Protecting Against Labour Market Risk: Employment Protection or Unemployment Bene¯ts?

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Abstract

This paper represents a ¯rst attempt to apply a multidimensional voting approach to the labor market institutions in order to explain the observed trade-o® between unemployment bene¯ts (UB) and employment protection legislation (EPL). In our model, voters are required to cast a ballot over the strictness of EPL and over the generosity of UB. Agents are heterogeneous along two dimensions: employment status { there are insiders and outsiders { and skills { low and high ability. We show that if there exists a majority of low-ability insiders, the voting game has a politico-economic equilibrium with low UB and high EPL. If, on the other hand, there are enough high ability types (either employed or unemployed) and low-ability outsiders, the politico-economic equilibrium displays a high level of UB and low EPL. Another testable implication of the model is that a larger share of elderly workers increases the demand for EPL. Combining cross-sectional and time-series observations on the strictness of EPL and generosity of unemployment bene¯ts in OECD countries, we show that a higher proportion of low-educated employees and an ageing population induce more demand for employment protection. Micro evidence on dismissals by level of education is also in line with the substantive hypotheses of our model.

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1. Introduction

Unemployment bene¯ts (UBs) and ¯ring costs or, more broadly, employment protective legislation (EPL) are two ways of protecting individuals against the risks of being unemployed . While EPL protects those who already have a job, and does not impose any explicit tax burden, UBs generally provide insurance to a larger portion of the labour force and are ¯nanced by a tax imposed on labour income. European countries use di®erent combinations of the two institutions. Plotted against each other, various measures of the two institutions are suggestive of the presence of a trade-o® between EPL and UBs (Buti, Pench and Sestito, 1998; Boeri, Boersch-Supan and Tabellini, 1999). Those countries, which adopt stronger dismissal restrictions, tend to enjoy smaller unemployment insurance programs, and viceversa.

It is frequently suggested that Southern European countries (EPL-intensive) should move along this trade-o® phasing out the most rigid dismissal regulations and extending the coverage of more mobility-friendly institutions, such as unemployment bene¯ts. Job-security oriented labour market institutions, which are focused on protection of primary breadwinners' labour income, are indeed ill-suited to accommodate new demands for mobility and, more broadly, microeconomic adjustment, as those arising in the context of so-called "globalisation". However, moving along this trade-o® is proving very di±cult. Reforms of EPL are generally con¯ned to introducing "at the margin" more °exible contractual types, rather than modifying rules for workers who already have a permanent contract.

Why do countries resort to di®erent combinations of employment protection and unemployment insurance to protect the individuals against the risk of being unemployed? This paper provides a politico-economic explanation of the observed trade-o® between EPL and UBs, applying for the ¯rst time (to our knowledge) a multidimensional voting approach to endogenous labour market institutions theory. Our model bridges the gap between two streams of literature in the political economy of labour markets. On the one hand, our environment is similar to that proposed by Wright (1986) to examine the unemployment insurance program. On the other hand, it draws on Saint-Paul (1996) models on EPL.

The focus is on the con°ict of interest between employed (insiders) and unemployed (outsiders). The transition between these two states { employment and unemployment { is regulated by the unemployment in°ow and out°ow rates, which are a®ected by the degree of EPL. The model is further enriched by introducing a second degree of heterogeneity, and thus an additional con°ict of interest. As in Acemoglu et al. (2000), workers di®er in their ability level. In our model, ability a®ects the productivity of the agents and the unemployment in°ow and out°ow rates. In absence of restrictions, high ability types would earn higher wages and face respectively a lower unemployment in°ow rate, due mainly to a higher job-to-job mobility, and a higher out°ow rate than

the low ability types. In our political economy model, voters are required to cast a ballot over the strictness of EPL and over the generosity of unemployment bene¯ts. Because of the multidimensionality of the issue space, the existence of a Condorcet winner of the majority voting game is not guaranteed. To overcome this problem, we concentrate on political equilibria induced by institutional restrictions, or structure-induced equilibria (see Shepsle ,1979 and Persson and Tabellini, 2000). In our political system, the entire electorate votes over the two issues (i.e., the payroll tax ¯nancing unemployment bene¯ts and the strictness of employment protection), and policy decisions are taken issue-by-issue. We show that if there exists a majority of low-ability insiders, the voting game has a politico-economic steady state equilibrium with positive unemployment bene¯ts and a high degree of EPL. If, on the other hand, there are enough high ability types (either employed or unemployed) and low-ability outsiders, the politico-economic equilibrium displays some level of unemployment bene¯t and a relatively low degree of EPL. When is the level of unemployment insurance higher in the latter equilibrium? In other words, when do we have a trade-o® between UBs and EPL? A key insight of the model is that, for sensible speci¯cations of the parameters, the decision over the unemployment insurance rests in the hands of the low-ability insiders. In taking their decision, they consider their current and future employment status. For instance, for a high degree of EPL, the unemployment rate increases, however, the low ability insiders are more protected against the risk of losing their job and will hence prefer a low level of UBs. Two elements are crucial in this decision: (i) the subjective rate of time discount, which measures the relevance of the current employment status, as opposed to the future ones; and (ii) the sensitiveness of the unemployment in°ow and out°ow rates of the low ability worker to the strictness of EPL.

The paper proceeds as follows: Section 2 documents the trade-o® and reviews the related literature, Section 3 presents the model and the economic environment. Section 4 develops the political system, and introduces the equilibrium concept. In section 5, we characterize the equilibria of the voting game. In sections 6 and 7, we discuss the results and conclude.

2. The trade-o®

Figure 2.1 documents the aggregate trade-o® between UB and EPL over a cross-country of European countries. It displays, on the vertical axis, a common measure of the strictness of employment protection de¯ned by the OECD (OECD, 1999) on the basis of an assessment of national legislations. The horizontal axis indicates the coverage of unemployment insurance and unemployment assistance (the fraction of unemployed receiving some form of UBs) as estimated on the basis of the European Community Household Panel (ECHP), a micro dataset covering all countries of the EU-15. The charts hints at a negative relation between the two schemes: the correlation coe±cient

is -.71 and is signi¯cant at 99 per cent. The Southern European countries, in particular, exhibit comparatively high costs of dismissals and a low coverage of UBs. Table 2.2 evaluates the correlation between alternative measures of UB generosity and strictness of EPL. In particular, the sub-index of EPL referred to "regular workers" (permanent contracts) only is considered and, in addition to UB coverage, net replacement rates in the ¯rst year of bene¯t provision as well as the product between replacement rates and coverage are taken into account. The correlation holds stronger when the focus is on coverage[1], but it is statistically signi¯cant also when net replacement rates are considered in conjuction with the overall EPL index[2]. The trade-o® has also been documented at the micro level. In particular, Boeri, Boersch-Supan and Tabellini (1999) found that individuals considering themselves protected by EPL are less willing to purchase state-provided unemployment insurance and their willingness to pay for UBs is lower than for individuals with a high subjective risk risk of job loss.

Economic theory, notably the literature on labour market institutions, provides a rationale for the substitutability between EPL and UB. They both protect workers against labour market risks. Models assigning a welfare-enhancing role to these institutions (e.g., Pissarides, 2001) show that { when severance payments and notice periods in case of dismissals are chosen optimally { there is no role for unemployment insurance. The two institutions may also have important design features in common. For instance, when EPL involves only transfers from the employer to the employee (i.e., it is a severance cum notice period scheme), it may collapse to an experience-rated unemployment insurance scheme. Usually, job security provisions explicitly or implicitly require payments directly from the employer to departing employees, in addition to judicial or administrative costs that are deadweight from the point of view of the individual employment relationship.

>From a normative standpoint, there are second-best arguments in favour of di®erent combinations of the two schemes. Both UB and EPL trade-o® lower productive e±ciency against ex ante distributional equity. Provision of insurance in the presence of asymmetric information unavoidably decreases productive e±ciency. Workers have no less incentive to decrease their job-seeking e®ort when covered by social rather than private insurance, and protection from "unfair" developments unavoidably decreases the labour market's speed of adjustment. In presence of stronger competitive pressures, EPL is deemed to have a worse performance than unemployment insurance as the initial adjustment to new conditions is expected to require signi¯cantly more labour reallocation (Bertola and Boeri, 2003). Unemployment insurance is also preferable to EPL on

[1]The stronger correlation observed in this case may be due to the fact that EPL tends to increase the duration of unemployment (beyond the maximum duration of bene¯ts), notably for ¯rst time job-seekers (who often do not qualify for UBs).

[2]Buti, Pench and Sestito (1998) were the ¯rst to analyse the pairwise correlation between UB replacement rates and EPL strictness.

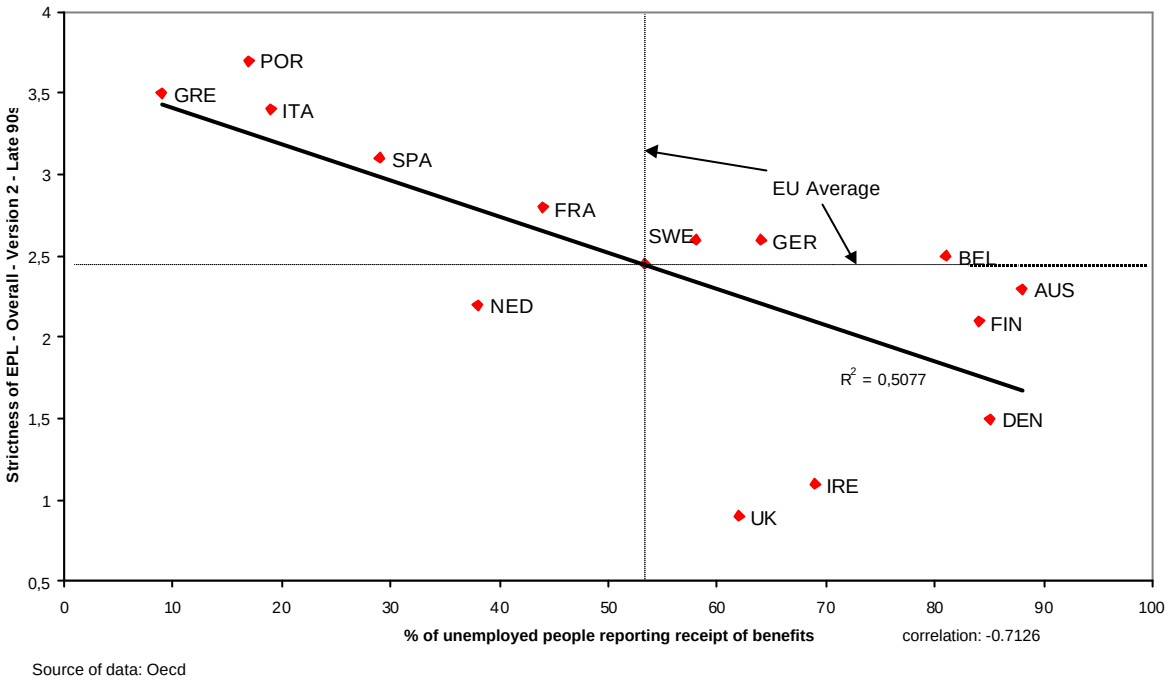

Figure 2.1: UB coverage and strictness of EPL in the EU-15

the grounds that it allows workers to seek for jobs that are hard to get because they require more specialised skills (Acemoglu and Shimer, 1999).

