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Globalization and Labour Markets  
Deregulation

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## Globalization and Labour Markets Deregulation

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### Zusammenfassung:

We present a model consistent with the stylized fact that „rigid Europe“ has witnessed higher unemployment and a more compressed wage structure than „flexible America“. A distinguishing feature of the present paper is that it endogenises the labour market regulations that account for this divergent experience. We use our political economy model to investigate the policy responses to globalization, i.e. to an increase in international capital mobility. It turns out that labour market institutions are not necessarily scaled down in the course of globalization; rather, the direction of the globalization-induced policy response is determined by the relative strength of the politically active groups.

JEL Klassifikation : F21, J31, P50

Schlüsselwörter : Unemployment, Minimum wage, Lobbying

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# Globalization and Labour Markets Deregulation

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## Abstract

We present a model consistent with the stylized fact that "rigid Europe" has witnessed higher unemployment and a more compressed wage structure than "flexible America". A distinguishing feature of the present paper is that it endogenises the labour market regulations that account for this divergent experience. We use our political economy model to investigate the policy responses to globalization, i.e. to an increase in international capital mobility. It turns out that labour market institutions are not necessarily scaled down in the course of globalization; rather, the direction of the globalization-induced policy response is determined by the relative strength of the politically active groups.

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## 1. Introduction

One of the most important aspects of globalization is that firms become increasingly mobile: advances in IT, easier access to information about foreign environments, reduced administrative barriers and transport costs allow them nowadays to relocate production activities across borders more easily than ever. This increased mobility of firms is partly reflected in the growth of foreign direct investment. World direct investment flows increased from approximately 3,5 bio. US dollars in the first half of the 70s to 233,4 bio. US dollars two decades later (Lipsey, 1999, p.327). The share of FDI in total capital flows increased from 5,8 to 26,2 percent during the same period, *op. cit.* p. 316.

While the growth of FDI undisputedly induces important economic benefits such as higher returns to capital, technology and management spillovers, etc., some observers see in it a potential danger. In particular, concerns have been raised that footloose firms will target investment towards locations where labour standards are lowest and where labour practices are least management restrictive. In a response to intensified competition individual states might even be tempted to pursue a policy of lowering labour standards, e.g. lowering minimum wages, relaxing employment protection legislation (such as restrictions on layoffs), restricting union penetration and centralization, etc. This strategy is labelled "social dumping". Extreme proponents to this view go even further and argue that social regulations will spiral downward in a so-called "race to the bottom" to the end that labour markets will become completely deregulated worldwide in the long run. While this argument is put forward primarily in

the political arena and is taken with skepticism by most academic economists (Freeman, 1998, p. 7), the question whether increased economic integration among countries with different labour market regimes will put pressure for adjustment of national policies, remains interesting and relevant. Will countries retain their labour market institutions, or will there be some adjustment as they become more integrated through trade and/or FDI? Will there be a tendency for institutional convergence? Which labour market regime, if any, will prove to be the most successful in the global economy?

In this paper we address these issues in the context of the Europe-America dichotomy. The reason for this focus is that Europe and America are main trading and investment partners<sup>1</sup> with significantly different labour market regimes<sup>2</sup>. The existing theoretical literature on the Europe-America dichotomy is substantial (notable contributions are Wood 1994, Krugman 1994 and 1995, Bertola and Ichino 1995, Davis 1998, Acemoglu and Newman, 2002). This literature

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<sup>1</sup>The EU share of the US inward direct investment stock was 60 percent in 1989 and 65 percent in 2000. The EU share of the US outward investment stock was 43 percent in 1989 and 46 percent in 2000 (OECD, 2001, p.409). Moreover, EU (resp.EEC) has been a net exporter of direct investment to the US both cumulative over the period 1982-2000 and in each single year of this period except in the period 1991-1995 (OECD 2001, p.408-415 and OECD 1993, p. 242-248).

<sup>2</sup>Europe is often being referred to in the literature as "rigid", and America as "flexible" as regarding the operation of the labour market. While European countries cannot be easily lumped up together, these labels are not totally unjustified. The employment protection index and the labour standards index drawn up by the OECD clearly point to the fact that virtually all countries of continental Europe have far more inflexible labour markets than the US (s. Nickell 1997, p. 60-61).

seeks to explain the stylized fact that "rigid" Europe has witnessed higher unemployment and a more compressed wage structure than "flexible" America by taking into account that the two economies operate in the same international environment and are thus exposed to the same external shocks (technical progress, trade, etc.). Typically, the divergent labour market experiences are attributed to the different labour market institutions, which are assumed to be exogenous. We follow the tradition of this literature to model Europe and America as two identical economies, which are exposed to a common shock: in our case, an increase in capital mobility. We do, however, endogenise the pertaining labour market regulations. This modelling strategy allows us to study not only how the effects of a given policy change as the economy opens, but also how openness affects the policy itself through the political process. To portray the political process we rely on the Grossman-Helpman approach (Grossman and Helpman, 1994) that builds upon the common agency model by Bernheim and Whinston (1986). As it is well known this modelling approach implies a government that sets economic policy as if it maximized a weighted sum of social welfare and contributions from organized interest groups. We focus on the conflict between workers and capital owners<sup>3</sup>. In our framework these two

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<sup>3</sup>This focus is motivated by the open economy perspective that we adopt in our paper. In the context of globalization union leaders often voice concerns about increased bargaining power of firms due to their increased mobility and call for stronger cooperation among workers. In this paper we consider homogeneous labour and do not analyze any conflict among workers. For an analysis of the conflict between workers with different employment opportunities in a closed economy see Saint-Paul (2000)

interests lobby the government on minimum wage legislation.

One central feature of our analysis is that we consider an imperfect labour market. Our framework thus accommodates the argument by Agell (1999) that potential efficiency benefits of labour market regulation may be important in the context of globalization.<sup>4</sup> Adopting a perfectly competitive labour market would imply that, other things being equal, more regulated countries should have a lower per capita labour income, which would be at odds with the fact that living standards within the developed world have been converging while the institutional variety among these countries remains substantial (Freeman 1998, Acemoglu and Newman 2002). To model the labour market we build on the efficiency wage hypothesis. In particular, we use the dual labour market model of Bulow and Summers (1985) augmented by capital in the secondary sector. In this model identical workers are accidentally assigned to either high-paying (primary) or to low-paying (secondary) jobs in equilibrium. The inefficiency of the labour market thus stems from the inability of primary firms to observe the effort of their workers, which results in a larger than optimal secondary sector. The dual model itself does not say anything about the nature of the goods produced in the two sectors. The usual interpretation is that primary jobs

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<sup>4</sup>In an imperfectly competitive framework labour market institutions that promote wage compression may be beneficial in various ways: e.g., through facilitating the expansion of high-productivity sectors, creating incentives for human capital accumulation and providing social insurance when private one is undersupplied (s. Agell 1999 for a review of these arguments). Further, wage compression may reduce wasteful use of resources in monitoring (Acemoglu and Newman 2002) and may stimulate technological development that increases the productivity in low-paid occupations (Acemoglu 2003)

are offered by large manufacturing establishments such as IBM while fast-food outlets, such as McDonalds, are typical suppliers of secondary jobs (Bulow and Summers 1986, p. 380, Saint-Paul 1996, p. 3). For our purposes, however, the nature of the goods produced by the two types of jobs is not important. As recent theoretical work has shown good and bad jobs may coexist within the same industry or even within the same firm (Saint-Paul 1996). The key insight in Saint-Paul's model is that the firm has two basic methods at its disposal to motivate its workers: offer wages higher than the reservation wage or invest in more intensive monitoring. Under some circumstances the firm may find it optimal to combine the two methods and split its workforce into two. Namely, part of the workers are prevented from shirking by means of higher wages (these are the primary workers who are envisaged as those enjoying greater employment security), and part by means of more intensive monitoring (these are the secondary workers, which are used by the firm as a buffer against fluctuations in product demand). Note that from this perspective the skill content of primary and secondary jobs need not be different.

We believe Saint-Paul's model of internal dualism offers an important insight into the forces at work behind the wage inequality among similar workers. Nevertheless, we model dualism as an intersectoral phenomenon. This amounts to assuming exogenous supply of primary and secondary jobs and is done mainly for simplicity. We believe that a model of internal dualism where firms optimally decide how to split their workforce into primary and secondary could generate similar interdependencies. In any case, one would expect labour market institutions to reduce the number of secondary jobs and increase that of



primary, perhaps at the cost of some unemployment. Moreover, as firms become increasingly mobile one would expect to see some shift of secondary jobs occurring from regulated to deregulated countries. These are basically the interdependencies that arise in our framework.

