

## CHAPTER 6: THE EFFECTS OF MIGRATION ON THE WELFARE STATE: EMPIRICAL EVIDENCE

### Introduction

The theoretical analysis of the preceding chapter complements the standard theory of the determinants of the size of government in a representative democracy, in which the size of government or the scope of redistribution depends on pre-tax income inequality. Two economic interpretations are used to explain this result. Lovell (1975) emphasizes the size of the government as a provider of public goods, while our and other studies have considered the role of the government in redistributing income; Persson and Tabellini (1999) provide a recent survey. In both applications, the analysis shows that the size of government or the scope of redistribution depends on a particular measure of the skewedness of the income distribution: the ratio of the median income to the average income, which represents the price of collectively supplied goods in terms of private goods for the median voter. The more skewed the distribution of income, the more by which the mean income exceeds the median income and the lower is this ratio, and thus the higher will be the tax burden.

Empirical evidence using panel data on 11 European countries from 1974 to 1992 provides support for our theory as an additional explanation for the size of the redistributive system. A statistically significant role of immigration in affecting the tax rate is found after controlling for income inequality and for several social and demographic variables that would be expected to reflect the government's revenue needs and thus determine the tax rate. We find that the tax burden on labor income in these countries decreases with the share of immigrants out of the total population, as our theoretical investigation indeed implies in the case where migrants do not participate in the political process. 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.

In sum, we find that immigration matters for the tax burden, even after controlling for income inequality (predominantly among the native-born), the generosity and size of the welfare state, the dependency ratio, per-capita income, and the exposure of the domestic economy to international trade.

### Empirical Test of the Hypothesis

We apply data on 11 European countries (listed in Table 6.1) over the period 1974 to 1992 to examine the empirical implications of the theory. These European countries have somewhat similar democratic political institutions. We did not include other advanced economies such as the United States because unlike in the United States immigrants in Europe typically have better access to the menu of welfare benefits regardless of whether or not they are citizens. Furthermore, 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 determinants of the labor tax burden that includes both measures of income inequality and additional control variables, and then add data on the share of immigration in the population to see if the data are consistent with the hypothesis that low-skill migration has a negative effect on the tax rate. The data on immigrants are broken out into the share of migrants in three educational classifications, so that the empirical test examines whether the effect of immigrants on the tax equilibrium depends on the educational level of the migrants in the way predicted by our theoretical analysis

Additional control variables are used to account for expenditure-side pressures that would be expected to influence the revenue requirements of policymakers in setting the tax rate. These include: transfers per capita to capture generosity, government employment as a share of total employment to indicate the breadth of government involvement in the economy, and a measure of openness to trade to capture exposure to external shocks. We control for per capita GDP, which has been found to have a positive correlation with the level of taxes and the size of government, reflecting the greater ability of richer countries to administer tax collection systems; see de Crombrughe and Fakin (1996). The baseline specification also includes the ratio of the income share of the top quartile to the combined

share of the middle two quartiles (“rich versus middle”) which corresponds to the ratio of the mean income to the median income suggested by the theory. This measure of income inequality (predominantly among the native-born) is used in empirical tests of the theory because the disproportionate share of income accruing to the upper quartile of the income distribution ensures that the mean income is determined in large measure by the income of those at the top and thus exceeds the median income (for which consistent cross-country data are not available). The theory predicts that the extent of redistribution depends on the preferences of the median voter—those in the middle rather than those at the bottom of the income distribution—which is why rich/middle is used in the baseline instead of other measures of inequality such as the income share of the top quartile relative to the bottom (“rich versus poor”).

Knowing whether or not immigrants exercise the right to vote would in principle be important, since if immigrants cannot or do not exercise their right to vote due to their political culture, then actually the prediction of the theory is straightforward in that the anti-tax coalition is unambiguously larger with low-skilled immigrants. As discussed below, however, little data exist on whether immigrants vote.<sup>1</sup> Our working hypothesis is that they do not; to the extent that this is correct, this sharpens the prediction of our model, since it means that the tax rate unambiguously declines with additional immigration.

