

International labour mobility and unemployment

Michael Bleaney and Mark A. Roberts
University of Nottingham¹

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Abstract

We develop a two-country labour-market model characterised by union wage-bargaining, in which the unemployed incur individual-specific costs of seeking work abroad. We explore the effects on equilibrium unemployment in each country of changes in union bargaining strength, the ratio of unemployment benefits to wages, and employers' willingness to hire foreign workers. Unfavourable labour-market institutions increase unemployment abroad as well as at home. We find that no country has an incentive to internationalise its own labour market unilaterally, because all the employment gains spill over abroad, which gives countries a strong incentive to co-ordinate on internationalisation.

¹ Postal address: School of Economics, University of Nottingham, Nottingham NG7 2RD.
e-mail: mark.roberts@nottingham.ac.uk.

1. Introduction

Labour-market institutions vary quite markedly across the OECD, and it has often been claimed that these differences are at least partly responsible for differences in economic performance (Blanchard and Wolfers, 2000; Bleaney, 1996; Bruno and Sachs, 1985; Nickell, 1997; Siebert, 1997). The majority of OECD countries are members of the European Union, which forbids employment discrimination against nationals of other member states. International labour flows are therefore potentially large and, although cultural and linguistic barriers currently restrict such flows, these barriers are likely to diminish in future. Yet very little attention has been paid to the possibility that international labour mobility could have a significant impact on the labour-market outcomes of particular institutional arrangements. Moreover, even if international labour flows appear small, they may be of a similar order of magnitude to interregional labour flows, which are also small in most European countries.² For example, international immigration has been a significant component of the population growth of London and the South-east of England in recent years.

There is no body of theoretical work that (to our knowledge) addresses these issues. The impact of monetary union on wage-setting and employment has been considered in a number of papers (e.g. Calmfors, 2001; Cukierman and Lippi, 2001), whilst Sibert and Sutherland (2000) analyse its effect on policy-makers' incentives to undertake labour-market reform. In these models the critical issue is the choice of currencies. In order to focus on issues of international labour mobility independently of countries' choice of currency, we develop a two-country adaptation of a standard flow-equilibrium model of the labour market.

The model assumes that there is an exogenously given turnover rate of jobs in each country, and that job separations result in a spell of unemployment. The equilibrium rate of unemployment is given by the condition that job separations equal new hires. We then introduce the possibility of hiring from abroad. This sets up an interaction between home and foreign labour markets, so that any factor which alters the home equilibrium will, in general, affect the foreign equilibrium as well. We provide a full

² Nickell (1997, p. 59) notes that 1% or fewer households change their region of residence in each year in most European countries, compared with about 3% in the United States.

characterisation of the comparative statics of the model. Labour-market reform in one country is, in general, good for all countries. A particularly interesting result is that what might be termed the “opening up” or “globalisation” of the home labour market (i.e. a greater willingness to hire foreign job applicants) reduces foreign unemployment without raising unemployment at home. Countries therefore have little incentive to adjust immigration rules unilaterally, but co-ordinated liberalisation benefits all countries by offsetting some of the adverse employment effects of generous unemployment benefit systems and union bargaining strength.

2. The model

We consider a two-country model, the two economies being defined as *domestic* and *foreign*. The domestic economy has a stock of U unemployed individuals and the foreign economy with the equivalent unemployed stock, U^* . [Henceforth, the foreign counterpart is denoted by an *asterisk*.] There are assumed to be individual-specific costs of searching for employment in another country, which only some of the unemployed choose to pay. Of the U home-based individuals, the proportion, $1-\lambda$, look only at home for jobs, while the proportion, λ , look both at home and abroad for work. We may refer to these as *type-1* and *type-2* individuals, because they choose to seek work respectively in one and two countries. There are also type-1 and type-2 individuals abroad, in the respective proportions, $1-\lambda^*$, λ^* , of the foreign stock of unemployment. Although for simplicity we initially treat λ and λ^* as exogenous, at a later stage of the analysis we shall allow them to be determined endogenously (i.e. with each individual choosing his/her type in order to maximise expected utility).

The quit or turnover rate of employment (δ) is assumed exogenous and identical in each country. The respective labour populations, employment levels and numbers of quitters for each country are M and M^* , $M-U$ and M^*-U^* and $\delta(M-U)$ and $\delta(M^*-U^*)$.

