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# THE POLITICAL ECONOMY OF FLEXICURITY

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## Abstract

We document the presence of a trade-off in the labor market between the protection of jobs and the support offered to unemployed people. Different countries' locations along this trade-off represent stable political-economic equilibria. We develop a model in which individuals determine the mix of job protection and support for the unemployed in a political environment. Agents are heterogeneous along two dimensions: employment status (insiders and outsiders) and skills (low and high). Unlike previous work on the political economy of labor market institutions, we emphasize the role of job protection and unemployment benefits in the wage-setting process. A key implication of the model is that *flexicurity* configurations with low levels of job protection and high levels of support to the unemployed should emerge in the presence of a highly educated workforce. Panel regressions of countries' locations along this institutional trade-off are consistent with the implications of our model. (JEL: J68, J65, D72).

## 1. Introduction

According to the President of the European Union, José Manuel Barroso, “flexicurity is essential if Europe is to preserve both its competitive edge and social model in a globalised world”.<sup>1</sup> Even in the rhetoric of the official documents of the E.U., *flexicurity* is defined as “flexible contracts” and “adequate unemployment benefits” coupled with a strong emphasis on active labor market policies—that is, less rigid employment protection legislation (EPL) combined with greater expenditure on unemployment benefits (UBs) and active labor market policies (ALMPs) per unemployed (EC 2007).

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<sup>1</sup>. See [http://ec.europa.eu/commission\\_barroso/president/focus/flexicurity](http://ec.europa.eu/commission_barroso/president/focus/flexicurity).

3 The institutional trade-off alluded to in the E.U. documents is evident in the data:  
4 European countries with more expenditure on UBs and ALMPs per unemployed have  
5 less EPL, and vice versa. But moving along this institutional trade-off is proving  
6 to be very difficult, given that countries' locations along the trade-off correspond to  
7 stable political-economic equilibria. Reforms of EPL have mostly been confined to  
8 introducing more flexible contractual types for new hires, without modifying rules  
9 for workers who already have a permanent contract. Unemployment benefit systems  
10 have seen modifications of the enforcement rules that increase the scope of activation  
11 schemes, but there has been at most modest changes in statutory replacement rates  
12 and in the maximum duration of benefits. This means that, whereas some countries  
13 continue to protect the jobs more than the unemployed people, other countries do just  
14 the opposite: concentrating their attention on providing support to the *unemployed*  
15 rather than protecting the jobs.

16 Why do European countries resort to such different combinations of these  
17 institutions? Do the institutions actually operate some form of redistribution in the  
18 labor market across individuals with different employment status and education? Why  
19 is it so difficult to modify such institutional configurations?

20 This paper addresses these issues by applying, for the first time (to our knowledge),  
21 a multidimensional voting approach to the theory of endogenous labor market  
22 institutions. A growing literature in the political economy of labor markets has analyzed  
23 these issues almost exclusively in one-dimensional models (Wright 1986; Saint-Paul  
24 1996; Hassler and Rodriguez Mora 1999; Saint-Paul 1999a, 1999b, 2000; Pallage and  
25 Zimmermann 2001; Hassler et al. 2005). Our theoretical framework puts together and  
26 expands on the environments proposed by Wright (1986) to examine UB and by Saint-  
27 Paul (1996, 1999a, 1999b, 2000) to model choices pertaining to EPL. We acknowledge  
28 that both EPL and UB share the objective of providing insurance against otherwise  
29 uninsurable labor market risk. At the same time, however, EPL protects employees  
30 against the risk of job loss without imposing a tax burden on the worker, whereas  
31 UBs transfer income to the unemployed and are funded by a tax on labor income. We  
32 consider the role of these two policies in the bargaining process over workers' wages,  
33 and also address the redistributive aspects of such policies.

34 Unlike Wright and Saint-Paul, we model EPL and UB as multidimensional  
35 institutions that not only effect redistributions from insiders to outsiders but also  
36 influence the wage formation of high- and low-skill types. Hence, we introduce two  
37 conflicts of interest in our model. The first conflict is *between insiders and outsiders*  
38 and arises in the transition between employment and unemployment: unemployment  
39 inflow and outflow rates are affected by the strictness of EPL. The second conflict is  
40 the traditional *class struggle between rich and poor* (high-skill and low-skill types,  
41 respectively) and occurs because both EPL and UB involve, to different degrees, some  
42 redistribution across skills both directly and indirectly—that is, via their design features  
43 and wage setting as well as by reflecting skill complementarities in the production  
44 function.

45 The strictness of EPL and the size of UB are determined through the political  
46 system. Because the issue space is multidimensional, the existence of a Condorcet

winner in the majority voting game is not guaranteed. We therefore consider a political system in which the entire electorate votes simultaneously on the payroll tax that finances UB (and hence on the size of UB) and on the strictness of EPL; however policy decisions are made on an issue-by-issue basis. In other words, we concentrate on steady-state structure-induced equilibria (as defined by Shepsle 1979; see also Persson and Tabellini 2000). This equilibrium concept allows us to retain the flavor of the *median voter* approach even in a multidimensional setting and thus to highlight more clearly the crucial relevance of the differential impact of UB and EPL in terms of the individuals' types. In this framework, the median voter on the UB is a low-skill or high-skill insider; however, the pivotal voter on the degree of EPL may be a low-skill insider or outsider or a high-skill individual, depending on how the population is distributed by skill level.

We show that flexicurity configurations—that is those with relatively low EPL and high UB—emerge in societies with a large (but not necessarily majoritarian) share of educated individuals. These qualitative results are robust with respect to a wide range of modifications in our specification of the economic and political environment.

Our empirical strategy provides tests of these implications of the model. We run panel regressions over OECD countries (where we have better data on labor market institutions) and also over the 54 countries with both EPL and UB, obtaining results that are in line with the model's predictions. In particular, we find a positive effect of education on the probability of adopting a flexicurity configuration. The progressiveness embedded in the UB system or in the structure of income taxes also favors flexicurity configurations in countries with more developed capital markets.

The paper proceeds as follows: Section 2 documents the trade-off between job protection and unemployment benefits, characterizes the multidimensional conflicts arising with UB and EPL, and reviews the related literature. Section 3 presents the model and the economic environment. Section 4 develops the political system, introduces the equilibrium concept, and discusses extensions of the model. In Section 5, we test the model's main assumptions and results against the data, and in Section 6 we summarize our conclusions.

## 2. The Trade-off between Unemployment Policies and Job Protection

The theoretical literature acknowledging the welfare-enhancing role of labor market institutions suggests that UB may be a close substitute for EPL. Clearly, both EPL and UB protect workers against uninsurable labor market risk. For dismissals, if severance payments and notice periods are chosen optimally to maximize the welfare of risk-averse agents, then there is no role for unemployment insurance (Pissarides 2001). These two institutions also have important design features in common. An experience-rated unemployment insurance scheme involves the same type (and possibly amount) of transfers from employer to employee as does severance pay or a statutory notice period in the event of dismissal. The only difference is that severance would be paid in one installment whereas UB is generally provided throughout the unemployment

spell (up to its maximum duration). The reform of the French UB system advocated by Blanchard and Tirole (2003) exploits this substitutability between EPL and UB: it involves an increase in the UB system's extent of experience rating, which confines EPL to a one-off monetary compensation for the job loss.

However, few countries currently allow for experience rating in their UB systems. The standard UB system is funded via compulsory contributions paid by all workers and employers, independently of the number of redundancies in the firm. This makes it more difficult to substitute EPL for UB (as applies) because payroll taxes are paid by all firms, even those that are upsizing. Flexicurity involves, in addition to the substitution of UB for EPL, the adoption of activation policies aimed at improving the cost-effectiveness of UB by monitoring job-search efforts of the recipients of UB. In particular, the offer of participation in a active labor market program (e.g., subsidized jobs, training schemes, public works) is used as a device to enforce work tests eliciting whether the UB recipient is actually willing to work and actively seeking employment. This clearly also requires the buildup of some administrative capacity, an adequately staffed public employment service (PES), and sanctioning with benefit cuts those unemployed who refuse a suitable job offer. These benefit sanctions are used as a deterrent to opportunistic behavior by UB recipients.

Figure 1 documents the aggregate trade-off between unemployment policies and job protection over the European countries for which we had comparable data on EPL and UB and on expenditure for ALMPs and PESs. In particular, on its horizontal axis the figure displays an index of the strictness of employment protection as compiled by the OECD (1999) on the basis of an assessment of national legislation. The vertical axis displays expenditure on UB, ALMPs, and PESs per unemployed person,  $U_{exp}$ , a

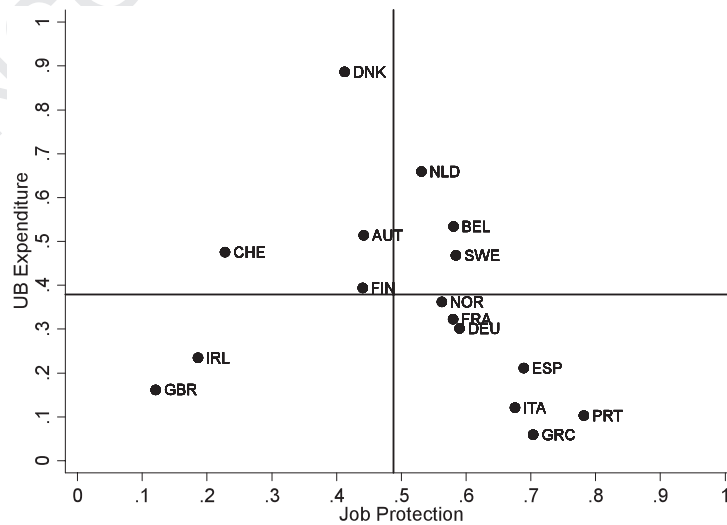


FIGURE 1. The trade-off (1985–2000), average period data, European countries.

TABLE 1. Alternative measures of the trade-off (E.U. 1985–2000).

EPL correlated with	Working-age population	Male prime-age (25 to 45)
Uexp	-.42	
UBexp	-.45*	-
UBcov	-.51*	-.64**
UBrr	-.29	-
UBrr*UBcov	-.41	-.48*

\*Notes: \*\*significant at 95%; \*significant at 90%. 15 observations (all countries displayed in Figure 1, except the UK). Source: EU-SILC for data on UBcov. OECD for the EPL index, Uexp, and UBexp.

summary measure of the stance of unemployment policies. Data are obtained from the OECD social expenditure database.

Measures of job protection and of unemployment policies are normalized and rescaled to fall between 0 and 1. Higher values denote stricter job protection and more spending per unemployed, respectively; data consist of averages for the 1985–2000 period. The figure hints at an inverse relationship between the provision of job protection and the generosity of unemployment policies. The UK is an outlier in that it displays markedly less of both institutions according to available measures. Similar results are obtained when focusing on either the correlation between strictness of job protection and UB generosity or on the correlation between strictness of job protection and expenditure on ALMP. Indeed, expenditure on UB and ALMP is strongly and positively correlated across countries.

Table 1 displays correlation coefficients between the measures displayed in Figure 1 as well as other measures of unemployment policies. In particular, we consider also the coverage of UBs (*UBcov*, the fraction of unemployed people receiving a UB according to the EU-SILC, a survey of income and living conditions), the replacement rate offered two years after the beginning of an unemployment spell (*UBrr*), and the product of these two measures. Since UB coverage among first-time job seekers is partly a function of the strictness of EPL (which has been found to postpone first entry in the labor market of job seekers not eligible for UBs), we also provide coverage measures for the male prime-age (25 to 45) group. The correlations are always negative and in most cases statistically significant when we exclude the UK.

