# TAX BURDEN AND MIGRATION:
# A POLITICAL ECONOMY
# THEORY AND EVIDENCE

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## ABSTRACT

The extent of taxation and redistribution policy is generally determined as a political-economy equilibrium by a balance between those who gain from higher taxes/transfers and those who lose. In a stylized model of migration and human capital formation, we show -- somewhat against the conventional wisdom -- that low-skill immigration may lead to a lower tax burden and less redistribution than would be the case with no immigration, even though migrants (naturally) join the pro-tax/transfer coalition. Data on 11 European countries over the period 1974 to 1992 are consistent with the implications of the theory: a higher share of immigrants in the population leads to a lower tax rate on labor income, even after controlling for the generosity and size of the welfare state, demographics, and the international exposure of the economy. As predicted by the theory, it is the increased share of low education immigrants that leads to the smaller tax burden.

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# 1  Introduction

The modern welfare state typically transfers income from the rich to the poor, either by cash transfers or by in-kind transfers. This redistribution feature makes the welfare state, therefore, an attractive destination, particularly for low-skill immigrants. A recent study by George Borjas (1994) indicates that foreign-born households in the United States accounted for 10 percent of households receiving public assistance in 1990, and for 13 percent of total cash assistance distributed, even though they constituted only 8 percent of all households in the United States. In Europe, restrictions on immigration were considerably tightened following the recessions of 1973-74, which led to concerns that immigrants were displacing native workers.[1] The main purpose of this paper is to analyze the interaction between migration and the political-economy equilibrium tax-transfer policy. Does migration necessarily tilt the political balance in favor of heavier taxation and more intensive redistribution? This paper addresses this issue both theoretically and empirically.

Our analytical model suggests that the extent of taxation and redistribution policy is determined as a political economy equilibrium by a balance between those who gain and those who lose from a more extensive tax-transfer policy. The model captures two conflicting effects of migration on taxation and redistribution. On the one hand, the low-income migrants who are net beneficiaries from the tax-transfer system will indeed join forces with the native-born low-income voters in favor of higher taxes and transfers. On the other hand, redistribution becomes more costly to the native-born population as the migrants share some of the benefits at their expense. We show that migration does not necessarily tilt the political balance in favor of heavier taxation and more intensive redistribution. The reason for this is that as the number of migrants grows, more native-born individuals from the middle of the income

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[1]See Friedberg and Hunt (1995) and Zimmerman (1995) for recent surveys of the literature on the labor market effects of immigration.

distribution are hurt by the extra tax burden brought about by the need to finance the transfer to the migrants, and these individuals shift to the high-income anti-tax coalition. This shift may be larger than the addition to the pro-tax coalition brought about by the migrants who join this coalition from the bottom end of the income distribution. In the case of free migration, arbitrage keeps the income of the migrants constant at the level of their alternative source-country income regardless of the host country tax-transfer policy, so that migrants lose interest in the outcome of the political-economy process. Thus, the tax burden necessarily falls as migration quotas are relaxed (that is, the number of immigrants increased) from no immigration toward free migration. This is also the result if migrants do not participate in the political process in the first place even without free migration, since in this case the anti-tax coalition becomes unambiguously larger.

Empirical evidence using panel data on 11 European countries from 1974 to 1992 provides strong support for the theory. We find that the tax burden on labor income in these countries decreases with the share of immigrants out of the total population, resolving the ambiguity arising from the theory. Most interesting, however, is that the educational composition of the immigrants matters in the way suggested by the theory, with an increasing share of immigrants with low levels of education leading to lower tax rates. The negative relationship between tax rates and the share of all immigrants thus reflects the predominant share of low education individuals among immigrants, and the larger share of low education individuals in the immigrant population than among natives. What is most remarkable about these results is that they are obtained even after taking into account several factors that would be expected to reflect the government's revenue needs and thus determine the tax rate. That is, immigration matters for the tax burden, even after controlling for the generosity and size of the welfare state, the dependency ratio, and the exposure of the domestic economy to international trade.

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The paper is organized as follows. Section 2 develops a stylized model of migration and human capital formation. Section 3 describes the nature of the political-economy equilibrium tax-transfer policy with or without migration quotas and derives the effects of migration on the tax-transfer policy, after which Section 4 provides simulations that illustrate the analytical results. Section 5 then presents empirical results, including a description of the data sources and discussion of the econometric findings. Section 6 concludes.

# 2   A Model of Migration

Following Saint-Paul (1994) and Razin and Sadka (1995), we assume a stylized economy in which there are only two types of labor productivity: "low" and "high." A high productivity worker provides one efficiency unit of labor, while a low productivity worker provides only $\rho < 1$ efficiency units of labor. Every individual can acquire education that makes her a high productivity ("skilled") worker, but if she does not acquire an education, then the worker remains low-productivity ("unskilled"). There is a continuum of individuals varying in the cost, $c$, of acquiring education (due to, say, innate ability). We assume that the distribution of these costs in the population is uniform over the interval $[0, 2\bar{c}]$. To simplify the notation, the size of the native-born population is normalized to 1.

