Individual Attitudes towards Immigrants:  
Welfare-State Determinants Across Countries*  

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Abstract

This paper analyzes welfare-state determinants of individual attitudes towards immigrants - within and across countries - and their interaction with labor-market drivers of preferences. We consider two different mechanisms through which a redistributive welfare system might adjust as a result of immigration. Under the first scenario, immigration leads to changes in tax rates, while under the second one the adjustment occurs through changes in per capita transfers. Our empirical evidence is consistent with the first welfare-state scenario and with labor-market determinants of immigration attitudes. In countries where natives are on average more skilled than immigrants, individual income is negatively correlated with pro-immigration preferences, while individual skill is positively correlated with them. These relationships have the opposite signs in economies characterized by skilled migration (relative to the native population). Such results are confirmed when we use cross-country data on the characteristics of destination countries’ welfare state.

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“We must end welfare state subsidies for illegal immigrants...This alienates taxpayers and breeds suspicion of immigrants, even though the majority of them work very hard. Without a welfare state, we would know that everyone coming to America wanted to work hard and support himself.” Rep. Ron Paul, R-Texas.¹

1 Introduction

No other facet of globalization has spurred as much public debate as the movement of workers across national boundaries. Even within ideologically homogeneous groups often contradictory positions emerge. U.S. labor unions, while now officially welcoming Latino and immigrant members², see their ranks and file oppose growing inflows of unskilled foreign workers. Similarly, while Silicon Valley entrepreneurs trooped in front of Congress in 1998 to obtain an increase in the number of H1-B visas, many conservative groups fear immigration and have fiercely opposed the Bush administration 2004 proposal to grant illegal immigrants legal status as guest workers.

A large portion of the discussion is fuelled by the income-distribution consequences of immigration. Native workers are concerned about new immigrants of similar skill levels because they are wary of increasing competition³, inducing downward pressure on their incomes and contributing to the growing feeling of uncertainty that accompanies globalization.⁴ On the other hand, native workers welcome immigrants who complement them in the labor market. A second and not less important dimension of the debate is represented by the welfare state channel. In fact, the very existence in many destination countries of redistributive social insurance programs is likely to have a magnetic effect on large numbers of immigrants, interested not only in new job opportunities, but also in the benefits that come in the form of subsidized health care, unemployment compensation or provisions concerning dependants.⁵ While this type of labor flows has the potential to represent a net burden for the public finances of the destination countries, these very same young immigrants have been portrayed by some as the answer to the deteriorating conditions of the welfare state in destination

²See Watts (2002).
³For instance, the threatening “Polish plumber” has been often mentioned as heavily conditioning the French vote against the new European constitution.
⁴See for instance Rodrik (1997).
⁵See Borjas (1999a), and Boeri, Hanson, and McCormick (2002).
countries with aging populations.\textsuperscript{6}

Whether immigration represents a net cost or benefit for the welfare system, adjustments in the redistribution carried out by the welfare state are unavoidable. Importantly, this paper shows that the type of response carried out by the welfare state matters in assessing the effect of immigration on various subgroups of the population. As a consequence, individual opinions about migration - which reflect the combination of its income-distribution effects through various channels - will not only be affected by the labor market consequences of population inflows: They will also be shaped by the type of response to immigration adopted by the welfare state. To shed light on these issues, we develop a theoretical framework of individual attitudes towards migration in which the labor market and welfare state interact with each other as drivers of opinions.

The analysis of the labor-market channel follows the previous literature.\textsuperscript{7} We assume that migrants can be either complements or substitutes for native workers and show that the probability that an individual is pro-immigration is an increasing (decreasing) function of her skill in countries where the relative skill composition of natives to immigrants is high (low). The intuition is that, when immigrants are unskilled, they reduce the relative supply of skilled to unskilled labor in the economy, thus increasing the skilled wage and reducing the unskilled wage. The opposite is true when immigrants are more skilled than natives.

More importantly, in our model we consider two alternative adjustment mechanisms through which the welfare state of the host country can respond to an inflow of immigrants. For each welfare state scenario, we analyze the effect of an inflow of either unskilled or skilled foreign workers. While the former represent a net cost for the welfare state, the latter are likely\textsuperscript{8} to make a positive net contribution to the system. In the first welfare–state scenario we assume that, following immigration, the value of per capita benefits is unaffected, while welfare costs (tax rates) adjust in order to balance the government’s budget. Assuming a redistributive fiscal system, we find that high-income individuals are more negatively affected by unskilled immigration than low-income individuals - as they bear most of the additional cost to the welfare system - while they are more positively affected than low-income individuals by skilled immigration. Under the second welfare–state scenario, we assume instead

\textsuperscript{6}See for example Storesletten (2000).
\textsuperscript{7}See Borjas (1999b), Scheve and Slaughter (2001), Mayda (2005), O’Rourke and Sinnott (2004).
\textsuperscript{8}As will become clearer in section 3 skilled migrant workers are not necessarily going to be net contributors to the welfare state, because differently from their native counterparts, they are not endowed with non–labor related assets.
that the adjustment induced by immigration takes place through changes in per capita wel-
fare benefits, as tax rates are kept constant. Under these assumptions, if immigrants are
unskilled relative to natives, the burden of the worsened fiscal position of the welfare state
falls relatively more on individuals at the bottom of the income distribution, that is unskilled
immigration negatively affects low-income households to a greater extent than high-income
ones. The intuition for this result is that, in this case, low-income natives will be competing
with immigrants for access to public services. On the other hand, skilled immigration to a
destination country - which is likely to relax the government’s budget constraint - implies an
improvement for low-income individuals from a welfare-state point of view, which is greater
than for high-income individuals. To summarize, under the first welfare-state scenario we
expect individual income to be negatively correlated with pro-immigration preferences in
countries where the skill composition of natives relative to immigrants is high (unskilled im-
migration) and positively correlated otherwise (skilled immigration). Under the second, we
expect the opposite type of cross-country pattern.

In the United States a large number of welfare programs are administered at the state
level. The recent experience of two U.S. states - California and Texas - can help us clarify
the difference between the two alternative scenarios we consider in our analysis. During the
nineties, both California and Texas were the destination of large inflows of mostly unskilled
immigrants, and both faced serious fiscal difficulties as the result of the 1990-1991 recession.
The Republican governors of the two states reacted very differently to the new challenges.
Pete Wilson in California backed Proposition 187, aimed at excluding illegal immigrants
from some welfare state benefits. George W. Bush in Texas promised, instead, never to
adopt a measure of this type. The difference between the policies carried out in California
and Texas can be interpreted in terms of the two scenarios outlined above. California has a
progressive income tax system, while Texas has instead no state income tax. Therefore, in
California high-income individuals were probably the ones mostly hit by immigration through
the welfare-state channel (first scenario), while in Texas this was the case for low-income
natives (second scenario). Since high-income voters are important Republican constituents
in both states, the two Republican governors had an incentive to implement completely
different policies. California’s response to the growing fiscal pressure created by immigration
was a reduction in transfers to immigrants - which relaxed the state’s budget constraint -
a move that high-income Republican constituents largely supported. Texas, on the other
hand, decided not to cut the (limited) transfers in place, a move that was seen with a
favorable eye by the local Latino minority. In particular, Bush did not need to adopt an anti-immigration stance - by reducing immigrants’ access to public services - as immigration was not hurting Republican voters. Therefore our richer theoretical framework allows us to propose an interpretation of the experience of California and Texas that is different from the one suggested by Hanson, Scheve, and Slaughter (2005).

Our empirical analysis, carried out using the 1995 National Identity Module of the International Social Survey Program, finds strong support for the model: It both provides new cross-country evidence for the role of welfare-state considerations and reinforces the results in the literature on labor-market determinants. In particular, using a direct and indirect measure of the relative skill mix of natives to immigrants, we find evidence consistent with the first public-finance scenario (according to which per capita welfare benefits are fixed and tax rates adjust following immigration) and with labor-market determinants of immigration attitudes. Our results show that, in countries where natives are on average more skilled than immigrants, individual income is negatively correlated with pro-immigration preferences, while individual skill is positively correlated with them. These relationships have the opposite signs in destinations characterized by skilled migration (relative to the native population). We confirm the robustness of these results using an alternative data set, the European Social Survey, carried out in 2002-2003 on a different sample of countries.

A growing literature in economics focuses on individual preferences9, as they represent a primary determinant of final policy outcomes (Rodrik (1995)). In this paper we study welfare-state determinants of migration opinions, for two main reasons. First, public-finance issues have played a key role in the historical debate on immigration. However there are only few papers in the literature that investigate welfare-state determinants of individual attitudes10 and they either focus on a single country or do not exploit the variation in the data across countries. In our analysis, instead, we investigate cross-country heterogeneity in the impact of individual-level variables by taking advantage of the variation in the data both at the individual level and at the country level. The second reason for this paper is methodological. In the existing literature, the correlation between individual skill and pro-immigration attitudes is interpreted as evidence in support of a labor-market competition

9See, for example, Luttmer (2001), Alesina and La Ferrara (2005), Blanchflower and Oswald (2004), Caplan (2002) and the literature surveyed below.
For example, in the United States and other countries receiving unskilled migration, the estimated correlation is positive, which is consistent with the labor-market hypothesis. However, given that individual skill and income are positively correlated, the same pattern would be observed in the data under the second scenario of our welfare-state model. In other words, it might be that skilled individuals favor unskilled immigration because they also enjoy high incomes and, under the second welfare-state scenario, are not in competition with immigrants for public services. As a result, it is difficult to separate the effect of the two channels on individual attitudes. In general, any other determinant of pro-immigration attitudes which is correlated with individual skill will give rise to a similar problem of omitted variable bias. In order to isolate the labor-market channel, previous studies (Scheve and Slaughter 2001 and Mayda 2005) compare the correlation between skill and pro-immigration preferences in the labor-force vs. out-of-labor-force subsamples. Any correlation should disappear for individuals out of the labor force if the labor-market hypothesis is what is driving the result, which is in fact what the previous literature finds. In this paper we tackle the problem in a different way. By explicitly considering welfare-state drivers, our analysis provides a new and more direct approach to differentiate between labor-market and welfare-state determinants.

The outline of the paper is as follows. Section 2 surveys the literature related to this paper, while Section 3 presents the theoretical model. In Section 4 we describe the data used in the empirical analysis, whose results are described in Section 5. Finally, Section 6 concludes.