Overall, there are theoretical arguments suggesting that there may be e±ciency gains in substituting EPL with UB. It has been often advocated that Southern European countries (located in the North-West of Figure 2.1), in particular, should move towards con¯gurations allowing for a more balanced mix of unemployment insurance and protection against dismissals.

However, moving along this trade-o® is proving extremely di±cult. An inventory of reforms in this area carried out by Fondazione Rodolfo Debenedetti[3] suggests that reforms have been parametric, involving only marginal groups of the workforce. This is con¯rmed by the updating of the OECD index of the strictness of employment protection for regular workers, displayed in Figure 2.3 (drawn from OECD, 1999): the EPL for

[3]See Bertola, Boeri and Nicoletti (2000) for details.

The trade-off

	EPL overall (mid-90s)	EPL regular workers (mid-90s)
a) UB coverage rate (ECHP '98)	-0,71**	-0,56**
b) UB net replacement rate (1999)	-0,34*	-0,07
a) * b)	-0,63**	-0,46**
nobs = 15	** significant at 99	* significant at 95

Figure 2.2: The correlation between different measures of EPL strictness and UB generosity (EU-15)

"regular" workers has hardly changed at all in OECD countries over the decade, being almost all located along the main diagonal. The location of the different countries along the UB-EPL trade-off would seem to be a stable politico-economic equilibrium. Characterising these equilibria is the task setup for the next section. In future work we plan to assess the stability of equilibria and analyse adjustments along the UB-EPL trade-off.

3. The Economic Model

In our economy, agents are infinitely long lived. In every period, they consume their current income, since, as in Wright (1986), we assume that no saving technology is available[4]. Their preferences are defined over the infinite stream of consumption, c, through the following utility function:

$$\Phi(c_t; c_{t+1;...}) = \sum_{k=t}^{1} \beta^{k-t} v(c_k)$$

where β represents the individual time discount, and the instant utility function is assumed to be logarithmic: $v(c) = \ln(c)$. Agents differ in their ability level. There are low and high ability types, l and h, and θ_j is the fraction of the type-j workers in the population. Clearly, $\theta_l + \theta_h = 1$. Moreover, we assume that there exist more low than high ability types, $\theta_l > \theta_h$. If employed, low ability workers earn a pre-tax real wage equal to w^l, while high ability workers earn w^h, with $w^h > w^l$. In every period, agents may be either employed or unemployed. According to the existing literature, we refer to the employed as "insider" and to the unemployed as "outsiders". The

[4] This assumption greatly simplifies the analysis. Notice that the existence of perfect capital markets would be analogous to have risk neutral agents. A discussion of the effects of this assumption on the results is in section 4.

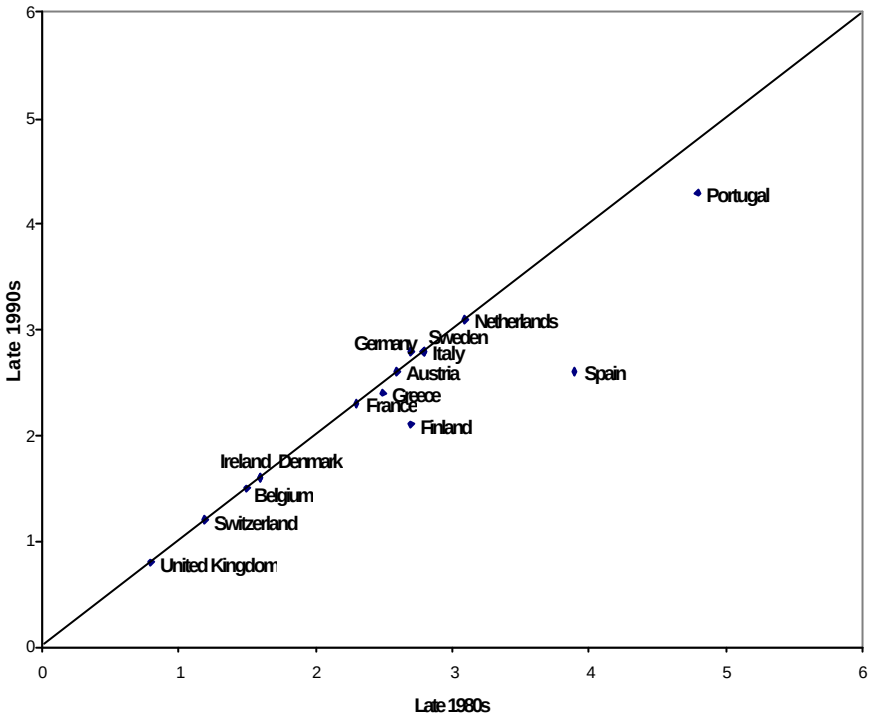

Figure 2.3: EPL for regular workers: late 1990s vs. late 1980s

transition between these two states is regulated by a Markov process, with type specific probability of transitions. 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 $u^j = F^j/\left(H^j + F^j\right)$, while the total unemployment rate is $u = u^l l + u^h h$. Clearly, we have that $\partial u^j/\partial F^j > 0$ and $\partial u^j/\partial H^j < 0$. Moreover, stability conditions for the unemployment rate require that $F^j < H^j \ \forall j$.

3.1. Labor Market Institutions

We consider two types of labor market institutions: i) an unemployment benefit (UB) program, which in every period taxes the employed and provides a transfer to the unemployed; and ii) an employment protective legislation (EPL) scheme, which affects labor market dynamics through its impact on the unemployment inflow and outflow rates.

Unemployment Benefits Our insurance program imposes a proportional tax, τ, on the labor income of the workers and awards to any type-j unemployed agent a transfer, b^j, that is proportional to her previous wage, and hence to her type: $b^j = \rho^j w^j$, where ρ^j is a replacement rate that measures the generosity of the scheme for each type. The system is budget balanced and thus the total amount of transfers to the unemployed equals the total contributions:

$$b^l u^l l + b^h u^h h = \tau \left[w^l l \left(1 - u^l\right) + w^h h \left(1 - u^h\right) \right].$$

We impose two further restrictions to UBs. First, the tax rate on the labor income has to be lower than the unemployment rate of both types: $\tau < Min\left\{u^l; u^h\right\}$. This condition guarantees that agents have an incentive to work, although in our model agents are not given an explicit labor-leisure decision. Second, we assume that $\rho^j = \tau\left(1 - u^j\right)/u^j$. The generosity of the UB system may differ across types, according to their unemployment rate. For instance, if high ability types have a lower unemployment rate { for a given tax rate { than low ability types, they will obtain a higher transfer when unemployed. Notice that under this characterization, the UB system is a pure unemployment insurance scheme which { for a given premium, the tax rate τ { provides a larger benefit to those types who are less likely to become unemployed. In fact, by setting these different replacement rates, we abstract from any redistributive element between types. In section 4, we discuss how our result would be affected by using a unique replacement rate, thereby allowing for some redistribution, typically from high to low ability types. Finally, let $z^j = \left(1 - u^j\right)/u^j = H^j/F^j$ be the ratio of type-j employed to unemployed agents. Then, we have that $b^j = \tau w^j z^j$.

Employment Protective Legislation Labour markets may be regulated by a legislation protecting the workers against the risk of becoming unemployed. This legislation may take different forms. According to the OECD (1994), the measure of EPL can be decomposed in: (1) procedural inconveniences to dismissals (mainly capturing the complexity of the procedures needed to issue a dismissal notice); (2) notice and severance payments requirements, (the time elapsed between the decision to layoff a worker and her/his effective removal from the payroll); and (3) difficulty of dismissals, which measure the relevance of litigation costs and any possible bias in the judicial enforcement process[5].

Cazes, Boeri and Bertola (1999) suggest that the third component of EPL – the difficulty of dismissal – accounts for most of the reduction in the dismissal rate associated with a more strict EPL. Accordingly, in our stylized framework, we simply characterize the EPL as a deadweight cost – such as litigation cost – which affects the unemployment inflow and outflow rates of the low and high ability type agents, while we disregard the existence of severance payments, and their possible role of insurance against the unemployment risk. As shown by Lazear (1990), under flexible wages, severance payments can be "undone" by wage contracts "bonding" the duration of a job. In our model, the degree of EPL is thus measured by a parameter $s \in [0;1]$, where $s = 0$ means no protection and $s = 1$ denotes maximum protection. As in Saint-Paul (1996 and 2000), we consider that the EPL decreases the unemployment inflow rate of the low-ability types, $F_1^l(s) \leq 0$. Consistently with empirical evidence, firings are assumed to be convex in the degree of EPL, $F_{11}^l(s) > 0$. This means that the impact on the inflow rate of an increase in the degree of EPL is larger when the labour market is flexible ($s \simeq 0$) than when it is already quite rigid[6]. We consider the impact of EPL on the inflow rate of the high-ability types to be lower than for low-ability types. Given our focus on litigation costs, which are independent of the worker's type, it is quite natural that, in periods of recession – when the marginal productivity of a worker is close to zero – an employee will be more willing to incur in such costs to layoff a high ability type, who earns a higher wage, than a low ability one. In other words, high ability agents are less protected than low ability ones by the EPL. For analytical simplicity, we take the rather extreme view that EPL only reduces the unemployment inflow rate of the low-ability types, while leaving the high types unaffected, i.e., F^h is a constant in our model. Moreover, we assume that the unemployment inflow rate of the low ability workers is always higher than the inflow rate of the high ability ones, $F^l(s = 0) \gneq F^h$, which also consistent with empirical evidence This also captures the difference in the job-to-job reallocation between low and high ability types. In fact, high ability types tend to have more job-to-job mobility and a lower unemployment inflow rate than the

[5] To this respect, see Ichino, Polo and Rettore (2001).

