

Structural Change and the Labor-market Effects of Globalization

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Abstract

The paper develops a simple political-economy model of unemployment benefit determination in a small open economy characterized by bargaining between firms and unions. The authors derive a number of comparative static results and present empirical results for a panel of OECD countries that are broadly consistent with the theory.

1. Introduction

Why is the average citizen so worried about globalization and the average economist so unworried? It is surely true, but unuseful, to say that the citizen and the economist simply do not understand the benefits and costs of globalization in the same way. There are good reasons why the economist feels comfortable arguing that, at least at an aggregate level, globalization is either no big deal or a substantial boon. It would be comforting to conclude that the citizen is simply wrong, with the obvious implication being that a little bit more effort at public education would help reduce globalphobia. There may be a significant element of truth here, but the consequences of introducing irrationality, ignorance, and learning into our models are substantial.¹ It seems to us to be useful to consider the possibility that the widespread concern with globalization emerges as a result of changes that are, to some extent, obscured when we apply standard trade-theoretic methods to understand globalization. In this paper we are interested in effects of globalization that operate on the labor market indirectly by transforming the structures that support one set of equilibria and induce change in those equilibria. We will develop our analysis in terms of the interdependence between economic and political structures in a given national economy. Because the economic and political structures are related, changes in the relationship of a national economy to the global economy can produce profound changes in the political-economic arrangements of a country. In addition to affecting equilibrium wages and employment, such changes could well be unsettling in themselves.

In section 2 we begin by briefly rehearsing the main framework within which most economists (at least trade economists) have considered the effects of globalization, and

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found them to be essentially unproblematic. We refer to these as *direct effects* of globalization. In section 3 we review some of the research suggesting that globalization has effects on the returns to labor market participation that work through its effects on labor market and political institutions. We refer to these as *indirect effects* of globalization. We believe that this research supports a claim that indirect effects of globalization are sufficiently plausible to consider them in more detail.

Thus, in section 4, we develop a simple model of political economic equilibrium with firm–union bargaining and a welfare state. Using this model, we consider the impact of increased openness. Specifically, we show the effect of globalization on the bargain between the firm and the union (Proposition 1); as a baseline we derive the equilibrium unemployment benefit with a utilitarian policymaker in the closed economy (Proposition 2) and in the open economy (Corollary 1). Since the politics of labor figure prominently in existing work on indirect effects of globalization, we also formally characterize equilibrium with lobbying by labor (Proposition 3). In section 5, we present some empirical work based on a fixed-effects panel model for OECD countries. With respect to the effects of globalization, we find strong evidence of a positive relationship between openness and the unemployment benefit, but a negative relationship between openness interacted with the budget deficit and the unemployment benefit. This suggests that an increase in the government debt to GDP ratio lowers the response of the benefit replacement rate to openness. That is, there is some evidence that, as suggested by some of the work reviewed in section 3 and the model developed in section 4, globalization acts as a constraint on the political economy of labor market outcomes. Section 6 concludes.

2. The Direct Labor Market Effects of Globalization

The professional literature (to say nothing of the popular literature) on the direct labor market effects of globalization is enormous. The essential empirical issue is macro-economic: accounting for the *economy-wide* rise of the skill-premium at a time when the share of skilled to unskilled workers is rising. Thinking systematically about the role of globalization in this context requires a model of the economy as a whole with sufficient structure that the link to the world economy can be treated explicitly, but simple enough that it generates guidance for both empirical work and policy. Standard low-dimensional trade-theoretic models provide just such a framework and, not surprisingly, they lie at the heart of a sizable majority of the theoretical work and an even larger share of the empirical work on trade (migration, foreign direct investment) and wages.²

As the story has now been told many times, in response to early work in the one-sector framework, trade economists successfully argued that the natural framework for thinking about the effect of trade on labor markets, at least from a maintained assumption of competitive markets, was the Stolper–Samuelson theorem and its various generalizations.³ The theoretical account of trade shocks as running from commodity-price changes to factor-price changes provided a compelling equilibrium mechanism, and some useful rough empirical checks, but the real success came with the development and refinement of the mandated wage regression methodology (Baldwin and Cain, 2000). The solid theoretical foundations of the mandated wage regression approach led to the almost complete displacement of the factor-content study as a framework for empirical study. The interpretation of the empirical results, as well as the appropriate implementation of the framework, is not without controversy, but the aggregate professional prior would seem to have settled on the conclusion that trade

has a small effect on the skill-premium (maybe 10–20%), but that other factors (especially technological change) are more important.

The analysis of immigration would appear to be very different, but in fact contains strong similarities to the above story. The obvious problem with the trade-theoretic framework from the perspective of evaluating immigration shocks is that, as long as we assume the commodity and factor markets are competitive and, as seems quite the most plausible assumption, that the number of goods exceeds the number of factors, then we are stuck with what Leamer (1995) calls the *factor-price insensitivity theorem*. This result, which is the single-country analogue of the factor-price equalization theorem, asserts that, under the dimensionality and competitiveness assumptions already mentioned, as long as the economy produces the same types of goods before and after an immigration shock (the endowment remains inside the same cone of diversification), the change in endowment will leave relative factor-prices unchanged. Since the goal is to find globalization effects that might help account for the changing skill-premium, this feature of the trade-theoretic model would seem to be a problem. However, it turned out that most studies found only extremely small effects of immigration on the skill-premium.

To the extent that foreign direct investment (FDI) could be seen as capital arbitrage, factor-price insensitivity would apply there as well. The problem in this case is that economists had long become convinced that FDI was fundamentally not about capital arbitrage. This was the fundamental realization in Hymer's (1960) classic dissertation that is generally credited with beginning the modern theory of foreign direct investment. Starting with Caves (1971), a large body of research has incorporated the insights of the firm-theoretic approach by interpreting FDI as an arbitrage of firm-specific capital. Similarly, monopolistic competition models could be enlisted to analyze FDI by interpreting one input as managerial or headquarters services (Helpman, 1984). But this has always been only uneasily related to the firm-theoretic foundations of the modern theory of FDI. The problems become more obvious when outsourcing becomes part of the picture. We pick up that part of the story in the next section.

3. Indirect Labor Market Effects of Globalization: Some Preliminary Remarks

Implicit in all the comparative static analyses discussed in the previous section is the assumption that the underlying structure of the economy is unchanged by whatever is taken to be the relevant globalizing force—trade, immigration, FDI. However, one of the essential claims in much of the popular writing on globalization, and surely a major source of the general social concern about globalization, is its transformative nature. That is, globalization is taken to transform the economic and political structures in ways that might be obscured when we apply the standard toolkit of trade theory.

Consider the case of global outsourcing, one of the characteristic aspects of contemporary globalization (Feenstra, 1998). From a microeconomic or firm-theoretic point of view, outsourcing is just the reverse process of internalization, which has long been central to the theory of foreign direct investment. However, from the macroeconomic (e.g., trade-theoretic) perspective, internalization and externalization are radical innovations relative to the models used to understand trade and migration. That is, when we come to focus explicitly on outsourcing, it becomes clear that we are dealing with nonmarginal change in production structure that does not really permit simple extension of standard techniques. Where allocation of production among existing facilities is trade-theoretically straightforward, the decision to outsource creates new

technologies and transforms the dimensionality of the underlying model.⁴ This recognition is increasingly being made in the theoretical literature on outsourcing (Jones and Kierzkowski, 2001; Deardorff, 2001; Kohler, 2001), but empirical work on the link between outsourcing and wages continues to use a mandated wage approach that manifestly does not permit such nonmarginal change (e.g., Feenstra and Hanson, 1999).

In the case of outsourcing, because it directly transforms dimensionality in our standard models, we can see how structural change interferes with inference based on those tools in a straightforward way. The role played by broader social institutions in supporting economic and political-economic outcomes is less well understood, although elements of such an analysis are beginning to be developed in economics, drawing to a considerable degree on existing research in political science and sociology.⁵ In this paper we are interested in the relationship between globalization, unions, and welfare states. Loosely speaking, the idea is that part of the support for an equilibrium in which relatively unskilled workers receive high wages comes from the mutually supporting institutions of unions and welfare states. That is, as a result of labor market institutions, in this case a union, some workers receive a higher wage than other otherwise identical workers. There are insiders and outsiders. In addition, because there is unemployment in equilibrium, we will assume that there is some governmental transfer to the unemployed. It should be clear that globalization could change each of the components of this relationship, with implications for equilibrium relative wages. With respect to the first, there is now a sizable body of research examining the relationship between the institutional structure of the unionized sector of an economy (i.e., the extent and centralization of organization) and various measures of macroeconomic performance. Countries with encompassing labor market institutions (i.e., large unionized sectors with centralized bargaining) are characterized by: lower wage inequality (Rowthorn, 1992; Zweimüller and Barth, 1994; OECD, 1997); lower unemployment (OECD, 1997); and higher growth (Calmfors and Driffill, 1988; Rowthorn, 1992; Calmfors, 1993; Danthine and Hunt, 1994). The usual explanation involves the ability of centralized bargaining institutions to internalize negative wage externalities (Calmfors, 1993; Garrett, 1998). That is, where strong sectoral unions pursue wage gains relative to some perceived market wage, resulting in cost-push inflation, reduced employment, lower growth, and intersectoral inequality, the centralized union recognizes these negative externalities and takes them into account in its bargaining. Thus, as unionization has declined, there is some evidence that wage inequality has increased (Freeman, 1998).