This trade-off holds also at the micro-level. Boeri, Börsch-Supan, and Tabellini (2001) find that individuals who feel protected by EPL are less willing to purchase state-provided unemployment insurance; Ichino, Polo, and Rettore (2003) find that courts deciding on labor disputes are more favorable to workers (effectively making EPL stricter) when UBs are lower.

The position of different countries in terms of this trade-off is fairly stable. The correlation between the 1985 and 2005 ratios of unemployment policies to job protection indicators (the two variables displayed in Figure 1) is 0.75, which is significant at 99% confidence level; the Spearman rank correlation coefficient is also 0.75.

It is difficult for a country to change its flexicurity configuration toward the northwest in Figure 1. Reforms of EPL, in particular, fail to change the job protection offered to insiders. An inventory of reforms (available at [www.frdp.org](http://www.frdp.org)) indicates that 93 out of 112 EPL-reducing reforms carried out in Europe during 1986–2002 involved the introduction of new contractual types only “at the margin”. According to the OECD index, only two European countries (Finland and Spain) out of 27 significantly reduced EPL for insiders (regular workers) during the period 1987–2005.

### 3. A Political-Economic Model

#### 3.1. The Environment

In our economy, agents are infinitely long-lived. In every period, they consume their current income because we assume that (as in Wright 1986), no saving technology is available.<sup>2</sup> Preferences are defined over the infinite stream of consumption  $c$  by the utility function  $\sum_{k=t}^{\infty} \delta^{k-t} v(c_k)$ , where  $\delta$  denotes the subjective discount factor. The utility function is assumed to be logarithmic,  $v(c) = \ln(c)$ . Agents may be of low or high skill type, as indicated (respectively) by the superscripts  $l$  and  $h$ . The fraction of low- and high-skill workers in the population is indicated by  $\rho$  and  $1 - \rho$ , respectively. We assume that there are more workers of low than of high skill type, so  $\rho > 1/2$ .

In every period, agents may be either employed (insiders) or unemployed (outsiders). The transition between the two states is regulated by a Markov process with skill-specific transition probabilities. In particular,  $F^j \in (0, 1)$  is the probability that a type- $j$  employed worker becomes unemployed (the unemployment inflow rate), and  $H^j \in (0, 1)$  is the probability that a type- $j$  unemployed worker finds a job (the unemployment outflow rate). Our analysis concentrates on steady states. Thus, for each group of agents the unemployment rate is  $u^j = F^j/(H^j + F^j)$  while the total unemployment rate is  $u = u^l \rho + u^h(1 - \rho)$ . Clearly,  $\partial u^j / \partial F^j \geq 0$  and  $\partial u^j / \partial H^j \leq 0$ . Moreover, we assume that the unemployment rate remains below 50%, which requires  $F^j < H^j$  for all  $j$ . When employed, low-skill workers earn a pretax real wage equal to  $w^l$  and high-skill workers earn  $w^h$ . Employed individuals face a binary labor supply decision. They either work full-time,  $l^j = 1$ , if the net wage exceeds their outside option; or they do not work at all,  $l^j = 0$ . In what follows we discuss the conditions under which individuals always have an incentive to work, when a job is available, rather than remain unemployed. Head-count labor supply will thus be fixed (and conveniently normalized to unity) in this setup, and all separations will be involuntary.

<sup>2</sup> This assumption greatly simplifies the analysis without affecting our qualitative conclusions. For instance, that agents are not allowed to self-insure (via private savings) against negative labor market shocks does not affect the wage-setting channel that, in part, drives our results.

### 3.2. Labor Market Institutions

We consider two types of labor market institutions: (i) job protection legislation, which affects unemployment inflow (and outflow) rates; and (ii) an income support scheme for unemployed people, which in every period taxes the labor income of employed workers and provides a transfer to the unemployed. Both institutions also affect wage setting.

*Job Protection (s).* Labor markets may be regulated by norms protecting workers against the risk of job loss. Economic theory and empirical evidence suggest that it is mainly red tape and procedural costs that affect labor market flows.<sup>3</sup> These costs are fixed (and so protect less-skilled workers), and they are deadweight from the standpoint of the employment relationship (and so cannot be replaced by experience-rated UB). Accordingly, we model EPL as protecting only the low-skill workers and disregard the existence of pure transfers such as mandatory severance payments.

In our model, the strictness of EPL is measured by a parameter  $s \in [0, 1]$ , where  $s = 0$  indicates no protection and  $s = 1$  maximum protection. As in Saint-Paul (1996, 2000), we concentrate on the effects of EPL on unemployment inflow and outflow rates—a relationship concerning which there is little ambiguity<sup>4</sup> and theoretical literature.

Consider the low-skill workers. A higher degree of EPL decreases their unemployment *inflow* rate,  $\partial F^l / \partial s = F_s^l \leq 0$ . Consistently with empirical evidence, we assume that this effect is larger when the labor market is flexible ( $s \simeq 0$ ) than under strict EPL;<sup>5</sup> that is,  $\partial^2 F^l / \partial s^2 = F_{ss}^l > 0$ .

The unemployment *outflow* rate is negatively affected by the strictness of EPL,  $\partial H^l / \partial s = H_s^l < 0$ , in accordance with empirical evidence (OECD 1999) and with economic theory (e.g., Bentolila and Bertola 1990) predicting that, in rigid labor markets, employers hire fewer workers in upturns in order to reduce the costs of dismissals during downturns. Figure 2 summarizes the behavior of the low-skill inflow and outflow rates as a function of EPL strictness. Observe that a trade-off arises because more extensive EPL decreases the unemployment inflow of low-skill workers, while reducing their outflow. The overall effect on the unemployment rate is therefore ambiguous, as in standard equilibrium search models of the labor market (Mortensen and Pissarides 2001). Provided that unemployment inflows are negative and convex in EPL and that unemployment outflows are linearly declining in EPL, we can expect unemployment to be decreasing for low levels of job protection (as the effect on

<sup>3</sup> When EPL is confined to severance-pay regimes, it can be replicated by any experience-rated UB. However, in that case the UB–EPL substitutability is rather uninteresting.

<sup>4</sup> See OECD (1999, 2004, 2006).

<sup>5</sup> The equilibrium search model of Mortensen and Pissarides (2001) also yields convexity in the reservation productivity (hence unemployment inflows) in EPL—provided that the matching function is specified as being Cobb–Douglas. This model also implies a negative effect of EPL on unemployment inflows *and* outflows. In the case of outflows, however, it is not possible to establish a priori the sign of the second derivative.

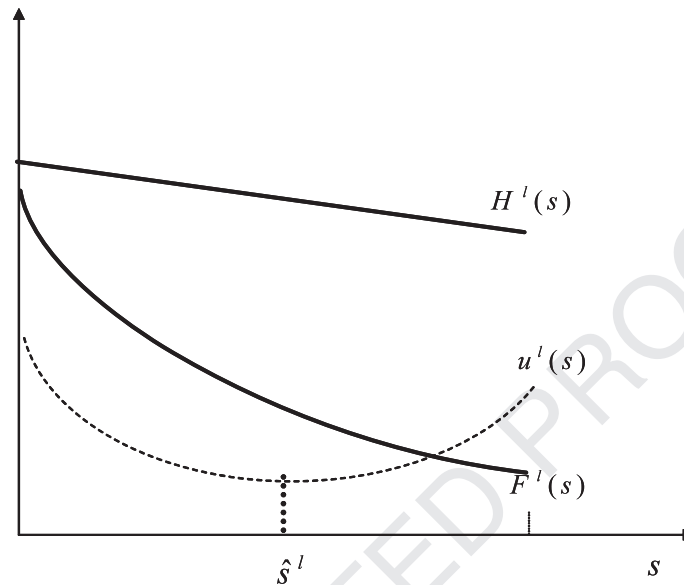


FIGURE 2. EPL and low-skill types.

unemployment inflows dominates) and increasing for larger values of  $s$  (as the effect on unemployment outflows becomes relatively more important). This assumption, which is standard in the literature (Persson and Tabellini 2000), is consistent with empirical evidence (see OECD 1999 and Section 5 to follow) and delivers an interior minimum at  $\hat{s}^l$ .

Finally, we assume for simplicity that EPL leaves high-skill workers unaffected—in other words, that  $F^h$  and  $H^h$  are constant.<sup>6</sup> Moreover, consistently with a large body of empirical evidence, we assume that the unemployment inflow rate is always higher for low-skill than for high-skill workers (i.e.,  $F^l(s) \geq F^h$  for all  $s$ ) and that, for any degree of EPL, the unemployment outflow rate of high-skill workers is higher than the outflow rate of low-skill ones ( $H^l(s) \leq H^h$  for all  $s$ ). It follows that, for any level of EPL, the unemployment rate is higher among low-skill workers, a fact widely documented in the literature.

*Unemployment Benefits ( $\tau$ ).* Our UB program awards a transfer  $b^j$  to a type- $j$  unemployed agent. Transfers are financed by a contribution rate  $\tau$  on workers' labor income. We consider a separate system for low-skill and high-skill individuals, since we

<sup>6</sup> This is another easily alterable assumption. In a companion paper (Boeri, Conde-Ruiz, and Galasso 2004), we show that these results hold also in an environment where EPL affects unemployment inflow and outflow rates of high-skill workers—provided that unemployment flows are less responsive for high-skill types than for low-skill individuals and that low-skill insiders constitute a majority of the voters.



choose to abstract from the redistributive element often associated with UB schemes.<sup>7</sup> The UB systems are assumed to be budget balanced in every period. Thus, the benefits transferred to a type- $j$  unemployed individual may be written as

$$b^j = \frac{\tau w^j (1 - u^j)}{u^j}, \quad (1)$$

where  $(1 - u^j)$  is headcount employment among the type- $j$  individuals.

Hence, unemployment benefits depend on the unemployment rate, the wage bill, and on level of taxation. For a given level of taxation  $\tau$ , high-skill agents will thus receive a higher UB transfer—and even a higher replacement rate, as measured by the ratio between the UB transfer and the previous wage—than will low-skill agents. In Section 4.4.1 we discuss a UB program with redistribution in which the low-skill unemployed enjoy a higher replacement rate than high-skill agents.

### 3.3. Wage Setting

Employment protection and UB also affect labor market stocks and flows indirectly—that is, via wage setting. In particular, we assume that (pretax) individual wages depend on both institutions as follows:

$$w^l = (1 - \beta^l)b^l + \beta^l \frac{1 - \delta}{\delta} \psi(s), \quad (2)$$

$$w^h = (1 - \beta^h)b^h + \beta^h \frac{1 - \delta}{\delta} \lambda(s), \quad (3)$$

(respectively) for low- and high-skill workers. Here  $\beta^l \in (0, 1)$  and  $\beta^h \in (0, 1)$  measure the bargaining power of low- and high-skill workers,  $\delta$  is the discount factor, and  $\psi(s)$  and  $\lambda(s)$  are functions of the strictness of job protection. In other words, wages are a weighted average of the reservation wage (the first term on the right-hand side of equations (2) and (3)) and of the discounted job protection cost, where weights are given by the bargaining power of workers.