2 Literature

Our paper is related to different strands of the literature. The first investigates the impact of immigration on the welfare state, and has shaped the debate about immigration policy in the United States, Europe and other destination countries. Borjas and Hilton (1996) and Borjas (1999a), for instance, have extensively documented how immigrant households that have relocated to the United States during the eighties and nineties are more likely to receive welfare benefits than the native population. While most of the existing gap in

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participation rates can be explained by observable characteristics, this is evidence of the growing pressure put on state and federal budgets by “New Americans”. Boeri, Hanson, and McCormick (2002), considering a large sample of EU countries, point out instead a substantial dispersion in the immigrant’s participation in the welfare state. Furthermore, they show that while immigrants are on average more likely than natives to be on the receiving end of unemployment and family benefits, this turn out not to be the case for old age pension benefits.\textsuperscript{12}

Razin, Sadka, and Swagel (2002) analyze the extent to which, in the long run, immigration affects the redistribution carried out by the welfare state. In a very elegant theoretical model the paper shows how – somewhat surprisingly – the presence of a fiscal leakage from the native to the foreign born population is likely to play against redistribution towards the less skilled. The intuition for this result is that, as the number of migrants grows, a larger proportion of the fiscal revenues ends up in the hands of unskilled immigrants, which implies that native taxpayers – among whom the median voter will most likely be counted – will opt for lower taxes. While in our paper the mechanism of welfare-state adjustment to immigration is taken as given,\textsuperscript{13} we are going to exploit some features of Razin, Sadka and Swagell’s (2002) model to develop the framework with which we analyze individual preferences in the presence of redistribution.

The second set of papers related to our work looks, more specifically, at how welfare-state considerations affect individual perceptions of immigration. Dustmann and Preston (2004b) empirically analyze attitudes towards immigrants in Great Britain using seven consecutive waves of an individual-level panel data set, the British Social Attitudes Survey. This paper offers a new approach to isolating the separate effects of three major determinants of attitudes: racial feelings, labor-market concerns, and welfare-system considerations. The authors develop a structural multiple-factor model which uses responses to various questions on racial, labor-market, and welfare issues to estimate the direct impact of the underlying three factors on immigration attitudes. The paper finds that racist feelings have the strongest effect on people’s views about immigration. Using a similar structural multiple-factor model

\textsuperscript{12}See Table 3.2, page 74. This argument has been used by many policy makers in Europe to highlight the potential role of immigration policy as a tool to deal with the difficulties created by pay as you go social security systems in the presence of an ageing population. For a formal analysis, see Razin and Sadka (1999), while Storesletten (2000) has studied how migration policy can be used to sustain the existing welfare system in the United States.

\textsuperscript{13}In particular, we assume that individuals take as given one of the two mechanisms of welfare-state adjustment, that is respondents do not perceive this adjustment as endogenous to immigration.
on data from the 2002-2003 wave of the European Social Survey, Dustmann and Preston (2004a) focus on economic variables and analyze three alternative channels through which individual attitudes towards immigrants are affected: labor market competition, public burden, and efficiency considerations. The main result of the paper is that, out of the three sets of economic determinants, fears about public finance have the strongest impact on immigration attitudes. Besides the methodological approach, these works differ from our paper since the analysis focuses on a single country (Dustmann and Preston 2004b) or does not explore the cross-country heterogeneity in the effect of individual-level variables (Dustmann and Preston 2004a). In addition, the welfare state is implicitly assumed to adjust to immigration through changes in the tax levels (as in the first welfare-state scenario in our model).

More recently, Hanson, Scheve, and Slaughter (2005) investigate the impact of both public-finance and labor-market variables on individual preferences over globalization - international migration and trade in goods and services - in the U.S. in 1992 and 2000. Their empirical analysis shows that, while the pre-tax cleavages in individual attitudes - working through the labor-market channel - are similar for immigration and trade, the post-tax cleavages in opinions - working through the public-finance channel - are different. Welfare-state considerations are therefore important in explaining differences in individual attitudes towards alternative globalization strategies. The role of the welfare state channel in explaining attitudes towards immigration is also highlighted in Hanson (2005), where a ‘rights–based’ immigration policy is proposed to limit the burden put by unskilled immigrants on the welfare state.\textsuperscript{14}

From a methodological point of view, Hanson, Scheve, and Slaughter (2005) is the paper in the literature closest to ours. However, while their paper focuses on the United States and exploits the across-states variation in the data, our analysis is a cross-country one. From a theoretical point of view, Hanson, Scheve, and Slaughter (2005) differs from our work in that it does not differentiate between the two public-finance scenarios, implicitly assuming that the first one holds. From an empirical point of view, the main innovation of our analysis is to incorporate data on the relative skill mix of natives to immigrants, which varies considerably across countries and affects whether immigrants represent a net burden or benefit for the welfare state.

\textsuperscript{14}The basic idea is to differentiate the level of entitlement to public benefits, depending on how long the immigrants have been in the host country. The immediate effect of this policy would be a reduction in the benefits available to immigrants through the welfare state.
Finally, our paper is also related to analyses of immigration preferences which focus on the labor-market competition hypothesis. Using data on the United States, both Scheve and Slaughter (2001) and Kessler (2001) find that more educated individuals are more likely to be pro-immigration, which is consistent with a labor-market story, as immigrants to the United States are less skilled than natives on average. Mayda (2005) and O’Rourke and Sinnott (2004) extend the analysis to a multi-country framework. Both papers find that a key variable determining the sign of country-specific correlations, between individual skill and attitudes, is the relative skill composition of natives to immigrants. Mayda (2005) constructs a direct measure of the relative skill mix using data on education levels of immigrant and native populations by destination country. O’Rourke and Sinnott (2004) use Borjas (1987) selection model to predict the skill level of immigrants to different host countries. Both papers also use an indirect measure of the relative skill mix, the per capita GDP of the destination country. Based on both measures, individual skill is estimated to be positively (negatively) correlated with pro-immigration preferences if the relative skill composition of natives to immigrants is high (low). Our paper finds the same results but in a broader framework, where the labor market interacts with the welfare state.

To conclude, the main contribution of this paper to the previous literature is in bringing together welfare-state and labor-market determinants of individual attitudes towards immigrants across countries. From a theoretical point of view, we are the first ones to analyze the two alternative public-finance scenarios. From an empirical point of view, our paper provides new cross-country evidence for the role played by public-finance issues.

3 Theoretical Framework

To study the effects of immigration on individual preferences we consider a small open economy that in the initial free trade equilibrium produces two output goods $i \in \{1, 2\}$ using a constant returns to scale technology $y_i = f_i(L_U, L_S, K)$, where $L_U$ is unskilled labor, $L_S$ is skilled labor and $K$ is capital. The economy is populated by a set of $N$ natives, indexed by $n$, and by $M$ immigrants, indexed by $m$. Each native is endowed with one unit of labor (either skilled or unskilled) and with $k^n \in \{k^L, k^H\}$ units of capital, where $k^H > k^L$. Immigrants are only endowed with either one unit of skilled or unskilled labor.\footnote{For a similar assumption, see Razin and Sadka (1999).}
supply of capital in the economy is thus given by

$$\sum_k^n k^n = K$$

while the total supply of each skill is given by

$$L_j = \phi_j N + \psi_j M \quad j \in \{U, S\} \quad (1)$$

where $\phi_j$ and $\psi_j$ respectively are the share of workers of skill profile $j$ in the native and immigrant populations, and $\sum_j \phi_j = \sum_j \psi_j = 1$. The key variable in our analysis of the effect of immigration is the migrants to native ratio, which is defined as $\pi = M/N$ and which, for simplicity, we will assume to be equal to zero in the initial equilibrium. Furthermore, the number of natives will be held constant throughout the analysis. A change in the immigrants to natives ratio will impact the domestic availability of the two types of skills in the following way:

$$\frac{\dot{L}_j}{d\pi} = \frac{\psi_j}{\phi_j} = \beta_j \quad (2)$$

where $\dot{L}_j = \frac{dL_j}{L_j}$ etc. Let $w_j$ be the prevailing wage rate, with $w_S > w_U$, and for simplicity, let us assume throughout our analysis that capital is perfectly mobile across countries, and that its return is equal to $r$. Let $c_i(w_U, w_S, r)$ be the unit cost function for good $i$. Wages and outputs are determined by two sets of equilibrium conditions. Firstly, equilibrium in the factor market requires supply to be equal to demand,

$$L_U = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial w_U} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial w_U} \quad (3)$$

$$L_S = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial w_S} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial w_S} \quad (4)$$

$$K = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial r} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial r} \quad (5)$$

Secondly, firms earn zero profits in equilibrium, i.e.

$$p_1 = c_1(w_U, w_S, r) \quad (6)$$

$$p_2 = c_2(w_U, w_S, r) \quad (7)$$
The tax system we consider has two components. All sources of income (labor and capital) are taxed at a rate $\tau$, and tax revenues are lump sum rebated by the government to the residents in the form of a demogrant $b$.\textsuperscript{16} Thus, by design, our tax system is redistributive. The government budget constraint can be written as

$$\tau(w_U L_U + w_S L_S + r \sum k^n) = b(N + M) \quad (8)$$

Immigration affects the utility of the current residents through three channels: the effect on the prevailing tax rates, the effect on the per capita transfers\textsuperscript{17} and the labor market (wage) effect. The net income of a native $n$ of skill level $j$ is given by

$$I_n^j = G_n^j(1 - \tau) + b \quad (9)$$

where the gross income $G_n^j = w_j + rk^n$. The effect of immigration on his net income can then be measured by

$$\frac{\hat{I}_j^n}{d\pi} = \frac{(1 - \tau)w_j \hat{w}_j}{b + G_j^n(1 - \tau)} - \frac{\tau G_j^n \hat{\tau}}{b + G_j^n(1 - \tau)} + \frac{b \hat{b}}{b + G_j^n(1 - \tau)} \quad (10)$$

The first term represents the labor market effect, the second is the effect through the adjustment in the tax level and the third term represents the adjustment induced in the government’s transfers to the residents. We will now consider the effects of immigration on the utility of current residents under two different hypotheses. First, we will assume that the foreign factor inflow does not affect the prevailing returns on skilled and unskilled labor, because the economy continues to be diversified in production after migration has taken place.\textsuperscript{18} Next, we will consider the case in which, after labor inflows, the receiving country fully specializes in the production of one good, so that factor returns will be affected.

\textsuperscript{16}For a similar approach to modelling the welfare system, see Razin and Sadka (1999).

\textsuperscript{17}The first two channels work through the welfare state. In our model we assume that the government’s budget constraint must be satisfied in each year. Notice that, in practice, immigration might also affect the welfare state through its impact on the accumulation of public debt. While explicitly modelling this scenario would render the analysis more complicated, allowing for the accumulation of debt would only shift into the future the choice between changing taxes or benefits to accommodate immigration.

