Economic Integration, International Capital Movements, and Labour Standards

Morten Skak

Abstract. The paper develops a model where more integration initiates a movement towards the bottom of labour standards when increased integration enhances the flow of capital and so increases the marginal gain of a reduction in the strictness of standards. Moreover, a Pareto improving common international standard with higher strictness than in the Nash equilibrium can be negotiated among countries with the same preference for employed worker protection versus social efficiency. When preferences differ between countries, an agreed common or minimum strictness of labour standards will typically not be Pareto improving, but to the detriment of the country that gives less weight to the protection of employed workers. However, in this case there is also a Pareto improving solution, which raises the strictness of labour standards compared to the Nash equilibrium for both countries, but at the same time accepts different country standards reflecting their different preference.

1. Introduction

The question of a possible race to the bottom of social standards through competing devaluations and/or social dumping of rules that protect living and working conditions of workers has occupied social scientists, politicians and people from national and international institutions and labour market organizations. The negative race of social standards can take three forms. Firstly, fear of loss of competitiveness in international (or interregional) trade may ignite social dumping, being the mean by which countries try to repair international competitiveness and payment imbalances. As

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the redressing of one country's imbalance implies an upcoming imbalance for other countries, competing social devaluations could turn into a race to the bottom of social standards. The USA has been in the forefront of the involvement of labour standards in international trade negotiations, and it was the fear of lost jobs because of increased competition from countries with no or low labour standards that sent US trade union members into the streets next to the WTO meeting in Seattle in 1999 (see, for example, Elliot, 2000; Marshall, 1994). Srinivasan (1996) treats this issue formally. It is also discussed by Krugman (1997), who concludes that the demand for international harmonization of standards is, by and large, ill founded.

Secondly, high social standards (e.g. generous social benefit schemes) may attract people from regions with lower standards and create immigration into regions with high standards. Such immigration causes an increase of taxes to pay for the standards, and taxpayers will react to this with a request for lower standards. In this way, the migration externality of social standards implies that societies will end up with a less than optimal level of social standards. Brueckner (2000) overviews this aspect and concludes that evidence confirms the need for 'super-state' interference to avoid races towards the bottom.

A third way involves international capital movements. Stricter labour standards increase labour costs and reduce return to capital, and this, under downward stickiness of wages, e.g. because of trade unions, implies that capital will move towards countries with low standards. Consequently, countries with high standards will be hit by high unemployment and low production and react to this by lowering their standards. Elmslie and Milberg (1996) present this as an argument for international minimum labour standards, and Erickson and Kuruvilla (1994) consider it to be the key aspect of the social dumping debate within the EU. Furthermore, because higher integration means more freely flowing international capital movements, increasing integration may initiate or enhance the race towards the bottom. Unlike the first two channels, the third seems not to have been formally treated in the literature. The model presented in this paper shows that a drift or race towards the bottom in terms of strictness of labour standards is the optimal response by individual countries to more integration. It also concludes that the externality caused by capital migration leads to too low a level of strictness of standards among identical countries. A negotiated agreement or a super-national authority could thus increase joint

welfare by introducing common standards set above the unilaterally decided level. However, if preferences with respect to worker protection versus social efficiency differ between countries, high-standard countries might be able to lift their welfare by imposing compromise international minimum standards at the expense of welfare in low-standard countries, and eventually also at the expense of joint welfare. But a Pareto-improving optimal solution can be negotiated in this case too with an increase in the strictness of standards in both countries compared to their unilaterally decided level, but with different standard levels in the countries that reflect their (political) preferences.

The next section presents the basic relations of the model and Section 3 formulates reaction curves. With this in place, Section 4 treats the case of common and minimum standards for countries with equal preferences, and Section 5 the case of common and minimum standards for countries with different preferences. Section 6 touches on empirical relevance and indications, and Section 7 concludes. Finally, an Appendix elaborates on the basis and derivation of some of the relations in the main text.

2. The pros and cons of labour standards

Labour standards are rules and regulations that affect workers' living and working conditions. They range from fundamental standards such as the prohibition of slavery and use of child labour to more sophisticated regulations on working time, fixed-term contracts, employment protection, minimum wages, and employment representation rights, etc. (see, for example, OECD, 1996b, 1999, 2004). The aims of labour standards are in general to increase security of workers in relation to their income and employment. More strict labour standards thus increase the welfare of employed workers directly and unemployed workers indirectly as they have a probability of becoming employed. Typically, fundamental standards such as the abolition of slavery are the first to be implemented in low-income countries, whereas standards such as notice rules and severance payments are enforced later in labour markets in high-income countries in addition to more fundamental standards. Hence, it seems natural to rank labour standards along one dimension where more encompassing regulations are interpreted as a higher level of strictness of standards. With this ranking of labour standards it is assumed in the following that the marginal welfare

that workers obtain from stricter standards falls as the level of strictness rises.

The negative effects of labour standards come from their costs in relation to production. The cost may be interpreted as a tax imposed on production that evaporates without trace with no revenue for the public sector, or it might be seen as a cut in the output per worker. As some standards no doubt increase worker productivity, the cost may be minimal and even nil. This is probably most likely to be the case for more fundamental standards such as the prohibition of slavery, maximum working hours and statutory resting periods, and less so for high-level standards such as severance payments in the case of redundancy.[1] The implication is that increasing strictness gradually becomes more costly for the employer at successively higher levels of strictness. Despite the cost of standards, full employment will prevail under perfect competition, and with a fixed supply of labour marginal capital productivity is unaffected. However, if wages are sticky (e.g. because of trade unions), the non-accelerating inflation rate of unemployment (NAIRU) will increase and the marginal productivity of capital will fall, leading to an outflow of capital into countries with lower standards until universal equality of marginal capital productivity is re-established. Thus, countries with stricter labour standards will have less input of labour and capital and so a lower output per capita when capital flows freely internationally and labour stays put.

An increase of integration which reduces the costs of moving capital from one country to another will, as demonstrated in the Appendix, increase the speed of capital movements, but not the (long-term) equilibrium point where marginal capital productivity is equalized between countries. Hence, the positive and negative effects of changes in the strictness of labour standards come faster and have stronger welfare effects under a positive time preference. All this is captured in the relation

$$U = U(\theta, \theta_f, \gamma), \quad U'_\theta < 0, \quad U''_{\theta\theta_f} < 0, \quad U''_{\theta\gamma} < 0, \quad U''_{\theta\theta} \leq 0. \qquad [1]$$

In relation [1], θ and θ_f indicate the strictness of labour standards in the home country and foreign country, respectively, and γ is the level of economic integration between the countries. U is the welfare in the home country measured by income per capita.

Relation [1] shows that stricter standards reduces income per capita, which makes it evident that there must be some welfare-

increasing effects for at least some groups in societies since they are implemented. Clearly, employed workers are the first to benefit from such standards and they constitute a decisive part of the electorate. Under these circumstances, how would a government choose the optimal level of strictness of labour standards?