Globalization is widely thought to have affected unions. On the one hand, globalization is generally taken to imply increased competition that, even without any change in relative bargaining power, will squeeze sectoral rents and lead to reduced wages in post-globalization bargains. In a closely related fashion, by raising the elasticity of demand for labor, imports can be seen to directly reduce the market power of unions. An alternative argument turns on the expectation that firms/capital are globally more mobile than labor. The existence of an exit option, even if not exercised, changes the relative bargaining power of the firm and the union. Thus, even without an observed increase in trade, unions should do worse in bargains after the cost of globalization of production (via importing, outsourcing, or FDI) fall. Finally, by affecting the return to union membership, the size of unions may decline, causing a further erosion of bargaining power.

Increased inequality, and real deterioration in the labor market outcomes of unskilled workers, is also directly related to changes in demand for welfare state provision. For example, it has been observed that despite increases in the dispersion of

earned incomes that, in some countries at least, inequality in post-transfer and post-tax income inequality has *not* grown (e.g., Gottschalk and Smeeding, 1997; Aaberge et al., 2000). This suggests that political pressures have been brought to bear on the generosity of public transfers at a time when earned incomes have become more unequally distributed. From a political economic perspective, the growing inequality of income could be associated with strong compositional effects on the demand for public insurance. In particular, it seems to be the case that the growing size and economic significance of sectors of the economy that pay higher wages for certain types of workers could somewhat paradoxically result in political pressures that lead to higher levels of transfer payments to disadvantaged workers. It has been suggested that this could result from changes in the identity of the median voter (e.g., Alesina and Rodrik, 1994; Persson and Tabellini, 1994; Saint-Paul and Verdier, 1996) or as an optimal response to increased income risk in an increasingly open economy (e.g., Rodrik, 1998). In this paper we consider an alternative account in which self-interested behavior and institutional features of labor determine public insurance policy outcomes. Specifically, we examine how the demand for unemployment benefits may change during periods of trade liberalization, when collective bargaining is more or less centralized.

Where the effect of globalization on unions is taken to be generally negative, the effects on the welfare state are potentially more mixed. On the negative side, scholars such as Steinmo (1994) and Tanzi (1995) argue that increased mobility of capital not only erodes the tax base, reducing the state's ability to fund welfare state programs, but by shifting taxes onto labor, the capacity of the state to redistribute is reduced. In a similar fashion, Garrett (1998) has argued that, by forcing states to turn increasingly to borrowing to fund welfare state programs, the international capital market ends up imposing an increasing premium on large welfare states. In ways that are harder to quantify, but seem *prima facie* plausible, the decreasing cost of the exit option increases the relative power of business in policymaking (Huber and Stephens, 1998). Finally, it has been argued that globalization increases the general credibility of orthodox (i.e., market-oriented) policy advice, thus reducing the plausibility of arguments supporting welfare state expansion and enhancing the credibility of arguments in favor of welfare state retrenchment (Evans, 1997; Krugman, 1999). On the other hand, there are a number of reasons for believing that the sources of pressure for change are, at a minimum, not overwhelming. First, as has been widely noted for some time, the classic, large welfare states developed in the context of considerably more open economies than did the smaller, market conforming welfare states (Katzenstein, 1985; Huber and Stephens, 1998). As Rodrik (1998) has argued, this may be related to increased income risk. Interestingly, Bordo et al. (1999) carry this argument further, suggesting that the presence of sizable welfare states, and Keynesian macroeconomic policy, may have played an important role in providing sufficient indifference to globalization, that policies like support for the GATT/WTO system and the Bretton Woods institutions continued even in the face of recessions that might have had system closing consequences in earlier eras. In addition, current welfare states show considerable heterogeneity in response to the increases in globalization experienced over the last 15 to 20 years (Garrett, 1998; Swank, 2002). Here it has been widely argued that heterogeneity of domestic political, as well as labor market, institutions support heterogeneity of responses to globalization (Calmfors and Driffill, 1988; Garrett, 1998; Swank, 2002).

The next section develops a model in which, when collective bargaining is more centralized, or when unions are relatively more concerned with employment growth than with raising workers' wages, the workers seek to encourage policymakers to raise

unemployment benefits. This happens because of the positive effect that higher reservation wages have on negotiated wages. In contrast, if wage and employment levels are negotiated in an extremely decentralized environment in which workers earn higher wages but are exposed to greater degrees of employment risk, then the workers whose employment is at greatest risk ally themselves with employers to lobby for reductions in transfer payments and benefits and the taxes which are necessary to finance them. That is, there is political pressure to decrease both unemployment benefits and taxes, but this tendency is largely reversed during times of greater openness to international competition.

In an era of rapid globalization, labor market deregulation and microeconomic reform, the associated decentralization of collective bargaining results in wages that are more closely aligned with productivity. However, these developments also expose the same workers to greater unemployment risk. Thus, they have an incentive to influence the direction of public insurance policies. There is considerable evidence that unions have played a prominent role in influencing policies that affect the welfare of their members. For example, there is the well-documented support by the trade union movement for higher minimum wages (e.g., Ehrenberg, 1994, pp. 44–45) and their active participation in the politics surrounding NAFTA (Mayer, 1998). In addition, Kau and Rubin (1981) found that US unions use their political contributions in a systematic and coordinated manner. Union campaign contributions are *always* significant in explaining not only voting on minimum wages, but also wage-price controls, benefits for strikers, OSHA (which regulates workplace safety) and CETA (i.e., manpower training programs) appropriations.

4. Indirect Labor Market Effects of Globalization: A Simple Model

Consider a small open economy populated by workers and shareholders. The economy has two sectors, a unionized sector and a non-unionized sector.⁶ Our purpose in this section, and the next, is to determine the effects of trade liberalization (our measure of “globalization”) on labor market outcomes via its direct effects on the wage bargain and indirect effects working through redistributive policies (e.g., the unemployment benefit).

Production in the Unionized Sector

The concave production technology for a representative firm in the unionized sector is represented by $x = f(n)$, where n is employment. Total profits are simply

$$\pi(n, w; p, t) = pf(n) - (1+t)wn, \quad (1)$$

where w is the wage and $t \in [0, 1)$ is a payroll tax levied on the total wage bill.⁷

The domestic relative output price of the good produced by the unionized sector is

$$p = (1 + \tau)p^*, \quad (2)$$

where p^* is the world price and τ is an *ad valorem* tariff. The tariff is assumed to be determined by multilateral trade negotiations in which the small country has negligible bargaining power, and therefore the tariff is taken as given by all domestic agents.

Workers and Shareholders

All individuals in the economy—shareholders, union, and non-union workers—are assumed to have the same preferences over consumption goods. The utility of each individual i is

$$U^i = c^{z^i} + u(c^{x^i}), \quad (3)$$

where c^{z^i} is consumption of the *numéraire* good produced by the non-unionized sector and c^{x^i} is consumption of the good produced by the unionized sector. $u(\cdot)$ is increasing and concave. Individuals maximize utility subject to their expected income constraint.

The quasilinear form of equation (3) implies that the consumption of c^{x^i} depends only on p . Denoting the aggregate consumption of x by $C(p)$ and aggregate production of x by $X(p)$, the government's tariff revenue is

$$T(p) = \tau p^*(C(p) - X(p)), \quad (4)$$

where $C(p) - X(p)$ represents aggregate imports of good x .⁸

Union Leadership versus Union Workers

The unionized sector is assumed to have rents to bargain over. The firm and the union leadership, which represents workers, negotiate wages and employment levels. That is, the objectives pursued by a union's leadership and the welfare of individual workers are possibly quite distinct (Pemberton, 1988).

We assume that the union's objective function in bargaining can be represented by the Stone–Geary utility function; i.e.,

$$U(n, w) = (n - m)^\gamma (c^e - c^v)^\delta, \quad (5)$$

where m represents the number of incumbent union workers, c^e is the income for an employed worker, and c^v denotes the reservation alternative for an unemployed worker.⁹

In the following, we assume that the income for an employed worker is $c^e = w$. During the second stage of the game, we treat c^v as exogenous. For individual workers, c^v reflects the value of not working in the unionized sector. It is affected by the value of leisure time, home or nonmarket production, or the wage in the informal sector of the economy. For the purposes of this paper, we assume that the unemployment benefit or income transfer payable to those not employed in the unionized sector affects c^v .

