Immigrants’ Rights and Benefits.
A public opinion analysis for Spain*

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Abstract

We study the factors that drive the preferences of natives toward granting immigrants access to health and education benefits, as well as voting rights. With a simple political economy model we predict that in a country facing relatively unskilled immigration, unskilled natives oppose granting health and education to immigrants because of the competition for resources this entails. On the other hand, skilled natives oppose granting voting rights because of fear of costly redistributive fiscal policies. The predictions of the model are tested with a dataset of public opinion on immigration for Spain. The data supports these hypotheses in high-immigration regions.

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1 Introduction

A significant number of the contributions in the literature on public opinion and immigration have focused on just one aspect of this relation, namely whether the amount of immigrants in a given country is about right or not. These studies rely on survey questions that ask respondents if they would like to see the levels of immigration increased, decreased, or stabilized.

Although these are valuable contributions, they are limited to analyzing the desired size of immigration. However, the relationship between public opinion and immigration is more complex than just this dimension. One important aspect to explore is the opinion about the rights and benefits that should be granted to immigrants.

Some interesting questions on this regard include: What rights and benefits do natives want to offer to immigrants? What are the determinants of the political rights that the public would like to grant? What are the determinants of the willingness to grant economically costly social benefits, like education or health? Do the stated hypotheses that explain attitudes toward the level of immigration in the literature still explain the granting of benefits and rights?

This paper explores some of these questions by formulating a simple political economy model that is empirically tested using a rich dataset of public opinion on immigration in Spain. By studying the rights and benefits that natives want to grant, we obtain a more complete view on the relationship between immigration and public opinion. Furthermore, this paper provides evidence on an interesting yet understudied case in the literature of immigration and public opinion, namely the Spanish case.\textsuperscript{1}

The Spanish case is interesting on its own, since Spain has shifted from being a country sending migrants to becoming a net receiver of immigrants in the last decades. In fact, beyond the North African migration, Spain has received the largest Latin American migration of any country in Europe. Furthermore, the immigration from Eastern European countries has recently grown at extremely fast rates. This transformation has occurred in a short period of time, and now Spain deals with an immigration rate of almost fifteen percent of its population.

The paper is organized as follows. In section 2 we present a brief overview of the literature related to this study. Section 3 presents the theoretical model and discusses the hypotheses to be tested with the data. In section 4 we discuss the status quo regarding voting rights and welfare benefits to immigrants in Spain. Section 5 presents our data and empirical strategy, and section 6 presents the main results. We include our conclusions in section 7.

\textsuperscript{1}The works of Escandell and Ceobanu (2008), Escandell and Ceobanu (2010), and Martínez i Coma and Duval-Hernández (2009) are exceptions to this claim.
2 Literature

There is now a growing literature studying the characteristics and determinants of public opinion on immigration.

The economic literature has focused mainly in analyzing two channels by which immigration affects public opinion, namely the labor market and the fiscal channel.

Regarding the first channel, the main question is whether labor market competition between immigrants and natives of similar skill generates opposition to immigration, and whether natives whose skill is complementary to those of immigrants tend to support higher immigration flows. Evidence in this direction has been found for the United States in Scheve and Slaughter (2001); Hanson et al. (2007), and for a set of countries by Mayda (2006), to cite a few studies.

The importance of a fiscal channel has also been explored, and evidence shows the relevance of this additional factor in explaining these attitudes (Dustmann and Preston, 2004; Hanson et al., 2007; Facchini and Mayda, 2009). This research has shown that attitudes are affected by whether the welfare state adjusts to immigration by modifying tax rates or the benefits provided (see for instance Facchini and Mayda, 2009).

Another relevant literature is the one modeling the political economy of immigration and welfare policies (see for instance Razin et al., 2002, forthcoming; Mariani, 2007; Ortega, 2005, 2010).

In particular, these studies share the feature of formulating a political process by which natives choose welfare or immigration policies, or both. In doing so, they analyze the implications of granting voting rights to immigrants, and hence of allowing them to alter the political equilibrium in the economy.

The possibility of voting immigrants opens new implications for the attitudes natives might have toward immigration. For instance, in the work of Ortega (2010) unskilled natives might be willing to tolerate higher levels of unskilled immigration, in spite of the higher labor market competition, for the sake of gaining political power for redistributive policies thanks to the vote of immigrants.

Our paper shares several of the main insights presented in those papers, albeit in a more simplified framework, as we focus only in a static model of redistribution. In particular, we compare the welfare of natives when publicly provided goods are granted to immigrants, and we study the equilibrium arising when the latter are allowed to vote over the optimal amount of taxes and of such goods.

This framework allows us to focus on three different scenarios: one where immigrants do not have access to publicly provided goods nor to vote, another one in which they have access to such goods but not to vote, and finally one where they are both fully participant...
in the welfare state and in the public decision making process.\footnote{2}

The implications of our simple political economy model are then tested with data on the willingness Spaniards have on granting, on the one hand access to health and education, and on the other, the right to vote.

Finally, one growing strand of studies closely related to ours appears in the sociology and social psychology literature. In particular, the papers of Scheepers et al. (2002), Raijman et al. (2003), Raijman et al. (2008), and Raijman (2010) study the preferences for granting civil rights to immigrants in European countries, Israel and the U.S. Their approach relies on arguments of competition (between natives and migrants), threat of immigration, and identitary factors. Our approach shares several features of their competition arguments, since our theoretical model accounts for competition in the economic arena (mainly for welfare benefits and in the labor market). Also, in the empirical analysis we account for the impact of identitary factors.

\section{Theoretical Framework}

In this section we present a simple political economy model to shed light on what determines the preferences of natives for granting certain types of rights and benefits to immigrants.

We start with a two-good, two-factor HO model extended with a welfare state similar to the models of Dustmann and Preston (2004) and Facchini and Mayda (2009). The productive factors are unskilled labor $L_u$ and skilled labor $L_s$, which are combined in a Constant Returns to Scale production function $q_i = f_i(L_u, L_s)$ for $i \in 1, 2$. For simplicity, good 1 will be the numeraire good, and $p$ will be the (relative) price of good 2. These prices are fixed, since we are assuming a small open economy. We will consider both the case of diversification (where the economy produces both goods) and the case of specialization in good 1.\footnote{3}

The native population is normalized to 1, and the immigrant population is of size $\pi < 1$. The native population has a share $\phi$ of unskilled workers, while for the immigrant population this share equals $\psi$. For the rest of the paper we will assume that $\phi < \psi$, i.e. immigrants are relatively more unskilled than natives. The implications of the opposite case can be easily derived from our model.