In an equilibrium where quits equal new hires:

$$\delta(M-U) = \theta_D U + \theta_F \lambda^* U^*, \quad (1)$$

$$\delta(M^* - U^*) = \theta_D^* U^* + \theta_F^* \lambda U \quad (1^*)$$

Consider equation (1). At any moment, $\delta(M - U)$ of the workers employed in the domestic labour market quit due to exogenous factors. Simultaneously, the domestic labour market gets U job applications from home-based unemployed individuals of both types and $\lambda^* U^*$ job applications from type-2 unemployed individuals who are based abroad. The proportion, θ_D , of the home-based applicants are accepted to become re-employed at home, while the proportion, θ_F , of the foreign-based applicants are accepted, which involves relocation to another country. The possibility that $\theta_D \neq \theta_F$ reflects discrimination, and generally we might expect a preference for home-based workers, $\theta_D > \theta_F$.³ The same reasoning applies symmetrically to equation (1*).

The steady-state requires that net international labour flows are zero, so that the exits of individuals equal entries^{4 5}:

$$\theta_F^* \lambda U = \theta_F \lambda^* U^* \quad (2)$$

We use the following definitions:

$$\theta_D \equiv \theta, \quad \theta_F \equiv \eta \theta \quad \text{where } 0 \leq \eta \leq 1 \quad (3)$$

$$\theta_D^* \equiv \theta^*, \quad \theta_F^* \equiv \eta^* \theta^* \quad \text{where } 0 \leq \eta^* \leq 1 \quad (3^*)$$

so that we can refer to η and η^* as the discrimination factors in each country, which we regard as exogenous. Increasing discrimination against individuals based abroad is captured by a declining η . Although the value of η is chosen by firms decentrally, government policies may also play a role (e.g. by altering the legal status of employees with foreign nationality).

Solving equations (1) and (2) simultaneously and using the definitions in (3) gives solutions for the unemployment rate in each country as:

³ This is not necessarily discrimination based on country of origin, but on country of recent residence, since a home-based foreign national would be favoured over a domestic national returning from abroad.

⁴ This condition prevents one-sided movement, which, in the steady-state, would cause the disappearance of one country's labour force!

⁵ We abstract from demographic factors, such as the number of school-leavers and entries and exits out of full-time education, etc.

$$u \equiv \frac{U}{M} = \frac{\delta}{\delta + \theta + \lambda \eta^* \theta^*} \quad (4)$$

$$u^* \equiv \frac{U^*}{M^*} = \frac{\delta}{\delta + \theta^* + \lambda^* \eta \theta} \quad (4^*)$$

Note that discrimination in one country raises unemployment⁶ only in the other country, as $\partial u / \partial \eta^* < 0$, $\partial u^* / \partial \eta < 0$ and $\partial u / \partial \eta = 0$, $\partial u^* / \partial \eta^* = 0$

We will consider a union model of the labour market in order to determine independently the endogenous unemployment rates, u and u^* , and the endogenous acceptance rates, θ and θ^* . Such a model is a convenient method of capturing differences in labour-market institutions across countries, which seem to be empirically significant for employment outcomes.

The intertemporal utilities of varies states

The expected utility of the employed of type $i = 1, 2$ in firm z who expects to be type $j = 1, 2$ in the next period (whether $i = j$ or $i \neq j$) is:

$$V_{EZ,t}^i = W_{Z,t} + \frac{1}{1+r} \left((1-\delta) V_{EZ,t+1}^j + \delta V_{UZ,t+1}^j \right) \quad i = 1, 2 \quad j = 1, 2 \quad (5)$$

where $W_{Z,t}$ is the wage currently paid by firm z , $1-\delta$ is the probability of remaining employed in firm z in the next period and δ is the probability of a spell of unemployment. For the unemployed of types 1 and 2 respectively, we obtain:

$$V_{UZ,t}^1 = B_t + \frac{1}{1+r} \left(\theta V_{E,t+1}^j + (1-\theta) V_{UZ,t+1}^j \right), \quad \text{if } i = 1 \quad (6.1)$$

$$V_{UZ,t}^2 = B_t + \frac{1}{1+r} \left(\theta V_{E,t+1}^j + \eta^* \theta^* V_{E,t+1}^{j^*} + (1-\theta - \eta^* \theta^*) V_{UZ,t+1}^j - C \right), \quad \text{if } i = 2 \quad (6.2)$$

where B_t is an unemployment benefit and, to recap, θ is the probability of being rehired by some firm at home in the next period and $\eta^* \theta^*$ is the probability of being hired abroad. Although searching in both countries increases the probability of a home-based individual finding employment, this must be weighed against the extra cost of searching abroad, C .