Suppose that the government levies an egalitarian income tax. The literature (e.g., James Mirrlees, 1971) suggests that a best egalitarian income tax can be approximated by a linear tax. We therefore consider an income tax with a flat rate, $t$, and a lump-sum cash grant, $\beta$. The uniform cash grant may also capture free provision of public services such as health and education (if all families are of similar size and age structure). To simplify, we assume that migrants qualify for all components of the entitlement programs in the destination country.

We assume that the individual labor supply is fixed, so that the income tax does not distort individual labor supply decisions. We endogenize the migration decision, however, by assuming that this depends on international net-income differentials. Specifically, we assume that there is a (given) net wage rate, $w^*$, for unskilled labor in the source country that is below the net income of unskilled workers in the destination country when there is no migration. Unskilled labor then migrates from the source country to the destination country, narrowing the income gap expressed in the following condition:

$$(1 - t)\rho w + \beta \geqq w^*, \tag{1}$$

where $w$ is the wage per efficiency unit of labor. If the host country imposes a quota on the number of immigrants and the quota binds, then condition (1) holds with a strict inequality. The existence of free migration eliminates the income gap, making condition (1) an equality.

Each individual can invest in either human capital (through education) or in physical capital that yields a return $r$. There exists a cutoff level, $c^*$, such that those with education cost below $c^*$ invest in human capital and become skilled, while everyone else remains unskilled. The cutoff level is determined by the equality between the marginal return to education and the marginal opportunity cost of education (via investment in physical capital). In the absence of taxation and income redistribution, $c^*$ is determined by:

$$(1 + r)c^* = (1 - \rho)w. \tag{2'}$$

An income tax (levied also on capital income) typically distorts investment decisions between physical and human capital because investment in human capital (i.e., the cost of acquiring education) is not tax deductible, while investment in physical capital is deductible via depreciation allowances (see Nerlove, Razin, Sadka and Weizsaecker (1993)). We therefore incorporate from this distortion by assuming that the cost of education is **not**

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tax-deductible. The equation that determines the cutoff cost level, $c^*$, is thus:

$$[1 + r(1 - t)]c^* = (1 - \rho)w(1 - t) \tag{2}$$

so that the tax affect investment decisions, as can be seen by comparing equations (2) and (2').

The proportion of skilled workers in the total population, $x$, is given by:

$$x = c^*/2\bar{c}. \tag{3}$$

Therefore, total human capital investment in the economy is given by:

$$\int_0^{c^*} (c/2\bar{c})dc = (c^*)^2/4\bar{c} \equiv H, \tag{4}$$

Denoting the initial endowment by $I$, the endogenously determined stock of physical capital $(K)$ is given by:

$$K = I - H. \tag{5}$$

We specify a constant returns to scale Cobb-Douglas production function for the output (GDP) of the economy:

$$Y = AK^\alpha L^{1-\alpha} \tag{6}$$

where

$$L = x + \rho(1 - x) + \rho m \tag{7}$$

is the aggregate input of labor in efficiency units (for simplicity, the two types of labor are assumed to be perfect substitutes in production). All immigrants are assumed to be

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unskilled, and their proportion in the native-born labor force is denoted by $m$. To simplify, we assume that capital does not depreciate, implying that $Y+K$ is available for consumption at the end of the production process. The wage rate $(w)$ and the return to capital $(r)$ are given by the standard marginal productivity conditions:

$$w = (1 - \alpha)A(K/L)^{\alpha} \tag{8}$$

and

$$r = \alpha A(L/K)^{1-\alpha} \tag{9}$$

Finally, the government's budget must be balanced. Since the income tax is levied on both labor and capital income and on both native-born and migrant workers, it follows that the entire GDP, $Y$, constitutes the tax base. As the cash grant is paid to both native-born individuals and immigrants, the government budget constraint is:

$$tY - \beta(1 + m) = 0. \tag{10}$$

The disposable income or consumption of a native-born individual with an education-cost level of $c$ is given by:[2]

$$v(c) = w(1 - t) + \beta + (I - c)[1 + r(1 - t)] \text{ for } c \leq c^*. \tag{11}$$

and

$$v(c) = \rho w(1 - t) + \beta + I[1 + r(1 - t)] \text{ for } c \geq c^*. \tag{11'}$$

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[2]The reader can verify that total consumption of native-born individuals, the integral sum of $v(c)(1/\bar{c})dc$, ranging from 0 to $2\bar{c}$, is equal to GNP, that is, $(Y - w^*m)$, plus the stock of physical capital $(K)$. This identity, of course, follows from Walras' law.