The values of δ and γ in equation (5) indicate the relative importance of wages and employment in bargaining objectives. Pemberton (1988) interpreted a low value for δ as reflecting a relatively greater weight being placed on the desire for high membership on the part of union leadership *vis-à-vis* the desire for high wages on the part of the median union member.¹⁰ Equation (5) results from interpreting the bargaining objective as deriving from a Nash game played between the union's leadership and the union's median member. The leadership wants a large union (high n), and consequently the lower wages that would achieve this growth or membership objective. The median union member, whose employment is assumed to be secure, is concerned only with maximizing wage rents.

One advantage of the Stone–Geary functional form is that it admits some interesting special cases (Farber, 1986, p. 1061). For example, if $\delta = \gamma$ and $m = 0$, then the union's objective is to maximize $U = n(c^e - c^v)$, the rents for employed union members. In this

case, it is useful to think of all-encompassing labor market institutions where the bargaining over wages and employment is relatively centralized. When $\gamma = 1$ and $\delta = 0$, the objective is $U = n - m$, to maximize the size of the union. When $\delta = 1$ and $\gamma = 0$, the bargaining objective is $U = c^e - c^v$, the earnings for each of its members over and above their reservation alternative. That is, the union is completely “wage-oriented” in its negotiations with the firm (Carruth and Oswald, 1987). Consequently, the union places no importance on “internalizing” the adverse impact of higher wages on employment levels.

Wage and Employment in the Unionized Sector

We assume that bargaining over wages and employment is efficient and that the choice from the set of efficient contracts is the one that maximizes the symmetric Nash product; i.e.,¹¹

$$S(n, w) = U(n, w)\pi(n, w). \quad (6)$$

We assume that the solution lies in the interior of the choice set and that S is strictly concave so that the solution is unique and may be characterized by the following first-order conditions (we suppress arguments where no ambiguity exists and use subscripts to denote partial derivatives):

$$S_w(\cdot) = S(\cdot)[\delta\Delta^{-1} - (1+t)n\pi^{-1}] = 0, \quad (7a)$$

$$S_n(\cdot) = S(\cdot)[\gamma(n-m)^{-1} + (pf_n - (1+t)w)\pi^{-1}] = 0, \quad (7b)$$

where $\Delta = c^e - c^v$ is the economic rent to employed workers. Substituting (7a) into (7b), we obtain the contract curve

$$(\gamma - \delta l)w = \gamma c^v - \frac{\delta l p f_n}{(1+t)}, \quad (8)$$

where $l = (n - m)/n$, $l \in (0, 1]$. From equation (8), and since $f(\cdot)$ is concave, the contract curve has a positive (negative) slope when $\gamma > (<) \delta l$. Note that when $\gamma = 0$, labor is employed until its marginal revenue product equals its marginal cost; i.e., $pf_n = (1+t)w$. When $\delta = 0$, $w = c^v$ and employment is maximized. In the following we refer to the former case as being equivalent to “decentralized bargaining” because wage and employment outcomes occur along the firm’s demand-for-labor curve.¹² Likewise, the latter case is referred to as “centralized bargaining” because wages and employment are determined by the Nash bargaining condition and lie to the right of the firm’s demand-for-labor curve.

The following proposition summarizes the comparative static results for wages and employment. For expositional purposes, we consider a production function with constant elasticity of employment, α . (Derivations are provided in the Appendix.)

PROPOSITION 1. $w(c^v, p^*, \tau, t, m, \gamma, \delta)$ and $n(c^v, p^*, \tau, t, m, \gamma, \delta)$. Suppose that $\alpha = n f_n f^{-1} > 0$. Then

- (i) $w_{c^v} > 0$, $w_{p^*} \geq 0$, $w_{\tau} \geq 0$, $w_t \leq 0$, $w_m < 0$, $w_{\gamma} < 0$, and $w_{\delta} > 0$;
- (ii) $n_{c^v} < 0$, $n_{p^*} \geq 0$, $n_{\tau} \geq 0$, $n_t < 0$, $n_m > 0$, $n_{\gamma} > 0$, and $n_{\delta} < 0$.

The sign patterns are quite standard. Higher prices, or import tariffs, for the unionized good increase employment and wages. (The possibility of a zero wage effect for

the output price and the payroll tax are byproducts of adopting an isoelastic form for the demand-for-labor curve.) The wage and employment effects of more decentralized wage bargaining and higher values of δ (or lower values of γ) indicate the effect of an increased orientation to the pursuit of higher wages, as opposed to lowering the risk of unemployment. The effects of a higher m , given γ , are equivalent to the effects of a higher value of γ , given m . (Recall that m is the union leadership's threat point in a Nash bargaining game with the median union member. Hence, a higher m strengthens the union leadership's drive for employment growth.)

It is readily apparent that the owners of firms will always lose from any policy that involves increasing c^v . Doing so increases wages and lowers output and labor demand by firms. On the other hand, workers may adopt a variety of positions regarding the desirability of various labor market policies and public insurance programs depending on the size of tax increases needed to finance more generous benefits as well as the nature of their preferences. Specifically, whether workers are likely to support higher unemployment benefits depends on the extent to which payroll tax increases are shifted back onto workers (Ehrenberg, 1994, p. 8), the exposure of workers to unemployment, and the effect of higher reservation wages on negotiated wages. What is clear is that one of the main effects of higher unemployment benefits is to increase the wage pressure by insiders. Further, some authors (e.g., Saint-Paul, 1996) argue that, since incumbent workers are more numerous and better organized than the unemployed, labor institutions are determined by the interests of the employed. In turn, these decisive voters are likely to support policies and labor market institutions that increase the exclusion of outsiders.

5. Equilibrium Unemployment Benefits in a Small Open Economy

In this section, we study the political determination of unemployment benefits. In addition to understanding the effect of different labor institutions on the generosity of benefits, a primary objective is to investigate the relationship between trade liberalization and unemployment benefits.

The Lobby-group Model

The menu auction model of Bernheim and Whinston (1986) provides a useful framework for understanding the interaction between special interest groups and the government.¹³ Interest groups are assumed to have organized exogenously and to consist of individuals with similar interests in policy outcomes. Our focus is upon the unemployment benefit, b . Denoting the set of lobby groups by L , political contributions are made by the various groups to an incumbent government in return for preferred labor market policies, $\Lambda^i(b)$, where $i \in L$. These functions relate the political contributions of lobby groups to feasible policy choices.

An incumbent government is assumed to choose b to maximize the weighted sum of aggregate political contributions and aggregate social welfare. The specific form of the government's objective function is

$$V^s(b) = \sum_{i \in L} \Lambda^i(b) + \sum_{j=k,u,n} a^j V^j(b), \quad (9)$$

where the V^j , $j = k, u, n$, are the gross indirect utility functions for each group of factor owners—capital, incumbent union workers, and non-union workers, respectively. The

$a^j \geq 0$ are the “weights” that the government places on each group’s social welfare, relative to revenues and political contributions. Equation (9) does not restrict the weights attached to the social welfare of each group in the economy to be equal. For example, $a^u > a^n$ would imply that the government places a higher weight on the welfare of union workers compared to the welfare of non-unionized workers (Rama and Tabellini, 1998; Fredriksson and Gaston, 1999). This particular feature of the model captures ideological or constituency-specific motives behind policymaking, reflecting a view that governments of different political persuasions treat the different groups differently.

Equilibrium unemployment benefits are the outcome of a two-stage game played between the government and the lobby groups.¹⁴ Aggregating the government’s welfare and the welfare of each group in society (net of political contributions), the policymaker’s choice of b is given by

$$b^* = \operatorname{argmax} \sum_{i \in L} V^i(b) + \sum_{j=k,u,n} a^j V^j(b). \quad (10)$$

Budgetary Considerations

If we restrict our attention to balanced-budget methods of financing higher unemployment benefits, then the revenue available to fund unemployment benefits is given by the sum of payroll taxes and tariff revenues:

$$twn + T(p) = (1 - n)b. \quad (11)$$

The effects of a trade liberalization are captured by reductions in τ . This holds true whether τ is an import tariff or subsidy, or an export tax or subsidy. Note that there are two avenues through which a reduction in trade barriers may have effects on unemployment benefits. First, in the case of an export subsidy or an import tariff, a lower τ reduces the internal relative price of the domestic good, thereby directly reducing employment in the protected sector. Second, in the case of an export tax or an import tariff, a lower τ reduces the revenue available to fund increases in benefits. Some authors have pointed to the possibility that the generosity of unemployment benefits, and hence the level of taxation needed to finance it, may well influence trade flows, at least in the short run (e.g., Ehrenberg, 1994). Equation (11) recognizes that, through the effect on government revenues, freer and more open trade will affect the budget used to fund unemployment benefits.