\footnote{2The case where they are allowed to vote but not to access welfare benefits is not observed in practice in any country. Furthermore, as it will be seen below, virtually none of the respondents in the survey analyzed supports such a combination of rights and benefits.}

\footnote{3We assume no joint production between goods.}
Labor supply is inelastic for each group and equal to

\[ L_u = \phi + \pi \psi \]
\[ L_s = 1 - \phi + \pi (1 - \psi) \]

Wages are \( w_s, w_u \) for skilled and unskilled workers respectively, and we assume \( w_s > w_u \).

The equilibrium of the goods and labor markets in this economy has been presented elsewhere in the literature (see for instance Dustmann and Preston, 2004; Facchini and Mayda, 2009) and we include its main features in Appendix C.

The main implication that follows from this equilibrium is that when the economy is diversified, the entrance of immigrants does not lead to wage changes, instead there is a change in the output mix toward sectors intensive in the abundant input. This has been called factor price insensitivity in the trade literature, and is directly related to the Rybczinski’s theorem (Leamer, 1995; Rybczynski, 1955).

However, when the economy specializes in the production of a single good the entrance of immigrants will lead to a change in wages. In particular, if immigrants are relatively more unskilled than natives the wages of unskilled workers will fall, and the ones of skilled workers will rise. In this paper, we will develop the implications of our model under both a scenario of fixed wages and a scenario where wages change.

There is a welfare system in the economy that levies a flat tax rate \( \tau \) and redistributes uniformly a per-capita demogrant \( b \) among the participants in the welfare system. This demogrant will capture the public provision of health services and education.

Denoting by the subscripts \( u, s \) the unskilled and skilled individuals, and by \( n, m \) the natives and migrants respectively, we express the average income of natives and immigrants as

\[ y_n = w_u \phi + (1 - \phi) w_s \]
\[ y_m = w_u \psi + (1 - \psi) w_s \]

hence, under the assumption of a balanced budget, the budget constraint of the welfare system is

\[ \tau (y_n + \pi y_m) = b (1 + \pi). \] (1)

In other words, the per-capita demogrant \( b \) equals the collected tax on the per-capita income of the economy, namely \( y_p = (y_n + \pi y_m)/(1 + \pi) \).

4The Appendix C specifies some conditions on the economy that ensure this condition will be satisfied.
Individuals have utilities

\[ u_u = (1 - \tau)w_u + \ln(b) \quad (2a) \]
\[ u_s = (1 - \tau)w_s \quad (2b) \]

for unskilled and skilled workers respectively.

This means that only unskilled individuals will value the consumption of the publicly provided good. The results of the model are robust to other more general specifications of the utility functions where skilled individuals enjoy from the consumption of this good too.\(^5\) The quasilinear utility function of the unskilled implies that the demogrant is an imperfect substitute of private consumption.\(^6\)

We assume the political equilibrium is found through probabilistic voting.\(^7\) In other words, we assume a political process where candidates run on a platform on the level of taxes and the publicly provided good, but in which there is a second policy dimension that could reflect non-economic attitudes toward immigration. Under simple assumptions about the distribution of voters’ preferences over this second policy dimension it is possible to show that candidates will choose a policy \((b^*, \tau^*)\) that maximizes an utilitarian social welfare function.

In our baseline scenario immigrants have access to the welfare system (by paying taxes and receiving the publicly provided good), but do not have the right to vote. As we will see below this situation describes the current status quo in Spain. In other words, the utilitarian welfare function will reflect the utilities of the natives, but the budget constraint will include the taxes and consumption of both natives and immigrants, i.e.

\[ (b^*, \tau^*) = \arg\max_{(b,\tau)} (1 - \tau)y_n + \phi \ln(b) \quad (3) \]
\[ \text{subject to } \tau(y_n + \pi y_m) = b(1 + \pi) \]

### 3.1 Exogenous Immigration

To illustrate the basic features of the model we start with a scenario where immigration is fixed and exogenously given. In other words immigration does not have an impact on wages. As explained before, this corresponds to the case where our economy diversifies and produces both goods \((q_1, q_2)\).

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5The only important requirement is that the marginal utility from consuming \(b\) is larger for unskilled workers, and that the necessary concavity conditions required for a maximum are met.

6Furthermore, this term satisfies an Inada condition that ensures the positivity of the \(b\) selected.

7The main implications of the model hold under other types of voting procedures, like majority voting.
Under the status quo where immigrants can consume \( b \) (and pay taxes) but do not vote we have that the optimal policy is given by

\[
\tau^* = \frac{\phi}{y_n} \quad b^* = \frac{\phi}{y_p} \tag{4}
\]

### 3.1.1 No Benefits, No Vote

We begin with the case where immigrants are excluded from the welfare system (i.e. they receive nothing from the system, nor contribute anything to it either) and they have no voting rights.

While the welfare function being maximized is the same one as before (i.e. the one of the natives utilities), the budget constraint under this new problem is \( b = \tau y_n \). The optimal solution for this modified problem is

\[
\tau' = \frac{\phi}{y_n} \quad b' = \phi \tag{5}
\]

In other words, the tax rate does not change, but since the per-capita income in the economy \( y_p \) is smaller than the per-capita income of the natives \( y_n \) (under the assumption of \( \phi < \psi \)), the optimal provision of \( b \) falls when immigrants participate in the welfare system.

Since unskilled natives benefit from the consumption of this good their utility also falls when (relatively unskilled) immigrants participate in the fiscal system. This gives us the first proposition of the paper.\(^8\)

**Proposition 1.** *The exclusion of (relatively unskilled) immigrants from the welfare system raises the utility of unskilled natives.*

The reduction in \( b \) when (relatively unskilled) immigrants participate in the welfare system arises from a *fiscal leakage* effect (Razin et al., 2002). In other words, (relatively unskilled) immigrants are net beneficiaries of the system since they contribute less (in taxes) than what they obtain from it in the form of the consumption of good \( b \).

Proposition 1 gives us our first empirical implication of the model, namely that *ceteris paribus* unskilled natives will be more likely to oppose granting health and education to immigrants.

Our model contrasts with the tax vs. benefits-adjustment models of Facchini and Mayda (2009). In their case the fiscal system can adjust to the entrance of unskilled immigrants by either adjusting downward benefits (as in our model) or by raising taxes to keep the

\(^8\)The proofs of all the results in the paper are included in Appendix A.
demogrant fixed. In our model, this last situation does not arise because of the voting model we propose. In particular, since natives are relatively more skilled than immigrants, in a voting context they will not support tax increases that will benefit immigrants more than proportionately.

3.1.2 Welfare Benefits and Voting Rights

We next consider the case where immigrants have full access to the welfare system and have the right to vote. The main implication of granting voting rights to immigrants is that now the objective welfare function incorporates the preferences of immigrants as well. In particular the new objective welfare function is

\[ \tilde{W} = \alpha u_u + (1 - \alpha)u_s = (1 - \tau)y_p + \alpha \ln(b) \]

where

\[ \alpha = \frac{\phi + \pi \psi}{1 + \pi} \]

is the share of unskilled individuals in the economy (including immigrants).