⁶ Throughout this paper the term “unemployment” means the unemployment rate rather than the population of unemployed.

Finally, equation (4) and the symmetry assumption imply that the expected utility of individuals who are employed in domestic firms other than z is

$$V_{E,t}^i = W_{z,t} + \frac{1}{1+r} \left((1-\delta)V_{E,t+1}^j + \delta V_{U,t+1}^j \right) \quad i=1,2 \quad j=1,2 \quad (7)$$

and, likewise, the expected utilities of each type quitting from a firm other than z are respectively:

$$V_{U,t}^1 = B_t + \frac{1}{1+r} \left(\theta V_{E,t+1}^j + (1-\theta)V_{U,t+1}^j \right), \quad i=1 \quad (8.1)$$

$$V_{U,t}^2 = B_t + \frac{1}{1+r} \left(\theta V_{E,t+1}^j + \eta * \theta * V_{E,t+1}^j * + (1-\theta - \eta * \theta *) V_{U,t+1}^j - C \right), \quad i=2 \quad (8.2)$$

The above six equations constitute the intertemporal utilities of those based in the domestic economy; there are also six equivalent equations for those based in the foreign economy.

This leads to the complication that whereas the utility of a domestic-based individual who will always remain a type-1 can be determined by the simultaneous solution of only four of these equations [(5), (6.1), (7) and (8.1)], the utility of a type-2 individual would require the simultaneous solution of a possible maximum of twelve equations, because of anticipated transitions between home and abroad. This is compounded by the fact that marginal individuals, outside a steady-state, may expect to change type according to the incentives offered at any future time.

For reasons of tractability, we assume that unions are concerned only the welfare of those type-1 members with high extra search costs for whom:

$$\eta * \theta * (V_{E,t+1}^j * - V_{U,t+1}^j) \leq C(i), \quad \eta \theta (V_{E,t+1}^j - V_{U,t+1}^j *) \leq C*(i*) \quad (9)$$

and that job separations are a random draw, so that a type-1 individual is as likely to become unemployed as a type-2 individual.

The wage bargain

We consider the right-to-manage model, as applied in Nickell and Andrews (1983), where the firm unilaterally determines employment by exerting its right to manage after the wage has been determined by bargaining (such a model is attractive because it seems a good approximation to reality and is relatively simple in structure). There is a prior, bilateral bargain over the wage in each firm, where both parties anticipate this unilateral, Nash response by firms. There is exactly one union per firm.

Each union is utilitarian, and each union is concerned with the utility of both its employed and unemployed members (respectively $V_{EZ,t}^1$ and $V_{UZ,t}^1$). The expected utility of a type-1 member in the event of an agreement is $(L_{Z,t}/M_{Z,t})V_{EZ,t}^1 + (1-L_{Z,t}/M_{Z,t})V_{UZ,t}^1$, where $L_{Z,t}$ is employment and $M_{Z,t}$ is union membership and $L_{Z,t} < M_{Z,t}$. In the event of a disagreement, all members become unemployed, so that the union bargaining surplus is $(L_{Z,t}/M_{Z,t})(V_{EZ,t}^1 - V_{UZ,t}^1)$.