If tariff revenues are not used to fund unemployment benefits, then more generous unemployment benefits need to be matched with higher payroll tax revenues. Since higher benefits have adverse employment effects, this necessitates a higher payroll tax rate.¹⁵ Hence, despite the possibility of beneficial wage effects for some workers, all workers and employers would unambiguously lose from the higher taxes needed to finance more generous benefits. Consequently, a balanced-budget constraint will serve to limit the size of equilibrium unemployment benefits (see below).

Impact of Higher Unemployment Benefits on Expected Income of Workers and Shareholders

Prior to wage and employment negotiations taking place, the income of all of the firm’s shareholders is given by equation (1), evaluated at optimal values for w and n . In addition, using equations (2) and (11), and recalling that $C(p)$ is independent of expected income, yields

$$I^k(b) = p^*f(n(b)) - w(b)n(b) - (1 - n(b))b. \quad (12)$$

From the balanced-budget constraint, for a given level of b , it is clear that firms in the unionized sector with higher levels of unemployment are taxed more heavily. In this sense, the financing of unemployment benefits is fully “experience-rated.”

The total net income of the group of incumbent union workers, m , is

$$I^u(b) = mw(b). \quad (13)$$

The expected income of $1 - m$ non-unionized workers is

$$I^n(b) = (n(b) - m)w(b) + (1 - n(b))(b + \kappa). \quad (14)$$

The specification for workers assumes that they are risk-neutral and that they maximize expected utility. Note that only when $m = 0$ and $\delta = \gamma$ do the preferences of non-union workers coincide with those of the political leadership of the union. We assume that the income while unemployed for workers is given by $c^v = b + \kappa$, where b is the government-provided benefit or income transfer and κ represents the value of informal sector or nonmarket production (e.g., as in Benhabib et al., 1991).¹⁶

Before proceeding it is useful to summarize the effects of changes in the generosity of higher unemployment benefits on the indirect utility of factor owners (see the Appendix for details):

$$V_b^k < 0, V_b^u > 0, \text{ and } V_b^n \cong 0. \quad (15)$$

Incumbent workers always prefer higher benefits, because their employment is secure and higher unemployment benefits increase the reservation wages of all workers (which, in turn, increase negotiated wages). Naturally, firms unambiguously prefer lower reservation wages. When $l = 1$, it is straightforward to show that

$$V_b^n = \begin{cases} \geq 0 & \text{if } \frac{\delta - \gamma - \alpha}{\alpha\delta} \leq v, \\ < 0 & \text{if } \frac{\delta - \gamma - \alpha}{\alpha\delta} \in (v, 1), \end{cases} \quad (16)$$

where $v = 1 - n$ is the percentage of the workforce not employed in the unionized sector. A sufficient condition for a higher value of b to have a positive impact on worker welfare is $\gamma + \alpha > \delta$. In fact, this condition implies that the Nash bargaining condition (NBC) has a steeper slope than the union workers' indifference curve (evaluated at (w^*, n^*)).¹⁷ Only when the rents from union bargaining become larger, which may result from very high levels of wage-oriented bargaining, do workers become concerned about the possible unemployment effects of higher levels of b .

Equation (16) also reveals that a sufficiently high probability of employment in the higher-wage and high-rent unionized sector lowers worker demand for public insurance. For example, if the unionized sector suffers falling output prices and higher unemployment, then the demand for higher unemployment benefits will increase. This result differs from a key finding of median voter models in which unemployment benefits are negatively related to unemployment. As Persson and Tabellini (2002, p. 31) note, this seems counterfactual when comparing Europe and the United States. Europe has both higher unemployment and higher unemployment benefits.

Socially Optimal Unemployment Benefits

The presence of a non-lobby group population is important in the context of the Grossman–Helpman model because it admits the possibility that policies shaped by influence-seeking activities are likely to deviate from those chosen by a utilitarian social planner. From equation (10), it is clear that policies will always be socially optimal if the welfare of each group in society is equally weighted and if all groups are politically organized. The socially optimal unemployment benefit is defined as the benefit that maximizes aggregate social welfare (in the absence of any lobbying and political contributions). The utilitarian policymaker assumption is a useful benchmark for discussing the lobby-group model. In this case, b is chosen to maximize

$$\Omega(b) = \sum_{j=k,u,n} V^j(b), \quad (17)$$

subject to the government's balanced-budget constraint. Summing equations (12) to (14), and using equation (11), yields the following maximand:

$$\Omega(b) = p^*f(n(b)) + (1 - n(b))\kappa. \quad (18)$$

The optimal unemployment benefit is simply chosen to maximize the value of market and nonmarket production.¹⁸

Obviously, if workers are risk-neutral and if nonmarket production has no value (i.e., $\kappa = 0$), then employment in the unionized sector should be maximized and unemployment benefits should never exceed zero (Acemoglu and Shimer, 1999).¹⁹ We summarize the key findings in Proposition 2.

PROPOSITION 2 (Utilitarian policymaker). *Suppose that $\kappa > 0$. Then:*

- (i) *Unemployment benefits are lower when the policymaker chooses balanced-budget or revenue-neutral policies.*
- (ii) *Unemployment benefits are positive only if collective bargaining is centralized.*

First, when a policymaker's balanced-budget constraint binds, unemployment benefits are lower than nonrevenue neutral benefits and transfers. Secondly, a more novel result is that $\gamma > \delta$ is a necessary condition for the optimal unemployment benefit to be positive. Recall from equation (16) that this condition implies that the bargaining objective places relative greater weight on employment growth and job security. Hence, more centralized bargaining systems are likely to have higher unemployment benefits. Focusing on the effects of liberalizing trade, the key comparative static results are summarized next.

COROLLARY 1 (Open economy). *$b^o(\kappa, p^*, \tau, m, \gamma, \delta)$, where:*

- (i) *$b_k^o > 0$, $b_m^o > 0$, $b_\gamma^o > 0$, and $b_\delta^o < 0$.*
- (ii) *If international competition lowers product prices and raises unemployment, then unemployment benefits are higher; i.e., $b_{p^*}^o \leq 0$.*
- (iii) *The impact of trade liberalization depends on whether tariff revenues are used to fund unemployment benefits. Specifically:*
 - (a) *If tariff revenues are not used to fund unemployment benefits, then:*
 1. *in the case of an import tariff or an export subsidy, $b_\tau^o \leq 0$; or*
 2. *in the case of an import subsidy or an export tax, $b_\tau^o \geq 0$.*
 - (b) *If tariff revenues are used to partially, or to fully, fund unemployment benefits, then:*

1. in the case of an import tariff or an export subsidy, $b_t^o > 0$; or
2. in the case of an import subsidy or an export tax, $b_t^o < 0$.

Part (i) indicates that unemployment benefits are higher when incumbent union workers, whose employment is secure, are more numerous. On the other hand, an aggressive pursuit of wage gains by union leaders, or wage contracts that expose workers to excessive amounts of unemployment risk, are balanced by lower unemployment benefits. The effect of higher values of κ on benefits reflects the increased value of time spent in nonmarket activities relative to time spent on production in the unionized sector.

Part (ii) indicates that, regardless of the method of financing, lower world prices raise unemployment benefits. That is, increased global competition is likely to lead to more generous unemployment benefits. The impact of trade liberalization, on the other hand, depends on whether tariff revenues are used to finance unemployment benefits and whether the unionized sector is protected or “antiprotected” (Vousden, 1990, p. 113).

Part (iii)(a) simply states that, for a small open economy liberalizing its unionized import-competing sector, optimal unemployment benefits will be higher. The lower tariff operates purely as an adverse domestic output price shock for the unionized sector. Of course, as unemployment benefits rise, income tax burdens are greater for workers and shareholders as well. Part (iii)(b) indicates that, when the unionized sector is protected and all tariff revenues are used to fund unemployment benefits, the effect of trade liberalization (assumed to be lower tariffs and lower subsidies) is to reduce the value of unemployment benefits.²⁰ When the unionized sector is “antiprotected,” benefits are increased. The effects of a trade liberalization are therefore twofold. First, lower import tariffs and export subsidies increase competition, which increases unemployment and raises benefits. Second, lower tariff or tax revenues affect the government’s budgetary position. In the case of lower import tariffs there is pressure on b to rise due to greater import competition, but there is an offsetting pressure on b to fall due to fiscal concerns.²¹

The Effect of Lobbying Activities

Clearly, how a policymaker weights the welfare of the different groups of factor owners strongly influences the generosity of unemployment benefits. For example, if a higher weight is placed on the welfare of shareholders compared to the welfare of workers, whether organized or not (i.e., $a^k > a^u$ and $a^k > a^n$), then equation (15) implies that benefits are lower than they otherwise would be. That is, this suggests that countries with pro-business governments have lower unemployment benefits than those countries with labor-oriented governments, *ceteris paribus*.