\textsuperscript{18}In other words, in this case there is factor price insensitivity to factor movements which, in general, holds if the number of internationally traded goods is no smaller than the number of primary factors of production and the immigration shock is small in size.
3.1 No labor market effect

The fiscal system can adjust to immigration in two different ways. In the first scenario, we assume that the per capita transfer is held constant, and study how taxes should adjust. In the second, we will assume that the tax structure is not altered, and study how the per capita transfer has to adjust to maintain the government’s budget in equilibrium. We start by analyzing the first scenario. Totally differentiating equation (8), after a few manipulations we obtain

$$\dot{\tau} + \sum_j \eta_j \dot{L}_j = d\pi$$

(11)

where \(\eta_j = \sum_i w_i L_i + r \sum_k k^n \) for \(j = U, S\) is the share of labor of skill level \(j\) in national income, and \(\eta_K = \sum_i w_i L_i + r \sum_k k^n = 1 - \eta_U - \eta_S\) is the share of capital in GDP. The effect of immigration on the tax rate is given by

$$\dot{\tau} = \frac{(\phi_U - \eta_U)(\beta_U - 1)}{(1 - \phi_U)} + \frac{\eta_K(1 - \psi_U)}{1 - \phi_U},$$

(12)

where \(\phi_U - \eta_U\) is the difference between the share of the unskilled in the initial population and their share in the initial GDP. Since \(w_U < w_S\), it follows immediately that \(\phi_U > \eta_U\). Consider equation (12) and to begin with, assume that the share of capital in national income is nil, i.e. that \(\eta_K = 0\). If the native and migrant skill composition are identical, i.e. if \(\beta_U = 1\), an inflow of immigrants will not alter the current labor income tax level. If instead immigrants are less skilled on average than natives, i.e. if \(\beta_U > 1\), their presence will lead to an increase in the tax rate. This is intuitive since in order to maintain the same per capita transfer, a reduction in the per capita pre-tax income will require an increase in the tax rate. If the share of capital in national income is instead positive, i.e. \(\eta_K > 0\), the increase in the tax rate needed to maintain a given demogrant in the presence of unskilled immigration will be even higher. As immigrants in our model are assumed not to own (physical) capital, which is part of the tax base, even if they are as skilled as natives (i.e. \(\beta_U = 1\)), they represent a net burden for the welfare state and this will require an increase in the tax rate to maintain the demogrant unchanged.\(^{19}\) The following proposition then holds

**Proposition 1** Holding the demogrant unchanged, an inflow of unskilled immigrants is less

\(^{19}\)Notice also that, the more unskilled immigrants are, the higher the tax increase required to maintain the demogrant unchanged. To see this, notice that \(\frac{\partial (\dot{\tau})}{\partial \phi_U} = \frac{\phi_U(1 - \eta_K) - \eta_U}{\phi_U(1 - \phi_U)} > 0\) since \(\phi_U > \frac{\eta_U}{\eta_U + \eta_S}\).
desirable for an individual the higher her pre-tax income. To the contrary, an inflow of skilled immigrants is more desirable for an individual the higher her pre-tax income as long as \( \eta_K < \eta^*_K \), where \( \eta^*_K = \frac{(1-\beta_U)(\phi_U-\eta_U)}{(1-\psi_U)} \).

**Proof.** Notice that absent labor market effects and holding the demogrant constant equation (10) implies

\[
\frac{\dot{I}}{d\pi} = -\frac{G\tau}{b + G(1-\tau)} \left[ \frac{\hat{\tau}}{d\pi} \right]
\]

To assess the effect of different individual income levels, notice that

\[
\frac{\partial \left( \frac{\dot{I}}{d\pi} \right)}{\partial G} = -\frac{\hat{\tau}}{d\pi} \left\{ \frac{b\tau}{[b + G(1-\tau)]^2} \right\}.
\]

If immigration is unskilled, which implies \( \frac{\dot{x}}{d\pi} > 0 \), then \( \frac{\partial \left( \frac{\dot{x}}{d\pi} \right)}{\partial G} \leq 0 \). On the other hand, if immigration is skilled, from equation (12) we know that \( \frac{\dot{x}}{d\pi} < 0 \) as long as \( \eta_K < \frac{(1-\beta_U)(\phi_U-\eta_U)}{(1-\psi_U)} \) and, as a result, \( \frac{\partial \left( \frac{\dot{x}}{d\pi} \right)}{\partial G} \geq 0 \). \( \square \)

Proposition 1 tells us that, if the demogrant is held fixed, the redistributive nature of the existing fiscal system implies that the cost of an inflow of unskilled immigrants will fall disproportionately more on higher income natives. Similarly, if immigration is skilled in nature, the higher income natives will be the largest beneficiaries since they will enjoy a disproportionately large decrease in their net tax burden. To see how the relationship is affected by a change in the extent of redistribution carried out by the welfare state, we need to calculate the following derivative:

\[
\frac{d \left( \frac{\partial \left( \frac{\dot{x}}{d\pi} \right)}{\partial G} \right)}{d\tau} = -\frac{\hat{\tau}}{d\pi} \frac{2bG}{[b + G(1-\tau)]^3}, \quad (13)
\]

which is negative as long as immigration is unskilled since \( \frac{\dot{x}}{d\pi} \geq 0 \). In other words, the negative relationship between individual income and pro-immigration preferences (under the first welfare-state scenario, given unskilled migration) becomes more pronounced the more redistributive the welfare system is.

Finally remember that, among natives, we can distinguish four different types of individuals, based on their skill levels and asset holdings. Skilled individuals with a large endowment of capital are the top income earners, while the low skilled with a low endowment of capital
will lie at the bottom of the income distribution. Agents with limited physical assets but highly skilled and low skilled agents with abundant assets occupy instead the middle of the income distribution: Either one of the latter two groups could have higher (gross) income than the other. Therefore the model allows for differential variation in individual skill and income, which will be exploited in the empirical analysis.

We turn now to the alternative scenario, in which tax rates are held fixed and the adjustment induced by migration occurs through changes in the demogrant. Going back to equation (8), totally differentiating we obtain

\[ \sum_j \eta_j \dot{L}_j = \dot{b} + d\pi \]  

(14)

and rewriting it we have

\[ \frac{\dot{b}}{d\pi} = \frac{(\phi_U - \eta_U)(1 - \beta_U)}{1 - \phi_U} - \frac{\eta_K(1 - \psi_U)}{(1 - \phi_U)} \]  

(15)

If the income share of capital is equal to zero, as long as the inflow of immigrants has the same skill composition as the native population (i.e. \( \beta_U = 1 \)), migration will have no effect on the demogrant. On the other hand, since \( \phi_U > \eta_U \), unskilled immigration (i.e. \( \beta_U > 1 \)) will lead to a decline in the per capita transfers,\(^{20}\) while skilled immigration (\( \beta_U < 1 \)) will lead to an increase. If the share of capital in national income is instead positive, the reduction in the demogrant which follows from an inflow of unskilled immigrants will be even larger. In fact a positive share of capital in national income implies that natives are richer, ceteris paribus, than the immigrants in the initial equilibrium. As a result the effect of unskilled immigration on the demogrant, holding tax fixed, will be more pronounced.

The following result characterizes the effect of immigration on the current residents.

**Proposition 2** **Holding the tax rates fixed, an inflow of unskilled immigrants is less desirable for an individual the lower her pre-tax income. To the contrary, an inflow of skilled immigrants is more desirable for an individual the lower her pre-tax income as long as \( \eta_K < \eta^*_K \), where**

\[ \eta^*_K = \frac{(1 - \beta_U)(\phi_U - \eta_U)}{(1 - \psi_U)} \]

\(^{20}\)Furthermore, as is intuitive, the more unskilled immigrants are, the larger will be the reduction in the demogrant. To see this, notice that

\[ \frac{\partial (\frac{\dot{b}}{d\pi})}{\partial \psi_U} = \frac{\eta_U - \phi_U(\eta_S + \eta_U)}{\phi_U(1 - \phi_U)} < 0 \] \( \text{since } \frac{\eta_U}{\phi_U} < \frac{\eta_S}{\phi_S} \).
Proof. Without labor market effects and holding the tax rates unchanged, equation (10) becomes

\[
\frac{\dot{I}}{d\pi} = \frac{b\dot{\hat{b}}}{b + G(1 - \tau)}
\]

To assess the effects of different individual income levels, notice that

\[
\frac{\partial}{\partial G} \left( \frac{\dot{I}}{d\pi} \right) = -\frac{b\dot{\hat{b}}}{(b + G(1 - \tau))^2}(1 - \tau) - \frac{b\dot{\hat{b}}}{b + G(1 - \tau)}
\]

We have seen that with a redistributive tax system, unskilled immigration leads to a reduction in the per capita transfers \((\frac{b}{d\pi} < 0)\) therefore \(\frac{\partial}{\partial G} \left( \frac{\dot{I}}{d\pi} \right) \geq 0\). With skilled immigration, \(\frac{b}{d\pi} > 0\) as long as \(\eta_k < \frac{(1 - \beta U)(\phi U - \eta_U)}{(1 - \psi U)}\) and therefore \(\frac{\partial}{\partial G} \left( \frac{\dot{I}}{d\pi} \right) < 0\). \(\square\)

The result in proposition 2 is fairly general and the intuition is straightforward. The inflow of unskilled immigrants will – for a given tax rate – reduce the demogrant paid to every native. The reduction in the demogrant will have a larger impact on the individuals with a smaller income. The opposite is true if immigration is instead skilled, and the share of capital in national income is small. To see how the relationship is affected by a change in the redistribution carried out by the welfare state, we need to calculate the following derivative:

\[
\frac{d}{db} \left( \frac{\partial}{\partial G} \left( \frac{\dot{I}}{d\pi} \right) \right) = -\frac{\dot{b}}{d\pi} \frac{[G(1 - \tau) - b]}{(b + G(1 - \tau))^3},
\]

which is positive if migration is unskilled as long as \(G(1 - \tau) > b\).

How do similarly endowed individuals fare in different fiscal systems? This question is answered in the following

**Proposition 3** If immigration is unskilled compared to the native population, a more redistributive welfare system will make each of its citizens worse off. On the other hand, if immigration is skilled and \(\eta_K < \eta^* K\), immigration will be welcomed by each citizen.

**Proof.** Without labor market effects, an inflow of immigrants will induce the following change in net income

\[
\frac{\dot{I}^n_j}{d\pi} = -\frac{\tau G^n_j \dot{\hat{\pi}}}{b + G^n_j(1 - \tau)} + \frac{b\dot{\hat{b}}}{b + G^n_j(1 - \tau)}
\]
while the government budget constrain implies that $b = \frac{\tau}{K}(w_U L_U + w_S L_S + r \sum_n k^n)$ and
\[
\frac{\dot{b}}{d\pi} = \frac{\hat{\tau}}{d\pi} + \sum_j \eta_j \frac{\hat{L}_j}{d\pi} - 1
\] (18)

Substituting equation (18) in equation (17) and differentiating we obtain
\[
\frac{d}{d\pi} \left( \frac{j_n}{d\pi} \right) = \frac{G^n_j}{\tau(1-\tau)G^n_j + b} \left( b \frac{\dot{b}}{d\pi} - \tau G \frac{\hat{\tau}}{d\pi} \right)
\] (19)

Consider now the situation in which $\frac{\dot{x}}{dx} = 0$ (second welfare-state scenario). From equation (15) we know that if immigration is unskilled, $\frac{\dot{b}}{d\pi} \leq 0$, and as a result, all natives would prefer to be in a less redistributive fiscal system. Similarly, as long as $\eta_K < \eta_K^*$, if immigrants are skilled, all citizens would prefer to be in a more redistributive fiscal system. Turning to the first welfare-state scenario in which the state responds to immigration by adjusting the tax level to keep the demogrant unchanged (i.e. $\frac{\dot{b}}{dx} = 0$), equation (12) implies that as long as immigration is unskilled, $\frac{\dot{x}}{dx} \geq 0$ and as a result, every individual in a more redistributive fiscal system will be negatively affected by unskilled immigration. On the other hand, all citizens will welcome skilled migration as long as $\eta_K < \eta_K^*$. □