The answer to the question depends on the specific labour standard considered; and ranking labour standards along one strictness dimension is a crude simplification. However, to unveil the political economy of the choice, take the strictness of employment protection legislation as an example and note that labour markets are characterized by much larger gross flows in and out of employment than the flow needed for the net change in the number of unemployed workers. Let the employed worker's probability of loosing his/her job per period be q (the quit rate) and the probability per period for an unemployed worker of finding a job be e (the entrance rate). Stricter labour standards (i.e. a higher value of θ) can thus be interpreted as a lower value of q. The change in the rate of unemployment u over a period will be[2]

$$\mathrm{d}u = (1-u)q - ue. \qquad [2]$$

In steady state with $\mathrm{d}u = 0$ this can be changed into

$$q = \frac{u}{1-u}e. \qquad [3]$$

With no public sector and unemployment benefits and taxes, the expected income of an employed worker is $U_e = (1 - q)U/(1 - u)$. $U/(1 - u)$ is income per capita distributed among employed workers only. The unemployed worker has no income, but the expected income of an unemployed worker is $eU/(1 - u)$. An altruistic government would maximize the joint income of both employed and unemployed workers, i.e. it maximizes the objective O (measured per worker)

$$O = (1-u)(1-q)\frac{U}{1-u} + ue\frac{U}{1-u}. \qquad [4]$$

However, using [3], the objective O collapses into income per capita U:

$$O = (1-q)U + \frac{u}{1-u}eU = U. \qquad [5]$$

O obtains its maximal value for the lowest strictness of labour standards (i.e. the highest value of q) possible. This indicates that special attention must be paid to employed workers when a government proposes employment protection legislation. In democratic societies, where employed workers form the majority of the electorate and the decisive voter is always employed, this seems natural. A government paying attention solely to the decisive voter would maximize the employed workers' expected income $U_e = (1 - q)U/(1 - u)$. An increase in the strictness of employment protection legislation will benefit the employed worker in two ways: firstly, by reducing the quit rate q, and, secondly, by reducing the employment rate $1 - u$, so that output will be shared among fewer employed workers. However, as demonstrated in the Appendix, U falls with higher strictness so U_e is assumed concave in q in order to have an internal maximum value. The q or θ corresponding to the maximum value of U_e will be chosen by a government sensitive to the decisive voter solely, in order to secure its re-election.

The altruistic government and the government focusing solely on the decisive voter can be considered two extremes, with real-life governments having an objective somewhere in between:

$$O = \alpha U_e + (1-\alpha)U_s, \quad U_e' > 0, \quad U_e'' < 0, \quad 0 < \alpha < 1. \qquad [6]$$

A government that is very attentive to general welfare (output per capita[3]) will have a small α, and a government that is very sensitive to the welfare of employed workers will have a big α. Objective [6] is similar to the objective in Grossman and Helpman (1994), where the two elements to be weighted are financial contributions to the government (for its re-election campaign) versus the joint welfare of all citizens. However, it would be too crude an interpretation of the above relation to say that social welfare always falls with an increase in the strictness of labour standards. Firstly, the effect depends on the specific type of standard that is introduced or changed, and, secondly, interpersonal comparison of utility changes has to be done in an evaluation of the change of social welfare. Hence, O cannot a priori be said to be a poorer measure of social welfare than U_s; but relation [6] shows that societies with social institutions and/or political systems that give high priority to

the welfare of employed workers will tend to set high levels of strictness in terms of labour standards.

3. The reaction curve and equilibriums with independent optimization

In a world of two countries that act autonomously, the government of each country will maximize [6] with respect to the strictness of labour standards, taking the level of strictness in the other country and the level of integration as given. Maximation of [6] with respect to θ gives the optimum condition

$$\left|\frac{U_s'}{U_e'}\right| = \frac{\alpha}{1-\alpha}, \qquad [7]$$

where the left-hand side increases in θ, θ_f and γ. Hence, the home country will react to an increase in the level of strictness of labour standards in the foreign country and/or the level of integration by reducing its own level of strictness. Moreover, an altruistic government with a low α will have a low level of strictness in relation to labour standards. In order to calculate the reaction function of the countries, a specific function for U_e and U_s is chosen:

$$U_e = 2\theta - \theta^2, \quad 0 < \theta < 1. \qquad [8]$$

U_e is strictly concave in θ, as shown in Figure 1. The function for U_s is

$$U_s = (1+\gamma\theta_f)(1-\theta), \quad 0 < \theta_f < 1, \quad 0 < \gamma < 1. \qquad [9]$$

U_s is linear in θ with the required properties (see [1]), and is depicted in Figure 1. Finally, the objective O becomes

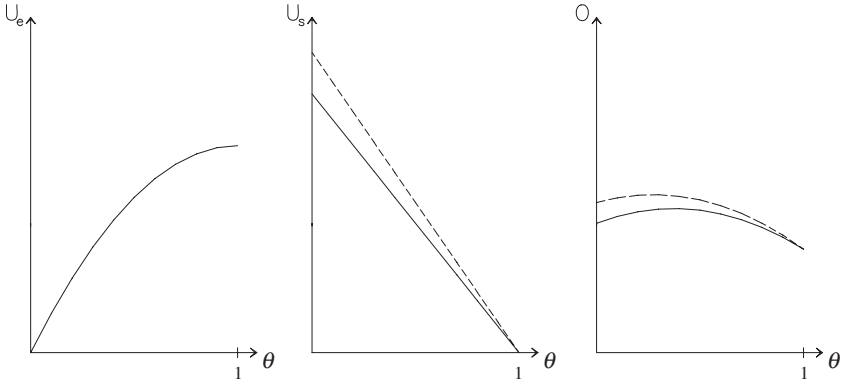
$$O = \alpha(2\theta - \theta^2) + (1-\alpha)(1+\gamma\theta_f)(1-\theta), \quad 0 < \theta_f < 1, \quad 0 < \gamma < 1. \qquad [10]$$

O is a linear combination of [8] and [9] and therefore is strictly concave — or hump shaped — in θ.

The home country's optimal value of θ is now

$$\theta^* = 1 - \beta(1+\gamma\theta_f), \quad 0 < \beta < 1, \qquad [11]$$

Figure 1. U_e, U_s and O as functions of θ, respectively



Note: $\gamma = 0.5$, $\alpha = 0.5$, $\theta_f = 0.5$, and $\theta_f = 0.9$ (dashed curves).

where

$$\beta = (1-\alpha)/2\alpha. \qquad [12]$$

β indicates the country's (political) preference for social efficiency versus protection of employed workers. A country with a high β has a political system that is more altruistic and less sensitive to the welfare of the decisive median worker who is always employed. It is easy to see from [11][4] that the (political) optimal strictness of a country's labour standards falls with increasing preference for social efficiency and that increasing integration and higher levels of strictness in relation to labour standards in the foreign country also leads to a fall in θ^*.