Similarly, to understand the effect that lobbying by interest groups has on the determination of public insurance and other labor market policies, it is important to identify the groups in an economy that are politically organized and actively participate in the political process. If we assume that the political weights attached to each group of factor owners by the policymaker are equal, this is readily seen by rearranging the solution to equation (10) to obtain

$$(1+a)\Omega_b = \sum_{i' \neq L} V_b^{i'} \quad (19)$$

Among others, Rama and Tabellini (1998) show that the policy distortion is proportional to the welfare effect of the policy on the unrepresented group in society.²²

Clearly, unemployment benefits are set at socially inefficient high (low) levels whenever the left-hand side of equation (19) is negative (positive). This result obtains because of the nonparticipation by groups of factor owners in the political process who, if represented, would press for lower (higher) benefits. Further, the degree of the distortion is decreasing in the relative weight placed on social welfare, a .²³

The comparative static effects of unequal treatment of groups of factor owners in the lobby group are transparent if we assume that only political contributions matter. Compared to the maximization of social welfare alone, because the government values contributions it weights more heavily the policy preferences of the organized groups that contribute. It seems reasonable to assume that only organized labor and/or capital owners make political contributions. In most OECD countries, non-unionized workers are politically unorganized or sufficiently disenfranchised so as not to lobby (and contribute to) the government for preferred policy outcomes.

Naturally, which groups of factor owners are politically active differs from country to country. In addition, it is not obvious that capital owners would be organized as a lobby in every country.²⁴ For example, if the unionized firm is foreign-owned and foreign shareholders do not participate politically or form a domestic lobby, then unemployment benefits are set inefficiently high. That is, since the welfare of incumbent union workers is valued more highly, this places upward pressure on benefit levels. To illustrate, the next proposition contains the results for the politically determined benefit, b^* , under the assumption that only organized labor makes political contributions.

PROPOSITION 3 (Lobbying by organized labor). *Suppose that $\kappa > 0$, that $a^i = a$, and that only organized labor lobbies. Then $b^* > b^o$. Further, b^* increases in (i) m , the number of organized workers, and (ii) the elasticity of negotiated wages with respect to unemployment benefits. Further, b^* decreases in (i) a , the government's weight on general welfare, and (ii) the elasticity of employment with respect to unemployment benefits.*

The results are straightforward. In terms of the comparative statics, note for the model we consider in this paper that the demand for higher benefits by incumbent union workers is driven by what Saint-Paul (1996) terms the "wage formation effect." The stronger this wage effect, the higher are unemployment benefits. Likewise, an elastic response of employment to higher benefits would counteract the wage formation effect.

6. Indirect Labor Market Effects of Globalization: Some Empirical Results

To test the main implications of the theory, our empirical analysis proceeds by examining unemployment benefit entitlements both within and between countries (see OECD, 1995 Jobs Study). In particular, we investigate whether openness of the economy and labor market institutions might be responsible for the differences. Amongst other things, in the empirical analysis our goal is to provide insights into policy-related questions that remain largely unresolved. First, is greater openness to trade correlated with the unemployment benefit generosity or stringency? Second, is there a statistical association between the nature of union participation in the economy, government indebtedness, partisan political effects, and unemployment benefits?

Using panel data for 17 OECD countries, we estimate the fixed-effects regression model. The dependent variable in all cases is the OECD's gross benefit replacement rate (BR): the proportion of expected income from work that is replaced by unem-

Table 1. Descriptive Statistics and Summary of Hypotheses

Variable	Label	Hypothesis	Mean	Standard deviation
Benefit replacement rate (%) ^a	•	BR	24.018	14.309
Government gross debt as percentage of GDP (%) ^b	Debt	–	36.295	27.132
Union density (%) ^c	Dentot	+	44.415	19.111
Trade openness ^d	Open	+	58.338	28.003
Political orientation of government ^e	Left	+	2.354	1.533

Notes and data sources:

^a Replacement rates (i.e., benefits before tax as a percentage of previous earnings before tax) as defined by legislated entitlements averaged across various circumstances in which an unemployed person may be. OECD (courtesy of OECD Social Policy Division).

^b Consolidated central government gross debt as a fraction of GDP (Franzese, 1998).

^c Total union membership (less self-employed) weighted by total dependent workforce, European countries from Ebbinghaus and Visser (2000). Data for Australia, Canada, Japan, and US from Golden et al. (1998).

^d (Total exports of goods and services + total imports of goods and services)/GDP. OECD Main Economic Indicators, online access.

^e *Left* = 1 if there is right-wing domination in both government and parliament; = 2 if right-wing or center parties make up between 33.3% and 66.6% of government; = 3 if center parties make up 50% or more of government; = 4 if left-wing or center parties make up between 33.3% and 66.6% of government; and = 5 if left-wing parties dominate the government. Woldendorp et al. (1998).

ployment and related welfare benefits.²⁵ Our model specification considers country fixed-effects and one-period lags of the independent variables, as well as a two-period lag of the dependent variable:²⁶

$$BR_{i,t} = \gamma BR_{i,t-2} + \beta' X_{i,t-1} + \theta_i + \varepsilon_{i,t}, \quad (20)$$

where $X_{i,t-1}$ is a vector including measures of openness, political orientation of the government (not lagged), union density, government debt, and a variable constructed by interacting the openness and debt variable; θ_i is the country-specific effect; and $\varepsilon_{i,t}$ is a random disturbance term. These are then stacked for estimation as a panel. Table 1 gives definitions, sources, and predicted signs of the variables in $X_{i,t-1}$.²⁷ In addition, we consider several variations on sample and specification.²⁸ The results are reported in Table 2.²⁹

Before considering our preferred specification, consider the specification in column (2) of Table 2. This contains the main variables with which we are concerned. As we showed in the previous section, both left-wing governments and widespread coverage of workers by union bargaining are predicted to raise unemployment benefits, and both of these results are clearly present. Our results on these variables are consistent with those in the large empirical literature in comparative political economy focusing on the link between labor market institutions, political orientation, and welfare-state outputs.³⁰ As suggested by our model, and consistent with the widely remarked link between openness to international trade and size of welfare-state interventions, we find a significant, positive relationship between the trade openness variable and the size of the unemployment benefit. Finally, since the government faces a balanced budget constraint in our model, we introduce a measure of the magnitude of debt as an indicator of how closely the constraint binds. The sign of the coefficient is negative, as predicted,

Table 2. Determinants of Benefit Replacement Rates, 1963–95 (robust standard errors)

	(1)	(2) No interaction	(3) Left lagged	(4) Contemporaneous	(5) With Italy
<i>Left</i>	0.260** (0.106)	0.253** (0.115)	0.162 (0.121)	0.257** (0.103)	0.258** (0.105)
<i>Union density</i>	0.139*** (0.046)	0.133*** (0.052)	0.139*** (0.046)	0.158*** (0.041)	0.111** (0.047)
<i>Openness</i>	0.098*** (0.034)	0.044* (0.027)	0.098*** (0.036)	0.102*** (0.035)	0.081** (0.035)
<i>Government debt</i>	0.043** (0.022)	-0.015 (0.018)	0.043* (0.023)	0.047** (0.023)	0.025 (0.019)
<i>Openness*Debt*10</i>	-0.007*** (0.002)		-0.007*** (0.002)	-0.007*** (0.002)	-0.006*** (0.002)
<i>Benefits(-2)</i>	0.797*** (0.072)	0.812*** (0.072)	0.798*** (0.072)	0.782*** (0.066)	0.817*** (0.079)
<i>R</i> ²	0.932	0.930	0.931	0.933	0.941
Observations	259	259	259	256	274

Notes: *Benefits* are lagged two years and *Left* is unlagged in all columns, except column (3) where *Left* is lagged one year. All other independent variables are lagged one year, except in column (4) where all variables are contemporaneous with the dependent variable. Column (5) adds Italy to the sample for the column (1) specification. ***, **, * denote significant at 1%, 5%, 10% level, respectively.

but it is not statistically significant. As in all specifications, the standard errors adjust for heteroskedasticity, and our tests reject the null of first- and second-order autocorrelation.

Now consider column (1) of Table 2, which contains the results for our preferred specification. The interpretations of our political orientation and union density variables are the same; but with the introduction of the interaction variable, which is highly significant though quantitatively small, the interpretation of trade openness and government debt become more delicate.³¹ Specifically, the values of the coefficients on openness and government debt now vary with each other's levels. That is, they describe conditional relationships, not unconditional ones. In this case, the negative interaction term captures the notion that, at any given level of openness to trade, a standard deviation increase in the government debt to GDP ratio lowers the response of the benefit replacement rate to openness (i.e., the conditional slope) by about 1.1 percentage points (i.e., $-0.0007 \times 58.338 \times 27.132$). Having accounted for this relationship, we are concerned that the estimate of a positive relationship between the unemployment benefit and debt may reflect endogeneity problems that will need to be dealt with in future work on this topic. The remaining specifications of the model yield essentially the same results. Consequently, we find the empirical results reported in Table 2 to be quite consistent with the theoretical approach adopted in sections 4 and 5 of this paper.

