Universität St.Gallen

Corporate Taxation and the Welfare State

Christian Keuschnigg

August 2008 Discussion Paper no. 2008-18

Department of Economics University of St. Gallen

Editor: Prof. Jörg Baumberger
University of St. Gallen
Department of Economics
Bodanstr. 1
CH-9000 St. Gallen
Phone +41 71 224 22 41
Fax +41 71 224 28 85
Email joerg.baumberger@unisg.ch

Publisher: Department of Economics
University of St. Gallen
Varnbüelstrasse 19
CH-9000 St. Gallen
Phone +41 71 224 23 25
Fax +41 71 224 22 98

Electronic Publication: http://www.vwa.unisg.ch

Corporate Taxation and the Welfare State

Christian Keuschnigg

Author's address:

Prof. Christian Keuschnigg
IFF-HSG
Varnbüelstrasse 19
9000 St. Gallen
Tel. +41 71 224 25 20
Fax +41 71 224 26 70
Email christian.keuschnigg@unisg.ch
Website www.iff.unisg.ch

Abstract

The paper compares the impact of corporate taxation and social insurance on foreign direct investment (FDI) and unemployment. Four main results are derived: (i) the optimal size of the welfare state depends on the degree of risk-aversion and the unemployment rate as a measure of labor income risk. The unemployment rate partly reflects the country's exposure to globalization; (ii) corporate taxation and social insurance have equivalent effects on unemployment and outbound FDI; (iii) while an increase in the corporate tax can raise corporate tax revenue, it is rather likely to worsen the government's total fiscal stance. A corporate tax cut can thus be self-financing due to fiscal increasing returns in the presence of a large public sector; (iv) a corporate tax should be used to contribute to welfare state financing only in exceptional cases when job creation is excessive and the unemployment rate is inefficiently low. These conditions are probably unlikely to hold in Europe's generous welfare states with high structural unemployment rates.

Keywords

Corporate tax, foreign direct investment, unemployment, welfare state.

JEL Classification

F21, H21, H53, J64, J65.

1 Introduction

Globalization puts pressure on the welfare state in high wage economies. In an integrated world, globally acting companies find it increasingly easy to access cheap labor in developing countries to cut costs, or to move production closer to large markets rather than exporting from the parent country. Firms can escape domestic wage pressure, for example, by outsourcing labor intensive components to low wage economies or entirely relocating production by means of outbound foreign direct investment (FDI). The policy problem is that the need to raise tax revenue from mobile companies and the wage pressure resulting from the welfare state reinforce these business strategies, thereby eroding the tax base and the financial viability of the welfare state. It is widely recognized that the corporation tax as a source tax importantly affects FDI by its impact on the location choice of firms. Similarly, the high replacement income available in the welfare state props up wages and thereby similarly drives out business investment to alternative locations.

These arguments are supported by substantial empirical evidence. Among other factors influencing location choice, firms tend to locate production in countries with a low corporate tax burden. Hines (1996) and Devereux and Griffith (1998) show that FDI is sensitive to measures of average effective corporate tax rates. Buettner and Ruf (2007) similarly report that effective marginal tax rates affect the scale and effective average rates the location of multinational investment. Devereux, Lockwood and Redoano (2008) find that countries compete over both average and marginal tax measures. Hines (1999), Devereux (2007) and OECD (2007) summarize the empirical evidence.

On the other hand, wages are a very important factor in the location decision of multinationals, possibly even more important than corporate taxes. By raising wages, the welfare state might thus induce outbound FDI much the same way as the corporation tax. Empirical evidence suggests indeed that generous welfare states have a sizeable effect on wage costs and outsourcing in advanced economies. Estimates of the elasticity of the reservation wage with respect to unemployment benefits range from .11-.17 (Lancaster and Chesher, 1983) to values around .4 (Feldstein and Poterba, 1984, Fishe, 1982, van

den Berg, 1990). The high benefits in Europe (replacement rates are mostly 60% or more, see Nickell, 1997) thus significantly inflate wages. Díaz-Mora (2005) estimates that a one percent increase in firms' domestic labor cost boosts the volume of outsourcing by 0.3%. Investigating outsourcing of Austrian firms to Eastern Europe, Egger and Egger (2003) find that countries with lower unit labor costs attract more outsourcing. When outsourcing is measured in per cent of gross production, the elasticity is -0.89. Relative wage costs thus have an important effect on the internationalization strategies of firms. However, there seems to be little empirical evidence how wage taxes and, in particular, replacement incomes in the welfare state affect FDI. Indirectly, the results in Desai, Foley and Hines (2004) seem to be consistent with the arguments proposed here. They report that indirect taxes have a significant and substantial impact on FDI. Although they do not emphasize this interpretation, indirect taxes also erode the workers' real wage and could be shifted to employers. Closer to the arguments in this paper are the findings in Egger and Radulescu (2008) who explicitely consider wage taxes and social security contributions and find that effective labor tax rates significantly affect FDI, although less importantly than profit taxes.

The theoretical literature has given little attention to the interaction of corporate taxation and welfare state policies. This paper focusses on this interaction and compares the impact on unemployment, outbound FDI, income and welfare. Borrowing elements from Keuschnigg (2008) and Keuschnigg and Ribi (2007), the paper proposes a model of search unemployment with risk-averse workers and discrete location choice of firms. It explains how outbound FDI responds to corporate taxation and social insurance in the presence of an imperfect labor market. We also address the more fundamental problem of how the size of the social insurance scheme should be chosen when private markets for unemployment insurance are missing, and whether the corporate tax should be used to contribute to the financing of the welfare state.

The main results of the paper are four: (i) the optimal size of the welfare state depends on the degree of risk-aversion and the unemployment rate as a measure of labor income

risk.[1] The unemployment rate partly reflects the country's exposure to globalization; (ii) corporate taxation and social insurance have equivalent effects on unemployment and outbound FDI; (iii) while a tax increase can raise corporate tax revenue, it is rather likely to worsen the government's total fiscal stance. A corporate tax cut can thus be self-financing due to fiscal increasing returns in the spirit of Blanchard and Summers (1987) if the savings in social spending and the growth in wage tax revenue are appropriately taken into account. An isolated view on corporate tax revenue is much too narrow;[2] (iv) a corporate tax should be used to contribute to welfare state financing only in exceptional cases, irrespective of whether it succeeds to improve the total fiscal stance or not. This last result might not be surprising, given the benchmark result of Gordon (1986), reflecting the Diamond and Mirrlees (1971) production efficiency theorem for a perfectly competitive economy, that a source tax on company profits should not be used. However, in addition to missing private insurance markets, unemployment in our model results from labor market distortions. Therefore, if firms are endowed with much bargaining power, leading to an inefficiently *low* unemployment rate, and if the optimal size of the welfare state is small in this economy, a positive corporation tax could usefully complement the tax financed insurance scheme to curb excessive job creation. These conditions are probably not very realistic in Europe's generous welfare states with high structural unemployment rates.

We now proceed in Section 2 to set up a simple model of involuntary unemployment and outbound FDI. The basic function of the welfare state is to provide social insurance of risk-averse workers, assuming that private unemployment insurance is not possible. Section 3 derives comparative static results in response to policy shocks. Section 4 characterizes the welfare optimal level of unemployment insurance and then discusses the role of the corporate tax. Section 5 concludes.

[1] We relate social insurance to the unemployment risk such as in Chetty (2006) and the literature cited there, and use a static model of job search similar to Boone and Bovenberg (2004).

[2] Blanchard and Summers (1987) pointed out that fiscal increasing returns are likely to emerge in the presence of a large public sector. Tax cuts can even be self-financing if they expand employment, thereby strengthening the wage tax base and leading to savings in welfare spending for the unemployed.

