible labour market under the bad state of the world.

Clearly the nature of the shift in the wage function, hence of the change in equilibria related to EPL, will depend on the slope of the no-shirking condition, hence on the characteristics of monitoring technologies. Below we provide some numerical simulations which are based on inferences on the ¯rm-size ¯rm-wage relationship in °exible labour markets. Before doing that, we turn our attention to the political economy of EPL.

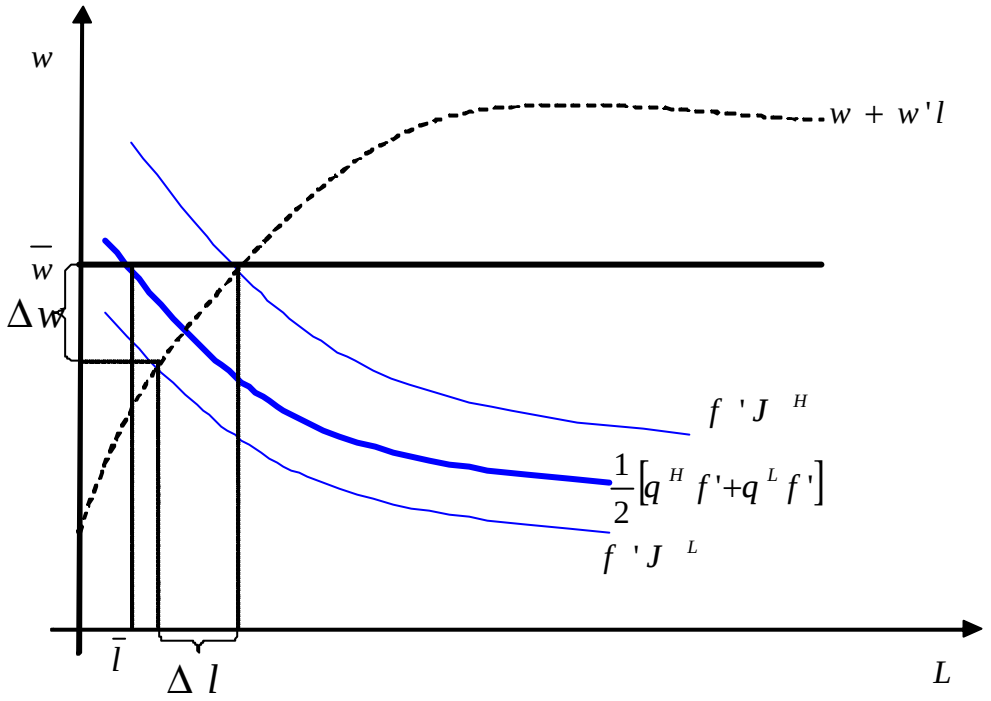


Figure 3.3: Employment and wage adjustment with and without EPL: small $\bar{}$rms

3.2.2. Political Support to EPL

In a given sector or region i, employees will be ex-ante favourable to the introduction of EPL insofar as

$$\lambda_i \frac{\bar{w}_i - e}{1-\delta} + (1-\lambda_i)\frac{b}{1-\delta} > \frac{\frac{1}{2}[w_i(l_i^l) + w_i(l_i^h)] - e + \delta p_i^{ns} U}{1-\delta(1-p_i^{ns})} \qquad (3.9)$$

where $\lambda_i = \min\left[\frac{l_i^l}{\frac{l_i^l + l_i^h}{2}}; 1\right]$ and we have dropped time subscripts as we are interested only in steady state comparisons. We can now state the following proposition.

Lemma 3.1. Proposition: Under rather mild restrictions on the relation between detection technologies and size of firms, only employees of relatively large units will support EPL.

Proof: For small firms λ_i tends to zero so that condition (3.9) reduces to $\frac{b}{1-\delta} > \frac{\frac{1}{2}[w_i(l_i^l)+w_i(l_i^h)] - e+\delta p_i^{ns} U}{1-\delta(1-p_i^{ns})}$, which is never satisfied because $b < U$. For large firms, instead, $\lambda_i = 1$, as EPL will stabilise employment at a level which is higher than average employment under the flexible regime. In this case, support to EPL implies that $\frac{\bar{w}_i - e}{1-\delta} > \frac{\frac{1}{2}[w_i(l_i^l)+w_i(l_i^h)] - e+\delta p_i^{ns} U}{1-\delta(1-p^{ns})}$; and after some algebra and by substituting here $p^{ns} = \frac{1}{2}\frac{l_i^h - l_i^l}{l_i^h}$, we have that

$$\frac{\delta(l_i^h - l_i^l)}{(1-\delta)l_i^h}\left[\bar{w}_i - (e+b) - \frac{4\rho l_i^h}{(l_i^h + l_i^l)[d(l_i^l) + d(l_i^h)]}\right] > \left[w_i(l_i^l) - \bar{w}_i\right] + \left[w_i(l_i^h) - \bar{w}_i\right]$$

In between these two extreme cases, both, the left-hand-side and the right-hand-side of [3.9] are monotonically increasing in size. It follows that the two value functions will cross only once. This unique crossing point represents the optimal threshold scale for the exemption from EPL.

Lemma 3.2. Corollary: If threshold scales are chosen according to the preferences of workers, then EPL will affect employment turnover, but may not reduce the average size of plants in an industry.

This follows from the condition above that EPL is supported only when the threshold is equal or higher than average employment in the flexible regime.