7. Conclusions

We have argued that standard ways of looking at the link between globalization and labor markets, which consistently find small or zero effects, by focusing on what we have

called direct effects, might obscure significant indirect effects. In addition to providing a review of research suggesting the significance of these indirect effects, we have constructed a model in which institutional features of the labor market help to explain observed trends in public insurance policies. That is, where related work has focused on the ways in which trade creates an outside option for domestic capital, we examined the link between trade and welfare-state provision. In our model, when wage bargaining is extremely decentralized, the lobbying influence of unions allied with the lobbying activities of employers encourages policymakers to ease tax burdens and cap increases in unemployment benefits. When the risk of unemployment is lower and collective bargaining is more centralized, workers prefer contracts with high unemployment risk and high wages, and this serves to increase the demand for publicly provided unemployment insurance. We then examined the impact of increased trade (in this case a reduction in the tariff) on the overall equilibrium. Trade has the effect of increasing sectoral unemployment, reducing the power of unions and increasing the demand for welfare-state provision. The particular channel of constraint is the budget deficit. The results of our empirical work are strongly consistent with the main predictions of the model.

We consider the results presented here to be sufficiently strong to support increased study of the indirect effects that are central to our story. We think several extensions are well worth considering. First, our model of lobbying is very simple—only organized labor lobbies and all groups are equally valued by government. Both of these assumptions should be examined. We clearly need to consider either politically active capital or a strong preference for capital in the government's objective function. As we note in section 3, a considerable body of research suggests that political valence (e.g., pro-labor/pro-capital) of the party in power is an important intervening variable in the relationship between globalization and sustainability of welfare states. In addition, it is not at all clear that trade is the empirically most significant force of globalization in determining these indirect effects. Given that the budget constraint plays an essential role here, it seems quite likely that international financial globalization should be considered in greater detail. We hope to pursue both of these in future work.

Appendix

Derivation of Comparative Statics in Proposition 1

Solving equations (7b) and (8) we have

$$w = \frac{(\gamma + \alpha)c^v}{B} \quad \text{and} \quad \frac{f}{n} = \frac{(\gamma + l)(1+t)c^v}{Bp},$$

where the elasticity of output is $\alpha = nf_n/f$, $l = (n - m)/n$ and $B = \gamma + \alpha l - (1 - \alpha)\delta l > 0$. It follows that

$$\begin{aligned} w_{c^v} &= \frac{(\gamma + 1)\gamma + (\gamma + l)\alpha l}{y} > 0; & n_{c^v} &= \frac{-(\gamma + l)Bn}{(1 - \alpha)yc^v} < 0; & w_p &= \frac{(1 - l)\delta\gamma f}{yn} \geq 0; \\ n_p &= \frac{(\gamma + 1)B(1+t)n}{(1 - \alpha)yp} > 0; & w_\delta &= \frac{w_{c^v}(1 - \alpha)lw}{(\gamma + \alpha)} > 0; & n_d &= \frac{-(\gamma + l)nl}{y} < 0; \\ w_\gamma &= \frac{-(1 - \alpha)\delta lpf}{y(1+t)n} < 0; & n_\gamma &= \frac{(1 + \delta)nl}{y} > 0; & w_m &= \frac{\gamma w_\gamma}{nl} < 0; & n_m &= \frac{\gamma n_\gamma}{nl} > 0; \end{aligned}$$

where $y = (\gamma + l)B + (1 - l)(1 + \delta)\gamma > 0$. Furthermore, it follows that

$$w_{p^*} = \frac{(1 + \tau)w_p}{(1 + t)} \geq 0; \quad w_\tau = \frac{p^*w_p}{(1 + t)} \geq 0; \quad w_t = \frac{-pw_p}{(1 + t)^2} \leq 0; \quad n_{p^*} = \frac{(1 + \tau)n_p}{(1 + t)} \geq 0;$$

$$n_\tau = \frac{p^*n_p}{(1 + t)} \geq 0; \quad n_t = \frac{-pn_p}{(1 + t)^2} \leq 0.$$

Derivation of Equation (15)

Differentiating equations (12) to (14), using the results listed in the above subsection, and simplifying we have

$$V_b^k = \frac{-[(1 - l)\gamma + (\gamma + l)\alpha]n}{y} < 0, \quad V_b^u = mw_{c^u} > 0,$$

$$V_b^n = \frac{[(\gamma + 1)\gamma + (\gamma + l)\alpha - (\gamma + l)\delta]nl}{y} + (1 - n).$$

Proof of Proposition 2

The solution to the maximization of equation (18) is

$$\Omega_b = (p^*f_n - \kappa)n_b = 0. \tag{A1}$$

When benefits are financed out of general revenues, the policymaker chooses b to maximize

$$\Omega(b) = p^*f(n(b)) + (1 - n(b))(b + \kappa). \tag{A2}$$

The solution is given by

$$\Omega_b = (p^*f_n - \kappa) - b + \frac{(1 - n)}{n_b} = 0. \tag{A3}$$

Comparison with equation (A1), and recalling that $n_b < 0$, yields part (i) of the proposition.

Next, use the first-order conditions (equations (7a) and (7b)) and the expression for the balanced-budget constraint (equation (11)) to obtain

$$b^o = \frac{(1 - \alpha)\kappa n}{\alpha(\gamma + l)} \left[\frac{(\gamma + \alpha l)(\gamma - \delta l) - Bl\tau}{B + n(1 - \alpha)\delta l} \right], \tag{A4}$$

where $B = \gamma + \alpha l - (1 - \alpha)\delta l > 0$. Part (ii) of the proposition follows. □

Derivation of Comparative Statics in Corollary 1

From equation (A1), and using the results from above, the comparative statics in part (i) follow directly. Next, when tariff revenues are not used to finance b , then the policymaker's objective is $\Omega(b) = pf(n(b)) + (1 - n(b))\kappa$, rather than equation (18). Total differentiation of $(pf_n - \kappa)n_b = 0$ yields

$$b_{p^*} = \frac{-(1-l)(1+\delta)\gamma c^v}{(\gamma+l)Bp^*} \leq 0. \quad (\text{A5})$$

Total differentiation of equation (A1) yields

$$b_{p^*} = \frac{-(1-l)(1+\delta)\gamma c^v}{(\gamma+l)Bp^*} \leq 0 \quad \text{and} \quad b_\tau = \frac{-n_\tau}{n_b} > 0. \quad (\text{A6})$$

In the case of an import tariff or an export subsidy, $n_\tau > 0$. In the case of an import subsidy or an export tax, $n_\tau < 0$. Parts (ii) and (iii) follow.

Proof of Proposition 3

The solution to maximization of equation (19) is

$$a(p^*f_n - \kappa)n_b = -mw_b. \quad (\text{A7})$$

Defining $\varepsilon_w = bw_b/w > 0$ and $\varepsilon_n = bn_b/n < 0$, equation (A7) can be rewritten as

$$p^*f_n = \kappa - \frac{(1-l)w\varepsilon_w}{a\varepsilon_n}. \quad (\text{A8})$$

Comparison with equation (A1), and noting that f_n increases in b , yields the proposition. \square

References

- Aaberge, R., T. Wennemo, A. Bjorklund, M. Jantti, P. J. Pedersen, and N. Smith, "Unemployment Shocks and Income Distribution: How Did the Nordic Countries Fare During their Crises?" *Scandinavian Journal of Economics* 102 (2000):77–99.
- Acemoglu, D. and R. Shimer, "Efficient Unemployment Insurance," *Journal of Political Economy* 107 (1999):893–928.
- Alesina, A. and D. Rodrik, "Distributive Politics and Economic Growth," *Quarterly Journal of Economics* 109 (1994):465–90.
- Baldwin, R. and G. Cain, "Shifts in Relative US Wages: the Role of Trade, Technology and Factor Endowments," *Review of Economics and Statistics* 82 (2000):580–95.
- Benhabib, J., R. Rogerson, and R. Wright, "Homework in Macroeconomics: Household Production and Aggregate Fluctuations," *Journal of Political Economy* 99 (1991):1166–87.
- Bernheim, B. D. and M. D. Whinston, "Menu Auctions, Resource Allocation, and Economic Influence," *Quarterly Journal of Economics* 101 (1986):1–31.
- Blank, R. M. and R. B. Freeman, "Evaluating the Connection between Social Protection and Economic Flexibility," in R. M. Blank (ed.), *Social Protection versus Economic Flexibility*, Chicago: University of Chicago Press (1994):21–41.
- Bordo, M., B. Eichengreen, and D. Irwin, "Is Globalization Today Really Different than Globalization a Hundred Years Ago?" *Brookings Trade Forum—1999*, Washington, DC: Brookings Institution (1999):1–72.
- Calmfors, L., "Centralisation of Wage Bargaining and Macroeconomic Performance: a Survey," *OECD Economic Studies* 21 (1993):161–91.
- Calmfors, L. and J. Driffill, "Bargaining Structure, Corporatism and Macroeconomic Performance," *Economic Policy* 6 (1988):14–61.
- Carruth, A. A. and A. J. Oswald, "On Union Preferences and Labour Market Models: Insiders and Outsiders," *Economic Journal* 97 (1987):431–45.
- Casamatta, G., H. Cremer, and P. Pestieau, "Political Sustainability and the Design of Social Insurance," *Journal of Public Economics* 75 (2000):341–64.