This wage equation can be rationalized in terms of a reduced-form Nash bargaining outcome in an equilibrium *gross job flow* model (see Mortensen and Pissarides 2001). When type- $j$  workers have no bargaining power (i.e.,  $\beta^j = 0$ ),  $w^j$  equals the reservation wage of workers that is, the unemployment benefit  $b^j$ . Greater bargaining power of workers allows them to obtain higher wages to an extent that depends on the strictness of job protection. When *employers* have no bargaining power (i.e.,  $\beta^j = 1$ ), unemployment benefits play no role in wage setting, which is then affected only by EPL according to  $\psi(s)$  for the low-skilled and to  $\lambda(s)$  for the high-skilled. Another interpretation of equations (2) and (3) is in terms of an efficiency wage outcome, in which case  $\beta^j$

<sup>7</sup> Redistribution may occur for two reasons. First, if benefits are constant across types and if the program is financed with a proportional tax on labor income, then high-skill workers contribute more than other types. Second, high-skill workers are less likely to become unemployed. Introducing redistribution in this environment would only strengthen our results. See Section 4.4.1 for further discussion.

parameterizes informational asymmetries in the monitoring of workers' productivity. The stronger these asymmetries, the greater effect EPL has on wage setting.

The rationale behind the functions  $\psi(s)$  and  $\lambda(s)$  is as follows. For low-skill individuals, EPL directly affects the probability of job loss and their discounted lifetime unemployment rate  $\theta_l^j$ . We shall show that this rate is initially decreasing<sup>8</sup> in  $s$  and then increasing in job protection as the effects of EPL on hiring begin to dominate. It follows that the function  $\psi(s) = \psi(\theta_l^j(s))$  is bell-shaped in  $s$ . For high-skill individuals the function  $\lambda(s)$  instead captures the effect of EPL on their marginal productivity. To see why  $\lambda(s)$  may depend on the degrees of EPL, consider a production function that combines low- and high-skill labor:  $Y = (L^l)^\alpha (L^h)^{1-\alpha}$ , where  $L^l = (1 - u^l)l^l$ ,  $L^h = (1 - u^h)l^h$ , and  $\alpha$  measures the relative importance of low-skill labor. Then the marginal product of the high-skill workers is

$$\lambda(s) = (1 - \alpha) \left( \frac{1 - u^l}{1 - u^h} \right)^\alpha. \quad (4)$$

It is easy to see that this function depends positively on the employment rate of low-skill labor, which complements high-skill labor in the production function and is maximized when the degree of EPL is equal to  $\hat{s}^l$ . Hence, an increase in the degree of EPL above the levels that minimizes the unemployment of the low skill types has opposite effects on the wages of low- and high-skill workers. The former would enjoy an increase in their wages—at the expense of remuneration of the other factor of income (i.e., skilled wages of the high-skill workers drop).<sup>9</sup>

Finally, given the wage setting in equations (2) and (3), and the existence of a UB system, observe that employed type- $j$  individuals will choose to supply labor only if  $(1 - \tau)w^j > b^j$ , which holds<sup>10</sup> for  $\tau < u^j$ .

In short, we have shown that in our environment *both* labor market institutions, EPL and UB, affect the pretax wages of low- and high-skill workers.

<sup>8</sup> In the Mortensen and Pissarides model, wages are given by

$$w = (1 - \beta)b + \beta \left( 1 + c \frac{v}{u} + \frac{1 - \delta}{\delta} s \right),$$

where  $v/u$  is the vacancy to unemployed ratio,  $c$  denotes hiring costs, and  $(1 - \delta)/\delta$  is the interest rate. In their model,  $s$  is found to have a negative effect on market tightness,  $v/u$ . Hence the function  $\psi(\cdot)$  in equation (2) can be interpreted as embodying the effect of EPL on wages via the induced change in market tightness. In our setting, this declining segment of the wage function also captures the compensating differentials that arise from risk aversion.

<sup>9</sup> Additionally, restrictions in the product market—which are typically associated with labor market regulations—could generate rents that allow factors of production to be paid more than their marginal product.

<sup>10</sup> Empirical evidence supports this assumption. In European countries that finance UB via payroll taxes, the unemployment rate of high-skill agents (and even more of low-skill agents) is typically larger than the contribution rate. For instance, in the late 20th and early 21st century, average unemployment rates were respectively 3.9% and 10.6% versus a total contribution rate of 2.33% in Belgium; 6.3% and 12% versus 5.8% contribution in France; and 11% and 4.8% versus 4.5% contribution in Germany.

### 3.4. Individual Preferences

As in Wright (1986) and Pissarides (2001), in our model individuals cannot save to insure against unemployment risk. Therefore, consumption in every period is entirely determined by their employment status: if employed each individual consumes  $(1 - \tau)w^j l^j$ ; if unemployed, each consumes  $b^j$ .

We can now characterize the indirect utility function of each agent type and labor market status with respect to EPL and UB. The expected lifetime utility of a type- $j$  agent who is currently in state  $i$  is given by

$$V_i^j(s, \tau) = \frac{(1 - \theta_i^j(s)) \ln((1 - \tau)w^j l^j) + \theta_i^j(s) \ln(b^j)}{(1 - \delta)}. \quad (5)$$

Here  $w^l$  and  $w^h$  are as defined in equations (2) and (3), and

$$\theta_i^j(s) = \frac{\delta F^j}{1 - \delta + \delta(F^j + H^j)} \quad \text{and} \quad \theta_O^j(s) = \frac{1 - \delta + \delta F^j}{\delta F^j} \theta_I^j(s) \quad (6)$$

represent the (discounted) proportion of time that current insiders (subscript  $I$ ) and outsiders (subscript  $O$ ) of type  $j$  will spend unemployed during their lifetime; clearly,  $\theta_O^j(s) > \theta_I^j(s)$ . Note that the measure  $\theta_i^h$  does not depend on EPL.

It is useful at this juncture to define the strictness of EPL that minimizes the (discounted) time spent unemployed by low-skill insiders and outsiders:<sup>11</sup>  $\tilde{s}_I = \arg \min \theta_I(s)$  and  $\tilde{s}_O = \arg \min \theta_O(s)$ . It is easy to see that  $\tilde{s}_O < \hat{s}^l < \tilde{s}_I$  (recall that  $\hat{s}^l$  is the degree of EPL that minimizes the unemployment rate of the low-skilled), since  $\tilde{s}_O$  and  $\tilde{s}_I$  take into account the agent's current employment status. Figure 3 summarizes the behavior of  $\theta_I^l(s)$ ,  $\theta_O^l(s)$ , and  $u^l$  with respect to  $s$ . Observe that the (subjective) discount factor  $\delta$  plays a crucial role in this context: as  $\delta$  approaches 1, current employment conditions lose their relevance and the indirect utilities of low-skill insiders and outsiders coincide,  $\theta_I^j = \theta_O^j = u^j$ ; whereas if  $\delta$  is sufficiently low, then individuals will be concerned only about their current status.

The degree of EPL has also an indirect effect on the utility of workers, through its impact on the wage setting. As shown in equation (2), EPL has a direct effect on the low-skill wage that workers with high bargaining power may obtain, via the function  $\psi(\theta_I^l(s))$ , as well as an indirect effect via its influence on the unemployment benefit  $b$ . The effect through  $\psi(\theta_I^l(s))$  reaches its maximum at  $s = \tilde{s}_I$ . Using equations (1) and (2), we can define  $s_b$  as the level of EPL that maximizes UB for a given tax rate. Because the impact of EPL on UB occurs through two channels—the unemployment rate of the low-skilled (which is minimized at  $\hat{s}^l$ ) and the wage setting (and hence the function  $\theta_I^l(s)$ )—it is easy to see that  $\hat{s}^l \leq s_b \leq \tilde{s}_I$ . In our setting, then, EPL has several positive effects on workers' utility. To limit the magnitude of these effects, we require the average utility of a low-skill worker (behind a veil of ignorance) to be

<sup>11</sup> With regard to the unemployment rate  $u^l(s)$ , the assumptions on  $F^l(s)$  and  $H^l(s)$  stated in the text are sufficient for  $\theta_I(s)$  and  $\theta_O(s)$  to have a minimum but not to be convex.

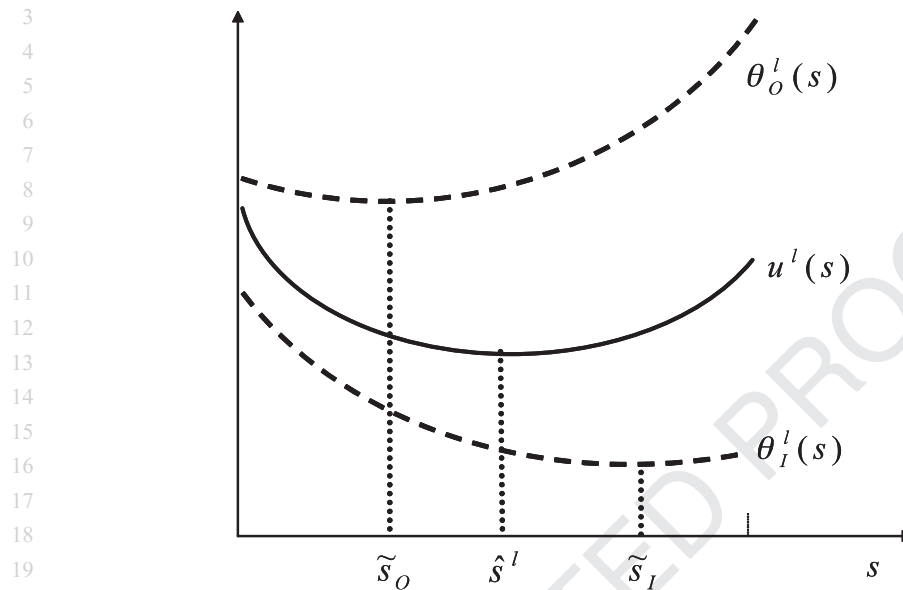


FIGURE 3. EPL: Low-skill insiders and outsiders.

decreasing in the degree of EPL for  $s > s_b$ ; see Appendix A. In other words, if the EPL is sufficiently large,  $s > s_b$ , then for the average low-skill worker the increase in the probability of becoming unemployed outweighs the increase in wage income and utility is reduced. Equations (3) and (4) show that EPL affects also the wages of the high-skilled, which are maximized for  $s = \hat{s}^l$ .

#### 4. The Political Environment

The strictness of EPL and the generosity of the UB system are determined in the political arena, where individual preferences—described by the indirect utility functions in equations (5) and (6)—are aggregated into a policy outcome. Given the strong persistence of the trade-off, we concentrate on steady-state equilibria. Agents vote once and for all on the income  $\tau$  that finances the unemployment benefits and on the strictness  $s$  of EPL.

Since the issue space  $(\tau, s)$  is bidimensional, Condorcet cycles typically arise. We therefore impose on the voting game a set of institutional restrictions that convert a multidimensional election into a simultaneous *issue-by-issue* voting game for which a structure-induced equilibrium exists (Shepsle 1979; Conde-Ruiz and Galasso 2003, 2005). The concept of structure-induced equilibrium or issue-by-issue voting applied to our political game can be summarized as follows. For every value  $s$  of the strictness of EPL, each voter determines her preferred level  $\tau$  of UB; analogously, the preferred level of  $s$  is chosen for any given  $\tau$ . In other words, every agent votes on two reaction functions  $\tau(s)$  and  $s(\tau)$ . A duple  $(\tau^*, s^*)$  is an equilibrium of this voting game if  $\tau^*$

represents the outcome of a majority vote on  $\tau$  (which determines the level of UBs) when the other dimension is fixed at  $s^*$ , and conversely for  $s^*$ .