3.2.3. An example

In order to illustrate the comparative statics properties of the model, we analyse the case of constant returns to labour ($f(l) = l$) and a detection technology given by $d(l) = l^{-\gamma}$, $\gamma > 0$; so that in this simple example, in contrast to the geometric example above, we are assuming that EPL regulations do not affect disciplinary layoffs.[7] For notational ease, we assume that the cost of exerting effort (e) is equal to one unit, and we set unemployment benefits (b) to be zero. Thus, dropping industry-subscripts for simplicity, we have

$$w(l) = 1 + \frac{1 + \theta[\pi - (1 - p^{ns})]}{\theta d(l)(1 - p^{ns})}$$

The employment levels in the flexible regime are given by

$$l_i^l = [\phi(\mu_l - 1)]^{-\frac{1}{\gamma}} \qquad l_i^h = [\phi(\mu_h - 1)]^{-\frac{1}{\gamma}} \qquad \text{being } \phi = \frac{\theta(1-p^{ns})}{(1+\gamma)\{1+\theta[\pi-(1-p^{ns})]\}}$$

Thus,

$$1 - p^{ns} = \frac{(\mu_h - 1)^{-\frac{1}{\gamma}} + (\mu_l - 1)^{-\frac{1}{\gamma}}}{2(\mu_h - 1)^{-\frac{1}{\gamma}}}$$

Under the rigid regime, $p^{ns} = 0$ and, hence, the employment level is given by

$$l^i = \left[\frac{\theta(\bar{\mu} - 1)}{(1+\gamma)[1+\theta(\pi - 1)]}\right]^{\frac{1}{\gamma}} \tag{3.10}$$

being $\bar{\mu} = \frac{\mu_l + \mu_h}{2}$. The wages corresponding to these three employment levels are:

$$w^h = w(l^h) = \frac{\gamma + \mu_h}{1+\gamma} \qquad w^l = w(l^l) = \frac{\gamma + \mu_l}{1+\gamma} \qquad w^i = \frac{\gamma + \bar{\mu}}{1+\gamma}.$$

Therefore, in this particular case the condition for support to EPL is given by

$$\frac{\bar{\mu} - 1}{1 - \theta}\pi > \frac{\bar{\mu} - 1 + (1+\gamma)\theta p^{ns} U}{1 - \theta(1 - p^{ns})}$$

[7] This assumption, which implies less workers' support for EPL, will be relaxed in the simulations below.

where $\acute{A}_i = \min\left\{\frac{(\bar{\mu}_i 1)^{-1}}{(\mu_h i 1)^{-1}}\left[\frac{1+\pm[\frac{1}{2} i (1 i p^{ns})]}{[1+\pm(\frac{1}{2} i 1)]}\right]^{-1}; 1\right\}$ or:

$$[1 ¡ \pm(1 ¡ p^{ns})]\acute{A} > 1 ¡ \pm + \frac{\pm^2 ½ p^{ns}}{1 + \pm[½ ¡ (1 ¡ p^{ns})]} \tag{3.11}$$

After some manipulations the latter inequality can be rewritten as:

$$\frac{\pm}{1 ¡ \pm(1 ¡ ½)} > \frac{1 ¡ \acute{A}}{\acute{A} p^{ns}} \tag{3.12}$$

Notice that this condition is always satis¯ed when $\acute{A}_i = 1$: It is also more likely to be satis¯ed when the unemployment out°ow rate, ½, and p^{ns} are large. Note also that p^{ns} is increasing in the di®erence between labour productivity under the good and the bad states of nature ($\mu_h ¡ \mu_l$). More importantly, support to EPL is increasing in $\bar{\mu}$, hence, by (3.2.3), in the average employment level in the industry. Overall, support to EPL is more likely the stronger the volatility of employment in the °exible regime and the larger the optimal size of plants in an industry. How large should the e±cient size of plants be in order to have workers to vote for EPL? This is what we will try to answer in the next section, based on numerical simulations of our model.

3.2.4. Some simulations

We now turn to numerical simulations enabling us to recover the politically supported threshold level of l from condition (3.11) in a more general specialisation of the detection technology, for di®erent values of labour productivity in the low and in the high states and taking the elasticity of production with respect to employment to be 2/3, which is in line with the labour share in most OECD countries. We specify the detection technology to be $d^r(l) = \max\{1 ¡ c^r \ln(l); 0\}$ where $0 < c^r < 1$. The superscript $r(= f; g)$ stands for the EPL regime (f: °exible, g: rigid), and $c^f < c^g$. This functional form is more °exible and allows for a better calibration, based on empirical estimates of ¯rm size-¯rm wage e®ects. As in the previous example, we set $e = 1$ and $b = 0$: Each period is a quarter. We take $\pm = 0{:}9925$; which implies an annual discount rate of roughly 3%, and $½ = 0{:}02$ which closely match the quarterly hiring rates observed in the Italian case (see below).

In the baseline we chose the parameter of the detection technology (c) in such a way as to match the ¯rm size-¯rm wage premia observed in °exible labour

markets. A recent study with matched employer-employee data set identi¯es the ¯rm size-¯rm wage e®ect in the US State of Washington ([1]). Although the elasticity of wages with respect to ¯rm size is not numerically reported, a visual inspection of Figure 6 in that paper yields a somehow constant elasticity of the order of 0.03-0.035, which is consistent with the elasticity reported by [8]. Although this premia can be attributed to several factors, not only to a size-dependent monitoring technology [17], in the baseline simulation the parameter of the detection technology under the °exible regime is chosen in such a way as to closely replicate this premium.