3.2 With labor market effects

If the immigration shock is large enough to lead to specialization in production, factor prices will need to adjust as a result of immigration. Factor returns are then determined by the following set of equations

\[ p_i = c_i(w_U, w_S, r) \] (20)
\[ L_U = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial w_U} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial w_U} \] (21)
\[ L_S = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial w_S} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial w_S} \] (22)
\[ K = y_1 \frac{\partial c_1(w_U, w_S, r)}{\partial r} + y_2 \frac{\partial c_2(w_U, w_S, r)}{\partial r} \] (23)

Continuing to assume that capital is internationally mobile, totally differentiating the
equilibrium conditions it is easy to show that the effect of immigration on wages is given by

\[ \hat{w}_U \frac{d\pi}{d\pi} = \frac{\beta_U - \beta_S}{\epsilon_{UU} - (\epsilon_{SU} + \frac{\eta_U}{\eta_S} \epsilon_{US}) + \frac{\eta_U}{\eta_S} \epsilon_{SS}} \]  

(24)

\[ \hat{w}_S \frac{d\pi}{d\pi} = -\frac{\eta_U}{\eta_S} \frac{\beta_U - \beta_S}{\epsilon_{UU} - (\epsilon_{SU} + \frac{\eta_U}{\eta_S} \epsilon_{US}) + \frac{\eta_U}{\eta_S} \epsilon_{SS}} \]  

(25)

where \( \epsilon_{ij} = \frac{\partial L_i}{\partial w_j} \). From this two equations, we immediately see that only if immigrants share exactly the same skill composition as natives, there will be no wage effects. If the skill composition of immigrants is different from that of the natives, then there will be wage effects. From the concavity of the cost function, it is easy to show that the sign of the denominator of equation 24 is negative\(^{21}\), and this implies that an inflow of unskilled immigrants will lead to a reduction of the wage of domestic unskilled workers, while the opposite will hold for skilled workers.

Turning back to the effect of immigration on the welfare state when wages adjust, holding the demogrant unchanged (first welfare-state scenario) and totally differentiating the government budget constraint we obtain

\[ \hat{\tau} + \sum_j \eta_j \hat{w}_j + \sum_j \eta_j \hat{L}_j = d\pi \]  

(26)

so that, rearranging, the impact on the tax rates of skilled and unskilled immigration can be rewritten as

\[ \hat{\tau} \frac{d\pi}{d\pi} = \frac{(\phi_U - \eta_U)(\beta_U - 1)}{(1 - \phi_U)} + \frac{\eta_K(1 - \psi_U)}{1 - \phi_U} - \sum_j \eta_j \frac{\hat{w}_j}{d\pi} \]  

(27)

On the other hand, holding the tax rates constant and allowing the demogrant to adjust (second welfare-state scenario), we have

\[ \hat{b} \frac{d\pi}{d\pi} = \frac{(\phi_U - \eta_U)(1 - \beta_U)}{1 - \phi_U} - \frac{\eta_K(1 - \psi_U)}{(1 - \phi_U)} + \sum_j \eta_j \frac{\hat{w}_j}{d\pi} \]  

(28)

In both situations, we can see that now the effects on the two dimensions of the fiscal state will be mediated by the labor market. At the margin, labor is paid the value of its marginal product, so an inflow of immigrants will leave the total remuneration of the existing

\(^{21}\)See Dustmann and Preston (2004a) for a proof.
labor force unchanged \( \sum_j \eta_j \hat{w}_j d\pi = 0 \). On the other hand, if the inflow of immigrants is non-marginal (i.e. \( \Delta \pi \)), the total remuneration of existing workers will raise \( \sum_j \eta_j \hat{w}_j \Delta \pi \geq 0 \) – these are the gains from migration pointed out by Berry and Soligo (1969) – thus leading to an increase in the existing tax base.

4 Data

To empirically investigate these theoretical predictions, we combine individual-level information on immigration attitudes with aggregate data on the characteristics of destination countries of immigrant flows. In particular, we use survey results from the 1995 National Identity Module of the International Social Survey Programme (ISSP 1995), which covers several destination countries, both advanced, middle-income and developing economies. We restrict the sample and only focus on higher-income countries: these are the best suited for the analysis of welfare-state determinants, given the non-trivial size of their welfare states.\(^{22}\)

To construct a measure of immigration attitudes, we use respondents’ answers in the ISSP survey to the following question: “There are different opinions about immigrants from other countries living in (respondent’s country). By “immigrants” we mean people who come to settle in (respondent’s country). Do you think the number of immigrants to (respondent’s country) nowadays should be: (a) reduced a lot, (b) reduced a little, (c) remain the same as it is, (d) increased a little, or (e) increased a lot”. The survey format also allows for “can’t choose” and “not available” responses which we exclude from the sample. We also leave out observations for individuals who are not citizens of the country where they are interviewed. The dependent variable in our empirical analysis, \( \text{Pro Immig Dummy} \), is dichotomous and equal to one for respondents who would like the number of immigrants to increase (either a little or a lot) and to zero otherwise.\(^{23}\) Our empirical analysis is based on estimation of probit models. Therefore the estimates in the Tables, which are marginal effects, should be interpreted as the change in the probability of being pro-immigration given a one-unit

\(^{22}\)In particular, our sample includes countries with per capita GDP (PPP-adjusted) in 1995 above 8,000 international dollars: Germany West, Germany East, Great Britain, United States, Austria, Italy, Ireland, Netherlands, Norway, Sweden, New Zealand, Canada, Japan, Spain, Slovenia, Czech Republic, Hungary, Slovak Republic. Italy is excluded from regressions which use real income, as this variable is not available.

\(^{23}\)We have checked the robustness of our results to various alternatives with respect to how the dependent variable is constructed (for example, keeping the “can’t choose” and “not available” observations; defining the middle category (c) as pro-immigration; using as dependent variable a five-valued ordered measure; etc.). See Mayda (2005) for more details about these robustness checks.
increase in the relevant variable, holding all the other regressors at their mean value. All specifications have standard errors adjusted for clustering on country and include destination countries’ fixed effects\(^\text{24}\), to account for the impact of unobserved, additive, country-specific effects. These intercepts make it possible to net out the impact of any country-level variable which is homogeneous across fellow citizens (for example, the additive effect of migration policy, of the state of the economy, of the skill composition of natives relative to immigrants, etc.\(^\text{25}\)).

Summary statistics for \textit{Pro Immig Dummy} and all the other ISSP and country-level variables used in the empirical analysis are presented in Tables 1 and 2. The fraction of individuals in the overall sample who are in favor of immigration is low (7.9\%). However, this fraction hides substantial cross-country variation. In Canada and Ireland, respondents are the most pro-immigration, in Hungary the least. In contrast, attitudes are much more favorable towards an alternative dimension of globalization, international trade. In the overall sample, 28\% of individuals welcome free trade, with the highest fraction in the Netherlands and the lowest one in Hungary.

Additional immigration questions are included in the ISSP survey. For example, individuals are asked whether they agree with the statement that immigration increases crime rates and whether they think that immigration makes the country more open to new ideas and cultures. We use answers to such questions to construct two variables, \textit{pro-immig crime} and \textit{pro-immig culture}, which capture each individual’s perception of the security and cultural impact of immigration, respectively. In some specifications we control for these two regressors which measure two important aspects of the non-economic impact of migration. By comparing two individuals who feel the same in terms of this dimension, we are better able to isolate the economic channels.

The ISSP data set also includes information on a number of individual-level characteristics that define the socio-economic background of each respondent (for example the age,\(^\text{24}\)Fixed-effect estimation of a probit model may give rise to the so called incidental parameter problem (Chamberlain 1984): the maximum-likelihood estimator of the incidental parameters (fixed effects) is consistent as \(T \to \infty\), for given \(N\) (assuming that there are \(T\) observations for each unit \(i = 1, \ldots, N\)) However, it is inconsistent for given \(T\), as \(N \to \infty\). Given that the panel data set we use is very long (\(N\) small, \(T\) high, since there are many individual observations for each country), the incidental parameters problem is not an issue in our case.

\(^{25}\)Therefore, these country-level variables cannot be included in the estimating equations (unless interacted with individual-level regressors) otherwise they would be perfectly collinear with the country dummy variables.

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sex, number of years of education, real income, social class, political affiliation, and trade union membership of the person interviewed). The two variables of interest for our analysis are the individual’s number of years of education and real income. We use data on the former variable to construct a measure of individual skill (**education**) and test the labor-market predictions of the model. We employ data on individual real income to test the predictions on welfare-state determinants. In particular, the variable **real income** is calculated using data from the ISSP data set on individual yearly income in local currency and purchasing-power-parity conversion factors from the World Development Indicators (World Bank 2001).26

The theoretical predictions about the impact of immigration on natives’ preferences, through both the welfare-state and the labor-market channels, are different (indeed opposite) depending on the skill composition of natives relative to immigrants in the destination country. Following Mayda (2005), we use two alternative measures of such skill mix. While the first one is a direct measure, it can only be constructed for a limited number of countries, for which the following data is available. We use information on 1995 education levels of both native and immigrant populations, which comes from the International Migration Statistics data set for OECD countries (OECD 1997). Education levels are coded according to the International Standard Classification of Education (ISCED): 1. less than first stage of second level (ISCED 00, 01, 0227); 2. completed second stage of second level (ISCED 03, 04); 3. completed third level (ISCED 05 and over); 4. other general education, not applicable and no answer. The relative skill composition of natives to immigrants is defined as the ratio of skilled to unskilled labor in the native relative to the immigrant populations. We measure the ratio of skilled to unskilled labor, for both natives and immigrants, as the number of individuals with education levels 2. and 3. divided by the number of individuals with education level 1. In particular, the variable we use in the regressions, **relative skill ratio**, equals the log of (one plus) the relative skill composition of natives to immigrants.28 The higher the **relative skill ratio**, the more unskilled immigrants are compared to natives.

The indirect measure we employ for the relative skill composition of natives to immigrants is the (log) per capita GDP of the destination country in 1995 (PPP-adjusted), from the World Development Indicators. Consider the standard international migration model

\[ \text{relative skill ratio} = \log(1 + \beta_U/\beta_S) \]

where \( \beta_U/\beta_S > 1 \) if and only if \( \beta_U > 1 \) (this is the case of unskilled immigration).