2 The Model

We propose a stylized, one period model of search unemployment and outbound FDI. The government spends on social insurance and levies wage and corporate taxes to raise revenue. The homogeneous output good serves as *numeraire*. Firms are risk neutral due to the possibilities of perfect diversification of independent production risks. There is free entry of firms. Each firm invests a fixed amount of capital, decides on the location of the production unit, and hires labor if production is set up at home. In addition to variable hiring per firm, employment also depends on the number of firms staying local, giving rise to intensive and extensive margins of labor demand. Labor market frictions lead to involuntary unemployment.

2.1 Workers and Firms

Workers: There is a mass one of risk-averse workers who are initially unemployed and search for a job. Expected utility of a worker is

$$V = e \cdot u\left(w - t\right) + \left(1 - e\right) \cdot u\left(b + h\right). \tag{1}$$

An employed worker supplies one unit of labor, earns a wage w and pays a specific wage tax t. Since labor supply on the job is fixed, it does not matter whether the wage tax is ad valorem or specific. Only the average tax rate t/w is economically relevant. When unemployed, individuals collect unemployment benefits b and enjoy the money equivalent value h of leisure or home production (see also Blanchard and Tirole, 2008). With independent risks, the ex ante probability e of getting employed is also the ex post employment rate, and $1-e$ is the unemployment rate. Similarly, expected income ex ante is equal to average income ex post, $c = e \cdot (w - t) + (1 - e) \cdot b$.

The concavity of the utility function reflects risk aversion, $u' > 0 > u''$. We use the notation $u_E \equiv u\left(w - t\right)$ and $u_B \equiv u\left(b + h\right)$, and similarly u'_E and u'_B, where indices E and B stand for the states of being employed or 'on benefits'. Taylor approximations

yield $u_B \approx u_E - (w-t-b-h)\,u'_E$ and $u'_B \approx u'_E - (w-t-b-h)\,u''_E = (1+\chi\rho)\,u'_E$ and will be used later on. The relative income gap between labor market states is $\chi \equiv (w-t-b-h)/(w-t)$ and $\rho \equiv -(w-t)\,u''_E/u'_E$ is the degree of relative risk-aversion. The worker's job surplus as a share of the wage will be denoted by $\Omega \equiv 1-t^*-h/w$ where $t^* \equiv (t+b)/w$ is the participation tax rate in the sense of Saez (2002) and Immervoll et al. (2007). The job surplus indicates the worker's income gain when switching from unemployment into a job. The participation tax measures the total fiscal burden imposed on the worker when accepting a job. Since it consists of the *sum* of the average wage tax burden and the foregone social benefits, it tends to be very high.

Firms: The timing of events is: (i) public policy; (ii) free entry of firms; (iii) choice of production location and location specific investment; (iv) job search by workers and locally operating firms; (v) matching and wage bargaining; (vi) production and income payments. Entry means that firms pay a development or start-up cost r in stage (ii) which allows them to draw an investment project of type $q' \in [0,1]$ from the distribution $G(q) = \int_0^1 g(q')\,dq'$ where q' is the project specific success probability of investment i. The type q' of the investment project reflects the firm's luck in its innovation effort. Knowing its type q', the firm chooses the plant location before the investment risk is resolved. Investment succeeds or fails with probability q' at the end of stage (iii). If the firm fails, it closes down with all prior investments being lost.

To set up production, firms must thus incur a risky investment i. The size of this investment is location specific and, importantly, is assumed to be larger abroad than at home. The firm must spend additional resources to prepare foreign production, adjust to different regulations and institutions abroad etc. For simplicity, we normalize to zero the fixed investment at home so that i is the differential investment required when setting up production abroad. After success or failure is realized, firms are homogeneous within each group (domestic or foreign located).[3]

[3]In new trade theory, see Helpman (2006) for a survey and Melitz (2003) for the original model,

For simplicity, we assume that a firm consists of only one job which must be filled with a suitable worker to start production. Due to mismatch of skills and required job qualifications, hiring is successful only with probability m which is taken as given by an individual firm but is endogenous in equilibrium, reflecting labor market tightness. In equilibrium, employment per firm is variable and given by m. Ignoring other search costs, expected cash-flow per domestic firm is

$$\pi = (y - w) \cdot m, \tag{2}$$

where y is output of the firm-worker match and $y - w$ is the firm's job rent. With probability $1 - m$, hiring is unsuccessful and before tax profit is zero.

Alternatively to hiring and producing at home, firms can relocate and produce abroad, earning a profit and repatriated dividend equal to π_f. Given location specific start-up cost, a domestic innovator of type q' sets up production locally if the expected net present value exceeds the alternative value of locating abroad, $(1 - \tau)\,\pi \cdot q' > \pi_f \cdot q' - i$, where τ is the corporate tax and π_f is the cash-flow and repatriated dividend of the foreign subsidiary, net of the foreign corporation tax. We assume that the home government applies the *exemption method* to avoid double taxation so that no further tax is levied on foreign source profits. The exemption method is the most commonly applied method in OECD countries. We do not explicitely model the foreign economy but take π_f to be larger than net of tax cash-flow earned at home. After all, the larger profit opportunities of accessing cheap labor in low wage economies, or of locating the plant close to foreign markets, are prime motivations of outbound FDI. Of course, the larger profit is available only if investment is successful, and must be set against the extra cost of locating abroad. As Figure 1 illustrates, it is thus too costly and not worthwhile for relatively unprofitable firms (those with a low success probability) to go multinational. The pivotal firm is

$$q = \frac{i}{\pi_f - (1 - \tau)\,\pi}, \quad \pi_f > (1 - \tau)\,\pi. \tag{3}$$

firms are heterogeneous in their factor productivity which necessitates specific aggregation procedures to analyze general equilibrium. The probabilistic formulation adopted here is the key simplification compared to heterogeneous firm models in new trade theory.

Prior to entry, firms expend innovation effort to develop their product line, giving rise to an entry cost r. Innovation results in an investment project of type q' with probability $g(q')$, which will make it worthwhile to stay local or go international, depending on condition (3). Ex ante, the probabilities of surviving and staying local or relocating are

$$s = \int_0^q q' dG(q'), \quad s_f = \int_q^1 q' dG(q'), \quad I = \int_q^1 i dG(q'). \tag{4}$$

Business failure results in $s + s_f < 1$. All firms must incur the entry cost but only part of them survive to the production stage where the cash-flow is generated.

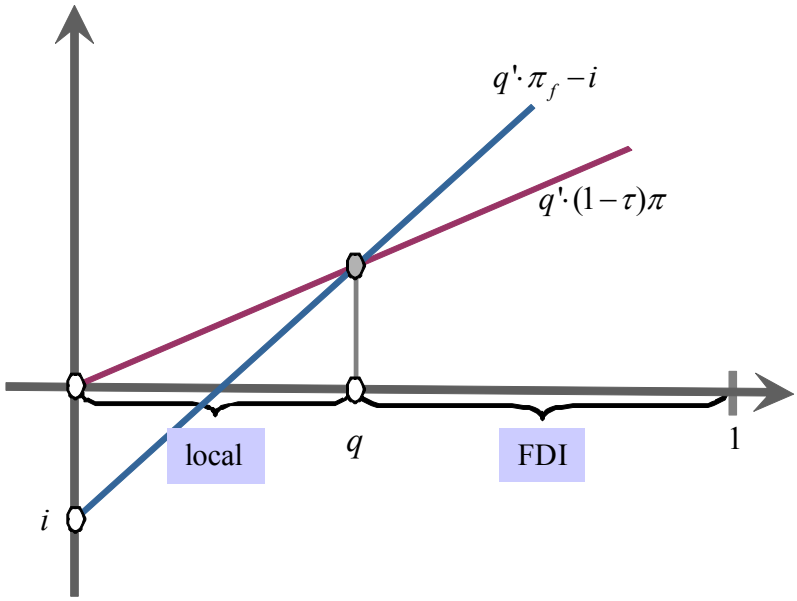

Fig. 1: Firm Selection

With n firms entering, a part ns survives the start-up phase and stays local, earning an aggregate cash-flow $n\pi$ gross of tax, and ns_f plants are moved abroad. Taking account of failure, the expected net present value of a new product line must cover the fixed entry cost, $\pi_e \geqslant r$, reflecting initial research and development expenses. Free entry eliminates all profit opportunities, leading to

$$\pi_e = s \cdot (1-\tau)\pi + s_f \cdot \pi_f - I = r(n), \quad r(n) \geqslant 0. \tag{5}$$