The key results from our simulations are reported in Figures 3.4 and 3.5. In Figure 3.4 we plot the detection technologies under each regime when its key parameters are $c^f = 0{:}05$ and $c^g = 0{:}1$: This speci¯cation of the detection technology under the °exible regime yields a ¯rm size-¯rm wage premium of 3.7%, close to the available empirical estimates cited above. For the rigid regime, we assume that the detection-cum-¯ring probability decreases at a higher rate with ¯rm size, as can be seen in the Figure.

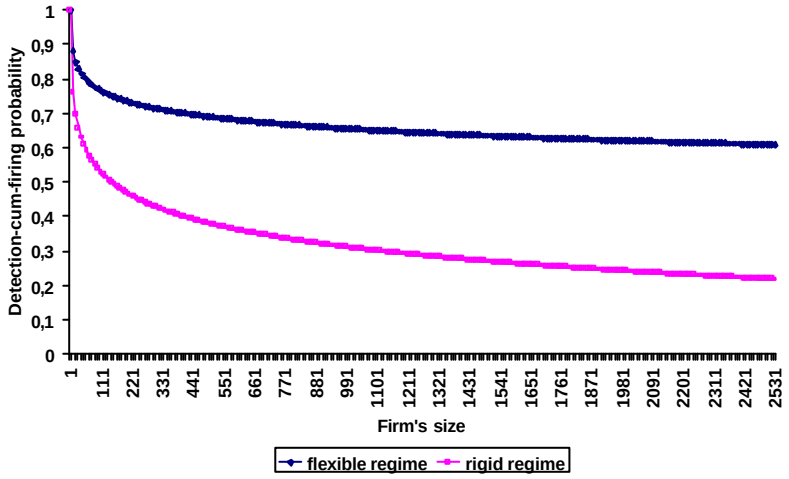


Figure 3.4. Detection technologies

In the top panel of Figure 3.5 we plot the average employment level in the °exible regime with respect to μ_h, where it is assumed that $\mu_h = 3\mu_l$; implying cyclical °uctuations of employment of about 50%: In the lower panel for each

μ_h we plot the support for EPL, where a negative value indicates that workers are better off under the flexible regime. The average employment level at which support for EPL starts turns out to be 18, very close to the level of the threshold scale below which the most restrictive provisions are not implemented in Italy, as discussed below.

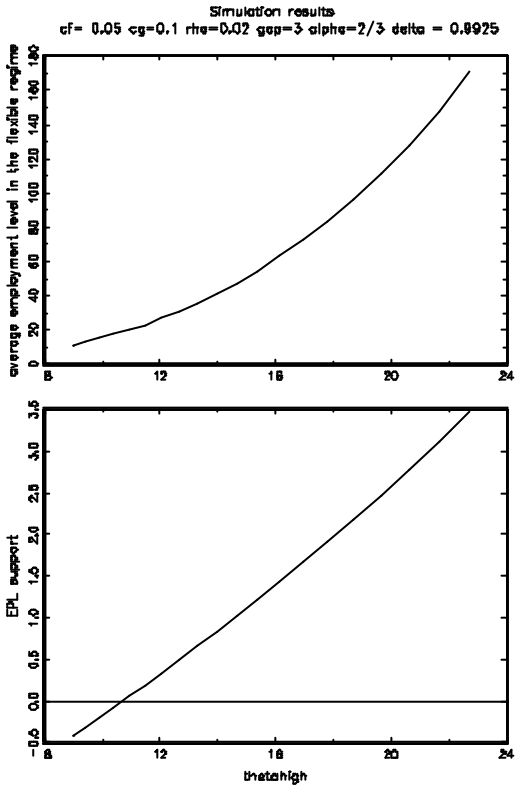


Figure 3.5. Simulation results.

4. Empirical evidence

The model above and its numerical simulations suggest that EPL can be politically supported by workers only when it involves firms with a relatively large efficient size. In the industries where EPL is supported by workers, it should reduce labour

turnover, notably hiring and ¯rings, but not the average size of plants. We test below these implications of the model drawing on individual data on labour market °ows in Italy and Spain, two countries with strict EPL and exemptions for small ¯rms. National legislations and data sets are brie°y described below.

4.1. Italy

Individual, no-fault, dismissals of workers with a permanent contract are in Italy regulated by the norms of the Statuto dei Lavoratori, approved in 1970. The employer is required to give a written notice to the employee who can also require a communication of the detailed reasons for the dismissal and the start of a conciliation procedure by the provincial employment o±ce or through conciliation committees set up under collective agreements. The length of the statutory notice period depends on the tenure of the worker. The worker can appeal to court against the dismissal within 60 days from the communication of the reasons of the dismissal, but has ¯rst to start a conciliation procedure with the ¯rm. The size of ¯rms matter in that the consequences of the judge's decision to overrule the ¯rm's decision depend on the size of the ¯rm. Workers in ¯rms employing more than 15 employees in a single plant (or 60 overall) are protected by the so-called \tutela reale", that is, they can choose either the reinstatement in the ¯rm, plus a compensation equal to foregone earnings between the date of the dismissal and the legal settlement of the case (with a minimum of 5 months), or a ¯nancial compensation of 15 months and the foregone earnings. Workers in the smallest units are instead covered by the so-called \tutela obbligatoria" (L. 604/1966): in this case it is the employer to choose between reinstatement and a compensation ranging between 2,5 and 6 months depending on seniority and the size of the ¯rm. Thus, EPL on individual dismissals is much stricter for units with more than 15 employees.

