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 has a larger impact on individuals at the top of the income distribution, while under the second one it is low-income individuals who are most affected through this channel. Individual attitudes are 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 exploit international differences in 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, although now officially welcoming Latino and immigrant members[2], 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 2004 proposal of the Bush administration 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 competition[3], 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, the same young immigrants have been portrayed by some as the answer to the deteriorating conditions of the welfare state in destination countries

[1]Cited from US Fed News, August 8, 2005.

[2]See Watts (2002).

[3]For instance, the threatening "Polish plumber" has been often mentioned as heavily conditioning the French vote against the new European constitution.

[4]See for instance Rodrik (1997).

[5]See Borjas (1999a), and Boeri, Hanson, and McCormick (2002).

with aging populations.

Regardless of 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 effects through various channels - will be influenced not only 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.[6] We focus on two factors of production, skilled and unskilled labor, and assume that migrants can be either complements or substitutes for native workers. We 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[7] 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. However, they are more positively affected than low-income individuals by skilled immigration. In general, under the first scenario, immigration

[6] See Borjas (1999b), Scheve and Slaughter (2001), Mayda (2005), O'Rourke and Sinnott (2004).

[7] As it 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 endowed only with labor–related assets.

has a larger impact on individuals at the top of the income distribution. Under the second welfare–state scenario, we assume instead that the adjustment induced by immigration occurs through changes in per capita welfare 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. In other words, unskilled immigration negatively affects low-income households to a greater extent than their high-income counterparts. The intuition for this result is that, in this case, low-income natives will be competing with immigrants for access to public services. If immigration is instead skilled - and is thus likely to relax the government's budget constraint - it will lead to an improvement in the position of low-income workers through the welfare state channel that is greater than for high-income individuals. In general, under the second scenario, it is low-income individuals who are most affected by immigration. 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 immigration*), and positively correlated otherwise (*skilled immigration*). Under the second one, we expect the opposite type of cross-country pattern.[8]

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 that is consistent with the first public-finance scenario (according to which it is high-income individuals who are most affected through the welfare-state channel) 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. 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.

[8] In order to simplify the analysis, we only consider two extreme cases in terms of the adjustment of the welfare state. However, it is possible to extend this framework and consider intermediate cases, where both tax rates and per capita benefits adjust. In that case what will matter is whether the adjustment takes place relatively more along one dimension, as opposed to the other.

A growing literature in economics focuses on individual preferences[9], 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 attitudes[10] 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 and at the country levels. 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 story.[11] 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 well be that skilled individuals are less opposed to 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 public-finance determinants.

The outline of the paper is as follows. Section 2 surveys the literature related to this

[9]See, for example, Luttmer (2001), Alesina and La Ferrara (2005), Blanchflower and Oswald (2004), Caplan (2002) and the literature surveyed below.

[10]See Dustmann and Preston (2004a), Dustmann and Preston (2004b), Hanson (2005), Hanson, Scheve, and Slaughter (2005a) and Hanson, Scheve, and Slaughter (2005b).

[11]See Scheve and Slaughter (2001), Kessler (2001), Mayda (2005) and O'Rourke and Sinnott (2004). See Espenshade and Hempstead (1996) and Hainmueller and Hiscox (2005) for an alternative interpretation of the empirical evidence.

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 (1999b), 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 participation rates can be explained by observable characteristics, this is evidence of the growing pressure put on state and federal budgets by "New Americans".[12] 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.[13]

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,[14] we are going to exploit some features of Razin, Sadka and Swagell's (2002) model

[12] For an analysis of the long run effects of immigration in the US, see also Smith and Edmonston (1997).

[13] 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. See also Haupt and Peters (2003) and Casarico and Devillanova (2003).