Notice that $v$ is strictly decreasing in $c$ for $c \leq c^*$ and then constant for $c \geq c^*$. With free migration, consumption of migrants is always $w^*$, since condition (1) becomes an equality, no matter what action the government takes.

# 3 A Political Economy Equilibrium

Given the flat tax rate $t$, equations (1)-(10) determine the market equilibrium levels of $w, r, c^*, x, H, K, Y, L, m$, and the budget-balancing level of the universal transfer $\beta$. We now turn to a description of the political mechanism that determines the tax burden, $t$.

## 3.1 No Migration

Consider first the closed-economy version of this model, i.e., suppose there is no migration. In this case, $m = 0$ and the equilibrium migration condition (1) is irrelevant. Start from a zero tax rate. A positive tax $t$ transfers income from the low-$c$ individuals (the "rich") to the high-$c$ individuals (the "poor"). As long as more than 50% of the population favors a higher tax rate, $t$ will rise. An equilibrium is achieved when the median voter stops this process. That is, the political equilibrium tax rate, $t_0$, is a solution to:[3]

$$\underset{t \geq 0}{Max} \ v^0(\bar{c}, t). \tag{12}$$

Since there is no migration, the population size is constant, so it follows that $\bar{c}$ is the median level of $c$ (because the cost levels are uniformly distributed over $[0, 2\bar{c}]$). We denote by $v^0(c, t)$ the consumption of a $c-$level individual with zero migration and a tax rate of $t$.

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[3]We restrict the tax rate $(t)$ to be nonnegative, to avoid the implausible situation in which a majority of rich people tax the poor minority $(\beta < 0)$.

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The political equilibrium tax rate in this no-migration case is depicted in Figure 1, where individual consumption is plotted against the cost level $c$. Consumption falls with the cost of education level up to the point $c^*$. From this point on, individuals do not acquire education, so that the cost difference among them is irrelevant. Therefore, consumption is constant for $c > c^*$ (see also equation (11')). Typically, equilibrium is achieved when the cutoff level of $c$ between the $c$–levels of those who gain and those who lose from a small increment $\Delta t$ in the tax rate occurs exactly at $\bar{c}$, the median voter's $c$–level. (With a large increment in the tax rate, some people with a higher c-level than $\bar{c}$ may also lose.)

## 3.2 Free Migration

Consider now the political equilibrium with free migration. In this case, equation (1) is relevant and the share of migrants in the population, $m$, is endogenously determined. Recall that with free migration immigrants always enjoy a consumption level of $w^*$, regardless of the tax rate, $t$ (and the implied transfer $\beta$). They are thus indifferent to the outcome of the political game. Therefore, regardless of whether they participate in the political process or not, the decisive median voter is still the individual with a skill level of $\bar{c}$. Hence, the free migration equilibrium tax rate, $\hat{t}$, is a solution to:

$$\underset{t \geq 0}{Max} \; \hat{v}(\bar{c}, t), \tag{12'}$$

where $\hat{v}(c, t)$ is the consumption level of a $c$–level individual with free migration and a tax rate of $t$. Migrants thus affect the political balance, not by a direct vote, but rather at the equilibrium through their effects on factor incomes and, consequently, consumption of the native-born residents.

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## 3.3 Migration Quota

A third case is with some migration but at a restricted level. Formally, we again drop condition (1) and set $m$ fixed at some arbitrary level of quota. (Of course, for this quota to be binding, the left hand side of (1) must be larger than the right hand side.) In this case, migrants' consumption is no longer fixed at $w^*$, but rather depends on $t$ (and $\beta$). Hence, migrants have a stake in the outcome of the political process and their vote (assuming that the destination country allows migrants to vote) will influence it. Lacking any physical capital, their consumption would be even lower than that of the native-born low-skill residents. Thus, they will always opt for a higher $t$ (and $\beta$). The median voter will be the individual with a skill level of $(c_m)$ which is equal to $\bar{c} + m/2$. Thus, the political equilibrium level of tax $(t^m)$ is a solution to:

$$\underset{t \geq 0}{Max}\ v^m(\bar{c} + m/2,\ t), \tag{12''}$$

where $v^m(c, t)$ is the consumption of a c-level individual with a restricted level of migration, m, and a tax rate of $t$.