The budget constraint remains (1) as in the status quo.

The optimal policies \((b, \tau)\) for this new problem will be given by

\[ \tilde{\tau} = \frac{\alpha}{y_p} > \tau^* \quad \tilde{b} = \alpha > b^* \] (6)

In other words, incorporating (relatively unskilled) immigrants into the political process leads to more redistributive policies. With these results in hand we can now evaluate who wins and who loses from granting voting rights to immigrants.

**Proposition 2.** Unskilled natives will be better-off by granting voting rights to (relatively unskilled) immigrants, while skilled natives will be worse-off.

This gives us our second empirical implication of the paper. Namely, that unskilled natives will be more likely to support voting rights for immigrants, than skilled natives, who will fear a move toward more redistributive policies.

These results complete the analysis of preferences for welfare benefits and voting rights in the absence of labor market effects. The next section takes labor market effects into consideration.
3.2 Endogenous Immigration and Labor Market Effects

We now consider a scenario when wages change because of immigration. This occurs when the economy specializes in the production of one good and the skill mix of immigrants is different from the one of natives. The derivations of the labor market effects of immigration can be found in Appendix C.

We assume the extreme case that immigration freely adjusts to changes in policies in the destination country. We do so in order to avoid considerations of optimal admission policies. Also, we do not explicitly model the supply of immigrants, since that depends on the distribution of the reservation utilities of potential immigrants in their source countries. We only assume that by giving immigrants health and education more relatively unskilled workers enter the economy (since it is the unskilled that value these goods more). Furthermore, we assume that the skill composition of the immigrant workforce decreases as taxes rise.

In the presence of endogenous immigration a higher tax level will have two consequences. First, by attracting more unskilled immigrants, it will raise natives’ average income (even if unskilled natives lose). It other words, it will generate an immigration surplus (see for instance, Borjas, 1995). Second, since there will be more unskilled workers in the economy, the fiscal leakage effect previously discussed, will be even larger. This larger “leakage” will drop the average income in the economy.\footnote{These facts are proven in Appendix C}

The implications this has on the optimal choice of $(\tau, b)$ can be better appreciated by examining the first-order condition of the problem (3) under flexible wages and free immigration. This condition is

$$y_n - (1 - \tau^o) \frac{\partial y_n}{\partial \tau} = \frac{\phi}{\tau^o} + \frac{\phi y_p}{y_p} \frac{\partial y_p}{\partial \tau}$$  \hspace{1cm} (7)

The left-hand side of this equation gives us the marginal cost of the tax, while the right-hand side gives us its marginal benefit.

By affecting wages, we now have that the fraction of the immigrant surplus that accrues to natives, i.e. $(1 - \tau^o) \frac{\partial y_n}{\partial \tau}$ lowers the marginal cost of the tax. In other words, it is less costly to raise taxes if that will bring unskilled immigrants that raise natives’ wages.

The second new effect will is reflected in the term $\frac{\phi y_p}{y_p} \frac{\partial y_p}{\partial \tau} < 0$ which captures the increase in the “fiscal leakage” brought about by raising taxes. This leakage lowers the marginal benefit of raising the tax because it attracts unskilled immigrants that are net beneficiaries of the fiscal system.
3.2.1 No Benefits, no Vote

In comparison with a scenario with fixed wages, the new optimal tax rate might be larger or smaller depending on which effect dominates. It can be shown that by granting immigrants health and education, unskilled natives will lose in utility terms if the after-tax immigrant surplus is smaller than the “fiscal leakage” effect. This is our next proposition.

**Proposition 3.** A sufficient condition for unskilled natives to lose in utility terms when granting immigrants access to the welfare system is that the after-tax immigrant surplus accruing to natives is smaller than the increased “fiscal leakage” effect brought by higher taxes.

In this scenario, it is shown that taxes, benefits and the wages of the unskilled will be smaller due to the unskilled immigration influx.

Even if taxes were to raise, it might be the case that unskilled natives lose because of lower wages and/or because of the reduced total benefits $b^o = \tau^o y^o_p$.

3.2.2 Welfare Benefits and Voting Rights

TO BE COMPLETED

3.3 Additional Economic and Non-economic factors

Besides the individual economic factors identified in the previous model there are other factors that will determine the preferences of natives toward granting voting rights and welfare benefits to immigrants.

An economic element affecting the willingness to provide such benefits and rights is the perceived *social* impact of immigration. In other words, someone who considers that immigration economically hurts other members of society might be less willing to support the provision of benefits that might function as “welfare magnets” to immigrants.

The theoretical and empirical analysis of these sociotropic voting considerations have a long tradition in the Political Science literature dating back to Kinder and Kiewet (1979, 1981).\(^{10}\)

Also non-economic factors like identity feelings might shape the support for rights and benefits to immigrants. For starters, the racial attitudes of natives are an important determinant of preferences toward immigration. In particular, individuals valuing ethnic diversity

\(^{10}\)In fact, recent studies have tried to incorporate such considerations into a rational voter framework (see for instance Edlin *et al.*, 2007).
will be more likely to support granting voting rights and welfare benefits to immigrants, while the opposite will occur for those seeing immigration as a threat to the core of national identity. Another factor to consider is that not all immigrant groups are the same. Some generate more acceptance while others more rejection.\footnote{For instance, in the case of Spain according to the 2731 CIS survey in September 2007, 31.2\% of the surveyed stated that they trust Latin Americans more than any other group. While almost 40\% said that Eastern Europeans do not inspire trust; and 43.8\% stated they do not trust immigrants originary of muslim countries.}

There is a large literature studying non-economic determinants of attitudes on immigration. In particular, the studies of Espenshade and Hempstead (1996); Dustmann and Preston (2007); Citrin and Sides (2006); Sides and Citrin (2007) to cite just a few, provide evidence on the importance of non-economic factors in explaining such attitudes.

While we do not incorporate explicitly these sociotropic and identitary factors in our theoretical model, we will account for several of these factors in the empirical specifications.

4 Immigration in Spain

Our choice of Spain as a case study arises in part due to the availability of survey data that directly enquires the preferences toward granting voting rights and welfare benefits to immigrants. However, the Spanish case is interesting on its own.

In recent decades, Spain has undergone a substantial transformation: while during the first half of the twentieth century it was a source of emigration, by the second half of the nineties it was receiving more immigrants than any other country in Europe.