[6] This feature clearly emerges from our empirical estimates in section 5.

low-ability types. Additionally, high-ability workers have more ¯rm speci¯c human capital, which reduces incentives of employers to ¯re them. Finally, for every skill type, the unemployment out°ow rate is negatively related to the strictness of EPL, that is, $H_1^l(s) < 0$ and $H_1^h(s) < 0$. This captures the idea that, in rigid labour markets, employers are less willing to hire workers in upturns, since they will not be able to dismiss them during downturns. We also assume that, for any degree of EPL, the unemployment out°ow rate of the high ability workers is higher than the out°ow rate of the low ability ones, $H^l(s) \cdot H^h(s)$ 8 s. With this characterization of the transition process in and out of the employment status, a trade-o® arises between the in°ow and the out°ow rates of the low ability types as the degree of EPL changes: more EPL decreases their in°ow into unemployment, while reducing also their out°ow. The overall e®ect on the low-ability unemployment rate is thus ambiguous. As Persson and Tabellini (2000), we explicitly assume that the unemployment rate is ¯rst decreasing and then increasing in the degree of EPL[7], and has an interior minimum at s^l. Finally, notice that under our characterization, EPL may only damage the high ability insiders, since it reduces their out°ow rate, while leaving their in°ow rate una®ected. Thus, the degree of EPL that minimizes the unemployment rate of the high ability types is zero, $s^h = 0$.

3.2. Individual Preferences

As in Wright (1986) and Pissarides (2001), in our model individuals cannot save to insure against the risk of becoming unemployed. Thus, in every period, the level of consumption for each skill type is emtirely determined by her employment status. If employed, a type j agent consumes $(1 - \tau)w^j$; if unemployed, she consumes b^j. It is useful to denote the di®erence in utility between the two labour market stata for a type-j agent as $\Delta v^j = v(1 - \tau)w^j - v(b^j)$. We can now characterize the indirect utility function with respect to the degree of EPL and UB. Let $V_i^j(s;\tau)$ denote the expected lifetime utility of a type-j agent when she is currently in state i. Then $V_O^j(s;\tau)$ is the expected lifetime utility of a type-j agent who is currently unemployed { an outsider { and $V_I^j(s;\tau)$ is the utility of a currently employed agent{ an insider. We can thus write

$$V_O^j(s;\tau) = v(b^j) + \beta[(1 - H^j)V_O^j(s;\tau) + H^j V_I^j(s;\tau)]$$
$$V_I^j(s;\tau) = v(1 - \tau)w^j + \beta[F^j V_O^j(s;\tau) + (1 - F^j)V_I^j(s;\tau)]$$

where $j = h;l$. It is straightforward to see that the expected utility depends only on the state, and not on the date. Solving the system of equations we ¯nd that, for a type-j

[7] Notice that the assumptions that (i) the in°ow rate is decreasing and convex in the degree of EPL, $F_1^l < 0$ and $F_{11}^l > 0$, and (ii) that the out°ow rate is a linear, non-positive function of the EPL, $H_1^l < 0$ and $H_{11}^l = 0$, are su±cient for the unemployment rate to have a minimum, although the unemployment rate needs not to be convex in s.

agent, who is currently in the employment status i, the indirect utility function is

$$V_i^j(s;\tau) = \frac{\left[1 - \mu_i^j(s)\right] v\left[(1-\tau) w^j\right] + \mu_i^j(s)\, v\left[b^j\right]}{(1-\beta)} \tag{3.1}$$

where

$$\mu_O^j(s) = \frac{1-\beta+\beta F^j}{1-\beta+\beta(F^j+H^j)} \tag{3.2}$$

represents the proportion of time that a type-j agent who is currently an outsider will spend unemployed during her lifetime, while

$$\mu_I^j(s) = \frac{\beta F^j}{1-\beta+\beta(F^j+H^j)} \tag{3.3}$$

represents the proportion of time that a type-j agent who is currently an insider will spend unemployed, and again $j = h;l$. Clearly, $\mu_O^j(s) > \mu_I^j(s)\ \forall j$. It is useful at this juncture to define the degree of EPL which minimizes the time spent unemployed respectively by a low-ability insider and outsider[8]: $s_I = \arg\min \mu_I^l(s)$ and $s_O = \arg\min \mu_O^l(s)$. It is easy to see that $s_O < s^l < s_I$ { where s^l is the degree of EPL which minimizes unemployment among low-ability types { since s_O and s_I take into account the current employment status of the agent. Finally, notice that as β approaches 1, current employment conditions lose their relevance and the indirect utilities of a type-j insider or outsider coincide: $\mu_I^l(s) = \mu_O^l(s) = u^l$.

4. The Political Game

The degree of EPL and the level of UB are decided at majority voting. When the election takes place, all persons alive, employed and unemployed, cast a ballot over $\tau \in [0;1]$, the income tax which finances the unemployment insurance, and $s \in [0;1]$, the degree of EPL. Individual preferences over the two issues are represented by the indirect utility functions at equation 3.1, further characterized at equations 3.2 and 3.3 for the outsiders and the insiders respectively. Notice that every agent has zero mass, and thus no individual vote could change the outcome of the election. As usual, this problem is solved by assuming that individuals vote sincerely. This majoritarian voting game shares an important features with the games analyzed in Conde-Ruiz and Galasso (1999 and 2003). The issue space is bidimensional, $(\tau;s)$, and thus a Nash equilibrium typically fails to exist. To overcome this well-known problem, we follow Shepsle (1979),

[8] Again, the assumptions on $F^l(s)$ and $H^l(s)$ { see footnote 4 { are sufficient for $\mu_I(s)$ and $\mu_O(s)$ to have a minimum, albeit not to be convex.

and more recently Persson and Tabellini (2000), in analyzing voting equilibria induced by institutional restrictions, i.e., structure-induced equilibria. Conde-Ruiz and Galasso (1999 and 2003) discuss the set of institutional restrictions, which are needed to convert a two-dimensional election into a (dynamic) simultaneous issue-by-issue voting game, in which a (structure induced) equilibrium exists[9]. The concept of structure induced equilibrium { or issue-by-issue voting { applied to our political game can be summarized as follows. For every value of s, the degree of EPL, each voter determines her most preferred value of ¿, the level of UB, and viceversa. In other words, every agent votes two reaction functions: ¿ (s) and s(¿). A pair (¿¤;s¤) is an equilibrium of this voting game if ¿¤ represents the outcome of a majority voting over the jurisdiction ¿ { the level of employment bene¯t { when the other dimension is ¯xed at its level s¤, and viceversa. Finally, we restrict ourselves to a steady state analysis and assume that the voting game takes place once and for all. Re-voting, as in Conde-Ruiz and Galasso (1999 and 2003), would allow to capture some dynamic aspects of the game, but at the cost of further complicating the analysis of the political equilibrium. We now turn to the voting game by examining the agents' decisions over the EPL for a given ¿ and then the decisions over the UB for a given s.

4.1. Voting over the degree of Employment Protective Legislation

EPL a®ects the utility of the agents through its e®ects on the unemployment in°ow and out°ow rates. As discussed in the previous section, high ability agents { either insiders or outsiders { oppose any positive level of EPL, which decreases their unemployment out°ow rate but does not decrease their in°ow rate. The choice of the low-ability agents is more complex, since the EPL creates a trade-o® between their in°ow and out°ow rates. To see this, consider a low-ability insider. An increase in the degree of EPL has two e®ects on her indirect utility (see eq. 3.1). First, it has an impact on the percentage of time that a current insider will spend unemployed during her lifetime, $\mu_l^l(s)$, and thereby on the di®erence between the utility in the two states { employed and unemployed. Since the utility is larger when employed, this e®ect is positive for $s < \theta_l$ { where θ_l represents the degree of EPL that minimizes $\mu_l^l(s)$ { becomes zero at $s = \theta_l$, and then turns negative. Second, an increase in the strictness of EPL has an impact on the unemployment bene¯t, through changes in the ratio of low ability employed to unemployed agents. This e®ect is positive for $s < \theta^l$ and weakly negative

[9] As originally proposed by Shepsle (1979), this institutional arrangement does not directly apply to elections, but rather describes the process of policy making decision by representatives in a legislature. Therefore, in adopting these institutional restrictions in our voting game, we are implicitly assuming that the elections select a group of representatives whose preferences exactly match the voters' preferences. All these representatives then form a committee with jurisdiction over unemployment insurance and a committee with jurisdiction over the degree of EPL, which separately { but simultaneously { decide over the two issues at stake.

thereafter. Therefore, a low-ability insider chooses a degree of EPL which is higher than $\hat{s}^I$, in order to benefit from the current positive effect of a decrease in the unemployment inflow rate, but lower than s_I since she takes into account the negative impact that the EPL has on the average unemployment rate and thus on the level of UBs, once $s > \hat{s}^I$. A low ability outsider faces a similar problem. The latter effect coincides with the low-ability insider's decision. However, the former is positive for $s < s_O < s_I$ { where s_O is the degree of EPL which minimizes $\mu_O^I(s)$, the fraction of time that a current outsider spends unemployed during her lifetime { becomes zero at $s = s_O$, and then turns negative. Therefore, a low-ability outsider will choose a level of EPL between s_O and $\hat{s}^I$, which best trades off the decrease in the average unemployment rate with the reduction in the current probability of being hired. The next proposition characterizes the decision of the median voter, $s^m(\tau)$.

Proposition 4.1. If $\left[1 - u^I\left(s_I^I\right)\right]\theta^I \geq \frac{1}{2}$, the median voter over the jurisdiction s is a low skilled insider, and the corresponding degree of EPL is $s^m(\tau) = s_I^I(\tau) \in [\hat{s}^I, s_I]$. If $\left[1 - u^I\left(s_I^I\right)\right]\theta^I < \frac{1}{2}$, the median voter over the jurisdiction s is a low skilled outsider, and the corresponding degree of EPL is $s^m(\tau) = s_O^I(\tau) \in [s_O, \hat{s}^I]$.

This proposition suggests that the median voter over the degree of EPL is a low-skilled agent. If { for the (high) degree of EPL chosen by a low-ability insider { the low-ability insiders are a majority, the median voter over s is clearly a low-ability insider; whereas if { for the (low) degree of EPL chosen by a low-ability outsider { the low-ability insiders are a minority, the median voter over s is a low-ability outsider[10]. The latter case is interesting, because it suggests that the low ability outsiders play a pivotal role in deciding over the degree of EPL, although they do not benefit from it, at least in their current state. How does the degree of EPL chosen by the median voter depend on the level of UB[11]? If the median voter is a low-ability insider, $s^m(\tau) = s_I^I(\tau)$, there is a negative relation between EPL and UB. In other words, for this median voter the reaction function of s with respect to τ is negatively sloped. This result hints at some substitutability between EPL and UB as instruments to protect against labor market risk. In fact, a higher level of unemployment insurance reduces the cost, in terms of consumption, of being unemployed, and thus a low-ability insider will require a lower degree of EPL. However, if the median voter is a low-ability outsider, $s^m(\tau) = s_O^I(\tau)$, the relation between EPL and UB becomes positive, and thus the reaction function $s_O^I(\tau)$ is positively sloped. This is because an increase in the tax rate, τ, reduces the

[10] Notice that both equilibria may fail to exist if { in the former case { the degree of EPL is too high and leads to large unemployment or if { in the latter case { it is too low and does not create enough unemployment.