#### 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 6.1, 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. Data on the share of migrants who have become citizens are not available for most countries (and even then only for 1995), and of course these data do not provide insight as to the participation rate of nationalized immigrants in the political process. 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 (1994) as extended by Mendoza, Milesi-Ferretti, and Asea (1997), and Daveri and Tabellini (2000); these are derived by using revenue statistics to calculate an average tax rate on labor income. The measures of income skewedness are derived from the updated inequality database of Deininger and Squire (1996), which provides measures of income shares by quintile over time, though data are not available for every year. Only the high quality measures in the database are used, and the missing observations are then obtained through linear interpolation (the shares do not vary all that much over time, though in most countries there is a general trend toward increased inequality).

Other data are taken from the OECD Analytical Database (ADB). These include per capita GDP, per capita transfers received by households, government employment as a share of total employment, and a measure of “openness to trade” defined as the sum of the imports plus exports as a share of GDP. Two measures of the dependency ratio are also obtained from the ADB, one with the unemployed in the dependent share of the population, reflecting the preponderance of long term unemployment in Europe, the other traditional dependency ratio of one minus the labor force as a share of the population. 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. Transfers are deflated by each country’s CPI to provide real transfers in 1990 terms, translated into the common currency of US dollars, and then divided by the population (also from the ADB) to provide per-capita transfers. Finally, per capita GDP is taken from the terms of trade adjusted measure in the Summers and Heston database.

## Description of Data

Tables 6.1 and 6.2 summarize the variables used in the regression analysis. The 11 countries in Table 6.1 are listed in order of an increasing (labor) 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 of 0.6 to 0.8 between the labor tax rate and transfers shown at the bottom of the table (per-capita transfers and transfers as a share of GDP). The correlation between tax rates and the share of government employment is also positive but not nearly as strong as with transfers. Similarly, only modest or even negative correlations are found between the tax rate and income distribution. In all countries, the bottom quintile receives about 5-10 percent of income, the middle three quintiles around 50-60 percent, and the top quintile 35-40 percent.

The dependency ratio is included in the sensitivity analysis to control for demographic factors such as the aging of the population that according to our political economy theory would influence the tax burden.<sup>2</sup> It can be seen in Table 6.1 that this (defined here in the traditional fashion, with unemployed not counted as dependent) varies widely across the 11 countries, with particularly high dependency rates (fewer workers per population) in Belgium, Italy, the Netherlands, and Spain, but little correlation with the tax rate. Somewhat surprisingly, countries with high unemployment rates have low labor tax rates, although this correlation of course does not say anything about causality or take into account other factors affecting taxes.

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. Alternatively, Alesina and Wacziarg (1998) suggest that the connection between openness and the size of government comes about indirectly through a size effect, with small countries being both more open than large countries and having larger government spending as a share of national income (and thus higher taxes). Finally, the last column of Table 6.1 shows that countries with a large stock of immigrants relative to their population tend to have higher tax rates, though the positive correlation is not as large as that between tax rates and transfers or openness and this again does not

imply causality or control for other determinants of tax rates.

Table 6.2 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 used in the regression are 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).<sup>3</sup>

## Results

The baseline regression specification for the determinants of the labor tax includes transfers per capita, the share of government jobs, openness, GDP per capita, and the measure of income skewedness suggested by the theory (rich/middle). All regressions include a complete set of country fixed effects (and thus, of course, no constant term).

Column 1 of Table 6.3 shows results for this baseline specification without any variables for immigration. The tax rate on labor income in each country is strongly related to per-capita income and the involvement of the government in the economy as measured by the share of government jobs. The estimated coefficients on these two variables indicate that a \$1,000 increase in per-capita GDP leads to an increase in the labor tax rate of about 1.2 percentage points, while a one percentage point increase in the share of government jobs in the economy gives just over a 0.7 percentage point increase in the tax rate.