#### 4.1. Voting on EPL ( $s$ )

The political decision concerning the EPL,  $s(\tau)$ , depends on the trade-offs that EPL creates through its effects on the unemployment inflow and outflow rates and on wages. In fact, although the tax rate  $\tau$  is taken as given by voters, they do realize that their choice of  $s$  will affect the UB benefit  $b^j$  according to equation (1). Consider the high-skill individuals. In this case, EPL has no direct relevance for individuals' inflow and outflow rates ( $F^h$  and  $H^h$ ), but it does affect their utility by modifying their wages according to equations (3) and (4). High-skill insiders and outsiders will therefore choose the degree of EPL,  $s = \hat{s}^l$ , that maximizes their wages any given tax rate.

The decision on the strictness of EPL for low-skill individuals both insiders and outsiders is more complex because of the direct impact of EPL on their inflow and outflow rates and on their wages. An increase in EPL has two effects on the indirect utility of low-skill individuals (see equation (5)). First, the (discounted) proportion of time that a low-skill worker (currently insider or outsider) spends unemployed during lifetime  $\theta_i^l(s)$ , with  $i = I, O$ . It is easy to see from Figure 3 that this effect by raising the discounted probability of being employed increases the utility of a low-skill insider for  $s < \tilde{s}_I$  and that of a low-skill outsider for  $s < \tilde{s}_O$ . Second, as discussed in Section 3.3, an increase in EPL modifies the unemployment benefit and the wages of the low-skilled both insiders and outsiders (see equations (1) and (2)). It follows that the level of EPL preferred by low-skill outsiders,  $s_O^l(\tau) \in (\tilde{s}_O, s_b)$ , is less strict than the level preferred by low-skill insiders,  $s_I^l(\tau) \in (s_b, \tilde{s}_I)$ , who seek to protect their current employment status. Regardless of their current status, high-skill individuals will prefer to set  $s_I^h = s_O^h = \hat{s}^l$ . Therefore, as a consequence of voting on the strictness of EPL, two orderings of preferences may emerge.<sup>12</sup> If the low-skill outsiders are concerned about their current employment status and thus  $s_O^l < \hat{s}^l$ , then  $s_O^l(\tau) < s_I^h(\tau) = s_O^h(\tau) = \hat{s}^l < s_I^l(\tau)$ ; otherwise, the ordering is  $s_I^h(\tau) = s_O^h(\tau) = \hat{s}^l < s_O^l(\tau) < s_I^l(\tau)$ .

How do these preferences regarding strictness of EPL depend on the UB level? The decision of high-skill agents is unaffected by the tax rate that finances the UB system. However, for the low-skill insiders there is a negative relationship between EPL and UB (see Proposition A.1), because a higher level of unemployment insurance reduces the cost, in terms of consumption, of being unemployed. Hence, low-skill insiders will demand less EPL. Low-skill outsiders, in contrast, will typically want more EPL because the negative effect of EPL on their utility when unemployed has decreased yet its positive impact on wage setting (see equation (2)) remains. Examples of the reaction function of  $s$  with respect to  $\tau$  for a high-skill worker ( $\hat{s}^l$ ) and for a low-skill insider ( $s_I(\tau)$ ) are given in Figure 4.

<sup>12</sup> Proposition A.1 establishes all the results presented in this section.

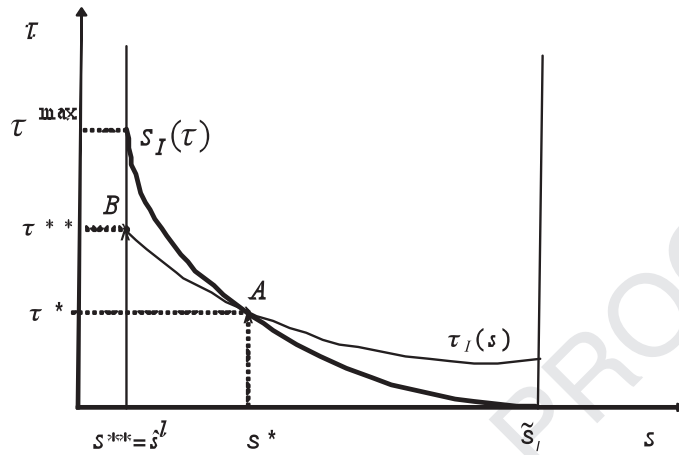


FIGURE 4. The UB-EPL political equilibrium.

4.2. Voting on UB ( $\tau$ )

In determining the tax rate  $\tau(s)$  that finances UB,<sup>13</sup> for any given level of EPL, individuals consider the insurance properties of UB and their positive effect on wage setting. To the usual trade-off between the costs represented by the stream of contributions when employed and the benefit of receiving a transfer when unemployed (see Wright 1986), individuals add the impact of UB on their wages. In fact, a higher contribution rate—and the resulting greater UB—increases their outside option and thus their wages in the bargaining process (see equations (2) and (3)).

For a given skill type, insiders prefer a lower level of UB than do outsiders because  $\theta_I^j < \theta_O^j$  that is, insiders face a lower (discounted) probability of becoming unemployed. Analogously, high-skill outsiders will choose a lower tax rate than will unemployed low-skill workers. The comparison between low- and high-skill insiders is less straightforward. In fact, low-skill insiders benefit more from the insurance component of UB than do high-skill insiders, who in turn have more to gain from the effect of UB in wage setting. In the end, as shown in Proposition A.2, two possible orderings of preferences over  $\tau$  may emerge. If the effect of UB on wages of the high-skilled dominates and thus  $\tau_I^h > \tau_I^l$ , then  $\tau_O^l > \tau_O^h > \tau_I^h > \tau_I^l$ ; otherwise, the ordering is  $\tau_O^l > \tau_O^h > \tau_I^l > \tau_I^h$ .

How do these preferences over the UB level depend on the strictness of EPL? First, the tax rate preferred by a low-skill insider is decreasing in the strictness of EPL. The intuition is straightforward. For  $s \in (s_b, \tilde{s}_I)$ , more EPL reduces low-skill insider’s probability of being unemployed and hence of benefiting from the transfer. Moreover, for  $s \in (s_b, \tilde{s}_I)$ , an increase in EPL also reduces the level of UB—and more so than it increases the wages of the low-skilled through the wage-setting process. The reaction

<sup>13</sup> Proposition A.2 establishes all the results presented in this section.

function of  $\tau$  with respect to  $s$  (see the plot of  $\tau_I(s)$  in Figure 4) is thus negatively sloped. Second, the decision of high-skill insiders regarding the tax rate that finances the UB system is, in contrast, unaffected by the degree of EPL.

### 4.3. Political Equilibria

In order to fully characterize the political equilibria of our issue-by-issue voting game, one must obtain the duple  $(s^*, \tau^*)$  at the intersection of the reaction functions of the two median voters. This procedure is described in the following proposition and is characterized graphically in Figure 4, where the reaction functions are plotted. Proposition 4.1 identifies locations along the UB–EPL trade-off in terms of different political equilibria arising from different proportions of high- and low-skill individuals in the population.

PROPOSITION 1. *Two issue-by-issue equilibria of the voting game may emerge:*

1. *if  $\rho(1 - u^l) > 1/2$ , then there exists an equilibrium  $(s^*, \tau^*)$  such that  $s^*(\tau^*) = s_I^l(\tau^*) \in (s_b, \tilde{s}_I)$  and  $\tau^*(s^*) = \tau_I^l(s^*)$ ;*
2. *if  $\rho(1 - u^l) < 1/2$ , then there exists an equilibrium  $(s^{**}, \tau^{**})$  such that  $s^{**}(\tau^{**}) = \max\{\hat{s}^l, s_O^l(\tau^{**})\} < s_b$  and  $\tau^{**}(s^{**}) = \max\{\tau_I^l(s^{**}), \tau_I^h(s^{**})\}$ .*

*Comparing equilibria, we have  $s^* > s^{**}$  and  $\tau^* \leq \tau^{**}$ .*

If they constitute a majority of the voters, low-skill insiders will dictate both labor market policies (EPL and UB). In this case, Proposition 1 indicates that they will adopt a strict labor market regulation  $s^* > s_b$  as well as the (low) level of UB chosen by a low-skill insider. This UB scheme emerges owing to its double role of providing insurance against unemployment risk while increasing the outside option's relevance to the wage-setting process. Q3

If instead there is a large share of high-skill individuals in the population and so low-skill insiders are not a majority, then the latter may still be pivotal in determining the UB system (if  $\tau_I^h < \tau_I^l$ ); however, the decision over the rigidity of the labor market (EPL) will be decided by either a high-skill individual or a low-skill outsider—depending on the ordering of preferences over the EPL. In either case, a lower degree of EPL will emerge. A high-skill median voter would be concerned only with maximizing the high-skill wage and therefore set  $s = \hat{s}^l$ , whereas a low-skill outsider median voter would internalize the negative effect of EPL on unemployment and thus be more conservative than a low-skill insider. Faced with the prospect of less EPL (and hence with a higher probability of becoming unemployed) and lower wages (through  $\psi(s)$ ), low-skill insiders will become more supportive of a higher level of unemployment benefits. Finally, note that if high-skill insiders are the pivotal voters in deciding the UB system then this is because  $\tau_I^h > \tau_I^l$ ; it therefore follows that in this case the UB system would be even higher.

Proposition 1 thus explains the existence of a trade-off between EPL and UB across groups of countries with different shares of low- and high-skill individuals in the population. Countries with a substantial proportion of high-skill individuals will

not feature a low-skill insider as a median voter with respect to the EPL decision (nor perhaps with respect to UB) and thus will have a more flexible labor market and more UB spending. Figure 4 displays the equilibrium outcomes when (i) the median voter on both issues is a low-skill insider (point A); and (ii) a low-skill insider is the median voter on UB and a high-skill agent is the median voter on EPL (point B).

#### 4.4. Extensions

The results in Section 4.3 identify a clear trade-off between EPL and UB across countries. Despite the stylized nature of model economic and political environment, these results are robust to several modifications. In this section we discuss some of these extensions.

*4.4.1 Redistribution and Perfect Capital Markets.* The trade-off between EPL and UB may also be driven by a redistributive motive that involves transfers from high- to low-skill individuals through the UB system. To explore this possibility, we consider an environment in which individuals have a utility function that is linear in consumption, precluding an insurance motive. Hence, if individuals are willing to demand UB, then this request will have to be motivated by redistributive reasons. To model this redistributive component of UB, we consider the benefits obtained by individuals as a function of their skill type:

$$b^l = \tau(1 - \tau) \left[ \frac{w^l l^l (1 - u^l)}{u^l} + \phi \frac{l^h w^h (1 - \rho)(1 - u^h)}{u^l \rho} \right], \quad (7)$$

$$b^h = \tau(1 - \tau)(1 - \phi) \frac{l^h w^h (1 - u^h)}{u^h}. \quad (8)$$

Thus, for  $\phi = 0$ , no redistribution takes place and we are back to the model<sup>14</sup> presented in Section 3; for  $\phi > 0$ , some redistribution takes place from high- to low-skill individuals. To simplify the analysis, we also assume that high-skill workers have full bargaining power; that is,  $\beta \rightarrow 1$  in equation (3).

If it is sufficiently strong (large  $\phi$ ), then this redistributive motive will induce low-skill individuals—regardless of their current labor market status—to support UB and high-skill individuals to oppose it. The voting behavior regarding EPL will also be modified by the existence of a redistributive UB scheme (and, of course, by the linear utility function). In particular, low-skill individuals will partially internalize the effect of EPL on high-skill wages (see equations (3) and (4)) because these wages now contribute to the financing of their unemployment benefits; low-skill insiders will therefore demand a lower level of EPL. These two effects drive a new EPL-UB trade-off, which may arise in response to the redistribution across skill types that is induced by these two labor market institutions.