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26 See end of Table 1 for definitions of variables based on the ISSP questions.
27 ISCED level 02 usually refers to individuals who have completed the ninth grade.
28 In terms of the notation in the theoretical model, the relative skill ratio equals \( \log(1 + \beta_U/\beta_S) \) where \( \beta_U/\beta_S > 1 \) if and only if \( \beta_U > 1 \) (this is the case of unskilled immigration).
with no productivity differences across countries. From a theoretical point of view, in this case the relationship between per capita GDP and immigrants’ skill mix (relative to natives) is unambiguous. High per capita GDP countries have a higher supply of skilled to unskilled labor than low per capita GDP countries, therefore lower skilled wages and higher unskilled wages. This creates an incentive for unskilled migrants to move from low to high per capita GDP countries, while skilled migrants will tend to move in the opposite direction. Therefore this simple model predicts that the relative skill composition of natives to immigrants is high in higher-income countries and low in lower-income countries. If we drop the unrealistic assumption of equal technology levels across economies, the pattern of international migration in terms of skill composition is ambiguous, since rates of return can be higher than in the rest of the world - for both types of labor in a technologically-advanced country. Therefore, in general, the relationship between per capita GDP and the relative skill composition of natives to immigrants becomes an empirical question. Based on a sample of fourteen countries, for which data on both variables is available (OECD 1997), Mayda (2005) shows that per-capita GDP in 1995 is indeed positively and significantly correlated with the relative skill composition for the same year (see discussion of this point and Figure 1 in Mayda 2005). Based on this evidence, we can therefore use per capita GDP levels as a proxy for the relative skill mix. Our first set of estimates (Table 3) is based on the latter indirect measure, as it is available for a larger number of countries. Robustness checks in Table 4 use the direct measure for the relative skill composition described above.

We also test the predictions of our model using information on the size of destination countries’ welfare states (labor tax rates and per capita benefits), which comes from two sources. Data on labor tax rates are taken from Mendoza, Razin, and Tesar (1994), as extended by Milesi–Ferretti, Mendoza, and Asea (1997) and Daveri and Tabellini (2000). To compute average labor income tax rates, these papers use fiscal revenue statistics. Figures on per capita transfers are taken from Razin, Sadka, and Swagel (2002) and are based on the OECD analytical database. Per capita transfers include both social security and other transfers, such as unemployment and disability compensation, and are deflated using each country’s CPI, and expressed in 1990 PPP equivalent dollars.

Our measure of the progressivity of the tax system in host countries is based on data from OECD (1998). In particular, we use information on average income tax rates (that is, personal income tax due as a fraction of gross wage earnings) for single individuals without children who earn, respectively, 67% and 167% of the annual wage earnings of an average
production worker (see Table 1 in OECD (1998)). Our measure of the progressivity of the tax system, *progressivity*, equals the difference in tax rates applied to these two groups.

Finally, we complement our investigation based on the ISSP survey using an additional individual-level data set, the 2002-2003 round of the European Social Survey (ESS), which covers a different (and larger) sample of countries than the ISSP\textsuperscript{29} and was run in a different period of time.\textsuperscript{30} The immigration question we examine in the ESS data set is also more specific than the one contained in the ISSP, as it focuses on immigrants of the same race or ethnic group as the majority in the country.\textsuperscript{31} The main advantage of this more narrowly phrased question is that it abstracts from racial and ethnic considerations, which usually bias the estimates on individual skill and income. On the other hand, the disadvantage of the ESS data set is that the income variable is not continuous, therefore it is subject to measurement error.

As before, we exclude non-nationals from the sample and construct a dichotomous variable, *Pro Immig Dummy-ESS*, which equals one if the individual would like many or some immigrants (of the same race and ethnic group as the majority), zero otherwise (that is, if the individual would like a few immigrants or none). Summary statistics of *Pro Immig Dummy-ESS* and the other ESS variables included in the regressions are presented in Table 5. The different picture these numbers portray relative to the ISSP data set - in particular, the higher fraction of individuals in favor of migration - is not surprising given that in the ESS survey the immigration question is asked in relation to immigrants of the same race and ethnic group as the majority.

Using *Pro Immig Dummy-ESS* as the dependent variable, we estimate probit models which include, as regressors, country dummy variables and have standard errors clustered by country.\textsuperscript{32} We combine the European Social Survey with aggregate statistics on the destination countries of immigrant flows. Data on per capita GDP of the destination country in 2002 (PPP-adjusted) have been obtained from the World Development Indicators data set.

\textsuperscript{29}As with the ISSP data set, we restrict the ESS sample and only focus on higher-income countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Slovenia, Czech Republic, Hungary.

\textsuperscript{30}For more information on the construction of the survey, see Jovell and al. (2003). The data are available from the Norwegian Social Science Data Services.

\textsuperscript{31}In particular, the survey asks: "To what extent do you think [country] should allow people of the same race or ethnic group as most [country] people to come and live here? 1. Allow many immigrants to come and live here; 2 Allow some; 3 Allow a few; 4 Allow none; 7 Refusal; 8 Don’t know; 9 No answer."

\textsuperscript{32}As recommended in the ESS website, our estimation uses both design and population size weights.
The relative skill ratio variable is constructed using 2002-2003 data on native and immigrant populations by level of education (lower secondary education, upper secondary, tertiary) from Table I.12 in SOPEMI (2005).

5 Empirical Results

As the theoretical model shows, the impact of immigration on natives’ preferences through the welfare-state channel is a function of individual income. On the other hand, the effect of immigration on natives’ attitudes through the labor-market channel is a function of individual skill. In our empirical specifications, we will be using both variables to disentangle the two effects. Notice that, while not surprisingly individual income and individual skill are positively and significantly correlated\textsuperscript{33}, they are far from being perfectly collinear, which makes it possible to analyze them in conjunction.

In particular, the theoretical model in Section 3 derives the following predictions. Through the welfare-state channel, if per capita transfers are fixed, tax rates are adjustable and the tax system is redistributive (first scenario), the more affluent an individual is, the less favorable he should be to immigration if he resides in a country where natives are on average more skilled than immigrants. Thus, in such countries, the relationship between individual income and pro-immigration attitudes should be negative. On the other hand, under the first scenario, richer households should favor immigration in countries characterized by skilled migration. Therefore, in such countries, we would expect a positive correlation between individual income and opinions in favor of immigrants (Proposition 1). Next, under the second scenario - that is, if the adjustment in the fiscal position of the welfare state due to immigration takes place through changes in per capita welfare benefits with tax rates kept fixed - still assuming a redistributive tax system, the correlations between income and pro-immigration attitudes should have exactly the opposite signs for each type of skill mix of natives to immigrants. We should observe a positive relationship between income and pro-immigration attitudes in countries with unskilled immigrants relative to natives and a negative relationship in countries with skilled immigrants relative to natives (Proposition 2).

Through the labor-market channel, skilled individuals should be more favorable to immigrants than unskilled ones in destinations characterized by unskilled immigration. In this case, skilled (unskilled) wages are positively (negatively) affected since unskilled immigration

\textsuperscript{33}Their correlation coefficient in the overall ISSP sample is 0.34 (significant at the 1\% level).
induces a reduction in the relative supply of skilled to unskilled labor. The opposite is true for countries where immigrants are skilled relative to natives.

We bring these theoretical predictions to the data in Tables 3 and 4. We investigate the empirical validity on average\textsuperscript{34} of either one of the two welfare-state scenarios, controlling for the impact of labor-market effects.

Our initial set of regressions (columns (1)-(5), Table 3) shows that it is problematic to analyze welfare-state variables on their own, independently from labor-market and non-economic determinants of immigration attitudes. Richer individuals are usually better educated than poorer ones, which has implications for their position in the labor market and for their view of immigration from a cultural and security point of view. For example, controlling only for the age and gender of the respondent, we estimate a positive and significant coefficient on real income in regression (1), where we assume a common coefficient on this variable across countries. However, once we also account for the impact of individual skill (equation (2)) and of other non-economic determinants of immigration preferences which are correlated with income (pro-immig crime and pro-immig culture in regression (3); upper social class, trade union member, political affiliation with the right in regression (4)), the effect of real income becomes insignificant.

We next let the coefficients on individual skill and income change by country, as suggested by the theory (regressions (5)-(7)). In these regressions, we use per capita GDP as a summary measure of each destination economy. As pointed out in Section 4, per-capita GDP represents an indirect measure of the relative skill mix of natives to immigrants, which is a key variable in the theoretical model. Since data on per capita GDP is available for all countries analyzed, the sample size is not affected. In particular, in column (6), we estimate the following probit model:\textsuperscript{35}

\[ \text{Prob}( \text{ProImmigDummy}_i = 1 \mid x_i) = \]
\[ = \Phi(\beta_1 \text{age}_i + \beta_2 \text{male}_i + \beta_3 \text{income}_i + \beta_4 \text{income}_i \cdot \text{pcgdp}_c + \beta_5 \text{educ}_i + \beta_6 \text{educ}_i \cdot \text{pcgdp}_c), \]

where \( \Phi(\cdot) \) represents the cumulative distribution function of a standard Normal, \( \beta \) is a vector of parameters to be estimated and \( x_i \) is the vector of all explanatory variables specific

\textsuperscript{34}In our analysis, due to the low number of country observations, we assume that all countries either follow the first scenario or the second one. In other words, we test the validity of each scenario on average across countries.

\textsuperscript{35}This specification, as well as all the other ones in the paper, also includes country dummy variables as regressors.
to individual $i$, who is from country $c$. In regression (7), we augment this specification by adding the two regressors pro-immig crime and pro-immig culture. Based on these specifications, we find evidence of substantial cross-country heterogeneity in terms of the impact of both skill and income. The effect of the two variables is characterized by the opposite pattern across countries. Our estimates show that, while the impact of education on pro-immigration preferences is positive in higher per-capita GDP countries ($\beta_6 > 0$) and negative in lower per-capita GDP countries ($\beta_5 < 0$), the effect of individual income is negative in higher per-capita GDP countries ($\beta_4 < 0$) and positive in lower per-capita GDP countries ($\beta_3 > 0$). Therefore our results are consistent with a labor-market plus welfare-state explanation of attitudes towards immigrants in a framework characterized by fixed welfare benefits, adjustable welfare costs (tax rates) and a redistributive fiscal system (first scenario).

In Table 4, we check the robustness of our results in a number of ways. First, in place of per capita GDP, we use the direct measure of the relative skill composition of natives to immigrants described in Section 4 (regressions (1) and (2)). Although these estimates are based on a smaller sample of countries due to data limitations, they are characterized by the same sign patterns as those using per capita GDP and by even higher levels of significance (this is true for both the labor-market and welfare-state variables). Based on specification (1), the estimates for income (0.0163 significant at the 5% level) and income*relative skill ratio (-0.0184 significant at the 5% level) imply that individuals from countries with relative skill composition above approximately 1.43 are less likely to be in favor of immigration the higher their income, while in countries with relative skill composition below this threshold (Italy, Ireland, Spain, Sweden in our sample), the correlation between pro-immigration attitudes and income is positive.