Equation [11] is the reaction curve for the home country for variation of θ_f. A similar expression with β_f and θ instead of β and θ_f, respectively, gives the reaction curve of the foreign country. Inserting this in [11] leads to the Nash equilibrium:

$$\theta^N = \frac{1-\beta(1+\gamma(1-\beta_f))}{1-\beta\beta_f\gamma^2} \qquad [13]$$

if positive, else:

$$\theta^N = 0.$$

Swapping β and β_f in [13] gives the equation for θ_f^N. As expected, the strictness of labour standards is lowest in the country that mostly favours social efficiency versus the protection of employed workers. If the two countries have the same preference for social efficiency (i.e. $\beta = \beta_f$) [13] condenses to

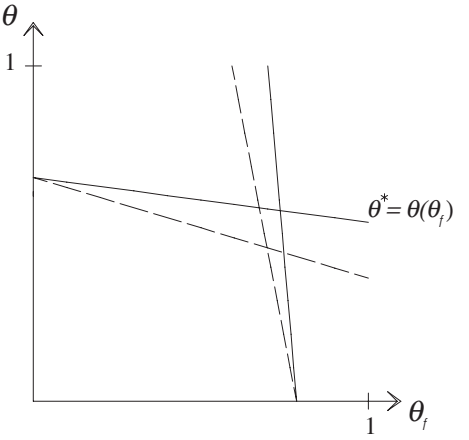
$$\theta^N = \frac{1-\beta}{1+\beta\gamma}, \qquad [14]$$

which is positive and less than one. [13] and [14] lead to

$$\frac{\partial\theta^N}{\partial\gamma} < 0, \quad \frac{\partial\theta_f^N}{\partial\gamma} < 0. \qquad [15]$$

Hence, more integration (i.e. a higher γ) gives lower levels of strictness of labour standards in the two countries, and the model supports the allegation that more integration leads to a 'race' towards the bottom of standards and endangers the welfare of employed workers. However, the race does not go the whole way to the bottom and contributes to a reduction of the NAIRU. Figure 2 illustrates the reaction curves, the crossing point of the Nash equilibrium, and the case of increased integration.

Figure 2. Reaction curves and the Nash equilibrium



Note: $\beta = 0.33$, $\beta_f = 0.21$, $\gamma = 0.4$ and $\gamma = 0.9$ (dashed curves).

The Nash equilibrium [13] is not the only possible equilibrium. There is a first-mover advantage in the game so that a reliable first mover, knowing the reaction curve of the adversary, can gain by a first big move downwards and stick to this. The first-moving government will maximize

$$O = \alpha(2\theta - \theta^2) + (1-\alpha)(1+\gamma(1-\beta_f(1+\gamma\theta)))(1-\theta),$$

leading to an optimal first-mover level of strictness of labour standards θ^S:

$$\theta^S = \frac{1-\beta(1+\gamma(1-\beta_f(1-\gamma)))}{1-2\beta\beta_f\gamma^2}. \qquad [16]$$

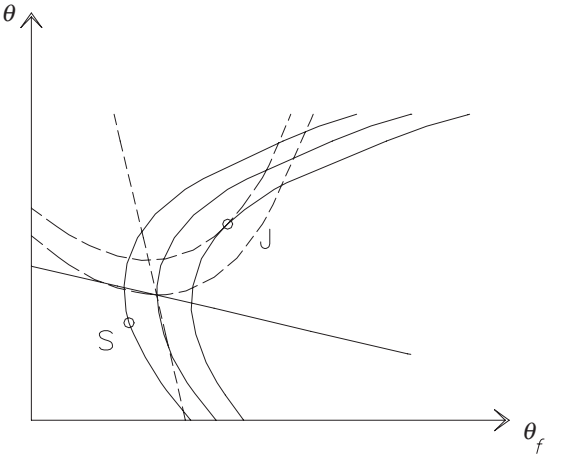
The strictness of labour standards set by the first-moving government θ^S is smaller than the Nash equilibrium θ^N from [13]. To win the game and become reliable, the first mover has to stick to this move no matter what the government of the other country does. However, the other government might try the same strategy, which will produce a Stackelberg equilibrium. In this case, both countries will set a strictness of labour standards according to [16] and this will last until, finally, one gives in, that is, because of increasing political pressure for more protection of employed workers. In principle, more integration might ignite first-mover reactions by governments and thus initiate a faster race towards the bottom. However, the first-mover advantage and therefore the welfare (objective)-reducing Stackelberg equilibrium can be avoided if countries reliably announce they will follow any attempt by other countries to reduce strictness. Figure 3 shows the equilibriums.

4. Common and minimum labour standards for countries with equal preferences

Internationally imposed labour standards are typically minimum provisions to secure a universal acceptable treatment of workers. Such minimum standards apply to all countries involved and are intended to improve the welfare of workers. Minimum standards are treated later; first, an optimal level of strictness for a common standard is sought.

An optimal common standard should somehow maximize the objective of the governments (political systems or voters of the

Figure 3. Equilibrium for Nash, Stackelberg and joint welfare maximization for identical countries



Notes: $\beta = 0.33$, $\beta_f = 0.33$, $\gamma = 0.7$. S is the unstable Stackelberg equilibrium, the crossing point of the reaction curves is the Nash equilibrium, and the J is the joint welfare maximization point of strictness. The reaction curve and indifference curves of the foreign country are dashed.

countries) that are eventually to agree on the standard. Hence, the size and negotiating abilities of the countries involved will play a role. To avoid such complications, it is assumed in the following that the two countries are of equal size. In this case, maximizing the joint welfare (objective) of the two countries gives the following common level of strictness.[5]

$$\theta^J = \frac{1-\rho(1-\gamma)}{1+2\rho\gamma}, \quad \rho = \frac{\alpha}{\alpha+\alpha_f}\beta + \frac{\alpha_f}{\alpha+\alpha_f}\beta_f. \qquad [17]$$

For countries with identical preferences in relation to social efficiency versus protection of employed worker (i.e. $\beta = \beta_f$) the optimum common level of strictness θ^J according to [17] is higher than the level in the Nash equilibrium [12]. This is depicted in Figure 3 where the crossing point of the reaction curves indicates the Nash equilibrium, point S the Stackelberg equilibrium, and point J the joint welfare-maximizing common level of strictness.

The common optimal level of strictness gives more protection to employed workers and brings countries closer to the objective set by the political system, which might be interpreted as country welfare.[6] However, NAIRU will also increase with stricter standards and so will unemployment and income per capita. Also, in this case, more integration (i.e. a higher γ in [17]) will lead to reduced strictness of labour standards. Note also[7] that countries have an incentive to join negotiations and agree on common stricter international labour standards and subsequently cheat in relation to national implementation. Because of this, international agreements on standards without a monitoring mechanism and sanctions are likely to be implemented reluctantly by the signatories.