<sup>14</sup> Given the linearity in the utility function, we have introduced an exogenous Laffer curve—represented by the term  $(1 - \tau)$  in equations (7) and (8)—that was not present in the model as described in Section 3.



For simplicity, we concentrate on the equilibrium in which a low-skill insider is the median voter with respect to both UB and EPL. In this case, an increase in the redistributiveness of UB will lead its median voter to increase the tax rate  $\tau$  that finances UB in order to exploit the redistributive transfer from high-skill individuals. A more redistributive UB will also lead low-skilled insider to demand less job protection (lower  $s$ ) in order to increase the wages of—and thereby the transfers from—the high-skilled. Moreover, for higher UB, a low-skill insider will also be less concerned about the risk of becoming unemployed and will accordingly vote to reduce the EPL.

In sum, more redistributive UB systems in the presence of well-developed capital markets are associated with less EPL and more UB.

*4.4.2 Alternative Political Environments.* To deal with a multidimensional policy space in which both the degree of EPL and the UB contribution rate must be determined, we rely on a steady-state version of the structure-induced equilibrium that expands the logic of the median voter into a multidimensional setting. To confirm the robustness of our results, we consider two alternative political regimes.

In a *party-unanimity Nash equilibrium* (PUNE) (see Roemer 1999), an individual voter chooses between two parties or coalitions based on their policy platform. Each party appeals to its own electorate, and within-party decisions pertaining to economic policy require unanimity. Suppose there are two parties, right and left. The left party seeks the support of low-skill insiders and outsiders, while the right party seeks the support of high-skill agents and low-skill insiders. Parties are assumed to be uncertain about the distribution of voter types. The expected utility of a party coincides with the expected utility of its constituency, which consists of three groups of actors: (i) *militants*, who want the party to adhere as closely as possible to its principles (i.e., to its partisan ideology); (ii) *opportunists*, who only care about winning the elections; and (iii) *reformists*, who wish to maximize the expected utility of the party's constituency. In a PUNE, given a proposal by the opposing party, every party requires its own final decision on that policy to be taken at inner-party unanimity. This amounts to unanimity between opportunists and militants, since in this case the agreement of reformists would automatically follow. It is easy to see that the policy outcome associated with the issue-by-issue voting game in the previous political environment is also a PUNE. In fact, the policy platform chosen by both parties targets low-skill insiders—a group that coincides (in the political game at described in Section 4.1) with the pivotal (median) voters. A deviation in the policy platform of one party toward more extreme positions (e.g., such as its partisan ideology) would—given the other party's platform—be welcome by militants but opposed by opportunists, since it would reduce the party's probability of winning the election. Therefore, the UB–EPL trade-off according to the population's skill composition carries over to this alternative political scenario.

Another commonly encountered political environment is the *probabilistic voting model* (Coughlin 1992; Persson and Tabellini 2000). In this setting, two political candidates compete in a majoritarian election by adopting a political platform—namely, a combination of EPL and UB—in order to maximize their probability of winning the election. The winning candidate becomes the policy maker and implements

her proposed policy. Agents vote according to the indirect utility associated with each candidate's platform and according to their own political ideology. Hence, both candidates determine the (same) combination of EPL and UB in order to maximize a welfare function that weights the indirect utility functions of all four voter groups: low- and high-skill insiders and outsiders. The outcome of this political process thus resembles the issue-by-issue case in that each political candidate will determine, contemporaneously but independently, the degree of EPL and level of UB. Different political equilibria emerge that are characterized by different locations along the UB–EPL trade-off as a function of the relative composition of low- and high-skill individuals in society.

## 5. Empirical Relevance

### 5.1. Testing the Key Assumptions

Our key political economy results rest on the assumption that the relationship between job protection and unemployment is nonmonotonic for low-skill workers. The political equilibria are found in a region where unemployment is increasing in job protection yet the unemployment EPL profile is U-shaped. Figure 5 displays, on the vertical axis, the 1985–2000 unemployment rates for persons with primary or lower educational attainment and, on the horizontal axis, the overall EPL index for that same period. A

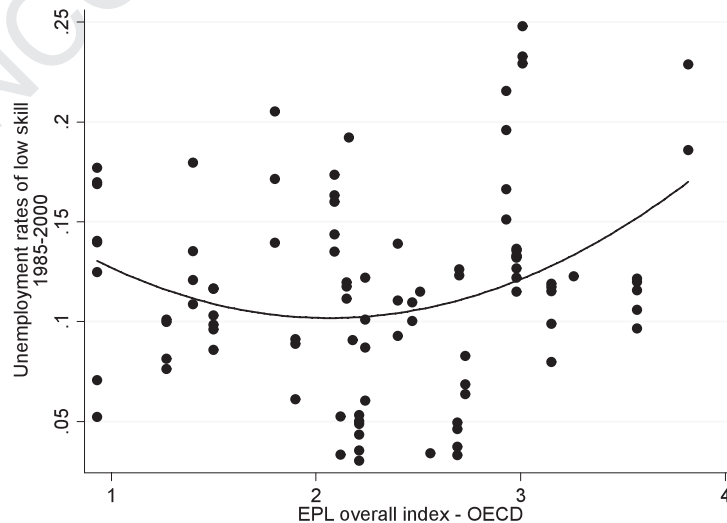


FIGURE 5. Unemployment rates among the unskilled and EPL (1985–2000, E.U. countries).

TABLE 2. Estimating the UB/EPL trade-off (between groups, 1985–2000).

Variables	ln (1 + Uexp/EPLreg)			ln (1 + Uexp/EPLreg)		
	(1)	(2)	(3)	(4)	(5)	(6)
LOWEDU	-0.033*** (0.010)	-0.033*** (0.011)	-0.034*** (0.010)	-0.031*** (0.011)	-0.029** (0.012)	-0.030** (0.011)
topMKTCAP* UBprog	0.317 (0.187)	0.271 (0.210)	0.215 (0.197)	0.243 (0.207)	0.181 (0.229)	0.126 (0.208)
ATTITUDES		0.159 (0.417)	0.075 (0.396)		0.311 (0.454)	0.249 (0.418)
OPEN	0.005 (0.004)	0.004 (0.005)	0.008 (0.005)	0.003 (0.005)	0.002 (0.005)	0.007 (0.005)
Constant	2.818*** (0.491)	2.866*** (0.551)	2.752** (1.177)	2.869*** (0.545)	2.815*** (0.599)	2.587* (1.243)
Period dummies	No	No	Yes	No	No	Yes
Observations	83	75	75	83	75	75
R <sup>2</sup>	0.512	0.498	0.644	0.405	0.409	0.606
Countries	23	23	23	23	23	23

\*Notes: Standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. See Appendix B for the list of countries and for summary statistics. LOWEDU is the share of the population with primary or lower educational attainment. topMKTCAP\*UBprog is an interaction variable of a dummy capturing the countries at the top quartile in terms of stock market capitalization and progressiveness of the UB system (the latter defined as the ratio of the replacement rates at 67% and 150% of the APW wage). ATTITUDES measures social sanctions against moral hazard. OPEN is trade turnover over GDP.

second-order polynomial is fitted across yearly and cross-country observations; both linear and quadratic terms are highly significant.<sup>15</sup>

Bassanini and Marianna (2009) estimate comparable hiring and separation rates for OECD countries, and find the same pattern posited in our model: both hirings and separations are declining in EPL, but hiring declines at a faster rate and is higher than that of separation for low levels of EPL.

These results are all in line with the substantive assumptions of our model. That EPL, unlike UB, protects only a limited segment of the workforce is also consistent with evidence that more individuals are concerned about job security in high-EPL and low-UB countries than in low-EPL and high-UB ones (Clark and Postel-Vinay 2004).

## 5.2. The Trade-off and Education

Our model implies that flexicurity configurations that provide more support to the unemployed and less job protection arise when there is a larger fraction of skilled people in the population.

Table 2 displays results of a panel regression of country location along the trade-off of unemployment policies versus job protection against measures of educational

<sup>15</sup> The coefficient of the linear EPL term is  $-0.092$  ( $t$ -statistic =  $-2.58$ ), and that for the quadratic term is  $0.022$  (2.86).

attainment of the working-age population and other covariates that, according to the literature, should support strict EPL and/or generous UB systems. In particular, we estimate the following equation over the period 1985–2000 (at five-year frequencies, given the low frequency at which data on educational attainment are available) for OECD countries:

$$\ln(1 + Uexp_{it}/EPL_{it}) = a_j + \beta_1(LOWEDU_{it}) + \beta_2(UBprog_i * topMKT CAP_i) + \beta_3(ATTITUDES_{it}) + \beta_4(OPEN_{it}) + \varepsilon_{it}. \quad (9)$$

Here  $Uexp$  is the expenditure on UBs or active labor market policies per unemployed;  $EPL$  is the OECD index of strictness of employment protection (limited to regular contracts,  $EPL_{reg}$ , or overall,  $EPL_{all}$ ) and  $LOWEDU$  is the share of the population with primary or lower education, as reported in the database of Barro and Lee (2000). The variable  $UBprog$  measures the progressiveness of the UB system, which is given by the ratio of (a) the replacement rate offered to a single unemployed person who was earning two-thirds of the average production worker (APW) wage to (b) the replacement rate of someone who was earning 1.5 times the APW wage. The  $topMKT CAP$  term is a dummy variable capturing the quartile of countries with the highest ratio of stock market capitalization to GDP (alphabetically: Australia, Japan, Netherlands, Switzerland, the UK, and the United States). Thus, the interaction between the latter two variables captures support for UB versus EPL in countries where workers can self-insure against income losses arising from dismissal, as in the extensions of our model discussed in Section 4.4.1. The variable  $ATTITUDES$  is drawn from the World Value Survey (WVS) and captures societal attitudes toward those who abuse UB. In particular, this variable measures the fraction of respondents stating that “it is justifiable to claim unemployment benefits to which one is actually not entitled.” The inclusion of this variable aims to capture the effects of civic attitudes vis-à-vis the abuse of UB (Algan and Cahuc 2009) as well as the degree of social acceptability of cash transfers that entail significant vertical redistribution. Higher levels of this variable should move the trade-off toward configurations that favor UB more and EPL less. Finally,  $OPEN$  measures trade turnover as a fraction of GDP according to the Penn tables. This is in line with the political economic literature suggesting that social insurance may be greater in countries that are more exposed to international competition (Rodrik 1998).

Summary statistics of these variables are reported in Appendix B. The cultural variables are available only for those countries covered by the WVS. For this reason, we also display regressions without  $ATTITUDES$  as a covariate; this allows us to obtain more degrees of freedom. Finally, in some specifications we included period dummies to control for possible worldwide shifts in the trade-off that were unrelated to country-specific variables.

The main message delivered by our regressions is that education has a critical effect on the position of countries along the trade-off of unemployment policies versus job protection. Lower educational attainment of the population is associated with fewer UBs and more job protection. This holds regardless of which EPL measure we take (overall or for regular contracts) and is in line with our theoretical results. The effects are sizeable: a decrease of ten percentage points in the share of low-skill workers

TABLE 3. Estimating the UB/EPL tradeoff (random effects panel regression over 54 countries, 1985–2000).