In our model the minimum wage reduces profits, benefits workers in the aggregate (provided it is set sufficiently high), reduces wage inequality and increases unemployment. The model, moreover, gives rise to a double-peaked social welfare function: one local social-welfare maximum occurring at no intervention, and the other at some binding level of the minimum wage. To the extent that social welfare matters in the political process (in the Grossman-Helpman set-up it is assumed to enter the government's objective function) this translates into institutional variety: some countries may end up at the no-regulation peak, others at the high-regulation peak. This argument provides some intuition for our first result: similar countries may have substantially different labour market regulations, and these differences may arise because of small differences in the political process.

Our main results however relate to the influence of economic integration via capital mobility. First, we analyze the effects of international capital mobility on a laissez-faire and on a regulated economy, which are otherwise identical, keeping the policy in each country fixed. This is the kind of comparative-statics analysis performed in the related literature. We find that the protective effects of regulation (in terms of higher wages for the low-wage workers) spread over to the deregulated country while unemployment remains restricted to the regulated one and increases after the opening. In this respect our results parallel

those of Davis (1998)<sup>5</sup>.

Second, when we allow for an endogenous policy response, we find that the increase in capital mobility may lead to either more or less strict regulation in the regulated country. The direction of the policy response turns out to be related to the relative political influence of the economic interests involved. In particular, we find that deregulation occurs whenever the labour interest is more influential in the political process. Furthermore, if the regulated country is assumed to be a small open economy, the policy response always goes against the interests of the stronger lobby, i.e. the minimum wage is reduced, or even abolished, whenever the workers' political influence is stronger, and it is increased whenever the capital owners dominate in the political process. In other words, economic integration turns out to work as a political equalizer in our model. The intuition for this result is that the minimum wage is less effective as a tool for redistribution in an integrated economy and the government is then less willing to deviate from social welfare maximization in order to accommodate the stronger political interest.

In sum, we do not find support for the argument that globalization will necessarily erode the established labour market regulations: the regulated country may or may not adopt the flexible-wage paradigm. Interestingly, worldwide deregulation does not appear to represent an equilibrium outcome, if regulation can be justified on efficiency grounds.

The paper is structured as follows. Section II presents the basic model. Section

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<sup>5</sup>It should be noted that we focus on inequality among similar workers, while the Davis paper addresses inequality among skilled and unskilled.

III considers the effects of the policy. The policy is endogenised in Section IV, and in Section V we derive the effects of the opening. Section VI concludes.

## 2. The Base Model

Consider an economy with two types of infinitely lived individuals, workers and capital owners. The only source of income for the workers is their wages, and for the capital owners it is firms' profits. There are two types of competitive firms, primary and secondary. Each secondary firm uses one unit of specific capital and labour. Its profits are equal to the marginal value product of capital by the homogeneity of degree one of the production function  $Y(L, K)$ . Primary firms produce with labour only and make no profit. Throughout the paper we abstract from product market interactions and keep the relative price of the goods produced by primary and secondary firms fixed. A composite numeraire good is defined. The output of both primary and secondary firms is measured in terms of the numeraire. Labour input is measured in efficiency units. A worker contributes one unit of effective labour, if he exerts effort  $e, e > 0$ . There are only two levels of effort,  $e$  and  $0$ . If a worker shirks<sup>6</sup>, i.e. exerts  $0$  effort, he contributes nothing to production. A major difference between secondary and primary firms is that the former can perfectly monitor the effort of their workers while the latter cannot. Primary firms are conscious of the effort elicitation problem and take workers' preferences into account in their

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<sup>6</sup>The model described in this Section draws heavily on Shapiro and Stiglitz (1984). It is set in continuous time and analyzes only steady state equilibria. Similar two-sector extensions of the Shapiro-Stiglitz model are developed in Bulow and Summers (1986) and Jones (1987)

employment decisions<sup>7</sup>. There are  $N$  identical and risk neutral workers with instantaneous utility separable in income and effort and normalized to

$$U = w - e \quad (1)$$

where  $w$  is the wage and  $e$  is the effort level. Workers maximize expected lifetime utility

$$V = E \int_0^{\infty} U_t \exp(-rt) dt \quad (2)$$

The effort decision of a worker employed in a primary firm is based upon a comparison between his lifetime utility if shirking,  $V^{PS}$ , and that if not shirking,  $V^{PN}$ . In steady state we have

$$rV^{PN} = w_p - e + s_n(V^{alt} - V^{PN}) \quad (3)$$

$$rV^{PS} = w_p + s_s(V^{alt} - V^{PS}) \quad (4)$$

where the instantaneous interest rate  $r$  ( $r > 0$ ), the separation rate for non-shirkers  $s_n$  ( $s_n > 0$ ), and that for shirkers  $s_s$  ( $s_s > s_n$ ) are exogenous parameters;  $V^{alt}$  is the lifetime utility of a worker fired from the primary sector, and  $w_p$  is the primary wage. Workers choose not to shirk whenever  $V^{PN} \geq V^{PS}$ . Substituting for  $V^{PN}$  and  $V^{PS}$  from (3) and (4) into this no-shirking condition we obtain

$$w_p \geq \frac{(r + s_s)e}{s_s - s_n} + rV^{alt} \quad (5)$$

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<sup>7</sup>Competitive firms producing with labour only do pay efficiency wages in Bulow and Summers (1986) as well.

Noting that there will be no shirking in equilibrium, we can write the corresponding asset equation for  $V^{alt}$  as

$$rV^{alt} = w_s - e + a(V^{PN} - V^{alt}) \quad (6)$$

where  $w_s$  is the secondary sector wage, and  $a$  is the instantaneous probability of a worker fired from the primary sector to find a job in that sector again. The first term in (6),  $w_s - e$ , is the instantaneous utility of a worker outside the primary sector. Since in the absence of intervention secondary jobs are freely accessible, the latter is equal to the instantaneous utility of having a secondary job. If  $w_s = e$ , the instantaneous utility of having a secondary job equals the instantaneous utility of being unemployed<sup>8</sup>, thus, without intervention, the model is consistent with voluntary unemployment. The flow probability  $a$  can be found from the steady state condition

$$a(N - L_p) = s_n L_p \quad (7)$$

where  $L_p$  denotes employment in the primary firms. Normalizing the marginal product of labour in the primary sector to one and using the zero-profit condition for the primary firms, the equilibrium in the case of no intervention can be described by the following three equations in  $w_s$ ,  $L_p$  and  $L_s$  (employment in the secondary sector):

$$1 = w_s + c_0 + c_1 \left[ \frac{N}{N - L_p} \right] \quad (8)$$

$$w_s = Y'_L(L_s, \bar{K}) \quad (9)$$

$$N = L_p + L_s \quad (10)$$

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<sup>8</sup>The latter is zero. We do not consider unemployment benefits.

We denote the solution of the above system  $(w_s^0, L_s^0, L_p^0)$ . Eq. (8) is obtained by first solving the system consisting of (3), (6) and (7) for  $a$ ,  $V^{PN}$  and  $V^{alt}$ , and then substituting the solution for  $V^{alt}$  into the no-shirking condition (5), whereby we denoted the constants  $\frac{er}{s_s - s_n}$  and  $\frac{es_n}{s_s - s_n}$  by  $c_0$  and  $c_1$  respectively. Eq. (9) says that the wage in the secondary sector equals the marginal product of labour. We denote by  $\bar{K}$  the number of secondary firms (which equals also the aggregate capital endowment since each firm is endowed with one unit of capital). Eq. (10) says that the sum of primary and secondary employment equals total labour force<sup>9</sup>. We assume that  $w_s^0 > e$ , i.e. in the case of no intervention there is full employment and equilibrium is given by (8) - (10).

### 3. The Effects of Regulation

In this Section we describe the effects of the government's policy. We assume that the government can directly set the wage in the secondary sector. The choice set  $W$  is given by the closed interval  $[w_s^0, 1]$ , where  $w_s^0$  is the secondary-sector wage obtained in the absence of intervention and 1 is the wage in the primary sector. If the government chooses  $w = w_s^0$ , i.e. the policy of no intervention, equilibrium is given by Eqs. (8)-(10). Alternatively, the government may choose  $w \in (w_s^0, 1]$ , i.e. a binding minimum wage. The imposition of a

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<sup>9</sup>If the secondary wage that solves the above system is below  $e$ , equilibrium is found by solving a system consisting of (8), (9) and the following two equations

$$w_s = e$$

$$L_p + M + L_s = N$$

where  $M$  is unemployment (here voluntary).

binding minimum wage entails that workers fired from the primary sector cannot immediately obtain a job in the secondary sector. In equilibrium this leads to involuntary unemployment: primary jobs are rationed due to the no-shirking condition, secondary jobs are rationed due to the binding minimum wage. This implies that in each instant a worker is in one of three possible states, each associated with different lifetime utility: employed in a primary firm, employed in a secondary firm, and unemployed. Therefore we have to consider a new flow system in equilibrium (see Figure 1 below).