# 4 The Effects of Migration on the Tax Burden

Since the model does not provide a tractable analytical solution for the effect of migration on the tax burden, we use numerical simulations to illustrate the nature of the political-economy equilibrium. A higher tax rate $t$ is, by itself without any transfer, welfare-reducing to all. The compensation comes in the form of a higher lump sum grant $(\beta)$, assuming that the economy is still on the "right" side of the so-called "Laffer Curve." On balance, unskilled people with high $c-$levels stand to gain more from a higher $\beta$ than they lose from the higher $t$ needed to finance the higher $\beta$ (that is, the net tax burden for them is negative). The

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opposite is true for the skilled (low $c-$level) individuals, who have positive net tax burdens. For low $(\beta, t)$ combinations, a majority of the population will opt for an increase in $t$ (and $\beta$), because the distortion effect of the tax is relatively low. As $t$ rises, the distortion increases as well, so that a further increase in $t$ raises less revenue than before and enables only a smaller increase in $\beta$. Thus, as $t$ rises, increasingly fewer individuals gain from the increase until the median voter stops this process.

We illustrate this by choosing numerical values for the parameters of the model and then varying the migration quota, $m$, from an initial level of no migration up to the level of $m$ that occurs with free migration. In the base case for the numerical simulations, we set the value of the parameter $\bar{c}$ to be relatively high (0.5), so that the cut-off cost level ($c^*$, which is endogeneously determined) is below $\bar{c}$, and a fortiori below the median $c-$level which is $\bar{c}+m/2$. The other parameter values are: share of capital in the economy, $\alpha = 0.33$; efficiency of low-skill workers, $\rho = 0.33$; initial endowment, $I = 3$; level of technology, $A = 1$; and wage rate in the source country, $\omega^* = 0.5$, which is about 15 percent less than the no-migration pre-tax wage for low-skill workers in the destination country.

With no migration, the equilibrium tax rate is quite high at 52 percent, reflecting the size of the low-skill population. As we allow some migration, two conflicting effects are at play. On the one hand, the low-skill migrants (whose net tax burden is negative) generally tilt the political power balance in favor of higher taxes (the "pro-tax effect"). But the revenue generated by a given increase in $t$ is shared by a larger population that now includes immigrants so that it can finance only a smaller increase in $\beta$. Thus, more of the native-born individuals (at the low-to-mid end of the $c-$distribution) oppose a further tax hike (the "anti-tax effect"). It turns out that the second effect dominates and the equilibrium tax rate falls as the migration quota rises. In fact, for these parameter values, the pro-tax effect completely vanishes. The reason for this is that the unskilled native individuals constitute

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more than half of the population even without immigrants, and this coalition has already exhausted its electoral power in setting a high tax rate. The migrants would have liked to raise the tax rate even further, but the (unskilled) median voter who is richer than the migrants (because she owns some physical capital) puts a lid on this tax-hike pressure.

When the migration quota is set at a level of 15 percent of the native-born population, the tax rate drops slightly below 40%. The tax rate drops all the way to zero (and, consequently, the transfer $\beta$ also falls to zero) as the migration quota is increased to a level about one-third of the native-born population.

When the migration quota is lifted altogether, the population almost doubles ($m$ reaches 0.97). As was already pointed out, with free migration the tax-transfer policy does not affect the well-being of the migrants, as their consumption remains constant at their opportunity cost of $\omega^*$. Therefore, the native-born individuals lose nothing to the migrants as a result of raising the transfer $\beta$. Hence, they will once again opt for some redistribution, and the political-economy equilibrium tax rate rises to about 12 percent in this case.

It is interesting to also examine a value for the parameter $\bar{c}$ low enough so that $\bar{c} < c^*$, so that the pro-tax coalition is initially dominated by the anti-tax (skilled) coalition in the absence of migration. This happens, for instance, when $\bar{c} = 0.3$. With no migration, the political equilibrium tax rate is indeed nil. In this case, as the migration quota is relaxed to allowed some immigration, the pro-tax effect of migration dominates the anti-tax effect. For instance, when the migration quota is set at a level of about one-third of the native-born population, the political equilibrium tax rate rises to about 15 percent. As the migration quota is raised further (say to $m = 0.4$), the anti-tax effect dominates and the political-economy equilibrium tax rate drops to about 5%. With free migration the tax rate drops to zero, as the migrants are indifferent about the tax transfer-policy, and the median voter among the native-born population (i.e., the individual with a $c$-level of $\bar{c} = 0.3$) is a skilled

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individual (since $\bar{c} < c^*$).

Of course, if migrants are not allowed to vote then the pro-tax effect of migration vanishes altogether, and there remains only the anti-tax effect due to the leakage of tax revenues into welfare benefits to migrants. But so long as there is some immigration short of free migration and some participation by migrants in the political system, then the theory predicts that as the immigration quota is increased from zero, the increased share of immigrants in the population will first lead to higher taxes and transfers. Once there is a large enough share of immigrants entering at the bottom of the income/skill distribution, the effect of migration on taxes will reverse and lead to a political-economy equilibrium with a lower tax burden.

