ESSAYS ON THE POLITICAL ECONOMY OF MIGRATION

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par

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Chapter 1

The political economy of migration: Issues and challenges

Over the last few decades, how to manage immigration has occupied center-stage in the policy making debate of many developed countries. Relying on standard international trade models - such as the Heckscher-Ohlin model - free trade and free migration should be equivalent measures of economic integration leading both to an equalization of factor prices. However, despite this predicted substitutability between opening borders to trade and to migration, the former has much more often been used in a globalization perspective. For instance, based on this prediction, NAFTA was expected to help Mexico to export more goods and fewer peoples - in the words of former Mexican president Salinas: “Mexico wants to export tomatoes and not tomato pickers”. Following the same kind of reasoning, the EU formed a custom union with Turkey in 1995. In this case also freeing trade was expected to both lower the incentives of Turkish citizens to migrate into the EU and prepare EU citizens to accept the adhesion of Turkey to the EU. More broadly, contrary to trade for which some consensus has been found through regional or international agreements, immigration policy is still mainly designed at a national level without much coordination. As a consequence, for most developed countries, there is “a much higher border effect for migration than for trade” (Helliwell 1997).

One explanation to the observed asymmetry between trade and immigration policy is that, contrary to the trade liberalization process, the shaping of immigration policy does not mainly rely on economic arguments and citizens feel more directly threatened by immigration than by trade. As aptly summarized by Wellisch and Wildasin (1995):

“Immigration policy has proven to be a contentious issue in developed countries. It often raises questions of race, culture, language, and religion, but intertwined with all of these, and no less important, is the economic dimension of migration. Immigration is alleged to have significant effects, favorable or unfavorable, on labor markets, housing markets, and industry output, either in particular regions
or throughout entire economies. Aside from these market impacts, it is also frequently claimed that immigration may have important fiscal effects.”

Along with empirical evidence on the economic impact of immigration, citizens’ subjective perceptions of these impacts on their daily life should be seen as a key element to consider for understanding better the actual immigration policy implemented in a given country. At the risk of simplification, one could argue that the perceived effects of immigration are mostly driven by labor market fears, welfare and fiscal arguments, or social concerns.\(^1\) The three essays of this dissertation contribute to the debate about immigration policy by providing new evidence dealing with one or several aspects of these fears.

The remainder of this chapter is organized as follows. I start by describing some relevant examples showing that public opinion pressures have not only widened the scope of the immigration policy debate but have also played a significant role in shaping of national and international immigration policies. This provides a justification for a political economy perspective in our quest to better understand the underlying determinants of individual preferences towards immigrants. Then we present the Swiss direct democracy system on which we will heavily draw for disentangling public from political preferences. Finally, we emphasize the main scope of this dissertation and provide a summary of the three essays composing this dissertation.

1.1 Individual perceptions of immigrants: Matter of fears?

1.1.1 Labor market fears

The impact of immigration on the labor market has been studied intensively by economists. One of the most often cited prediction in this area is that individual preferences towards immigrants highly depend on the individual level of skills or of education. Indeed, immigration of low-skill workers is broadly expected to have a negative effect on wages of low-skill resident workers and - in addition - to induce a higher fiscal burden on host country residents.\(^2\) However, even if the empirical evidence in favor of this prediction is not clear cut,\(^3\) most developed countries - which experienced large inflows of relatively low-skill migrants - have effectively put more restrictions on the immigration of low-skill workers than of high-skill, thereby reflecting these perceptions.\(^4\)

\(^1\) See Chiswick and Hatton (2003) for an overview of the factors shaping immigration policy in many developed countries.
\(^2\) See next section for an overview.
\(^3\) For instance, while the overviews of Longhi et al. (2005) and of Borjas et al. (1996) tend to emphasize a very small influence of immigration on wages, Borjas (2003) provides a new evidence that this influence is indeed high.
\(^4\) According to most political economy models, if the median voter is a low-skill citizen, restrictions against low-skill immigrants should be prevalent.
For instance, Canada was the first country, in 1965, to officially institute an immigration policy based on a point system. This system gives priority to citizens with a high degree of education and/or with specialized skills to enter the country for working purposes. Following the Canadian experience, Australia and New Zealand designed similar point systems.

Since the beginning of the nineties, the US also widened the scope for the admission of skilled workers both by delivering more easily permanent resident permits and by creating a series of “temporary worker” programs for high-skill workers. Moreover, since 2004, NAFTA has been extended so as to permit to an unlimited number of Canadians, Mexicans, Americans with a B.A. or more to cross borders for working reasons.

In the construction of the modern European Union, the acceptance of new members has often been associated with an eager debate about the expected size and labor market impact of migration flows from applicant countries with a lower degree of development. This was especially the case for the EU enlargement to the ten new member states of eastern Europe in 2004. Associated with mass migration fears, - strongly present in opinion polls but not corroborated by economic predictions\(^5\) - 12 out of 15 old member states imposed employment and/or welfare access restrictions on new member states’ citizens.

Another closely related and debated topic in EU is how to regulate the entry and stay of third-country nationals who are seeking employment in EU. Answers to this question have been quite diverse, ranging from a common immigration policy with EU level immigration quotas to the introduction of a European “Green Card” allowing third country nationals whose skills are highly needed to enter more easily.\(^6\)

Not escaping the rule, immigration policy is also a hotly debated topic in Switzerland. For instance, during the pre-vote debate on the bilateral agreements with EU - especially the article on free mobility of labor - fears of mass immigration of low-skill workers and of its subsequent negative effects on the labor market have been taken as main arguments against the acceptance of the project. In order to encourage Swiss citizens to accept the bilateral agreements, various measures of accompaniment\(^7\) and safeguard clauses\(^8\) have been officially

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\(^5\) See for instance Boeri et al. (2001) and Dustmann et al. (2003).

\(^6\) January 11th, 2005, the European Commission proposed some common rules for the admission of economic migrants in a “Green Paper on an EU approach to managing economic migration” (COM/2004/0811 final). This consultation led to the adoption in December 2005 of a “Policy Plan on Legal Migration” (COM/2005/669) which lists the actions and legislative initiatives that the Commission intends to take so as to pursue the consistent development of the EU legal migration policy.

\(^7\) The measures of accompaniment are the following:
- The temporary provision of services by EU firms or workers is submitted to minimal guarantees both in terms of labor market wages and of working conditions;
- Extension of the collective conventions regulating working conditions in Switzerland;
- Possible introduction of minimum wages in sectors not governed by collective conventions.

\(^8\) The safeguard clauses are the following:
- Switzerland is allowed to restrict immigration during 12 years following the effective date of the agreement if there is some evidence of economic or social problems linked to immigration;
- After these 12 years, if Switzerland can provide further evidence of too a high immigration pressure on the labor market, it can ask for new safeguard clauses;
- Finally, 7 years after the effective date of the agreement, Switzerland can decide whether it wishes to
added in the enactment. In 2000, the bilateral agreements have been accepted by the Swiss electorate but fears of migration were still present. Indeed, in 2005, the enlargement of these agreements to the ten new EU members has again awakened labor market fears and needed further adjustments of the safeguard clauses. Once again, even if the enlargement of these agreements has been accepted by popular vote, public pressures succeeded both in slowing down the process of the opening of borders to immigrants and in getting guaranties in case of disproportional immigration flows.

1.1.2 Welfare and fiscal arguments

Among the other economic reasons often evoked for explaining restrictive immigration policies, we find fiscal concerns. Generally, in most developed countries, the immigrants are younger and less skilled than natives, hence they may have a positive impact on the financing of pensions and a negative effect on tax revenues and on welfare spending. Even if no negative fiscal impact of immigrants has been empirically assessed,\(^9\) opinion polls indicate that many citizens believe that immigrants take out more from the public budget than they put in.\(^10\) In addition to the potential fiscal burden of immigrants, there is the fear that “welfare-motivated migration would create competition among western European states to frighten off potential migrants, which would lead to an erosion of the traditional social welfare state” (Sinn 2002).

Taking into account these two arguments can be an additional explanation of why countries generally impose higher levels of restrictions to low-skill immigrants than on high-skill immigrants. Moreover, these arguments have also often been widely used to put restrictions on the access of immigrants to social security or welfare programs. For example, eager discussions about keeping illegal residents from using public schools, receiving social services or non-emergency health care have emerged in some developed countries. In the US, this principle has even been accepted - by popular vote - in 1994 in California (proposition 187) and in 2004 in Arizona (proposition 200).

Another example to illustrate the fear of fiscal competition can be found in the recent debate on the liberalization of services according to the “origin country principle” among EU members. Indeed, according to its opponents, the directive on the liberalization of the internal market of services - Bolkestein’s directive 2003 - would seriously erode workers’ rights and protection and led to a “race to the bottom” of EU’s social system. Once again, public pressure weighted heavily in the political process by slowing the back end of the project.

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10For instance, the following question from the European Social Survey 2002: “Most people who come to live here work and pay taxes. They also use health and welfare services. On balance, do you think people who come here take out more than they put in or put in more than they take out?” reports, on a scale from 0 - generally take out more - to 10 - generally put in more -, an average value of 4.18 for the north-western European countries, 4.34 for the southern and 3.91 for the eastern.
1.1.3 Social concerns

Cohabiting with economic fears, social concerns can also be seen as a very relevant source of influence on the public opinion. Indeed, “the movement of people differs from the movement of goods and services, because people create attachments with those with whom they share social capital, including norms, language, customs, values and culture” (Schiff 2002). Even if the definition of social capital differs somewhat from one author to the other, it is generally associated with norms of reciprocity and moralistic trust. However, in the context of immigration policy, reciprocity and trust can lead to two opposed behaviors.

One the one hand, a high level of social capital may have a very positive influence on individual attitudes towards immigrants. Indeed, a trusting individual is expected to believe that immigrants will not enter the country to abuse welfare or to pursue illegal activities but rather to work hard to get a better wage and to enhance the economic ties with their country of origin. Moreover, immigrants are also expected to enrich cultural life, to accommodate to the recipient country’s customs and to stimulate economic growth.