[11] Lemma A.1 in the appendix provides a formal answer.

current cost of being unemployed and thus induces the low-ability outsider to increase the degree of EPL in order to decrease the average unemployment rate and to increase the unemployment bene¯t{ recall that $s^l_O(¿) < b^l$. Finally, notice that in the case of perfect capital markets, agents would only care about the net present value of their income. This may lead to a polarization of the low-ability agents' voting decisions. In fact, the insiders would choose an even larger degree of EPL, $s > s^l_I$, provided that the e®ect on the probability of being unemployed dominates the negative e®ect on the unemployment bene¯t; and viceversa for the low-ability outsiders, $s < s^l_O$.

4.2. Voting over Unemployment Bene¯ts

The two types of agents { low and high ability { according to their current employment status determine their most preferred level of UB. For given s, they maximize their indirect utility function with respect to the tax rate, ¿, which ¯nances the unemployment bene¯t. As in Wright (1986), the most preferred tax rate for a type-j insider is $¿^j_I(s) = \mu^j_I(s)$, (from equation 3.3), and for a type-j outsider is $¿^j_O(s) = \mu^j_O(s)$, (from equation 3.2), where $j = l; h$. Notice that these tax rates are decreasing in the unemployment out°ow rate and increasing in the in°ow rate, since a lower (higher) probability of being unemployed induces a lower (higher) demand for unemployment insurance. We can now compare these tax rates[12]. Among the insiders, the low ability have a higher probability of becoming unemployed and a lower out°ow rate. Thus, they prefer a higher tax rate than the high ability workers, $¿^l_I(s) \geq ¿^h_I(s)$. A similar reasoning applies to the outsiders, hence $¿^l_O(s) \geq ¿^h_O(s)$. Additionally, for a given ability type j, the outsiders prefer a higher tax rate than the insiders, due to their current status, and thus $¿^j_O(s) > ¿^j_I(s)$. Although we are not able to provide a complete ordering of the preferences of the agents over the UB tax rate, the next proposition characterizes the median voter over ¿, and thus the tax rate that she prefers for a given s.

Proposition 4.2. If $u \cdot 1=2$, the median voter over the unemployment tax rate is a low ability insider, and the corresponding tax rate is $¿^m(s) = ¿^l_I(s) = \mu^l_I(s)$.

Except in the extreme case in which the unemployed constitute a majority of the population, the low ability insiders are pivotal in determining the level of unemployment insurance. Taken together with the previous results on the degree of EPL, this suggests that most of the political power rests in the hands of the low ability insiders, who set the UB level and are likely to decide over the degree of EPL. How does their choice

[12] Clearly, if the UB scheme entails some element of redistribution across types { such as in a Beveridgean system, where the bene¯ts are °at, or in an \unfair" insurance scheme, where the replacement rate is constant across types, regardless of their unemployment risk { the voting behavior would change. See discussion in section 4.4.3.

over UB depend on the degree of EPL? The level of UB is first decreasing and then increasing in the degree of EPL (see Lemma A.2 in the appendix for a proof). Thus the reaction function of τ with respect to s is U-shaped. The intuition is straightforward. For low degrees of EPL, an increase in s reduces the average unemployment rate of a low-ability agent as well as her unemployment inflow rate. Thus, a low ability insider is more protected against the risk of being unemployed, requires less UB, and τ decreases. Once the degree of EPL is larger than s^l, any additional increase of EPL raises the average unemployment rate, but this effect is compensated by a reduction in the unemployment inflow rate, and thus the demand for UB declines. However, beyond s_l { the degree of EPL which minimizes the percentage of time spent unemployed by a current insider { the negative effect on the unemployment rate becomes dominant, a low ability insider is more likely to become unemployed and her demand for UB begins to increase. Notice that the existence of perfect capital markets would polarize the voting decision also in the case of UBs. In particular, the insiders, who have a below-average unemployment risk would prefer to self-insure through savings and vote for $\tau = 0$. A type-j outsider, whom unemployment risk is above average, would demand full insurance through the UB, and thus $\tau = u^j$.

4.3. The Political Equilibria

To find the political equilibria of our voting game over the degree of EPL, s, and the level of UB, τ, we need to bring together the voting behavior over s and τ in our issue-by-issue voting game. The (structure-induced) equilibrium outcomes of this voting game correspond to the loci where the two reaction functions of the median voter { described respectively in sections 4.1 and 4.2 { cross, and are described in the next proposition:

Proposition 4.3. (I) If $\left[1 - u^l\left(s^l_l, \frac{1}{2}\right)\right] \leq \frac{1}{2}$, there typically exists a structure-induced equilibrium (SIE) of the voting game $(\tau^*; s^*)$, such that $\tau^* = \tau^l_l(s^l_l)$ and $s^* = s^l_l(\tau^l_l) \in [s^l; s_l]$;

(II) If $\left[1 - u^l\left(s^l_l, \frac{1}{2}\right)\right] < \frac{1}{2}$, there typically exists a structure-induced equilibrium (SIE) of the voting game $(\tau^{**}; s^{**})$, such that $\tau^{**} = \tau^l_l(s^l_O)$ and $s^{**} = s^l_O(\tau^l_l) \in [s_O; s^l]$.

(III) If $(\tau^*; s^*)$ and $(\tau^{**}; s^{**})$ exist, then $s^{**} < s^*$ and $\tau^{**} > \tau^*$.

This proposition contains the crucial theoretical result of the paper. If the low ability insiders constitute a majority of the voters, they determine both the degree of EPL and the level of UBs. This case is geometrically characterised in Figure 4.1, where

the two reaction functions, $\phi_l^I(s)$ and $s_l^I(\phi)$, are portrayed. Even if the low-ability are not a majority, they are still pivotal in choosing UBs, and thus the relevant reaction function is still $\phi_l^I(s)$. In this case, if there are enough unemployed individuals, the low-ability outsiders are pivotal in deciding over the EPL and the relevant reaction function becomes $s_O^I(\phi)$ (see figure 4.1). The last part of this proposition accounts for the existence of a trade-off between UB and EPL,depending on the skill composition in the economy. A large fraction of low-ability types creates a large support in favour of EPL, but then, this large degree of employment protection decreases the demand for UB. In economies with a large share of high ability individuals (case II), the support for EPL is reduced. Lower degrees of EPL in turn induce { among the low ability insiders, who are still pivotal in the UB decision { a higher demand for UB. In the next section, we assess empirically the link between this trade-off and the skill profile of the population.

Could a trade-off emerge even among countries with a majority of low-ability insiders? The next proposition addresses this issue by examining how the equilibrium outcome in case I at proposition 4.3 is affected by a change in the subjective rate of time discount.

Proposition 4.4. For $\left[1 - u^I s_l^I\right] \frac{1}{2}^I \geq \frac{1}{2}$, a decrease in β induces a change in an equilibrium outcome from $(\phi^\alpha; s^\alpha)$ to $(\phi^{\alpha'}; s^{\alpha'})$, such that $\phi^{\alpha'} < \phi^\alpha$ and $s^{\alpha'} > s^\alpha$.

If the low-ability insiders assign greater weight to their present status (as β decreases), they will require less UBs, but more EPL. This insight carries a powerful testable implication, namely in countries with an older population of low-ability insiders who discount the future employment status more heavily, we should observe stricter EPL and less generous UBs. Analogously, the existence of early retirement provisions, which guarantee an early exit from the labour market to middle-aged workers, reduces the relevance of the future employment opportunities, and thus puts more pressure on increasing restrictions on dismissals.

4.4. Discussion and Extensions

The results of our baseline model, notably the existence of a trade off between EPL and UB, are robust to extensions of our model. We consider three alternative specifications in this section. Firstly, we modify the utility function to analyze the effects of changes in the degree of risk aversion. Secondly, we change the specification of the (low-ability) outflow rate, H^I, to allow for some effect of UBs on the outflow rate. Thirdly, we introduce an element of redistribution { from high to low ability agents { in the unemployment benefit, by assuming that the replacement rate, θ, is equal across groups. In the discussion that follows, it will be useful to present the results in comparison with those obtained in the baseline model characterised in the previous sections.