Equations (4) and (5.1) give this as

$$S_{Z,t}^U = (L_{Z,t}/M_{Z,t})(V_{EZ,t}^1 - V_{UZ,t}^1) = (L_{Z,t}/M_{Z,t})(W_{Z,t} - B_t + H_{t+1})$$

$$\text{where } H_{t+1} \equiv \frac{1}{1+r} \left((1-\delta)V_{EZ,t+1}^1 - \theta V_{E,t+1}^1 - (1-\delta-\theta)V_{U,t+1}^1 \right) \quad (10)$$

The firm has a Cobb-Douglas technology of labour alone, and has to pay f , a fixed cost, whether there is production or not. If there is production, then profit is

$$\pi_{Z,t} = A_{Z,t}l_{Z,t}^\alpha - W_{Z,t}l_{Z,t} - f \quad (11)$$

If there is no production, profit is $-f$. The right-to-manage assumption implies that employment is set according to the profit-maximising condition:

$$\alpha A_{Z,t}l_{Z,t}^{\alpha-1} = W_{Z,t} \quad (12)$$

Equations (10) and (11) give profits as:

$$S_{Z,t}^F = (1-\alpha)\alpha^{\alpha/1-\alpha} A_{Z,t}^{1/1-\alpha} W_{Z,t}^{-\alpha/1-\alpha} \quad (13)$$

which is also the firm's bargaining surplus, as we are assuming there is neither output nor wage payments in the event of a disagreement. The outcome of the Nash wage bargain is equivalent to maximizing the "Nash function",

$$N_{Z,t} = (S_{Z,t}^U)^\varpi (S_{Z,t}^F)^{1-\varpi}$$

with respect to the wage where $0 \leq \varpi \leq 1$ is the union's bargaining power. The wage solution is

$$W_{Z,t} = \phi(B_t - H_{t+1}), \text{ where } \phi \equiv 1 + \varpi(\alpha^{-1} - 1) \geq 1 \text{ as } \alpha \leq 1 \quad (14)$$

The model is solved both in the steady-state where,

$$V_{Z,t} = V_Z, \quad V_t = V \quad \forall t \quad (15)$$

and in symmetric equilibrium where,

$$V_Z = V, \quad W_Z = W \quad \forall z \quad (16)$$

Under these conditions, equations (5) and (6.1) are solved simultaneously to give

$$V_U^1 = \left(\frac{1+r}{r} \right) \left(\frac{(r+\delta)B + \theta W}{r+\delta+\theta} \right) \quad (17)$$

$$V_E^1 = \left(\frac{1+r}{r} \right) \left(\frac{\delta B + (r+\theta)W}{r+\delta+\theta} \right) \quad (18)$$

Substituting equations (17) and (18) into (10) and (14) yields

$$H = \left(\frac{1-\delta-\theta}{r+\delta+\theta} \right) (W - B) \quad (19)$$

and

$$W_Z = \phi B - \phi \left(\frac{1-\delta-\theta}{r+\delta+\theta} \right) (W - B) \quad (20)$$

It is convenient to assume long-run proportionality between unemployment benefits and wages:

$$B = bW, \quad (21)$$

where the replacement ratio, b , represents the strength of commitment to income equality. As wages are homogeneous of degree one in benefits and *vice versa*, the wage becomes a common factor on both sides of equation (20), to give a solution for the endogenous acceptance rate for the domestic country,

$$\theta = \frac{(1+r)(1-b)}{1-\phi^{-1}} - (r+\delta) \quad \text{where } 0 < \theta < 1 \quad (22)$$

and, likewise, for the foreign economy,

$$\theta^* = \frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \quad \text{where } 0 < \theta^* < 1 \quad (22^*)$$

The probability of the unemployed in getting a job is negatively related to union power, the replacement rate, the turnover rate and positively related to the interest rate as $\phi > 1$. Note that the constraint that $\theta < 1$ places a lower bound on ϕ of $(1+r+\delta)/(\delta+(1+r)b)$ and likewise for ϕ^* .

Partial solution with exogenous proportions of type 2 agents, λ and λ^* .

Equations (4), (4*), (22) and (22*) together give

$$u = \frac{\delta}{\frac{(1+r)(1-b)}{1-\phi^{-1}} - r + \lambda\eta^* \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right)} \quad (23)$$

$$u^* = \frac{\delta}{\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - r + \lambda^*\eta \left(\frac{(1+r)(1-b)}{1-\phi^{-1}} - (r+\delta) \right)} \quad (23^*)$$

Note that the influence of other-country parameters in these equations depends on the factor $\lambda\eta^*$ for the home country ($\lambda^*\eta$ for the foreign country) – these factors represent the own-country proportion of type-2 individuals multiplied by the other country's willingness to hire from abroad. We now consider the comparative statics of unemployment where the proportion of type-2 agents can be regarded as either exogenous or, at least, highly inelastic. We report only the comparative statics for the domestic country; those for the foreign country are then apparent by symmetry of the model.