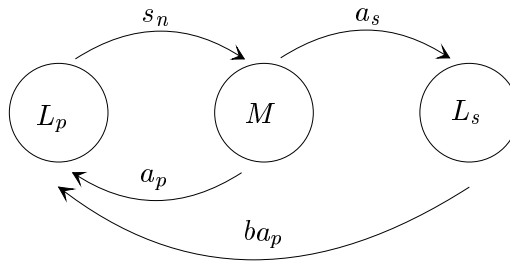


Figure 1:

The arrows in Figure 1 indicate the flows between the three states, in steady state, the letters above indicate the instantaneous probability of a worker in a given state to get in the respective flow. Note that workers fired from the primary sector enter directly the unemployment pool, there is no arrow from  $L_p$  to  $L_s$ . There is no arrow from  $L_s$  to  $M$  either, which indicates that secondary sector workers cannot be falsely accused of shirking and fired. The unemployed acquire primary jobs at rate  $a_p$  and secondary jobs at rate  $a_s$ . The parameter  $b$  reflects how successful an unemployed worker is on average in finding a primary job relative to a secondary worker. We have the following equilibrium

conditions:

$$rV^{alt} = a_p(V^{PN} - V^{alt}) + a_s(V^{sec} - V^{alt}) \quad (11)$$

$$rV^{sec} = w_s - e + ba_p(V^{PN} - V^{sec}) \quad (12)$$

$$s_n L_p = a_p M + ba_p L_s \quad (13)$$

$$s_n L_p = (a_p + a_s)M \quad (14)$$

$$N = L_p + M + L_s \quad (15)$$

Eqs. (11) and (12) define the lifetime utility of the unemployed ( $V^{alt}$ ) and that of the employed in the secondary sector ( $V^{sec}$ ). The next two equations say that the flows into and out of the primary sector (13) as well as the secondary sector (14) must be equal. Eq. (15) says that the sum of employment in both sectors and unemployment ( $M$ ) equals total labour force. Solving (3) and (11) - (15) simultaneously for  $M, a_p, a_s, V^{PN}, V^{sec}, V^{alt}$ , and substituting the solution for  $V^{alt}$  into (5) yields a no-shirking condition in  $w_p, w_s, L_s$  and  $b$ . Since  $w_p$  has been normalized to 1,  $w_s = w$ , as set by the government, and  $L_s$  is given by the requirement that marginal value product of labour equals the wage (9), it remains only to pin down the parameter  $b$  to close the model. One possibility would be to assume that  $b = 1$ , i.e. the typical secondary worker and unemployed have equal chance of finding a primary job at any point of time. It may be argued however that the involuntarily unemployed have an incentive to search harder since the utility gain from obtaining a primary job for them is larger. This would imply  $b < 1$ . Moreover, the government may provide assistance in the job search to the unemployed to compensate them for the adverse effects of the minimum wage. In any case, we will treat  $b$  here



as exogenous and will consider the extreme case of  $b = 0$ . This significantly simplifies the equilibrium dynamics as the flows into and out of the secondary sector drop out. Setting  $b = 0$  yields the following no-shirking condition

$$w_p \geq e + c_0 + c_1 \left( \frac{N - L_s}{N - L_s - L_p} \right) \quad (16)$$

The model in the binding minimum wage case reduces then to the following two equations in  $L_p$  and  $L_s$ .

$$L_p = \alpha(N - L_s) \quad (17)$$

$$w = Y'_L(L_s, \bar{K}) \quad (18)$$

Eq. (17) is obtained by solving (16) for  $L_p$  and setting  $w_p = 1$ . It implies that employment in the primary sector is proportional to the labour force outside the secondary sector with a constant of proportionality  $a \equiv \frac{1-e-c_0-c_1}{1-e-c_0}$ . It follows that unemployment<sup>10</sup> is also proportional with  $M = (1 - \alpha)(N - L_s)$ . Employment in the secondary sector is directly obtained from the condition that marginal product equals the minimum wage (18).

We are now in a position to derive the welfare effects of the policy instrument  $w$  on the politically active groups. To focus on the social conflict between capital and labour we consider just two lobby groups that comprise the whole population: the one lobby group is that of the capital owners and the other that of the workers<sup>11</sup>. We assume that the two lobbies have overcome the collective

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<sup>10</sup>The condition that unemployment is involuntary is  $V^{alt} < \int_0^{\infty} (w - e) \exp(-rt) dt$  and we assume that it is satisfied in equilibrium.

<sup>11</sup>A standard result in the Grossman-Helpmann model is that the equilibrium policy departs

action problem<sup>12</sup> and each maximizes the aggregate utility of its members. We denote the aggregate lifetime utility of the capital owners by  $V_K$  and that of workers by  $V_U$ .  $V_K$  and  $V_U$  are obtained by double integration, once over time for each individual, and once over individuals. Given that the number of workers in each of the three possible states does not change over time in equilibrium we can change the order of integration and write  $V_i = U_i \int_0^{\infty} \exp(-rt) dt$ ,  $i = K, U$  where  $U_i$ ,  $i = K, U$ , stands for the aggregate instantaneous utility found by summing over individuals. Since the aggregate lifetime utilities are proportional to  $U_K$  and  $U_U$  we can use these latter measures in the subsequent analysis without loss of generality. They are defined as follows:

$$U_K \equiv Y(L_s, \bar{K}) - wL_s \quad (19)$$

$$U_U \equiv (1 - e)L_p + (w - e)L_s \quad (20)$$

A graph should be useful in the derivation of the functions  $U_K(w)$  and  $U_U(w)$  (see Figure 2 below).

The two lines starting at points I and A represent the marginal product of labour in the primary and the secondary sector respectively. The curve passing through point D is the right-hand side of (8), the no-shirking condition in the

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from the social-welfare maximizing one due to the existence of an unrepresented part of the population. Even though in our framework all individuals are organized the same result is obtained because of the unequal power of the two lobby groups.

<sup>12</sup>A source of additional tension within the workers' group may be their ex-post heterogeneity.

Nevertheless, the fact that they are identical ex-ante and the uncertainty about who will end up unemployed make it reasonable to assume that workers act as a homogeneous group.

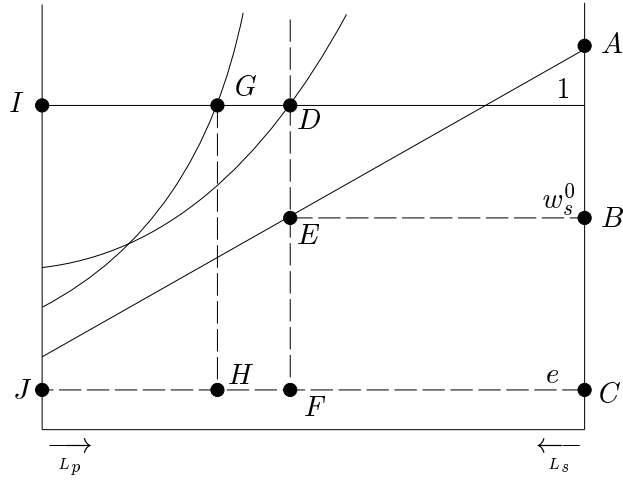


Figure 2:

case of no intervention. The position of the horizontal line  $JC$  reflects the effort level  $e$ . In the case of no intervention employment in the primary sector equals the distance  $ID$  and employment in the secondary sector - the distance  $EB$ . The aggregate welfare of the capital owners is found as the area of the triangle  $ABE$  and that of the workers as the area of the rectangles  $IDFJ$  and  $EBCF$ , which represent the aggregate utility of the workers employed in the primary and the secondary sector respectively. The introduction of a just binding minimum wage only marginally affects point  $E$  (the intersection of the marginal product in the secondary sector and the policy level) while shifting the no-shirking condition to point  $G$ <sup>13</sup>. After the introduction of a binding minimum wage therefore aggregate welfare of the workers employed in the primary sector is given by the area  $IGHJ$ . Further increasing the minimum wage implies that

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<sup>13</sup>This can be seen from (16), where the right-hand side goes to infinity when  $L_p$  goes to  $N - L_s$ . Since  $L_s$  equals the distance  $EB$  it follows that with a binding minimum wage the no-shirking condition is asymptotic to the vertical line going through point  $E$ .

the point E moves along the marginal product line towards point A whereby the employment in the secondary sector is progressively diminished and the no-shirking condition progressively relaxed (shifted to the right). We can now proceed with the algebraic derivation of the functions  $U_K(w)$  and  $U_U(w)$ . The results are graphed in Figure 3.