[14] In particular, we assume that individuals take as given one of the two scenarios of welfare-state adjust-

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 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 (2005a) 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. The authors conclude that welfare-state considerations are therefore important in explaining differences in individual attitudes towards alternative globalization strategies. The role of the welfare state

ment, that is respondents do not perceive the adjustment *type* as endogenous to immigration. Therefore, ours is not a political-economy model, and it is best suited for a short-run analysis. See also Ortega (2005) for a long-run political-economy model of migration and 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.[15]

From a methodological point of view, Hanson, Scheve, and Slaughter (2005a) 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 (2005a) differs from our work in that it does not consider the two public-finance scenarios we instead analyze, implicitly assuming that the first one holds. Our analysis of the two scenarios is indeed motivated by their account of the different experience of California and Texas, two states that during the eighties and nineties were the destination of large inflows of mostly unskilled immigrants. Both states faced serious fiscal difficulties as a result of the 1990-1991 recession but their two Republican governors 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. We think that the difference between the policies carried out in California and Texas can be interpreted in terms of the two scenarios we investigate in this paper. 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, did not need to adopt an anti-immigration stance - by reducing immigrants' access to public services - as immigration was mostly hurting low-income voters through this channel. Finally, from an empirical point of view, the main innovation of our analysis relative to theirs 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

[15]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.

welfare state.[16]

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. Using both a direct and an indirect measure, 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.

3 Theoretical Framework

To analyze the effects of immigration on individual attitudes we consider a simple two–factors HO model with and without diversification in production, and we augment it by incorporating a redistributive welfare system. If production is diversified, two goods are produced. Alternatively, if the economy is not diversified, only one good is produced. We can think of the two production factors as unskilled (L_U) and skilled labor (L_S). They are combined using a constant returns to scale technology $y_i = f_i(L_U, L_S)$ to produce output $i \in 1, 2$. We will assume good 1 to be the numéraire, so that its price will be normalized to 1, while p will be the price of good 2. 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 an amount $e^n \in \{e^L, e^H\}$ of the numéraire good, where $e^H > e^L$. Immigrants are only endowed with either one unit of skilled or unskilled labor.[17]

[16] Hanson, Scheve, and Slaughter (2005b) use across-states variation in the skill composition of immigrants to the U.S.. This paper estimates the impact of the latter variable on skill cleavages in U.S. immigration opinions, but not separately for the labor-market vs. welfare-state channel.

[17] For a similar assumption, see Razin and Sadka (1999).

The total endowment of the numéraire good in the economy is thus given by

$$\sum_n e^n = E$$

while the total supply of each skill is given by

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

where ϕ_j and ψ_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:

$$\frac{\hat{L}_j}{d\pi} = \frac{\psi_j}{\phi_j} = \beta_j \tag{2}$$

where $\hat{L}_j = \frac{dL_j}{L_j}$ etc. Let w_j be the (before tax) prevailing wage rate, with $w_S > w_U$. Let $c_i(w_U, w_S)$ 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,

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

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

Secondly, perfect competition implies that firms earn non-positive profits in equilibrium, i.e.

$$1 \leq c_1(w_U, w_S) \tag{5}$$

$$p \leq c_2(w_U, w_S) \tag{6}$$

Assume that the government intends to levy an egalitarian income tax. The literature has suggested (Mirrlees 1971) that the best egalitarian income tax can be approximated by a linear tax. As a result, we consider an income tax with a flat rate τ, accompanied by a lump sum rebate b. The cash grant may be thought of as capturing the provision of free public services, and for simplicity we are assuming that migrants are entitled to all public programs available in the destination country. Thus, by design, our tax system is redistributive. The government budget constraint can be written as

$$\tau(w_U L_U + w_S L_S + E) = b(N + M) \tag{7}$$

Immigration affects the well being of the current residents through three possible channels: the effect on the prevailing tax rates, the effect on the per capita transfers[18] and the labor market (wage) effect. The net income of a native n of skill level j is given by

$$I_j^n = (1 - \tau)G_j^n + b, \tag{8}$$

where $G_j^n = w_j + e^n$. The effect of immigration on his net income can then be measured by

$$\frac{\hat{I}_j^n}{d\pi} = \frac{(1-\tau)w_j \frac{\hat{w}_j}{d\pi}}{I_j^n} - \frac{\tau G_j^n \frac{\hat{\tau}}{d\pi}}{I_j^n} + \frac{b\frac{\hat{b}}{d\pi}}{I_j^n} \tag{9}$$

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 effect of immigration on the utility of current residents under two different hypotheses. First, we will assume that the economy is initially diversified and continues to be so even after immigration has occurred. Under standard assumptions[19] this implies that the prevailing returns on skilled and unskilled labor will not be affected and we label this the 'no labor market effect' case. Next, we will consider the effect of immigration in an economy that to begin with is not diversified, so that factor returns will be affected by changes in endowments.