Proposition 1. *Increased discrimination (a lower value of η) in one country raises unemployment only in the other country.*

Proof

By differentiation of (23) and (23*), it follows immediately that

$$\frac{\partial u}{\partial \eta} = 0, \quad (23.1)$$

$$\frac{\partial u}{\partial \eta^*} = -\frac{\lambda}{\delta} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) u^2 < 0 \quad (23.2)$$

The magnitude of response is small, either if the proportion of type-2 individuals is small or if unemployment is already small. Note that the magnitude of all the comparative statics is small if the unemployment rate is already low. ||

Proposition 2. *A high number of type-2 individuals is good only for the unemployment rate of the country in which they are based.*

Proof

This again follows from differentiation of (23) and (23*):

$$\frac{\partial u}{\partial \lambda} = -\frac{\eta^*}{\delta} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) u^2 < 0, \quad (23.3)$$

$$\frac{\partial u}{\partial \lambda^*} = 0 \quad (23.4)$$

This effect is small, if there is high discrimination abroad. ||

Proposition 3. *Generosity in domestic benefits and greater domestic union power raise both domestic and foreign unemployment.*

Proof

This follows from differentiation of (23) and (23*) with respect to the relevant variables:

$$\frac{\partial u}{\partial b} = \frac{1}{\delta} \left(\frac{1+r}{1-\phi^{-1}} \right) u^2 > 0 \quad (23.5)$$

$$\frac{\partial u}{\partial \phi} = \frac{1}{\delta} \left(\frac{(1+r)(1-b)}{(\phi-1)^2} \right) u^2 > 0, \quad (23.6)$$

$$\frac{\partial u}{\partial b^*} = \frac{\lambda \eta^*}{\delta} \left(\frac{1+r}{1-\phi^{*-1}} \right) u^2 > 0 \quad (23.7)$$

$$\frac{\partial u}{\partial \phi^*} = \frac{\lambda \eta^*}{\delta} \left(\frac{(1+r)(1-b^*)}{(\phi^*-1)^2} \right) u^2 > 0 \quad (23.8)$$

Note that the impact of these variables on own-country unemployment is unaffected by foreign variables or by the domestic willingness to hire from abroad. Under certain conditions it is possible that changes in the foreign replacement ratio will affect domestic unemployment more than changes in the domestic replacement ratio. This occurs if $\lambda \eta^* (1 - \phi^{-1}) > 1 - \phi^{*-1}$. For this condition to be satisfied, the foreign economy must have substantially weaker unions than the domestic economy, and the domestic unemployed must have good prospects of being hired abroad (because of a low foreign discrimination rate and a high proportion of domestic type-2 individuals). The same conditions tend to make increased union militancy abroad worse for unemployment than the same at home, which occurs if $\lambda \eta^* (\phi^{-1} - 1)^2 (1 - b^*) > (\phi^{*-1} - 1)^2 (1 - b)$; this is also more likely if the foreign economy has less generous unemployment benefits. ||

Complete solution with endogenous proportions of type 2 agents, λ and λ^* .

The results above are obtained by fixing the proportion of type-2 agents. We now relax this assumption and allow the proportion to be optimally determined. The expected utility of the type $i = 1, 2$ quitting from firm z is $V_{UZ,t}^i = \max(V_{UZ,t}^1, V_{UZ,t}^2)$, where $V_{UZ,t}^1$ and $V_{UZ,t}^2$ are as given in (6.1) and (6.2). From those equations, it follows that a domestic unemployed individual, i , will be type-2 if the expected wealth increase from finding a job abroad exceeds the extra cost of searching for a job abroad:

$$\eta^* \theta^* (V_E^* - V_U) > C(i)$$

where $C(i)$ is the cost of searching abroad. We assume that this extra search cost for each domestic individual is also proportional to the domestic wage:

$$C(i) = c(i)W \quad (24)$$

Solving (16) and (17) using (20) gives:

$$V_U = \left(\frac{1 + \phi^{-1}r - (1 - \phi^{-1})\delta}{r} \right) W \quad (25)$$

$$V_U^* = \left(\frac{1 + \phi^{*-1}r - (1 - \phi^{*-1})\delta}{r} \right) W^* \quad (25^*)$$

$$V_E = \left(\frac{1 + r - (1 - \phi^{-1})\delta}{r} \right) W \quad (26)$$

$$V_E^* = \left(\frac{1 + r - (1 - \phi^{*-1})\delta}{r} \right) W^* \quad (26^*)$$