- Caves, R., "International Corporations: the Industrial Economics of Foreign Investment," *Economica* 38 (1971):1–27.
- Clark, A. and A. J. Oswald, "Trade Union Utility Functions: a Survey of Union Leaders' Views," *Industrial Relations* 32 (1993):391–423.
- Danthine, J. P. and J. Hunt, "Wage Bargaining Structure, Employment and Economic Integration," *Economic Journal* 104 (1994):528–41.
- Deardorff, A., "Fragmentation across Cones," in S. W. Arndt and H. Kierzkowski (eds.), *Fragmentation: New Production Patterns in the World Economy*, Oxford: OUP (2001):35–51.
- Doornik, J., D. Hendry, M. Arellano, and S. Bond, "PcGive, Panel Data Models," in J. Doornik and D. Hendry (eds.), *Econometric Modelling Using PcGive*, Vol. III, London: Timberlake Consultants Ltd (2001).
- Ebbinghaus, B. and J. Visser (eds.), *Trade Unions in Western Europe since 1945*, London: Macmillan (2000).
- Ehrenberg, R. G., *Labor Markets and Integrating National Economies*, Washington, DC: Brookings Institution (1994).
- Evans, P., "The Eclipse of the State: Reflections on Stateness in an Era of Globalization," *World Politics* 50 (1997):62–87.
- Farber, H. S., "The Analysis of Union Behavior," in O. Ashenfelter and R. Layard (eds.), *Handbook of Labor Economics*, Vol. 2, New York: Elsevier Science (1986):1039–89.
- Feenstra, R., "Integration of Trade and Disintegration of Production in the Global Economy," *Journal of Economic Perspectives* 12 (1998):31–50.
- Feenstra, R. and G. Hanson, "The Impact of Outsourcing and High Technology Capital on Wages: Estimates for the US, 1979–1990," *Quarterly Journal of Economics* 114 (1999):907–40.
- Franzese, Jr, R. J., "The Political Economy of Public Debt: an Empirical Examination of the OECD Postwar Experience," paper for the Wallis Conference on Political Economy, Northwestern University (1998).
- Friedrich, R., "In Defense of Multiplicative Terms in Multiple Regression Equations," *American Journal of Political Science* 26 (1982):797–833.
- Fredriksson, P. G. and N. Gaston, "The 'Greening' of Trade Unions and the Demand for Eco-Taxes," *European Journal of Political Economy* 15 (1999):663–86.
- , "Environmental Governance in Federal Systems: the Effects of Capital Competition and Lobby Groups," *Economic Inquiry* 38 (2000):501–14.
- Fredriksson, P. G. and J. Svensson, "Political Instability, Corruption and Policy Formation: the Case of Environmental Policy," *Journal of Public Economics* 87 (2003):1383–405.
- Freeman, R. B., "War of the Models: Which Labour Market Institutions for the 21st Century?" *Labour Economics* 5 (1998):1–24.
- Garrett, G., *Partisan Politics in the Global Economy*, Cambridge: Cambridge University Press (1998).
- Gaston, N. and D. Nelson, "Unions and the Decentralisation of Collective Bargaining in a Globalising World," *Journal of Economic Integration* 17 (2002):377–96.
- Gaston, N. and D. Nelson, "The Employment and Wage Effects of Immigration: Trade and Labour Economics Perspectives," in D. Greenaway, R. Upward, and K. Wakelin (eds.), *Trade, Investment, Migration and Labour Market Adjustment*, Basingstoke: Palgrave Macmillan, (2002):201–35.
- Goldberg, P. K. and G. Maggi, "Protection for Sale: an Empirical Investigation," *American Economic Review* 89 (1999):1135–55.
- Golden M., M. Wallerstein, and P. Lange, "Union Centralization Among Advanced Industrial Societies," National Science Foundation (1998).
- Gottschalk, P. and T. M. Smeeding, "Cross-national Comparisons of Earnings and Income Inequality," *Journal of Economic Literature* 35 (1997):633–87.
- Grossman, G. M. and E. Helpman, "Protection for Sale," *American Economic Review* 84 (1994):833–50.
- Hall, H. K. and D. Nelson, "Institutional Structure and the Political Economy of Protection: Administered versus Legislated Protection," *Economics and Politics* 4 (1992):61–77.

- , “The Peculiar Political Economy of NAFTA,” manuscript, Murphy Institute of Political Economy (2001).
- Haskel, J., B. Kersley, and C. Martin, “Labour Market Flexibility and Employment Adjustment: Micro Evidence from UK Establishments,” *Oxford Economic Papers* 49 (1997):362–79.
- Helpman, E., “A Simple Theory of International Trade with Multinational Corporations,” *Journal of Political Economy* 92 (1984):451–71.
- Huber, E. and J. Stephens, “Internationalization and the Social Democratic Model,” *Comparative Political Studies* 31 (1998):353–97.
- Hymer, S., *The International Operations of National Firms: a Study of Direct Foreign Investment*, Cambridge, MA: MIT Press (1960).
- Jones, R. and H. Kierzkowski, “A Framework for Fragmentation,” in S. Arndt and H. Kierzkowski (eds.), *Fragmentation: New Production Patterns in the World Economy*, New York: Oxford University Press (2001):17–34.
- Katzenstein, P., *Small States in World Markets*, Ithaca: Cornell University Press (1985).
- Kau, J. B. and P. H. Rubin, “The Impact of Labor Unions on the Passage of Economic Legislation,” *Journal of Labor Research* 2 (1981):133–45.
- Kohler, W., “A Specific-factors View on Outsourcing,” *North American Journal of Economics and Finance* 12 (2001):31–53.
- Koskela, E. and R. Schöb, “Alleviating Unemployment: the Case for Green Tax Reforms,” *European Economic Review* 43 (1999):1723–46.
- Krugman, P., “Domestic Policies in a Global Economy,” *Brookings Trade Forum—1999*, Washington, DC: Brookings Institution (1999):73–93.
- Leamer, E., “The Heckscher–Ohlin Model in Theory and Practice,” *Princeton Studies in International Finance* 77 (1995).
- Martin, J., “Measures of Replacement Rates for the Purpose of International Comparisons: a Note,” *OECD Economic Studies* 26 (1996):99–115.
- Mayer, F., *Interpreting NAFTA: the Science and Art of Political Analysis*, New York: Columbia University Press (1998).
- Organisation for Economic Co-operation and Development (OECD), *Employment Outlook*, Paris: OECD (1997).
- Pemberton, J., “A ‘Managerial’ Model of the Trade Union,” *Economic Journal* 98 (1988):755–71.
- Persson, T., “Do Political Institutions Shape Economic Policy?” *Econometrica* 70 (2002):883–905.
- Persson, T. and G. Tabellini, “Is Inequality Harmful for Growth?” *American Economic Review* 84 (1994):600–21.
- , “Political Economics and Public Finance,” in A. J. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics*, Vol. 3, Amsterdam: North-Holland (2002).
- Rama, M. and G. Tabellini, “Lobbying by Capital and Labor over Trade and Labor Market Policies,” *European Economic Review* 42 (1998):1295–316.
- Rodrik, D., “Why Do More Open Economies Have Bigger Governments?” *Journal of Political Economy* 106 (1998):997–1032.
- Rowthorn, R. E., “Centralisation, Employment and Wage Dispersion,” *Economic Journal* 102 (1992):506–23.
- Saint-Paul, G., “Exploring the Political Economy of Labour Market Institutions,” *Economic Policy* 23 (1996):263–315.
- Saint-Paul, G. and T. Verdier, “Inequality, Redistribution and Growth: a Challenge to the Conventional Political Economy Approach,” *European Economic Review* 40 (1996):719–28.
- Shleifer, A. and R. W. Vishny, “Corruption,” *Quarterly Journal of Economics* 108 (1993):599–617.
- Slaughter, M., “What Are the Results of Product–Price Studies and What Can We Learn from Their Differences?” in R. Feenstra (ed.), *The Impact of International Trade on Wages*, Chicago: University of Chicago Press/NBER (2000):129–65.
- Steinmo, S., “The End of Redistribution? International Pressures and Domestic Tax Policy Choices,” *Challenge* 37 (1994):9–18.