[18]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. In practice, immigration might also affect the welfare state through its impact on the accumulation of public debt. While explicitly modeling 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.

[19]In particular, if no factor intensity reversal occurs.

3.1 No labor market effect

To gain some intuition on the importance of the type of welfare state response to immigration in shaping individual attitudes, we consider a simplified setting in which one of two alternative scenarios are possible. Under 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 (7), after a few manipulations we obtain

$$\hat{\tau} + \sum_j \eta_j \hat{L}_j = d\pi \tag{10}$$

where $\eta_j = \frac{w_j L_j}{\sum_i w_i L_i + E}$ for $j = U, S$ is the share of labor of skill level j in total domestic income, and $\eta_E = 1 - \eta_U - \eta_S$ is the share of the initial endowment in total domestic income. The effect of immigration on the tax rate is given by

$$\frac{\hat{\tau}}{d\pi} = \frac{(\phi_U - \eta_U)(\beta_U - 1)}{(1 - \phi_U)} + \frac{\eta_E(1 - \psi_U)}{1 - \phi_U}, \tag{11}$$

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 (11) and to begin with, assume that the share of initial endowment in national income is nil, i.e. that $\eta_E = 0$. If the native and migrant skill compositions are identical, i.e. if $\beta_U = 1$, an inflow of immigrants will not alter the current 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 the initial endowment in national income is instead positive, i.e. $\eta_E > 0$, 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 other assets besides labor, 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.[20] The following proposition then holds

[20]A similar 'fiscal leakage' effect has been modeled by Razin, Sadka, and Swagel (2002). Notice also

Proposition 1 *Holding the demogrant unchanged, an inflow of unskilled immigrants is less 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* $\eta_E < \eta_E^*$, *where* $\eta_E^* = \frac{(1-\beta_U)(\phi_U - \eta_U)}{(1-\psi_U)}$.

Proof. Notice that absent labor market effects and holding the demogrant constant equation (9) implies

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

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

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

If immigration is unskilled, which implies $\frac{\hat{\tau}}{d\pi} > 0$, then $\frac{\partial\left(\frac{\hat{I}}{d\pi}\right)}{\partial G} \leq 0$. On the other hand, if immigration is skilled, from equation (11) we know that $\frac{\hat{\tau}}{d\pi} < 0$ as long as $\eta_E < \frac{(1-\beta_U)(\phi_U - \eta_U)}{(1-\psi_U)}$ and, as a result, $\frac{\partial\left(\frac{\hat{I}}{d\pi}\right)}{\partial G} \geq 0$. □

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:

$$\frac{d\left(\frac{\partial\left(\frac{\hat{I}}{d\pi}\right)}{\partial G}\right)}{d\tau} = -\frac{\hat{\tau}}{d\pi}\frac{2bG}{[b + G(1-\tau)]^3}, \tag{12}$$

which is negative as long as immigration is unskilled since $\frac{\hat{\tau}}{d\pi} \geq 0$. 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, as illustrated in Figure 1.

that, the more unskilled immigrants are, the higher the tax increase required to maintain the demogrant unchanged. To see this, notice that $\frac{\partial\left(\frac{\hat{\tau}}{d\pi}\right)}{\partial\psi_U} = \frac{\phi_U(1-\eta_E)-\eta_U}{\phi_U(1-\phi_U)} > 0$ since $\phi_U > \frac{\eta_U}{\eta_U+\eta_S}$.