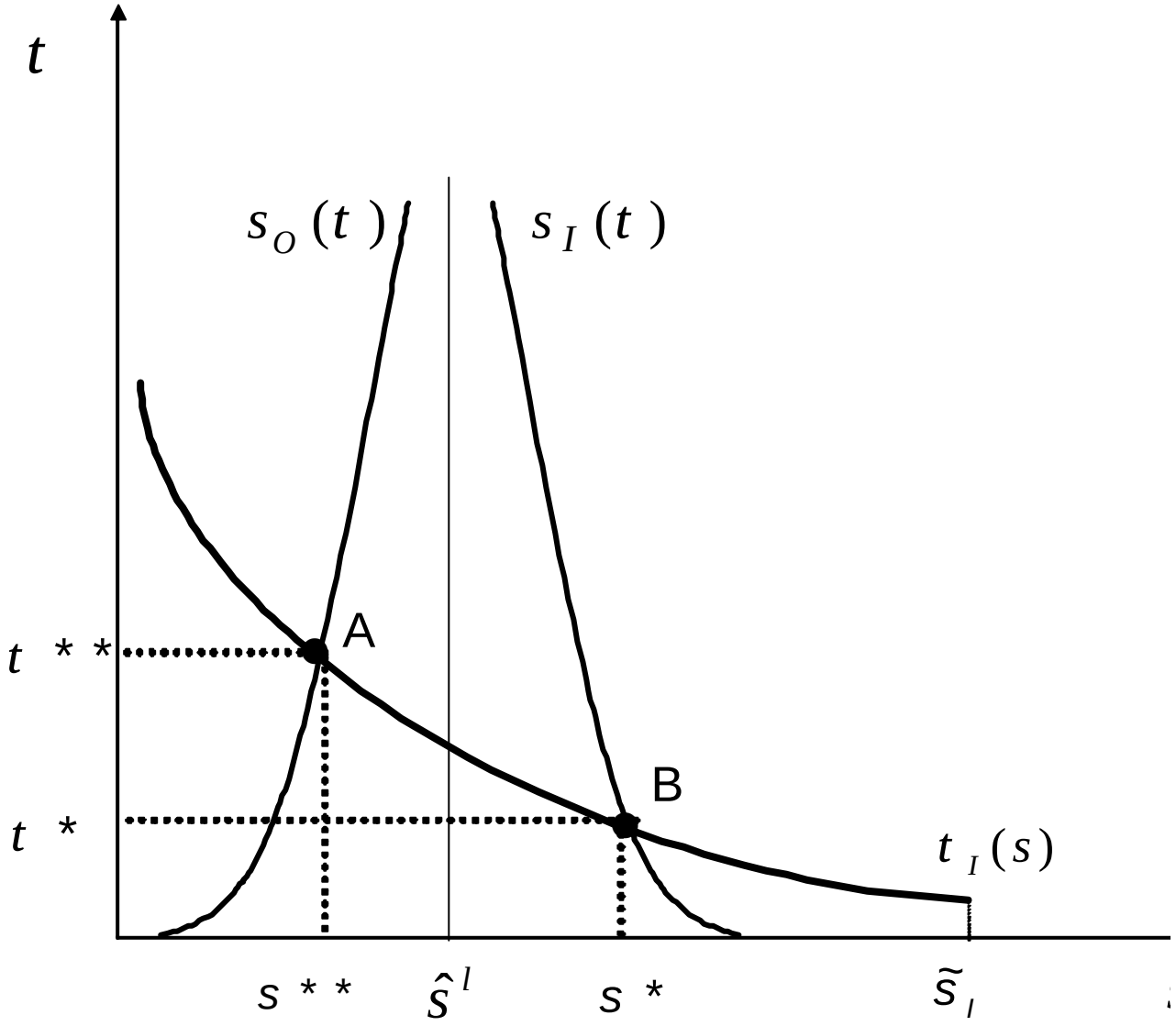

Figure 4.1: Issue-by-issue voting equilibria and the trade-o® UBvs.EPL.

4.4.1. Risk Aversion and Capital Markets

In this section, we extend our baseline model by using a CES instant utility function: $v(c) = c^{1-\circ}/(1-\circ)$. How do the results obtained under this specification compare to our baseline case, in which the utility function is logarithmic ($\circ = 1$)? An increase in the degree of risk aversion does not change the order of votes along any of the two dimensions. However, it does shift the reaction functions. As agents become more risk averse, they prefer to have more insurance against unemployment: for any given degree of EPL; this a low-ability insider will vote for a higher tax rate, τ for any s. Geometrically, the reaction function $\tau_I^I(s)$ shifts upwards, as depicted in Figure 4.2. An increase in the degree of risk aversion has opposite effects on the voting behavior of low-ability insiders and low-ability outsiders, and thus on the reaction functions, $s_I^I(\tau)$ and $s_O^I(\tau)$. In particular, for a given tax rate, τ, it increases the most preferred degree of EPL of a low-ability outsider – thus moving $s_O^I(\tau)$ to the right – whilst it decreases the voted EPL of a low-ability insider – thus shifting $s_I^I(\tau)$ to the left. The intuition is as follows. An increase of risk aversion makes income-consumption when unemployed more important to the agents. If the median voter is a low-ability insider, a decrease in the degree of EPL (as compared with the baseline model) increases UBs, by reducing the average unemployment rate (recall that $s_I^I(\tau) > \theta^I$), but it increases her probability of becoming unemployed (recall that $s_I^I(\tau) < \theta_I$). Proposition A.3 in the appendix shows that the former effect dominates and thus the reaction function $s_I^I(\tau)$ shifts to the left, as in Figure 4.2. If the median voter is a low-ability outsider, on the other hand, the unemployment benefits are increased, through a reduction in the average unemployment rate, by an increase in the degree of EPL (recall that $s_O^I(\tau) < \theta^I$). This also increases the low-ability outsider's probability of remaining unemployed (recall that $s_O^I(\tau) > \theta_O$). However, since the former effect dominates – see Proposition A.3 in the appendix – the reaction function $s_O^I(\tau)$ moves to the right, as in Figure 4.2. We can now discuss the resulting equilibria in an environment with a stronger degree of risk aversion. When the median voter on both dimensions is a low-ability insider, more risk aversion induces a substitution of EPL with UB (a shift from equilbrium B to B' in Figure 4.2). When the median voter over s is a low-ability outsider, i.e., when there are more high-ability agents in the economy, an increase in the degree of EPL increases the EPL and has an ambiguous impact on the tax rate. Finally, notice that for any given level of risk aversion, there is a trade off between EPL and UB still exists. This may well capture asymmetries between the US, and, more broadly Anglo-Saxon countries experiencing lower EPL and UBs then the EU average and the other European countries. When capital markets are more developed, voters can buy insurance against labour market risk also by having access to capital markets (e.g., Bertola (1999) and Pissarides (2000)).

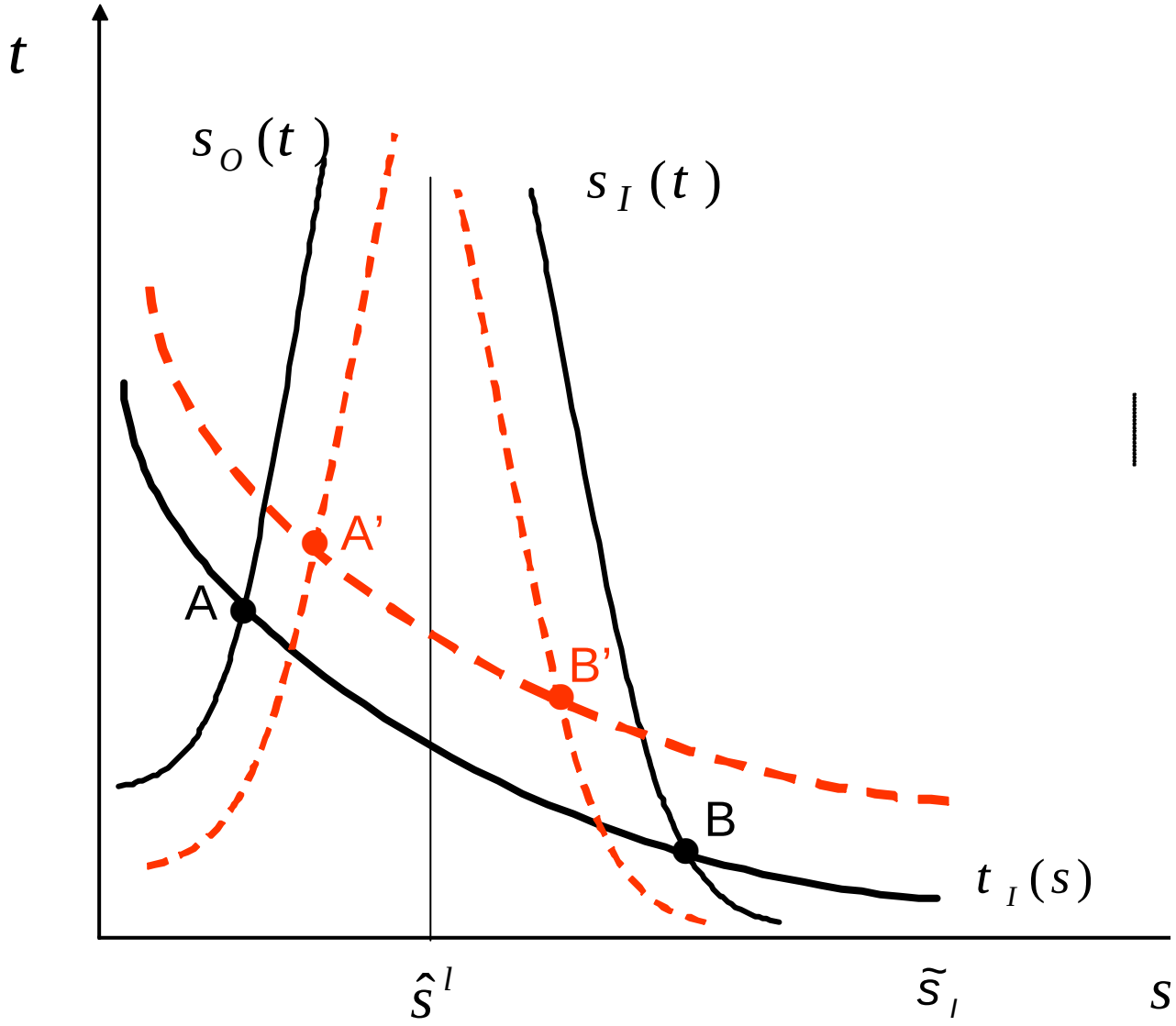

Figure 4.2: Increasing risk-aversion.

4.4.2. Unemployment Bene¯t and (Low-Ability) Out°ow Rate

In this section, we return to the logarithmic utility function, and analyse what happens when the out°ow rate of the low-ability agents depends on the UBs. There is a large body of empirical literature pointing to job search disincentives associated with the provision of UBs (see Atkinson and Micklewright, 1991 and Krueger and Myers, 2002 for surveys of the empirical literature). In the context of our model, we simply assume that the low-ability unemployment out°ow rate is negatively related to the tax rate[13], ¿, which ¯nances UBs: $H_2^l(s;¿) < 0$. This extension introduces substantial modi¯cations to the structure of the model. In particular, the degree of EPL which minimizes the unemployment rate among the low-ability agents will now depend negatively on the tax rate, $\mathbf{s}^l(¿)$. Analogously, the levels of EPL which minimize the time spent unemployed respectively by a low-ability insider and outsider { $\mathbf{s}_I = \arg\min \mu_I^l(s)$ and $\mathbf{s}_O = \arg\min \mu_O^l(s)$ { will now be negatively a®ected by the tax rate: $\mathbf{s}_O(¿) < \mathbf{s}^l(¿) < \mathbf{s}_I(¿)$.

How about the agents' voting behavior under this new environment? Consider the votes over the degree of EPL. If the median voter is a low-ability insider, then there is no di®erence with respect to the baseline. The reaction function $s_I^l(¿)$ is negatively sloped and $\mathbf{s}^l(¿) < s_I^l(¿) < \mathbf{s}_I(¿)$. When the median voter is a low-ability outsider, we cannot determine exactly how the reaction function $s_O^l(¿)$ will depend on the tax rate, ¿, i.e., the sign of the derivative of $s_O^l(¿)$ w.r.t. ¿. However, we know that $\mathbf{s}_O(¿) < s_O^l(¿) < \mathbf{s}^l(¿)$. When voting on the tax rate, we clearly have that $¿_I^l < \mu_I^l$, where μ_I^l was the solution in the baseline case, due to the additional negative e®ect of the tax rate on the out°ow rate. Moreover, we can show that $¿_I^l(s)$ is decreasing in the degree of EPL, as long as $s < \mathbf{s}_I(¿)$. Figure 4.3 summarizes all the reaction functions and highlights that, as in the baseline case, with this speci¯cation a trade o® between the degree of EPL and the generosity of unemployment bene¯ts may arise, depending on the skill composition of the economy.