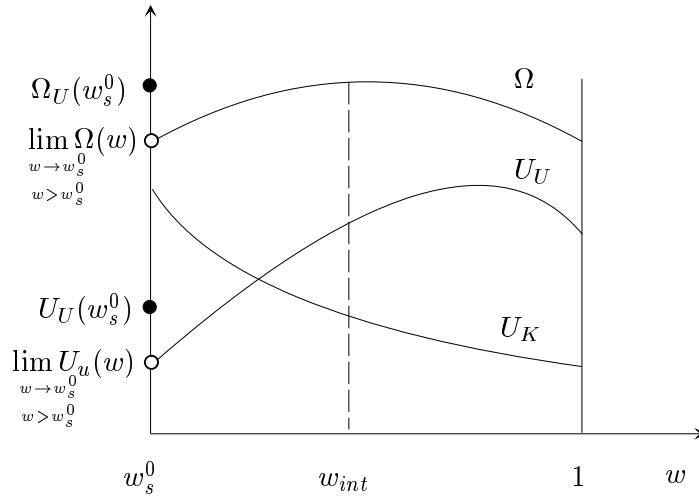


Figure 3:

Capital owners' utility  $U_K(w)$  is continuous and decreasing at a diminishing rate over the whole range  $[w_s, 1]$ . Differentiating (19) and using (18) and (9) we obtain

$$U'_K(w) = -L_s < 0 \quad (21)$$

where, for any wage,  $L_s$  is obtained from Eq. (18). Workers' aggregate utility is discontinuous at  $w = w_s^0$ . This is so because the introduction of a just binding minimum wage tightens the no-shirking condition relative to its initial position as illustrated in Figure 2. The utility loss from a just binding minimum wage

for the workers as whole is

$$U_U(w_s^0) - \lim_{\substack{w \rightarrow w_s^0 \\ w > w_s^0}} U_U(w) = (1 - e)(1 - \alpha)(N - L_s^0) > 0 \quad (22)$$

where  $(1 - e)$  is the loss in instantaneous utility of a primary worker who becomes unemployed, and  $(1 - \alpha)(N - L_s^0)$  is the size of the affected workforce. For  $w \in (w_s^0, 1]$  the function  $U_U(w)$  is continuous and differentiable. Using (17) and (20) we find

$$U_U(w) = (1 - e)\alpha N + (w - w_{int})L_s, \quad \text{for } w > w_s^0 \quad (23)$$

where we have denoted the constant  $\alpha + (1 - \alpha)e < 1$  by  $w_{int}$ . Differentiating this expression we obtain

$$U'_U(w) = (w - w_{int})\frac{dL}{dw} + L_s, \quad (24)$$

where, for any wage,  $L_s$  and  $\frac{dL}{dw} = \frac{1}{Y''_{LL}(L_s, \bar{K})}$  are found from (18). We assume that  $w_s^0 < w_{int}$ , which guarantees that the function  $U_U$  has a well defined maximum over the interval  $(w_s^0, 1]$ <sup>14</sup>. Furthermore, we assume that this maximum is higher than  $U_U(w_s^0)$ , i.e. in the aggregate workers can gain from the imposition of a minimum wage. This implies a conflict of interest between capital owners and workers with respect to the policy. The workers' preferred policy is some binding minimum wage, while capital owners' preferred policy is no intervention. It is also of interest to look at the utilitarian social welfare function  $\Omega(w) \equiv U_K(w) + U_U(w)$ . This definition together with (21) and (24) implies:

$$\Omega' = U'_K + U'_U = (w - w_{int})\frac{dL_s}{dw} \gtrless 0 \quad \text{as} \quad w \gtrless w_{int} \quad (25)$$

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<sup>14</sup>Since  $\frac{dL}{dw} = \frac{1}{Y''_{LL}(L_s, \bar{K})} < 0$  we have  $U'_U(w) > 0$  for all  $w \in (w_s^0; w_{int})$ , i.e.  $U_U(w)$  reaches its maximum somewhere after  $w_{int}$ .

It is clear that labour market regulation in our model entails both efficiency costs and benefits, in terms of  $\Omega$ , leaving the net effect ambiguous. When we start at the laissez-faire equilibrium, "marginal" costs dominate "marginal" benefits. This is captured in an extreme way here by the jump in  $\Omega$ , which is equal to the jump in  $U_U$ , when a just binding minimum wage is introduced. Further, as it is clear from (25),  $\Omega$  is increasing over the range  $(w_s^0, w_{int})$ , i.e. over this range it is the marginal benefits that become dominant, and to the right of  $w_{int}$   $\Omega$  is decreasing again, i.e. it is the marginal costs that dominate. A similar two-peak relationship between efficiency and regulation may be obtained in more general settings as well. Here the costs of regulation are associated with a surge in involuntary unemployment. The benefits stem from shifting workers from low-productivity to high-productivity sectors<sup>15</sup>. The interpretation would be different, if one views the presence of primary and secondary jobs as intra- rather than as an inter-sectoral phenomenon. On the benefit side, the shift from secondary to primary jobs induced by the minimum wage would potentially relocate resources from monitoring to productive activities. On the cost side, it would reduce the flexibility of the firms and entail that production opportunities in periods of economic boom be not fully realized. The presence of both costs and benefits to labour market institutions provides a natural explanation of the institutional variety among the leading industrialised countries. Accordingly, in our model two different institutional settings, the laissez-faire and the binding

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<sup>15</sup>The relevance of such benefits has been discussed in Bulow and Summers (1986) in the context of industrial policy, and in Agell (1999) in the context of labour market policy.

minimum wage one, may generate the same aggregate welfare<sup>16</sup>. This follows from the fact that either of the two peaks  $\Omega^0 \equiv \Omega(w_s^0)$  or  $\Omega^{int} \equiv \Omega(w_{int})$  may be higher in our framework depending on the constellation of parameters.

#### 4. The political equilibrium

In this Section we endogenise the policy. We assume that it is determined in a political process which takes the form of a two stage game (Grossman Helpmann 1994). At the first stage the two lobbies offer the government contribution schedules  $\lambda_i(w), w \in W, i = K, U$ ; at the second stage the government chooses  $w \in W$  so as to maximise the weighted sum of contributions and net social welfare:

$$\Gamma(w) \equiv \gamma_K \lambda_K(w) + \gamma_U \lambda_U(w) + [\Omega(w) - \lambda_K(w) - \lambda_U(w)] \quad (26)$$

Net social welfare (the term in brackets) receives a weight of 1, contributions - weights of  $\gamma_K$  and  $\gamma_U$  respectively, where we assume  $\gamma_K \geq 1, \gamma_U \geq 1$ . The parameters  $\gamma_K$  and  $\gamma_U$  can be regarded as a measure of the strength of each lobby: the higher its  $\gamma$ , the more effective the lobby is in influencing the policy. For example in the extreme case  $\gamma_K = \gamma_U = 1$  both lobbies are powerless and the government is a social welfare maximizer. Another extreme case would be that one of the lobbies has infinite power ( $\gamma_i \rightarrow \infty$ ). In this case this lobby could induce the government to set any policy  $\hat{w}$  by simply offering a contribution schedule that pays an arbitrarily small amount  $\epsilon > 0$  at  $\hat{w}$  and zero anywhere.

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<sup>16</sup>The same idea has been expressed by Acemoglu and Newman (2002). However, they do not build a political economy model nor do they analyze the impact of globalization on institutional change.

There are different reasons why the two lobbies may not be equally effective in influencing the government. Rama and Tabellini for instance argue that the nature of the contributions (labour offers support demonstrations, while capital offers cash) as well as the cost to organize into an active lobby may differ between capital and labour (Rama and Tabellini 1998, p. 1306).

At the first stage of the game each lobby offers a contribution schedule. Following Grossman and Helpman (1994) and Rama and Tabellini (1998) we restrict our attention to the Nash-equilibrium supported by the so called "truthful" contribution schedules. These take the form

$$\lambda_i(w, R_i) \equiv \max [U_i(w) - R_i, 0], \quad i = K, U \quad (27)$$

i.e. they pay the government, for any  $w$ , the excess welfare of lobby  $i$  at  $w$  relative to a given reservation utility. The problem of choosing an optimal contribution schedule for lobby  $i$  reduces then to the problem of choosing an optimal reservation utility  $R_i$ . The equilibrium is a combination of two reservation utilities  $(R_K^{eq}, R_U^{eq})$  and a corresponding policy  $w^{eq} = \underset{w \in W}{\operatorname{argmax}} \Omega(w) + (\gamma_K - 1)\lambda_K(w, R_K^{eq}) + (\gamma_U - 1)\lambda_U(w, R_U^{eq})$  such that no lobby can improve its net welfare by readjusting its reservation utility, given the reservation utility of the other lobby. Net welfare is defined as gross welfare minus contributions

$$U_i^{net}(w) \equiv U_i(w) - \lambda_i(w) \quad (28)$$

The two definitions (27) and (28) imply:

$$U_i^{net}(w) = \min [U_i(w), R_i] \quad (29)$$

This highlights the basic trade-off in choosing an optimal reservation utility. On one hand  $R_i$  shouldn't be chosen too low because it is an upper bound on



what the lobby can get. On the other hand it shouldn't be too high because then the contribution is small and the lobby cannot effectively influence the policy. The following Lemma 1 says that it is not optimal for a lobby to ask for more than what it can get.