Variables	ln(1 + UB/EPL2)				
	(1)	(2)	(3)	(4)	(5)
LOWEDU	-0.030*** (0.007)	-0.021** (0.010)	-0.029*** (0.010)	-0.024** (0.010)	-0.020* (0.010)
ATTITUDES		-0.523** (0.244)	-0.486** (0.221)	-0.372* (0.196)	-0.247 (0.215)
MKTCAP			-0.001 (0.003)		
topMKTCAP * TAXprog				0.005 (0.019)	0.006 (0.017)
HIGHINCOME	1.865*** (0.391)	1.635*** (0.474)	1.807*** (0.470)	1.858*** (0.493)	2.103*** (0.476)
OPEN	-0.001 (0.002)	-0.001 (0.003)	-0.006* (0.003)	-0.007** (0.003)	-0.009*** (0.003)
Constant	3.090*** (0.552)	3.182*** (0.691)	3.744*** (0.702)	3.505*** (0.697)	3.399*** (0.686)
Period dummies	No	No	No	No	Yes
Observations	209	126	110	104	104
Countries	54	45	40	39	39

\*Standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

\* Notes: See Appendix B for the list of countries and for summary statistics, and Table 2 for the definition of the variables not listed here. EPL2 is the Botero et al. (2004) index of employment protection. MKTCAP is stock market capitalization over GDP. topMKTCAP \* TAXprog is an interaction variable of a dummy capturing the countries at the top quartile in terms of stock market capitalization and the progressiveness of the tax system, as measured by the ratio of the top to the bottom tax rate. LOWEDU is the share of the population with primary or lower educational attainment. ATTITUDES measures social sanctions against moral hazard. OPEN is trade turnover over GDP.

increases flexicurity by one-fourth of the standard deviation of the Uexp/EPL ratio. The interaction between UB progressiveness and stock market capitalization appears also to move the trade-off toward flexicurity configurations, but this interaction is nonsignificant at conventional levels. The coefficients for ATTITUDES and OPEN never achieve statistical significance.

Table 3 displays results of a random-effects regression of country location along the UB–EPL trade-off over a larger set of nations. In particular, we collected data on institutional characteristics of the 54 countries with both EPL and UB, listed in Appendix B, which include several middle-income countries. Measurement of institutions in these countries is difficult because many legal norms, including employment protection, are poorly enforced.<sup>16</sup> The estimated equation (9) uses available institutional measures for this larger set of countries. In particular, we now have only a measure of UB generosity—that is, the average of the gross replacement rate in the first two years of unemployment—and our variable EPL is the overall index of strictness of employment protection provided by Botero et al. (2004) for this

<sup>16</sup> This problem is present also in OECD countries. Only half of US firms pay statutory severance compensations to workers who are laid off.

TABLE 4. UK and rest of the EU15 (1995–2005, average period data).

	UK	E.U.
Uexp (Euros)	6585	17112
UBcov	0.36	0.75
UBrr*UBcov	0.03	0.32
UBrr (1 year)	0.19	0.54
EPLall	0.62	2.62
EPLreg	0.98	2.44
UBprog	<b>2.03</b>	<b>1.15</b>
MKTCAP	<b>127.88</b>	<b>54.77</b>
LOWEDU	<b>38.5</b>	<b>39.54</b>

Note: see Tables 1, 2, and 3 for definitions of the different variables.

broader set of countries, which is highly correlated with the OECD EPL index for the countries in which both indicators are available (see Appendix B). The covariates are, to the extent possible, the same as in the regression reported in Table 2. In particular, LOWEDU is the share of the population with primary or lower education, as indicated by Barro and Lee (2000) database, OPEN is trade turnover as a fraction of GDP, as provided by the Penn tables; and ATTITUDES captures societal attitudes toward those who abuse UBs, as elicited in the WVS. The interaction between stock market capitalization<sup>17</sup> and the vertical redistribution effected by the UB system can be obtained only for a subset of countries by using the top-to-bottom marginal tax rates provided by the International Tax Database of the American Enterprise Institute and the Worldwide Tax Summaries tabulated by PricewaterhouseCoopers. For a larger set of countries, in column (3) we control only for stock market capitalization—which is not interacted with progressiveness. Given the greater heterogeneity of countries, we include in all our specifications a dummy capturing HIGHINCOME countries as defined by the World Bank.

Once again, our regressions strongly suggest that education is an important factor affecting the position of countries with respect to the UB/EPL trade-off. Lower educational attainment of the population is associated with less UB and more EPL. The size of these effects is comparable to that observed for only OECD countries.

### 5.3. Dealing with the Outliers

As discussed in Section 2, the UK is an outlier in that it involves lower levels of both EPL and UB than the other (Western) European countries. As shown in Table 4, the UK has lower levels of UBs and job protection (whatever measure we take) than the average E.U. country. At the same time, however, it displays a much higher level of progressiveness in UB design than do other European countries: the replacement rate

<sup>17</sup> The countries in the top quartile of the distribution of stock market capitalization are in this case Australia, Belgium, Canada, Chile, Finland, Ireland, Japan, Malaysia, Netherlands, Singapore, South Africa, Sweden, the UK, and the United States.

TABLE 5. Lessons from the reformers.

	$\Delta\text{EPLreg}$	$\Delta\text{UBgen}$	$\Delta\text{UBexp}$	$\Delta\text{Uexp}$
Spain	-0.16	-0.043	0.102	0.083
Greece	0	-0.051	0.000	0.007
$\Delta\text{Spain-Greece}$	-0.16	0.008	0.102	0.076
Finland	-0.62	0.105	-0.092	-0.052
Sweden	-0.04	0.097	-0.304	-0.248
$\Delta\text{Finland-Sweden}$	-0.58	0.008	0.212	0.197

\*Notes:  $\Delta\text{EPLreg}$ : change in the value of the OECD EPL index for regular workers over the reform period (1994–2001 for Spain and Greece; 1990–2001 for Finland and Sweden).  $\Delta\text{UBgen}$ : change in the generosity of UBs, that is, the coverage of UBs (the fraction of unemployed receiving UBs) multiplied by the average gross replacement rate in the first year of receipt of benefits.  $\Delta\text{Uexp}$ : change in the UB and ALMP expenditure per unemployed person.  $\Delta\text{UBexp}$ : change in the UB expenditure per unemployed person only.

offered to a single worker who (before unemployment) was earning two-thirds of the APW wage is twice as large as the replacement rate of someone previously earning 1.5 times of the APW wage (seventh row of the table). The UK also has, on average, deeper capital markets—as indicated by its stock market capitalization over GDP, which is more than twice that of other countries in EU15. The fraction of the population with primary or lower educational attainment is lower in the UK than in the rest of the E.U., although differences in this case are of second order.

Additional insights regarding the factors affecting countries' locations along the UB/EPL trade-off come when we compare (a) the experience of the two European countries that saw a significant reduction in EPL for regular workers in the period covered by the data (b) the experience of countries having similar initial institutional configurations that did not reform EPL for regular workers. Although our model is not dynamic, it suggests that movement toward flexicurity is facilitated if UB is allowed to become more generous—or at least to effect higher levels of vertical redistribution.

Recall from Section 2 that the only reformers of EPL for regular workers in Europe were Finland and Spain. The reforms of EPL that occurred in these two countries were split into a number of milder liberalization measures. In Finland there were three waves of reforms: in 1991, 1996, and 2001; in Spain, mild reductions of EPL for regular workers were enacted in 1994 and 1997.

Table 5 compares the experience of Spain with that of Greece and the experience of Finland with that of Sweden. These *matches* are chosen by drawing on a taxonomy of labor market and social policy institutions in the E.U. (Esping-Andersen 1990), which covers the Nordic and the Southern European countries. In particular, variations in the level of key policy variables are displayed for the compared countries, along with differences in these variations across each pair of countries, in the spirit of double-difference analysis.

As shown in the table, Spain reduced EPL while experiencing an increase in UB and in expenditure per unemployed (whether we include only UB or also active policies), whereas just the opposite (or no change) occurred in Greece. With regard to the second match, Finland significantly reduced EPL for regular workers while

increasing its UB and reducing expenditure per unemployed person (with or without ALMPs) to a level below that of Sweden's.

Overall, there is some indication that countries reducing EPL for regular workers evidence higher UB, however measured, than countries with broadly comparable institutional configurations at the outset that did *not* reform EPL for regular workers. At the frequency of collected data for this study, no major changes are observed in the educational attainment of the workforce: the share of the population with primary or lower education scarcely changed in the four countries considered in this section. It could be that increasing the generosity of the UB system is the only politically feasible option for countries wishing to reduce job protection.

## 6. Conclusions

OECD countries provide insurance to workers against labor market risks by combining different degrees of job protection and support for the unemployed. The European Commission and several national governments often argue in favor of adopting “flexicurity” assigning a greater weight to UB and ALMP and less importance to EPL in protecting workers against labor market risk. However, the institutional configurations of the various countries are relatively stable and often far apart from flexicurity.

Unlike previous literature, this paper characterizes these institutions as schemes for redistribution not only between insiders and outsiders but also across skill groups. We also allow these two institutions to affect aggregate labor market flows as well as wage setting. Our theoretical model suggests that “flexicurity” configurations, which are characterized by less job protection and more support for the unemployed, should emerge in countries in which a larger fraction of the population is skilled.

Empirical findings based on panels of OECD countries and of more than 50 countries with both EPL and UB are broadly in line with this theoretical implication. Furthermore, a case-study analysis of the outliers also broadly supports the model implications.

A normative implication of this result is that the European Commission—rather than asking countries to adopt flexicurity configurations—should perhaps encourage member states to upgrade their workforce by investing more in education. Another normative implication suggested by extensions of our model and by results of the case studies can be stated as a political feasibility theorem for countries wishing to move with greater speed toward flexicurity (i.e., before the investment in education is repaid with a significant increase in the share of high-skill workers): reforms of job protection need to trade labor market flexibility against state-provided unemployment insurance. In countries with a well-developed capital market, an unemployment benefit system whose redistributions are strongly in favor of the low-skill segments of the workforce could also increase support for flexicurity.

The dynamic adjustment to a new equilibrium is a subject for future research.



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## Appendix A. Proofs of the Main Propositions

To impose some restriction on the positive role of the EPL, we consider the optimization problem of an average low-skill worker, who determines her preferred degree of EPL behind a veil of ignorance. The first-order condition (FOC) of this optimization problem is

$$\mathfrak{S}(s) = -\frac{\partial u^l}{\partial s} (V_E - V_U) + (1 - u^l) \frac{\partial V_E}{\partial s} + u^l \frac{\partial V_U}{\partial s},$$

where

$$V_E = \ln((1 - \tau) w^l),$$

$$V_U = \ln(b^l),$$

$$\partial V_E / \partial s = (\partial w^l / \partial s) / (1/w^l),$$

$$\partial V_U / \partial s = (\partial b^l / \partial s) (1/b^l).$$

Put  $\Delta = V_E - V_U$ . The following assumption guarantees that, for an average low-skill individual behind a veil of ignorance, more EPL increases utility for  $s < s_b$  and reduces it for  $s \geq s_b$ .

ASSUMPTION A.1.  $\mathfrak{S}(s) < 0$  for  $s \geq s_b$ . Thus,

$$-(\partial u^l / \partial s) \Delta + (1 - u^l) (\partial w^l / \partial s) (1/w^l) + u^l (\partial b^l / \partial s) (1/b^l) < 0.$$

It is convenient to define the following elasticities:  $\eta_{\theta_O, s} = (\partial \theta_O^l / \partial s) (s / \theta_O^l)$  and  $\eta_{\psi, s} = (\partial \psi / \partial s) (s / \psi)$ .