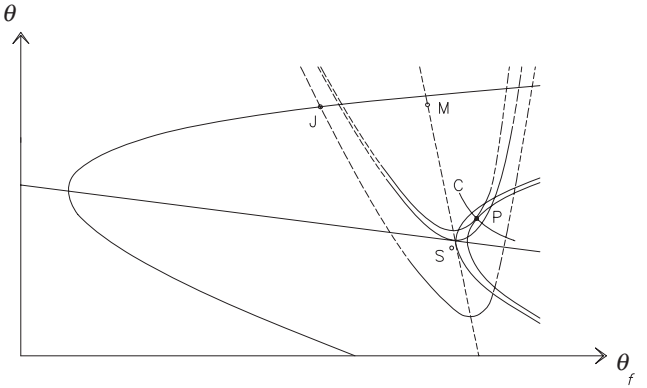
With the Nash equilibrium as starting point, a common *minimum* (level of strictness of) standard will be higher and above the reaction curves so that no country will go higher than the minimum. Because of this, there is no difference between common standards and common minimum standards when countries have equal preferences.

5. Common and minimum labour standards for countries with different preferences

The conclusions above do not always hold when governments (countries) attach different weights to social efficiency versus employed worker protection. In the case[8] plotted in Figure 4, the joint welfare-maximizing common level of strictness according to [13], shown as point J, might be interpreted as the most likely negotiated compromise common level of strictness. It has a level of strictness that is lower than both the Nash and Stackelberg levels in the country that values protection of employed workers highly, and this country will realize a welfare (objective) loss. But the country that puts less emphasis on employed worker protection will also suffer compared with the Nash and Stackelberg equilibriums. Hence, the joint welfare-maximizing compromise common level of strictness [13] that strikes a level of strictness between individual country levels gives less welfare to both countries and is clearly non-optimal. The example shows that enforcement of common international compromise labour standards might be worse than no agreement for all participating countries.

However, when preferences differ between countries, a common *minimum* level of strictness of labour standards becomes relevant.

Figure 4. Equilibrium points when countries have different preferences



Notes: $\beta = 0.43$, $\beta_f = 0.13$, $\gamma = 0.7$. S is the unstable Stackelberg equilibrium, the crossing point of the reaction curves is the Nash equilibrium, J is the joint welfare maximization point, M is the point of minimum strictness, C is the contract curve, and P is a Pareto-improving point. The reaction curve and indifference curves of the foreign country are dashed. The axes do not go through the origin and the scales differ. Note that at point J, $\theta = \theta_f$.

Assume point J in Figure 4 is an agreed common *minimum* level of strictness of labour standards, so that each country is free to choose its level of strictness provided it is no lower than the minimum level. In this case, the home country will stick to the minimum level as the best solution, and the foreign country, putting more weight on protection of employed workers, will pick the best point on its reaction curve knowing that the other country cannot go below the minimum level. The foreign country thus chooses point M on its reaction curve and obtains a welfare level that is higher than in all other points. The home country gains from increased strictness in the foreign country compared with point J, but it is still the case that its welfare is below the welfare in the Nash equilibrium. Moreover, under the given specification, the joint welfare of the countries is higher in the Nash equilibrium.

A common *minimum* standard can be said to be *relevant* when at least one country chooses a standard higher than the minimum. With a relevant common minimum standard between the Nash standards (e.g. point J) the low-standard country is forced to raise its standard and this will raise the welfare of the high-standard

country. In addition, the increased strictness in the low-standard country will induce the high-standard country to increase its welfare further by reducing its standard below the Nash level, still keeping it over the minimum level. The high-standard country is thus sure to gain from a relevant common minimum labour standard; and the low-standard country will see its welfare reduced. In other words, a relevant common minimum labour standard is not Pareto improving compared with the Nash equilibrium.

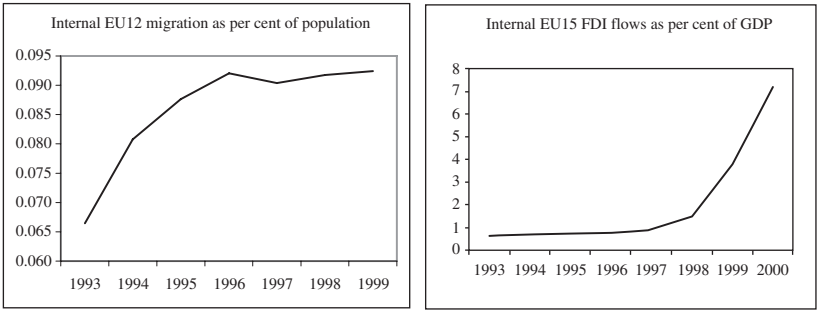
However, a Pareto-improving optimal solution can be negotiated in this case too. The Pareto optimal point of such an agreement lies on a contract curve positioned north-east of the two reaction curves and depicted as curve C in Figure 4. The formula for the contract curve is in the Appendix. Point P in the figure is a possible agreement where the low-standard country has higher welfare than at any of the other equilibrium points, whereas the high-standard country is better off only at point M. If point P is agreed, both countries will have to raise their level of strictness compared with the Nash equilibrium.

The point on the contract curve on which countries will agree depends on their bargaining ability. However, if no country will settle for welfare lower than the Nash level, a Pareto-improving agreement can be reached that forces both countries to raise their levels of strictness and respects difference in (political) preferences reflected in country standards. This deserves attention in international negotiations on labour standards.

6. Empirical relevance and indications

The relevance of the model presented in the previous sections hinges on the size and importance of international capital movements and their sensitivity to integration. The model assumes no migration of labour combined with important flows of capital that increase with more integration. Corroborating evidence can be found from the recent case of increased integration in the EU. Figure 5 shows the development of factor movements inside the EU after the formal start of the Internal Market, which aimed to break down remaining internal non-tariff barriers. In principle, both labour and capital moved freely before, but the Internal Market wiped out existing 'technical barriers' and gave a new impetus to integration. Moreover, with the Maastricht Treaty of 1992 the EU

Figure 5. Internal EU flows of factors of production



Note: EU12 is EU15 minus Austria, Greece and Italy.
Source: Author's calculations based on Eurostat (1998/99 and 2000), *Eurostat Yearbook*; Eurostat (2000 and 2002), *European Social Statistics. Migration*; and European Commission (2002), *European Economy*, No. 4.

embarked on monetary union, with the euro being launched as notes and coins in 12 of the 15 Member States in 2002.