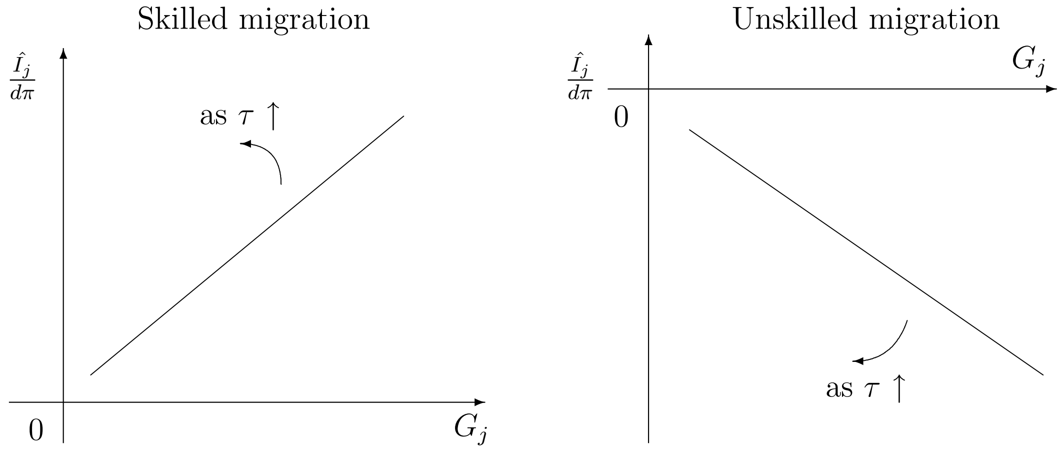

Figure 1: First Welfare-State Scenario

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 initial wealth endowment are the top income earners, while the low skilled with a low initial wealth endowment will lie at the bottom of the income distribution. Agents with limited initial endowment 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 (7), totally differentiating we obtain

$$\sum_j \eta_j \hat{L}_j = \hat{b} + d\pi \tag{13}$$

and rewriting it we have

$$\frac{\hat{b}}{d\pi} = \frac{(\phi_U - \eta_U)(1-\beta_U)}{1-\phi_U} - \frac{\eta_E(1-\psi_U)}{(1-\phi_U)} \tag{14}$$

If the share of the initial endowment in national income 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,[21] while skilled immigration ($\beta_U < 1$) will lead to an increase. If the share of the initial endowment 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 initial endowments 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 the 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* $\eta_E < \eta_E^*$, *where* $\eta_E^* = \frac{(1-\beta_U)(\phi_U-\eta_U)}{(1-\psi_U)}$.

Proof. Without labor market effects and holding the tax rates unchanged, equation (9) becomes

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

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

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

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

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 – that is, the increase in the demogrant will have a more positive impact on low-income individuals – if immigration is instead skilled, and

[21] Furthermore, as is intuitive, the more unskilled immigrants are, the larger will be the reduction in the demogrant. To see this, notice that $\frac{\partial\left(\frac{\hat{b}}{d\pi}\right)}{\partial\psi_U} = \frac{\eta_U-\phi_U(\eta_S+\eta_U)}{\phi_U(1-\phi_U)} < 0$ since $\frac{\eta_U}{\phi_U} < \frac{\eta_S}{\phi_S}$.