# 5 Empirical Test of the Hypothesis

We next apply data on 11 European countries over the period 1974 to 1992 to examine the empirical implications of the theory. We use data on European countries rather than across other advanced economies such as the United States because unlike in the United States, immigrants in Europe have access to the full menu of welfare benefits regardless of whether or not they are citizens. As a result, low-skilled immigrants in Europe are more likely to be net recipients of welfare benefits, while the opposite could be the case in the United States where immigrants (especially illegal immigrants) are not entitled to certain social welfare benefits. In addition, the definition of a migrant is relatively consistent across European statistical agencies but dissimilar from the United States.

The empirical strategy is to estimate a baseline specification of the social and demographic determinants of the labor tax rate, and then add data on the share of immigration in the population to see if the data are consistent with the predictions of the theory after

taking into account these other influences. The social welfare and demographic variables are used to control for expenditure-side pressures that would be expected to influence the revenue requirements of policymakers in setting the tax rate. These variables include: transfers per capita to show generosity, government employment as a share of total employment to indicate the breadth of government involvement in the economy, the dependency ratio to proxy for demographic factors, and a measure of openness to trade to capture exposure to external shocks.

## 5.1 Data Sources

Data on the stock of immigrants and educational composition of migrants are from the OECD Migration Statistics database, supplemented for years before 1980 by various issues of the OECD *Trends in International Migration* Annual Report. As shown in Table 1, the data encompass various periods for each of the 11 countries, so that an unbalanced panel is used in the regressions. Unfortunately, the migration data exist before 1980 for only five of the eleven countries, and are the principal constraint in extending the sample to earlier years.

The Migration Statistics database also provides data on the educational attainment of immigrants and native-born individuals for three categories, with "low education" defined as completing less than the first stage of the second schooling level, "high education" as completing the third level of school, and "medium education" defined as the balance. These data are available for only one year—1995—so we assume that the educational composition of migrants and natives is constant over time.

As discussed in the previous section, knowing whether or not immigrants exercise the right to vote would in principal be important, since if immigrants cannot or do not vote, then the prediction of the theory is straightforward in that the anti-tax coalition is

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unambiguously larger with low-skilled immigrants. Data on the share of migrants who have become citizens are available for only a few countries (and again, only for 1995), and of course these data do not provide insight as to the participation rate of nationalized immigrants in the political process.[4] Because of this data constraint, we do not use information on the share of immigrants who are citizens in the empirical work.

Data on the labor tax rate from 1974 to 1992 are taken from Mendoza, Razin, and Tesar (1995) as extended by Mendoza, Milesi-Ferretti, and Asea (1996); these are derived by using revenue statistics to calculate an average tax rate on labor income.

Other data are taken from the OECD Analytical Database (ADB). These include per capita transfers received by households, government employment as a share of total employment, the dependency ratio (one minus the labor force as a share of the population), and a measure of "openness to trade." Per capita transfers include both social security and other transfers such as unemployment and disability compensation, though social security payments are by far the largest component of transfers in most countries. These transfers are translated into the common currency of US dollars and deflated by each country's CPI to provide real transfers in 1990 terms, and then divided by the population (also from the ADB) to provide per-capita transfers. Openness to trade is defined as the sum of the imports plus exports as a share of GDP.

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[4]In some countries, such as Germany, gaining citizenship is quite difficult for migrants and very few do – less than 1% of Turkish immigrants, for example. In others, such as Denmark and the Netherlands, immigrants can vote in local elections, while immigrants from Commonwealth countries can vote in all elections in the United Kingdom. See the *Economist*, February 15, 1992.

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## 5.2 Empirical Results

Table 1 provides a summary of the variables used in the regression analysis. The countries are listed in order of an increasing tax rate, so that it can easily be seen that high tax countries are generally those with more generous transfers, a feature that is also reflected in the strong (unconditional) correlations at the bottom of the table between the labor tax rate and benefits (both per-capita and as a share of GDP). The unconditional correlation is not nearly as strong between tax rates and the share of government employment.

The dependency ratio is included in the regression to control for demographic factors such as the aging of the population that might influence the tax burden. It can be seen in Table 1 that this varies widely across the 11 countries, with particularly high dependency rates (fewer workers per population) in Belgium, Italy, the Netherlands, and Spain.

Openness to trade is included as a determinant of the labor tax rate to address the hypothesis of Rodrik (1998) that a function of the welfare state is to provide social insurance against the adverse effects of external shocks, so that larger governments would be expected to be found in more open economies. Finally, the last column of Table 1 shows that countries with large shares of immigrants relative to their population tend to have higher tax rates, though the positive correlation is not nearly as large as that between tax rates and transfers or openness.