The baseline specification without immigration data provides moderate support for the hypothesis of Rodrik that the welfare state exists to provide social insurance against external shocks or the alternative based on country size proposed by Alesina and Wacziarg, as the effect of openness on labor taxes has the expected positive sign but is statistically significant at only the 13 percent level. The measure of income skewedness has the positive coefficient predicted by the standard theory, but is far from significant, while transfers per

capita is also not statistically significant.

The next two columns of Table 6.3 add data on the stock of immigrants as a share of the population to the baseline specification, first for the share of all immigrants and then for immigrants by education level. In column 2, the share of immigrants out of the population has the expected negative coefficient and is significant at the 8 percent level, indicating that the effect of immigrants in enlarging the anti-tax coalition dominates, providing empirical resolution of the ambiguity in the theoretical model. A one percentage point increase in the share of immigrants in the population (a roughly 20 percent increase in the total stock of immigrants of all 11 countries) leads to a 0.6 percentage point decline in the labor tax rate. The other results are qualitatively the same with the immigrant share added to the regression, though the coefficient on transfers is now larger and more significant, while the effect of openness on the tax rate becomes both larger and statistically significant. As before, income skewedness is not statistically significant, though transfers is now significant at better than the 10 percent level.

Column 3 shows the baseline specification with immigrants by educational attainment. The results are remarkably consistent with our theory: low education immigrants have a statistically significant negative effect on the tax rate, while medium and high education immigrants have positive effects (the latter strongly significant). Although the coefficient on medium education immigrants as a share of the population is not statistically different from zero, it is significantly different from the coefficient on low education immigrants at the 5 percent confidence level. The coefficient on high education immigrants is significantly different from that on low education immigrants at better than the one percent level.

These results do not change in column 4, which drops transfers per capita (which was no longer significant in the third specification). In the pared-down specification of column 5, however, it can be seen that the rich/middle variable is statistically significant at the seven percent level when both transfers and per capita GDP are omitted. This points to a collinear relationship between transfers, income, and income distribution, a point that is explored further in the next sub-section. In all of this, however, the results for the effect of immigration on the tax rate are essentially unchanged.

The composition of immigrants thus matters for the tax rate in precisely the way

predicted by the model: low education immigrants lead to lower taxes, while an increased share of medium and high education immigrants, who would likely not be net recipients of government benefits, leads to higher tax rates. This is found even after controlling for factors such as transfers per capita and the share of the government in total employment that would be expected to drive expenditures and thus determine the required level of taxes. Immigration might also increase income inequality and thus lead to higher taxes as predicted by the theory (although our empirical results are inconclusive on this point since the coefficient on the variable suggested by the standard theory is significant only in certain specifications), but our results show that immigration has an independent effect on tax rates, and this independent effect works to reduce taxes, as is consistent with our theory.<sup>4</sup>

### Sensitivity Analysis

Table 6.4 shows results for several alternative specifications. The first column uses an alternate measure of income skewedness - the share of the rich relative to the poor rather than to the middle two quartiles - and finds nearly identical results to the baseline, although the coefficient on rich/poor is estimated more precisely than on rich/middle (the two measures of income skewedness have a correlation of nearly 0.8). Similar results not shown in the table are also obtained using middle/poor, the ratio of the combined shares of the three middle quintiles to the share of the bottom quintile.

The next two columns use the dependency ratio instead of transfers per capita, first with the unemployed counted as dependent, and then with individuals who are unemployed but in the labor force not counted as dependent. Using the first measure of the dependency ratio instead of transfers has no effect on the results: The dependency ratio is not statistically significant and the other coefficients hardly change. In the third column of Table 6.4 where the unemployed are not counted as dependent, the coefficient on the dependency ratio becomes negative and significant, in line with the theoretical analysis of Razin, Sadka and Swagel (2000b). However, the results regarding the effect of immigration on the tax rate are again unchanged - the coefficients change somewhat in magnitude, but are still significant and with the same sign, while the other variables are also mostly unchanged, though the coefficient on rich/middle becomes negative, but is still far from significant. The difference between these two specifications shows that in contrast to the simple correlation shown



in Table 6.1, there is a positive correlation between the unemployment rate and the labor tax rate once other factors are taken into account. As suggested by Daveri and Tabellini (2000), this possibly reflects the effect in the other direction of high labor taxes leading to unemployment. The results on immigration are also unchanged in specifications that include other demographic variables, such as the share of children or the share of the elderly in the population (results not shown).