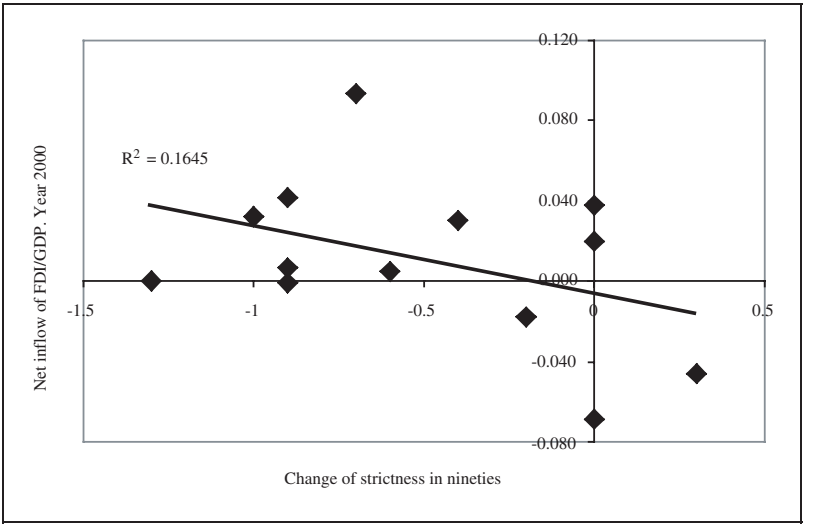
With significant language and cultural barriers between most EU Member States, one can hardly expect internal EU migration to be of major importance. But even within linguistic regions the movement of workers in response to changing economic conditions is more modest than in the USA (see, for example, Eichengreen, 1997; Obstfeld and Peri, 1998). This may change in the future, but the left-hand panel of Figure 5 indicates a levelling out of internal EU migration below 1 per 1,000. In contrast to this, internal capital movements measured by foreign direct investment (FDI) have soared since the beginning of the Internal Market and in 2000 reached a level of between 7 and 8 per cent of GDP (i.e. more than 10 times the level in 1993). Thus integration has spurred capital movements but has left worker migration comparatively untouched.

Evidence on inward capital movements in response to less strict labour standards is also needed to support the model. The OECD (1996b) concludes that 'there is some evidence that inflows of foreign direct investment have been larger in countries where labour costs are lower and government regulations on labour standards less stringent'. And Elmslie and Milberg (1996) on the US–Canadian Free Trade Agreement: 'Since 1989, when the agreement went into

effect, Canada has experienced a substantial decrease of foreign capital and a shrinkage of its corporate tax base. This has contributed to the pressure on the Canadian government to reduce its high standards for health care and welfare benefits.' However, Erickson and Kuruvilla (1994) have studied the labour cost incentive for capital movements in the EU for the period 1980–88 and conclude that over this period capital movements to lower cost countries were not much larger than to higher labour cost countries. Two possible explanations for the low sensitivity of capital movements are invoked; one is that other countries outside the EU have much lower labour costs and therefore attract the bulk of capital movements; another is that the period is too early and that in the future the internal market will speed up internal European capital movements.

Figure 6 depicts the correlation between changes in employment protection legislation (EPL) strictness in EU countries during the

Figure 6. Change of EPL strictness and internal EU net flows of FDI



Notes: EU countries plotted are EU15 minus Greece and Luxembourg. 'Change of EPL strictness in nineties' is the difference between OECD EPL strictness version 1 for the late 1990s and late 1980s. The original data show a general tendency for over-reporting inflows of FDI.

Source: As for Figure 5 plus OECD (2004, Table 2.A2.4).

1990s and net flows of FDI from other EU countries in 2000. The negative correlation gives some support to the model presented above. However, a rigorous study of determinants of internal EU FDI flows is beyond the scope of this paper. Rodrik (1996) has looked for determinants of American (US) FDI abroad over the years 1982–89 and has found that countries with poor child labour practices attract less capital than other countries; and OECD (2000a) points out that core and non-core labour standards have different and often opposite effects on economic outcomes. Core labour standards are defined in the ILO Declaration on Fundamental Principles and Rights at Work (see ILO, 1998) as the freedom of association, elimination of forced labour, abolition of child labour and elimination of discrimination. An explanation might be that FDI is not guided solely by differences in labour costs but also by factors such as legal systems, social capital, and infrastructure, etc., all factors that are typically correlated with labour costs. Based on this, the presented model may be better suited for higher level standards in more developed countries with similar legal systems, social capital, infrastructure, etc.

In the model, stricter labour standards (e.g. employment protection legislation) leads to higher NAIRU. A recent OECD (2004) study suggests a negative relation between strictness of employment protection legislation and employment of youth and prime-age women, but with uncertain overall effects. Stricter employment protection legislation expands job security for the employed and increases spells for those hit by unemployment and provides barriers to first job seekers, which creates segmentation and inflexibility in labour markets. This may be especially harmful in times when more profound structural changes are needed, but has limited and even positive effects under expanding business cycles (see Chen *et al.*, 2003).

The theoretical model uses the strictness of labour standards concept, and the OECD (1994a) shows a synthetic index for labour standards for 18 Member States. But later studies by the OECD (1994c, 1999, 2004) are confined to the narrower concept of employment protection legislation. Table 1 demonstrates, by use of the OECD (2004) index (version 2), that levels of strictness differ between regions. North America is clearly a region with a low level of strictness, whereas countries in Southern Europe favour a comparatively high level of strictness. Naturally, differences in the level of strictness grow between individual countries. Among the countries covered by Table 1, the USA comes out with the lowest level

Table 1. Strictness of employment protection legislation

Region	Late 1990s
Nordic countries	1.9
Central and Western Europe	2.1
Transition economies	1.8
Southern Europe	3.3
North America	0.9
Asia and Oceania	1.6

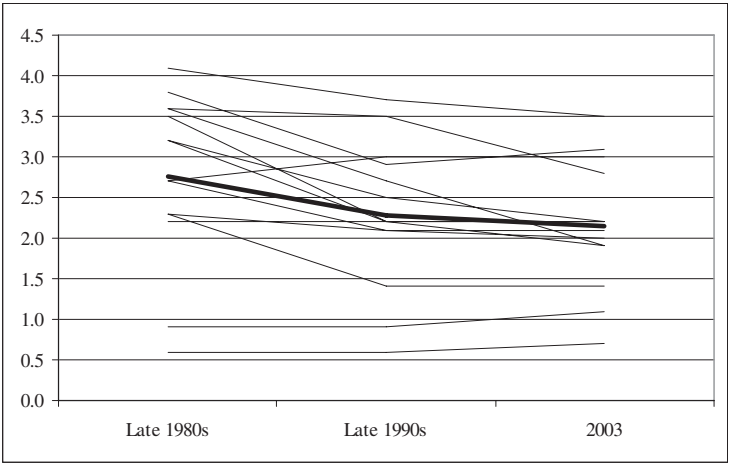
Note: An arithmetic average is shown of the version 2 overall strictness levels for countries of the respective region. Nordic countries are Denmark, Finland, Norway and Sweden; Central and Western Europe is Austria, Belgium, France, Germany, Ireland, the Netherlands, Switzerland and UK; Transition economies are the Czech Republic, Hungary and Poland; Southern Europe is Greece, Italy, Portugal, Spain and Turkey; North America is Canada and USA; Asia and Oceania are Australia, Japan, Korea and New Zealand.
Source: Author's calculations based on OECD (2004, Table 2.A2.4).