PROPOSITION A.1. *When voting on the degrees of EPL  $s$  for a given  $\tau$ , the following statements hold.*

1. *High-skill individuals (insiders and outsiders) set  $s_i^h(\tau) = \hat{s}^l$  with  $i = I, O$ , for all  $\tau$  and  $\hat{s}^l$  does not depend on  $\tau$ .*

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2. Low-skill insiders set  $s_I^l(\tau) \in (s_b, \tilde{s}_I)$  and  $s_I^l(\tau)$  is decreasing in  $\tau$ .
  3. Low-skill outsiders set  $s_O^l(\tau) \in (\tilde{s}_O, s_b)$  and  $s_O^l(\tau) > \hat{s}^l$  if  $\theta_O^l \Delta \eta_{\theta_O, s} < \eta_{\psi, s}$ .
  4. The median voter on  $s$  is a low-skill insider if  $(1 - u^l)\rho > 1/2$ , a high-skill individual if  $(1 - u^l)\rho < 1/2$  and  $\theta_O^l \Delta \eta_{\theta_O, s} > \eta_{\psi, s}$ , and a low-skill outsider if  $(1 - u^l)\rho < 1/2$  and  $\theta_O^l \Delta \eta_{\theta_O, s} < \eta_{\psi, s}$ .

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*Proof.* 1. For high-skill individuals, choosing  $s$  for a given  $\tau$  amounts to maximizing equation (5) with respect to  $s$  where only  $w^h$  depends on  $s$ , as shown in equations (3) and (1). It is easy to see that the utility of the high-skilled, both insiders and outsiders, is maximized when the employment rate of the low-skilled is maximized—that is, when  $s_I^h(\tau) = \hat{s}^l$  for all  $\tau$ . Furthermore,  $\hat{s}^l$  does not depend on  $\tau$ .

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2. For low-skill insiders, the maximization problem of choosing  $s$  for a given  $\tau$  is characterized by the following FOC with  $i = I$ :

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$$-\Delta \frac{\partial \theta_i^l(s)}{\partial s} + \frac{1 - \theta_i^l(s)}{w^l} \left[ (1 - \beta) \frac{\partial b^l}{\partial s} + \beta \frac{1 - \delta}{\delta} \psi' \frac{\partial \theta_i^l(s)}{\partial s} \right] + \frac{\theta_i^l(s)}{b^l} \frac{\partial b^l}{\partial s}. \quad (\text{A.1})$$

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This expression is clearly positive if evaluated at  $s = s_b$ , since  $\partial b^l / \partial s = 0$  and since all other terms are positive (notice that  $\partial \theta_i^l / \partial s < 0$  at  $s = s_b$  and that  $\psi' < 0$  always). Moreover, if evaluated at  $s = \tilde{s}_I$  then the FOC (A.1) is negative, since  $(\partial \theta_i^l(s)) / \partial s = 0$ , as are all the other terms (note that  $\partial b^l / \partial s < 0$  at  $s = \tilde{s}_I > s_b$ ). Simple algebra shows that, for a given  $\tau$ ,  $V_i^l(s, \tau)$  achieves a global maximum  $s_I^l(\tau)$  in the interval  $(s_b, \tilde{s}_I)$ . Also, the second-order condition (SOC) of this maximization evaluated at  $s_I^l(\tau)$  is negative, so that  $s_I^l(\tau) \in (s_b, \tilde{s}_I)$  is a maximum. To prove that  $s_I^l(\tau)$  is decreasing in  $\tau$ , we use the total differential on the FOC (A.1). Because the SOC is negative at  $s_I^l(\tau)$ , the sign of  $ds/d\tau$  corresponds to the sign of  $d\text{FOC}(s)/d\tau$ :

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$$\begin{aligned} \frac{d\text{FOC}(s)}{d\tau} = & \underbrace{-\frac{\partial \theta_i^l}{\partial s} \left[ \frac{(1 - \tau) \frac{\partial w^l}{\partial \tau} - w^l}{(1 - \tau) w^l} \right]}_{\text{I}} + \underbrace{\frac{\partial \theta_i^l}{\partial s} \frac{1}{b^l} \frac{\partial b^l}{\partial \tau}}_{\text{II}} \\ & + \underbrace{(1 - \theta_i^l) \frac{1 - \beta}{w^l} \left[ \frac{\partial^2 b^l}{\partial s \partial \tau} - \frac{1 - \beta}{w^l} \frac{\partial b^l}{\partial s} \frac{\partial b^l}{\partial \tau} - \frac{\beta}{w^l} \frac{1 - \delta}{\delta} \frac{\partial \psi}{\partial s} \frac{\partial b^l}{\partial \tau} \right]}_{\text{III}} \\ & + \underbrace{\frac{\theta_i^l}{b^l} \left[ \frac{\partial b^l}{\partial s} \frac{1}{b^l} \frac{\partial b^l}{\partial \tau} - \frac{\partial^2 b^l}{\partial s \partial \tau} \right]}_{\text{IV}}, \end{aligned} \quad (\text{A.2})$$

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where  $\partial b^l / \partial \tau > 0$ , and, for  $s \in (s_b, \tilde{s}_I)$ , we have  $\partial \theta_i^l / \partial s < 0$ ,  $\partial u^l / \partial s > 0$ , and  $\partial b^l / \partial s < 0$ , so that terms I and II are clearly negative. Moreover,

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$$\frac{\partial^2 b^l}{\partial s \partial \tau} = \frac{\partial b^l}{\partial s} \frac{u^l}{\tau(u^l - \tau(1 - u^l)(1 - \beta))} - \frac{\partial u^l}{\partial s} \frac{b^l(1 - \beta)}{(u^l - \tau(1 - u^l)(1 - \beta))^2} < 0. \quad (\text{A.3})$$

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Simple algebra shows that also the terms III and IV are negative and so  $d\text{FOC}(s)/d\tau < 0$ .

3. For low-skill outsiders, the FOC resulting from the maximization problem of choosing  $s$  for a given  $\tau$  amounts to (A.1) with  $i = O$ . It is easy to see that for a low-ability outsider (i.e.,  $i = O$ ) the FOC (A.1) is positive if evaluated at  $s = \tilde{s}_O$ , since the former term is equal to zero while the others are positive (notice that  $\partial b^l/\partial s > 0$  and  $\partial \theta^l/\partial s < 0$  at  $s = \tilde{s}_O^l$ ). On the other hand, if evaluated at  $s = s_b$  the FOC is negative. To see this, observe that (A1) is negative at  $s = s_b$  if

$$-(\partial \theta_O^l/\partial s) \Delta + (1 - \theta_O^l)(1/w^l) \beta((1 - \delta)/\delta) \psi' (\partial \theta^l/\partial s) < 0.$$

It is easy to verify that Assumption 1 at  $s = s_b$  becomes

$$-(\partial u^l/\partial s) \Delta + (1 - u^l)(1/w^l) \beta(1 - \delta/\delta) \psi' (\partial \theta^l/\partial s) < 0,$$

which implies the FOC. Simple algebra shows that, for a given  $\tau$ ,  $V_O^l(s, \tau)$  achieves a global maximum  $s_O^l(\tau)$  in the interval  $(\tilde{s}_O, s_b)$ . Also, the SOC of the preceding maximization problem evaluated at  $s_O^l(\tau)$  is negative, so that  $s_O^l(\tau) \in (\tilde{s}_O, s_b)$  is a maximum. Finally, in order for  $s_O^l(\tau) < \hat{s}^l$  the FOC (A1) must be negative if evaluated at  $s = \hat{s}^l$ . Notice that

$$\partial w/\partial s = (1 - \beta) (\partial b^l/\partial s) + \beta ((1 - \delta)/\delta) (\partial \psi/\partial s)$$

(from equation (2)) and that

$$\frac{\partial b^l}{\partial s} = \frac{\tau \beta (1 - u^l)}{u^l - \tau (1 - u^l) (1 - \beta)} \frac{1 - \delta}{\delta} \frac{\partial \psi}{\partial s}$$

at  $s = \hat{s}^l$ . Using simple algebra, the FOC (A1) can be written as

$$-\Delta (\partial \theta_O^l(s)/\partial s) + (\partial \psi/\partial s)(1/\psi);$$

this is negative for

$$\theta_O^l \Delta \eta_{\theta_O, s} > \eta_{\psi, s},$$

where

$$\eta_{\theta_O, s} = (\partial \theta_O^l/\partial s) (s/\theta_O^l) \quad \text{and} \quad \eta_{\psi, s} = (\partial \psi/\partial s) (s/\psi).$$

4. Given the results obtained so far, there are two possible rankings of the voters' preferences: (i)  $\tilde{s}_O < s_O^l(\tau) < s_I^h(\tau) = s_O^h(\tau) = \hat{s}^l < s_I^l(\tau) < \tilde{s}_I$  or (ii)  $\tilde{s}_O < s_I^h(\tau) = s_O^h(\tau) = \hat{s}^l < s_O^l(\tau) < s_I^l(\tau) < \tilde{s}_I$ . For  $(1 - u^l)\rho > 1/2$ , the low-skill insiders constitute a majority of the population and hence their preferred level of EPL represents the Condorcet winner over  $s$ . If  $(1 - u^l)\rho < 1/2$ , then the median voter on  $s$  can be a high-skill individual (case (i)) or a low skill outsider (case (ii)). Case (i) arises when  $s_O^l(\tau) < \hat{s}^l$ , which occurs for  $\theta_O^l \Delta \eta_{\theta_O, s} > \eta_{\psi, s}$ , and vice versa for case (ii). Although the preferences of low-skill insiders and outsiders may not be single peaked over the entire range of  $s$ , it is easy to show that the low-skill insiders' preferences are single peaked for  $s < \hat{s}^l$  and that the low-skill outsiders' preferences are single peaked for  $s > \hat{s}^l$ . Therefore low-skill insiders prefer  $\hat{s}^l$  to any other  $s < \hat{s}^l$ ; whereas low-skill outsiders prefer  $\hat{s}^l$  to any other  $s > \hat{s}^l$ ; hence  $\hat{s}^l$ , as chosen by the high-skill individuals, is a Condorcet winner over  $s$  in case (i). The same logic applies in case (ii).  $\square$

PROPOSITION A.2. *When voting on the UB contribution (tax) rate  $\tau$ , for a given degree of EPL  $s$ , we have that type- $j$  outsiders prefer  $\tau_O^j(s) = u^j$  and that type- $j$  insiders prefer  $\tau_I^j(s)$  where*

$$\tau_I^j(s) = \begin{cases} \frac{u^j \theta_I^j}{u^j - (1 - \beta)(1 - u^j)(1 - \theta_I^j)} & \text{if } \beta > \bar{u}\beta^j = 1 - \frac{u^j - \theta_I^j}{(1 - u^j)(1 - \theta_I^j)}, \\ u^j & \text{otherwise.} \end{cases}$$

Here  $\tau_I^j(s)$  is decreasing in  $s$  for  $\beta > \bar{u}\beta^j$ , and  $\tau_I^h$  does not depend on  $s$ .

The median voter on  $s$  is a low-skill insider if  $(1 - u^l)\rho > 1/2$  or if  $(1 - u^l)\rho < 1/2$  and  $\tau_I^l(s) > \tau_I^h(s)$ ; the median voter is a high-skill insider if  $(1 - u^l)\rho < 1/2$  and  $\tau_I^l(s) < \tau_I^h(s)$ .