**Lemma 1** In equilibrium each lobby gets its reservation utility:

$$R_i^{eq} = U_i^{net}(w^{eq}), \text{ or equivalently } R_i^{eq} \leq U_i(w^{eq}). \quad (\text{Proof in the Appendix})$$

We now proceed to characterize how the equilibrium policy and reservation utilities depend upon the political parameters  $\gamma_K$  and  $\gamma_U$ . Our objective is to divide the parameter space  $(\gamma_K, \gamma_U)$  into a set where the equilibrium policy is laissez-faire (we shall denote this set  $\Lambda^0$ ), and a set where the equilibrium policy is a binding minimum wage (we shall denote this set  $\Lambda^m$ ). We have

**Lemma 2** The equilibrium policy satisfies

$$w^{eq} = \underset{w \in W}{\operatorname{argmax}} \gamma_K U_K(w) + \gamma_U U_U(w). \quad (\text{Proof in the Appendix})$$

An immediate implication of Lemma 2 is that the equilibrium policy is homogeneous of degree zero in  $\gamma_K$  and  $\gamma_U$ . This leads to

**Proposition** There exists a critical ratio  $\gamma^*$ , such that for  $\gamma_K/\gamma_U > \gamma^*$  the equilibrium policy is laissez-faire and for  $\gamma_K/\gamma_U < \gamma^*$  the equilibrium policy is a binding minimum wage. (Proof in the Appendix)

This Proposition makes it clear what the sets  $\Lambda^0$  and  $\Lambda^m$  look like. Among all points  $(\gamma_K, \gamma_U)$  that satisfy the general requirement  $\gamma_K \geq 1, \gamma_U \geq 1$ , those that

lie to the left and above the straight line  $\gamma_K = \gamma^* \gamma_U$  belong to  $\Lambda^0$ , and those that lie to the right and below this line belong to  $\Lambda^m$ . The precise slope of the borderline  $\gamma_K = \gamma^* \gamma_U$  depends upon the economic parameters of the model as illustrated in Figure 4.

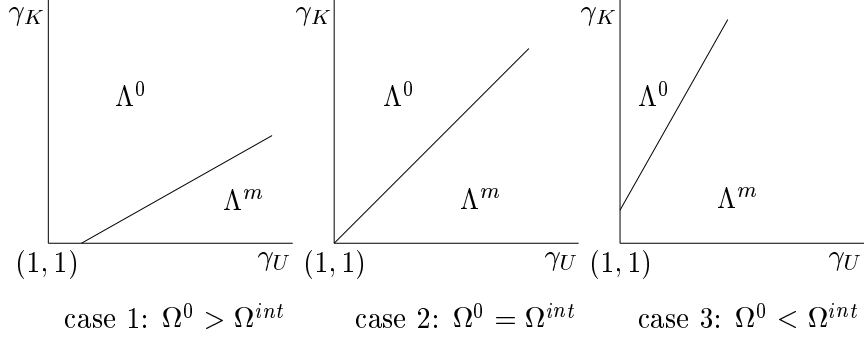


Figure 4:

For example if  $\Omega^0 > \Omega^{int}$ , i.e. social welfare is maximised by no intervention, then the point  $(1,1)$  must lie to the left and above the line  $\gamma_K = \gamma^* \gamma_U$  (remember that for  $\gamma_K = \gamma_U = 1$ ,  $w^{eq} = \underset{w \in W}{\operatorname{argmax}} \Omega(w)$ ). Hence in this case  $\gamma^* < 1$ . If on the other hand  $\Omega^0 < \Omega^{int}$ , i.e. social welfare is maximised by a binding minimum wage ( $w^{int}$ ), then the point  $(1,1)$  must lie to the right and below the line with slope  $\gamma^*$  and hence  $\gamma^* > 1$ . Finally, if  $\Omega^0 = \Omega^{int}$ , then the point  $(1,1)$  lies exactly on the borderline,  $\gamma^* = 1$ . It is clear that when  $\Omega^0 = \Omega^{int}$  and  $\gamma_K = \gamma_U = 1$  the equilibrium policy is not unique - it may be  $w_s^0$  or  $w_{int}$ . In fact it can be shown that, whatever the slope of the borderline  $\gamma^*$ , when  $(\gamma_K, \gamma_U)$  lies exactly on that line, the equilibrium policy is not unique - it can be laissez faire or a binding minimum wage. The sets  $\Lambda^0$  and  $\Lambda^m$  have therefore an intersection, which is given by the line  $\gamma_K = \gamma^* \gamma_U$ . Now we proceed to characterise

the equilibrium policy to the right and below this line. By the Proposition it is a binding minimum wage. By Lemma 2 it must satisfy

$$G'(w) \equiv \gamma_K U'_K(w) + \gamma_U U'_U(w) = 0, \quad (30)$$

if it is strictly in the interior of  $W$ , and  $G'(w) \geq 0$  if it is equal to one. We shall assume that the function  $G(w) \equiv \gamma_K U_K(w) + \gamma_U U_U(w)$  is globally concave for all  $(\gamma_K, \gamma_U) \in \Lambda^m$ , which guarantees that the equilibrium policy is unique for  $\frac{\gamma_K}{\gamma_U} \neq \gamma^*$ . Under this assumption we obtain the following comparative static results by implicit differentiation of (30) for  $w^{eq}$  strictly in the interior of  $W$ :

$$\frac{dw^{eq}}{d\gamma_K} = -\frac{U'_K}{G''} < 0 \quad \frac{dw^{eq}}{d\gamma_U} = -\frac{U'_U}{G''} > 0 \quad (31)$$

We conclude this Section by showing that the above assumption is satisfied for example with the following production function in the secondary sector:  $Y(L, K) \equiv AL - B\frac{L^2}{K} + CK$ , where A, B, and C are positive parameters. Using (21), (24) and (30) we obtain

$$G'(w) = \gamma_U(w - w_{int})\frac{dL_s}{dw} + (\gamma_U - \gamma_K)L_s \quad (32)$$

With the above production function we have  $Y'_L = A - \frac{2B}{K}L$  (linear marginal product curve) and  $Y''_{LL} = -\frac{2B}{K} = const.$  Using Eq. (18) we obtain  $L_s = \frac{K}{2B}(A - w)$  and  $\frac{dL_s}{dw} = \frac{1}{Y''_L} = -\frac{K}{2B}$ . Substituting this into (32) we see that  $G'(w)$  is linear with  $G''(w) = \frac{K}{2B}(\gamma_K - 2\gamma_U)$ . Obviously  $G(w)$  is concave for  $\gamma_K < 2\gamma_U$ . What if  $\gamma_K \geq 2\gamma_U$ ? It can be shown that the equilibrium policy is then unambiguously  $w_s^0$ , i.e. these  $(\gamma_K, \gamma_U)$  combinations do not belong to the set  $\Lambda^m$ .<sup>17</sup>

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<sup>17</sup>We have  $G'(w) = \frac{K}{2B}[(A + W_{int}) - 2w]\gamma_U - (A - w)\gamma_K] \leq \frac{K}{2B}(A - w)(2\gamma_U - \gamma_K)$  because

## 5. The effects of openness

All results so far have been derived treating the capital stock (number of firms operating in the country)  $K$  as given. In this Section we endogenise this variable by assuming that firms can relocate their production activities to exploit cost differentials internationally. We shall denote by  $\bar{K}$ , as before, the original number of firms (capital endowment) and by  $K$  the number of firms operating in the country after it opens to capital mobility.