This transformation was the result of a complex process which included stricter admission policies in formerly traditional destination countries in Europe. Also, Spain’s geographical location made it a natural gateway for immigrants coming from Northern Africa. Eventually some of these immigrants in transit became permanent. Figure 1 shows the rapid evolution of immigration rates experienced over the last decade.

FIGURE 1 ABOUT HERE

This figure also shows that most of the immigration has come from less-developed countries. In particular, the largest immigration groups come from the Maghreb, Latin America, and more recently from East European countries.
The Spanish Constitution states that the welfare rights of foreign residents are the same as those of Spanish nationals. Political rights though, are different since article 13.2 excludes the possibility of immigrants being elected and holding voting rights.

There are three exceptions. First, since the adoption of Maastricht Treaty, EU citizens can vote in municipal and European elections. Second, immigrants may vote when so established by a treaty. And, third, when the principle of reciprocity applies -if a national from country A can vote in the elections of country B when residing there, nationals from country B can vote in the elections of country A, when residing there.

Although there are *ius soli* elements, the main way to automatically obtain Spanish nationality is through *ius sanguini*.\(^\text{12}\)

In other words, the status quo allows immigrants to access public education and health services, but it prevents them of voting, unless they naturalize after several years of legally residing in Spain.

5 Data and Methods

5.1 Data

The data used in this study are the “Barómetro de Noviembre” provided by the Centro de Investigaciones Sociológicas for November of 2005. The survey is a nationwide sample of Spaniards 18 years of age and older. The sample covers 47 provinces, and the sampling procedure is multi-stage stratified by clusters. The questionnaires were applied through direct interviews at the home of the interviewees.

We have two dependent variables. The first one takes value 1 if the respondent believes immigrants should have access to public education (for them and their children) and to free public health, and is zero otherwise. The second one takes value 1 if the respondent believes that immigrants who have been living in Spain for some time should be granted the right to vote in both general and local elections, and is zero otherwise.\(^\text{13}\)

A summary of the interrelationship between the attitudes toward voting and welfare rights for immigrants is presented in Table 1.

TABLE 1 ABOUT HERE

\(^{12}\) Also, automatic nationality is guaranteed if one of the parents was born in Spain or if the person would be stateless.

\(^{13}\) A detailed description of the variables used in the analysis is included in Appendix B. Table B1 presents the basic descriptive statistics of the estimation sample.

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This table shows that the vast majority of respondents (about 85%) support giving both health and education benefits to immigrants, and about 60% support allowing them to vote in both general and local elections. In fact, about 55% of the respondents support granting both full welfare and voting rights. However, the fact that almost 30% of them favor giving immigrants health and education without voting rights indicates that there is something substantially different between these two entitlements.

While these are high values in terms of the willingness to grant such benefits and rights, we have to consider that there might be non-economic factors behind them, and that in an interview respondents might overstate such willingness. Nevertheless, we will show that even at these high levels of support, the economic hypothesis previously posited hold in the data.

5.2 Empirical Methodology

Empirically we model the decision to support granting voting rights and welfare benefits to immigrants through two equations relating each binary dependent variable to a set of sociodemographic characteristics that can help us test the hypotheses posited.

In particular, we use a Bivariate Probit model to estimate these equations. In other words, we assume that individuals have an underlying propensity \( y^*_1 \) to provide welfare benefits and another one \( y^*_2 \) regarding the provision of political rights. These propensities are related to a set of sociodemographic characteristics \( X \) by the following equations:

\[
y^*_j = X \beta_j + u_j \quad j \in \{1, 2\},
\]

where \( u_1 \) and \( u_2 \) are a set of unobserved characteristics assumed to be jointly distributed with a bivariate standard Normal distribution, i.e. \( (u_1, u_2) \sim \Phi([0, 0]; \Sigma) \).

In practice we do not observe the underlying propensities, but indicators on whether the respondents want to provide rights and benefits, i.e.

\[
y_j = 1 \quad if \quad y^*_j \geq 0 \quad j \in \{1, 2\}
\]

We estimate several specifications of this model including different sets of explanatory variables.

In a first estimation we include some basic sociodemographic characteristics like gender, age, schooling level, marital and employment status, and religiousness. We also include variables at the local level like the province immigration rate, the regional unemployment rate, as well as the composition shares of different immigrant groups at the province levels. These shares are included to control for the heterogeneity in immigration groups that prevail in Spain.
We test the main hypotheses of the model, namely that unskilled natives are less in favor of granting health and education to immigrants, and more supportive of granting them voting rights, by estimating their predicted support for these policies, and comparing it with the one by skilled natives, holding everything else constant.

In all the specifications we include interactions between the education level and the immigration rate at the province level. These interactions are important because we expect to obtain clearer evidence on the predicted hypotheses of the model in high-immigration regions.

A second set of estimations includes, in addition to the previous variables, a pair of variables on whether the respondent has a preference for living in a culturally diverse environment, and whether it prefers not having an immigrant who is from a different ethnic group as a boss or married to a close relative. These additional variables are included to control for non-economic factors that might drive the responses on the dependent variables.

In a third set of estimations we try to further isolate preferences driven by fiscal reasons from those driven by both fiscal and labor market reasons.

In order to achieve this we do two things. First, we include variables capturing whether the respondent believes immigration reduces natives’ wages, or whether it thinks it helps filling vacant jobs in the economy. Second, we interact the schooling and province immigration rates (and their interaction) with the labor market status of the respondent. We consider the effects estimated for individuals out of the labor force to be less affected by labor market considerations, and hence we will focus on them to test our main hypotheses.

Finally, in the fourth and final specification we add to the previous model a variable on whether high-skilled respondents think immigration hurt the poor, in order to control for possible sociotropic driven answers.

6 Results

Tables B2 and B3 in Appendix B present the full set of results for the bivariate probit models estimated.

In this section we focus on graphics of the predicted probabilities of supporting the different entitlements, by level of education for the different models. We also present the estimated difference in these predicted probabilities between respondents with a higher level of education and those with an elementary one.

In the top panel of Figure 2 we observe the predicted probability of support for granting health and education to immigrants by level of education, and also the difference in support between skilled respondents (those with some College education or higher) and the less skilled (those with 6 years or less of education), by immigration at the province level. These
predictions arise from the bivariate probit were only the basic sociodemographic controls are included.

In this figure we observe that at provinces with low levels of immigration the support for granting these entitlements is somewhat similar between educational groups. However, as we move to provinces with a higher degree of immigrant penetration we find that such support drops among unskilled and increases among skilled individuals. The prediction for natives with intermediate skills falls somewhere in the middle of the other two.

The figure on the right of the top panel displays the difference between the probability of support between natives with a higher education and those with elementary education. In this figure a positive number means that *ceteris paribus* skilled natives support a given policy more than the unskilled do. A 90 percent confidence interval is also presented to visualize the statistical significance of the predicted difference.