On the other hand, individuals with a high level of social capital may be opposed to immigration as they fear that immigration will undermine their country’s social norms, weaken the existing social ties, or increase transactions costs. An illustration of the narrow definition of social capital is the awakening of the extreme right parties in Europe. Since the beginning of the nineties, extreme right parties have encountered much success in western Europe, as for instance in France, Austria, Netherlands, Italy, Belgium, Switzerland, not only because their xenophobic and racist arguments pleased some citizens but also because they were seen by many citizens as parties able to protect them against a loss in social capital.

1.2 Scope and motivations

The shaping of immigration policy in a direct democracy: Overview

In almost all the events listed so far, the public opinion had, without dispute, a significant role to play in the shaping of immigration policy. However, given that most developed countries are run by a representative democracy, it is not an easy task to disentangle public preferences from politician preferences. Given that “political outcomes are closer to citizens’ preferences in direct democracy compared to representative democracy” (Feld and Kirchgässner 2000), the Swiss direct democracy provides a unique and arguably very relevant setting to analyze the impact of individual preferences on the shaping of the immigration policy.

11As argued by Knack and Keefer (1997), “individuals in higher-trust societies spend less to protect themselves from being exploited in economic transactions.”
Indeed, Swiss nationals have broad voting rights and they have been using them extensively in the context of immigration policy making. Since 1970, the Swiss citizens have had vote on 13 referenda and on 9 popular initiatives connected with immigration policy. Given these extended political rights, the Swiss government had to take into account the popular reactions given out in the context of the pre-vote discussions so as to avoid that the initiatives asking for a sharp reduction in immigration flows be accepted by popular vote.

As most other similarly developed countries, the Swiss government has encountered difficulties to implement a coherent immigration policy since fears about immigration were always strongly present during the political debates. Nevertheless, with more or less success, the government succeeded to reconcile economic interests and public pressures while making Switzerland successfully absorb a large inflow of foreigners.\textsuperscript{12} Indeed, compared to most European countries, Switzerland has had one of the highest immigration’s share during the whole post-war period. Figure 1-1 shows the ranking of Switzerland in terms of foreigners’ share in the population in 2001.

Figure 1-1: Foreigners’ share in different European countries, 2001

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{foreigners_share}
\caption{Foreigners’ share in different European countries, 2001}
\end{figure}

**Organization**

Drawing on the unique institutional features of Switzerland as well as on European survey data, this dissertation seeks to shed light on the following issues: Why has the shaping of immigration policy been so hotly debated not only in the political sphere but also on the public place? How have individual perceptions - often very strongly opposed to immigration - interfered in the political making process? How has the Swiss direct democracy influenced the immigration policy? What kind of lessons can be drawn from the Swiss experience with

\textsuperscript{12}The share of foreigners in population increased from 6.04% in 1950 to 20.38% in 2003.
voting on immigration policy? What are the main determinants of individual attitudes towards immigration? Do political economy models help to understand better what shapes individual preferences? How much do economic characteristics matter? How do social preferences interfere with economic aspects? Have fiscal concerns about the impact of immigrants been over-estimated by the public opinion? Is there effectively a risk of fiscally induced migration and of a “race to the bottom” of fiscal revenues? These issues are all tabled in at least one of the three essays of this dissertation.

Each of the three essays of this dissertation is self-contained and focuses on a specific issue linked to the political economy of immigration policy. Even if relying explicitly on economic theory and on political economy frameworks, all three essays have a significant empirical content. The two first essays focus on the determinants of individual preferences towards immigration as reported by attitude surveys and the third essay presents an empirical test of the impact of migration on local tax rates. Finally, it is worth emphasizing that the first and the third essay rely on the specificity of the Swiss direct democracy.

1.3 Chapter synopsis

“Voting about immigration policy: What does the Swiss experience tell us?”

Over the last decade, opinions polls have been more and more widely used by economists to understand better the determinants of individual preferences towards immigrants. Indeed, opinions polls can be considered as a unique way to test the predictions of theoretical models which cannot be easily identified otherwise. However, as the outcomes of opinion polls do not directly influence immigration policies, they may suffer from diverse bias.

To circumvent most of the drawbacks of standard opinion polls data, the first essay: “Voting about immigration policy: What does the Swiss experience tell us?” uses a unique post-vote survey database to focus on the individual determinants of the participation and of the voting choice.

This essay starts by reviewing the political economy dimension of immigration policy in a direct-democracy framework. Using a Ricardo-Viner model, we discuss the medium term impact of immigration on factor rewards and the conditions under which a vote on immigration restrictions would be accepted in a popular vote. As a main prediction, we find that, whatever the skill mix of the immigrants, there will always be an opposition between high- and low-skill native voters.

Relying on the numerous popular votes on immigration policy which took place in Switzerland, this essay shows how the results at the voting booths have influenced the immigration policy over the last thirty years. In particular, the system of direct democracy has forced the Swiss government to stay a course accommodating the conflicting interests of the economic community - opposed to tight quotas - and of the public at large as expressed
through many contestation votes. Nevertheless, the resulting flexible system of annual quotas by worker categories, combined with limited mobility and exemptions, has successfully helped Switzerland to absorb a large inflow of foreigners.

Drawing on two unique post-vote surveys on how citizens voted about immigration policy, we could both test our political economy prediction and control for the “selection bias” - not all citizen actually go and vote - which may affect the outcome of a vote. Furthermore, by using post-vote data, we were also able to improve on traditional opinion poll data because they are free of any “hypothetical bias” - individual votes have a real influence on the final outcome. Indeed, the two initiatives analyzed in this essay could have, if accepted, a direct and immediate impact on the immigration policy as they both proposed a significant limitation in migration flows into Switzerland.

Estimating simultaneously the determinants of voting and participation decisions by using a bivariate probit model with sample selection, we establish that, confirming political economy predictions, education matters in the shaping of the attitudes towards immigrants but non-economic arguments also play an important role. We also find that turnout had no decisive influence on the outcome of the votes on immigration. However, by comparing the outcome of the vote - rejection of the anti-immigrant initiatives - with the results of pre-vote surveys - favorable to restrictions on immigration -, we emphasize that the results from opinion polls may suffer from a large “hypothetical bias” and may be overly pessimistic if interpreted as reflecting what peoples would actually vote if asked to. Given these two results, the observed differences between the outcomes of opinion polls and the real policies implemented do not depend on turnout but rather on the hypothetical context in which opinion polls take place.

“Trust: The forgotten factor shaping attitudes towards immigrants?”

Closely related to the preceding essay, the second essay: “Trust: The forgotten factor shaping attitudes towards immigrants?”, uses European level opinion poll data to investigates further the determinants of attitudes towards immigration. Even if opinion poll data may be hampered by an “hypothetical bias” and not be accurate enough to predict the outcome of a vote, their large sample size, the diversity of the countries sampled as well as the number of variables available for direct use make them a powerful tool to disentangle the economic from the social determinants of individual attitudes.

Relying on the rapidly growing experimental evidence stating that “economists fail to understand fundamental economic questions when they disregard social preferences” (Fehr and Fischbacher 2002), this essay is, to our knowledge, the first to explicitly introduce a variable related to social preferences and reciprocity beliefs - trust - among the determinants of attitudes towards immigrants. However, why focus on trust? This choice is not innocuous since trust has been considered by may social scientists - such as Putnam (2000) - as “a key component of social capital because it acts a social lubricant that enables a variety of forms of social interaction and cooperation”. Moreover, there is an ever growing evidence
that the level of trust of a country has an influence on its economic performance, on its government efficiency, on the participation in civic organizations, etc.

Using data from a new European opinion poll, the ESS, we could show that trust is a very important determinant of preferences towards immigrants and that this result is robust to many alternative specifications. Moreover, considering explicitly the possible bias associated with the use of subjective survey data both as explanatory and explained variables, we tested the robustness of our results by estimating simultaneously trust and preferences towards immigration within a Limited Information Maximum Likelihood framework. The results we find confirm that trust is an important determinant of attitudes towards immigrants and that it is a moral value that spreads not only to neighbors or to community members but also to immigrants.

Confirming past empirical evidence, we also show that education always significantly matters in the shaping of attitudes towards immigrants and that being active on the labor market increases this effect. In addition to this result, we could determine that the expected skill structure of immigration flows - proxied by its past structure - highly influences actual preferences, i.e. low-skill citizens living in countries with a history of low-(high-)skill immigration flows are much more against (in favor of) immigration than the high-skill citizens living there. Furthermore, introducing trust - which highly depends on education - in our estimations only slightly reduces the direct influence of education on attitudes towards immigrants. This finding suggests that the social content of education emphasized by social scientists cannot relevantly be linked to subjective expectations about reciprocity.

As for political implications, our results suggest that economic policy interventions to reduce job insecurity or welfare concerns should be coupled with social actions such as, for instance, promoting a better integration of immigrants, fighting discriminations, enhancing access to education, reducing income disparities or prompting legal enforcement, to reduce efficiently hostility towards immigrants.

“Does fiscally induced migration enhance tax competition? Evidence from Switzerland”

Based on the often mentioned fear that fiscally induced migration would enhance fiscal competition between states and/or countries, the third essay: “Does fiscally induced migration enhance tax competition? Evidence from Switzerland”, seeks to identify if tax competition for a higher tax base has been observed among Swiss local jurisdictions and has led to the much feared “race to the bottom” of tax revenues.

Even if many determinants of tax rates have been mentioned theoretically, the empirical literature has been almost exclusively endeavored to test the Meltzer-Richard (1981) hypothesis\(^\text{13}\) as well as strategic tax interactions between communities. Given that almost

\(^\text{13}\) Broadly, this model predicts that the lower the median voter income relative to the average income of the community, the higher the tax level.
no empirical survey has taken explicitly into account the effect of migration on taxes, we try to answer both of the following questions: Are own tax rates influenced by neighbor tax rates? If yes, through which channel do these strategic interactions occur? The answers to these questions may indeed have significant implications from a fiscal federalism point of view. If tax interactions occur mainly through a mimicking behavior of authorities or mainly through tax induced migration, the optimal policies to be implemented may be quite different. In the case of fiscally induced migration, the fear of a “race to the bottom” may have to be considered seriously and decentralization of fiscal competencies be inefficient.