We use data from the national Labour Force Survey, a quarterly survey with a large rotating panel. At yearly frequencies, we can track histories of about 40 per cent of the LFS sample, that is, about 80,000 individuals. The size of the ¯rm is stated by the employees. This gives rise to problems of \heaping"; indeed the distribution of the stated employment levels reveals marked peaks at discrete intervals (e.g., 10 employees, 20 employees, etc.). However, due to the importance for workers of the 15 employees threshold, measurement error around this threshold is likely to be limited. In the empirical analysis below we use information from both, matched records across LFS waves (enabling us to

identify separations) as well as contemporaneous and retrospective information in the initial and the final period respectively (allowing us to measure the size of the firm the worker was attached to and the nature of the separations). Unfortunately the information provided by the survey is not sufficient to disentangle disciplinary from economic layoffs.

4.2. Spain

In Spain EPL admits three reasons for layoffs: i) objective (worker's incompetence, lack of adaptation to the job post, absenteeism, etc.), ii) economic, technological, organisational or productive, and iii) disciplinary reasons (worker's unjustified absences, lack of discipline or subordination, etc.).

The formal procedure for dismissals is different depending on the alleged cause. For objective and economic layoffs there is a notice period of 30 days. At the moment of the dismissal the employer must give the employee a written notice explaining the reason of the dismissal and a severance payment of 20 days' wages per year of seniority (with a maximum of 12 months of wages). Dismissed workers may appeal to court and the judge may declare the dismissal \fair", \unfair" or \null". If the dismissal is declared \fair", the worker keeps the severance payment. In case of dismissals due to economic, technological, organisational or productive reasons declared \fair" by the labour court in firms below 25 employees, a state fund (FOGASA) pays 40% of the corresponding severance payments.

For disciplinary firings a notice period is not required. At the moment of the dismissal the employer must give the employee a written notice explaining the cause of the dismissal, but not the severance payment as in the case of economic or objective dismissals. The worker may then appeal to court. If the dismissal is declared \fair" the worker leaves the firm without any severance payments.

For any type of dismissal declared \unfair" by the labour court, the employer can choose between reinstatement or paying a higher severance payment of 45 days' wages per year of seniority with a maximum of 42 month's wages (33 days' wages per year of seniority with a maximum of 24 month's wages under the new permanent contract introduced in 1997) together with the wages corresponding to the period between the date of the dismissal and the date of the court's decision. If the dismissal is declared \null", then the worker must be reinstated and the wages corresponding to the period between the date of the dismissal and that of the court's ruling must be paid.

Collective dismissals are defined as those justified by either economic, techno-

logical, organisational or productive reasons a®ecting over a period of 90 days at least to:

- 10 employees in ¯rms below 100 employees.
- 10% of employees in ¯rms between 100 and 300 employees
- 30 employees in ¯rms with more than 300 employees.

In this case, the employer must ¯rst seek the approval of the administrative o±ce in charge (usually under the Ministry of Employment or the Employment O±ce of regional governments). Simultaneously, the employer must open a consultation period with workers' representatives. The minimum duration of the consultation period is 30 days (15 days in ¯rms below 50 employees). When this is over, the employer ought to communicate the results of the consultation to the administrative o±ce, which then has 15 days to grant approval for the dismissals (in case of no response after 15 days, it is understood that the approval is granted). In practice, administrative approval is almost only granted in case of agreement between the employer and workers' representatives. Severance payments are then established in 20 days' wages per year of seniority, with a maximum of 12 months' wages (in practice, to achieve the agreement with workers' representatives, employers pay severance payments much higher than the amount established by the legislation).

Notice that small ¯rms (below 25 employees) have a better treatment for economic dismissals, since they may get 40% of severance payments as a subsidy from a state fund, while large ¯rms bene¯t from a more favourable treatment insofar as they can get access to collective redundancy regulations. For disciplinary dismissals, instead, the same rules apply to all ¯rms, independently of size.

As for temporary work, Spain was one of the pioneers in liberalising ¯xed term contracts in 1984.[8] Up until 1994 ¯xed-term contracts could be used to hire workers, not only in seasonal, short-duration jobs, but also for \typical" jobs which do not usually have an expected date of termination. These contracts allow for dismissals, at the termination of the contract, at much lower costs (in some cases, even at zero costs) than those under permanent contracts, without needs of going through any judicial or administrative procedures. The proportion of ¯xed-term employees rose very fast in the second half of the 1980s to reach about one third of dependent employment by the early 1990s. Along the 1990s there have been several labour market reforms restricting the scope of ¯xed-term employment contracts (in 1994 and 1997) and providing subsidies to the conversion of ¯xed-term employment contracts into permanent ones and to the hiring of employees

[8] For a recent survey on the e®ects of ¯xed-term employment in Spain, see [9].

under the latter (after 1997). As a result of the reforms, since 1994 fixed-term contracts can only be used, in principle, to hire workers for seasonal, short duration jobs. However, the incidence of fixed-term employment has decreased only slightly and is still above 30%.

Like the Italian LFS, the Spanish Labour Force Survey is a household panel survey with a rotation scheme. Each household is interviewed during six consecutive quarters, with one sixth of the sample entering and exiting the survey every quarter. Respondents have to provide the number of employees of their firms in a continuous fashion, but the response is coded in four classes (less than 10 employees, 10-19 employees, 20-49 employees, and 50 or more employees). Hence, we can construct flows from employment into unemployment controlling for firm size in the last employment spell. Moreover, unemployed workers with a previous employment spell are asked about the reason why they lost their last job (quit, collective layoff, individual layoff, not renewal of fixed-term contract, etc.). Unfortunately, in the case of individual firings, the LFS offers no information on the reasons alleged by the firm. However, from other sources (labour court statistics) we know that around 80% of individual firings are justified on disciplinary grounds. On the contrary, all collective layoffs ought to be justified on economic reasons. Hence, we can proxy disciplinary firing with individual firings and economic dismissals with collective layoffs.