**FIGURE 2 ABOUT HERE**

These results are consistent with the main predictions of the model. In particular, this figure confirms that the predicted difference between skilled and unskilled respondents is statistically insignificant at low-immigration regions, but positive and statistically different from zero at high-immigration regions.

In the lower panel of that figure we present the results for the willingness to give voting rights to immigrants. There the results are drastically different. In low immigration regions skilled respondents tend to favor more than anyone else granting such rights. However, as we move to high immigration regions this strong support falls drastically (by about 40 percentage points) ending up at a similar level of support with unskilled natives.

The graph at the bottom right confirms there is a statistically significant difference in low-immigration regions, but that such difference vanishes in high-immigration ones.

As they stand these last results go against the prediction of the theoretical model previously presented. In other words, we expect less support for voting rights among skilled natives, while we actually find the opposite. However, the fact that the stronger support is found in low-immigration regions make us think that probably such support is driven by (economic and non-economic) reasons other than the ones posited in the model.

In order to further explore this possibility we next present in Figure 3 the results arising from models that control for non-economic attitudes toward immigration.

**FIGURE 3 ABOUT HERE**

In this figure we observe that once we control for these non-economic preferences, the
willingness of unskilled respondents in low-immigration regions to grant health and education is actually higher than the one of skilled natives, but in high-immigration provinces, where presumably the policy implications of immigration are more salient, this propensity becomes smaller among the unskilled as predicted by the model.

In what concerns voting rights we observe again a relatively higher support among skilled natives in low-immigration provinces, and the opposite in high-immigration ones. However, these differences are not statistically different from zero.

We next turn to the predictions of the model where we control for the impact of labor market driven preferences by separating respondents according to their labor status (i.e. in or out of the labor force), and by including as controls variables that reflect the perceived impact of immigration on the labor markets. As previously explained, we expect the preferences of people outside the labor force to reflect more closely the fiscal concerns captured by the model.

Figure 4 presents results on the propensity for granting health and education by education level and labor market status of the respondent. Here we observe the same patterns of the previous graphs, however, the differences between education groups are statistically insignificant. We also don't observe a greater opposition to these entitlements among unskilled in the labor market (whose well being would be negatively affected by both fiscal and labor market competition).

In Figure 5 we observe that for natives out of the labor force the skilled respondents living in low-immigration regions are more likely to favor voting rights for immigrants, yet such preferences are drastically reversed as we move to high-immigration regions. There the opposition is the highest among this group and statistically different from zero. Indeed, the skilled display a levels of support 40 percentage points lower than that of their unskilled counterparts, holding everything else constant.

For individuals in the labor force we find the same pattern although the results are not statistically significant different from zero. This milder divergence by skill level might reflect that skilled workers benefit from an influx of unskilled immigrants due to their complementsarities in the labor market, and hence they are not as opposed to granting them voting rights if that is going to foster immigration that benefits them.\footnote{This needs further corroboration because, as we mentioned, we do not observe a corresponding stronger opposition to granting access to health and education among unskilled in the labor force when compared to unskilled out of the labor force.}

Finally in Figures 6 and 7 we present the results after controlling for the sociotropic preferences of skilled natives. There we find again the similar patterns displayed before, although now the divergences in support to health and education benefits by education level become again statistically significant.
In summary, when looking at regions with a high influx of immigrants and controlling for labor market, sociotropic, and non-economic factors that drive preferences, the empirical findings are in line with the predictions stemming from the theoretical model. In other words skilled natives tend to support granting health and education to immigrants as they do not compete with them for the consumption of these goods and their taxes are not raised substantially by the provision of such goods. However, they oppose the provision of voting rights because of the fear of potential redistributive policies brought about by voting immigrants.

7 Conclusions

In this paper we present a simple model to explain why natives might be willing to grant voting rights and welfare benefits to immigrants and we test the predictions of this model using a rich dataset of public opinion about immigration in Spain.

The theoretical model predicted that when immigrants are more unskilled than natives are, unskilled respondents reject the provision of health and education to immigrants, because of the competition for fiscal resources it implies to them. On the other hand, it predicted that skilled natives would oppose granting voting rights to immigrants, because that would lead to more redistributive fiscal policies financed through higher taxes.

We conduct a series of estimations where we control for a set of basic sociodemographic characteristics first, and then gradually add other factors that might affect preferences like labor market factors, sociotropic motives, and non-economic attitudes toward immigration. In the estimated models we find support for these hypotheses in high-immigration regions.

In general, this study confirms that the relationship between public opinion and immigration is more complex than simply a “general attitude” toward immigrants. This calls for conducting further studies focusing on several aspects of this relationship like the preferences on the type of admission policies to be implemented, and the mechanisms favored by the public to assimilate immigrants into the host society.

An interesting line of future research is also to study the naturalization policies that natives support, in order to understand what factors drive these preferences.

A better understanding of these issues not only provides a richer picture on the political preferences of natives in host countries, but is also relevant for public life, since it may define future political strategies regarding immigration rights, and the shaping of immigration policy in general.
References


Tables and Graphs

Figure 1: Evolution of Immigration in Spain

Table 1: Attitudes Toward Voting Rights and Access to Health and Education

<table>
<thead>
<tr>
<th>Health and Education</th>
<th>No Rights</th>
<th>Right to Vote</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>No Access</td>
<td>205</td>
<td>102</td>
<td>307</td>
</tr>
<tr>
<td></td>
<td>10.56%</td>
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<td>15.82%</td>
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<tr>
<td>Access</td>
<td>555</td>
<td>1,079</td>
<td>1,634</td>
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<tr>
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<td>28.59%</td>
<td>55.59%</td>
<td>84.18%</td>
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<tr>
<td>Total</td>
<td>760</td>
<td>1,181</td>
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<tr>
<td></td>
<td>39.16%</td>
<td>60.84%</td>
<td>100%</td>
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</table>
Figure 2: Support for Rights and Benefits.
Base Controls Only

Health and Education

Voting Rights

Immigration Rate at the Province Level %
Figure 3: Support for Rights and Benefits. 
Base Controls + Non-Economic Factors

Health and Education

Immigration Rate at the Province Level %

Voting Rights

Immigration Rate at the Province Level %
Figure 4: Support for Health and Education.
Base, Non-Economic, Labor Market Controls

Out of the Labor Force

In the Labor Force

Immigration Rate at the Province Level %
Figure 5: Support for Voting Rights.
Base, Non-Economic, Labor Market Controls

Out of the Labor Force

In the Labor Force

Immigration Rate at the Province Level %
Figure 6: Support for Health and Education.