Table 2 shows the breakdown of native individuals and immigrants by the three broad educational levels in 1995. As expected, the share of low education individuals is generally smaller for natives than for immigrants, though the opposite is the case in Spain and Italy, both of which have small immigrant populations relative to their populations. Conversely, the share of high education immigrants is larger than the share of high education natives in six of eleven countries. Since the education data are available only for 1995, the shares of immigrants by education level in the population used in the regression are

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created by assuming that these are constant over time, and then multiplying the share of immigrants in the population in each year by the share of immigrants by education level out of all immigrants, providing a measure of the shares of immigrants within each of the three educational levels out of the total population (and similarly for natives).[5]

The baseline regression specification for the determinants of the labor tax includes transfers per capita, the share of government jobs, the dependency ratio, and openness. We also add the share of native individuals with a "medium" education; this is included as a rough measure of income inequality, since it might be expected that the larger the share of the middle class, the less pressure would be felt for redistributive taxes. All specifications include a complete set of country fixed effects (and thus of course no constant term).

Column (1) of Table 3 shows results for the baseline specification, without any variables for immigration. As expected, the tax rate on labor income in each country is intimately connected to the size of the welfare state and the involvement of the government in the economy: the coefficients on transfers per capita and the share of government jobs are both positive and significant, likely reflecting the need for higher revenues to fund these transfers. The estimated coefficients on these two variables indicate that a \$1,000 increase in per-capita transfers or a 1 percentage point increase in the share of government jobs in the economy would both lead to an increase in the labor tax rate of about 3/4 of a percentage point.

In the baseline and other regressions in Table 3, the dependency ratio has a strong negative effect on the labor tax rate, even though the opposite might have been expected *a priori*, since a higher dependency ratio means that a smaller group of workers must support the non-active population and a higher tax rate might be needed to raise government revenue.

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[5]For example, we multiply: $\frac{\text{Immigrants}}{\text{Population}} \times \frac{\text{Low Education Immigrants}}{\text{Immigrants}}$ to derive a variable that gives the share of low education immigrants in the population.

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An alternate possibility is that there are independent exogenous trends driving both labor taxes and the dependency ratios. It turns out that the labor tax rate has a slight upward trend in all of the eleven countries aside from Great Britain, while the dependency ratio has a downward trend in all countries but Finland, a development that is presumably related to the increasing labor force participation rate of women in Europe in the 1970s and 1980s. The first two columns of Table 4 provide some sensitivity analysis on this point. The first column in Table 4 shows that adding a time trend to the base regression specification lowers the magnitude (in absolute value) of the negative coefficient on the dependency ratio without greatly affecting the other coefficients, while the second column shows that a similar result is found in a regression with detrended series for the labor tax rate and dependency ratio. These sensitivity analyses suggest the importance of other factors not accounted for in the regression in affecting the relationship between the labor tax rate and the dependency ratio, but this does not change our results as to the relationship between migration and the tax burden.

The regression results provide support for the hypothesis of Rodrik that the welfare state exists to provide social insurance against external shocks, as the effect of openness on labor taxes is statistically significant at the 10 percent level with the expected positive sign. The share of medium education natives has a positive rather than negative coefficient and is strongly significant in the baseline specification, but this is reversed in the other specifications that add data on immigration. Moreover, the sensitivity analysis in the third column of Table 4 shows that dropping this variable from the specification does not affect the other results.

The next two columns of Table 3 add data on immigrants as a share of the population to the base specification, first for the share of all immigrants in column (2), and then for immigrants by education level in column (3). In both specifications, the coefficients on the

social welfare variables are essentially unchanged, but having included data on immigrants, the share of medium education natives now has the expected negative sign and is statistically significant at just over the 6 percent confidence level.

In column (2), the share of immigrants out of the population has a statistically significant negative coefficient, indicating that the effect of immigrants in enlarging the anti-tax coalition dominates, providing empirical resolution of the ambiguity in the model. A 0.5 percentage point increase in the share of immigrants (roughly a 10 percent increase in the stock of immigrants for the average of all 11 countries) leads to a 2 percentage point decline in the labor tax rate.

The results in column (3) are remarkably consistent with the theory: low education immigrants have significant negative effect on tax rates, while the effects of medium and high education immigrants are not significantly different from zero at the usual confidence levels. Moreover, the coefficient on high education immigrants has the expected positive sign: high education immigrants would likely not be net recipients of government benefits, so that the political equilibrium would shift toward higher tax rates with more high education immigrants. Although the coefficient on high education immigrants as a share of the population is not statistically different from 0, it is significantly different from the coefficient on low education immigrants at the 3 percent confidence level. The composition of immigrants thus matters for the tax rate in precisely the way predicted by the model.