### 5.1. The effects of capital mobility between a laissez-faire and a regulated economy: the Europe-America Case

We start by considering a benchmark model paralleling that of Davis (1998): we analyze the effects of perfect capital mobility between two economies which are identical in all respects except that the one (Europe) has an exogenous binding minimum wage and the other (America) a flexible. The previous Section makes it clear that two identical economies can indeed have such polarly different labour market policies. Simply assume that initially, before opening to international capital mobility, the parameter point  $(\gamma_K, \gamma_U)$  was to the right and below the borderline with slope  $\gamma^*$  in Europe, while in America it was to the left and above. In fact as we have seen in the last Section the difference between the political parameters in both countries may be arbitrarily small. Let us now first look at what the effects of capital mobility would be, if each country retained its policy. Obviously capital flight from Europe to America

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$A > W_{int}$ . But then it is clear that if  $2\gamma_U - \gamma_K \leq 0$  then  $G(w)$  is decreasing over the whole range  $(w_s^0, 1]$  and hence the equilibrium policy is  $w_s^0$ .

would take place until the secondary sector wages in both countries are completely equalized. The reduction of the number of secondary firms operating in Europe would be met by an equiproportionate reduction of the secondary sector employment in Europe to keep the marginal product of labour in that sector equal to the minimum wage. As we know from Section 3 (see Equation (17)) the reduction of secondary sector employment would entail an increase in both unemployment and primary-sector employment in Europe. We see thus that the effects of capital mobility here are very similar to the effects of trade in the Davis (1998) model. In both cases the regulation's protective effects (in terms of higher wages for the low-paid workers) spread over to the deregulated country, and in both cases the regulation's costs (in terms of involuntary unemployment) remain borne by the regulated country alone and increase with the opening. This suggests that the minimum wage may become politically unsustainable in Europe after the opening.

Now we turn to the question under what conditions and how the equilibrium policy in Europe is going to change when capital becomes mobile. Unfortunately we cannot analyze the simultaneous determination of equilibrium in both countries. The latter problem is quite complex, because the optimal strategy of each lobby depends then not only upon the strategy of its competing lobby in the home country, but also upon the strategies of the two lobbies in the other country (because the effects of the domestic policy are different depending upon the policy set in the other country). What we do therefore is analyze the policy determination in Europe by assuming that America keeps its wage flexible and

that this is known to all players<sup>18</sup>. The first question now is whether Europe may be driven to remove any regulation and adopt the flexible wage policy. To address this question we have to see how the shape of the reduced-form political support function  $G(w)$  is affected by the opening of the economy. This is made easy by the symmetry of the model and the assumption of perfect capital mobility. First, the choice set of the government is as before:  $w_s^0$  corresponds to the policy of no intervention, and any  $w \in (w_s^0, 1]$  represents a binding minimum wage.

When the policy in Europe is laissez-faire, capital mobility with identical America has actually no effect - equilibrium is given by Eqs. (8)-(10) as before. When the policy in Europe is a binding minimum wage, we have the following system of equations:

$$\begin{aligned}
 1 &= w + c_0 + c_1 \left[ \frac{N}{N - L_P^A} \right] & (33) \\
 w &= Y'_L(L_s^A, K^A) \\
 N &= L_P^A + L_s^A \\
 L_P &= \alpha(N - L_s) \\
 w &= Y'_L(L_s, K) \\
 2\bar{K} &= K + K^A
 \end{aligned}$$

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<sup>18</sup>Note that as long as the wage  $w^A$  set in America is lower than that in Europe it will not be binding, hence in this case we may treat America as keeping its wage flexible (even if  $w^A > w_s^0$ ). Moreover, given that the only asymmetry in this model is in the ratio  $\frac{\gamma_K}{\gamma_U}$ , whereby the workers' lobby is relatively stronger in Europe, it seems extremely unlikely that America ends up with a higher wage when the policies are determined simultaneously.

The superscript "A" denotes the American variables when these are distinct from the European ones. The first three equations correspond to the equilibrium conditions in a flexible wage economy (8)-(10), the second two equations correspond to the equilibrium conditions in a regulated economy (17)-(18), and the last equation says that the sum of capital operating in both countries equals two times the single country's endowment. We can see that the aggregate welfare of the capital owners is the same for any policy because the wage set in Europe automatically prevails in both countries and determines the profits of each single secondary firm regardless of its location decision. This means that the function  $U_K(w)$  doesn't shift relative to its position without capital mobility. The function  $U_U(w)$ , on the other hand, shifts as depicted in Figure 5.

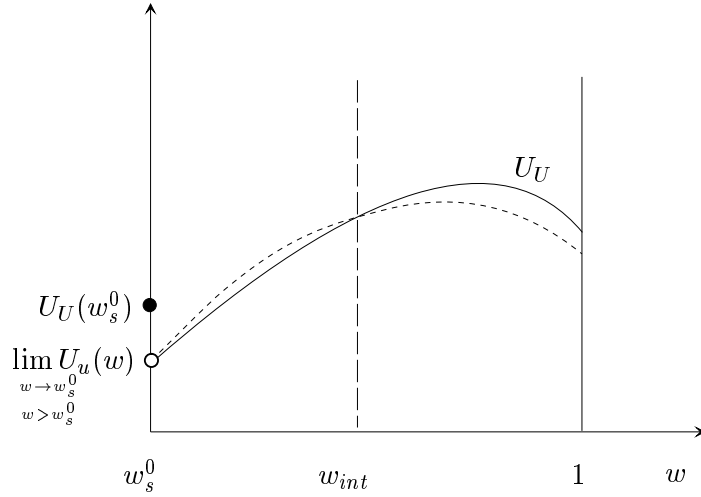


Figure 5:

Clearly at  $w_s^0$  there is no capital flight, and hence  $U_U(w_s^0)$  and  $\lim_{\substack{w \rightarrow w_s^0 \\ w < w_s^0}} U_U(w)$  are unaffected by capital mobility. For any  $w > w_s^0$  however some firms re-

locate, which means that the aggregate employment in the secondary sector,  $L_s$ , obtained at any given wage with capital mobility, is lower than that without capital mobility. Using Eq. (23) we can conclude that  $U_U(w)$  shifts upward for  $w \in (w_s^0; w_{int})$ , remains unchanged at  $w_{int}$ , and shifts downward for  $w \in (w_{int}, 1]$ .

After what we said above about the openness increasing the costs of regulation it may appear puzzling that for some policies the workers are actually better-off with capital mobility than without it. The explanation is that any policy entails costs (here involuntary unemployment) and benefits (here boosting the employment in the more productive primary sector) and that both of them are affected when the economy becomes opens. It turns out that for policies in the range  $w \in (w_s^0; w_{int})$  openness reinforces benefits by more than it does costs. It is now clear that the reduced form political support function  $G(w)$  is unchanged at  $w_s^0$ ,  $w \rightarrow w_s^0$ , and  $w_{int}$ , shifts upward for  $w \in (w_s^0; w_{int})$  and downward for  $w \in (w_{int}, 1]$ . From this we can conclude that Europe unambiguously retains its minimum wage, if it was set originally not higher than  $w_{int}$ . On the other hand, it may well happen that the opening to capital mobility leads to a complete deregulation in Europe, if originally the minimum wage was set higher than  $w_{int}$ . We should note that  $w_{int}$  is, among the "interventionist" policies, the most efficient one, i.e.  $w_{int} = \underset{w \in W, w \neq w_s^0}{\operatorname{argmax}} \Omega(w)$ , and that the original equilibrium in Europe is to the left (right) of  $w_{int}$  exactly when the union is the relatively weaker (stronger) lobby<sup>19</sup>. We identify therefore the condition that the union

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<sup>19</sup>This is because  $G'(w_{int}) \geq 0$  as  $\gamma_U \geq \gamma_K$  as implied by Eq. (32).



be the stronger lobby ( $\gamma_U > \gamma_K$ ) as necessary for a complete deregulation to occur in Europe after the opening. It may be of interest also to know whether Europe can be driven to adopt the flexible-wage policy, even if a minimum wage is more efficient from a social welfare perspective, i.e. if  $\Omega^0 < \Omega^{int}$ . It turns out that this cannot happen because  $\Omega^0 < \Omega^{int}$  implies  $G(w_s^0) < G(w_{int})$  for  $\gamma_U > \gamma_K$ , and as we have seen  $G(w)$  is unaffected by capital mobility at both  $w_s^0$  and  $w_{int}$ .