Full Set of Controls

Out of the Labor Force

In the Labor Force

Immigration Rate at the Province Level %
Figure 7: Support for Voting Rights.
Full Set of Controls

Out of the Labor Force

In the Labor Force

Immigration Rate at the Province Level %
Appendix

A Proofs

Proof of Proposition 1

Under exogenous immigration we have that the first-order condition of the optimization problem under the “status quo” scenario is

\[-y_n + \frac{\phi}{\tau^*} = 0\]

This and the budget constraint (1) give the solution in (4).

This first-order condition also holds for the scenario where immigrants are excluded from the welfare system. However now the budget constrain is now \(b' = \tau' y_n\), leading to the solution in equation (5).

Since the utility of skilled natives does not depend on \(b\), and taxes don’t change when excluding immigrants from the welfare system, their utility will remain unchanged in these scenarios.

For unskilled natives the utility change brought by restricting the access of immigrants to welfare benefits is

\[\Delta u_u = \phi (\ln b' - \ln b^*) > 0\]

since \(b' > b^*\), whenever \(\phi < \psi\), i.e. whenever immigrants are relatively more unskilled than natives. This means unskilled natives will experience utility gains by restricting the access of immigrants to health and education. \(\square\)

Proof of Proposition 2

Under exogenous immigration we have that the first-order condition of the optimization problem when immigrants vote and participate in the fiscal system is

\[-y_p + \frac{\alpha}{\tau^*} = 0\]

This and the budget constraint (1) give the solution in (6).

Since taxes are higher when (relatively unskilled) immigrants vote skilled natives will be worse-off.
For unskilled natives we can approximate their utility change by
\[ \Delta u = \frac{\partial u(b^*, \tau^*)}{\partial \tau} (\bar{\tau} - \tau^*) + \frac{\partial u(b^*, \tau^*)}{\partial b} (\bar{b} - b^*) \]
\[ = -w_u \left( \frac{\alpha}{y_p} - \frac{\phi}{y_n} \right) + \frac{1}{b^*} \left( \alpha - \phi \frac{y_p}{y_n} \right) \]
\[ = -w_u \frac{\alpha y_n - \phi y_p}{y_n y_p} + \frac{1}{\phi} \left( \frac{\alpha y_n - \phi y_p}{y_p} \right) \]
\[ = \left( \frac{\alpha y_n - \phi y_p}{y_p} \right) \left( \frac{1}{\phi} - \frac{w_u}{y_n} \right) \]

Since \( \phi < \alpha < 1, y_p < y_n, \) and \( w_u < y_n \) then \( \Delta u > 0. \]

**Proof of Proposition 3**

Again assume that by giving immigrants access to heath and education an influx of unskilled workers will enter the economy. Also assume that the second-order conditions to obtain an optimum for problem (3) under flexible wages are met.

If the after-tax immigration surplus accruing to natives is smaller than the “fiscal leakage” effect, namely if \( (1 - \tau^o) \frac{\partial y_n}{\partial \tau} < \left| \frac{\phi}{y_p} \frac{\partial y_p}{\partial \tau} \right| \)
the first-order condition (7) becomes
\[ y_n + \kappa(\tau) = \frac{\phi}{\tau^o} \]
where \( \kappa(\tau) \) is a function of \( \tau \) satisfying
\[ \kappa(\tau^o) > 0, \quad \kappa'(\tau) > 0 \]

Since the \( \phi/\tau \) is a decreasing function of \( \tau \), the new equilibrium level \( \tau^o \) will be \( \tau^o < \tau^* \), for \( \tau^* \) defined in (4). The optimal \( b^o = \tau^o y_p^o \) is also smaller than \( b^* \), since with the new immigrant influx both \( \tau^o \) and \( y_p^o \) are lower.

We can now extend the comparison of \( (\tau^o, b^o) \) with the \( (\tau', b') \) obtained in (5) under full exclusion of immigrants of the welfare system since
\[ \tau^o < \tau^* = \tau', \quad b^o < b^* < b' \]

TO BE COMPLETED □
B Data Description

This appendix includes a detailed description of the variables used in the estimations.

Dependent Variables

Voting Rights

“Do you think that any foreigner that has lived in Spain for a while should have the right to vote in municipal and general elections?”

Welfare Rights

“Do you think immigrants should be given the possibility of accessing the public education system (for them or their children) and having free health care?”

Independent Variables

Male - Dummy for male respondents
Age - Age of the respondent
Married - Dummy for married respondent
Devout Catholic - Dummy for Catholic respondent who goes to church at least once a week

Schooling

Elementary - Illiterate Completed or Incomplete Elementary Schooling (6 years or less)

Middle Education - Basic Secondary (Basic Secondary Education (4 years) or Medium Level Professional Training) and Higher Secondary (Higher Secondary Education (2 years) or Higher Level Professional Training)

Higher Education - Technical, Bachelor’s Degree or higher

Labor Force Participation - Dummy for respondent in the workforce
Province Immig. Rate - Immigration rate at the province level

Immigrant Ethnic Shares
Moroccan Immigrants - Share of Moroccans among the immigrant population at the province level.

Latin American Immigrants - Share of Latin American among the immigrant population at the province level. Only the immigrants from the main sending countries are included, namely Argentina, Colombia, Ecuador, and Peru.

Eastern European Immigrants - Share of Eastern Europeans among the immigrant population at the province level. Only the immigrants from the main sending countries are included, namely Bulgaria and Romania.

GDP Per Capita (000s Euros)- Per Capita GDP in (000s Euros) at the Autonomous Community level.

Preference for Diversity - Answer to question:
“If you had to choose a place to live, where would you prefer to do so?

1. In a place where almost nobody was of an ethnic group or race different from the majority of Spaniards.”

2. In a place where some people were of an ethnic group or race different from the majority of Spaniards.”

3. I am indifferent.”

4. In a place where most of the people were of an ethnic group or race different from the majority of Spaniards.”

The values of the response variable follow the ranking in the previous options.

Rejects other races - Average of the answers to the two following questions:

“Considering the foreigners who come to live in Spain and who are from a different race or ethnic group than the majority of Spaniards...

1. How much would you care if one of these persons was your boss?”
2. How much would you care if one of these persons married a close relative of yours?”

The responses range from 0 to 10 according to degree of importance.

_Perception on Impact of Immigration_

“Wages fall...” - Answer to question: “In general, wages fall as a consequence of people coming to Spain to live and work.”

“Impact on Poor...” - Answer to question: “In general, the coming of people to Spain to live and work more severely affects the economic outlook of poor Spaniards.”

“Labor needed...” - Answer to question: “In general, people coming to Spain to live and work allow the filling of vacant jobs for which there is insufficient workforce.”

The responses range from 1 to 5 according to degree of agreement.