4.4.3. Redistributive Unemployment Bene¯t

In this section, we consider a redistributive unemployment bene¯t program, which imposes a proportional tax, ¿, on the labor income of all workers and awards to any unemployed agent a transfer, b, which does not depend on her previous wage, and hence on her type. As in the baseline case, the system is budget balanced and thus the total

[13] We are aware that the empirical evidence ¯nd no conclusive evidence on the in°uence on the tax rate on the out°ow rate. Nevertheless, for analitical semplicity, we assume that the unemployment out°ow rate depends on the tax rate, ¿, rather than on the unemployment bene¯t, b, since this modelling choice allows us to obtain closed form solutions.

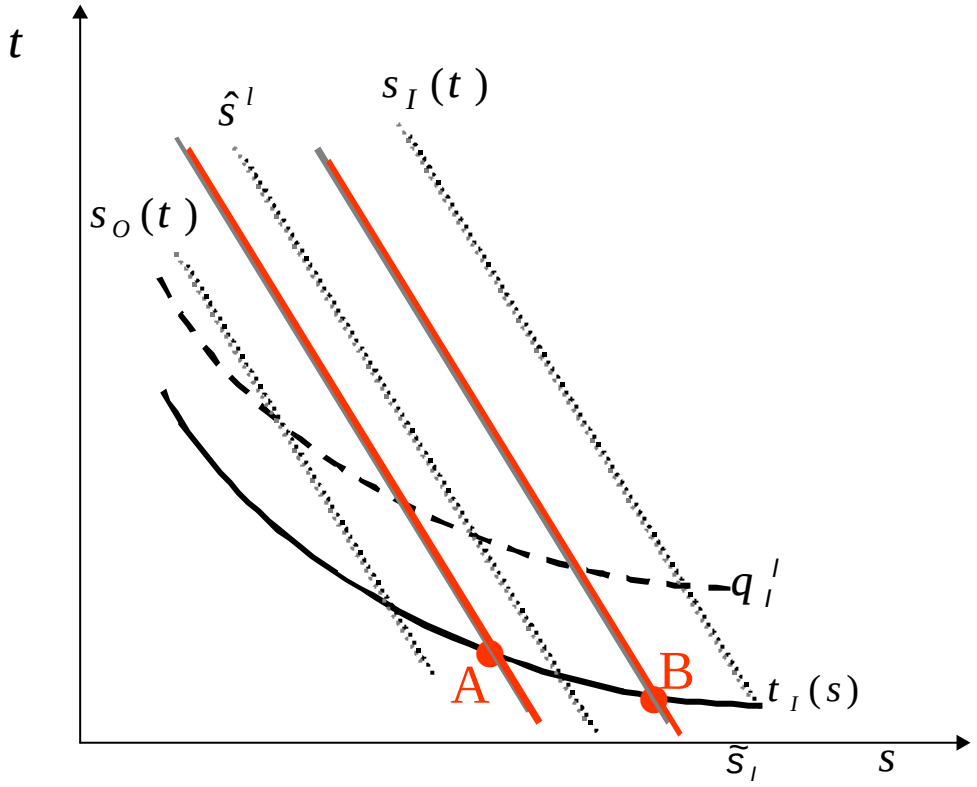

Figure 4.3: Unemployment bene¯ts and the out°ow rate of low-ability types

amount of transfers to the unemployed equals the total contributions. Thus, we have:

$$b = \tau \frac{w^l \left(1 - u^l\right) + w^h \left(1 - u^h\right)}{u^l + u^h}.$$

How does the existence of a redistributive unemployment benefit program affect the agents' voting behavior? Consider the votes over the degree of EPL for a given level of the tax rate, τ. With respect to the baseline case, there are two differences: (i) for a given degree of EPL, the consumption when unemployed increases for the low ability types – while it decreases for the high ability individuals – due to the redistribution, and (ii) the impact of the EPL on the utility when unemployed is magnified, as an increase in the degree of EPL reduces the employment rate of the high ability agents, and hence the unemployment benefit. Both effects tend to reduce the relevance of EPL for the low ability types – the former because being unemployed becomes less costly, and the latter due to the negative impact of the EPL on the unemployment benefit. Hence, as shown in Figure 4.4, both reaction functions, $s_I^l(\tau)$ (if the median voter is a low-ability insider) and $s_O^l(\tau)$ (if the median voter is a low-ability outsider) shift to the left, as low-ability agents now prefer less EPL. When voting on the tax rate financing UBs, two new effects emerge for the low ability agents with respect to the baseline case. An increase in the tax rate generates larger UBs for the low ability outsiders, due to the redistributive component of the program. This creates a substitution effect, as low ability agents are induced to vote for more UB, and an income effect, that induces low ability agents to vote for less UB. With our logarithmic utility function the two effects cancel out, and thus the reaction function $\tau_I^l(s)$ does not move[14]. Figure 4.4 displays the equilibrium with the redistributive unemployment benefits and a logartihmic utility function: the two reaction functions $s_I^l(\tau)$ and $s_O^l(\tau)$ have shifted to the left, while $\tau_I^l(s)$ has not changed. As in the baseline case, two equilibria arise – depending on the skill composition of the population – one with low EPL and high UB and another one with high EPL and low UB. Notice that both equilibria display a lower degree of EPL and more UB with respect to the baseline case, .

5. Empirical Relevance

The purpose of this section is to assess the empirical relevance of i) the substantive hypotheses of the model, and ii) its implications.

[14] If we consider the CES instant utility function of the previous section, we have that for $\sigma > 1$ the income effect dominates and the reaction function moves downward, whereas for $\sigma < 1$, the substitution effect dominates and the reaction function moves upward.

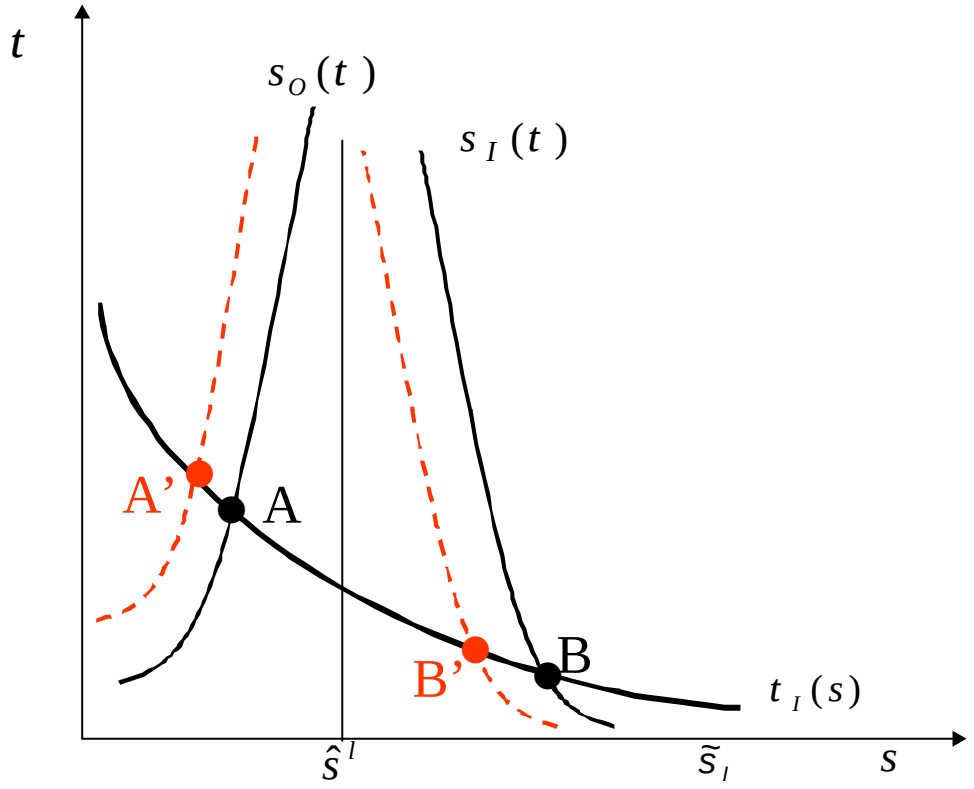

Figure 4.4: Redistributive unemployment bene¯ts.

5.1. Does EPL reduce unemployment in°ow rates?

A key assumption of the model is that EPL decreases the in°ow rate, notably among low-skilled types. OECD (1999) documents over a cross-section of OECD countries that stricter EPL is associated with lower in°ow rates into unemployment. More insights on the relationship between EPL and the incidence of unemployment can be drawn by having access to micro data on employment-unemployment histories and drawing on di®erences in the enforcement of employment protection regulations across ¯rms. Units with less than 15 employees in Italy are exempted from the application of the strictest EPL regulations, those involving the compulsory reinstatement of a worker who was unfairly dismissed. Fixed-term contract workers are also uncovered by these provisions insofar as their contract can just not be renewed by the employer at expiration. Thus, Boeri and Jimeno (2002) used the 15 employee threshold and the ¯xed-term/permanent contract divide to test { within a di®erences-in-di®erences approach { the impact of EPL on the probability of being dismissed. They found signi¯cant e®ects of EPL on the likelihood of being laido®. Here, we extend their analysis by focusing on unskilled workers. Table 1 displays regressions of the probability of being laid-o® on a number of personal characteristics (gender, tenure, educational attainment, region of residence and industry of a±liation) plus a dummy capturing ¯rms with less than 15 employees. Data are dawn from matched records across di®erent waves of the Italian Labour Force Survey, a quarterly survey with a large rotating panel allowing, at yearly frequencies, to 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. Matched records across LFS waves (enabling us to identify separations) as well as contemporaneous and retrospective information in the initial and the ¯nal period allow to capture the nature of the separations, that is, whether it is a layo® or a voluntary quit[15].

Table 2. E®ects of EPL on unemployment in°ows DProbit estimates (1). Italy , 1994-1996

[15]Unfortunately the information provided by the survey is not su±cient to disentangle disciplinary from economic layo®s.