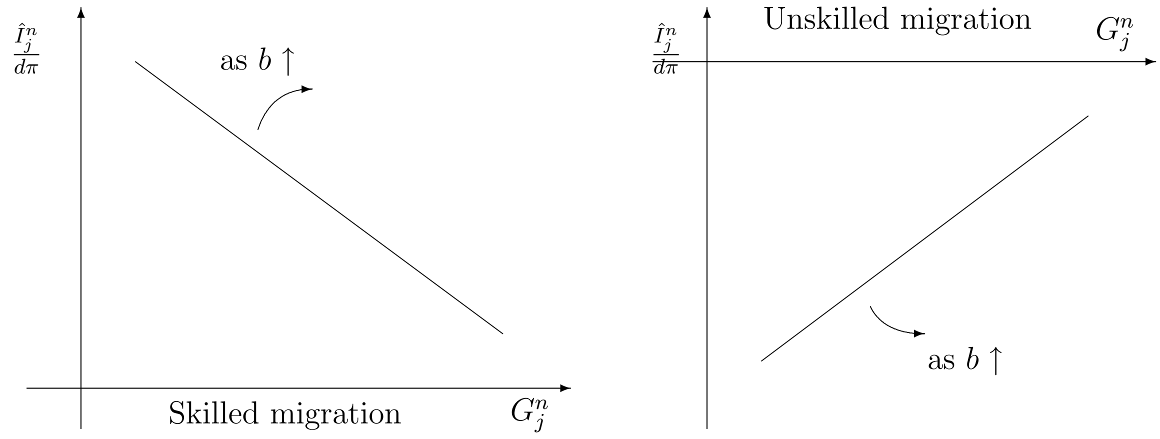

Figure 2: Second Welfare State Scenario

the share of the initial endowment 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:

$$\frac{d\left(\frac{\partial\left(\frac{\hat{I}}{d\pi}\right)}{\partial G}\right)}{db} = -\frac{\hat{b}}{d\pi}\frac{[G(1-\tau)-b]}{[b+G(1-\tau)]^3}, \tag{15}$$

which is positive if migration is unskilled as long as $G(1-\tau) > b$. These effects are illustrated in Figure 2.

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* $\eta_E < \eta_E^*$*, immigration will be welcomed by each citizen.*

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

$$\frac{\hat{I}_j^n}{d\pi} = -\frac{\tau G_j^n \frac{\hat{\tau}}{d\pi}}{b+G_j^n(1-\tau)} + \frac{b\frac{\hat{b}}{d\pi}}{b+G_j^n(1-\tau)} \tag{16}$$

while the government budget constrain implies that $b = \frac{\tau}{N}(w_U L_U + w_S L_S + E)$ and

$$\frac{\hat{b}}{d\pi} = \frac{\hat{\tau}}{d\pi} + \sum_j \eta_j \frac{\hat{L}_j}{d\pi} - 1 \tag{17}$$

Substituting equation (17) in equation (16) and differentiating we obtain

$$\frac{d\left(\frac{\hat{I}_j^n}{d\pi}\right)}{d\tau} = \frac{G_j^n}{\tau[(1-\tau)G_j^n + b]^2}\left(b\frac{\hat{b}}{d\pi} - \tau G\frac{\hat{\tau}}{d\pi}\right) \tag{18}$$

Consider now the situation in which $\frac{\hat{\tau}}{d\pi} = 0$ (second welfare-state scenario). From equation (14) we know that if immigration is unskilled, $\frac{\hat{b}}{d\pi} \leq 0$ and, as a result, all natives would prefer to be in a less redistributive fiscal system. Similarly, as long as $\eta_E < \eta_E^*$, 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. $\frac{\hat{b}}{d\pi} = 0$), equation (11) implies that as long as immigration is unskilled, $\frac{\hat{\tau}}{d\pi} \geq 0$ and, as a result, every individual will be more negatively affected by unskilled immigration the more redistributive the fiscal system is. $\square$

3.2 With labor market effects

We turn now to the second setting, in which the economy is initially specialized in the production of only good one. Factor returns are then determined by the following set of equations

$$1 = c_1(w_U, w_S) \tag{19}$$

$$L_U = y_1 \frac{\partial c_1(w_U, w_S)}{\partial w_U} \tag{20}$$

$$L_S = y_1 \frac{\partial c_1(w_U, w_S)}{\partial w_S} \tag{21}$$

Totally differentiating the equilibrium conditions, it is easy to show that the effect of immigration on wages is given by

$$\frac{\hat{w}_U}{d\pi} = \frac{\beta_U - \beta_S}{\epsilon_{UU} - (\epsilon_{SU} + \frac{\eta_U}{\eta_S}\epsilon_{US}) + \frac{\eta_U}{\eta_S}\epsilon_{SS}} \tag{22}$$