Table B1 presents descriptive statistics for the variables used in the study.
Table B1: Descriptive Statistics

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<thead>
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<th>Variable</th>
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<th>Mean</th>
<th>Std. Dev.</th>
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<th>Max</th>
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<td></td>
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<td><strong>Schooling</strong></td>
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<tr>
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<td></td>
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<td>0.17</td>
<td>0.66</td>
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<td><strong>In the Labor Force</strong></td>
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<td></td>
<td></td>
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<td>1,258</td>
<td>0.07</td>
<td>0.25</td>
<td>0</td>
<td>1</td>
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<tr>
<td><strong>Schooling</strong></td>
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<td>Higher</td>
<td>1,258</td>
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<td><strong>Racial Preferences</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>“Wages fall...”</td>
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<td>“Labor needed...”</td>
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<td>9.82</td>
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<td>20.25</td>
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<td>8.85</td>
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<td>5.65</td>
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<td><strong>Share of Immigrant Groups</strong></td>
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<td></td>
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<td>0.00</td>
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### Table B2: Bivariate Probit Models 1 and 2

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<th>Vote</th>
<th>Health and Edu</th>
<th>Vote</th>
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<td>0.066</td>
<td>-0.264 ***</td>
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<td>(0.080)</td>
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<td>-0.006</td>
<td>-0.0003</td>
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<td>(0.011)</td>
<td>(0.014)</td>
<td>(0.012)</td>
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<td>(0.0001)</td>
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<td>(0.00012)</td>
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<td>(0.091)</td>
<td>(0.076)</td>
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<td>(0.108)</td>
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<td>(0.100)</td>
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<td>0.205 *</td>
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<td>(0.093)</td>
<td>(0.116)</td>
<td>(0.100)</td>
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<td>(0.153)</td>
<td>(0.220)</td>
<td>(0.170)</td>
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<td>(0.267)</td>
<td>(0.217)</td>
<td>(0.292)</td>
<td>(0.235)</td>
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<td>-0.031 **</td>
<td>-0.031 *</td>
<td>-0.029 **</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.012)</td>
<td>(0.017)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Schooling X Prov Immig Rate</td>
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<td>0.008</td>
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<td>0.008</td>
</tr>
<tr>
<td></td>
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<td>(0.013)</td>
<td>(0.019)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Higher*Prov Immig</td>
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<td>-0.027</td>
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<td>(0.024)</td>
<td>(0.019)</td>
<td>(0.026)</td>
<td>(0.021)</td>
</tr>
<tr>
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<td>(3.139)</td>
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<td>(0.369)</td>
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<td>(1.347)</td>
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<td>(1.450)</td>
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<td>Muslim Countries</td>
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<td>0.611</td>
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<tr>
<td>Latin America</td>
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<td>1.217</td>
<td>3.253 ***</td>
<td>1.643 ***</td>
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<td>(0.037)</td>
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<td>(0.657)</td>
<td>(0.522)</td>
<td>(0.731)</td>
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\[
\text{corr}(u_1, u_2) = 0.433, \quad \text{Log-Lik} = -2,008.3, \quad N = 1,941
\]

***, **, * H\(_0\): β = 0 rejected at 1, 5, 10% of significance

Standard errors in parentheses

34
Table B3: Bivariate Probit Models 3 and 4

<table>
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<tr>
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<th>Health and Edu</th>
<th>Vote</th>
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<td>-0.268***</td>
<td>0.092**</td>
<td>-0.285***</td>
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<td>(0.070)</td>
<td>(0.084)</td>
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<td><strong>Age</strong></td>
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<td>(0.0127)</td>
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<td>(0.00015)</td>
<td>(0.00013)</td>
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<td><strong>Devout Catholic</strong></td>
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<td>(0.127)</td>
<td>(0.104)</td>
<td>(0.128)</td>
<td>(0.106)</td>
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<td><strong>Unemployed</strong></td>
<td>-0.040</td>
<td>-0.217**</td>
<td>0.011</td>
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<td>(0.133)</td>
<td>(0.110)</td>
<td>(0.139)</td>
<td>(0.112)</td>
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<td>(0.412)</td>
<td>(0.306)</td>
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<td><strong>Schooling</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Elementary (Omitted)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intermediate</strong></td>
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<td>-0.337</td>
<td>-0.335</td>
<td>-0.372</td>
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<td>(0.357)</td>
<td>(0.287)</td>
<td>(0.359)</td>
<td>(0.290)</td>
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<td></td>
<td>(0.634)</td>
<td>(0.581)</td>
<td>(0.667)</td>
<td>(0.582)</td>
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<td>-0.029*</td>
<td>-0.039*</td>
<td>-0.030*</td>
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<tr>
<td></td>
<td>(0.021)</td>
<td>(0.017)</td>
<td>(0.021)</td>
<td>(0.017)</td>
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<tr>
<td><strong>Schooling X Prov Immig Rate</strong></td>
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<td>0.020</td>
<td>0.041</td>
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</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.025)</td>
<td>(0.031)</td>
<td>(0.025)</td>
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<tr>
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<td>0.089</td>
<td>-0.109**</td>
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<tr>
<td></td>
<td>(0.060)</td>
<td>(0.051)</td>
<td>(0.061)</td>
<td>(0.051)</td>
</tr>
<tr>
<td><strong>Labor Force Interactions</strong></td>
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<tr>
<td><strong>Schooling</strong></td>
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<tr>
<td><strong>Elementary (Omitted)</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Intermediate</strong></td>
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<td>(0.391)</td>
<td>(0.504)</td>
<td>(0.396)</td>
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<tr>
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<td>(0.755)</td>
<td>(0.661)</td>
<td>(0.768)</td>
<td>(0.661)</td>
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<tr>
<td><strong>Province Immig Rate</strong></td>
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<td>0.028</td>
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<tr>
<td></td>
<td>(0.037)</td>
<td>(0.027)</td>
<td>(0.036)</td>
<td>(0.028)</td>
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<tr>
<td><strong>Schooling X Prov Immig Rate</strong></td>
<td>-0.015</td>
<td>-0.030</td>
<td>-0.015</td>
<td>-0.035</td>
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<td>(0.045)</td>
<td>(0.036)</td>
<td>(0.045)</td>
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<td><strong>Higher*Prov Immig</strong></td>
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<td>(0.072)</td>
<td>(0.058)</td>
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<tr>
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<td>-0.006</td>
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<td>(0.020)</td>
<td>(0.025)</td>
<td>(0.020)</td>
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<td>(0.380)</td>
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*Continued on Next Page…
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<th>Health and Edu</th>
<th>Vote</th>
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<td>0.299 ***</td>
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<td>(0.039)</td>
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<td>-0.095 ***</td>
<td>-0.073 ***</td>
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<td>Perceived Labor Impact</td>
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<td>“Wages fall...”</td>
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<td>-0.123 ***</td>
<td>-0.058 *</td>
<td>-0.121 ***</td>
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<td>(0.027)</td>
<td>(0.033)</td>
<td>(0.028)</td>
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<td>0.117 ***</td>
<td>0.128 ***</td>
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<td>corr(u1, u2)</td>
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<td>0.289 ***</td>
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<td>(0.050)</td>
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<td>Log-Lik</td>
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<td>-1,715</td>
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<td>-1,570.3</td>
<td>1,677</td>
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Characterization of the Economy

Consider a two-factor small open economy. The productive factors are unskilled labor $L_u$ and skilled labor $L_s$.