Using (21*), (23), (25*) and (26), the condition becomes

$$\frac{\eta^*}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \left((1+r - (1-\phi^{*-1})\delta) \frac{W^*}{W} - (1+\phi^{-1}r - (1-\phi^{-1})\delta) \right) > c(i)$$

The wage ratio, W^*/W , is not determined by anything in the model so far. It is possible to determine this by imposing an equality condition between domestic and foreign profits in (17).⁷

If the technology parameters are the same, because of full technology transference in the steady-state, and the Cobb-Douglas exponent is also the same, then the wages are equalized, so the condition becomes

$$\frac{\eta^*}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right) > c(i)$$

For a given distribution across individuals of proportional search costs, $c(i)$, the proportion of type-2 agents is determined by the proportion for which this inequality holds. That is,

$$\lambda = \int_{C_{MIN}}^{\hat{c}} c(i) di \quad \text{where}$$

$$\hat{c} \equiv \frac{\eta^*}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right)$$

⁷ In a model where some individual workers are internationally footloose, it is certainly consistent to allow individual entrepreneurs to move across national frontiers until profit differences are arbitrated away.

so,

$$\lambda = \lambda(\eta^* d), \quad \frac{\partial \lambda}{\lambda(\eta^* d)} > 0$$

$$\text{where } d \equiv \frac{1}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right) \quad (27)$$

Proposition 4. *One country's proportion of type-2 individuals is independent of its own replacement ratio but decreasing in the other country's replacement ratio.*

Proof

This follows directly from differentiation of (27):

$$\frac{\partial \lambda}{\partial b} = 0 \quad (27.1)$$

$$\frac{\partial \lambda}{\partial b^*} = \frac{-(1+r)}{r(1-\phi^{*-1})} \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right) \frac{\partial \lambda}{\partial(\eta^* d)} \eta^* < 0 \quad (27.2)$$

Note that the effect in (27.2) is particularly strong when the other country's unions are weak (ϕ^* is small). ||

Proposition 5. *Strong domestic unions and weak foreign unions raise the domestic proportion of type-2 individuals.*

Proof

This proposition also follows immediately from differentiating (27):

$$\frac{\partial \lambda}{\partial \phi} = \frac{1}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \phi^{-2} (r+\delta) \frac{\partial \lambda}{\partial(\eta^* d)} \eta^* > 0 \quad (27.3)$$

$$\begin{aligned} \frac{\partial \lambda}{\partial \phi^*} &= -\frac{1}{r} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right) \delta \phi^{*-2} \frac{\partial \lambda}{\partial(\eta^* d)} \eta^* \\ &\quad - \frac{1}{r} \left(\frac{(1+r)(1-b^*)}{(1-\phi^{*-1})^2} \right) \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right) \phi^{*-2} \frac{\partial \lambda}{\partial(\eta^* d)} \eta^* < 0 \quad || \quad (27.4) \end{aligned}$$

Likewise, for the foreign economy,

$$\lambda^* = \lambda(\eta d^*), \quad \frac{\partial \lambda^*}{\lambda(\eta d^*)} > 0$$

$$\text{where } d^* \equiv \frac{1}{r} \left(\frac{(1+r)(1-b)}{1-\phi^{-1}} - (r+\delta) \right) \left((1-\phi^{*-1})r + (\phi^{-1} - \phi^{*-1})\delta \right) \quad (27^*)$$

Note that two-way mobility requires that the two degrees of union power are not too different from each other:

$$\frac{r+\delta}{r+\delta\phi^{*-1}} < \phi < \frac{\delta}{(r+\delta)\phi^{*-1}-r\delta}$$

In its absence, there would be one-way mobility, which is problematic in the steady-state. This suggests that union power in one country cannot get too much out of line with the degree of union power in the other country, implying that union reform in one country would also cause pressures for the same reform in the other.