We allow for constant or diminishing returns to innovation, i.e. $r'(n) > 0$ with $r' = 0$ a special case. The fixed cost r could reflect the quality of local infrastructure or some other

limited resource which is subject to congestion. The cost of using the local factor increases with the number of firms established. Suppose $r = r_0 \cdot n^\sigma$, giving rise to $r' = \sigma r/n$ and $r + nr' = (1+\sigma)\, r$, where r is the private entry cost and $nr' = \sigma r$ is a negative externality on other users of the local factor. In other words, there is excess entry due to crowding.[4]

2.2 Labor and Product Markets

Labor Market: Firms and workers meet on a matching labor market. Search effort of workers is fixed, leaving a mass 1 of job searchers. Each firm is endowed with one vacancy. Since only local firms hire in the domestic labor market, the number of vacancies is sn. Job searchers and vacancies are matched according to $e \cdot 1 = m\,(1, sn) = m \cdot sn$. Skill mismatch leads to rationing subject to a standard linear homogeneous matching technology. Only a fraction m of vacancies and e of workers get matched, the remaing part remains idle, leading to involuntary unemployment and waisted investments. Using an empirically validated Cobb Douglas technology $M = 1^\eta\,(sn)^{1-\eta}$ shows how the employment and hiring probabilities depend on labor market tightness $\theta = sn$. A tighter market, i.e. more demand per worker, boosts employment chances of workers but makes hiring by firms more difficult:

$$e\,(\theta) = \theta^{1-\eta}, \quad m\,(\theta) = 1/\theta^\eta, \quad \theta m = e. \tag{6}$$

A successful match yields a rent to be shared by the worker firm pair. The wage follows from standard Nash bargaining, $w = \arg\max\ [u\,(w-t) - u\,(b+h)]^\gamma\,[y-w]^{1-\gamma}$, where γ reflects the worker's bargaining power. The bargaining condition $\gamma u'_E \cdot (y-w) = (1-\gamma)\,(u_E - u_B)$ implicitely determines the gross wage. Using the approximation mentioned subsequent to (1), wage bargaining yields

$$w = \gamma y + (1-\gamma)\,(t+b+h)\,. \tag{7}$$

[4] The opposite case would be agglomeration benefits which result in positive externalities and might lead to excess entry. In this case, entry should be subsidized, giving no useful role to the corporate tax.

Job rents $y-w=(1-\gamma)(y-t-b-h)$ and $w-t-b-h=\gamma(y-t-b-h)$ are a share of the joint surplus. They are are related by

$$\frac{y-w}{w}=\frac{1-\gamma}{\gamma}\cdot\Omega,\quad t^{*}\equiv\frac{t+b}{w},\quad \Omega\equiv 1-t^{*}-h/w, \tag{8}$$

where t^{*} is the participation tax rate, Ω is the worker's job surplus per unit of the wage. Similarly, $(y-w)/w$ is the firm's job surplus per wage unit.

Output Market: The government's budget constraint is

$$te+\tau\pi sn=(1-e)\,b. \tag{9}$$

Walras' Law implies goods market clearing. To show this, denote aggregate consumption by $c=(w-t)\,e+b\,(1-e)$. Using the fiscal budget yields $c=we+\tau\pi sn$. Writing foreign source income (repatriated dividends) as $Y_f\equiv ns_f\pi_f-nI$, the free entry condition gives $sn\pi-\tau sn\pi+Y_f=rn$. Use $e=msn$ and write $sn\pi=(y-w)\,e$, leading to $ye+Y^f-rn=\tau sn\pi+we$. We thus obtain from the earlier equation the national income identity $Y=c+rn$, where GNP $Y\equiv ye+Y^f$ consists of GDP plus foreign factor income, and is spent on private consumption and investment. Equilibrium is solved in terms of a wage tax t which balances the fiscal budget, and a market tightness θ which clears the matching labor market.

3 Equilibrium in the Welfare State

Except when stated otherwise, we compute logarithmic changes relative to an initial equilibrium, $\hat{w}=dw/w$. It is convenient to define the change in (specific) taxes and social spending relative to the gross wage, $\hat{t}\equiv dt/w$ and $\hat{b}\equiv db/w$, while the relative change in the corporate tax rate is defined as $\hat{\tau}=d\tau/(1-\tau)$. The exogenously chosen instruments are b and τ, the wage tax is endogenously set to balance the fiscal budget.

3.1 Wages, Profits and Investment

We first show how labor market tightness and the wage tax determine employment, wages, profits as well as national and foreign investment. Market tightness directly determines employment by the matching probabilities in (6),

$$\hat{e} = (1-\eta)\cdot\hat{\theta}, \quad \hat{m} = -\eta\cdot\hat{\theta}, \quad \hat{\theta} = \hat{s} + \hat{n}. \tag{10}$$

The wage rate is set by decentralized wage bargaining. Bargaining partly shifts taxes and benefits to employers, leading to a higher gross wage. From (7),

$$\hat{w} = (1-\gamma)\cdot\left(\hat{b} + \hat{t}\right). \tag{11}$$

The expected gross profit of a domestic plant reflects wage costs and firms' hiring chances. Substituting the results above and using (8) to replace firm rent yields

$$\hat{\pi} = \hat{m} - \frac{w}{y-w}\cdot\hat{w} = -\eta\cdot\hat{\theta} - \frac{\gamma}{\Omega}\cdot\left(\hat{b} + \hat{t}\right). \tag{12}$$

If producing abroad becomes more profitable relative to production at home, more firms will choose outbound FDI. To illustrate the consequences of globalization for the welfare state, we allow for an exogenous increase in profits π_f from foreign production. Obviously, improved prospects of accessing cheap labor or locating near large foreign markets leads firms to opt for FDI more frequently. Linearizing (3) shows how the identity of the pivotal firm changes,

$$\hat{q} = \frac{(1-\tau)\,\pi}{\pi_f - (1-\tau)\,\pi}\cdot(\hat{\pi} - \hat{\tau}) - \frac{\pi_f}{\pi_f - (1-\tau)\,\pi}\cdot\hat{\pi}_f. \tag{13}$$

The expected value π_e of a new firm depends importantly on selection effects, as reflected in the probabilities s. From (4),

$$\hat{s} = \frac{q^2 g(q)}{s}\cdot\hat{q}, \quad \hat{s}_f = -\frac{s}{s_f}\cdot\hat{s}. \tag{14}$$

The impact of a change in q on expected profit π_e is zero to the first order which reflects the discrete choice condition (3), i.e. $d\pi_e = \{[(1-\tau)\,\pi - \pi_f]\,q - i\}\,g(q)\,dq = 0$.