(0.7) and Portugal with the highest (3.7). The data behind the table also show that the EU12 continental countries (excluding Luxembourg) have an average level of strictness equal to 2.7 (i.e. 2.7 times the UK level). Such differences cannot be overlooked and the presented model shows that this can have important implications for a Pareto-improving international agreement.

A pertinent question is whether or not economic integration leads to a race towards the bottom of labour standards, or in the European case of Table 1, a reduction in the strictness of employment protection legislation.

Based on OECD (2004), Figure 7 shows the development of strictness of employment protection legislation from the late 1980s to 2003 in 14 EU countries. The thick line is the (arithmetic) average of the countries and shows a reduction in the strictness in a period where integration increased with the creation of the Internal Market and the Maastricht 1991 decision to create the European Economic and Monetary Union. Thus, more integration seems to have led to a 'race' towards the bottom. This supports the conclusions of the model, but it should be borne in mind that for some time these countries (see, for example, the OECD Jobs Study (OECD, 1994b)) have been urged to increase labour market flexibility. The drift towards less restrictive employment protection legislation might thus also be the effect of a widespread change of preferences towards more emphasis on social efficiency versus

Figure 7. Change of EPL strictness levels in EU14



Note: The version 1 strictness of employment protection legislation for 14 EU countries (Luxembourg excluded, thin lines) and the arithmetic average (thick line) are shown.
Source: OECD (2004, Table 2.A2.4).

employed worker protection. The figure also indicates a tendency for convergence with an increase in protection in two low-level countries, namely the UK and Ireland.[9] This corresponds to a movement from the Nash equilibrium to point M in Figure 4.

7. Conclusions

Free international capital movements in a globalized world and increased international integration have raised fear that capital and jobs will flee to countries with low labour standards. The paper presents a formal model that connects capital flows with changes in the strictness of labour standards. Among the assumptions of the model is a labour market with trade unions. Moreover, it assumes that the cost of strictness is not neutralized by higher labour productivity.

The model shows that when countries are similar and act independently, a Nash equilibrium will emerge in which more integration leads to lower strictness of labour standards (i.e. a race towards

the bottom). Moreover, this movement may be enhanced if integration ignites a first-mover reaction leading to a Stackelberg equilibrium. Compared with these equilibriums, a Pareto-improving solution can be reached with a common higher strictness of labour standards.

When preferences differ between countries, an agreed common or minimum strictness of labour standards will typically not be Pareto improving, but will be to the detriment of the country that gives less weight to the protection of employed workers. However, in this case a Pareto-improving solution can also be found. This solution raises the strictness of labour standards compared with the Nash equilibrium for both countries, but accepts a difference in country standards by acknowledging their difference in preferences.

Appendix

Two countries with different levels of employment protection legislation and free movement of capital

The world consists of two counties with the same production technology and output:

$$Y = f(K, L); \quad f_K, f_L > 0; \quad f_{KK}, f_{LL} < 0; \quad f_{KL}, f_{LK} > 0, \qquad [A1]$$

where Y is output, which is sold to the price 1 per unit in a perfectly competitive world market, K is the fully employed capital, and L is employed labour. Also, labour market relations are similar between the countries with a wage setting schedule:

$$w = w(L); \quad w_L > 0. \qquad [A2]$$

The (real) wage level is w. With a fixed labour supply $\overline{L} \geq L$, unemployment is possible. Employed workers are subject to employment protection legislation (EPL)[10] that is costly for the employer at the cost d per worker, where d grows with stricter EPL level. Thus, d indicates the level of strictness and the cost per worker of EPL. The population and the labour force $\overline{L}$ is identical so that income per capita is $Y/\overline{L}$. With the amount of capital K given and a user cost of capital equal to u per unit, companies maximize profit π:

$$\pi = f(K, L) - (w + d)L - uK \qquad [A3]$$

with respect to employment L. Hence, the equilibrium rate of unemployment is found where

$$f_L(K, L) - w(L) - d = 0. \qquad \text{[A4]}$$

With K and d given exogenously, [A4] gives a value of L that is the equilibrium level of employment with a corresponding equilibrium real wage and level of unemployment (i.e. the NAIRU).

With only two countries in the world, let there be no EPL in country 1 while country 2 considers an EPL level of d. If introduced, d becomes the difference in EPL level between the two countries. The population, or labour force, of the two countries are assumed not to migrate over borders, whereas capital is international and moves between the countries in order to maximize total profit. However, moving capital from one country to another is costly according to the function

$$c = c(I); \quad c(0) = 0; \quad c'(I) > 0; \quad c''(I) > 0. \qquad \text{[A5]}$$

Here, I is the amount of capital that moves internationally per unit time (e.g. 1 year). Thus, international capital movements are dampened by the costs of movement. More integration reduces these costs, so that $c'(I)$ becomes lower the more the two economies are integrated. While capital can move between the countries and so change the amount of capital in each country, total capital is still fixed worldwide and fully employed.

Assume an equilibrium starting point with identical countries so that total capital $\overline{K}$ is divided equally between the two countries,[11] both with no EPL, or $d = 0$. From this starting point, country 2 introduces EPL at a level d. What will happen?

Capital, being international, will seek to maximize the present value of profit earned in both countries through an optimal spatial location and with moving costs of capital taken into consideration. The function to maximize becomes

$$\int_0^\infty \{f(K_t, L_t^1) - w_t^1 L_t^1 + f(\overline{K} - K_t^1, L_t^2) - (w_t^2 + d)L_t^2 - u\overline{K} - c(I_t)\}e^{-\rho t}\mathrm{d}t. \qquad \text{[A6]}$$

Note that the superscripts 1 and 2 indicate the country; t is time with a time preference behind the discount factor ρ. Capital movements, or FDI (i.e. I_t), flow from country 2 to country 1 with

$\dot{K} = I$ and $K_0 = \overline{K}/2$. Furthermore, labour markets in the two countries both have the wage setting schedule [A2], which must be respected in all periods to keep the labour market in equilibrium. Under these conditions [A6] is maximized with respect to I, L^1 and L^2.