Relying on a unique communal level data-set, we were able to improve upon past empirical evidence by controlling better for the institutional setting governing the tax setting behavior of public authorities. First, the Swiss political system is built on direct democracy with Swiss citizens having extended rights to participate in the policy making process and to influence the political outcome according to their preferences. Hence, compared with most developed countries, Switzerland provides without doubt one of the most adequate setting to match the predictions of the median voter model. Second, using Swiss municipal data reduces considerably the problem of comparability of local jurisdictions’ fiscal competencies which usually hampers empirical tests. Indeed, the Swiss communes within a canton all have the same public services to provide and the same constraints on the way of setting taxes. Moreover, despite of these strong restrictions on the tax setting competencies, differences in communal tax multipliers have remained large during the last two decades. Third, as Swiss municipalities highly rely on income taxes to finance their expenditures, the tax rate chosen by a commune might have a substantial impact on households residential choice. Combined with a high migration rate between communes, the database used in this essay will be very informative to isolate the effect of fiscally induced migration on local tax rates.

As main results, we find no significant evidence in favor of the Meltzer-Richard hypothesis but, once spatial interactions models are used,\textsuperscript{14} we find a strong and significant evidence that taxes interact positively within a given geographical area. Moreover, we could also identify that fiscally induced migration is only a minor channel through which taxes interact strategically.

These results provide interesting policy implications as they suggest that concerns about fiscally-induced migration and its detrimental effect on tax rates should not be a main source of concern for communities wanting to allow free mobility of workers with some neighboring communities having a similar level of economic development or for communities wanting to decentralize fiscal competencies to lower level jurisdictions. However, these results depend heavily on Swiss communes being submitted to an exogenously given tax schedule which implies that they cannot offer substantial tax cuts only to the high-earner individuals whose residential choice is highly influenced by taxes.

\textsuperscript{14}Note that empirical tests of spatial interactions models implies the use of spatial econometrics and instrumental variables.
Bibliography


Chapter 2

Voting about immigration policy: What does the Swiss experience tell us?

Abstract

Recently, many opinion polls and household surveys have revealed that a majority of developed countries citizens fear the consequences of increased immigration. At the same time, immigration policy has become a very “sensitive” issue to manage for most host countries governments. Drawing on the Swiss direct democracy, this paper reviews the Swiss experience with immigration which has been shaped strongly by regular voting on immigration policies. Relying on two unique post-vote data-sets on how Swiss citizens voted on initiatives attempting to limit the share of foreigners to its current level, this paper improves upon past empirical evidence by by-passing the problem of “hypothetical bias” plaguing the analysis of conventional survey data. Following political economy predictions, we address the question of whether the skill level of a citizen influences his attitude towards immigration, and we correct explicitly for the participation bias due to non-mandatory voting. As a main result, we find evidence that the hypothetical bias hampering pre-vote surveys may be large but that turnout has not a decisive influence on the outcome of a vote. We also find that - confirming political-economy predictions - education matters in the shaping of immigration preferences but non-economic arguments also play an important role.

*JEL classification: F22, J15, J30, J61, P16*

*Key words: Attitudes towards immigrants, immigration policy, political economy, vote, hypothetical bias, Switzerland*
2.1 Introduction

Over the last few decades, how to manage immigration has occupied center-stage in the policy-making debate of many developed countries. Indeed, squeezed between increasing migration pressures, the move towards regional agreements, and the rather negative views citizens have about immigration, the shaping of immigration policy has turned out to be a very “sensitive” subject to manage for the authorities of nearly all the host countries.

Given that most developed countries are run by a representative democracy, opinion polls have often been considered as a unique way to disentangle the public’s preferences from those of the politicians, and have been used more and more widely to better understand the determinants of individual preferences towards immigrants. Associated with labor market effects, welfare and fiscal concerns, or social arguments, many household surveys have emphasized that a majority of developed countries citizens are fearful of the consequences of increased immigration. However, as the outcomes of opinion polls do not directly influence immigration policies, they may suffer from diverse bias and interpreting them as reflecting what people would actually vote if asked to, may not be appropriate.

In the context of the Swiss direct democracy where Swiss citizens vote regularly on immigration policy, it is possible to identify citizens’ attitudes towards immigration by controlling for the “hypothetical bias” hampering conventional opinion polls data. Thanks to two unique post-vote data-sets, this paper seeks to explain the probability of participating in a vote and of accepting more restrictions on immigration in terms of individual characteristics. Moreover, as turnout is not mandatory in Switzerland, we can also explicitly take into account the “participation bias”. As a relevant result, we find that, while the participation choice seems not to have mattered for the outcome of the vote, the outcome effectively observed is far away from the predictions relying on pre-vote surveys, thus suggesting a large hypothetical bias when using conventional opinion poll data.

More broadly, the paper contributes to the debate on the political economy of migration policy and expands on de Melo et al. (2004). It recounts the Swiss experience with immigration and emphasizes the interaction of economic interests - mostly favorable to immigration - with the expression of citizens’ preferences via the political system - mostly reluctant to further immigration. The system of direct democracy has forced the Swiss government to conduct its immigration policy so as to avoid that restrictive propositions would be adopted by popular vote. At the same time - despite its very high share of foreigners - anti-immigration attitudes seem to be less widespread in Switzerland than in other European countries at least as reported in the Eurobarometer 53 and in the European Social Survey Round 1.

The remainder of the paper is structured as follows. Section two reviews the political economy dimension of immigration policy in a direct-democracy framework which is relevant both for Switzerland and for interpreting the results from recent post-vote surveys. Section three is an overview of the empirical literature based on opinion polls. Section four then briefly recounts how popular votes on referenda and initiatives shaped Swiss immigra-
tion policy over the last forty years. Section five presents the two Swiss post-vote data-sets and the econometric methodology used to estimate jointly the probability of participating in the vote and of accepting more restrictions on immigration in terms of individual characteristics. In section six, we analyze the results taking explicitly into account the possible “selection” bias associated with non-mandatory turnout. Differences or similarities between the outcome of a vote and results from conventional opinion polls are also discussed further. Conclusions follow in section seven.

2.2 The political economy of immigration in a direct democracy

When studying the impact of immigration on host countries, it is customary to consider labor-market, fiscal, and social effects. Here, we will concentrate on labor market effects, emphasizing the channels through which immigration may affect host-countries citizens. While many different kind of models try to explain the impact of immigration on natives’ labor market conditions, we focus on factor-endowment models which are probably the most suitable to study the political economy of immigration in a direct democracy. Relying on these models, we wish to emphasize the role of economic factors ownership in the determination of migration policies while discussing the political economy of skill requirements, e.g. under what conditions low-skill immigrants are likely to be accepted under an endogenous immigration policy.

2.2.1 Political economy predictions using factor-endowment models

Among the most often cited factor-endowment models connecting natives’ factor incomes to immigration, we find the Factor-Proportion analysis and the Heckscher-Ohlin model. The main prediction of the Factor-Proportion analysis is that any change in a country’s relative factor endowment will have an impact on factor prices, e.g. an inflow of unskilled immigrants in a country - by reducing the proportion of skilled versus unskilled workers - will raise (reduce) the wage of skilled (unskilled) citizens. The Heckscher-Ohlin (HO) model - in the standard case where the number of produced goods is at least as large as the number of production factors - predicts that immigration will have no impact on the factors’ rate of return as long as the country does not modify its output mix.¹ However, the larger the immigration flows and the more different the skills of the immigrants compared to the skills of the natives, the higher the probability that a country’s output mix - and hence the factors’ rate of return - will change, e.g. a large inflow of low-skill immigrants in a

¹This effect is sometimes called the factor-price-insensitivity.
country which is relatively richly endowed with high-skill workers will decrease the relative wage of the low-skill workers.\footnote{See Scheve and Slaughter (2001) and Mayda (2006) for a more complete summary of the implications of these models for predicting individual preferences towards immigration.}

In 1996, Benhabib was the first to introduce explicitly a median-voter approach in factor-endowment models. By supposing that capital - including human capital - is distributed unequally among natives and that a fixed pool of potential immigrants with different capital endowments is wishing to enter a country, he was able to show that if the median native’s capital endowment is smaller than some critical level - which is the case when the distribution of capital is sufficiently skewed to the right -, a minimum skill requirement for immigrants will defeat any other policy under majority voting with pairwise alternatives.

While a useful first step, Benhabib’s model does not allow us to take into account the observation that attitudes toward immigration are shaped not only by households’ characteristics but also by sectors of activity. Relying on the Ricardo-Viner model - which seems to be the most adequate to examine the distributional issues raised by immigration in a medium-term time-frame\footnote{For instance, Hillman and Weiss (1999) state: “Yet, domestic mobile labor (which is of course mobile in the short and the long run) ostensibly bases its trade-policy position on the factor-content propositions of the long-run HO model, and its position on immigration policy on the short-run specific-factors model”.} -, Grether et al. (2001) have argued that, if individual attitudes towards immigration are entirely determined by expected income effects, the acceptable level of immigration will be determined by the interaction of the three following elements: (i) the number of immigrants, (ii) the capital distribution among natives, and (iii) the capital endowment of the immigrants. Probably the main testable implication of this model is that, in the case where capital is evenly distributed within the groups of skilled and unskilled citizens and where the immigration surplus is infinitesimal, skilled natives will always adopt a position which is systematically opposed by unskilled natives. For example, if unskilled citizen are “capital-poor” and if the median voter is an unskilled citizen, unskilled “capital-poor” immigration will be opposed in a direct democratic framework.

How does the Ricardo-Viner model help us predict the shaping of immigration policies? At a country level, according to the characteristics - skill level and capital ownership - of the median voter, we will be able to predict what are the acceptable characteristics for new immigrants to enter the country. At an individual level, this model gives us some interesting insights on who might loose and who might win from immigration according to labor market characteristics.