The fourth column of Table 6.4 omits per capita real GDP and includes both transfers per capita and the dependency ratio (with unemployed counted as dependent.) The results further illustrate the important role played by per capita GDP and the relationships between income, transfers, and the dependency ratio: Transfers and openness become statistically significant, while the coefficient on the dependency ratio becomes significant and with a negative sign. Similarly, the last column of Table 6.4 shows that the results for immigration remain unchanged if GDP growth is used instead of the level (although this moves away from the stylized facts developed by the earlier literature). An explanation for the importance of per capita real GDP is that transfers and the dependency ratio both have slight upward trends in many countries in the period examined, so that their contribution in explaining the tax rate is picked up by GDP. Even without per capita GDP, however, income skewedness is not statistically significant when transfers and the dependency ratio are included, but is significant - at a moderate level as seen in the last column of Table 6.3 - when they are omitted. Income distribution thus appears to matter for the tax rate as predicted by the theory, but this can be captured in the data in several alternate ways. In all specifications, however, the results for immigration by education level are not affected despite any possible collinearity between the other right-hand-variables, so that the effect of immigration represents an additional channel through which the tax burden is determined.

Finally, there are two potential problems of reverse causality from the tax rate to the immigrant share. First, taxes may affect migration because higher taxes would be associated with higher benefits and would thus be expected to lead to more immigration of low-skilled workers. But this means that in our regressions with the labor tax rate as the dependent variable, this positive effect of taxes on immigration is partially offsetting the negative effect we find of migration on taxes. Our results would thus be even stronger were we able to

use instrumental variables to account for the reverse causality. Second, states with a more comprehensive welfare system may choose to protect these systems from “raiding” migrants by tightening restrictions on entry of migrants. This gives rise to an alternative explanation for the negative correlation between taxes and migration found in our data. Had we been able to find a good set of instruments, we would have been better able to test the hypothesis that migration negatively affects the size of the welfare state.

### Conclusion

Our theoretical analysis 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.

Our empirical results using data on 11 European countries from 1974 to 1992 are consistent with the implications of the theory. After controlling for variables suggested by the theory of the size of government in a representative democracy, and for a number of additional variables that would be expected to affect expenditures and thus determine the tax burden required to fund the welfare state, we find that a larger share of immigrants in the population leads to a smaller tax burden. When we examine the effect of immigration by education level, we find as predicted by our theory that a large 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.

Table 6.1: Summary Statistics on Migration and the Welfare State  
(average for each country, in percent)

Country	Years	Labor tax rate	GDP per capita	Transfers/ GDP	Transfers per capita	Rich/ middle	Rich/ poor	Govt. jobs share	D
Overall		41.2	11,791	21.3	3,580	0.69	5.40	19.8	5
UK	1984-92	25.9	12,345	12.0	1,730	0.76	4.85	20.5	5
Finland	1983-92	33.3	12,659	20.3	4,132	0.60	4.66	20.5	4
Spain	1980-91	34.2	8,140	15.3	1,483	0.62	4.17	12.1	6
France	1974- 82, 90	38.3	11,499	20.8	4,004	0.85	8.62	20.2	5
Germany	1974-92	39.8	12,339	16.8	2,646	0.73	6.79	15.0	5
Austria	1983-92	40.3	11,819	22.6	3,621	0.64	4.98	20.2	5
Italy	1983-91	40.3	11,499	22.2	3,327	0.71	4.65	16.9	5
Denmark	1982-92	43.0	13,174	19.5	4,055	0.66	6.74	29.9	4
Belgium	1974-91	44.4	11,243	26.5	3,878	0.63	4.41	18.9	5
Sweden	1974-92	48.0	13,060	21.0	5,297	0.70	5.45	30.7	4
Netherlands	1974-92	49.7	11,553	29.8	4,028	0.66	4.47	13.8	6
Correlations with labor tax rate									
Country	(11 observations)		0.19	0.81	0.71	-0.09	-0.35	0.21	0
averages									
All data	(146 observations)		0.34	0.75	0.62	-0.12	0.06	0.25	0