Diminishing returns to innovation imply less elastic entry behavior, $\hat{r} = \sigma\hat{n}$. A high value of σ means inelastic entry (strongly decreasing returns to innovation), a low value implies very elastic entry. The free entry condition (5) thus changes by

$$\hat{\pi}_e = \frac{s\,(1-\tau)\,\pi}{\pi_e} \cdot (\hat{\pi} - \hat{\tau}) + \frac{s_f \pi_f}{\pi_e} \cdot \hat{\pi}_f = \sigma \cdot \hat{n}. \tag{15}$$

3.2 Unemployment and Taxes

Labor Market: Labor market tightness depends on the number of locally built plants, $\hat{\theta} = \hat{s} + \hat{n}$, where $\hat{s}$ reflects location choice. Substituting (13-15) and rearranging yields

$$\hat{\theta} = \mu \cdot (\hat{\pi} - \hat{\tau}) + \mu_f \cdot \hat{\pi}_f, \tag{16}$$

with elasticities defined as

$$\mu \equiv \frac{s\,(1-\tau)\,\pi}{\sigma\pi_e} + \frac{q^2 g\,(q)}{s}\frac{(1-\tau)\,\pi}{\pi_f - (1-\tau)\,\pi} > 0, \quad \mu_f \equiv \frac{s_f\pi_f}{\sigma\pi_e} - \frac{q^2 g\,(q)}{s}\frac{\pi_f}{\pi_f - (1-\tau)\,\pi}.$$

These elasticities capture the level effect from free entry (the strength depends on σ) and the selection effect from location choice (the strength depends on $q^2 g\,(q)\,/s$). For example, local production becoming more profitable not only encourages overall innovation but also leads firms to establish a larger share of plants at home. An increase in foreign profits also boosts the overall expected return to innovation and attracts entry but, on the other hand, leads firms to locate more often abroad, making the overall effect on θ ambiguous. Obviously, the level effect dominates if entry is sufficiently elastic (σ is small, entry cost increases little with n), implying $\mu_f > 0$. An increase in foreign profits would strongly encourage business creation and thereby lead to a larger number of local plants even if the share of local plants in all investments becomes smaller.

Via entry and location choice, higher profits lead to a tighter labor market. On the other hand, a tighter market makes hiring more expensive and depresses profitability which works in the opposite direction. To obtain the equilibrium adjustment of labor market tightness, we substitute (12) and rearrange,

$$\hat{\theta} = -\frac{\mu}{1+\mu\eta}\left[\frac{\gamma}{\Omega} \cdot \left(\hat{t} + \hat{b}\right) + \hat{\tau}\right] + \frac{\mu_f}{1+\mu\eta} \cdot \hat{\pi}_f. \tag{17}$$

If welfare policy boosts the wage, profits at home decline, reducing not only entry but leading to relocation abroad. Market tightness falls. The labor market locus is negatively sloped in θ-t space.

Fiscal Balance: To analyze the fiscal constraint, consider first the adjustment of the corporate tax base. Noting $\theta = sn$, we have from (12)

$$\widehat{sn\pi} = \hat{\theta} + \hat{\pi} = (1-\eta) \cdot \hat{\theta} - \frac{\gamma}{\Omega} \cdot \left(\hat{b} + \hat{t} \right). \tag{18}$$

The fiscal budget in (9) implies $(1-e)\, w\hat{b} = ew\hat{t} + t^* e\hat{e} + (1-\tau)\, sn\pi\hat{\tau} + \tau sn\pi\widehat{sn\pi}$. Substituting from above, dividing by ew and using $\pi sn = (y-w)\, e$ together with (8) as well as $\hat{e} = (1-\eta)\, \hat{\theta}$ yields

$$\begin{aligned} [1 - \tau(1-\gamma)] \cdot \hat{t} &= -\left[t^* + \tau\Omega(1-\gamma)/\gamma\right](1-\eta) \cdot \hat{\theta} \\ &: \quad + \left[\frac{1-e}{e} + \tau(1-\gamma)\right] \cdot \hat{b} - (1-\tau)\frac{1-\gamma}{\gamma}\Omega \cdot \hat{\tau}. \end{aligned} \tag{19}$$

A tighter labor market is associated with higher employment and improves the fiscal stance, allowing for a lower wage tax burden. The fiscal gain is proportional to the participation tax rate t^*. On the other hand, a tighter labor market also reflects more entry, i.e. a larger number of firms and corporate tax payers, which further allows to reduce the wage tax. Higher benefits directly raise social spending. In addition, benefits also inflate wage claims and thereby reduce profits and firm entry which erodes the corporate tax base. For both reasons, a higher wage tax is required.

Equilibrium: The linearized fiscal constraint in (19) and the labor market free entry condition (17) form a simultaneous system in θ, t. Figure 2 illustrates the solution of the model. In particular, the labor market locus must be steeper for the equilibrium adjustment to be stable. This stability condition implies that the determinant of the system, written in matrix form, must be positive,

$$\nabla \equiv 1 + \mu\eta - t^*(1-\eta)\,\mu\frac{\gamma}{\Omega} - \tau(1-\gamma)(1+\mu) > 0. \tag{20}$$

In fact, the sign of the determinant is guaranteed if the government is small, $\nabla = 1 + \mu\eta$ in this case. We can now solve the system for the equilibrium adjustment in market tightness and the wage tax,

$$\begin{aligned}
\hat{\theta} &= \frac{1-\tau(1-\gamma)}{\nabla}\mu_f \cdot \hat{\pi}_f - \frac{\gamma\mu}{\nabla} \cdot \hat{\tau} - \frac{\mu}{\nabla e}\frac{\gamma}{\Omega} \cdot \hat{b}, \\
\hat{t} &= -\left[t^* + \tau\Omega(1-\gamma)/\gamma\right](1-\eta)\frac{\mu_f}{\nabla} \cdot \hat{\pi}_f \qquad (21) \\
&: \quad -\left[\left[1+\mu\eta-\tau(1+\mu)\right]\frac{1-\gamma}{\gamma}\Omega - t^*(1-\eta)\mu\right]\frac{1}{\nabla} \cdot \hat{\tau} \\
&: \quad +\left[(1+\mu\eta)\frac{1-e}{e} + t^*(1-\eta)\mu\frac{\gamma}{\Omega} + \tau(1-\gamma)(1+\mu)\right]\frac{1}{\nabla} \cdot \hat{b}
\end{aligned}$$

Figure 2 illustrates stability of equilibrium and the adjustment to exogenous shocks. The signs underneath the exogenous variables indicate how the budget and labor market schedules are shifted in response to exogenous shocks.