Proposition 6. *The endogeneity of λ amplifies the adverse effect of the foreign replacement ratio, b^* , and union power, ϕ^* , on domestic unemployment.*

Proof

Take a constant elasticity approximation of (27), since these approximations are generally valid locally ($\varepsilon > 0$):

$$\lambda = \lambda_0 (\eta^* d)^\varepsilon \quad (28)$$

Substitution of equations (28) and (27) back into (23) gives

$$u = \frac{\delta}{\frac{(1+r)(1-b)}{1-\phi^{-1}} - r + \eta^{*1+\varepsilon} \lambda_0 r^{-\varepsilon} \left(\frac{(1+r)(1-b^*)}{1-\phi^{*-1}} - (r+\delta) \right)^{1+\varepsilon} \left((1-\phi^{-1})r + (\phi^{*-1} - \phi^{-1})\delta \right)^\varepsilon} \quad (29)$$

The proposition follows directly from a comparison of equations (23) and (29). The amplification is very powerful where the interest rate is low. Moreover, the effect of domestic union power is at least dampened, and, possibly, even reversed for some parameter values, notably, in the limit of generosity where $b \rightarrow 1$.

3. Conclusions

In the presence of international labour mobility, one country's unemployment rate depends on other countries' labour-market institutions as well as its own. Consequently, labour-market reform benefits foreign countries as well as the home country. In the model developed here, however, this effect does not dilute the home country's incentive to reform its labour market, since international labour mobility has no effect on the domestic employment gains from reform.

On the other hand, the employment gains from globalisation (in the sense of opening up domestic labour markets to foreign-based workers) are entirely external – globalisation reduces foreign unemployment but not domestic unemployment. This suggests that countries will have no incentive to "go it alone" by legislating to prevent discrimination against foreign workers, unless there are other economic, political or ideological reasons for doing so. However, there are clear gains from co-operation where each country provides an environment of equal or better opportunities for employing the other country's unemployed, since then unemployment is reduced in all countries.⁸

The relationship between this result and political or other pressures for labour-market and welfare reform remains largely a matter of speculation. Internationalisation might alleviate the pressure for these other reforms in social-democratic countries, while it may be viewed as another arm with which to fight unemployment in more conservative societies.

The results also imply that, as labour markets become increasingly internationalised, domestic unemployment becomes more sensitive to the state of foreign labour markets. Consequently, international co-operation in opening up domestic labour markets to foreign-based workers will create a further incentive for international co-operation in determining labour-market policies. Conversely, the desire for an

⁸ To achieve this, it is not necessary to form an economic union, but only to pass simultaneous legislation restricting discrimination.

ultimate autonomy in domestic labour-market policy may put a brake on any initial movement towards internationalisation.

References

- Blanchard, O.J. and J. Wolfers. 2000. The role of shocks and institutions in the rise of European unemployment: the aggregate evidence, *Economic Journal* 110, C1-C33.
- Bleaney, M.F. 1996. Central bank independence, wage-bargaining structure, and macroeconomic performance in OECD countries, *Oxford Economic Papers* 478, 20-38.
- Bruno, M. and J.D. Sachs. 1985. *Economics of Worldwide Stagflation*, Oxford: Basil Blackwell.
- Calmfors, L. 2001. Unemployment, labour market reform and monetary union, *Journal of Labor Economics* 19, 265-89.
- Cukierman, A. and F. Lippi. 2001. Labour markets and monetary union: a strategic analysis, *Economic Journal* 111, 541-65.
- Nickell, S. 1997. Unemployment and labor market rigidities: Europe versus North America, *Journal of Economic Perspectives* 11 (3), 55-74.
- Nickell, S. and Andrews, M. 1983. Unions, real wages and employment in Britain, *Oxford Economics Papers* (Supplement), 183-206.
- Sibert, A. and A. Sutherland. 2000. Monetary union and labor market reform, *Journal of International Economics* 51, 421-35.
- Siebert, H. 1997. Labor market rigidities: at the root of unemployment in Europe, *Journal of Economic Perspectives* 11 (3), 37-54.