### Notes to Table 6.1

GDP per capita and transfers per capita are in real (1990) U.S. dollars; Trade openness is defined as  $(\text{exports} + \text{imports})/\text{GDP}$ ; dependency ratio includes unemployed as dependent; the two measures of income inequality are the income share for the top quintile divided by the income share for the middle three quintiles (rich/middle), and the share of the top quintile divided by the share of the bottom quintile (rich/poor).

Table 6.2: 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:

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

Table 6.3: Determinants of Tax Rate on Labor Income  
(dependent variable: labor tax rate, 146 observations)

	(1)	(2)	(3)	(4)	(5)
Transfers per capita	0.231 (1.05)	0.463 (1.82)	0.043 (0.16)		
Government jobs/ total employment	0.715 (6.32)	0.686 (6.05)	0.754 (6.89)	0.763 (6.82)	1.124 (9.79)
Trade openness	0.043 (1.54)	0.058 (2.01)	0.047 (1.67)	0.046 (1.99)	0.048 (1.72)
GDP per capita	1.204 (5.82)	1.261 (6.07)	1.278 (6.41)	1.257 (6.83)	
Rich/middle income share	0.018 (0.57)	0.003 (0.09)	-0.008 (-0.24)	0.012 (0.29)	0.066 (1.81)
Immigrants/ population		-0.619 (-1.76)			
Immigrants with low education/population			-7.423 (-2.77)	-7.172 (-2.80)	-7.916 (-2.60)
Immigrants with medium education/population			3.750 (1.20)	3.481 (1.15)	5.066 (1.43)
Immigrants with high education/population			10.924 (2.92)	11.437 (3.19)	17.624 (4.25)
R <sup>2</sup>	0.667	0.675	0.711	0.711	0.585

All specifications include a full set of country fixed effects (coefficients not shown). t-statistics are in parentheses.

Table 6.4: Sensitivity Analysis  
(dependent variable: labor tax rate, 146 observations)

	Rich/Poor for Income Distribution	Use dependency ratio	Alternate dependency ratio	Drop GDP per capita	Use per capita GDP growth
Transfers per capita	0.049 (0.19)			0.783 (3.06)	0.786 (3.07)
Government jobs/total employment	0.763 (6.98)	0.729 (5.78)	0.758 (7.30)	1.083 9.49)	1.082 (9.49)
Dependency ratio		0.064 (0.41)	-0.721 (-3.50)	-0.493 (-3.74)	-0.451 (-3.30)
GDP per capita	1.178 (5.73)	1.353 (5.98)	0.808 (3.72)		
Growth of GDP per capita					0.073 (1.12)
Rich/middle class income share		-0.006 (-0.19)	-0.035 (-1.17)	0.020 (0.55)	0.019 (0.55)
Rich/poor income share	0.001 (0.99)				
Trade Openness	0.049 (1.81)	0.043 (1.82)	0.023 (0.98)	0.101 (3.43)	0.095 (3.16)
Immigrants with low education/population	-5.845 (-2.00)	-7.284 (-2.76)	-9.366 (-3.74)	-7.435 (-2.51)	-7.943 (-2.65)
Immigrants with medium education/population	1.963 (0.57)	3.614 (1.18)	6.135 (2.10)	3.802 (1.10)	4.448 (1.27)
Immigrants with high education/population	12.229 (3.15)	11.087 (3.08)	7.757 (2.18)	10.915 (2.66)	11.135 (2.72)
R <sup>2</sup>	0.713	0.711	0.736	0.655	0.658

**Notes:**

All specifications include country fixed effects (coefficients not shown). t-statistics are in parentheses. First measure of dependency ratio includes unemployed as dependent; the alternate measure does not.