Our next robustness check exploits the variation across countries in the size and progressivity of the welfare state. As often pointed out in the previous literature, the variable real income is likely to be associated with a substantial amount of noise. For this reason, in regressions (3)-(5), Table 4, we follow Hanson, Scheve, and Slaughter (2005) and estimate specifications where we use education as a proxy for the level of both individual skill and individual income. In order to differentiate between the labor-market hypothesis and the welfare-state one, we use data on the size and progressivity of the welfare state in each

\footnote{For numerous additional robustness checks of the labor-market results, see Mayda (2005).}
\footnote{Regressions (1) and (2) are based on the following countries: Germany West, Germany East, Great Britain, Austria, Ireland, Netherlands, Sweden, Canada, Spain.}
destination country. In particular, in column (3), we estimate the following probit model:\(^{38}\)

\[
\text{Prob}(ProImmigDummy}_i = 1 \mid x_i) = \\
= \Phi(\gamma_{1}age_i + \gamma_{2}male_i + \gamma_{3}educ_i + \gamma_{4}educ_i \cdot RSR^c + \gamma_{5}educ_i \cdot benefits^c + \gamma_{6}educ_i \cdot RSR^c \cdot benefits^c),
\]

where \(RSR\) stands for relative skill ratio and \(benefits\) represents per capita benefits in 1995. The two terms \(\gamma_{3}educ_i\) and \(\gamma_{4}educ_i \cdot RSR^c\) capture the labor-market effect, while the following two terms \((\gamma_{5}educ_i \cdot benefits^c\) and \(\gamma_{6}educ_i \cdot RSR^c \cdot benefits^c\) provide evidence on the welfare-state channel. If the welfare state is relatively small in a destination country (small value of \(benefits\)), we expect labor-market determinants to be the main economic drivers of immigration attitudes. In this case, we should find that the impact of individual skill is positive in countries where natives are more skilled than immigrants on average \((\gamma_{4} > 0)\) and negative viceversa \((\gamma_{3} < 0)\). On the other hand, the bigger the size of a destination country’s welfare state, the more important welfare-state determinants should be in shaping preferences, and therefore the more likely it is that the effect of \(education\) is consistent with Propositions 1 or 2. Recall that, using direct information on real income, we found results consistent with the first scenario of the theoretical model, where per capita benefits are assumed to be fixed and tax rates adjust following immigration (Proposition 1): in this case, higher-income individuals oppose unskilled immigrants and favor skilled ones. Therefore, in regression (3), we should find \(\gamma_{6} < 0\) and \(\gamma_{5} > 0\). These are indeed the signs of the terms in \(education\) in regression (3). These estimates are based on a limited number of countries, but they provide evidence which is consistent with our expectations and with our previous results, thus confirming their robustness. The two sets of determinants - labor-market and welfare-state ones - produce opposite results in terms of the impact of \(education\).

The latter findings are confirmed in specification (4) that uses an alternative measure of the size of the welfare state, i.e. labor tax rates. We find that, if labor tax rates are low, the marginal effect of individual skill is consistent with the labor-market hypothesis (negative and positive in correspondence of, respectively, skilled and unskilled migration) but has the opposite signs if labor tax rates are high, once again strengthening our previous results. Finally, we investigate the same set of issues by differentiating countries according to the progressivity of their tax system (regression (5), Table 4). The theoretical model predicts

\(^{38}\)This specification, as all the other ones in the paper, also includes country dummy variables as regressors.
that the income-distribution effects of welfare-state variables should be more pronounced
the more redistributive the tax system is (see equations (13) and (16)). On the contrary,
with zero redistribution, the labor-market channel should prevail, even in countries with
sizeable welfare states. Our estimates in specification (5) are, once again, consistent with
these implications and with our previous results. To conclude, we believe that our main
specifications and additional robustness checks provide strong empirical evidence for the
interaction of labor-market drivers of preferences with welfare-state ones, along the lines of
the first welfare-state scenario.

In the last column of Table 4 we consider respondents’ preferences with respect to an
alternative dimension of globalization, free trade of goods and services. We use the same
specification as in regression (1), Table 4 with Pro Trade Dummy as the dependent variable. Our goal is to investigate whether cleavages in trade attitudes mirror those for immigration. If that was the case, we might worry that our results are not driven by the welfare-state channel since trade openness is not likely to have as large an impact as immigration on public burden in advanced countries. In any case, even if this were not true - that is, trade liberalization significantly affects the welfare state - we do not expect the effect of public-finance issues on trade preferences to be a function of the relative skill composition of natives to immigrants. As our results on trade preferences in regression (6), Table 4 show, the effects estimated in our previous regressions are indeed specific to immigration attitudes.

To conclude, the results based on the ESS data set offer empirical evidence which is
remarkably similar to what we found using the ISSP survey. As the estimates in Table 6 show, individual attitudes towards immigrants in the ESS sample are on average consistent with the first welfare-state scenario (the effect of income is positive and negative given, respectively, skilled and unskilled migration) and with labor-market determinants (the effect of education is negative and positive given, respectively, skilled and unskilled migration). In addition, using results from country-specific regressions, Figure 1 presents similar evidence on this cross-country heterogeneity.

\[^{39}\text{Of course, our underlying assumption is that a progressive tax system is more redistributive.}\]

\[^{40}\text{See definition of } \text{Pro Trade Dummy at the end of Table 1.}\]

\[^{41}\text{As Hanson, Scheve, and Slaughter (2005) note, } \text{“immigrants may pay taxes, may receive public services, and may vote over tax and spending choices. Imports, obviously, do none of these things.” (p. 1). In general, the fiscal costs of trade adjustment assistance programs are limited.}\]

\[^{42}\text{An alternative view is that trade liberalization has a considerable impact on the welfare state since the demand for social insurance increases with free trade (Rodrik 1998).}\]

\[^{43}\text{We constructed the same graphs using the ISSP data and they look very similar although, given the}\]
Dummy-ESS on year of birth, male, real income and education. The estimated marginal effects of education (income) from these country-specific regressions are then plotted on the top (bottom) panel of Figure 1 as a function of the 2002 per capita GDP of the destination country.\textsuperscript{44} The top graph shows a positive and significant (at the 10\% level) correlation between the host country’s per capita GDP and the size of the effect of education (as in Mayda 2005). On the other hand, the bottom graph displays the opposite type of pattern, a negative and significant (at the 5\% level) correlation between the destination country’s per capita GDP and the marginal effect of income. Given the difference in country coverage of the sample, in the questionnaire date and wording of the immigration question relative to the ISSP survey, these results represent an important robustness check of the conclusions of this paper.

6 Conclusions

In this paper we have developed a framework to study the effect of a redistributive welfare state on individual attitudes towards immigration. To the best of our knowledge, our theoretical model is the first to highlight that individual attitudes depend in a fundamental way on how the welfare state adjusts to an inflow of foreign workers.\textsuperscript{45} In particular, we have shown that high income individuals are worse hit by unskilled immigration only if taxes are raised to maintain per capita transfers unchanged (first scenario). At the same time, agents at the bottom of the income distribution will suffer more with unskilled immigration if tax rates are kept constant and the adjustment is carried out through a reduction in the per capita transfers (second scenario). These relationships are reversed in the case of skilled migration.

Using a sample of OECD countries, we have brought the predictions of our model to the data. Differently from the existing literature, we have carried out our investigation taking full advantage of both the cross-country and individual-level variation in the data. The results we obtain are on average consistent with the first welfare state scenario, i.e. with an adjustment

\textsuperscript{44}We use design weights for each country-specific probit model.

\textsuperscript{45}Most papers do not recognize this ambiguity and implicitly assume that the adjustment to immigration occurs through changes in tax rates (Dustmann and Preston 2004a, Hanson, Scheve, and Slaughter 2005 and Hainmueller and Hiscox 2005). While Dustmann and Preston (2004b) mention that the adjustment can take place through reductions in per capita benefits, they do not formalize this case in their theoretical model.
to immigration that is carried out through changes in the tax rates. In particular, we find that high income individuals oppose immigration through this channel in countries where immigration is unskilled and therefore a net burden to the welfare state. The data suggest an opposite pattern when migration is skilled. In this case the correlation between income and pro-immigration preferences is positive, which is consistent with a situation where migrants are perceived as a net contribution to the welfare state. In relation to the example discussed in the introduction, concerning California and Texas, our results in support of the first scenario are not surprising. Texas – where the second adjustment mechanism seems to be the relevant one – indeed represents a special case in terms of its fiscal system, since it has no state income tax.

More generally, we find that the income distribution effects of immigration are perceived by individuals as less pronounced than pointed out in the existing literature. Individual skill and income have opposite effects on individual attitudes. Since skill and income are positively correlated, the labor market and welfare state channels partially offset each other. For example, the very same skilled and high income German businessman may feel ambivalent regarding the arrival of immigrants since he might benefit from hiring them (labor market complementarity) but be hurt by paying their way through the welfare state.

Finally, in our model we use the relative skill composition to capture whether immigration will be a net burden or a contribution to the destination country’s welfare state. In many OECD economies, pay as you go social security systems are the main vehicle through which retirement benefits are paid. Thus, another interesting question to consider is how differences in the age structure of natives relative to immigrants can affect individual attitudes towards immigration. This question represents an important direction for future research.

References


Dustmann, C. and I. Preston (2004b). Racial and economic factors in attitudes to immigration. mimeo, UCL.


Table 1. Summary statistics of individual-level variables (ISSP data set)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>pro-immig dummy</td>
<td>13605</td>
<td>0.0786</td>
<td>0.2691</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>pro-trade dummy</td>
<td>7966</td>
<td>0.2797</td>
<td>0.4489</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>age</td>
<td>13605</td>
<td>44.7291</td>
<td>16.0457</td>
<td>14.0000</td>
<td>96.0000</td>
</tr>
<tr>
<td>male</td>
<td>13605</td>
<td>0.5048</td>
<td>0.5000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>log of real income</td>
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<td>9.1908</td>
<td>1.2025</td>
<td>3.9616</td>
<td>11.6643</td>
</tr>
<tr>
<td>education (years of education)</td>
<td>13605</td>
<td>12.0949</td>
<td>3.4868</td>
<td>1.0000</td>
<td>20.0000</td>
</tr>
<tr>
<td>pro-immig crime</td>
<td>13605</td>
<td>0.2711</td>
<td>0.4445</td>
<td>0.0000</td>
<td>1.0000</td>
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<td>pro-immig culture</td>
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<td>0.4999</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
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<td>upper social class</td>
<td>6364</td>
<td>3.4239</td>
<td>1.0982</td>
<td>1.0000</td>
<td>6.0000</td>
</tr>
<tr>
<td>trade union member</td>
<td>6364</td>
<td>0.4419</td>
<td>0.4966</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>political affiliation with the right</td>
<td>6364</td>
<td>2.8914</td>
<td>0.9559</td>
<td>1.0000</td>
<td>5.0000</td>
</tr>
</tbody>
</table>

Pro Immig Dummy is based on responses to the following question: "Do you think the number of immigrants to (respondent's country) nowadays should be ...: reduced a lot (1), reduced a little (2), remain the same as it is (3), increased a little (4), increased a lot (5); can't choose; NA." Pro Immig Dummy =1 if answers to the above question are either (4) or (5); 0 if they are either (1),(2) or (3). Can't choose and NA are treated as missing values.

Pro Trade Dummy is based on responses to the following question: "Now we would like to ask a few questions about relations between (respondent's country) and other countries. How much do you agree or disagree with the following statements: (respondent's country) should limit the import of foreign products in order to protect its national economy: 1=agree strongly; 5=disagree strongly; can't choose; NA." Pro Trade Dummy =1 if answers to the above question are either (4) or (5); 0 if they are either (1),(2) or (3). Can't choose and NA are treated as missing values.

Male is coded as follows: 1 male, 0 female (i.e., missing values are excluded). log of real income is calculated using data in local currency on individual yearly income from the ISSP-NI data set and purchasing-power-parity conversion factors from the WDI (World Bank).