\subsection*{2.2.2 Who votes?}

In a direct democracy in which voting is not compulsory - as in the Swiss case examined here -, one needs first to analyze the vote-participation process.\footnote{Campbell (1999) has shown that “[...] the alternative preferred by more expected zealous voters [...] wins with a high probability [...] even if the expected proportion of the entire electorate that shares that preference is arbitrarily small.”} This process can be viewed
as a cost-benefit analysis\textsuperscript{5} where a citizen will only go and vote if the sum of the benefits of getting his favored alternative accepted is higher than his voting costs.

The costs of voting can be, for instance, the time spent to go to the booths or to get informed about the issues of the vote. Even if we suppose that the average time needed to go to the booths is the same for all citizens, we can expect middle-aged and well-educated individuals, for instance, to be able to acquire information at less costs than the rest of the population. However, since education and age are often positively correlated with income, we can also expect their opportunity cost to get informed and to go to the booths to be much larger.\textsuperscript{6}

The benefits for a citizen to see his preferred outcome accepted can be viewed from three - not necessarily reinforcing - perspectives. According to an “instrumental” view, benefits are simply implied by an expected weighted difference in utility between a citizen’s preferred alternative and the other. This benefit is high if the result of the vote has a great influence on the citizen’s utility and/or if the citizen’s choice is expected to be pivotal. According to an “expressive” view, benefits are associated with the pleasure a citizen gets when supporting his preferred alternative and/or simply with the pleasure induced by participating in the vote. The closer (farther) the citizen’s preferred (non preferred) alternative is to his bliss point, the more he gets satisfaction by supporting his preferred alternative. Finally, according to a “signaling” view, a citizen can earn benefits either by abstaining to vote in order to show his discontent or by voting for his preferred alternative even if his vote in not seen as pivotal. According to the “instrumental” view, abstention is never a way to influence policy. On the contrary, according to the “expressive” and “signaling” views, abstention is placed on the same level as voting “yes” or “no”. Therefore, abstention cannot be explained on the basis of a sequential mechanism, where the question to vote or not is answered prior to and independently of the question how to vote.

This observation is an important input for specifying our choice of econometric framework as will be seen in section four. Unfortunately, the post-vote data-set we will use does not allow us to disentangle which elements of the cost-benefit analysis mattered most for each citizen’s participation choice. For instance, in the Ricardo-Viner set-up considered above, a skilled “capital-rich” citizen might expect his income to significantly increase if new unskilled and “capital-poor” immigrants enter the country. If voting costs are null, according to the “instrumental” view, he will vote in favor of more immigration, but according to the two other views, we cannot say if he will participate or not because of the unobserved characteristics (cultural preferences, discontentment with the government, pleasure with voting, etc.) which may enter his choice.

\textsuperscript{5}For more details see Fauvelle-Aymar et al. (2000) or Kirchgässner and Schulz (2005).

\textsuperscript{6}See Frey (1971) for an early contribution.
2.3 What do empirical studies using opinion polls tell us?

Compared to the large theoretical literature on the determinants of attitudes towards immigration, empirical studies of these determinants have emerged only since the mid-nineties and are still scarce. This sudden interest in empirical facts has probably been highly motivated by the increased immigration pressure on almost all the developed countries since the beginning of the nineties and by the fear of mass immigration flows associated with, for instance, the EU enlargement. Besides, the increased diversification of new immigrants’ culture and country of origin as well as the decline in their average skill level have surely had quite an important impact on the perception natives have about immigrants. Finally, the rapidly growing number of surveys conducted - partly resulting from better interactions between economists and social science researchers - and the increasing quality of data sampling methods have enhanced interest in the empirical determinants of attitudes.

Relying generally on a question of the type: “Do you think that the level of immigrants/foreigners in your country should be: decreased, kept the same or increased”, most - if not all - of the empirical analyses of the determinants of attitudes towards immigrants have reported that the skill level, either proxied by years of education or by occupation-related wages, has a significant positive impact on the probability of favoring immigration as predicted by most factor-endowment models. Moreover, by looking at multi-country databases, Mayda (2006) and O’Rourke and Sinnott (2006) found that in high (low) per capita GDP countries, the high-skill individuals are more (less) in favor of immigration than the low-skill individuals, which they interpret as a validation of the Heckscher-Ohlin model.

In addition to the standard socioeconomic and demographic variables, most authors included among their explanatory variables different measures of racial or cultural prejudice or of national pride. As expected these non-economic determinants also have a very significant influence on citizens’ attitudes. Relying on these results, most studies conclude that both economic and non-economic factors matter for the shaping of attitudes towards immigrants.

However, virtually all studies of attitudes towards immigration discussed here rely on opinion poll data. Even if the survey methodology is good, these kind of data are usually

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8Nevertheless, alternatively to the economic literature in which the individual level of skill is considered as a proxy for income gains or losses incurred in the labor market, most social scientists - such as Citrin et al. (1997) - have emphasized that the skill level should rather be considered as a proxy for tolerance or for more cosmopolitan social networks.

9The assumption behind this argument is that countries with a high per capita GDP are also relatively richly endowed with high-skill labor.

10Such as, for instance, the ISSP (International Social Survey Programme), the WVS (World Value Survey), the ESS (European Social Survey), the NES (National Election Study), the Eurobarometer, the British Social Attitudes Survey.
affected by an “hypothetical bias” as the surveyed individuals know that their answers will not have any direct impact on the policies implemented in their country. Therefore, their information costs when answering survey questions are much smaller than when voting and the main benefit they can get is a “signalling” one. Moreover, as abstention is not an option in the context of an opinion poll, some important information might be lost.

Contrary to the opinion-poll data used so far to better understand the attitudes towards immigration, the two databases we use for our empirical study are issued from post-vote surveys which in turn explicitly consider turnout and are not subject to a “hypothetical bias”.

2.4 The shaping of Switzerland’s immigration policy

As has been emphasized by Feld and Kirchgässner (2000), “political outcomes are closer to citizens’ preferences in direct democracy compared to representative democracy”. Since voting rights are a central part of the Swiss democratic life\(^\text{11}\) - thus by far dominating other countries with respect to the frequency of use\(^\text{12}\) -, relying on a median voter framework may help us to get some useful insights on the shaping of public policies. Keeping in mind this point of view, how has direct democracy contributed to the shaping of Switzerland’s immigration policy over the last fifty years?\(^\text{13}\)

During the period of strong growth in the early post-war period, labor shortages in Switzerland were met by immigration, with the foreigners’ share in the population increasing from 5.8% to 9.1% between 1950 and 1960 (see figure 2-1). But at the beginning of the sixties, tensions started building up and the government decreed two federal orders - in 1963 and 1964 - aiming at limiting the inflow of migrants.

In 1965, the first popular initiative attempting to limit the number of foreigners to 10% of total population - instead of the prevailing 15% - was introduced. Confronted with this threat, in 1968, the government decreed a new federal order aiming at stabilizing the stock of foreigners while at the same time making it easier for foreigners’ children to become naturalized and giving leeway on exemptions to assuage economic interests. The initiative was withdrawn but, as the number of foreigners with renewable or long-term permits actually increased by close to 5%, instead of falling by 3% as announced in the Federal decree of 1968, a second initiative asking to limit the foreigners’ share to 10% of the population was introduced in 1969. Since this time the instigators gave up the possibility of withdrawing the initiative, the first vote on immigration policy in Switzerland took place in 1970.

\(^{11}\)See Linder (1994) for an overview of the Swiss political system and of the critical role played by voting rights.

\(^{12}\)Swiss citizens called to the booths - on average - four times per year.

\(^{13}\)This section draws and expands on de Melo et al. (2003). Appendix III provides an overview of all the votes on initiatives and referenda which took place in Switzerland since the end of World War II.
The vote of June 7, 1970 marks a watershed in Switzerland’s policy towards immigrants. It was the first of a series of popular initiatives taken to the polls over the next thirty years, and the beginning of a policy based on a complex system of yearly quotas that is still applied today. This vote also registered one of the highest participation rates\textsuperscript{14} - 75% - and was only narrowly rejected in spite of a last ditch effort by the government to bring consensus around its immigration policy by introducing further restrictions.

In reaction to this first vote on immigration policy and squeezed between economic interests and popular pressures, the Swiss government started to devise a complex system of quotas. This system was designed to give it the flexibility to play both sides and to adjust rapidly to short-term objectives resulting from the combined pressures coming from labor unions wishing binding quotas, firms wishing loose quotas, and parts of the public wishing to preserve cultural identity as expressed in its xenophobic requests. For example, family reunification was not included in the quotas, nor was the transformation of seasonal to annual permits. Nevertheless, this “loophole” led to a third popular initiative seeking to restrain immigration. With a high participation rate, the initiative’s rejection on October 20, 1974 by a 2/3 majority heralded the success of the government’s “give and take” approach.

The role of the democratic process was also evident in the 1981 vote on a popular initiative aiming at creating more equality between Swiss nationals and foreigners, and eliminating the seasonal workers status. This proposal to abolish the seasonal workers status was sharply opposed by the construction, catering, and agriculture sectors that rely heavily on this category of labor and it was clearly rejected by the electorate. Nevertheless, since by that time the foreign population was effectively stabilized and the proportion of annual permits had fallen from 70% in 1970 to 25% in 1980, flexibility in migratory policy had already substantially waned.

It is only in the late eighties with the surge in asylum seekers and the prospects of a closer relationship with the EU that immigration policy started again to be questioned. On the one hand, distinguishing between economic and political immigration motives was becoming difficult, and, on the other hand, the guest-worker system appeared inappropriate if closer ties with the EU were to develop. Sensing that the vote on the EEA act would be rejected because it would call for an abolishment of the guest-worker system, an immigration policy based on “cultural proximity” - often referred to as the “three-circle” policy\textsuperscript{15} - was adopted by the government. In 1992, the referendum to join the EEA was nevertheless rejected by Swiss citizens.

The introduction of the “three-circle” policy was rapidly the subject of much criticism both within Switzerland from the business sector against the quota system and from the anti-immigrant citizens on the weakness of the discriminatory “cultural proximity policy”.

\textsuperscript{14}Note that the right to vote for women was only introduced in 1971.