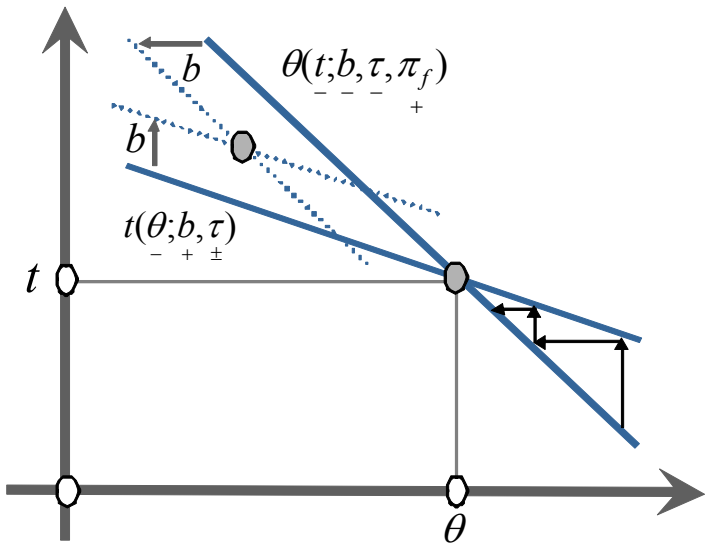

Fig. 2: Equilibrium in the Welfare State

The general equilibrium effects on labor market tightness and the wage tax pin down all other variables. In particular, we are interested how firm entry and the levels of national investment and FDI respond to public policy. Given constant foreign profits, entry in (15) is driven by changing domestic profits net of corporate tax, $\hat{\pi} - \hat{\tau}$. Combining (13-14)

shows that the same for the composition of investment, s and s_f:

$$\hat{n} = \frac{s\,(1-\tau)\,\pi}{\sigma\pi_e} \cdot (\hat{\pi} - \hat{\tau})\,, \quad \hat{s} = \frac{q^2 g\,(q)}{s} \frac{(1-\tau)\,\pi}{\pi_f - (1-\tau)\,\pi} \cdot (\hat{\pi} - \hat{\tau})\,. \tag{22}$$

In the present model, the level of national investment is equal to labor market tightness, $\theta = ns$, which is related in (16) to net of tax profit at home, $\hat{\pi} - \hat{\tau} = \hat{\theta}/\mu$. The equilibrium solution in (21) therefore directly reveals how the impact on national investment reflects firm entry and location choice. The same holds for the level of FDI which we denote by $F = ns_f$. Noting $\hat{s}_f = -\,(s/s_f) \cdot \hat{s}$, we find from (22) that

$$\hat{F} = \hat{n} + \hat{s}_f = \left[\frac{1}{\sigma}\frac{(1-\tau)\,\pi s}{\pi_e} - \frac{q^2 g\,(q)}{s_f}\frac{(1-\tau)\,\pi}{\pi_f - (1-\tau)\,\pi}\right] \cdot (\hat{\pi} - \hat{\tau})\,. \tag{23}$$

3.3 Globalization

Firms are able to better exploit business opportunities abroad and earn larger profits from foreign operations when the world economy becomes increasingly integrated. The immediate effect illustrated in Figure 1 is that a larger share of firms invests abroad rather than at home. However, outbound FDI might not come at the expense of domestic employment. More profitable foreign operations strengthen innovation and business entry which boosts investment both at home and abroad. The elasticity μ_f in (16) shows that globalization involves a positive level effect on domestic employment but a negative selection effect. If entry responds very elastically to higher expected profits π_e, i.e. if σ is low, then the level effect clearly dominates, leaving a positive impact on employment. Figure 2 is based on a positive elasticity μ_f and shifts the labor market locus to the right (not drawn). Globalization thus boosts job creation at home, tightens up the labor market and reduces unemployment.

Tax revenues grow on two margins. Since firms create – on net – a larger number of plants at home, the corporate tax base expands, raising tax revenues. Possibly even more important, higher employment results in a twofold fiscal gain since the number of tax payers rises while the number of welfare recipients shrinks. Hence, tax revenues grow in

proportion to the participation tax t^*. Given an improving fiscal stance, the government is able to cut the wage tax which reinforces the positive effects. The lower tax partly reduces wage demands, strengthens domestic profits, thereby partly reverses the trend to outbound FDI and further boosts employment. In equilibrium, the wage tax falls and market tightness rises. Despite of a declining gross wage, the net of tax wage grows due to a lower tax, $\hat{w} - \hat{t} = -\gamma\hat{t} > 0$. If entry and thereby job creation are elastic, domestic workers unambiguously gain in two ways. They not only reveive higher take home salaries, they also benefit from a higher employment rate. However, if entry is inelastic (σ high, making μ_f negative), all the results are reversed and globalization inflicts welfare losses to domestic workers (see A.3 in the Appendix).

Proposition 1 ***(Globalization)*** *Globalization leads to a larger share of outbound FDI and boosts entry. When entry is elastic, the net effect on domestic employment is positive and the wage tax can be reduced. Welfare of domestic workers increases. The results are reversed when entry is inelastic.*

4 Public Policy

4.1 Welfare State Reform

The consequences of expanding social spending financed with a wage tax is illustrated in Figure 2. As unemployment increases, the government must strongly raise taxes to finance benefit entitlements. The transmission mechanism is well understood from section 3.1. More generous benefits strengthen the workers' fall back position. Further, the wage tax gets partly shifted to employers as well. For these reasons, social protection inflates firms' wage costs and reduces profits from domestic activity. Depending on the share of domestic relative to foreign investments, expected profits from business creation decline as well. Not only is total investment reduced, a larger part of it is shifted to foreign locations. National employment falls which is reflected in a lower labor market tightness

in Figure 2. The total level of FDI, however, is ambiguous since the selection effect favors and the entry effect subtracts from FDI.

The general equilibrium feedback reinforces this negative trend. As unemployment picks up and more tax payers turn into welfare recipients, the government suffers a double loss. It must spend more on social benefits and, at the same time, collects less wage tax revenue. The fiscal stance deteriorates in proportion to the participation tax t^*. Furthermore, with less total investment and a larger part of it allocated to foreign locations, both the level and selection effects work to erode the national corporate tax base. The government must thus raise the wage tax even more to balance the budget. In the end, unemployment is up, net wages decline, and the business sector not only scales down total investment but increasingly opts for outbound FDI.

On the positive side, workers enjoy better protection against job losses when benefits are more generous. Providing insurance to risk-averse individuals in the face of uninsurable labor income risk and missing private markets is a fundamental reason for the existence of the welfare state. At least a small level of social insurance is welfare increasing. Setting all taxes to zero in the initial equilibrium and introducing a small social insurance scheme raises the wage tax in (21) by $\hat{t} = \frac{1-e}{e} \cdot \hat{b}$, where $\nabla = 1 + \mu\eta$ in this case. Substituting this into the welfare effect noted in (A.2) yields

$$\hat{V} = \left[(1-e)\,\chi\rho - \frac{\gamma - \eta^*}{\eta^*} \right] \frac{1}{e} \cdot \hat{b}, \quad \eta^* \equiv \frac{1+\mu\eta}{1+\mu} < 1. \tag{24}$$

The first term reflects the gains from insurance where ρ is the degree of relative risk-aversion, χ measures the income gap between work and unemployment, and $1 - e$ is the unemployment rate and measures the degree of risk. The gains from insurance arise because of missing markets. However, other market failures might be present as well which could work in favor or against the case for social insurance. There could be entry externalities which would disappear, however, if entry were perfectly elastic. In addition, the unemployment rate in a search labor market could be too high or too low, compared to the socially optimal rate because the bargaining power of workers and firms is not

aligned with their relative effectiveness in job search (Hosios, 1990). Consider first the case of infinitely elastic entry ($\sigma \to 0$ and $\mu \to \infty$, leading to $\eta^* \to \eta$) which eliminates the entry externalities and leaves only the search distortion. If the bargaining power satisfies the so-called Hosios condition $\gamma = \eta$, the equilibrium unemployment rate is not distorted. In this case, workers get a share γ of the joint surplus from job creation. This share exactly corresponds to their effectiveness in creating the surplus which is measured by the elasticity η of the matching function. Intuitively, workers get only a share of the joint surplus but also contribute only the same share to the creation of it. The labor market is efficient, and the welfare gains purely reflect the gains from insurance.