$$\frac{\hat{w}_S}{d\pi} = -\frac{\eta_U}{\eta_S}\frac{\beta_U - \beta_S}{\epsilon_{UU} - (\epsilon_{SU} + \frac{\eta_U}{\eta_S}\epsilon_{US}) + \frac{\eta_U}{\eta_S}\epsilon_{SS}} \tag{23}$$

where $\epsilon_{ij} = \frac{\partial L_i}{\partial w_j}\frac{w_j}{L_i}$. From these 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 22 is negative[22], 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

$$\hat{\tau} + \sum_j \eta_j \hat{w}_j + \sum_j \eta_j \hat{L}_j = d\pi \tag{24}$$

Notice that in this case the tax base will not only be affected by compositional changes, but also by efficiency gains due to factor price changes. Rearranging, the impact on the tax rates of skilled and unskilled immigration can be rewritten as

$$\frac{\hat{\tau}}{d\pi} = \frac{(\phi_U - \eta_U)(\beta_U - 1)}{(1 - \phi_U)} + \frac{\eta_E(1 - \psi_U)}{1 - \phi_U} - \sum_j \eta_j \frac{\hat{w}_j}{d\pi} \tag{25}$$

On the other hand, holding the tax rates constant and allowing the demogrant to adjust (second welfare-state scenario), the government budget constraint becomes

$$\sum_j \eta_j \hat{w}_j + \sum_j \eta_j \hat{L}_j = d\pi + \hat{b} \tag{26}$$

[22]See Dustmann and Preston (2004a) for a proof.

Rearranging, the impact of immigration on the demogrant becomes

$$\frac{\hat{b}}{d\pi} = \frac{(\phi_U - \eta_U)(1-\beta_U)}{1-\phi_U} - \frac{\eta_E(1-\psi_U)}{1-\phi_U} + \sum_j \eta_j \frac{\hat{w}_j}{d\pi} \tag{27}$$

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 a marginal inflow of immigrants will leave the total remuneration of the existing labor force unchanged ($\sum_j \eta_j \frac{\hat{w}_j}{d\pi} = 0$) and have no effect on the redistribution carried out by the welfare state. On the other hand, if the inflow of immigrants is non–marginal (i.e. $\Delta\pi$), the total remuneration of existing workers will raise ($\sum_j \eta_j \frac{\hat{w}_j}{\Delta\pi} \geq 0$) – these are the gains from migration pointed out by Berry and Soligo (1969)[23] – and relax the government's budget constraint.

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. In particular, we use survey results from the 1995 National Identity Module of the International Social Survey Programme (ISSP 1995), which covers 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.[24]

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

[23] See also Borjas (1995) for a proof.

[24] In particular, our sample includes countries with per capita GDP (PPP-adjusted) in 1995 above 8,000 international dollars: West Germany, East Germany, 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.

observations for individuals who are not citizens of the country where they are interviewed. The dependent variable in our empirical analysis, *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.[25] Our empirical analysis is based on estimation of probit models (the Tables report coefficient estimates). All specifications have robust standard errors adjusted for clustering on country[26] and include destination countries' fixed effects[27], 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 linear effect of migration policy, of the state of the economy, of the skill composition of natives relative to immigrants, etc.[28]).

Summary statistics for *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 being 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, *pro-immig crime* and *pro-immig culture*, which capture each individual's perception of the security and cul-

[25] 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.).

[26] There is not consensus in the literature regarding whether standard errors should be simply "robust" or also "clustered by country". Therefore, we also run the regressions with standard errors set to be "robust" and found very similar results.

[27] 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 $i = 1, ..., N$) 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.

[28] 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.

tural 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, 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 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 instead the predictions on welfare-state determinants. In particular, the variable *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).[29]

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, 02[30]); 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*

[29]See end of Table 1 for definitions of variables based on the ISSP questions.