As a next step we look at how the minimum wage in Europe is going to be adjusted, if it is retained. To this end we look at how the slope of the political support function at the original equilibrium changes when capital mobility is introduced. Since the function  $U_K(w)$  is unaffected for all  $w \in W$  all we need to see is how  $U'_U(w)$  as given by expression (24) changes at the original equilibrium. Capital mobility affects the terms  $L_s$  and  $\frac{dL_s}{dw}$  in this expression. We have already established that  $L_s$  is lower at any wage with capital mobility than without. It remains to see how  $\frac{dL_s}{dw}$  is affected. This is not obvious because the firm level reduction of employment in response to a small wage increase is the same with and without capital mobility giving rise to two opposite tendencies. On one hand, the number of firms operating in Europe at any wage is smaller with capital mobility, which tends to make the effect of a wage increase on aggregate employment smaller (in absolute value). On the other hand, with capital mobility a small wage increase has the additional effect of inducing further relocation of firms, which tends to make its effect on aggregate employment larger (in absolute value). It turns out that the second effect always dominates, i.e.  $\frac{dL_s}{dw}$  is smaller (larger in absolute value) at any wage

with capital mobility than without.<sup>20</sup> Using expression (24) we can see now that the opening to capital mobility may either reduce or increase  $U'_U(w)$  for  $w \in (w_s^0; w_{int})$ , while for  $w \in (w_{int}; 1]$   $U'_U$  is unambiguously reduced. We can conclude that if originally the minimum wage was set below  $w_{int}$  the direction in which it is adjusted is indeterminate and that otherwise it is unambiguously going to be reduced.<sup>21</sup>

Intuitively one may expect that the surge in capital mobility would strengthen

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<sup>20</sup>To see this totally differentiate the system (33) and solve for  $\frac{dL_s}{dw}$  to obtain (for the case of capital mobility)

$$\frac{dL_s}{dw} = \frac{1}{Y''_{LL}(L_s, K)} \frac{Y''_{LK}(L_s, K)}{Y''_{LK}(L_s^A, K^A)} \left[ 1 - \frac{(L_s^A)^2 Y''_{LL}(L_s^A, K^A)}{c_1 N} \right]$$

Obviously the obtained  $\frac{dL_s}{dw}$  is negative. Remember that before we had

$$\left( \frac{dL_s}{dw} \right)^{NCM} = \frac{1}{Y''_{LL}(L_s^{NCM}, \bar{K})}$$

where the superscript "NCM" indicates that the corresponding value is obtained for the case of "no capital mobility". Obviously  $\left( \frac{dL_s}{dw} \right)^{NCM}$  is also negative. Now build the ratio

$$\frac{\frac{dL_s}{dw}}{\left( \frac{dL_s}{dw} \right)^{NCM}} = \frac{Y''_{LL}(L_s^{NCM}, \bar{K})}{Y''_{LL}(L_s, K)} \frac{Y''_{LK}(L_s, K)}{Y''_{LK}(L_s^A, K^A)} \left[ 1 - \frac{(L_s^A)^2 Y''_{LL}(L_s^A, K^A)}{c_1 N} \right]$$

Using the homogeneity of degree  $-1$  of  $Y''_{LL}(\cdot)$  and  $Y''_{LK}(\cdot)$  and the fact that at any given wage the equilibrium labour/capital ratio is the same with and without capital mobility (i.e.  $\frac{L_s^{NCM}}{\bar{K}} = \frac{L_s}{K} = \frac{L_s^A}{K^A}$ ) we can write  $\frac{Y''_{LL}(L_s^{NCM}, \bar{K})}{Y''_{LL}(L_s, K)} = \frac{K}{\bar{K}}$  and  $\frac{Y''_{LK}(L_s, K)}{Y''_{LK}(L_s^A, K^A)} = \frac{K^A}{K}$ . We see then that the term premultiplying the brackets equals  $\frac{K^A}{\bar{K}}$  which is larger than one for any  $w > w_s^0$ . But the term in brackets is also larger than one, which proves that for any  $w > w_s^0$  the term  $\frac{dL_s}{dw}$  is larger in absolute value with capital mobility than without.

<sup>21</sup>The only possible exception is if initially we have a corner solution at  $w = 1$ . Even in this case the result that  $G'(w)$  falls holds, which means that a reduction of the minimum wage may occur. Note also that we never have a corner solution if  $U_U(w)$  reaches its maximum before 1.

the political influence of the capital owners and lead to a reduction or possibly an abolition of the minimum wage under all circumstances. Interestingly, however, the effects of capital mobility here are quite different depending on the relative strength of the politically active groups in Europe. As we have seen, if the union is the stronger lobby, the results are as expected: the minimum wage is unambiguously reduced, and it may even be abolished after the opening. However, if the capital owners are the stronger lobby, then the minimum wage is unambiguously retained, and it may even be increased after the opening. This suggests that openness tends to act more as a political equalizer, rather than give excessive power to the capital owners. In the following we consider a version of the model, which demonstrates this even more clearly.

## **5.2. The Small Economy Case**

The results of the benchmark model considered so far have been derived under the assumption of perfect capital mobility. This had the implication that the wage set in Europe prevailed automatically in both countries. It may be argued that such a one- to-one impact of the European policy on the American wages is exaggerated. That is why we consider now the case of a fixed foreign wage, i.e. we treat Europe as a small economy. As before we assume that originally the equilibrium policy has been determined when the firms were not mobile. We assume also that the original equilibrium policy is a binding minimum wage, which is above the foreign wage, i.e. after the opening, if the wage is not adjusted, Europe would be a capital exporter. This time we perform only a local analysis, i.e. we look at how the slope of the political support

function changes at the original equilibrium. To make the problem of policy determination in Europe after the opening interesting we have to consider now an imperfect capital mobility. Specifically, we shall assume that if firm  $i$  decides to relocate in the foreign country, then it can use effectively there only  $\theta_i$  part of its capital. We assume further that the distribution of the firm-specific iceberg costs  $\theta_i$ , whereby the firms are ordered in increasing order of their  $\theta_i$ 's, can be approximated by a continuous function  $\theta(K)$ ,  $K \in [0; \bar{K}]$  with  $\theta \in (0; 1)$  and  $\theta' > 0$ . The number of firms  $K$  which operate in Europe at any wage can be found then from the arbitrage condition

$$\Pi(w) = \Pi(w^*)\theta(K) \quad (34)$$

Where  $\Pi(w) \equiv \max_L Y(L, 1) - wL$  is the return to a unit of capital at wage  $w$  and  $w^*$  is the foreign wage. The left-hand side in (34) is the profit of the  $K^{th}$  firm if it stays, and the right-hand side is its profit if it relocates. Clearly at policy  $w$  all firms up to the  $K^{th}$  one, as obtained from (34) find it profitable to stay because they have higher relocation costs (lower  $\theta$  and thus lower profits abroad) while all firms after the  $K^{th}$  (their number is  $\bar{K} - K$ ) find it profitable to relocate. The aggregate utility of the capital owners at any wage is found then as

$$U_K(w) = \Pi(w)K + \Pi(w^*) \int_K^{\bar{K}} \theta(K) dK \quad (35)$$

where  $K$  is obtained from (34). The first term in (35) represents the aggregate profits of those firms which stay in Europe, and the second term is the profits of those which relocate. Denoting the indefinite integral of  $\theta(K)$  as  $\Theta(K)$  we

can write (35) also as

$$U_K(w) = \Pi(w)K + \Pi(w^*)\Theta(\bar{K}) - \Pi(w^*)\Theta(K) \quad (36)$$

Totally differentiating this expression and solving for  $\frac{dU_K}{dw}$  we obtain

$$U'_K(w) = \Pi'(w)K + [\Pi(w) - \Pi(w^*)\theta(K)] \frac{dK}{dw} \quad (37)$$

Since  $\Pi'(w)$  equals minus the optimal plant-level employment at wage  $w$  (by the envelope theorem) and  $K$  is the number of firms operating in Europe at wage  $w$  it is clear that the first term in (37) equals minus the aggregate employment in the secondary sector in Europe at any given wage. The second term in (37) is zero by the arbitrage condition (34). With capital mobility we have therefore  $U'_K = -L_s$ , which is higher (lower in absolute value) at any wage than the respective value when there is no capital mobility. This is quite intuitive: a small wage increase reduces the aggregate firms profits by less if some firms can escape the increase by relocating. Now using (24) and (37) we find that the slope of the political support function is given by the same expression with and without capital mobility, namely:

$$G'(w) = \gamma_U(w - w_{int}) \frac{dL_s}{dw} + (\gamma_K - \gamma_U)L_s \quad (38)$$

The only difference is that the terms  $\frac{dL_s}{dw}$  and  $L_s$  in (38) are both smaller ( $\frac{dL_s}{dw}$  larger in absolute value) with capital mobility than without<sup>22</sup>. Since  $L_s$  is always positive, and  $\frac{dL_s}{dw}$  always negative, this means that the increase in

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<sup>22</sup>To see that  $\frac{dL_s}{dw}$  is larger in absolute value with capital mobility differentiate totally (18)

and (34) to obtain

$$dw = Y''_{LL}(L_s, K) dL_s + Y''_{LK}(L_s, K) dK$$

capital mobility makes the first term in (38) larger in absolute value and the second term smaller in absolute value. Since at the original equilibrium the two terms are of opposite sign and add up to zero, then after the opening the whole expression would obtain a sign opposite to that of the second term  $(\gamma_K - \gamma_U)L_s$ . We can conclude that the policy is going to be adjusted against the interests of the stronger lobby, i.e. if the union is the stronger lobby ( $\gamma_K < \gamma_U$ ), then openness will bring about a wage reduction, and if the capital owners are the stronger lobby ( $\gamma_K > \gamma_U$ ), then openness will give rise to a wage increase. This highlights the politically equalizing role of capital mobility. What is the intuition for this puzzling, at first glance, result? It is that in setting the policy, the government pursues both efficiency and distributional targets. This can be seen in expression (38) where the first term can be interpreted as reflecting the pure efficiency target (note that by Eq. (25)  $(w - w_{int}) \frac{dL_s}{dw}$  is the marginal effect of the policy on aggregate efficiency as measured by  $\Omega$ ), and the second term can be interpreted as reflecting a particular distribution target (note that the larger the difference in the political power of the two groups, the larger this