In the present model, entry and search distortions are related because they work on the same job creation margin. The elasticity μ measures how entry translates into national investment and job search by firms, and $1-\eta$ measures how effective firms' job search is in creating productive matches. The combined effect would be $1 - \eta^* = (1 - \eta) / (1 + 1/\mu)$, corresonding to η^* in (24). When entry becomes less than perfectly elastic (μ falls and η^* rises), the negative entry externalities become important, leading to excess entry. Obviously, this can be corrected if the bargaining power were shifted to workers, thereby reducing firms' surplus and retarding entry. We thus have a 'modified Hosios condition' $\gamma = \eta^*$ for an efficient labor market. If workers are weak ($\gamma < \eta^*$), corresponding to an equilibrium with an inefficiently low unemployment rate, the total welfare gains from introducing unemployment insurance would become larger than the pure gains from insurance. The policy would indirectly strengthen workers' bargaining power via their fall back position in wage negotiations and bring the overly low unemployment rate closer to the efficient level. However, in an economy with a strong bargaining position of workers and an overly high unemployment rate, the welfare gains from insurance are partly offset by the welfare losses from reduced efficiency of the search equilibrium.

When other market distortions are not too large ($\gamma = \eta^*$), social spending should be expanded until the gains from insurance are offset by the increasing excess burden from tax financing. It is now important to evaluate the comparative static effects in

the presence of positive tax rates, giving rise to tax base effects. Substituting again the equilibrium tax rate in (21) into the welfare effect in (A.2), using the determinant ∇ as well, and keeping τ constant, eventually yields

$$\begin{aligned} \hat{V} &= [(1-e)\,\chi\rho - \Gamma_B]\,\frac{1}{e}\cdot\hat{b} = 0, \qquad (25) \\ \Gamma_B &\equiv t^*\cdot\frac{(1-\eta)\,\mu\gamma}{\Omega\nabla} + \tau\cdot\frac{(1-\gamma)\,(1+\mu)}{\nabla} + \frac{\gamma-\eta^*}{\eta^*}\cdot\frac{1+\mu\eta}{\nabla}. \end{aligned}$$

Optimal policy must balance the gains from insurance with the excess burden of welfare state financing, $(1-e)\,\chi\rho = \Gamma_B$. The excess burden shows up not only in the welfare system (proportional to the participation tax t^*) but also in the corporate tax (proportional to the rate τ). Since social insurance pushes up wages, it erodes profit per domestic firm, the number of firms located at home (reduced entry and a shift towards FDI both reduce national investment) so that domestic corporate tax revenue declines. The excess burden is augmented or reduced by the last term in Γ_B, reflecting the potential labor market distortions from search and entry externalities.

Proposition 2 ***(Welfare State)*** *Expanding the welfare state boosts wages, cuts profits and reduces national investment and job creation due to reduced entry and a shift towards FDI. Unemployment rises. If the labor market is close to efficient ($\gamma = \eta^*$), a small insurance scheme creates first order gains from insurance. The scheme is optimally expanded until the gains from insurance are offset by the excess burden of welfare state financing.*

4.2 Corporate Taxation

For given gross profits which do not directly depend on the corporate tax, the immediate impact of the tax is to reduce net profits from local production which leads firms to shift towards FDI. Figure 1 illustrates by rotating down the line $q'\cdot(1-\tau)\,\pi$. A lower net of tax profit from local production also reduces expected profit π_e from innovation and, thereby, reduces firm entry. Both the selection effect towards FDI and the reduced entry diminish local job creation, leading to more unemployment. In equilibrium, labor market

tightness unambiguously declines. In consequence, as stated in (22), both firm entry and the share of local investments fall. In constrast, the level of outbound FDI in (23) remains inherently ambiguous, reflecting a negative entry and a positive selection effect.

While an increase in the corporate tax rate definitely raises corporate tax revenue, the total impact on the fiscal stance is less clear when the government must also levy wage taxes to finance social spending. For each worker ending up unemployed, the government looses net tax revenue (net of social spending) in proportion to the participation tax t^*. While the corporate tax raises more corporate tax revenue (as long as the term $1 + \mu\eta - \tau(1 + \mu)$ in (21) is positive which is the case if the tax rate is not too large),[5] it also triggers substantial fiscal losses in wage tax revenue and inflates welfare spending. For this reason, the total impact of a higher corporate tax on the fiscal stance is ambiguous a priori. If the net effect is to improve the fiscal stance, the wage tax may be cut which leads to wage concession, thereby strengthens profits, and partly reverses the negative direct effects on national investment. In Figure 2, the direct effect shifts the labor market locus to the left, the feedback effect shifts the budget line down. However, if the fiscal stance deteriorates, the feedback effect shifts up the budget line and magnifies the negative consequences of a higher corporate tax.

Proposition 3 ***(Corporate Tax)*** *The corporate tax reduces net of tax profit from domestic plants, impairs firm entry and leads to a relocation of investment towards foreign destinations. Unemployment rises due to a strong decline in national investment and job creation. The total fiscal stance may improve or deteriorate, leading to an ambiguous adjustment in the wage tax.*

Both corporate taxation and unemployment insurance add to unemployment. To compare the relative impact of the two policies on the unemployment rate, we now combine them in a way that is just offsetting. To keep calculations simple, we start from a situation with $\tau = 0$ initially. We ask the following question: if we raise the corporation tax by

[5] A rational government would always choose a tax rate on the increasing slope of the Laffer curve.

$\hat{\tau} = d\tau = \tau$ percentage points, by how much do we need to reduce benefits to prevent an increase in unemployment? Since employment is proportional to market tightness, we can combine the policy changes in (21) in a way that keeps θ and, thus, the unemployment rate constant. Using $\Omega \equiv 1 - t^* - h/w$ yields

$$\hat{b} = -\left(1 - t^* - h/w\right) e \cdot \hat{\tau} \quad \Rightarrow \quad \hat{e} = (1 - \eta) \cdot \hat{\theta} = 0. \tag{26}$$

Although the model is surely too stylized to give a reliable evaluation of the issue, it does point to an important trade-off. Taking the model literally, one can calibrate the employment rate and participation tax rate to attain realistic values, such as $e = .9$ (10% unemployment) and $t^* = .5$ (a 50% participation tax). If the monetary valuation of leisure during unemployment were zero ($h = 0$), then $(1 - t^*)\, e = .45$. If the replacement rate in unemployment insurance was 60% initially, and we introduced a corporation tax with a rate of 10% ($\hat{\tau} = .1$), then one would need to cut the replacement rate by $\hat{b} \approx \left(b^1 - b^0\right)/w^0 = -.45 \times .1$ or 4.5 percentage points, from 60% to 55.5%, to offset the impact of the corporation tax. While there is always a trade-off between a higher corporate tax and larger benefits, the magnitude of this trade-off is reduced if the monetary equivalent of leisure during unemployment were positive.[6] We summarize:

Proposition 4 ***(Relative Impact on Unemployment)*** *Raising the corporation tax from a level of zero to $\hat{\tau}$ percentage points and raising benefits by $\hat{b} = \left(1 - t^* - h/w\right) e \cdot \hat{\tau}$ percentage points have the same effect on the unemployment rate.*

While it is recognized that the average corporate tax rate significantly affects FDI, the potential of the welfare state to influence FDI flows was not investigated to the same extent. How does the corporation tax compare with the welfare state to influence FDI? FDI reflects both a level (entry) and a composition effect. Equation (23) shows that these two effects tend to offset each other so that national policy in general has an ambiguous

[6] On the other hand, unemployed workers might suffer from social stigma which might be associated with a negative value of h.

impact on outbound FDI. FDI adjusts in proportion to net of tax profit at home which changes in line with labor market tightness, $\hat{\pi} - \hat{\tau} = \hat{\theta}/\mu$ in (16). If firm entry is very elastic ($\sigma \to 0$), the entry effect clearly dominates and FDI increases whenever firms earn larger net of tax profit from home operations. If entry is inelastic (σ large), the selection effect dominates and FDI declines in response to the same shock. Whatever the sign of the net effect, the same policy combination that keeps θ and, thus, domestic unemployment constant, also keeps net of tax profits and outbound FDI constant.