Dependent variable: dummy 1 if unempl or out-of-LF in '95 after empl in '94			
variables	coe±cient	signi¯cance	standard error
dummy 1 if employees <=15	0.003	**	0.002
# empl in the ¯rm	-0.00001	**	0.000
primary edu	0.024	***	0.002
primary edu*dummy <=15	0.004		0.004
dummy northern Italy	-0.004	***	0.001
dummy central Italy	-0.002	***	0.000
prev job less than 1 year	0.013	***	0.004
prev job 1 year	0.007	***	0.002
prev job 3-5 years	0.006	***	0.002
1 manufactoring, 0 service	0.004	***	0.001
male	-0.003	***	0.001
Pseudo R^2	0.12	nobs	13676
(1) Coe±cients are % variation of the baseline probability			

Boeri and Jimeno observed a statistically signi¯cant and positive e®ect on the probability of dismissal of the dummy capturing ¯rms below the threshold scale exempting small ¯rms from the domain of application of the most stringent EPL provisions. This e®ect is present even when we introduce additional dummies, at higher threshold scale (e.g., 20 or 25 employees[16]). It is not present, however, when we focus on temporary workers. Thus, applying a di®erence-in-di®erence (above vs. below the threshold scale and permanent vs. temporary workers) one ¯nds support to the presence of a negative e®ect of EPL on layo® probabilities. As shown by Table 2, individuals with only primary or lower educational attainments have a higher probability of being dismissed than individuals with higher levels of education. The interaction term capturing the e®ects of the 15-employees threshold on low-skilled workers is positive but not signi¯cant at conventional levels. While it is true that low-skilled types face a higher risk of dismissal, we cannot rule out that EPL may also a®ect medium and highly-skilled individuals. From the standpoint of our model what is essential is that the reduction of dismissal probability associated with EPL is larger in size for the low skilled individuals and this is consistent with our data.

5.2. Estimating the UB/EPL trade-o®

Tables 5.1 and 5.2 display estimates of the UB/EPL tradeo® across a panel of European countries. In particular, the dependent variable is the logarithm of the ratio of the measure of generosity of unemployment bene¯ts and the OECD index of the strictness of employment protection discussed in Section 1. Table 5.1 focuses on the characteristics

[16] We also tried with dummies located at the 30,35,40 and 45 thresholds obtaining the same results.

Number of obs = 121
Prob > F = 0.0000
Adj R2 = 0.4851

Log(ub/epl)	Coefficient	Significance	Standard-Error
market capitalisation	0,003	**	0,002
share middle edu	1,216	***	0,451
share high edu	5,563	***	0,662
share of emp15_24	6,268	***	2,011
share of emp55_64	-2,954		2,532
union density	0,002		0,002
dummy data	2,683	***	0,433
cons	-5,218	***	0,559

Note: One asterisk denotes significance at 90%, two asterisks at 95%, three at 99%.

Figure 5.1: The trade-o® and the characteristics of insiders

of insiders. In particular, it evaluates the e®ects on the UB/EPL con¯guration of a di®erent skill composition of the workforce. The regression results suggest that a larger share of workers with secondary (the middle edu variable) and tertiary educational attainments (high edu) are associated with con¯gurations assigning a larger weight to UB vs. EPL. The age structure of employment is also important: larger proportions of young people in employment yield institutional con¯gurations attributing more importance to unemployment insurance with respect to employment protection. The scope of capital markets (which provides an alternative way to protect against labour market risk) also induces more request for employment protection, while the e®ect of union density (which tentatively captures obstacles to wage adjustment) is not statistically signi¯cant.

A problem with this speci¯cation is that the skill and age composition of employment are endogenous to the particular institutional con¯guration adopted by the various countries. This means that Table 5.1 may simply capture reverse causality, e.g., the fact that countries with stricter EPL have lower employment rates among young people.

Number of obs = 115			
Prob > F = 0.0000			
Adj R2 = 0.5384			
Log(ub/epl)	**Coefficient**	**Significance**	**Standard-Error**
market capitalisation	0,004	**	0,002
share middle edu	1,310	***	0,492
share high edu	4,196	***	0,855
pop15_24/total	0,009		0,006
pop55_64/total	-0,019	***	0,006
union density	0,004		0,002
dummy data	1,902	***	0,483
cons	-3,194		1,924
Note: One asterisk denotes significance at 90%, two asterisks at 95%, three at 99%.			

Figure 5.2: The Trade-o® and the Characteristics of Outsiders

Thus, in Table 5.2 we focus on the characteristics of the population in working age (the voters in our model) rather than of employed individuals only. The results are still in line with the implications of the model: a distribution of skill types more skewed towards highly or medium-skilled individuals yields equilibria assigning more weight to UB vs EPL. Interestingly, in this case we ¯nd a signi¯cant e®ect also of the ageing variable: a larger share of individuals aged 55-to-64 involves stricter EPL and/or lower generosity of UB. Stock market capitalisation - a measure of the scope of capital markets { also tend to favour institutional con¯gurations with more UB and less EPL according to our estimates, which is also in line with the empirical implications of our model.

6. Voting for EPL

Finally a survey carried out by Fondazione Rodolfo Debenedetti in April 2002 on a representative sample of Italians yields insights as to the characteristics of those voting for stricter employment protection. All individuals aged 16 to 80 were asked whether they preferred a °exible "labour market regime in which it is relatively easy to ¯nd a job, but it is likewise easy to loose a job" or a rigid labour market in which jobs are di±cult but last longer. Table ?? displays the dprobit estimates of the probability of

Dprobit estimates			
Dependent variabile: Probability of preferring a rigid labour market, active population			
Variable	**dF/dx**	**Standard Error**	**Significance (for the underlying coefficients)**
Old (>55)	0.1376	0.0748	*
Young (< 25)	0.0123	0.0705	
Male	-0.0300	0.0462	
Third Level Education	-0.0936	0.0522	*
Secondary Education	-0.0623	0.0514	
Self-employed, managers and professionals	-0.1558	0.0830	*
Blue collar	0.0455	0.0604	
Unemployed	-0.1409	0.1130	
Low Income (<560 Euros)	0.0852	0.0878	
High Income (>1549 Euros)	-0.0491	0.0679	
N. of observations			**517**
Pseudo R-squared			**0.0301**

Figure 6.1: The trade-o® at the individual level.

being in favour of a rigid labour market over a sample of active individuals (excluding pensioners, housewives and students). As can be seen from the table, the fact of being aged more than 55 yields a 15 per cent higher probability (than the baseline) to vote in favour of employment protection. Higher educational attainments, instead, play in the opposite direction, just in line with the predictions of our model.

7. Conclusions

European countries provide di®erent types of insurance to workers against labour market risks, by combining di®erent degrees of employment protection and unemployment insurance. A heated debate has been taking place over the need to reform some of the existing labour market institutions, and some form of consensus has emerged even among academics that Southern European countries should adopt institutional con¯g-

urations assigning a greater weight to UB and less importance to EPL in protecting workers against labour market risk. However, reforming institutions along these lines is proving difficult and politically costly. Reforms of EPL are generally confined to introducing "at the margin" more flexible contractual types, rather than modifying rules for workers who already have a permanent contract. As a result, labour market segmentation and dualism among protected and unprotected jobs arises, with undesirable consequences in terms both of efficiency and equity, according to the literature to date.

In this paper we have shown that different institutional configurations can be interpreted as politico-economic equilibria, corresponding to different skill and age compositions of insiders and outsiders, to differences in the scope of capital markets and to design features of the unemployment benefit system, namely the amount of redistribution from high-skill to low-skill types it allows for. Our empirical results are encouragingly in line with the implications of the model. Its key assumptions, concerning the relation between EPL and labour market flows, are not falsified by facts. In future work, we plan to extend the model dynamically and empirically assess the adjustment path along the UB/EPL policy trade-off.

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A. Appendix

Proof of Proposition 4.1: First, we need to establish the ordering of the votes over s for a given ε. While high-skilled agents' preferences are single-peaked, since $\partial V_j^h(s;\varepsilon)/\partial s < 0 \; \forall j;\varepsilon$, low-skilled agents' preferences may turn out not to be single-peaked. Fortunately, it is easy to show that the latter display single-crossing propertites. In particular, for $s' > s$, if $V_I^l(s';\varepsilon) > V_I^l(s;\varepsilon)$, then $V_O^l(s';\varepsilon) > V_O^l(s;\varepsilon)$. We can thus order the votes over s as follows:

$$s_I^l(\varepsilon) \leq b^l \leq s_O^l(\varepsilon) \leq s_I^h = s_O^h = 0 \quad \forall \varepsilon. \tag{A.1}$$

To prove the first part of the proposition, notice that, for a given level of EPL, s, the low-ability insiders are a majority if and only if $u^l(s) < 1 - \rho^h/\rho^l$. Therefore, they are a majority if this condition holds for the degree of EPL that they would choose, $s^m(\varepsilon) = s_I^l(\varepsilon)$, that is if $u^l\left(s_I^l\right) \leq \frac{1}{2}\left(1 - \frac{\rho^h}{\rho^l}\right)$. To see that $s_I^l(\varepsilon) \in (b^l, \bar{s})$, recall that $s_I^l(\varepsilon)$ equates the following first order condition to zero:

$$\underbrace{-\left[H_1^l F^l - F_1^l H^l\right]\varepsilon v^l}_{A} - \underbrace{(1-\delta) F_1^l \varepsilon v^l}_{B} + \underbrace{\frac{F^l}{b^l}\left[1 - \delta + \delta F^l + H^l\right]}_{C}\frac{\partial b^l}{\partial s}. \tag{A.2}$$

If we evaluate this FOC in b^l, the first and the third terms, i.e., A and C, are equal to zero, while the second term, and thus the entire FOC, is positive, since $F_1^l < 0$. Therefore, $s_I^l(\varepsilon) > b^l$. On the other hand, if we evaluate this FOC in $\bar{s}$, the first two terms, i.e., A and B, are equal to zero, since $-\left[H_1^l F^l - F_1^l H^l\right] - (1-\delta) F_1^l = 0$ for $s = \bar{s}$. The third term, and thus the entire FOC, is negative, since $\partial b^l/\partial s < 0$ for $s = \bar{s}$. To prove the second part, suppose that the low-ability insiders are not a majority for $s = s_O^l$, that is $u^l\left(s_O^l\right) > \frac{1}{2}\left(1 - \frac{\rho^h}{\rho^l}\right)$. Because of the ordering at eq. A.1, and since $\rho^l > \rho^h$, the median vote is $s^m(\varepsilon) = s_O^l(\varepsilon)$. To see that $s_O^l(\varepsilon) \in (\bar{s}, b^l)$, recall that $s_O^l(\varepsilon)$ equates the following first order condition to zero:

$$\underbrace{-2\left[H_1^l F^l - F_1^l H^l\right]\varepsilon v^l}_{A} + \underbrace{\delta(1-\delta) H_1^l \varepsilon v^l}_{B} + \frac{1 - \delta + \delta F^l}{b^l}\underbrace{\left[1 - \delta + \delta F^l + H^l\right]}_{C}\frac{\partial b^l}{\partial s}. \tag{A.3}$$

If we evaluate this FOC in b^l, the first and the third terms, i.e., A and C, are equal to zero, while the second term, and thus the entire FOC, is negative, since $H_1^l < 0$.