- Swank, D., *Global Capital, Political Institutions, and Policy Changes in Developed Welfare States*, Cambridge: Cambridge University Press (2002).
- Tanzi, V., *Taxation in an Integrating World*, Washington, DC: Brookings Institution (1995).
- Voudsen, N., *Economics of Trade Protection*, Cambridge: Cambridge University Press (1990).
- Woldendorp J., H. Keman, and I. Budge, "Party Government in 20 democracies: an Update (1990–1995)," *European Journal of Political Research* 33(1) (1998):125–64.
- Zweimüller, J. and E. Barth, "Bargaining Structure, Wage Determination, and Wage Dispersion in 6 OECD Countries," *Kyklos* 47 (1994):81–93.

Notes

1. Hall and Nelson (2001) develop a simple, preliminary analysis of this sort.
2. As Gaston and Nelson (2002) argue, the one-sector model used by labor economists has the virtue of providing clear guidance for empirical work, but must introduce the effect of standard globalization shocks (trade, immigration, foreign direct investment) in an essentially ad hoc way. That is, they shift either demand or supply, but there is no essential equilibrium relationship between globalization and the labor market.
3. The surveys of this literature are now almost sufficiently numerous to warrant a survey of their own. We make do with a reference to Slaughter's (2000) survey of work explicitly rooted in the Stolper–Samuelson theorem.
4. Consider a two-good model in which one sector decides to outsource. Either the original sector disappears, producing a three-good model (i.e., the original good unchanged good, and the two new sectors created by splitting the old technology) or a four-good model (if some firms continue to produce the final good under a unified technology). In either case, the dimensionality of both the price vector and the technology matrix must change, rendering standard comparative static methods problematic.
5. See Persson (2002) for a recent discussion with application to macroeconomic policy, and Hall and Nelson (1992) give an early institutional comparative static analysis of trade policy.
6. Rama and Tabellini (1998) refer to these as the "formal" and "informal" sectors of the economy.
7. Most OECD countries rely on payroll taxes to fully, or to partially, fund their unemployment insurance systems (Ehrenberg, 1994; Koskela and Schöb, 1999).
8. If aggregate imports are negative, then $\tau > 0$ can be interpreted as an export subsidy. Similarly, if $\tau < 0$, then τ can be interpreted as an import subsidy if aggregate imports are positive, or as an export tax if aggregate imports are negative.
9. Strictly speaking, m denotes the fallback utility level of the union leadership should the sector's employees quit union membership. For example, if the union operates in more than one sector of the economy, it represents union membership in those other sectors (see Pemberton, 1988, and discussion below). In the present context, we assume that there are m incumbent workers employed elsewhere in the organization. We follow Pemberton (1988) and Burda (1997) in assuming that $n > m$, so that $(n - m)$ represents the incremental utility gain to the union leadership from the bargaining agreement.
10. Farber (1986, p. 1063) summarizing his own earlier research on the United Mine Workers states that the union "seems to have placed more weight on employment relative to compensation than rent-maximization would imply." On the other hand, Clark and Oswald (1993) show that unions often care more about wages than employment.
11. It is debatable whether firms and unions negotiate *both* wages and employment or just wages alone. Empirical evidence in favor of efficient bargaining is mixed (Farber, 1986, p. 1067). On the other hand, negotiation over work rules may ensure that bargains are efficient. Notwithstanding, in this paper when unions and firms agree to wage–employment combinations on the firm's labor demand curve is given by the special case $\gamma = 0$.
12. Haskel et al. (1997) show that increasing labor market flexibility in the United Kingdom has resulted in labor input being more closely aligned to the business cycle. This implies that

- wage and employment contracts lie closer to the marginal revenue product or demand-for-labor curve.
13. Given our focus on indirect effects of globalization in the context of a politically active union, some form of lobbying model is clearly the preferred political-economy framework. Grossman and Helpman's (1994) implementation of the menu auction model is particularly attractive because it makes the government an active participant in the political process (unlike previous lobbying models) as well as the organized interests (unlike the political-response-function models). However, we are well aware that both political-response-function models and lobbying models with a passive register government yield essentially the same qualitative results.
14. Goldberg and Maggi (1999) emphasize that the Grossman–Helpman formulation is formally equivalent to choosing the unemployment benefit that maximizes the joint surplus of all the parties involved.
15. Since employment is affected by both taxes and unemployment benefits, there are certain permissible values of both t and b for our problem to be well-defined. To illustrate, suppose that tariff revenues are not used to finance benefits, that we have a constant elasticity of production, and that $l = 1$. We require that $bg_i n_i < 1$, where $g(n) = (1 - n)(nw)^{-1}$, which implies that $t(1 + t)^{-1} < (1 - \alpha)(1 - n)$. The condition for the tax rate also ensures that we are on the Laffer-efficient side of the tax revenue function. This requires that the tax elasticity of employment is not “too” elastic; i.e., $n_t t n^{-1} > -1$ (or that $t(1 + t)^{-1} < (1 - \alpha)$).
16. The risk neutrality allows us to focus on the political contestability of unemployment benefits, rather than on the role of benefits as providing insurance, per se. (See also note 19, below.) We also leave aside the issue of whether unemployment insurance benefits might optimally be provided privately, rather than socially; see Casamatta et al. (2000).
17. From equation (7b), assuming $l = 1$, the slope of the NBC is $-(1 - \alpha)wn^{-1}$; and from equation (8), the slope of the indifference curve evaluated at (w^*, n^*) is $-(1 - \alpha)\delta w[(\gamma + \alpha)n]^{-1}$ (using equations (7b) and (8) to simplify). Comparing the two expressions, the NBC has a relatively steeper slope when $\gamma + \alpha > \delta$. In addition, evaluated at (w^*, n^*) , the slope of the union leadership's indifference curve has a steeper slope than the worker's indifference curve as long as $\gamma > \delta$; i.e., when the union leaders are relatively more concerned with employment growth than with higher wages.
18. The maximand is the same regardless of whether τ is an export tax or subsidy or an import tariff or subsidy. See note 14.
19. Acemoglu and Shimer (1999) focus on the effects of unemployment benefits on workers' job search behavior. They show that firms may be willing to invest more in high-risk capital if the costs of searching for high-wage/high-unemployment-risk jobs by risk-averse workers are lowered by positive levels of unemployment insurance. An increase in the value of nonmarket time would have similar effects.
20. Such budgetary considerations may provide a theoretical explanation for Blank and Freeman's (1994) argument that some European countries, in the face of increased international competition, tried to reduce the “generosity” of their social programs.
21. In contrast, when an import subsidy is lowered there is pressure on benefits to be reduced due to higher internal prices, but there is also a relaxation of the government's balanced-budget constraint making the payment of more generous benefits possible. (Likewise, there are offsetting effects for export taxes and subsidies.)
22. It should be clear that asymmetric weighting of groups makes for a more complex relationship.
23. Some authors have interpreted a as measuring a policymaker's incorruptibility or the willingness of a government to adhere to welfare-maximizing policies (Shleifer and Vishny, 1993; Fredriksson and Svensson, 2003). However, in the context of pluralist democracies like those of the OECD, which make up our empirical sample, this is clearly a problematic interpretation of public political effort by organized groups.
24. For example, the globalization of capital markets and the increased mobility of capital, coupled with the fact that lobbying and political contributions are costly, may reduce the attractiveness of lobbying for capital owners (Fredriksson and Gaston, 2000). However, this sort of

argument is usually associated with governments being strongly pro-capital as well—i.e., fear of alienating “the capital market” induces governments to adopt market conforming regulation, low rates of capital taxation, etc.

25. The OECD produces these data for odd-numbered years from 1961 to 1999. Martin (1996) provides a detailed description of this variable. The OECD Directorate for Education, Employment, Labour and Social Affairs, Social Policy Division, was kind enough to provide these data.

26. The lag of the dependent variable is a control for first-order autocorrelation. We are constrained to use a two-year lag because the variable is calculated only biennially.

27. Our sample countries are essentially the high-income OECD countries for which we could get at least 10 years of data: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, UK, and US. In fact, our preferred specification also excludes Italy as a result of problems with the dependent variable (see the annex to Martin, 1996). We initially suspected that there might be problems with the German data as a result of unification, but exclusion of Germany has no qualitative effect, and only very small quantitative effects, on our results.

28. We considered random-effects specifications of all the reported fixed-effects specifications. In addition to the usual problems with interpreting random effects, in all but one case the Hausman test rejected the random-effects specification in favor of the fixed-effects specification.

29. The reported estimates were produced in PcGive, using the panel data models module (Doornik et al., 2001). We checked the results by estimating the models in TSP and EViews with no significant differences in results. That is, although these packages use somewhat different corrections to the standard errors, the qualitative and quantitative differences in significance were small.

30. See the discussions in Garrett (1998) and Swank (2002).

31. See Friedrich (1982) for an extended discussion of the use of interaction terms and their interpretation.