\textsuperscript{15}Under the “three-circle” system, work permits were granted preferentially to citizens of EU and EFTA countries, then to citizens of certain other countries considered to be traditional migration partners of Switzerland, and finally to citizens from the rest of the world.
and abroad by criticisms against the “stigmatizing and discriminatory” effects of this policy during the International Convention against racism in 1995. Hence, in 1998, a proposal of a point system akin to the one in use in Canada and Australia was discussed by the Swiss authorities. Although this proposal did not carry the day, the government shifted to a “two-circle” policy to accommodate the desire for closer ties with the EU - with 67% of the electorate accepting the bilateral agreements \(^{16}\) with the EU in May 2000 - while catering to anti-foreigner feelings in the population. Meanwhile, guest-worker permits were cut in half to 88’000 during the decade of the nineties.

Since June 1st, 2002, the conditions for admitting immigrants from EU countries has been regulated by bilateral agreements which insure a smooth transition to free mobility of persons between these two areas. In September 2005, Swiss citizens had to vote on the extension of the free mobility agreement to the ten new EU member states. The issue of that vote was uncertain until the official results were published, but, once again, the safeguard clauses negotiated by the Swiss government helped to insure a positive outcome. For the citizens outside EU, their admission to Switzerland is actually governed by a new foreigners’s law which is based on a strict point system.

As highlighted by the preceding description, the Swiss direct-democracy system has had a very important impact on the shaping of Swiss immigration policy. Indeed, the system of popular initiatives - some aiming at controlling the flow of immigrants, others at

\(^{16}\) Among the bilateral agreements there was the free mobility of labor between Switzerland and EU15 countries.
improving the status of immigrants - forced the government to compromise and to design over the years an effective, though not economically efficient, immigration policy. Moreover, minorities opinions have often been taken into account in the political process in order to avoid opposition through the voting booths. Combined with the fact that the foreigners’ share in population has always been one of the highest in Europe and half of the new immigrants are entering Switzerland for labor purposes, Switzerland seems to be a good country for analyzing the political and economic stakes at an individual level.

### 2.5 Data and empirical methodology

Drawing on a unique post-vote database, this section emphasizes the need to use an appropriate empirical specification to take into account the specificity of both the voting and the participation choice. It highlights also to what extent using post-vote data can help us to get further insights on the determinants of attitudes towards immigration.

#### 2.5.1 Two popular initiatives on immigration restrictions in Switzerland

The first vote to be analyzed is the initiative “for the regulation of immigration” which took place on September 24, 2000. The main requirement of this initiative was that the foreigners’ share should not exceed 18% of the total Swiss population. Unconventionally included in these 18% were asylum-seekers, international organization workers and guest workers, but not high-skill workers, students and artists. Notice that the foreigners’ share was already 19.3% in 2000. This initiative was rejected by 63.8% of the voters and the participation rate was of 45.3%. The second vote analyzed here is the initiative “for the limitation of immigration” which took place on December 4, 1988. The requirement of this initiative was to limit the total annual immigration flows to Switzerland to two-thirds of the total annual emigration flows (including asylum-seekers) and to limit the number of seasonal workers and cross-border commuters. This initiative was rejected by 67.3% of the voters and the participation rate was of 52.8%, a high participation rate in Switzerland.

For both initiatives, nearly all the political parties and the government recommended to vote “no” arguing that these initiatives would have a negative impact on the economy because of the rigidity of their application, and could put back in question the relations with the EU as well as Swiss humanitarian policy. Among the other common points between these initiatives, both took place during a period of good economic conditions - low unemployment and high GDP growth. Finally, between 1988 and 2000, the foreigners’ population in Switzerland evolved as follows: the foreigners share and the number of asylum

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17For a description of the “VOX” post-vote sampling methodology and of the potential inherent biases, please refer to appendix I.

18The average participation rate between 1993 to 1999 was 42%.
seekers increased while the number of guest workers and the share of foreigners from EU
countries decreased. Since the implications of both initiatives on immigration policy differ
only slightly, comparing them should lead to interesting insights on how attitudes towards
immigrants evolved between 1988 and 2000.

2.5.2 Econometric framework

As mentioned in section two, the voting and the participation decisions have to be treated
within the framework of a simultaneous model. If we consider that \( p \) is the individual
participation choice (where \( p = 1 \) denotes participation) and \( v \) is the individual vote decision
(where \( v = 1 \) denotes an acceptance of the initiative) observed only if \( p = 1 \), the simplified
reduced form of a structural voting model is given by the two following equations:

\[
\begin{align*}
    v^* &= x'\beta + \varepsilon, & v = 1 \quad &\text{if } v^* > 0 \text{ and } p = 1, \quad v = 0 \quad &\text{if } v^* \leq 0 \text{ and } p = 1; \\
    p^* &= x'\alpha + z'\gamma + \mu, & p = 1 \quad &\text{if } p^* > 0, \quad p = 0 \quad &\text{otherwise}
\end{align*}
\]

(2.1)

(2.2)

Here, \( v^*, p^* \) are the two dependent latent variables; \( x, z \) are the vectors of explanatory
variables; \( \varepsilon \) and \( \mu \) are the errors supposed to follow a bivariate normal distribution. The
possibility of interdependence between the decision to participate and to vote in favor of
the initiative is captured by the fact that the disturbances are assumed to be correlated:
\( \text{Corr}(\varepsilon, \mu) = \rho \).

To estimate this model, we use a maximum-likelihood probit model with sample selection.\(^{19}\) The three types of observations in the sample are:

\[
\begin{align*}
    p &= 0 & \text{prob}(p = 0 \mid x, z) &= \Phi(-(x'\alpha + z'\gamma))^20 \\
    p &= 1, v = 0 & \text{prob}(v = 0, p = 1 \mid x, z) &= \Phi_c(-(x'\beta, x'\alpha + z'\gamma, -\rho) \\
    p &= 1, v = 1 & \text{prob}(v = 1, p = 1 \mid x, z) &= \Phi_c(x'\beta, x'\alpha + z'\gamma, \rho)
\end{align*}
\]

(2.2)

where \( \Phi(x, z) \) is the univariate normal \( CDF \) function and \( \Phi_c(x, z, \rho) \) is the bivariate normal
\( CDF \) function. Based on these probabilities, the likelihood function can be written as follows:

\[
\mathcal{L} = \prod_{i=1}^{N_1} \Phi_c(-x_i'\beta, x_i'\alpha + z_i'\gamma, -\rho) \cdot \prod_{i=N_1+1}^{N} \Phi_c(x_i'\beta, x_i'\alpha + z_i'\gamma, \rho) \cdot \prod_{i=N+1}^{M} \Phi(-(x_i'\alpha + z_i'\gamma))
\]

\(^{19}\)See van Ven and Praag (1981) for an early use of this method.

\(^{20}\)The intermediate steps are:

\[
\begin{align*}
    \text{prob}(p = 0 \mid x, z) &= \text{prob}(p^* \leq 0 \mid x, z) \\
    &= \text{prob}(\mu \leq -(x'\alpha + z'\gamma) \mid x, z) \\
    &= \Phi(-(x'\alpha + z'\gamma))
\end{align*}
\]
where the first $N_1$ observations represent the choices: $p_i = 1$ and $v_i = 0$, the following $(N - N_1)$ observations: $p_i = v_i = 1$ and the last $(M - N)$ observations: $p_i = 0$.

This model has the advantage of handling simultaneously two distinct estimations with possibly correlated disturbances. Explicitly modeling the correlation between the error terms is important as some unobserved individual characteristics may influence both the participation and the vote choice. Besides, this model allows us to properly take into account that only the characteristics of the citizens who voted matter for the final outcome of the vote.

2.5.3 Exclusion restrictions

The main difficulty for identifying adequately a bivariate probit with sample selection is to find at least one instrument - $z$ variable - which explains the participation choice but not the vote decision, i.e. the attitude towards immigration. Indeed, in the absence of such a variable the identification of the selection effect would be entirely parametric, depending exclusively on untestable assumptions about the unobserved heterogeneity.

The first instrument we considered is “political orientation” squared. This variable may be a good proxy for the level of importance an individual attributes to a given vote, i.e. citizens in the extremes of the political spectrum are expected to participate more since, according to an “expressive” view at least, the benefits they will get by voting will be very high.

As an alternative instrument, we used “interest in politics”. A priori, we expect this variable to have a very significant influence on the participation choice whatever the object of the vote.\footnote{To avoid the problems linked with the use of categorical variables - interest in politics was coded on a four level scale -, we transformed this variable into dummies.} Unfortunately, this variable exists only in the 2000 post-vote survey.

Table 2.1: Summary statistics, difficulty to understand the implications of the votes

<table>
<thead>
<tr>
<th></th>
<th>Solar</th>
<th>Counter-project</th>
<th>Environment</th>
<th>Immigration</th>
<th>Referendum</th>
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<tbody>
<tr>
<td><strong>Difficulty 2000</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.561</td>
<td>0.624</td>
<td>0.636</td>
<td>0.364</td>
<td>0.690</td>
</tr>
<tr>
<td>Std</td>
<td>0.497</td>
<td>0.485</td>
<td>0.482</td>
<td>0.482</td>
<td>0.463</td>
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<th></th>
<th>Speculation</th>
<th>Work</th>
<th>Immigration</th>
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<tbody>
<tr>
<td><strong>Difficulty 1988</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.421</td>
<td>0.252</td>
<td>0.278</td>
</tr>
<tr>
<td>Std</td>
<td>0.494</td>
<td>0.434</td>
<td>0.448</td>
</tr>
</tbody>
</table>

Finally, taking into account that usually Swiss citizens are called to the booths for voting on more than one object at the same time,\footnote{The 4th December 1988, the citizens were called to vote on 3 initiatives: one against land speculation,} the various difficulties an individual has
to understand the consequences of the different objects under vote can also be appropriate instruments, i.e. it surely affect the participation choice but is independent of the attitude towards immigration.

2.6 Results

This section starts with presenting the results for the 2000 initiative which are the most satisfactory given the increased availability of data. Then we turn to the presentation of the results for the 1988 initiative. Finally, some comparisons of both initiatives are made. Appendix II describes the variables used for estimation.