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$$\Pi'(w) dw = \Pi(w^*)\theta'(K) dK$$

Solving for  $\frac{dL_s}{dw}$  we obtain for the case of capital mobility  $\frac{dL_s}{dw} = \frac{1}{Y''_{LL}(L_s, K)} \left[ 1 - \frac{Y''_{LK}(L_s, K)\Pi'(w)}{\Pi(w^*)\theta'(K)} \right]$ . Remember that without capital mobility  $\left(\frac{dL_s}{dw}\right)^{NCM} = \frac{1}{Y''_{LL}(L_s^{NCM}, \bar{K})}$ . Using the homogeneity of degree  $-1$  of  $Y''_{LK}(\cdot)$  and the fact that at any wage the labour/capital ratio with and without capital mobility is the same, we can express  $\frac{dL_s}{dw}$  in the case of capital mobility as  $\frac{dL_s}{dw} = \left(\frac{dL_s}{dw}\right)^{NCM} \frac{\bar{K}}{K} \left[ 1 - \frac{Y''_{LK}(L_s, K)\Pi'(w)}{\Pi(w^*)\theta'(K)} \right]$ . Clearly  $\frac{\bar{K}}{K}$  and the term in brackets are both larger than one.

term is in equilibrium, i.e. the more the government redistributes in favour of the interests of the stronger lobby). When the economy opens, the trade-off between the distribution and efficiency targets changes so that it becomes less attractive for the government to deviate from the socially optimal policy in order to accommodate the interests of the stronger lobby.

## 6. Conclusion

We presented a model of endogenous labour market regulation, which shows how small differences in the relative power of the politically active groups may lead to large differences in labour market policies across countries. It also shows that through capital mobility the labour market policies in other countries can have profound implications for the policy in an open economy. Our model allows for institutional variety even when firms can costlessly relocate their production activities and thus does not support the "race to the bottom" argument. Rather it supports the view that openness diminishes the political power of national lobbies and leads to more "neutral" policies. Although these results are suggestive, one should refrain from drawing general conclusions. In particular, more empirical work is needed to evaluate the effect of globalization on labour market institutions. One possibility to test the theory presented in this paper would be to extend the approach of Agell (1999) by including variables that portray country-specific aspects of the political process in order to see under what circumstances openness leads to more/less rigid labour markets. Another research strategy would be to look directly at how foreign labour market institutions (weighted by the bilateral trade or investment share) affect the domestic

institutional change.



## Appendix

**Proof of Lemma 1:** Consider a strategy  $\hat{R}_i$  that would lead to policy  $\hat{w}$  such that  $U_i(\hat{w}) < \hat{R}_i$ . We show that  $\hat{R}_i$  is weakly dominated by any other strategy  $\tilde{R}_i$  such that  $U_i(\hat{w}) < \tilde{R}_i < \hat{R}_i$ . Suppose first that  $\tilde{R}_i$  leads to the same policy  $\hat{w}$  as  $\hat{R}_i$ . In this case the net welfare from playing  $\tilde{R}_i$  is the same as that from playing  $\hat{R}_i$ : it is equal to  $U_i(\hat{w})$ . Suppose on the other hand that  $\tilde{R}_i$  leads to a different policy  $\tilde{w}$ . Clearly in this case the lobby's contribution at  $\tilde{w}$  must be positive, implying that the net utility from playing  $\tilde{R}_i$  is  $\min [U_i(\tilde{w}, \tilde{R}_i)] = \tilde{R}_i$  which is larger than that from playing  $\hat{R}_i$ . Since a lobby can only gain by such a small reduction in its reservation utility it will reduce it until  $R_i^{eq} \leq U_i(w^{eq})$ .

**Proof of Lemma 2:** (this proof is analogous to the proof of Eq. (11) in Grossman-Helpman (1994)): For the government to choose  $w^{eq}$  at the second stage of the game  $w^{eq}$  must satisfy  $\Omega(w^{eq}) + (\gamma_K - 1)\lambda_K(w^{eq}, R_K^{eq}) + (\gamma_U - 1)\lambda_U(w^{eq}, R_U^{eq}) \geq \Omega(w) + (\gamma_K - 1)\lambda_K(w, R_K^{eq}) + (\gamma_U - 1)\lambda_U(w, R_U^{eq})$  for all  $w \in W$ , where  $R_K^{eq}$  and  $R_U^{eq}$  are the equilibrium reservation utilities of the two lobbies. By definition (27) we have  $\lambda_i \geq U_i(w) - R_i^{eq}$  for all  $w \in W$ ,  $i = K, U$  and by Lemma 1 we have  $\lambda_i(w^{eq}, R_i^{eq}) = U_i(w^{eq}) - R_i$ ,  $i = K, U$ . Therefore  $\gamma_K U_K(w^{eq}) + \gamma_U U_U(w^{eq}) \geq \gamma_K U_K(w) + \gamma_U U_U(w)$  for all  $w \in W$ .

**Proof of the Proposition:** Define  $F(\gamma) \equiv \gamma U_K(w_s^0) + U_U(w_s^0)$  and  $G(\gamma) \equiv \max_{w \in W} \gamma U_K(w) + U_U(w)$  where

$$U_{UC}(w) \equiv \begin{cases} \lim_{\substack{w \rightarrow w_s^0 \\ w > w_s^0}} U_U(w) & , \text{for } w = w_s^0 \\ U_U(w) & , \text{for } w \neq w_s^0 \end{cases}$$

Clearly  $U_{UC}(w)$  is continuous and differentiable for all  $w \in W$ . The envelope function  $G(\gamma)$  is also continuous and differentiable with  $G'(\gamma) = U_K(w)$  evaluated at  $\operatorname{argmax}_{w \in W} \gamma U_K(w) + U_{UC}(w)$ . Note also that

$$G(\gamma) = \sup_{w \in (w_s^0; 1]} \gamma U_K(w) + U_U(w).$$

Lemma 2 implies that the equilibrium policy is laissez faire if  $F\left(\frac{\gamma_K}{\gamma_U}\right) - G\left(\frac{\gamma_K}{\gamma_U}\right) > 0$  and that it is a binding minimum wage if  $F\left(\frac{\gamma_K}{\gamma_U}\right) - G\left(\frac{\gamma_K}{\gamma_U}\right) < 0$ . Now we show that the function  $H(\gamma) \equiv F(\gamma) - G(\gamma)$  equals zero at one point only ( $\gamma^*$ ) and that it is negative to the left and positive to the right of that point. First,  $H(\cdot)$  is continuous (because  $F$  and  $G$  are continuous) and nondecreasing (because  $G'(\gamma) \leq F'(\gamma) = U_K(w_s^0)$ ). Moreover  $H(0) = U_U(w_s^0) - \max_{w \in W} U_{UC}(w) < 0$  and  $H(\gamma) > 0$  when  $\gamma$  sufficiently large. To see that such a sufficiently large  $\gamma$  exists consider  $\hat{\gamma} = \max_{w \in W} \frac{U'_{UC}(w)}{-U'_K(w)}$  (remember that  $U_K(w) < 0$  for all  $w \in W$ ). We have  $\hat{\gamma} \geq \frac{U'_{UC}(w)}{-U'_K(w)}$  for all  $w \in W$  which is equivalent to  $\hat{\gamma} U'_K(w) + U'_{UC}(w) \leq 0$  for all  $w \in W$ . But this means that the policy that maximizes  $\hat{\gamma} U'_K(w) + U'_{UC}(w)$  is  $w_s^0$ . Hence  $G(\hat{\gamma}) = \hat{\gamma} U_K(w_s^0) - U_{UC}(w_s^0)$  and  $H(\hat{\gamma}) = \hat{\gamma} U_U(w_s^0) - U_{UC}(w_s^0) > 0$ . It remains to show that  $H(\gamma)$  is strictly increasing when it equals zero. Suppose that it is not, i.e. suppose  $H(\tilde{\gamma}) = 0$  and  $H'(\tilde{\gamma}) = 0$ .  $H'(\tilde{\gamma}) = 0$  implies  $G'(\tilde{\gamma}) = F'(\tilde{\gamma}) = U_K(w_s^0)$ . Hence  $G(\tilde{\gamma}) = \tilde{\gamma} U_K(w_s^0) + U_{UC}(w_s^0)$ . But then  $H(\tilde{\gamma}) = U_U(w_s^0) - U_{UC}(w_s^0) > 0$ , which is a contradiction. This completes the proof.

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