Omitting the product $u\overline{K}$ because it is constant, the current-value Hamiltonian is

$$H = f(K, L^1) - w^1 L^1 + f(\overline{K} - K, L^2) - (w^2 + d)L^2 - c(I) + \lambda I. \quad [A7]$$

With labour markets in equilibrium, the optimality conditions become

$$\frac{\partial H}{\partial L^1} = f_L(K, L^1) - w^1(L^1) = 0. \quad [A8]$$

$$\frac{\partial H}{\partial L^2} = f_L(\overline{K} - K, L^2) - w^2(L^2) - d = 0. \quad [A9]$$

$$\frac{\partial H}{\partial I} = -c'(I) + \lambda = 0. \quad [A10]$$

$$\dot{\lambda} - \rho\lambda = -f_K(K, L^1) + f_K(\overline{K} - K, L^2). \quad [A11]$$

Equations [A8] and [A9] secure labour market equilibrium in every period, and the four equations above together with the initial condition $K_0 = \overline{K}/2$ and the identity $\dot{K} = I$ solve for the variables K, L^1, L^2, I and λ. Before capital movements starts, d is zero, and so is I and λ, and also the right-hand side of [A11] because marginal capital productivities in the two countries are identical.

Implicit differentiation of [A8] gives

$$\frac{\partial L^1}{\partial K} = -\frac{f_{LK}}{f_{LL} - w'} > 0. \quad [A12]$$

Hence, an inflow of capital into country 1 when country 2 sets a positive d will increase K and also employment. For country 2 [A9] leads to

$$\frac{\partial L^2}{\partial K} = \frac{f_{LK}}{f_{LL} - w'} < 0, \quad [A13]$$

because of the simultaneous outflow of capital from country 2. Further, [A10] gives $\lambda = c'(I) > 0$, and

$$\frac{\partial \lambda}{\partial I} = c''(I) > 0 \Rightarrow \dot{\lambda} = \dot{I}c''(I). \qquad [A14]$$

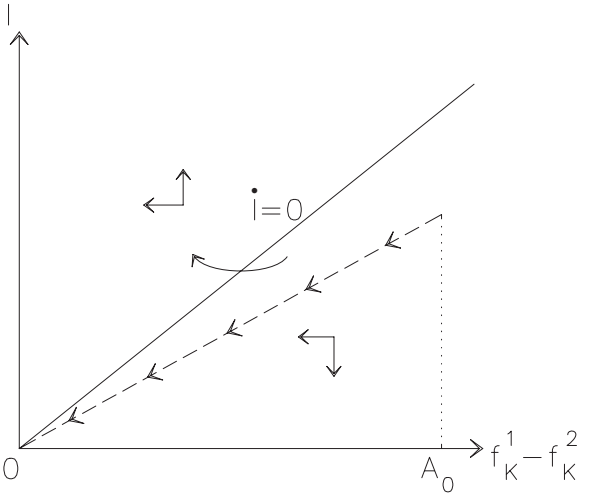
Using this, equation [A11] can be transformed into a differential equation for FDI from country 2 to country 1:

$$\dot{I} = \frac{\rho c'(I) - f_K(K, L^1) + f_K(\overline{K} - K, L^2)}{c''(I)}. \qquad [A15]$$

Equation [A9] shows that a positive d becomes a wedge between f_L and w^2 and hence L^2 will be reduced in country 2. Moreover, lower employment reduces f_K in the country and hence the right-hand side of [A11] becomes negative. This induces a flow of capital from country 2 to country 1.

Figure A1 depicts[12] the dynamic way to the new equilibrium from a starting point where the right-hand side of [A11] is $-A_0$. The international capital movement I may, according to equation [A15], be so big that $\dot{I}$ will be zero. This is the case along the line $\dot{I} = 0$. With movements as shown by the arrows, a stable path to a

Figure A1. The dynamic path of international capital movements



new equilibrium at the origin can only be below this line and follows the dashed line with arrows that show the movement over time. Hence, international capital movements will jump to their biggest yearly level initially and gradually diminish until the new equilibrium is reached.

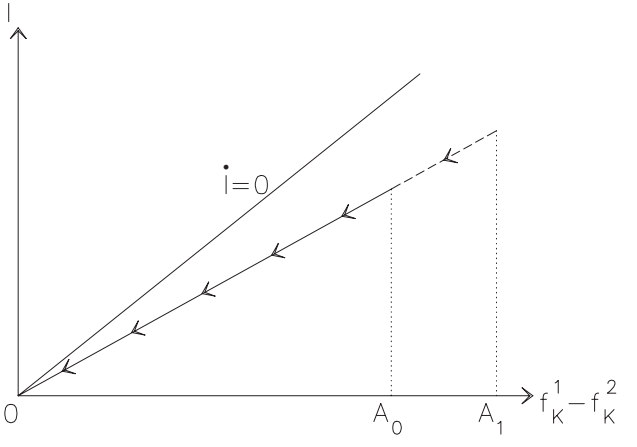
In the new equilibrium [A15], [A11] and [A10] will be zero, so that [A8] and [A9] hold together with

$$f_K(K, L^1) = f_K(\overline{K} - K, L^2). \qquad [A16]$$

From [A12] and [A13] it is known that employment has increased in country 1 and decreased in country 2. Furthermore, equation [A2] shows that the wage has risen in country 1 and fallen in country 2. Consequently, workers in country 2 clearly suffer a welfare loss and the more so because international capital movements pull capital out of the country and reduce marginal labour productivity. All capital owners will lose as a result of the lower level of total employment. The loss is partly redressed, however, by the optimal international relocation of capital. With reduced employment and less capital, income per capita $Y/\overline{L}$ has clearly fallen in country 2.

A larger difference between EPLs. Figure A2 depicts the path for the introduction of a larger d (i.e. a larger change of the EPL in country 2). The line $\dot{I} = 0$ remains unchanged, but a greater negative effect on employment in country 2 gives a higher initial difference between

Figure A2. The path for a greater difference in EPL

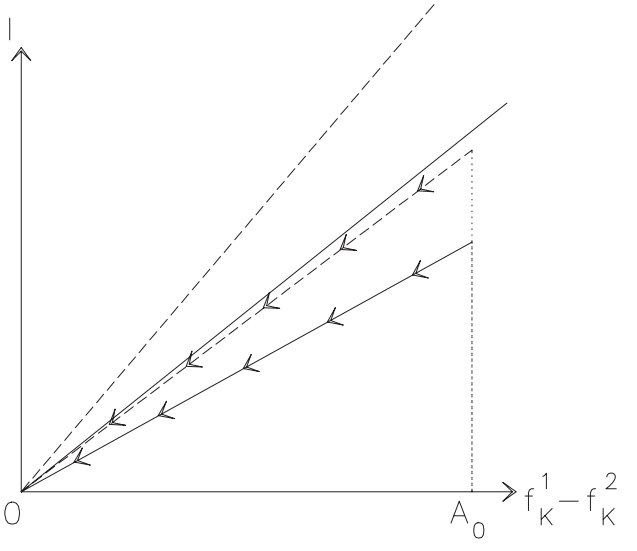


marginal capital productivities, equal to A_1 in the figure. Thus more capital moves internationally per year and the total amount of capital that will move between the initial and the final new equilibrium is greater. Effects on employment, workers' income and the income of capital owners will be as described above but larger. Hence, for country 2, which initiates the capital movements by introducing a high level of EPL, the negative welfare effects are larger.