[30]ISCED level 02 usually refers to individuals who have completed the ninth grade.

ratio, equals the log of (one plus) the relative skill composition of natives to immigrants.[31] The higher the *relative skill ratio*, the more unskilled immigrants are compared to natives.[32]

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 with no productivity differences across countries. From a theoretical point of view, in this case the relationship between destination countries' 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 destination countries' 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

[31]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*).

[32]The *relative skill ratio* measure is likely to understate the actual skill level of natives to immigrants, in all countries, for two reasons. First, the immigration statistics used are for legal migration. Second, educated immigrants often work in occupations that require lower skills than their education level.

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[33] and was run in a different period of time.[34] 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.[35] 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.[36]

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*

[33]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.

[34]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.

[35]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."

[36]See definition of *income* at the end of Table 5.

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 robust standard errors clustered by country.[37] 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. 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 use both variables to disentangle the two effects. Notice that, while not surprisingly individual income and individual skill are positively and significantly correlated[38], 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 be-

[37]As recommended in the ESS website, our estimation uses both design and population size weights.

[38]Their correlation coefficient in the overall ISSP sample is 0.34 (significant at the 1% level).

tween 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 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[39] of either one of the two welfare-state scenarios, controlling for the impact of labor-market effects.

Our initial set of regressions (columns (1)-(4), Table 3), where we assume a common coefficient on individual-level variables across countries, illustrate basic patterns in the data. Ceteris paribus, older individuals and women are less likely to favor immigrant inflows, even though the latter effect is not always significant. These first results also show that it is problematic to analyze the welfare-state variable on its 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 *income* in regression (1). 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 *income* becomes insignificant.

[39]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.

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 proxy pfor 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:[40]

$$Prob(ProImmigDummy_i = 1 \mid x_i) =$$

$$= \Phi(\beta_1 age_i + \beta_2 male_i + \beta_3 income_i + \beta_4 income_i \cdot pcgdp^c + \beta_5 educ_i + \beta_6 educ_i \cdot pcgdp^c),$$

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

Using the coefficient estimates of regression (7), we calculate marginal effects for *income* and *education* and their interaction variables and find that they are of the same sign (and conventional significance levels) as the corresponding coefficients.[41] For example, while in the United States doubling real income decreases the probability that the respondent is pro-immigration by 0.7 percentage points, in the Slovak Republic it increases it by 0.8. In the United States, one more year of education raises the likelihood by 1.2 percentage points, whereas in the Slovak Republic it decreases it by 0.2 percentage points. While these numbers

[40] This specification, as well as all the other ones in the paper, also includes country dummy variables as regressors.

[41] To calculate the marginal effects of interaction variables, we use the Stata command *predictnl* which gets around the problems pointed out in Ai and Norton (2003).

appear small, they are large in relation to the mean of the dependent variable which is only 7.9 percentage points.

Based on the regressors of the last specification (regression 7, Table 3), we also investigate the relative importance of labor-market and welfare-state determinants of attitudes. We estimate a linear (OLS) regression using the ordered variable *Immig Opinion* as the dependent variable.[42] We start with a specification which only includes the socio-demographic, non-economic and labor-market regressors (*age*, *male*, *educ*, *educ*pcgdp*, *pro-immig crime*, *pro-immig culture* plus country dummy variables) and next add the welfare-state variables (*income*, *income*pcgdp*). The difference between the two R^2 measures is the fraction of the total variance which is explained by public-finance drivers, after accounting for the contribution of socio-demographic, non-economic and labor-market determinants plus country dummy variables. If we repeat the same exercise including first the socio-demographic, non-economic and welfare-state regressors plus country dummy variables, and next the labor-market variables, the R^2 increases by slightly more than before.[43] Therefore, while this paper uncovers the significant role played by public-finance issues across countries, it also finds that labor-market determinants are marginally more important than welfare-state variables, in terms of variance explained.

In Table 4, we check the robustness of the results in Table 3 in a number of ways.[44] First, in place of per capita GDP, we use the direct measure of the relative skill composition of natives to immigrants[45] described in Section 4 (regressions 1 and 2).[46] Although these estimates are based on a smaller sample of countries due to data limitations[47], they are characterized by the same sign patterns as those using per capita GDP and by even higher

[42] *Immig Opinion* ranges from 1="reduced a lot" to 5="increased a lot".