Proposition 5 ***(Relative Impact on FDI)*** *Raising the corporation tax from a level of zero to $\hat{\tau}$ percentage points and raising benefits by $\hat{b} = (1 - t^* - h/w)\, e \cdot \hat{\tau}$ percentage points have the same effect on outbound FDI.*

Given missing insurance markets, the government should always protect workers and establish a welfare state. Hence, the corporation tax should be evaluated in the presence of other taxes and spending. We now investigate the ambiguity noted in Proposition 3 and clarify the conditions under which a higher corporate tax is indeed able to improve the fiscal stance. We again consider a small corporate tax, starting from a level of zero. In evaluating all derivatives at $\tau = 0$, we ignore the negative consequences on the corporate tax base. If the tax worsens the fiscal stance, it will do so even more if raised from already positive levels since this leads to additional revenue losses from a shrinking corporate tax base. Evaluating (21) at $\tau = 0$ and using the definition of η^* in (24), leading to $(1 - \eta^*)/\eta^* = (1 - \eta)\,\mu/(1 + \mu\eta)$, yields

$$\hat{t} = \left[\frac{t^*}{\Omega} - \frac{\eta^*}{1 - \eta^*}\frac{1 - \gamma}{\gamma}\right] \frac{\Omega\,(1 - \eta)\,\mu}{\nabla} \cdot \hat{\tau}. \tag{27}$$

Inserting the definition of $\Omega = 1 - t^* - h/w$ gives the following result:

Proposition 6 ***(Corporation Tax and Fiscal Stance)*** *Introducing a small corporate tax reduces the fiscal stance if the participation tax rate is large,*

$$t^* > \frac{\alpha}{1 + \alpha}\,(1 - h/w)\,, \quad \alpha \equiv \frac{\eta^*}{1 - \eta^*}\frac{1 - \gamma}{\gamma}, \tag{28}$$

where $\alpha = 1$ in an efficient labor market ($\gamma = \eta^*$) with an optimal unemployment rate.

Suppose that the labor market is efficient and the value of home production h which raises reservation wages beyond the influence of fiscal variables, is zero as well. In this case, a small corporate tax reduces the fiscal stance if the participation tax rate is larger than a half ($t^* > 1/2$). According to Immervoll et al. (2007), participation tax rates are rather high and larger than 50% in most European countries with an extensive welfare state.[7] The condition could thus easily be fulfilled, meaning that an increase in the tax rate, although raising more corporation tax, could potentially worsen the total fiscal stance. The upshot is that one must take into account the implications for wage tax revenue and social spending if one wants to evaluate the corporation tax in the welfare state. Given that the largest part of tax revenue in many countries is collected from wage income, and the largest part of public spending is for social purposes, the result could be important.

The condition is even more likely to be fulfilled if the value of home production or the money equivalent value of leisure (see Blanchard and Tirole, 2008) is positive. Home production inflates reservation wages beyond the influence of the wage tax and unemployment benefits. The resulting wage demands squeeze profits from domestic production and thereby impair national investment and job creation, resulting in a high unemployment rate. A further increase in unemployment due to a rise in the corporate tax would be particularly costly in terms of net tax revenue (wage tax minus social spending). Finally, the condition is also more likely to be fulfilled in an economy with excessive unemployment where the bargaining power of workers exceeds the efficient level. When γ rises above η^* and α falls below unity, the threshold rate of the participation tax declines.

An important issue is whether the corporate tax should be used at all to contribute to welfare state financing when participation tax rates are high and labor market distortions are potentially large. One might conclude that a small corporate tax could be welfare increasing since its revenue can be used to cut the typically large participation tax. Given the results on the fiscal stance, it seems unlikely, although not impossible, that the corporate tax could play a useful role in the welfare state. To clarify this, suppose that the

[7] The preceding section identifies the economic parameters that call for a large or small welfare state.

government collects a wage tax to finance unemployment benefits, for example, at levels that fulfill the optimality condition (25). The government would indeed optimally use the corporation tax to cut the wage tax burden if this could increase welfare. To see this, keep b constant, substitute the equilibrium solution for the wage tax in (21) into the welfare change in (A.2), and use the definitions of ∇ and η^*, to derive

$$\hat{V} = \left[(\eta^* - \gamma) \frac{(1+\mu)\,\Omega}{\nabla} - \tau \cdot \frac{(1-\gamma)\,(1+\mu)\,\Omega}{\nabla} - t^* \cdot \frac{(1-\eta)\,\mu\gamma}{\nabla} \right] \cdot \hat{\tau}. \tag{29}$$

If the labor market were efficient $\gamma = \eta^*$, using the corporate tax to reduce the wage tax destroys welfare. So the corporate tax should not be used to contribute to welfare state financing, even if the participation tax is very high, pointing to a high tax distortion in wage taxation. But *because* the participation tax is high, the corporate tax also involves a very high excess burden which is seen not in the erosion of the corporate tax base but elsewhere in the system. It destroys jobs and thereby causes large fiscal losses proportional to t^* from lower wage tax revenues and inflated social spending. For this reason, the excess burden of the corporate tax involves a high excess burden even if its rate is small or zero.

A case for a positive corporate tax rate can only be constructed if the workers' bargaining power is very weak and/or if entry is inelastic, giving rise to congestion externalities. Under these conditions, the unemployment rate is inefficiently low and the labor market distortion, as measured by the gap $\eta^* - \gamma$, is relatively large. A low unemployment rate also means that little labor income risk is to be insured. If, in addition, the workers' risk-aversion is small, there is little demand for social insurance. In consequence, the benefit level, the wage tax and, thus, the participation tax rate are small. The welfare state reduces entry and national job creation and thereby relaxes market tightness, as is required in an equilibrium with $\eta^* > \gamma$. However, when the optimal size of the welfare state is relatively small, it might not be enough to offset the labor market distortion. The government could then additionally levy a corporate tax to relax the labor market and restore an efficient unemployment rate. The tax rate would be raised until $\hat{V} = 0$ in (29) and no further welfare gain are feasible.

Proposition 7 ***(Corporate Tax and Welfare)*** *If the unemployment rate is efficient*

or inefficiently high ($\gamma \geqslant \eta^*$), even a small corporate tax yields a strictly positive excess burden and should not be used. A positive corporate tax could possibly be rationalized in a small welfare state if the unemployment rate is inefficiently low.

In the present model, the case for levying a corporate tax seems rather weak. It is not even sure that it helps to improve the fiscal stance. The increase in corporate tax revenue might be smaller than the fiscal losses that result from inflated social spending and a loss in wage tax revenue. From a welfare theoretic point of view, a corporate tax could possibly be rationalized in an economy with an excessively low unemployment rate resulting from an overly strong bargaining position of firms. The role of the corporate tax is then to internalize negative externalities in a distorted labor market and to reduce excessive job creation, and not so much in generating tax revenue to reduce other distorting taxes. It might be doubted that this potential function of the corporate tax is particularly relevant in reality. In any case, this condition is unlikely to be fulfilled when risk aversion and therefore the demand for insurance is large so that the government willingly accepts a high participation tax rate.