Therefore, $s_O^l(\phi) < b^l$. On the other hand, if we evaluate this FOC in s_O, the first two terms, i.e., A and B, are equal to zero, since $\alpha H_1^l F^l - F_1^l H^l - (1-\alpha) H_1^l = 0$ for $s = s_O$. The third term, and thus the entire FOC, is positive, since $\partial b^l / \partial s > 0$ for $s = s_O$. q.e.d.

Lemma A.1. $s_I^l(\phi)$ is decreasing in ϕ, while $s_O^l(\phi)$ is increasing in ϕ.

Proof of Lemma A.1: To prove that $s_I^l(\phi)$ is decreasing in ϕ, we apply the implicit function theorem to the FOC at eq.A.2. Since $SOC_{s_I^l} < 0$, we have that the sign of $ds_I^l(\phi)/d\phi$ is equal to the sign of $dFOC(s_I^l(\phi))/d\phi$. Notice that

$$\frac{dFOC_{s_I^l(\phi)}}{d\phi} = \frac{(1-\alpha) F_1^l + \alpha F_1^l H^l - H_1^l F^l}{\phi (1-\phi)} < 0 \text{ for } s = s_I^l(\phi).$$

Thus, $s_I^l(\phi)$ is decreasing in ϕ, $ds_I^l/d\phi < 0$. We use the same strategy to show that $s_O^l(\phi)$ is increasing in ϕ. The sign of $ds_O^l(\phi)/d\phi$ is equal to the sign of $dFOC(s_O^l(\phi))/d\phi$, where

$$\frac{dFOC_{s_O^l(\phi)}}{d\phi} = \frac{(1-\alpha) H_1^l - \alpha F_1^l H^l - H_1^l F^l}{\phi (1-\phi)} > 0 \text{ for } s = s_O^l(\phi).$$

Thus, $s_O^l(\phi)$ is increasing in ϕ, $ds_O^l/d\phi > 0$. q.e.d.

Proof of Proposition 4.2: Recall that $\phi_O^l < \phi_I^l < \phi_I^h$. Thus, we may have that either i) $\phi_O^l < \phi_O^h < \phi_I^l < \phi_I^h$, in which case ϕ_I^l is the median over the distribution of the preferred tax rates only if the outsiders are less than half population, $u < 1/2$; or ii) $\phi_O^l < \phi_I^l < \phi_O^h < \phi_I^h$, in which case ϕ_I^l is the median over the distribution of the preferred tax rates if the low ability outsiders are not a majority of the population, which is implied by $u < 1/2$, since $\eta^l u^l < u$. q.e.d.

Lemma A.2. $\phi_I^l(s)$ is first decreasing and then increasing in s with a minimum in s_I.

Proof of Lemma A.2: Recall that $\phi_I^l(s) = \mu_I^l(s)$, and thus $s_I = \arg\min \phi_I^l(s)$. By deriving the numerator of $d\mu_I^l(s)/ds$ w.r.t. s, it is easy to see that { under the assumptions on F(s) and H(s) { the function $\mu_I^l(s) = \phi_I^l(s)$ is first decreasing and then increasing in s, albeit not necessarely convex for $s < s_I$. q.e.d.

Proof of Proposition 4.3: (I) For $u^l \leq s_I^l \leq \frac{1}{2}\left(1 - \frac{\eta^h}{\eta^l}\right)$, a low-ability insider is the median voter in both dimensions. Her reaction functions are $\phi_I^l(s)$ and $s_I^l(\phi)$. To need

to show that these reaction functions cross { at least { once for $s^{\alpha} \in (\beta^I; \theta_I)$ and $\xi^{\alpha} > 0$. Recall that, by lemma A.2, $\xi_I^I(s)$ is decreasing in s for $s \in (0; \theta_I)$. By lemma A.1, $s_I^I(\xi) \in (\beta^I; \theta_I)$ is decreasing in ξ, however, if the preferences of the low-ability insiders are not single-peaked, $s_I^I(\xi)$ may not be continuous. Let us first consider a continuous function. By using eq. A.2, and the reasoning in Prop. 4.1, it is easy to show that $s_I^I(\xi) = \beta^I$ { its lower bound, see figure 1 { for $\xi = u^I$. Since $\xi_I^I(\beta^I) = \mu_I^I(\beta^I) < u^I$, the reaction function $s_I^I(\xi)$ is above the reaction function $\xi_I^I(s)$ for $s = \beta^I$. To show that the two reaction functions cross, we need to establish that for s close to θ_I the reaction function $s_I^I(\xi)$ is below the reaction function $\xi_I^I(s)$. To see this consider the FOC at eq.A.2, which implicitely defines $s_I^I(\xi)$. Notice that as $\xi \to 0$, $\phi v^I \to +1$, and the first two terms of eq.A.2 tend to $+1$, since $s_I^I(\xi) < \theta_I$, while the third term is negative, since $s_I^I(\xi) > \beta^I$. Thus, according to the low ability insider optimization, for $\xi \to 0$, $s_I^I(\xi) \to \theta_I$. Finally, notice that for $s = \theta_I$, $\xi_I^I(\theta_I) = \mu_I^I(\theta_I) > 0$, and the reaction function $s_I^I(\xi)$ is below the reaction function $\xi_I^I(s)$. To summarize, if the function $s_I^I(\xi)$ is continuous, it crosses $\xi_I^I(s)$ at least once for $s^{\alpha} \in (\beta^I; \theta_I)$ and $\xi^{\alpha} > 0$. If the function is not continuous, a (Structure Induced) equilibrium may fail to exist, since the crossing may not occur. (II) For $u^I - s_O^I > \frac{1}{2}\left(1 - \frac{\gamma_h}{\gamma_l}\right)$, the reaction function $\xi_I^I(s)$ does not change, while the median voter over s becomes a low-ability outsiders, with reaction function $s_O^I(\xi)$. To need to show that these reaction functions cross { at least { once for $s^{\alpha\alpha} \in (\theta_O; \beta^I)$ and $\xi^{\alpha\alpha} > 0$. Recall that, by lemma A.1, $s_O^I(\xi) \in (\theta_O; \beta^I)$ is increasing in ξ, however, if the preferences of the low-ability outsiders are not single-peaked, $s_O^I(\xi)$ may not be continuous. Let us first consider a continuous function. By using eq. A.3, and the reasoning in Prop. 4.1, it is easy to show that $s_O^I(\xi) = \beta^I$ { its upper bound, see figure 1 { for $\xi = u^I$. Since $\xi_I^I(\beta^I) = \mu_I^I(\beta^I) < u^I$, the reaction function $s_O^I(\xi)$ is above the reaction function $\xi_I^I(s)$ for $s = \beta^I$. To show that the two reaction functions cross, we need to establish that for s close to $\theta_O < \beta^I$ the reaction function $s_O^I(\xi)$ is below the reaction function $\xi_I^I(s)$. To see this consider the FOC at eq.A.3, which implicitely defines $s_O^I(\xi)$. Recall that as $\xi \to 0$, $\phi v^I \to +1$. This implies that the first two terms of eq.A.3 tend to -1, since $s_O^I(\xi) > \theta_O$, while the third term is positive, since $s_O^I(\xi) < \beta^I$. Thus, according to the low ability outsider optimization, for $\xi \to 0$, $s_O^I(\xi) \to \theta_O$. Finally, notice that for $s = \theta_O$, $\xi_I^I(\theta_O) = \mu_I^I(\theta_O) > 0$, and thus reaction function $s_O^I(\xi)$ is below the reaction function $\xi_I^I(s)$. To summarize, if the function $s_O^I(\xi)$ is continuous, it crosses $\xi_O^I(s)$ at least once for $s^{\alpha\alpha} \in (\theta_O; \beta^I)$ and $\xi^{\alpha\alpha} > 0$. If the function is not continuous, a (Structure Induced) equilibrium may fail to exist, since the crossing may not occur. (III) If an equilibrium exists in case (I) and (II), then $\theta_O < s^{\alpha\alpha} < \beta^I < s^{\alpha} < \theta_I$. Moreover, since both $(\xi^{\alpha}; s^{\alpha})$ and $(\xi^{\alpha\alpha}; s^{\alpha\alpha})$ occur on the decreasing portion of $\xi_I^I(s)$, then $\xi^{\alpha} = \xi_I^I(s^{\alpha}) < \xi^{\alpha\alpha} = \xi_I^I(s^{\alpha\alpha})$, since $s^{\alpha\alpha} < s^{\alpha}$.

q.e.d.

Proof of Proposition 4.4: For $u' s_1' \cdot \frac{1}{2}\left(1 - \frac{\gamma^h}{\gamma^l}\right)$, an equilibrium outcome $(\theta^*; s^*)$ is represented by the point in which the two reaction functions $\theta^m(s)$ and $s^m(\theta)$ cross. Suppose that, for a given $\bar{\gamma}$, there exists a unique crossing, and thus a unique equilibrium outcome $(\theta^*; s^*)$. A decrease in $\bar{\gamma}$ shifts the reaction function $\theta^m(s)$ downward. In fact, $\partial\theta^m(s)/\partial\bar{\gamma} = F'/[1 - \bar{\gamma} + \bar{\gamma}F' + \bar{\gamma}H']^2 > 0$. The other reaction function, $s^m(\theta)$, is implicitly defined at A.2. To calculate the effect of a change in $\bar{\gamma}$ on $s^m(\theta)$, we need to totally differentiate this equation. Thus, $\frac{ds}{d\bar{\gamma}} = -\frac{dFOC(s)/d\bar{\gamma}}{soc(s)}$, and sign $\frac{ds}{d\bar{\gamma}}$ = sign $\frac{dFOC(s)}{d\bar{\gamma}}$, since $soc(s^m) < 0$. By differentiating eq.A.2 w.r.t. $\bar{\gamma}$, we obtain that $\frac{dFOC(s)}{d\bar{\gamma}} = \frac{F'(F_1' + H_1')\phi v'}{(1 - \bar{\gamma} + \bar{\gamma}(F' + H'))^2} \cdot 0$. Thus, $ds/d\bar{\gamma} \cdot 0$, a decrease in $\bar{\gamma}$ moves the reaction function $s^m(\theta)$ upward. Recall that the reaction function $s^m(\theta)$ crosses $\theta^m(s)$ on its decreasing portion. Thus, by putting together the downward shift in $\theta^m(s)$ and the upward movement in $s^m(\theta)$, it is easy to see that a decrease in $\bar{\gamma}$ leads to a new equilibrium outcome $(\theta^{*\prime}; s^{*\prime})$, with $\theta^{*\prime} < \theta^*$ and $s^{*\prime} > s^*$. q.e.d.

Add Proposition A.3