[43] The difference in the two changes of R^2 is half of a percentage point.

[44] For numerous additional robustness checks of the labor-market results, see Mayda (2005). For example, Mayda (2005) shows that the correlation between education and pro-immigration preferences disappears if the sample is restricted to individuals out of the labor force. This says that the effect of skill is indeed working through the labor-market channel. The labor-market results are also confirmed when data on individual occupation is used: respondents in occupations which experience a higher inflow of immigrants are less likely to be pro-immigration (Mayda 2005).

[45] The skill composition of immigrants is shaped by migration policy which, in turn, is a function of attitudes. However, in an individual-level analysis such as this one, reverse causality is not an issue, since each individual has an infinitesimal impact on the aggregate policy outcome.

[46] The skill composition of immigrants is shaped by migration policy which, in turn, is a function of attitudes. However, in an individual-level analysis such as this one, reverse causality is not an issue, since each individual has an infinitesimal impact on the aggregate policy outcome.

[47] Regressions (1) and (2) are based on the following countries: Germany West, Germany East, Great Britain, Austria, Ireland, Netherlands, Sweden, Canada, Spain.

levels of significance (this is true for both the labor-market and welfare-state variables). Based on specification (1), the estimates for *income* (0.137 significant at the 5% level) and *income*relative skill ratio* (-0.1545 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.[48]

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 *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 (2005a) 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 destination country. In particular, in column (3), we estimate the following probit model:[49]

$$Prob(ProImmigDummy_i = 1 \mid x_i) =$$

$$= \Phi(\gamma_1 age_i + \gamma_2 male_i + \gamma_3 educ_i + \gamma_4 educ_i \cdot RSR^c + \gamma_5 educ_i \cdot benefits^c + \gamma_6 educ_i \cdot RSR^c \cdot benefits^c),$$

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 *income*, we

[48]Notice that these results are qualitatively similar when we interact each of the four main terms with the 1995 size of the immigrant inflow, as a fraction of the destination country's population.

[49]This specification, as all the other ones in the paper, also includes country dummy variables as regressors.

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 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 coefficient on 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 that the income-distribution effects of welfare-state variables should be more pronounced the more redistributive the tax system is (see equations (12) and (15)).[50] 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 regressors as in regression (1), Table 4 with *Pro Trade Dummy* as the dependent variable.[51] 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.[52] In any case, even if this were not true - that is,

[50] Of course, our underlying assumption is that a more progressive tax system is more redistributive.

[51] See definition of *Pro Trade Dummy* at the end of Table 1.

[52] As Hanson, Scheve, and Slaughter (2005a) note, "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,

trade liberalization significantly affects the welfare state[53] - 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.

Finally, 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 coefficient on income is positive and negative given, respectively, skilled and unskilled migration) and with labor-market determinants (the coefficient on 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.[54] For each country, we estimated a probit model of *Pro Immig 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.[55] 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 eduction (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. To conclude, given the difference in country coverage of the sample, in the questionnaire date and wording of the immigration question relative to the ISSP survey, the ESS results represent an important robustness check of the conclusions of this paper.

6 Conclusions

In this paper we have developed a simple theoretical framework to study the effect of a redistributive welfare state on individual attitudes towards immigration. We have highlighted

the fiscal costs of trade adjustment assistance programs are limited.

[53]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).

[54]We constructed the same graphs using the ISSP data and they look very similar although, given the smaller number of countries, the correlations are less significant.

[55]We use design weights for each country-specific probit model.

that this effect depends in a fundamental way on how the welfare state adjusts to an inflow of foreign workers. 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 two different surveys of individual attitudes towards migrants, 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 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 Section 2, 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 as perceived by individuals are 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 and fertility rates of natives relative to immigrants can affect individual attitudes towards immigration. This question represents an important direction for future research.

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