4.3. Estimating Layoff Probabilities

We initially test the effect of the 15 employee threshold in Italy on layoff probabilities. In particular, we regress the probability of being laid-off from period t to $t+1$ on a number of personal (gender, age, educational attainments, region of residence) and firm characteristics (industry of affiliation, the number of employees at t in the plant the worker is attached to) plus a firm size dummy capturing possible thresholds effects. Workers being laid-off are those who are not employed at $t+1$ while they were at t and who declare to have lost their job because of a dismissal. The sample includes only employees at t. We consider first workers with permanent contracts (\regular" workers) and then employees with a fixed-term contract at t.

As noted above, these probit regressions do no identify threshold effects implied by EPL if the relationships between job turnover and firm size is not controlled for. We initially confront this issue by running three different specifications: i) regressions with two dummy variables, one for firm below 50 employees and another

for ¯rm below 15 employees, ii) regressions with two dummy variables, one for ¯rm below 30 employees and another for ¯rm below 15 employees, and iii) regressions with continuous size variables (the logarithm of the number of employees and its squared term) and a dummy variables for ¯rms below 15 employees. In each case the ¯rst variable is expected to capture ¯rm-size e®ects related to factors other than EPL, while the second variable is expected to capture EPL threshold e®ects. We also run separate regressions for men and women since EPL, together with rules against gender discrimination may imply di®erent ¯ring probabilities. Finally, we compare the marginal e®ects of ¯rm size variables on the layo® probabilities of permanent and temporary workers. Were these variables capturing only size e®ects unrelated to EPL, we should expect them to have similar marginal e®ects on layo® probabilities both for permanent and for temporary workers.

The results regarding the marginal e®ects of the dummy variable for ¯rms below 15 employees on layo® probabilities, for both permanent and temporary workers, are displayed in Table 5.1. Overall we observe a statistically signi¯cant and positive e®ect of the dummy capturing ¯rms below the threshold scale de¯ned by art.18 of the Statuto dei Lavoratori. Ceteris paribus, the exemption from the so-called \reintegra" would seem to increase by about one-fourth layo® probabilities. This e®ect is statistically more signi¯cant for men than for women while it is not present when the focus is on temporary workers, who are clearly not involved by art.18. All this is evidence in support of the existence of EPL threshold e®ects.

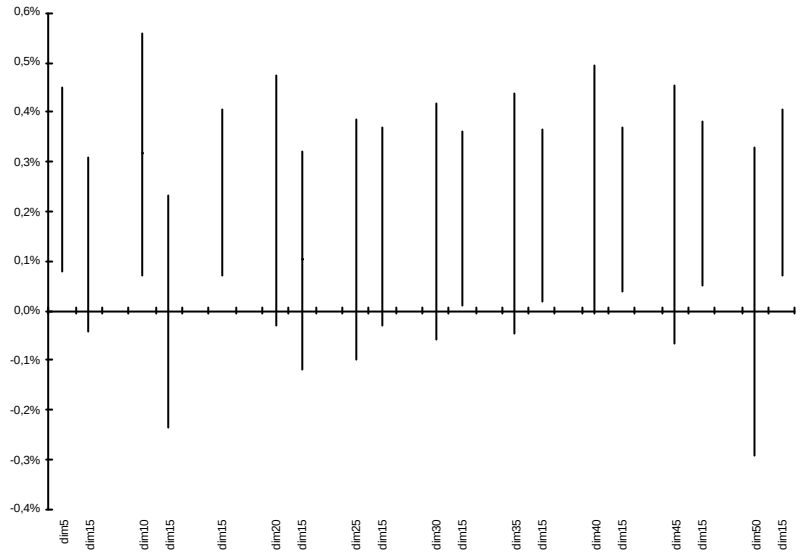
The choice of discrete ¯rm size variables to capture size e®ects other than EPL is obviously arbitrary. To check the robustness of the 15-employees threshold e®ect on layo® probabilities, we also run alternative regressions including ¯rm size dummy variables at di®erent levels (5, 10, 20, 25, 35, 40 and 45 employees) together with the dummy variable for ¯rms below 15 employees. The results (point-estimates and their 95% con¯dence interval bands) are presented in Figures 5.1(a) through 5.1(c) together with the results from the two previous speci¯cations. For all permanent workers, the 95% con¯dence intervals corresponding to the dummy variable for ¯rms below 15 employees are always above zero when the additional ¯rm size variables included in the regressions are de¯ned at levels of 30 and above. This does not happen when this additional variable is de¯ned at levels 25 and below. Given the \heaping" problem commented above and the relatively small sample size, we would not take this ¯nding as conclusive evidence against EPL threshold e®ects. In any case, the results are less favourable when running separate regressions for men and women (see Figures 5.1(b) and 5.1.(c)).