*Proof.* The FOC resulting from the maximization problem of choosing  $\tau$  for a given  $s$  is equal to

$$-\frac{1 - \theta_i^j}{1 - \tau} + \left[ \frac{(1 - \theta_i^j)(1 - \beta)}{w^j} + \frac{\theta_i^j}{b^j} \right] \frac{\partial b^j}{\partial \tau} = 0 \text{ for } i = I, O \text{ and } j = l, h, \quad (\text{A.4})$$

where  $\partial b^j / \partial \tau = b^j u^j / (\tau[u^j - \tau(1 - u^j)(1 - \beta)])$ ; this can be rewritten as

$$-\frac{1 - \theta_i^j}{1 - \tau} + \frac{\theta_i^j}{\tau} + \frac{(1 - u^j)(1 - \beta)}{u^j - \tau(1 - u^j)(1 - \beta)} = 0 \text{ for } i = I, O \text{ and } j = l, h. \quad (\text{A.5})$$

To see that preferences are single peaked, consider the SOC

$$-\frac{1 - \theta_i^j}{(1 - \tau)^2} - \frac{\theta_i^j}{\tau^2} + \left[ \frac{(1 - u^j)(1 - \beta)}{u^j - \tau(1 - u^j)(1 - \beta)} \right]^2 \text{ for } i = I, O \text{ and } j = l, h; \quad (\text{A.6})$$

using the FOC (A5), we can rewrite this as

$$-\frac{(1 - \theta_i^j)\theta_i^j}{(1 - \tau)^2} - \frac{(1 - \theta_i^j)\theta_i^j}{\tau^2} - \frac{2(1 - \theta_i^j)\theta_i^j}{\tau(1 - \tau)} < 0 \text{ for } i = I, O \text{ and } j = l, h.$$

1. From equation (A5) it easily follows that type- $j$  outsiders would want to set  $\tau_O^j > \theta_O^j > u^j$ , but this would induce type- $j$  individuals *not* to supply labor when employed. Therefore,  $\tau_O^j(s) = u^j$  for all  $j = l, h$ .
2. Equation (A5) and simple algebra yield

$$\tau_I^j(s) = u^j \theta_I^j / (u^j - (1 - \beta)(1 - u^j)(1 - \theta_I^j)).$$

It is easy to see that  $\tau_I^j(s) < u^j$  if  $\beta > \bar{u}\beta^j$ . Observe that, since  $\theta_I^h$  and  $u^h$  do not depend on  $s$ , it follows that  $\tau_I^h$  does not depend on  $s$ ; instead, it is  $\tau_I^l(s)$  that will

depends on  $s$ . In particular,

$$\frac{\partial \tau_j^l(s)}{\partial s} = -\frac{\partial u^l}{\partial s} \frac{(1-\beta)(1-\theta_j^l)\theta_j^l}{u^l - \tau(1-u^l)(1-\beta)} + \frac{\partial \theta_j^l}{\partial s} \frac{u^l[u^l - (1-u^l)(1-\beta)]}{[u^l - \tau(1-u^l)(1-\beta)]^2} < 0,$$

because in the relevant range  $s \in (s_b, \tilde{s}_l)$ , we have  $\partial u^l / \partial s > 0$ ,  $\partial \theta_j^l / \partial s < 0$  and  $u^l > \tau(1-u^l)(1-\beta)$ .

3. The foregoing results imply that  $\tau_O^h = u^h < \tau_O^l = u^l$ ,  $\tau_j^l(s) \leq u^l$ , and  $\tau_j^h(s) \leq u^h$ . Hence, three rankings are possible: (1)  $\tau_O^l > \tau_O^h \geq \tau_j^h \geq \tau_j^l$ ; (2)  $\tau_O^l > \tau_O^h \geq \tau_j^l \geq \tau_j^h$ ; and (3)  $\tau_O^l \geq \tau_j^l > \tau_O^h \geq \tau_j^h$ . Clearly, the median voter is always a low-skill insider if  $(1-u^l)\rho > 1/2$ . The median voter is still a low-skill insider if  $(1-u^l)\rho < 1/2$  and  $\tau_j^l(s) > \tau_j^h(s)$ , which puts us in ranking (2) or (3) because  $u^j < 1/2$  for all  $j$  and all  $\rho > 1/2$ . If instead  $(1-u^l)\rho < 1/2$  and  $\tau_j^l(s) < \tau_j^h(s)$ , so that we are in ranking (1), then the median voter is a high-skill insider.  $\square$

*Proof of Proposition 1.* We need to show that the reaction functions  $\tau(s)$  and  $s(\tau)$  cross at least once. Recall that:  $\tau_j^l(s) \in (0, u^l)$  for  $\beta > \bar{u}\beta^l$  is decreasing in  $s$ ;  $\tau_j^h$  does not depend on  $s$ ;  $s_j^l(\tau) \in (s_b, \tilde{s}_l)$  is decreasing in  $\tau$ ;  $s_j^h(\tau) = \hat{s}^l$  does not depend on  $\tau$  and  $s_O^l(\tau) \in (\hat{s}^l, s_b)$ .

Consider case (i). For  $s \in [s_b, \tilde{s}_l]$ , we have  $\tau(s) = \tau_j^l(s) \in (0, u^l)$  with  $\partial \tau / \partial s < 0$ ; for  $\tau \in [0, u^l]$ , we have  $s(\tau) = s_j^l(\tau) \in (s_b, \tilde{s}_l)$  with  $\partial s / \partial \tau < 0$ . Hence, the two reaction functions cross in an interior  $(s^*, \tau^*)$ ; that is,  $s^* \in (s_b, \tilde{s}_l)$  and  $\tau^* \in (0, u^l)$ . In case (ii), if  $\theta_O^l \Delta \eta_{\theta_O, s} \geq \eta_{\psi, s}$  then the median voter on  $s$  is a high-skill, and so  $s = \hat{s}^l$ . It is then easy to see that the two reaction functions cross at  $s = \hat{s}^l$  and that  $\tau(\hat{s}^l) = \max\{\tau_j^l(\hat{s}^l), \tau_j^h(\hat{s}^l)\} \in (0, u^l)$ . In case (ii) with  $\theta_O^l \Delta \eta_{\theta_O, s} < \eta_{\psi, s}$ , the median voter on  $s$  is a low-skill outsider. Simple algebra shows that, as  $\tau \rightarrow 0$ ,  $s_O^l(\tau) \rightarrow \tilde{s}_O$ ; and that as  $\tau \rightarrow u^l$ ,  $s_O^l(\tau) \rightarrow s_b$ . However, the function  $s_O^l(\tau)$  need not be monotonic. The reaction functions will therefore cross at least once at interior point  $(s^{**}, \tau^{**})$ , where  $s^{**} = s_O^l(\tau^{**}) \in (\tilde{s}_O, s_b)$  and  $\tau^{**} = \max\{\tau_j^l(s^{**}), \tau_j^h(s^{**})\} \in (0, u^l)$ . However, additional cross points (and hence equilibria) may exist, though the total number of points will always be odd.  $\square$

## Appendix B. Descriptive Statistics

The regression analysis displayed in Table 3 is carried out over the countries listed in Table B.1 having both EPL and UB.

Table B.2 provides summary statistics for the variables used in the regression over 24 OECD countries (period 1985–2000), whose results are displayed in Table 2. The Barro–Lee (2000) educational attainment variable is available only at five-year frequencies. For the remaining variables we have yearly observations.

Table B.3 provides summary statistics for the variables used in the regression over 54 countries with both EPL and UB systems (period 1985–2000), whose results are displayed in Table 3. This is an unbalanced panel. Observations for OECD countries are available over the entire period, while for other countries we have for some variables just one observation.

TABLE B1. List of countries included in regression 1.

Argentina	Greece	Philippines
Australia	Hong	Poland
Austria	Hungary	Portugal
Belgium	India	Romania
Bolivia	Indonesia	Russia
Brazil	Ireland	Senegal
Canada	Israel	Singapore
Chile	Italy	Spain
China	Jamaica	Sri Lanka
Colombia	Japan	Sweden
Denmark	Kenya	Thailand
Dominican Republic	Korea	Uganda
Egypt	Malaysia	UK
Finland	Mexico	United States
France	Netherlands	Venezuela
Germany	Norway	Zimbabwe
Ghana	Pakistan	
Greece	Peru	

TABLE B2. Descriptive statistics for the OECD countries.

Variable	Mean	Std Dev.	Min	Max
EPLall (OECD index)	2.10	1.08	0.21	4.10
EPLreg (OECD index)	2.11	0.94	0.17	4.83
Uexp	0.17	0.15	0.00	0.74
$\ln(1 + Uexp/EPLall)$	2.16	0.85	0.20	3.92
$\ln(1 + Uexp/EPLreg)$	2.11	0.82	0.14	3.90
LOWEDU (%)	35.38	14.96	6.30	70.80
MKTCAP (%)	62.01	57.32	3.28	317.03
ATTITUDES	0.29	0.46	0.00	1.00
OPEN	64.35	35.15	13.45	184.10
UBprog	1.51	0.39	0.96	2.14
topMKTCAP * UBprog	0.45	0.77	0.00	2.04

TABLE B3. Descriptive statistics for the 54 countries.

Variable	Mean	Std Dev.	Min	Max
UBgen	0.16	0.20	0.00	0.71
EPL2 (Botero index)	0.47	0.18	0.16	0.83
$\ln(1 + UBgen/EPL2)$	2.25	1.98	0.00	4.85
LOWEDU (%)	52.49	21.69	6.30	96.90
MKTCAP (%)	45.97	48.50	0.28	250.73
ATTITUDES	0.30	0.46	0.00	1.00
HIGHINCOME	0.43	0.50	0.00	1.00
OPEN	65.16	54.77	3.96	377.68
TAXprog	8.57	12.57	0.00	65.00
topMKTCAP * TAXprog	3.26	9.83	0.00	61.00

3 TABLE B4. Yearly correlations between the OECD and Botero et al. (2004) EPL indices.

4 Year	5 Pairwise correlation 6 coefficient	7 Spearman rank 8 correlation coefficient
9 1985	0.7841	0.7650
10 1986	0.7804	0.7627
11 1987	0.8035	0.7967
12 1988	0.8035	0.7967
13 1989	0.8035	0.7967
14 1990	0.7623	0.7367
15 1991	0.7285	0.7331
16 1992	0.7285	0.7331
17 1993	0.6995	0.6954
18 1994	0.6890	0.6636
19 1995	0.6700	0.6603
20 1996	0.6688	0.6499
21 1997	0.6590	0.6644
22 1998	0.6577	0.6734
23 1999	0.6586	0.6646
24 2000	0.6249	0.6379
25 2001	0.6154	0.6360
26 2002	0.6003	0.6211

27 Table B.4 provides pairwise correlations and Spearman rank correlations between  
 28 the OECD EPL overall index of employment protection and the index provided by  
 29 Botero et al. (2004) for the 24 countries in which both indices are available. As the  
 30 Botero index was computed with reference to regulations in the 1990s without a  
 31 specific date, we display yearly correlations over the period covered by our data.  $\chi^2$   
 32 tests of the independence of the two distributions reject the  $H_0$  hypothesis at 99%.



## Queries

**Q1** AQ: EPL roman not Epl italic in table head, ok?

**Q2** AQ: please give ref for footnote cite

**Q3** AQ: 'outside' is as intended...or 'outsider'?

**Q4** AQ: Notes in Table 3 refer to Table 3. Is this necessary?

# MARKED PROOF

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Insert comma	(As above)	,
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