Labor supply is inelastic for each group and equal to

$$
L_u = \phi + \pi \psi \\
L_s = 1 - \phi + \pi (1 - \psi)
$$

where $\pi$ is the size of the immigrant population (native population is normalized to 1), $\phi$ is the share of native unskilled workers, while for the immigrant population this share equals $\psi$. We assume that $\phi < \psi$.

The technology is a Constant Returns to Scale production function $q_i = f_i(L_u, L_s)$ for $i \in 1, 2$ in the case of diversification, and $q_1 = f_1(L_u, L_s)$ in case the economy specializes.

Let $c^i(w_u, w_s)$ be the unit-cost function of producing good $i$, and $w_j$ are the wages of group $j$.

The zero-profit condition in the diversified economy is

$$
1 = c^1(w_u, w_s), \\
p = c^2(w_u, w_s),
$$

while the labor market equilibrium is given by

$$
L_u = q_1 \frac{\partial c^1(w_u, w_s)}{\partial w_u} + q_2 \frac{\partial c^2(w_u, w_s)}{\partial w_u}, \\
L_s = q_1 \frac{\partial c^1(w_u, w_s)}{\partial w_s} + q_2 \frac{\partial c^2(w_u, w_s)}{\partial w_s}.
$$

By taking the total differential of the zero-profit condition, and assuming that there are no factor intensity reversals, it is easy to show that $dw_s = dw_u = 0$ (see for instance Feenstra, 2003; Dustmann and Preston, 2004). Hence wages will be insensitive to immigration.

In a specialized economy the zero-profit condition is (dropping the good $i$ superscript)

$$
1 = c(w_u, w_s),
$$

while the labor market equilibrium is given by

$$
L_u = q_1 \frac{\partial c(w_u, w_s)}{\partial w_u} = q_1 c_1, \\
L_s = q_1 \frac{\partial c(w_u, w_s)}{\partial w_s} = q_1 c_2,
$$

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Define the skill ratio in the economy \( k = L_s / L_u \). In equilibrium this skill ratio equals

\[
k = \frac{c_2}{c_1} \quad \text{(C1)}
\]

Taking the derivative of the zero-profit condition wrt \( k \)

\[
0 = c_1 \frac{\partial w_u}{\partial k} + c_2 \frac{\partial w_s}{\partial k}
\]

which implies

\[
\frac{\partial w_u}{\partial k} = -k \frac{\partial w_s}{\partial k} \quad \text{(C2)}
\]

Taking the derivative of (C1) wrt \( k \) we obtain

\[
1 = \frac{1}{c_1^2} \left( c_1 \frac{\partial c_2}{\partial k} - c_2 \frac{\partial c_1}{\partial k} \right) = \frac{1}{c_1} \left( c_{21} \frac{\partial w_u}{\partial k} + c_{22} \frac{\partial w_s}{\partial k} - k c_{11} \frac{\partial w_u}{\partial k} - k c_{12} \frac{\partial w_s}{\partial k} \right)
\]

where \( c_{ij} \) is the partial derivative of \( c \) with respect to \( i \) and \( j \). After some algebra this can be rewritten as

\[
c_1 = \frac{\partial w_s}{\partial k} \left[ k^2 c_{11} + c_{22} - 2 k c_{12} \right].
\]

By the concavity of the cost function the term in brackets in the RHS of the equation is negative. Since \( c_1 > 0 \) it follows that

\[
\frac{\partial w_s}{\partial k} < 0 \quad \frac{\partial w_u}{\partial k} > 0. \quad \text{(C3)}
\]

Namely, the wages of (un)skilled will (in)decrease as the skill ratio increases due to immigration.

### C.1 Some useful results

First we show that an influx of relatively unskilled immigrants will generate gains in the average income of natives \( y_n \), in spite of the losses faced by unskilled natives. Recall that

\[
y_n = \phi w_u + (1 - \phi) w_s
\]

by using (C2) it follows that
\[
\frac{\partial y_n}{\partial k} = \phi \frac{\partial w_u}{\partial k} + (1 - \phi) \frac{\partial w_s}{\partial k} = \frac{\partial w_s}{\partial k} (1 - \phi - \phi k) < 0 \tag{C4}
\]
since \( k < (1 - \phi)/\phi \) and \( \frac{\partial w_s}{\partial k} < 0 \). Hence, an influx of unskilled immigrants, i.e. a decrease in \( k \), will raise the average natives’ income, generating an immigration surplus.

A second effect that will take place is that the income of immigrants already present in the economy will fall with a further influx of immigration because of the competition by the new immigrants. The overall impact on the per-capita income in the economy will be negative. Recall that

\[
y_p = \alpha w_u + (1 - \alpha) w_s
\]
for

\[
\alpha = \frac{\phi + \pi \psi}{1 + \pi}
\]

Hence,

\[
\frac{\partial y_p}{\partial k} = \left( (w_u - w_s) \frac{\partial \alpha}{\partial k} + \alpha \frac{\partial w_u}{\partial k} + (1 - \alpha) \frac{\partial w_s}{\partial k} \right) = (w_u - w_s) \frac{\partial \alpha}{\partial k} > 0 \tag{C5}
\]
by (C2), and the fact that

\[
\frac{\partial \alpha}{\partial k} < 0 \quad k = \frac{1 - \alpha}{\alpha}
\]

This means that an increase in the relative number of unskilled immigrants (i.e. a fall in \( k \)) lowers the economy per-capita income.

With this results we have the next lemma.

**Lemma 1.** If \( \frac{\partial k}{\partial \tau} < 0 \) then

\[
\frac{\partial y_n}{\partial \tau} > 0 \quad \text{and} \quad \frac{\partial y_p}{\partial \tau} < 0
\]

**Proof.** Using the previous equalities it follows that

\[
\frac{\partial y_n}{\partial \tau} = \frac{\partial y_n}{\partial k} \frac{\partial k}{\partial \tau} > 0
\]

\[
\frac{\partial y_p}{\partial \tau} = \frac{\partial y_p}{\partial k} \frac{\partial k}{\partial \tau} < 0
\]