Is there EPL-level sensitivity? Above, d was interpreted as a difference between levels of EPL with the implication that the *difference* has the same effect irrespective of the EPL *level* from which it is measured (i.e. the EPL level of country 1). If greater strictness becomes increasingly more costly to companies, because ways to alleviate the negative effects become scarcer, the cost effect of a difference will be greater with higher levels of strictness. Empirical evidence cited in the main text indicates that more fundamental and therefore low-strictness labour standards are hardly costly to companies — for example, the abolition of child labour is not costly because it increases the educational level and productivity of the labour force, whereas high-strictness standards (e.g. compulsory severance payments to fired workers that may even reduce productivity of employed workers) are more costly. Based on this it is assumed in the main text that the effect of a change in the strictness in the home country is increasing in the level of strictness in the foreign country.

The effects of more integration. The cost function [A5] is based on an assumption of costly international FDI. Such costs are direct transportation costs and costs related to the passing of various legal barriers to international movements of capital, but also stem from differences in national and local administrative routines and behavioural differences between cultures. Most of these costs are reduced under increased integration so that marginal costs $c'(I)$ fall. However, a lower $c'(I)$ will not affect the equilibriums fixed by relations [A8], [A9] and [A16], but only affects the path as illustrated in Figure A3. The total amount of capital that moves internationally between the two equilibriums is thus not affected by the level of integration provided capital is allowed to move. However, more integration will speed up movements with larger initial amounts of capital that moves per year. As can be seen from [A15], larger investments are needed under a smaller $c'(I)$ on the balancing path to the new equilibrium. Hence, as illustrated in Figure A3, the initial jump

Figure A3. The path with more integration



in international foreign investments will be larger, but so will the reductions in the flow of investments over the years. Increased integration will thus have the implication for country 2 that a given increase of the EPL will give a more massive initial outflow of capital and corresponding heavier negative effects on employment and remuneration of workers.

As explained above, capital owners will also lose from higher EPL, but they will gain from more integration, because it becomes cheaper to move capital and because the speedier relocation gives a faster reduction of costs of misallocation due to the higher level of EPL in country 2. However, with welfare measured by income per capita $Y/\overline{L}$, more integration speeds up and so enhances the negative effects on welfare in a country that unilaterally implements an increase in the EPL.

Summary. The relevant relations from the foregoing exercises can be condensed into the following relation used in the main text:

$$Y/\overline{L} = U = U(\theta, \theta_f, \gamma), \quad U'_\theta < 0, \quad U''_{\theta\theta_f} < 0, \quad U''_{\theta\gamma} < 0, \quad U''_{\theta\theta} \leq 0. \quad \text{[A17]}$$

Here, θ and θ_f indicate the strictness of labour standards (e.g. employment protection legislation) in the home country and the

foreign country, respectively, and γ is the level of economic integration between the two countries. U is the welfare in the home country measured by income per capita $Y/\overline{L}$, and the specified derivatives are needed in the main text to derive the reaction of the home country, taking the position of the foreign country and the level of integration as given. As mentioned in the main text, introduction of fundamental (low-strictness) standards might increase worker productivity and therefore not have any negative effects on employment, capital movements and output. The function U might therefore be concave with derivatives close to or equal to zero for low values of θ and specifications according to [A17] for higher values of θ.

Equation [17] for countries of different size

If the countries are of different size, weightings according to the relative size should be attached to the utility of each country to express the joint utility U_t:

$$U_t = bU + (1-b)U_f \quad 0 < b < 1, \qquad \text{[A18]}$$

where U and U_f are the utility levels of the home country and the foreign country, respectively. The letter b is a parameter for the relative size of the home country in terms of inhabitants. This changes [A18] into the following formula:

$$\theta^{JW} = \frac{1-\delta(1-\gamma)}{1+2\delta\gamma}, \quad \delta = \frac{b\alpha}{b\alpha+(1-b)\alpha_f}\beta + \frac{(1-b)\alpha_f}{b\alpha+(1-b)\alpha_f}\beta_f, \qquad \text{[A19]}$$

where δ is a weighted indicator of the relative preference for social efficiency. A higher δ reduces θ^{JW}, and a bigger b gives the preference of the home country more weight in δ.

The contract curve

The contract curve in Figure 4 is found to have the following formula that gives the level of strictness θ of the home country as a function of the level of strictness θ_f of the foreign country:

$$\theta = \frac{\gamma + (\kappa)^{1/2}}{2\beta_f\gamma}, \qquad \text{[A20]}$$

where

$$\lambda = (1-\beta\beta_f\gamma^2)(1-\theta_f) - \beta_f(1-\gamma+\beta(1+\gamma\theta_f)\gamma). \quad [A21]$$

$$\kappa = \lambda^2 - 4\beta_f\gamma\mu. \quad [A22]$$

$$\mu = (1-\beta\beta_f\gamma^2)(1-\theta_f) - \beta(1-\theta_f)(1+\gamma\theta_f) - \beta_f + \beta\beta_f(1+\gamma\theta_f). \quad [A23]$$

Notes

[1] Still, in Eurobarometer 45.1 (1996) the overwhelming majority of respondents claim that an improvement in health and safety at the workplace will increase work efficiency.

[2] $1 - u$ is the employment rate.

[3] Here, a subscript s has been added to U to indicate that social or labour market efficiency is at stake.

[4] $0 < \theta^*$ requires $\beta(1 + \gamma\theta_f) < 1$, which, using [12], implies that $(1 + \gamma\theta_f)/(3 + \gamma\theta_f) < \alpha$. The minimum of $(1 + \gamma\theta_f)/(3 + \gamma\theta_f)$ is 1/3, which thus becomes the lower bound for α. Moreover, $\theta^* < 1$, gives 1 as the upper limit for α. Hence, $\alpha = 1/3 \Leftrightarrow \beta = 1$ and $\alpha = 1 \Leftrightarrow \beta = 0$.

[5] The Appendix gives formula [17] with countries of different size.

[6] If, for example, EU Member States are considered to be similar, this gives a strong argument for the European Social Charter.

[7] See the indifference curves in Figure 3.

[8] The case illustrated in Figure 4 has a Nash equilibrium with a level of strictness in the home and foreign country of 0.31 and 0.85, respectively, i.e. a relation between the levels that corresponds to the relation between the UK and the average of the continental EU12 countries according to the data behind Table 1 (1 and 2.7, respectively).

[9] All other countries except France had falling EPL strictness from the late 1980s to 2003.

[10] Although the main text sees EPL as one element under the broader concept of Labour Standards, EPL is used as an abbreviation here.

[11] There might be equal gross flows of capital between the countries in this equilibrium, but it is assumed above that capital is always allocated efficiently so that only net flows are considered.

[12] In the figures, f_K^1 and f_K^2 indicate the marginal productivity of capital in countries 1 and 2, respectively.

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