Upper social class is coded as follows: 1=lower, 2=working, 3=lower middle, 4=middle, 5=upper middle, 6=upper.

Trade union member equals one if the individual is a member of a trade union, zero if he is not. Political affiliation with the right is coded as follows: 1=far left, 2=centre left, 3=centre, 4=right, 5=far right.

Pro-immig crime is based on responses to the following question: "How much do you agree or disagree with the following statement? Immigrants increase crime rates: 1=agree strongly; 5=disagree strongly." Pro-immig crime =1 if answers to the above question are either (4) or (5); 0 otherwise.

Pro-immig culture is based on responses to the following question: "How much do you agree or disagree with the following statement? Immigrants make (respondent's country) more open to new ideas and cultures: 1=disagree strongly; 5=agree strongly." Pro-immig culture =1 if answers to the above questions are either (4) or (5); 0 otherwise.

Summary statistics for pro-immig dummy, age, male, log of real income, education, pro-immig crime, pro-immig culture are based on the same observations as in regressions (1)-(3) and (5)-(7) in Table 3.

Summary statistics for pro-trade dummy are based on the same observations as regression (6) in Table 4.

Summary statistics for upper social class, trade union member, political affiliation with the right are based on the same observations as regression (4) in Table 3.
Table 2. Summary statistics of individual-level variables by country (ISSP data set) and of country-level variables

<table>
<thead>
<tr>
<th>country</th>
<th>pro-immig dummy</th>
<th>pro-trade dummy</th>
<th>education</th>
<th>log of real income</th>
<th>per capita gdp</th>
<th>relative skill composition</th>
<th>benefits</th>
<th>progressivity</th>
<th>labor tax rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.0805</td>
<td>0.1326</td>
<td>13.4257</td>
<td>9.6637</td>
<td>27395</td>
<td>3350</td>
<td>8.0000</td>
<td>29.1050</td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>0.0743</td>
<td>0.2920</td>
<td>12.6633</td>
<td>9.6180</td>
<td>24694</td>
<td>5374</td>
<td>11.3000</td>
<td>40.6000</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>0.1568</td>
<td>0.3600</td>
<td>11.8682</td>
<td>9.6473</td>
<td>23212</td>
<td>7645</td>
<td>5.8000</td>
<td>29.3630</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>0.2061</td>
<td>0.2855</td>
<td>14.7612</td>
<td>9.9558</td>
<td>23085</td>
<td>1.6709</td>
<td>2433</td>
<td>11.9000</td>
<td>30.3440</td>
</tr>
<tr>
<td>Austria</td>
<td>0.0395</td>
<td>0.1679</td>
<td>10.3555</td>
<td>9.2601</td>
<td>22090</td>
<td>2.5329</td>
<td>6181</td>
<td>10.4000</td>
<td>39.6070</td>
</tr>
<tr>
<td>Germany West</td>
<td>0.0282</td>
<td>0.3854</td>
<td>10.9086</td>
<td>9.4788</td>
<td>21479</td>
<td>4.0923</td>
<td>4438</td>
<td>12.9000</td>
<td>40.2100</td>
</tr>
<tr>
<td>Germany East</td>
<td>0.0199</td>
<td>0.2312</td>
<td>10.9497</td>
<td>9.1904</td>
<td>21479</td>
<td>4.0923</td>
<td>4438</td>
<td>12.9000</td>
<td>40.2100</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.0547</td>
<td>0.3930</td>
<td>12.6851</td>
<td>9.9000</td>
<td>20812</td>
<td>2.6941</td>
<td>7166</td>
<td>15.9000</td>
<td>49.7960</td>
</tr>
<tr>
<td>Italy</td>
<td>0.0355</td>
<td>0.2315</td>
<td>11.0284</td>
<td>9.6637</td>
<td>20513</td>
<td>0.6374</td>
<td>3475</td>
<td>8.8000</td>
<td>42.1830</td>
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<tr>
<td>Sweden</td>
<td>0.0671</td>
<td>0.2468</td>
<td>11.4111</td>
<td>9.5651</td>
<td>20031</td>
<td>1.3362</td>
<td>5879</td>
<td>11.0000</td>
<td>53.0110</td>
</tr>
<tr>
<td>Great Britain</td>
<td>0.0413</td>
<td>0.1433</td>
<td>11.3209</td>
<td>9.8841</td>
<td>19465</td>
<td>2.2523</td>
<td>2163</td>
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<td>24.5040</td>
</tr>
<tr>
<td>New Zealand</td>
<td>0.1159</td>
<td>0.2513</td>
<td>14.3098</td>
<td>9.5682</td>
<td>17706</td>
<td>2705</td>
<td>5.8000</td>
<td>24.9920</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>0.1910</td>
<td>0.2260</td>
<td>12.2490</td>
<td>9.1528</td>
<td>17264</td>
<td>0.3950</td>
<td>2370</td>
<td>15.5000</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>0.0844</td>
<td>0.1107</td>
<td>10.1275</td>
<td>9.0672</td>
<td>15163</td>
<td>0.4686</td>
<td>1899</td>
<td>10.0000</td>
<td>36.9000</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.0186</td>
<td>0.2619</td>
<td>10.6766</td>
<td>8.7888</td>
<td>12978</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.0244</td>
<td>0.2778</td>
<td>12.9111</td>
<td>8.6610</td>
<td>12426</td>
<td></td>
<td>4.9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>0.0148</td>
<td>0.0992</td>
<td>10.4914</td>
<td>8.1421</td>
<td>9315</td>
<td></td>
<td></td>
<td></td>
<td>16.9000</td>
</tr>
<tr>
<td>Slovak Republic</td>
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<td>0.2566</td>
<td>11.8364</td>
<td>5.9451</td>
<td>8487</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**gdp** is the per capita GDP in 1995, PPP (current international dollars). The relative skill composition (**RSC**) is the ratio of skilled to unskilled labor in the native relative to the immigrant populations. For both natives and immigrants, the ratio of skilled to unskilled labor is measured as the ratio of the number of individuals with levels 2 and 3 of education to the number of individuals with level 1 of education. The RSC uses data on the stock of immigrants and natives in 1995. **benefits** is per capita transfers in 1995. **progressivity** is equal to the difference in average income tax rates applied to single individuals without children who earn, respectively, 167% and 67% of the annual wage earnings of an average production worker (OECD 1998). **labor tax rate** is the 1990 labor tax rate. See end of Table 1 for definitions of pro-immig dummy, pro-trade dummy, education and log of real income.
Table 3. Welfare-state and labor-market determinants using an *indirect* measure of the relative skill composition (ISSP data set)

<table>
<thead>
<tr>
<th>Probit with country dummy variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable</strong></td>
<td>age</td>
<td>male</td>
<td>log of real income</td>
<td>log of real income*gdp</td>
<td>education (years of education)</td>
<td>education*gdp</td>
<td>pro-immig crime</td>
</tr>
<tr>
<td>age</td>
<td>-0.0009</td>
<td>-0.0004</td>
<td>-0.0003</td>
<td>-0.0003</td>
<td>-0.0004</td>
<td>-0.0004</td>
<td>-0.0003</td>
</tr>
<tr>
<td></td>
<td>0.0002**</td>
<td>0.0002*</td>
<td>0.0001*</td>
<td>0.0002+</td>
<td>0.0002**</td>
<td>0.0002**</td>
<td>0.0001*</td>
</tr>
<tr>
<td>male</td>
<td>0.0056</td>
<td>0.0083</td>
<td>0.01</td>
<td>0.0063</td>
<td>0.0087</td>
<td>0.0085</td>
<td>0.0099</td>
</tr>
<tr>
<td>log of real income*gdp</td>
<td>0.0002**</td>
<td>0.0002*</td>
<td>0.0001*</td>
<td>0.0002+</td>
<td>0.0002**</td>
<td>0.0002**</td>
<td>0.0001*</td>
</tr>
<tr>
<td>education (years of education)</td>
<td>0.0082</td>
<td>0.0048</td>
<td>0.0072</td>
<td>-0.1211</td>
<td>-0.138</td>
<td>-0.1087</td>
<td>-0.1087</td>
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<tr>
<td>education*gdp</td>
<td>0.0013**</td>
<td>0.0008**</td>
<td>0.0014**</td>
<td>0.0470**</td>
<td>0.0472**</td>
<td>0.0371**</td>
<td>0.0371**</td>
</tr>
<tr>
<td>pro-immig crime</td>
<td>0.0578</td>
<td>0.0081**</td>
<td>0.0563</td>
<td>0.0060**</td>
<td>0.044</td>
<td>0.0026+</td>
<td>0.0026+</td>
</tr>
<tr>
<td>pro-immig culture</td>
<td>0.0563</td>
<td>0.0060**</td>
<td>0.044</td>
<td>0.0026+</td>
<td>0.0053</td>
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<td>-0.0162</td>
</tr>
<tr>
<td>upper social class</td>
<td>0.0044</td>
<td>0.0026+</td>
<td>0.0053</td>
<td>-0.0162</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
</tr>
<tr>
<td>trade union member</td>
<td>0.0009</td>
<td>0.0053</td>
<td>-0.0162</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
</tr>
<tr>
<td>political affiliation with the right</td>
<td>-0.0162</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
<td>0.0052**</td>
</tr>
</tbody>
</table>

The sample excludes all individuals who are not citizens of the country where they are interviewed. The table contains the estimated marginal effect on the probability of being pro-immigration of an increase in the value of the relevant regressor, holding all other regressors at their mean value. Robust standard errors, clustered by country, are presented under each marginal effect. + significant at 10%; * significant at 5%; ** significant at 1%. See end of Tables 1 and 2 for definitions of variables. All regressions in this table control for country fixed effects.
<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Probit with country dummy variables</td>
<td></td>
<td>Pro Immig Dummy</td>
<td></td>
<td>ProTrade</td>
<td></td>
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</tr>
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<td>-0.0004</td>
<td>-0.0005</td>
<td>-0.0005</td>
<td>-0.0005</td>
<td>-0.0002</td>
</tr>
<tr>
<td></td>
<td>0.0003*</td>
<td>0.0002*</td>
<td>0.0002*</td>
<td>0.0002*</td>
<td>0.0002**</td>
<td>0.0004</td>
</tr>
<tr>
<td>male</td>
<td>0.0045</td>
<td>0.0079</td>
<td>0.0077</td>
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<td>0.005</td>
<td>0.0054</td>
<td>0.0052</td>
<td>0.0121**</td>
</tr>
<tr>
<td>log of real income</td>
<td>0.0163</td>
<td>0.0139</td>
<td>0.0162</td>
<td>0.0186</td>
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<td>0.039</td>
</tr>
<tr>
<td></td>
<td>0.0074*</td>
<td>0.0071*</td>
<td></td>
<td></td>
<td></td>
<td>0.0141**</td>
</tr>
<tr>
<td>log of real income*relative skill ratio</td>
<td>-0.0184</td>
<td>-0.0162</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0078*</td>
<td>0.0072*</td>
<td></td>
<td></td>
<td></td>
<td>0.0179</td>
</tr>
<tr>
<td>education (years of education)</td>
<td>-0.0029</td>
<td>-0.0038</td>
<td>-0.0566</td>
<td>-0.0411</td>
<td>-0.0078</td>
<td>0.127</td>
</tr>
<tr>
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<td>0.0009**</td>
<td>0.0008**</td>
<td>0.0186**</td>
<td>0.0090**</td>
<td>0.0047+</td>
<td>0.0045**</td>
</tr>
<tr>
<td>education*relative skill ratio</td>
<td>0.0127</td>
<td>0.0099</td>
<td>0.0572</td>
<td>0.0483</td>
<td>0.0263</td>
<td>0.0116</td>
</tr>
<tr>
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<td>0.0010**</td>
<td>0.0012**</td>
<td>0.0347+</td>
<td>0.0089**</td>
<td>0.0055**</td>
<td>0.0031**</td>
</tr>
<tr>
<td>education*benefits</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td>0.0023**</td>
</tr>
<tr>
<td>education<em>relative skill ratio</em>benefits</td>
<td>-0.006</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0041</td>
</tr>
<tr>
<td>education*labor tax rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>education<em>relative skill ratio</em>labor tax rate</td>
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<td></td>
<td></td>
<td></td>
<td>0.0002**</td>
</tr>
<tr>
<td>education*progressivity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0005</td>
</tr>
<tr>
<td>education<em>relative skill ratio</em>progressivity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0004**</td>
</tr>
<tr>
<td>pro-immig crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0552</td>
</tr>
<tr>
<td>pro-immig culture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0092**</td>
</tr>
</tbody>
</table>