Table 5.1. E®ects of EPL ¯rms' size threshold on layo® probabilities. Marginal e®ects from probit estimates. Italy, 1994-1996

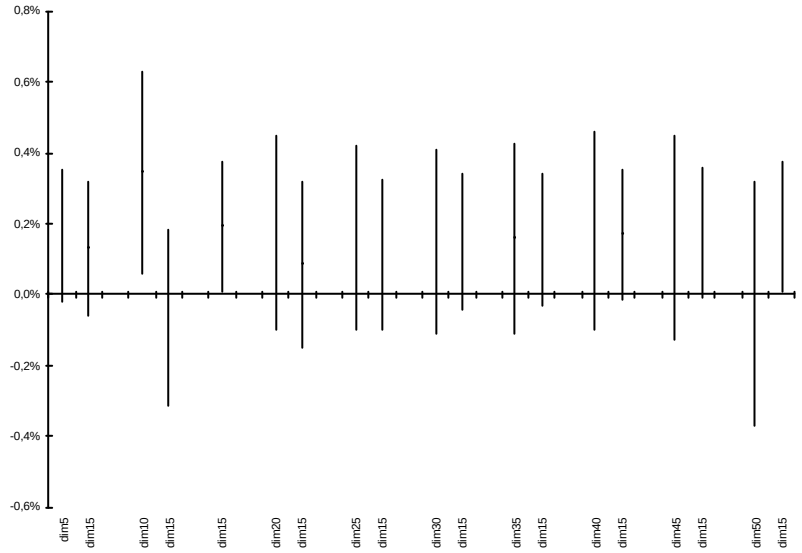
Permanent Workers			
	All[1]	All[2]	All[3]
Less than 15 employees	0:28 3:3	0:25 2:4	0:24 2:9
Temporary Workers			
Less than 15 employees	¡ 0:21 1:4	¡ 0:21 1:2	¡ 0:01 0:3
Permanent Workers			
	Men[1]	Men[2]	Men[3]
Less than 15 employees	0:25 2:7	0:21 1:8	0:19 2:2
Temporary Workers			
Less than 15 employees	¡ 0:17 1:1	¡ 0:24 1:3	¡ 0:02 0:2
Permanent Workers			
	Women[1]	Women[2]	Women[3]
Less than 15 employees	0:27 1:8	0:25 1:3	0:25 1:6
Temporary Workers			
Less than 15 employees	¡ 0:13 0:8	¡ ¡ ¡ ¡	0:00 1:0

Sample: LFS 1993-1996. In each cell the ¯rst row is the marginal e®ect (in percentage points) and the second row is the corresponding unsigned t-statistics. All regressions include worker's age and age squared, educational attainment, tenure and tenure squared, dummy for services, dummy for part-time, regional dummies, dummies for family status, and time dummies. [1]Includes a dummy for ¯rm size below 50 employees. [2]Includes a dummy for ¯rm size below 30 employees. [3]Includes ¯rm size and its squared. Number of observations: All/Permanent: 45,770; All/Temporary: 5,347; Men/Permanent: 28,999; Men/Temporary: 3,301; Women/Permanent: 16,771; Women/Temporary: 1,626.

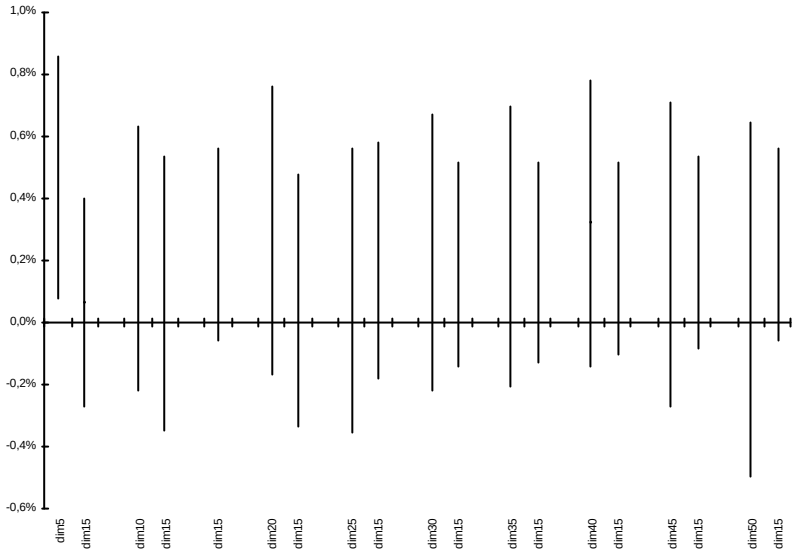
(a) All permanent workers.



(b) Male permanent workers.



(c) Female permanent workers.



Marginal e®ects of ¯rm size variables on layo® probabilities. Italy, 1994-1996.

Note: dim(i): dummy variable for ¯rms below i employees

Our sample for Spain does not contain a continuous variable on the firm number of employees. Moreover, Spanish EPL does not refer to any specific firm size threshold for the application of the different rules (other than the 25 employee level below which firms qualify for transfers in the case of objective dismissals). Hence, we cannot follow the same empirical strategy implemented in the Italian case. However, we can observe individual and collective dismissals. To the extent that, for small firms, red tape costs involved in individual dismissals are lower than those implied by collective dismissals, and the contrary happens for large firms, we should observe that individual/disciplinary layoffs are more frequent in small firms, while collective/economic dismissals are more frequent in large firms.

Table 5.2 provides the marginal effects of firm size on the probability of individual firings, collective dismissals, and not renewal of fixed-term contracts estimated on Spanish data. We control for size effects, by using a wider set of co-variates representing worker's and job's characteristics, than with the Italian data, taking advantage of a larger sample size. Thus, besides the four firm size dummies (1-9 employees, 10-19 employees, 20-49 employees, and 50 employees or more) each of the three probit regressions includes the following regressors: GDP growth (at quarterly frequencies), year and quarterly dummies, dummies for educational attainments (5), the industry (11), the occupation (8), worker's tenure (4), worker's family status (4), the region (7). We also include worker's age and age squared in the regressors.