2.6.1 The September 2000 initiative

In table 2.2, we report the results of three joint estimations of the voting and participation equations using alternative sets of the instruments presented in last section. Note that specifications [4] and [5] are identical to specifications [2] and [3] except for the education dummies replaced by a potential earning variable and a dummy for being retired.

Before discussing the results of our estimations in details, we present some evidence on the relevance of our instruments. First, whatever the specification chosen, there is always at least one instrument which significantly influences participation. Second, according to an $F$-test on the joint significance of the instruments, we could always reject the hypothesis of weak instruments.

Since our instruments seem to be adequate, we start by focusing on the estimation of the coefficients of correlation between the errors which may allow us to identify a possible sample-selection bias. As can been seen in table 2.2 in no estimation - according to a Wald and to a likelihood ratio test - this coefficient is significantly different from zero at a 1% level, i.e. no unobserved characteristic has a simultaneous and systematic influence on the vote and on participation decision. This result means that there is no sample selection bias and that the estimations of the vote and participation equations could have been made separately.

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20 Given that many surveyed answered “don’t know” to these questions, we classified them with the surveyed who answered “it was difficult”. Moreover, in 2000, as the difficulties to understand the implications of three questions about environmental policy were very highly correlated (0.82), we used only the first question in our estimations.

25 See Bound et al. (1995) for an overview of the use of $F$-tests to identify weak instruments.
### Table 2.2: Estimation results, 2000 initiative

<table>
<thead>
<tr>
<th></th>
<th>Vote</th>
<th>Participation</th>
<th>Vote</th>
<th>Participation</th>
<th>Vote</th>
<th>Participation</th>
<th>Vote</th>
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<td>[1a]</td>
<td>[1b]</td>
<td>[2a]</td>
<td>[2b]</td>
<td>[3a]</td>
<td>[3b]</td>
<td>[4a]</td>
<td>[4b]</td>
<td>[5a]</td>
<td>[5b]</td>
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<tr>
<td>Compulsory school</td>
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<td>-0.309**</td>
<td>-0.354</td>
<td>-0.133</td>
<td>-0.392</td>
<td>-0.22</td>
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<tr>
<td></td>
<td>[0.48]</td>
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<td>[0.76]</td>
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<td>[1.29]</td>
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<td>-0.098</td>
<td>-0.626*</td>
<td>-0.129</td>
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<td>Professional school</td>
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<td>0.265</td>
<td>0.494**</td>
<td>0.318</td>
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<td>[2.48]</td>
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<td>0.377***</td>
<td>-0.511***</td>
<td>-0.06</td>
<td>-0.473**</td>
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<td>[0.86]</td>
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<tr>
<td>Earnings /100</td>
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<td>-0.010**</td>
<td>0.007*</td>
<td></td>
<td></td>
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</tr>
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<td>Retired</td>
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<td>-0.879**</td>
<td>0.404</td>
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<td>[0.53]</td>
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<td></td>
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</tr>
<tr>
<td>Age</td>
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<td>0.032*</td>
<td>-0.042</td>
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<td>-0.04</td>
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<td>Age(^2) / 1000</td>
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<td>0.457*</td>
<td>0.007</td>
<td>0.455*</td>
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<td>0.333**</td>
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<td>0.381**</td>
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<td>0.033</td>
<td>0.221***</td>
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<td>0.240***</td>
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<td>[5.51]</td>
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<td>Political orientation(^2)</td>
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<td>0.042***</td>
<td>0.019</td>
<td>0.042***</td>
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<td>[1.37]</td>
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<tr>
<td><strong>French</strong></td>
<td>0.098</td>
<td>-0.374***</td>
<td>-0.065</td>
<td>-0.267*</td>
<td>-0.121</td>
<td>-0.304**</td>
<td>-0.015</td>
<td>-0.279*</td>
<td>-0.084</td>
<td>-0.315**</td>
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<tr>
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<td>0.40</td>
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<td>0.33</td>
<td>[1.78]</td>
<td>0.61</td>
<td>[2.13]</td>
<td>0.08</td>
<td>[1.87]</td>
<td>0.42</td>
<td>[2.20]</td>
</tr>
<tr>
<td><strong>Italian</strong></td>
<td>0.422</td>
<td>-1.036***</td>
<td>-0.031</td>
<td>-0.535**</td>
<td>-0.178</td>
<td>-0.984***</td>
<td>0.155</td>
<td>-0.431**</td>
<td>-0.011</td>
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<td>0.49</td>
<td>[4.32]</td>
<td>0.41</td>
<td>[1.96]</td>
<td>0.03</td>
<td>[4.17]</td>
</tr>
<tr>
<td><strong>Foreigners' share</strong></td>
<td>-0.009</td>
<td>0.020**</td>
<td>-0.001</td>
<td>0.026***</td>
<td>0</td>
<td>0.015*</td>
<td>-0.004</td>
<td>0.026***</td>
<td>-0.002</td>
<td>0.015*</td>
</tr>
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<td></td>
<td>0.71</td>
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<td>0.35</td>
<td>[2.92]</td>
<td>0.19</td>
<td>[1.75]</td>
</tr>
<tr>
<td><strong>Political interest very high</strong></td>
<td>2.829***</td>
<td>[10.55]</td>
<td>2.794***</td>
<td>[10.57]</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Political interest high</strong></td>
<td>1.961***</td>
<td>[9.01]</td>
<td>1.944***</td>
<td>[9.04]</td>
<td></td>
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<tr>
<td><strong>Political interest low</strong></td>
<td>0.810***</td>
<td>[3.55]</td>
<td>0.788***</td>
<td>[3.48]</td>
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<tr>
<td><strong>Difficulty solar</strong></td>
<td></td>
<td>-0.535***</td>
<td></td>
<td>-0.532***</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>[3.71]</td>
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<td>[3.71]</td>
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<tr>
<td><strong>Difficulty immigration</strong></td>
<td></td>
<td>-0.897***</td>
<td></td>
<td>-0.892***</td>
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<td></td>
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</tr>
<tr>
<td><strong>Difficulty referendum</strong></td>
<td></td>
<td>-0.462***</td>
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<td>-0.472***</td>
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<td></td>
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<td></td>
<td></td>
<td>[3.02]</td>
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<td>[3.09]</td>
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</tr>
</tbody>
</table>

Rho - $\rho$: -0.722, -0.125, 0.147, -0.163, 0.134
Log-likelihood: -714.425, -602.313, -615.587, -611.317, -624.554

Absolute value of z-statistics in brackets, Constants not reported, 810 observations
* significant at 10%; ** significant at 5%, ***significant at 1%
However this result informs us only on the behavior of unobserved characteristics. In terms of observed characteristics, it may well be that participation has had an impact on the outcome of the vote. According to specification [2], had all the citizens participated in the vote, the percentage of “no” to the initiative would have increased only by a little less than 2%. Moreover, even if the participation and the voting choice are independent - which would suggest that opinion polls may be accurate enough for predicting voting attitudes -, we must not forget that, contrary to opinion polls, our post-vote data are not subject to the hypothetical bias. Despite having no direct way to assess the size of this hypothetical bias, it is still interesting to compare our results with pre-vote survey results. According to two independent opinions polls, one carried out in July 2000 for the Swiss television (DSR/TSR) and the other in May 2000 for the Swiss government, the initiative should have been accepted by the electorate. For example in the July 2000 opinion poll, 40% of respondents were in favor of the popular initiative, 42% against and 17% did not have an opinion. Given that the question asked in these pre-vote surveys was identical to the question asked at the exit of the booths, we are tempted to interpret this result as evidence of the existence of an hypothetical bias in standard opinions polls.26

To close our discussion about sample selection, we have to mention that specification [1] reports a very large and negative coefficient of correlation between the errors which, surprisingly, is not significant. This result may be attributed either to a very flat likelihood function or to a non-normal distribution of the errors. Given this possible misspecification problem, the rest of this section discusses almost exclusively the results obtained for specifications [2] to [5].

The result that individuals with the highest level of education, university or HES, and with a high school degree have a significantly higher probability to reject the anti-immigration initiative than the other education groups deserves to be emphasized. As an illustration, an increase at sample means in the education level from apprenticeship to high school or university (whose coefficients are statistically identical) increases the probability to vote “no” by about 15 percentage points. Since the number of years of education for getting a professional school degree is higher than that for obtaining a high school degree, this result seems to only confirm partially the theoretical predictions, i.e. skilled natives will always adopt a position which is systematically opposed by unskilled natives. In Switzerland both apprenticeship and professional schools are vocational trainings, thus the years of education attached to the different kind of education may not be a good proxy for the level of skill acquired and the situation in the labor market. Once we look at the specifications where education levels are replaced by potential earnings, we find that this variable has the expected sign and is highly significant: an income increase of 1'000 Frs increases the

---

26See Schlüpfer and Hanley (2006) for another evidence of an hypothetical bias in a Swiss vote. By using both contingent valuation survey data and real vote outcomes, they have shown that the “voting-based willingness to pay was only a small fraction of stated willingness to pay, indicating an inflation in values due to the hypothetical context”. See also Cummings et al. (1997) for another example of hypothetical bias in contingent valuations.
probability to reject the initiative by about 3 percentage points. At the same time, the retired are more favorable to immigration which may confirm that they are not afraid of possible labor market effects associated with immigration.

Similarly to Scheve and Slaughter (2001) and Mayda (2006), having left-wing convictions has a very large and significant influence on the vote on immigration.\(^{27}\) Furthermore, being owner of his housing increases the probability to accept the initiative by about 11 percentage points which could be explained by owners being less mobile than renters and hence being more strongly submitted to the consequences of immigration flows. Being married and being a woman are both associated with a higher probability of rejecting the initiative even if only significant at a 10\% level. Besides, it is interesting to note that living in an area with a high foreigners’ share has no significant influence on the voting choice.