Finally, the last two columns of Table 4 provide some additional sensitivity analysis. Although the flow of immigrants per year is determined to a large degree by each country's policy, the stock of immigrants in the population could in principle be affected by other variables, particularly by the generosity of each country's benefits per capita. The third column of Table 4 thus drops per capita transfers from the regression, and shows that this possible collinearity between the right hand side variables does not change the results for

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the effects of immigration on tax rates. This also suggests that there is not likely to be a problem of reverse causation from the tax rate to the immigrant share, since benefits and the tax rate are strongly correlated. An extension of the paper would be to develop and test of theory that jointly explains migration and taxes/benefits. Finally, and as mentioned above, the last column of Table 4 drops the variable for medium education natives, showing once again that our results are essentially unchanged.

# 6 Conclusion

Earlier studies have examined the burden imposed on the modern welfare state by migration. For instance, Wildasin (1994) and Razin and Sadka (1995) show how all income groups of the native-born population may lose from migration with income redistribution schemes.[6] In this paper we examine how these schemes are shaped in the context of a political-economy equilibrium. The theory suggests that migration does not necessarily tilt the political balance in favor of heavier taxation and more intensive redistribution. The reason for this is that more native-born individuals from the middle of the income distribution (that is, the skill/ability distribution) may lose from the extra tax burden brought about by the need to finance the transfer to the migrants, and as a result shift to the side of the high-income anti-tax coalition. This shift may be larger than the increase to the pro-tax coalition brought about by the migrants who join this coalition.

Our empirical results using data on 11 European countries from 1974 to 1992 are

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[6]These results may change when dynamic considerations are introduced; see, for instance, Razin and Sadka (1998). See also Cremer and Pestieau (1998), who examine the political economy approach to the choice of the payroll tax in the context of tax competition between tax countries in the presence of labor mobility, and Canova and Ravn (1998), who look at how the system of income distribution matters for the welfare consequences of migration on the native born.

remarkably consistent with the implications of the theory. A larger share of migrants in the population leads to a smaller tax burden, even after controlling for a number of variables that would be expected to drive expenditures and thus determine the tax burden required to fund the welfare state. As predicted by the theory, when the immigrants are divided by education levels, a larger share of low education immigrants leads to a smaller tax burden, while a larger share of middle and high education immigrants has either no effect or leads to higher tax burdens.

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## Table 1: Summary Statistics on Migration and the Welfare State
(average for each country, in percent)

| Country | Labor tax rate | Transfers/ GDP | Transfers per capita | Share of govt jobs | Dependncy ratio | Trade openness | Migrants/ population |
|---|---|---|---|---|---|---|---|
| Overall average | 41.6 | 21.3 | 3580 | 19.8 | 54.9 | 69.3 | 4.6 |
| UK 1984-92 | 25.9 | 12.0 | 1730 | 20.5 | 50.6 | 51.6 | 3.1 |
| Finland 1983-92 | 33.3 | 20.3 | 4132 | 20.5 | 48.5 | 52.7 | 0.5 |
| Spain 1980-91 | 33.3 | 15.3 | 1483 | 12.1 | 62.6 | 39.1 | 0.7 |
| France 1974-82,90 | 38.3 | 20.8 | 4004 | 20.2 | 56.8 | 42.2 | 7.7 |
| Germany 1974-92 | 39.8 | 16.8 | 2646 | 15.0 | 53.8 | 53.1 | 7.2 |
| Austria 1983-92 | 40.6 | 22.6 | 3621 | 20.2 | 55.1 | 75.3 | 5.1 |
| Italy 1983-91 | 42.8 | 22.2 | 3327 | 16.9 | 59.9 | 38.6 | 1.0 |
| Denmark 1982-92 | 43.0 | 19.5 | 4055 | 29.9 | 45.1 | 68.8 | 2.7 |
| Belgium 1974-91 | 44.4 | 26.5 | 3878 | 18.9 | 59.2 | 126.2 | 8.9 |
| Sweden 1974-92 | 48.0 | 21.0 | 5297 | 30.7 | 48.2 | 61.3 | 5.1 |
| Netherlands 1974-92 | 52.4 | 29.8 | 4028 | 13.8 | 61.3 | 101.7 | 3.7 |
| **Correlations with labor tax rate** | | | | | | | |
| Country averages (11 observations) | 0.84 | 0.69 | 0.16 | 0.18 | 0.55 | 0.30 | |
| All data (146 observations) | 0.78 | 0.58 | 0.19 | 0.12 | 0.55 | 0.28 | |

Notes: 1. Transfers per capita computed in real (1990) U.S. dollars.
2. Trade openness defined as (exports + imports)/GDP.
3. Share of government jobs is government employment as a share of total employment.
4. Dependency ratio defined as 1 - (labor force/population).