The sample excludes all individuals who are not citizens of the country where they are interviewed. The table contains the estimated marginal effect on the probability of being pro-immigration of an increase in the value of the relevant regressor, holding all other regressors at their mean value. Robust standard errors, clustered by country, are presented under each marginal effect. + significant at 10%; * significant at 5%; ** significant at 1%. All regressions in this table control for country fixed effects. The relative skill ratio is the log of one plus the relative skill composition. See end of Tables 1, 2 for definitions of variables.
Table 5. Summary statistics of individual-level variables (ESS data set)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>pro-immig dummy</td>
<td>29248</td>
<td>0.6451</td>
<td>0.4785</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>year of birth</td>
<td>29248</td>
<td>1955</td>
<td>18</td>
<td>1893</td>
<td>1988</td>
</tr>
<tr>
<td>male</td>
<td>29248</td>
<td>0.4838</td>
<td>0.4997</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>real income</td>
<td>29248</td>
<td>2.8104</td>
<td>1.7746</td>
<td>0.111</td>
<td>12.000</td>
</tr>
<tr>
<td>education (highest level attained)</td>
<td>29248</td>
<td>2.9800</td>
<td>1.4845</td>
<td>0.000</td>
<td>6.000</td>
</tr>
</tbody>
</table>

Summary statistics in this table are based on the same observations as in regression (3), Table 6.

Table 5 (cont.). Summary statistics of individual-level variables by country (ESS) and of country-level variables

<table>
<thead>
<tr>
<th>country</th>
<th>pro-immig dummy</th>
<th>education</th>
<th>real income</th>
<th>per capita gdp</th>
<th>relative skill composition</th>
<th>benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxembourg</td>
<td>0.5429</td>
<td>2.6379</td>
<td>3.4873</td>
<td>59977</td>
<td>2.0547</td>
<td>8310.9470</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.7775</td>
<td>2.7174</td>
<td>1.8867</td>
<td>35653</td>
<td>0.4043</td>
<td>3587.3380</td>
</tr>
<tr>
<td>Norway</td>
<td>0.7119</td>
<td>3.4791</td>
<td>3.7711</td>
<td>34750</td>
<td>1.4222</td>
<td>6951.4750</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.7981</td>
<td>3.2322</td>
<td>4.5611</td>
<td>31020</td>
<td>5.1932</td>
<td>7505.3120</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.6310</td>
<td>2.9866</td>
<td>3.4162</td>
<td>29550</td>
<td>1.6595</td>
<td>5543.4070</td>
</tr>
<tr>
<td>Austria</td>
<td>0.4276</td>
<td>3.2512</td>
<td>3.0337</td>
<td>29015</td>
<td>3.1415</td>
<td>6189.7400</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.7482</td>
<td>3.1962</td>
<td>3.5789</td>
<td>28957</td>
<td>1.1638</td>
<td>7317.9740</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.6764</td>
<td>3.0236</td>
<td>2.8084</td>
<td>27459</td>
<td>1.8042</td>
<td>5709.0030</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.6345</td>
<td>2.9809</td>
<td>3.7550</td>
<td>27176</td>
<td>2.0380</td>
<td>5042.1450</td>
</tr>
<tr>
<td>France</td>
<td>0.6331</td>
<td>2.9979</td>
<td>2.3630</td>
<td>26613</td>
<td>3.5085</td>
<td>6309.9100</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.8866</td>
<td>2.9907</td>
<td>3.2947</td>
<td>26468</td>
<td>1.4150</td>
<td>6587.4060</td>
</tr>
<tr>
<td>Finland</td>
<td>0.5808</td>
<td>2.8742</td>
<td>3.2209</td>
<td>26018</td>
<td>1.2446</td>
<td>5775.8980</td>
</tr>
<tr>
<td>Italy</td>
<td>0.7053</td>
<td>2.3389</td>
<td>2.2621</td>
<td>25554</td>
<td>.</td>
<td>5269.5770</td>
</tr>
<tr>
<td>Germany</td>
<td>0.7188</td>
<td>3.3340</td>
<td>3.2395</td>
<td>25546</td>
<td>5.6564</td>
<td>6065.6310</td>
</tr>
<tr>
<td>Spain</td>
<td>0.5433</td>
<td>2.1593</td>
<td>2.1309</td>
<td>22445</td>
<td>0.5475</td>
<td>3273.5390</td>
</tr>
<tr>
<td>Israel</td>
<td>0.7989</td>
<td>3.5000</td>
<td>1.9656</td>
<td>22003</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Greece</td>
<td>0.2754</td>
<td>2.2421</td>
<td>2.1162</td>
<td>18834</td>
<td>0.8266</td>
<td>3082.1880</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.4377</td>
<td>1.7066</td>
<td>2.0345</td>
<td>18398</td>
<td>0.3275</td>
<td>2745.0350</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.6581</td>
<td>3.3278</td>
<td>1.5314</td>
<td>18018</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.5474</td>
<td>3.0845</td>
<td>1.8317</td>
<td>16556</td>
<td>2.6415</td>
<td>2444.1780</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.4942</td>
<td>2.2740</td>
<td>1.0678</td>
<td>14159</td>
<td>0.6698</td>
<td>.</td>
</tr>
</tbody>
</table>

pro-immig dummy equals one if the individual would like many or some immigrants (of the same race and ethnic group as the majority), zero otherwise (that is, if the individual would like a few immigrants or none). real income is household income (expressed on a scale from 1 to 12) divided by the number of household members. education (highest level attained) goes from 0 to 6 (not completed primary education; primary or first stage of basic; lower secondary or second stage of basic; upper secondary; post secondary, non-tertiary; first stage of tertiary; second stage of tertiary).

per capita gdp in 2002 (PPP, constant 2000 international $) is from the World Development Indicators (World Bank). The relative skill composition (RSC) is the ratio of skilled to unskilled labor in the native relative to the immigrant populations. For both natives and immigrants, the ratio of skilled to unskilled labor is measured as the ratio of the number of individuals with upper secondary or tertiary education to the number of individuals with lower secondary education. The RSC uses data on the stock of immigrants and natives in 2002-2003 (OECD 2005). benefits is per capita social expenditure in 1998 (at constant 1995 prices and PPP-adjusted).
Table 6. Welfare-state and labor-market determinants (ESS data set)

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Pro Immig Dummy-ESS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
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<tr>
<td>year of birth</td>
<td>0.0016</td>
</tr>
<tr>
<td></td>
<td>0.0005**</td>
</tr>
<tr>
<td>male</td>
<td>0.0202</td>
</tr>
<tr>
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<td>0.0111+</td>
</tr>
<tr>
<td>real income</td>
<td>0.526</td>
</tr>
<tr>
<td></td>
<td>0.2420*</td>
</tr>
<tr>
<td>real income*gdp</td>
<td>-0.0496</td>
</tr>
<tr>
<td>real income*relative skill ratio</td>
<td>0.0237*</td>
</tr>
<tr>
<td>real income<em>relative skill ratio</em>benefits</td>
<td>-0.002</td>
</tr>
<tr>
<td>education (highest level attained)</td>
<td>-0.5047</td>
</tr>
<tr>
<td></td>
<td>0.3423</td>
</tr>
<tr>
<td>education*gdp</td>
<td>0.0561</td>
</tr>
<tr>
<td>education*relative skill ratio</td>
<td>0.0336+</td>
</tr>
<tr>
<td>education<em>relative skill ratio</em>benefits</td>
<td>0.0284</td>
</tr>
<tr>
<td>education*benefits</td>
<td>0.0100**</td>
</tr>
<tr>
<td>education<em>relative skill ratio</em>benefits</td>
<td>0.0479*</td>
</tr>
<tr>
<td>Observations</td>
<td>36413</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.07</td>
</tr>
</tbody>
</table>

The sample excludes all individuals who are not citizens of the country where they are interviewed. The table contains the estimated marginal effect on the probability of being pro-immigration of an increase in the value of the relevant regressor, holding all other regressors at their mean value. Robust standard errors, clustered by country, are presented under each marginal effect. As recommended in the ESS website, our estimation uses both design and population size weights. + significant at 10%; * significant at 5%; ** significant at 1%. All regressions in this table control for country fixed effects.

- real income is household income (expressed on a scale from 1 to 12) divided by the number of household members. The relative skill ratio is the log of one plus the relative skill composition. The relative skill composition (RSC) is the ratio of skilled to unskilled labor in the native relative to the immigrant populations. For both natives and immigrants, the ratio of skilled to unskilled labor is measured as the ratio of the number of individuals with upper secondary or tertiary education to the number of individuals with lower secondary education. The RSC uses data on the stock of immigrants and natives in 2002-2003 (OECD 2005).
- benefits is per capita social expenditure in 1998 (at constant 1995 prices and PPP-adjusted).
- per capita gdp in 2002 (PPP, constant 2000 international $) is from the World Development Indicators (World Bank).
The regression line is estimated using robust standard errors. The coefficient estimate is $1.74 \times 10^{-6}$, significant at the 10% level (observations for the Czech Republic and Luxembourg are dropped as they are outliers). We also estimate the line using WLS (with weights equal to the inverse of the squared standard errors of the country-specific marginal effects). The sign of the correlations does not change, but the level of significance drops.

The regression line is estimated using robust standard errors. The coefficient estimate is $-2.21 \times 10^{-6}$, significant at the 5% level (the observation for Luxembourg is dropped as it is an outlier). We also estimate the line using WLS (with weights equal to the inverse of the squared standard errors of the country-specific marginal effects). The sign of the correlations does not change, but the level of significance increases.