The estimation of the participation equation yields interesting results in its own right. First, referring to estimation [1b], having a high level of education has a positive and very significant influence on participation. However, when adding the political interest or the difficulty to understand the objects of the vote in the participation equation, the effect of the education dummies - except of the professional school dummy - vanishes. This result suggests that the positive effect of education on the participation choice is mainly driven by high-skill individuals having lower information costs and more interest in politics than low-skill individuals.\(^{28}\) That the professional school dummy remains significant in specifications [2b] and [3b] can be explained by a very weak correlation between this variable and the instruments. This implies that the participation behavior of the individuals with a professional school degree is governed by some specific and unobserved characteristics.

Second, estimations [1b], [3b] and [5b] report that persons at the political extremes are more likely to participate than those who hold centrist beliefs. Indeed, the probability of participation is related to the political scale by a U-shaped relationship with a minimum around 0 which is close to the sample mean (-0.09). When the difficulty to understand the implications of the votes is replaced by the self-reported political interest - as in estimations [2] and [4] - the political orientation squared loses its significance which suggests that this variable is effectively closely related to the intensity of political preferences.

Third, the participation of Swiss citizens living in a minority language area or in an agglomeration with a small share of foreigners is significantly lower. The former result is quite common in Switzerland whatever the objects of the vote\(^{29}\) and the latter is surely

---

\(^{27}\) Even if it might be argued that the political orientation is endogenous to the attitude towards immigrants, this problem is in fact very limited in our case since we are not working with general attitudes about a given topic but with a well defined vote choice.

\(^{28}\) Note that the correlation between a very high interest in politics and a university (compulsory school) degree is: 0.26 (-0.05), and between the average difficulty to understand the issues of the vote and a university (compulsory school) degree is: -0.18 (0.11).

\(^{29}\) It has to be mentioned that in addition to the federal objects, most cantons and communes also ask their citizens to vote on cantonal and/or communal objects. Hence, it may be that some of these objects generate a large cantonal mobilization which, in turn, will also affect the participation to the federal vote. In 2000, among the minority language cantons, only one - Geneva - had a high participation rate (51\% vs 45\% on average).
due to immigration policy affecting much more those who have a higher probability to be in close contact with foreigners.

Fourth, the woman, married, and owner dummies often have a significant positive impact on the probability to participate in the vote. For instance, being owner increases the probability to go to the polls by about 14 percentage points, being married by about 10 and being a woman by about 8.

Finally if we look at the influence of our instruments on participation, we find that, compared with having no interest in politics, reporting a little interest increases the probability to participate by 27 percentage points and reporting a very high interest by about 61 percentage points. In specifications [3] and [5], admitting to have had difficulty to understand the implications of the immigration initiative reduced the probability to vote by about 34 percentage points whereas having had difficulty to understand the implications of a change in the voting rights reduced it only by about 17 percentage points.

2.6.2 Nonparametric bounds

Even if the estimations of specifications [2] to [5] are helpful to understand better the determinants of voting attitudes, the large but insignificant correlation coefficient reported by the estimation of specification [1] casts some doubts on the validity of the estimation methodology to identify adequately a possible selection bias. Indeed, the use of a bivariate probit with sample selection is not assumption-free, e.g. the errors of the model are assumed bivariate normal and the instruments used not to influence the outcome of the vote. In order to relax these two assumptions, we present some calculations of non-parametric bounds as introduced by Manski (1990).\footnote{The use of this method has been kindly suggested by an anonymous referee.}

Using the law of iterated expectations and taking into account that both \( v \) and \( p \) are binary variables, the probability to vote in favor of the anti-immigrant initiative - conditional on observed exogenous characteristics \( x \) - can be written as:

\[
\Pr(v = 1 \mid x) = \Pr(v = 1 \mid x, p = 1) \cdot \Pr(p = 1 \mid x) + \Pr(v = 1 \mid x, p = 0) \cdot \Pr(p = 0 \mid x)
\]

where the data identify \( \Pr(v = 1 \mid x, p = 1), \Pr(p = 1 \mid x) \) and \( \Pr(p = 0 \mid x) \) but not \( \Pr(v = 1 \mid x, p = 0) \). If we define \( K_0 \) and \( K_1 \) as, respectively, the lowest and highest possible value \( \Pr(v = 1 \mid x, p = 0) \) can take, \( \Pr(v = 1 \mid x) \) can be bounded as follows:

\[
B_L = \Pr(v = 1 \mid x, p = 1) \cdot \Pr(p = 1 \mid x) + K_0 \cdot \Pr(p = 0 \mid x) \leq \Pr(v = 1 \mid x)
\]

\[
\leq \Pr(v = 1 \mid x, p = 1) \cdot \Pr(p = 1 \mid x) + K_1 \cdot \Pr(p = 0 \mid x) = B_U
\]

Without any additional assumption, we can set \( K_0 = 0 \) and \( K_1 = 1 \). By taking this information into account, we obtain Manski’s “worst-case” bounds:

\[
B_L^w = \Pr(v = 1 \mid x, p = 1) \cdot \Pr(p = 1 \mid x) \quad \text{and} \quad B_U^w = \Pr(v = 1 \mid x, p = 1) \cdot \Pr(p = 1 \mid x) + \Pr(p = 0 \mid x).
\]
On the upper part of table 2.3, we report a series of calculations of these “worst-case” bounds. Except for the individuals who are politically on the left or who have a university degree, all these bounds include the threshold value of 50%. Nevertheless, given that these upper bounds are only slightly over 50%, the outcome of the vote would have depended on turnout only if the abstentionists’ preferences had been dramatically different from those of the individuals who voted.

Since abstention can often be explained by citizens’ indifference towards the outcome of the vote, the bounds we just discussed could be reduced further. If we suppose that the number of indifferent citizens is significant and if we suppose that in a mandatory vote these indifferent citizens would have voted in favor of the initiative with a probability of 50%, we can persuasively consider that \( K_0 > 0 \) and \( K_1 < 1 \). However, which values should be given to \( K_0 \) and \( K_1 \)? Without any additional assumption, the only thing we can state is that for the unconditional upper bound \( (B_U) \) to be equal to 50%, we must have \( K_1 = 0.79 \) which, in the context of the Swiss votes, seems to be a much more realistic upper value for \( \Pr(v = 1 \mid x, p = 0) \).

Table 2.3: Bounds on the probability to accept the initiative, 2000 initiative

<table>
<thead>
<tr>
<th>( x, z )</th>
<th>( B_L )</th>
<th>( \Pr(v = 1 \mid x) )</th>
<th>( B_U )</th>
<th>( x, z )</th>
<th>( B_L )</th>
<th>( \Pr(v = 1 \mid x) )</th>
<th>( B_U )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manski “worst-case” bounds</td>
<td></td>
<td></td>
<td></td>
<td>age 18/39</td>
<td>10.10</td>
<td>21.74</td>
<td>63.64</td>
</tr>
<tr>
<td>uncond. on ( x )</td>
<td>16.30</td>
<td>28.33</td>
<td>58.77</td>
<td>compulsory s.</td>
<td>8.33</td>
<td>19.05</td>
<td>64.58</td>
</tr>
<tr>
<td>apprenticeship</td>
<td>16.97</td>
<td>30.86</td>
<td>61.99</td>
<td>age 40/65</td>
<td>17.28</td>
<td>28.11</td>
<td>55.81</td>
</tr>
<tr>
<td>high school</td>
<td>5.45</td>
<td>12.5</td>
<td>61.82</td>
<td>age &gt;65</td>
<td>25.63</td>
<td>36.94</td>
<td>56.25</td>
</tr>
<tr>
<td>professional s.</td>
<td>34.72</td>
<td>49.02</td>
<td>63.89</td>
<td>left</td>
<td>6.09</td>
<td>9.92</td>
<td>44.67</td>
</tr>
<tr>
<td>university</td>
<td>14.48</td>
<td>19.81</td>
<td>41.38</td>
<td>center</td>
<td>13.53</td>
<td>26.46</td>
<td>62.39</td>
</tr>
<tr>
<td>Instrumental variables bounds</td>
<td></td>
<td></td>
<td></td>
<td>right</td>
<td>34.46</td>
<td>50.00</td>
<td>65.54</td>
</tr>
<tr>
<td>pol. interest</td>
<td>26.46</td>
<td>28.33</td>
<td>32.59</td>
<td>diff. immig.</td>
<td>20.74</td>
<td>28.33</td>
<td>45.03</td>
</tr>
<tr>
<td>diff. solar</td>
<td>23.66</td>
<td>28.33</td>
<td>39.73</td>
<td>diff. ref.</td>
<td>23.99</td>
<td>28.33</td>
<td>36.44</td>
</tr>
</tbody>
</table>

Even if having the advantage of being assumption-free, the “worst-case” bounds are quite wide and do not allow us to properly reject the possibility that full turnout would have changed the outcome of the vote. To reduce these bounds, we assumed that the instruments discussed in last section are relevant and valid, i.e. they significantly explain participation and they satisfy mean independence: \( \Pr(v = 1 \mid x, z = z_v) = \Pr(v = 1 \mid x) \).
Using this additional information reduces the bounds as follows:\textsuperscript{31}

\[
B^*_L = \sup_{z_v \in \mathbb{Z}} [\Pr(v = 1 \mid x, z_v, p = 1) \cdot \Pr(p = 1 \mid x, z_v)] \leq \Pr(v = 1 \mid x, z_v) \\
\leq \inf_{z_v \in \mathbb{Z}} [\Pr(v = 1 \mid x, z_v, p = 1) \cdot \Pr(p = 1 \mid x, z_v) + \Pr(p = 0 \mid x, z_v)] = B^*_U
\]

The estimations of these bounds are provided in the lower part of table 2.3. In no case, we find evidence of a turnout effect, i.e. had all the individuals participated in the vote, the initiative would never have been accepted. This evidence supports the initial results obtained by relying on the assumption that the errors of equations (2.1) and (2.2) are jointly normal.