### Table 2: Summary Statistics on Education Levels in 1995
(Percent shares of native born and immigrants)

| Country | Natives | | | Immigrants | | |
|---|---|---|---|---|---|---|
| | low | medium | high | low | medium | high |
| UK | 46.5 | 34.9 | 18.6 | 57.9 | 21.8 | 20.4 |
| Finland | 37.0 | 44.8 | 18.2 | 39.9 | 50.4 | 9.8 |
| Spain | 67.8 | 18.1 | 14.1 | 47.0 | 27.4 | 25.6 |
| France | 40.3 | 43.0 | 16.7 | 53.3 | 30.7 | 16.0 |
| Germany | 19.1 | 62.0 | 18.9 | 46.3 | 42.9 | 10.7 |
| Austria | 31.7 | 61.9 | 6.4 | 47.4 | 43.7 | 8.9 |
| Italy | 64.2 | 29.5 | 6.3 | 53.3 | 30.7 | 16.0 |
| Denmark | 25.4 | 52.6 | 22.1 | 31.6 | 39.5 | 29.0 |
| Belgium | 45.3 | 34.1 | 20.6 | 52.8 | 27.7 | 19.5 |
| Sweden | 27.2 | 49.5 | 23.3 | 30.3 | 44.8 | 24.9 |
| Netherlands | 24.0 | 57.5 | 18.6 | 40.2 | 43.7 | 16.0 |

Notes:   1. Low education is less than first stage of second schooling level; high education is completed third schooling level; medium education is balance.

## Table 3: Determinants of Tax Rate on Labor Income
(dependent variable: labor tax rate, 146 observations)

|  | (1) | (2) | (3) |
|---|---|---|---|
| transfers per capita | 0.746 | 0.869 | 0.750 |
|  | (3.71) | (4.32) | (3.28) |
| government jobs/total employment | 0.753 | 0.777 | 0.869 |
|  | (7.35) | (7.75) | (7.83) |
| dependency ratio | -0.950 | -0.973 | -0.851 |
|  | (-6.53) | (-6.85) | (-5.33) |
| trade openness | 0.044 | 0.042 | 0.036 |
|  | (1.69) | (1.62) | (1.43) |
| natives with medium education/population | 2.193 | -5.001 | -12.426 |
|  | (3.88) | (-1.88) | (-1.82) |
| immigrants/population |  | -4.325 |  |
|  |  | (-2.77) |  |
| immigrants with low education/population |  |  | -7.834 |
|  |  |  | (-3.17) |
| immigrants with medium education/population |  |  | -12.948 |
|  |  |  | (-1.29) |
| immigrants with high education/population |  |  | 4.230 |
|  |  |  | (0.94) |
| $R^2$ | 0.650 | 0.670 | 0.682 |

Notes: 1. All specifications include a full set of country fixed effects and thus no constant. The coefficients of these fixed effects are not shown.
2. t-statistics in parentheses
3. Coefficient on transfers per capita has multiplied by $10^5$; for example, coefficient in column (1) is $7.46 \times 10^{-6}$.

## Table 4: Sensitivity Analysis
(dependent variable: labor tax rate, 146 observations)

| | Add time trend | Detrend tax rate & dependcy ratio | Drop transfers per capita | Drop native education |
|---|---|---|---|---|
| transfers per capita | 0.524 (2.04) | 0.215 (0.94) | | 0.642 (2.88) |
| government jobs/total employment | 0.745 (5.79) | 0.540 (5.33) | 0.924 (8.20) | 0.783 (7.72) |
| dependency ratio | -0.598 (-2.86) | -0.531 (-2.52) | -0.944 (-5.79) | -0.975 (-6.69) |
| trade openness | 0.020 (0.76) | -0.002 (-0.06) | -0.002 (-0.11) | 0.040 (1.55) |
| natives with medium education/population | -14.884 (-2.17) | -13.680 (-1.96) | -6.643 (-0.97) | |
| immigrants with low education/population | -6.497 (-2.55) | -4.863 (-1.93) | -9.664 (-3.87) | -6.954 (2.45) |
| immigrants with medium education/population | -17.986 (-1.75) | -17.864 (-1.70) | -1.905 (-0.19) | 4.597 (1.59) |
| immigrants with high education/population | 4.994 (1.12) | 3.158 (4.50) | 5.654 (1.22) | -0.619 (-0.17) |
| time trend | 0.128 (1.86) | | | |
| $R^2$ | 0.691 | 0.331 | 0.656 | 0.650 |

Notes: 1. All specifications include industry fixed effects (coefficients not shown)
2. t-statistics in parentheses
3. Coefficient on transfers per capita has multiplied by $10^5$; for example, coefficient in column (1) is $7.46 \times 10^{-6}$.
4. In second specification, the labor tax rate and dependency ratio are each regressed on a time trend (that is, a panel of trends) and country fixed effects, and then the residuals from these regressions are used in the specification shown in the table.

# Figure 1: Equilibrium Tax Rate with No Migration