5 Conclusions

A major problem of the modern welfare state is the delocation of investment. The purpose of the paper was to compare the consequences for national employment and outbound FDI of corporate and labor taxation in the welfare state. The main results are that these policies are largely equivalent in their impact on unemployment and FDI. Based on an admittedly overly stylized back of the envelope calculation, we found that an increase in the corporate tax by 10 percentage points might have the same impact on unemployment and FDI than an increase in the replacement rate of social incurance by 4.5 percentage points. Another important result is that the corporate tax, while raising corporate tax revenue, could easily worsen a country's overall fiscal stance. By creating more unemployment, it inflates social spending and erodes wage tax revenue. The excess burden of the corporate

tax is therefore only to a minor extent due to the erosion of the corporate tax base but rather lies in the inflated cost of the welfare state. Even if it does raise enough revenue to improve the overall fiscal stance, the case for using the corporate tax in an advanced welfare state seems very weak. Based on an explicit welfare analysis, we found that the corporate tax could play a useful role only if social insurance is optimally kept at a small scale, e.g. because of small risk-aversion, and if the labor market is distorted towards excessive job creation. One might conclude that these conditions are hardly fulfilled in European welfare states with high structural unemployment rates.

Appendix: Welfare Analysis

Expected utility changes by $dV = (u_E - u_B)\, de + eu'_E\,(dw - dt) + (1-e)\, u'_B db$. Divide by w and use the Taylor approximations noted in (1). Use the definition of the participation tax t^*, substitute the change in the wage rate, $\hat{w} = (1-\gamma)\left(\hat{b} + \hat{t}\right)$, leading to the welfare impact

$$\hat{V} \equiv \frac{dV}{ewu'_E} = \Omega \cdot \hat{e} + (1-\gamma)\cdot \hat{b} - \gamma \cdot \hat{t} + \frac{1-e}{e}\frac{u'_B}{u'_E}\cdot \hat{b}. \tag{A.1}$$

The term $\frac{1-e}{e}\frac{u'_B}{u'_E}$ is the marginal rate of substitution of income between good and bad states. Use $u'_B/u'_E = 1 + \chi\rho$ and replace $\hat{e} = (1-\eta)\,\hat{\theta}$ from the labor market locus (17),

$$\hat{V} = \left[\frac{1-e}{e}\chi\rho + \frac{1}{e} - \frac{\gamma}{\eta^*}\right]\hat{b} - \frac{\Omega\,(1-\eta)\,\mu}{1+\mu\eta}\hat{\tau} - \frac{\gamma}{\eta^*}\hat{t} + \Omega\frac{(1-\eta)\,\mu_f}{1+\mu\eta}\hat{\pi}_f, \tag{A.2}$$

where $\eta^* \equiv \frac{1+\mu\eta}{1+\mu} < 1$ is defined.

The final welfare change is obtained by substituting the equilibrium solution of the wage tax in (21). For example, if entry is elastic and $\mu_f > 0$, globalization allows to cut the wage tax so that domestic welfare rises,

$$\hat{V} = \Omega\frac{1-\eta}{1+\mu\eta}\mu_f \cdot \hat{\pi}_f - \frac{\gamma}{\eta^*}\cdot \hat{t} > 0. \tag{A.3}$$

References

[1] Blanchard, Olivier J. and Lawrence H. Summers (1987), Fiscal Increasing Returns, Hysteresis, Real Wages and Unemployment, *European Economic Review 31*, 543-566.

[2] Blanchard, Olivier J. and Jean Tirole (2008), The Joint Design of Unemployment Insurance and Employment Protection, *Journal of the European Economic Association 6*, 45-77.

[3] Buettner, Thiess and Martin Ruf (2007), Tax Incentives and the Location of FDI: Evidence From a Panel of German Multinationals, *International Tax and Public Finance 14*, 151-164.

[4] Boone, Jan and Lans Bovenberg (2004), The Optimal Taxation of Unskilled Labor with Job Search and Social Assistance, *Journal of Public Economics 88*, 2227– 2258.

[5] Chetty, Raj (2006), A General Formula for the Optimal Level of Social Insurance, *Journal of Public Economics 90*, 1879-1901.

[6] Desai, Mihir A., Fritz C. Foley, and James R. Hines (2004), Foreign Direct Investment in a World of Multiple Taxes, *Journal of Public Economics 88*, 2727-2744.

[7] Devereux, Michael P. (2007), *The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence*, Oxford University Centre for Business Taxation, WP07/02.

[8] Devereux, Michael P. and Rachel Griffith (1998), Taxes and the Location of Production: Evidence from a Panel of US Multinational Firms, *Journal of Public Economics 68*, 335-367.

[9] Devereux, Michael P, Ben Lockwood, and Michaela Redoano (2008), Do Countries Compete Over Corporate Tax Rates?, *Journal of Public Economics 92*, 1210-1235.

[10] Diamond, Peter and James Mirrlees (1971), Optimal Taxation and Public Production, Part I: Production Efficiency (II: Tax Rules), *American Economic Review 61*, 8-27 (261-278).

[11] Díaz-Mora, Carmen (2005), *Determinants of Outsourcing Production: A Dynamic Panel Data Approach for Manufacturing Industries*, DEFI WP 05/07.

[12] Egger, Hartmut and Peter Egger (2003), Outsourcing and Skill-Specific Employment in a Small Economy: Austria after the Fall of the Iron Curtain, *Oxford Economic Papers 55*, 625-643.

[13] Egger, Peter and Doina M. Radulescu (2008), *Labour Taxation and Foreign Direct Investment*, CESifo WP No. 2309.

[14] Feldstein, Martin and James Poterba (1984), Unemployment Insurance and Reservation Wages, *Journal of Public Economics 23*, 141-167.

[15] Fishe, Raymond P.H. (1982), Unemployment Insurance and the Reservation Wage of the Unemployed, *Review of Economics and Statistics 64*, 12-17.

[16] Gordon, Roger H. (1986), Taxation and Savings in a World Economy, *American Economic Review 76*, 1086-1102.

[17] Helpman, Elhanan (2006), Trade, FDI, and the Organization of Firms, *Journal of Economic Literature 44*, 589-630.

[18] Hines, James R. Jr. (1996), Altered States: Taxes and the Location of Foreign Direct Investment in America, *American Economic Review 86*, 1076-1094.

[19] Hines, James R. (1999), Lessons from Behavioral Responses to International Taxation, *National Tax Journal 52*, 305-322.

[20] Hosios, Arthur J. (1990), On the Efficiency of Matching and Related Models of Search and Unemployment, *Review of Economic Studies 57*, 279-298.

[21] Immervoll, Herwig, Henrik J. Kleven, Claus T. Kreiner, and Emmanuel Saez (2007), Welfare Reform in European Countries: A Microsimulation Analysis, *Economic Journal 117*, 1–44.

[22] Keuschnigg, Christian (2008), Exports, Foreign Direct Investment and the Costs of Corporate Taxation, *International Tax and Public Finance 15*, 460-477.

[23] Keuschnigg, Christian and Evelyn Ribi (2007), *Outsourcing, Unemployment and Welfare Policy*, CEPR WP No. 6605.

[24] Lancaster, Tony and Andrew Chesher (1983), An Econometric Analysis of Reservation Wages, *Econometrica 51*, 1661-1676.

[25] Melitz, Marc J. (2003), The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica 71*, 1695-1725.

[26] Nickell, Stephen (1997), Unemployment and Labor Market Rigidities: Europe versus North America, *Journal of Economic Perspectives 11*, 55-74.

[27] OECD (2007), Tax Effects on Foreign Direct Investment. Recent Evidence and Policy Analysis, *OECD Tax Policy Studies No. 17*, Paris.

[28] Saez, Emmanuel (2002), Optimal Income Transfer Programs: Intensive versus Extensive Labor Supply Responses, *Quarterly Journal of Economics 117*, 1039-1073.

[29] Van den Berg, Gerard J. (1990), Search Behaviour, Transitions to Non-participation and the Duration of Unemployment, *Economic Journal 100*, 842-865.