We run separate regressions for men and women since there are noticeable differences in both the weight of employment in large firms and the incidence of fixed-term employment across gender. We also tried alternative specifications entering firm size dummies separately and then jointly. Were the effects on layoffs probabilities only the result of size effects independent of EPL, we would observe positive coefficients for larger firms, independently of the definition and number of firm size dummies included in the regression. As an additional test, we run similar regressions for employees under fixed-term contracts to estimate the effects of firm size on the probability of the employment contract not being renewed. If we were capturing only size effects on turnover unrelated to EPL, then there should be no significant differences in the effects of firm size on layoff probabilities and on the renewal of fixed-term employment contracts.

Our results indicate that large firms are less likely to dismiss workers under individual layoffs. Even within small and medium sized units (below 50 employees) there seems to be a negative correlation between size and probability of individual layoff (see the last two columns on the right-hand-side of Table 5.2). As for group

layo®s, we only ¯nd a signi¯cant positive e®ect for ¯rms over 50 employees, in the case of male workers. Finally, the coe±cients of ¯rm size dummies in the regression for the probability of not renewal of ¯xed-term contracts show a di®erent pattern: they are considerably higher for women in large ¯rms, and for men in ¯rms with 20-49 employees.

Overall, the results for Spain are also consistent with the predictions of the model in section 5.2. Large ¯rms, which cannot monitor workers very closely, are less likely to use individual/disciplinary layo®s. Thus, they usually adjust their labour force in \chunks", justifying economic reasons and taking advantage of the lower red tape costs per worker and alternative labour force adjustments schemes (early retirement, more generous unemployment insurance schemes) involved by collective dismissals.

Table 5.2. E®ects of ¯rm size on layo®s probabilities.
Marginal e®ects from probit estimates, Spain, 1992-1999

	Men	Women	Men	Women	Men	Women	Men	Women
Individual layo®s								
10-19	0:47 2:8	0:30 0:8	{	{	{	{	¡ 0:16 1:5	¡ 0:89 2:5
20-49	{	{	0:12 0:5	0:36 0:8	{	{	¡ 0:42 1:9	¡ 0:91 2:2
50 or more	{	{	{	{	¡ 1:22 7:8	¡ 2:58 7:9	¡ 1:36 7:5	¡ 2:93 8:4
Collective layo®s								
10-19	¡ 0:05 0:6	0:06 0:5	{	{	{	{	0:09 0:8	0:06 0:4
20-49	{	{	0:01 0:1	0:15 1:0	{	{	0:16 1:1	0:13 0:8
50 or more	{	{	{	{	0:18 2:1	¡ 0:11 1:1	0:26 2:3	¡ 0:07 0:5
Not renewal of ¯xed-term contract								
10-20	0:51 3:3	0:30 1:3	{	{	{	{	0:41 2:4	0:68 2:6
20-49	{	{	¡ 1:24 4:8	¡ 0:50 1:4	{	{	¡ 1:06 3:8	0:4 0:1
50 or more	{	{	{	{	0:17 0:8	1:03 3:7	0:21 0:9	1:31 4:3

Sample: LFS, 1992-1999. In each cell the ¯rst row is the marginal e®ect (in percentage points) and the second row is the corresponding unsigned t-statistics. Additional regressors are GDP growth, year and quarterly dummies, ¯ve dummies for educational attainments,eleven sectoral and eight occupational .dummies, four tenure dummies, age and age squared, four dummies for family status, and seven regional dummies. Unsigned t-statistics in parenthesis. Sample sizes: Individual dismissals/Men: 44,170; Individual dismissals/Women: 16,096; Collective dismissals/Men: 43,382; Collective dismissals/Women: 15,609; Temporary/Men: 168,281. Temporary/Women: 92,283.

4.4. Hirings by size of ¯rms and the equilibrium size distribution

Our model predicts that EPL should reduce not only layo®s, but also hirings above the threshold scale. However, when the threshold is chosen by workers, it

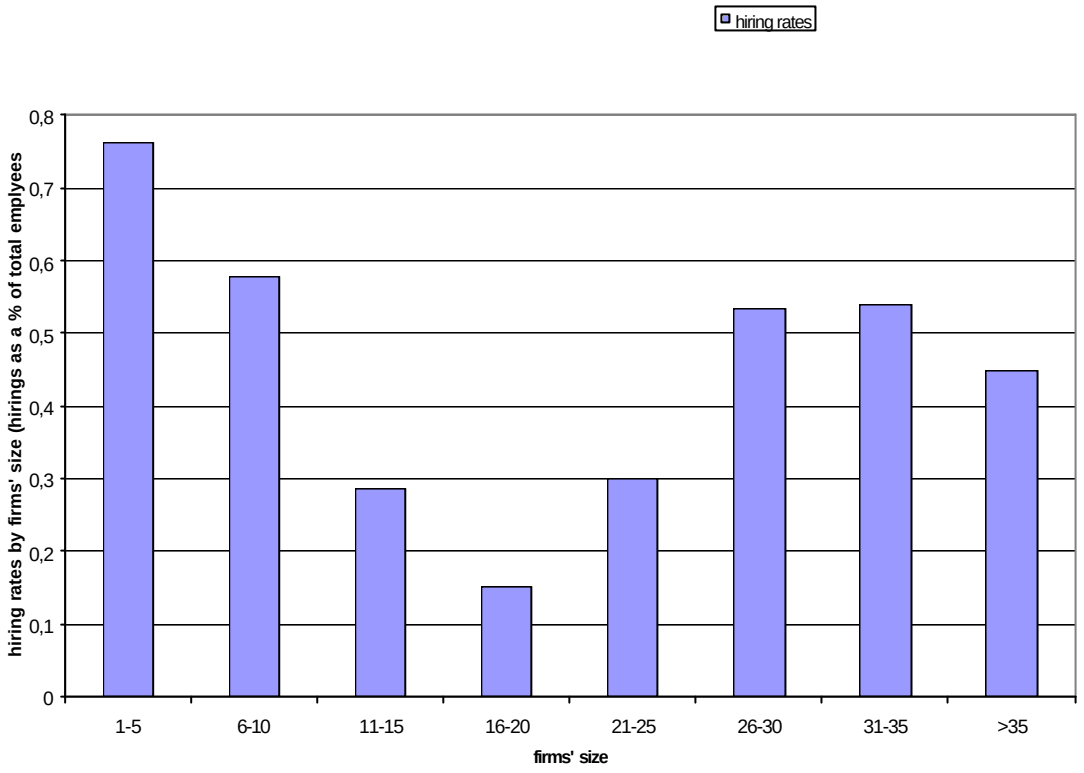


Figure 4.1: Hirings by ¯rm's size: Italy

should not reduce average employment levels of ¯rms.

LFS data allow us to estimate proxy monthly hiring rates (the workers declaring to have a tenure lower than one month) by size of ¯rms, both in Italy and Spain. Results are presented in Figures 4.1 and ??. For Italy they point to a decline of hiring probabilities in a neighborhood of the 15 employees threshold. Well above the threshold, hiring start rising again, but remains at a lower level than below the threshold. Some lumpy adjustment of labour may be involved in this rise of hiring rates: the 15 employees threshold is indeed uniform across the board and may actually constrain growth in some industries. As for Spain, where the LFS gives only information on ¯rm size coded in four groups, hiring rates of permanent employees in ¯rms over 50 employees are about half the hiring rates in smaller ¯rms (1-10 employees).

Hirings by ¯rm size: Spain

The Italian size distribution of ¯rms (Figure 4.2) however, does not point to a serious discontinuity in a neighborhood of the 15 employees threshold. Moreover, a recent study by Borgarello, Garibaldi and Pacelli (2002) { based on longitudinal, social security data on establishment-level employment changes { estimated that the 15 employees thereshold has a very mild, but signi¯cant, e®ect on growth rates of ¯rms located just below the 15 employees threshold.

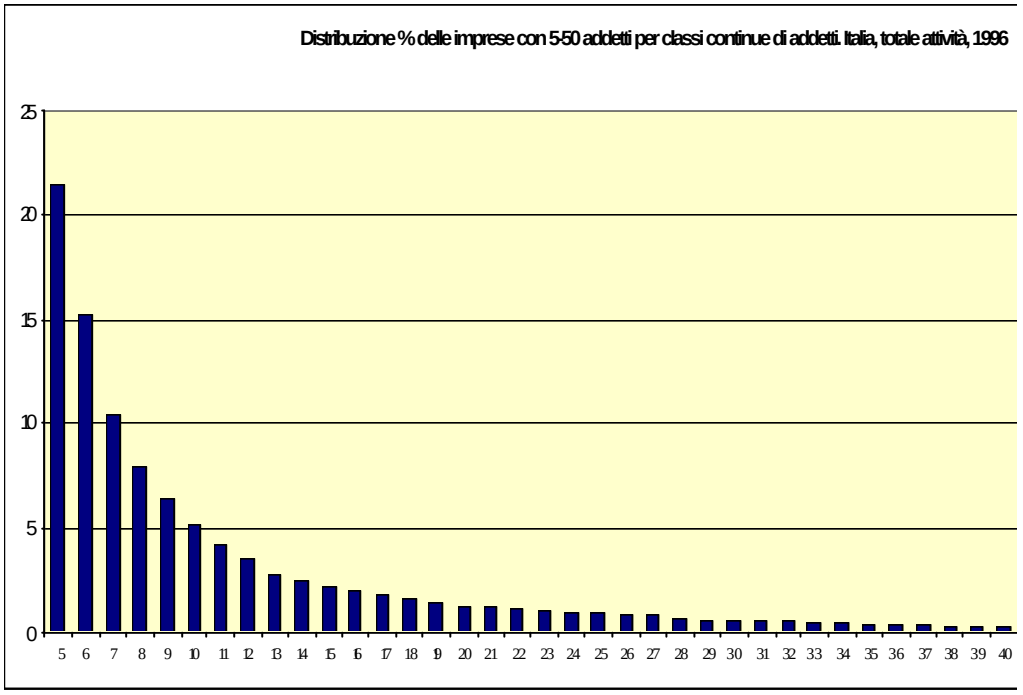


Figure 4.2: The size distribution of ¯rms: Italy

5. Final Remarks

There are a few institutional features of the labour market which have been as thoroughly investigated as employment protection. Despite the attention devoted by applied economists to this issue, we still know very little about the impact of these regulations on employment adjustment of ¯rms. Above all, it is di±cult to isolate the e®ects of EPL from those of other institutional features of the labour market. This is because most of the work has been carried out in terms of cross-country and pairwise correlations between EPL and various measures of labour market performance.

In this paper we take a di®erent approach in that we focus on within country variation in the enforcement of EPL. In particular, we draw inferences from the exemptions clauses which relieve small units from EPL. To this end, we develop a theoretical model which extends standard model of EPL in that it disentangle disciplinary from economic layo®s and provide a rationale for these exemption rules.

Our empirical results are in line with the prediction of the model: the small ¯rm (15 employees) threshold does matter in conditioning layo® probabilities in Italy. And in Spain ¯rm size also matters both for layo® probabilities and the cause alleged for the dismissal. We observe scale e®ects also on hiring, while there is no evidence of a discontinuity in the size distribution of ¯rms

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