2.6.3 The December 1988 initiative

To extend our analysis, columns [6] of table 2.4 report the estimations of the vote and participation choices for the December 1988 initiative. Similarly to the 2000 initiative, the coefficient of correlation between the errors is not significantly different from 0, i.e. there is no sample selection bias. Looking at the vote estimation [6a], as most of the explanatory variables turned out to be insignificant, we tested the overall explanatory power of this regression. According to a Wald test ($W = 33.4 > 24.7 = \chi^2_{11}$), we could reject the hypothesis that only the constant belongs to the equation at a 1% level. The most significant explanatory variable is having a high education level. If an individual decides to increase his education level from intermediate to high, his probability to vote “yes” will decrease by about 13 percentage points. In addition to education, we find that being a women has a rather negative impact on immigration restrictions as was the case in 2000. However, contrary to 2000, being owner of his housing has a positive, though only significant at a 10% level, impact on the rejection of the initiative.

Turning to the participation equation, we find that most variables - married, owner, political orientation squared as well as our instruments - have the same influence as the ones reported in the estimation of the 2000 initiative. Education also matters since low-skill citizens participated significantly less in the vote. Surprisingly, living in an Italian speaking region\textsuperscript{32} turns out to have the opposite, and significant, sign as in 2000. However, the explanation is probably to be found in the very small sample size - less than 5\% - of this population in the whole sample.

Given that for the 1988 initiative we also have data about what the citizens who did not participate to the vote would have voted had they participated, using the same sample, specifications [7] and [8] present the estimations of a bivariate probit model with and without sample selection. Since adding information on the “hypothetical” vote of the abstentionists

\textsuperscript{31}See Manski and Pepper (2000) for further details.

\textsuperscript{32}In 1988, the italian speaking Swiss region reported an average participation rate of 48.5\% below Swiss average 52.8\%. 
Table 2.4: Estimation results, 1988 initiative

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low education</td>
<td>0.299</td>
<td>-0.461***</td>
<td>0.289</td>
<td>-0.566***</td>
<td>0.358**</td>
<td>-0.564***</td>
</tr>
<tr>
<td></td>
<td>[1.51]</td>
<td>[3.40]</td>
<td>[1.35]</td>
<td>[3.86]</td>
<td>[2.58]</td>
<td>[3.84]</td>
</tr>
<tr>
<td>High education</td>
<td>-0.504***</td>
<td>0.003</td>
<td>-0.500***</td>
<td>-0.101</td>
<td>-0.627***</td>
<td>-0.105</td>
</tr>
<tr>
<td></td>
<td>[3.08]</td>
<td>[0.03]</td>
<td>[3.08]</td>
<td>[0.79]</td>
<td>[4.42]</td>
<td>[0.82]</td>
</tr>
<tr>
<td>Age</td>
<td>0.001</td>
<td>0.024</td>
<td>0.001</td>
<td>0.016</td>
<td>-0.011</td>
<td>0.016</td>
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<tr>
<td></td>
<td>[0.03]</td>
<td>[1.44]</td>
<td>[0.04]</td>
<td>[0.86]</td>
<td>[0.60]</td>
<td>[0.86]</td>
</tr>
<tr>
<td>Age2 / 1000</td>
<td>0.051</td>
<td>-0.172</td>
<td>0.052</td>
<td>-0.049</td>
<td>0.151</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>[0.23]</td>
<td>[1.04]</td>
<td>[0.23]</td>
<td>[0.26]</td>
<td>[0.84]</td>
<td>[0.27]</td>
</tr>
<tr>
<td>Married</td>
<td>0.051</td>
<td>0.205*</td>
<td>0.056</td>
<td>0.327***</td>
<td>0.079</td>
<td>0.325***</td>
</tr>
<tr>
<td></td>
<td>[0.32]</td>
<td>[1.89]</td>
<td>[0.33]</td>
<td>[2.80]</td>
<td>[0.66]</td>
<td>[2.80]</td>
</tr>
<tr>
<td>Female</td>
<td>-0.226*</td>
<td>-0.133</td>
<td>-0.233*</td>
<td>-0.128</td>
<td>-0.151</td>
<td>-0.129</td>
</tr>
<tr>
<td></td>
<td>[1.73]</td>
<td>[1.39]</td>
<td>[1.81]</td>
<td>[1.22]</td>
<td>[1.45]</td>
<td>[1.23]</td>
</tr>
<tr>
<td>Owner</td>
<td>-0.260*</td>
<td>0.284***</td>
<td>-0.249*</td>
<td>0.287**</td>
<td>-0.260**</td>
<td>0.285**</td>
</tr>
<tr>
<td></td>
<td>[1.80]</td>
<td>[2.78]</td>
<td>[1.71]</td>
<td>[2.56]</td>
<td>[2.38]</td>
<td>[2.54]</td>
</tr>
<tr>
<td>Political orientation</td>
<td>0.033</td>
<td>0.029</td>
<td>0.033</td>
<td>0.024</td>
<td>0.019</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>[1.08]</td>
<td>[1.16]</td>
<td>[1.10]</td>
<td>[0.88]</td>
<td>[0.74]</td>
<td>[0.89]</td>
</tr>
<tr>
<td>Political orientation2</td>
<td>0.015*</td>
<td>0.022**</td>
<td>0.022**</td>
<td>0.022**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[1.85]</td>
<td>[2.38]</td>
<td>[2.39]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French</td>
<td>0.231</td>
<td>0.237</td>
<td>0.23</td>
<td>0.246</td>
<td>0.173</td>
<td>0.245</td>
</tr>
<tr>
<td></td>
<td>[1.27]</td>
<td>[1.60]</td>
<td>[1.26]</td>
<td>[1.53]</td>
<td>[1.14]</td>
<td>[1.52]</td>
</tr>
<tr>
<td>Italian</td>
<td>0.338</td>
<td>0.584**</td>
<td>0.34</td>
<td>0.533*</td>
<td>0.513**</td>
<td>0.547*</td>
</tr>
<tr>
<td></td>
<td>[1.08]</td>
<td>[2.13]</td>
<td>[1.11]</td>
<td>[1.76]</td>
<td>[2.01]</td>
<td>[1.80]</td>
</tr>
<tr>
<td>Foreigners share</td>
<td>-0.005</td>
<td>-0.018*</td>
<td>-0.005</td>
<td>-0.014</td>
<td>-0.013</td>
<td>-0.014</td>
</tr>
<tr>
<td></td>
<td>[0.35]</td>
<td>[1.93]</td>
<td>[0.37]</td>
<td>[1.40]</td>
<td>[1.27]</td>
<td>[1.41]</td>
</tr>
<tr>
<td>Difficult speculation</td>
<td>-0.249*</td>
<td>-0.320**</td>
<td>-0.332**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[1.94]</td>
<td>[2.32]</td>
<td>[2.46]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult work</td>
<td>0.081</td>
<td>-0.003</td>
<td>-0.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.43]</td>
<td>[0.01]</td>
<td>[0.01]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult immigration</td>
<td>-0.453**</td>
<td>-0.306</td>
<td>-0.291</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[2.48]</td>
<td>[1.50]</td>
<td>[1.43]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rho - ρ</td>
<td>-0.000</td>
<td>0.046</td>
<td>-0.098</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-772.866</td>
<td>-694.770</td>
<td>-804.130</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* significant at 10%; ** significant at 5%, *** significant at 1%
can affect both the coefficient of correlation between the unobserved characteristics and the coefficients associated with the observed variables, identifying a possible participation bias requires a deeper discussion of these two points. First, for both specifications, we cannot reject the hypothesis that the errors are uncorrelated, i.e. the vote and participation choice can relevantly be explained in terms of observed characteristics. Second, according to a Wald test \( W = 17.6 < 19.7 = \chi^2_{11} \), we also find that the coefficients reported by the vote estimations [7a] and [8a] are identical at a 5% level.\(^{33}\) These two results taken together seem to indicate that participation had no significant influence on the outcome of the vote.

Table 2.5: Marginal and conditional probabilities of accepting the initiative

<table>
<thead>
<tr>
<th>Specification</th>
<th>Entire sample (786)</th>
<th>Sub-sample of voters (583)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[7a], ( P(v = 1</td>
<td>p = 1) )</td>
<td>22.39% (^a)</td>
</tr>
<tr>
<td>[8a], ( P(v_{\text{hypoc}} = 1) )</td>
<td>23.88%</td>
<td>23.89% (^a)</td>
</tr>
</tbody>
</table>

\(^{a}\) sample adjusted predicted outcomes

That the participation choice had no influence on the outcome of the vote is confirmed in table 2.5. Indeed, the outcome of the vote obtained by considering, in turn, the sub-sample of voters and the whole sample are very close, i.e. had voting been mandatory, the percentage of “yes” to the initiative would have increased by only 1.3%.

2.6.4 How have the attitudes between 1988 and 2000 evolved?

Even if the phrasing of the question to limit immigration differed somewhat in the 1988 and 2000 votes, some comparisons can nevertheless be made. First, both initiatives were rejected by about 3/4 of the voters and no participation bias seems to have influenced the outcome. Thus, the observed difference between opinion polls and real vote outcomes is more certainly due to an hypothetical bias than to non-mandatory voting. To put this result into perspective, consider what would have happened if the Swiss government had followed opinion polls to define its immigration policy?

Second, similarly to most empirical analyses of attitudes towards immigration using opinion polls data, we found that, in both initiatives, education mattered in the choice of vote. This supports the predictions based on the Ricardo-Viner model discussed in section

---

\(^{33}\)Nevertheless, the coefficients associated with having a low level of education and living in the Italian speaking region both became significant in specification [8a]. These results may certainly be attributed to differences in sample sizes. For the former, since having a low level of education has a significant and large influence on the probability not to participate to the vote, adding the abstentionists to the estimations increases their representativeness in the whole sample from 14.9% to 17.1% which in turn may affect the standard error of the estimated coefficient. The latter result is probably linked to the same problem as mentioned in preceding vote analysis, i.e. the sample of surveyed living in the Italian speaking region is very small.
two, i.e. there is an opposition between low- and high-skill citizens. However, based on the evolution of the Swiss immigration policy which became, between 1990 and 2000, more and more restrictive towards low-skill non EU workers, we should have observed low-skill natives being more positive to immigrants in 2000 compared to 1988. That this has not been observed can be explained by a high level of persistence in the perceptions citizens have about the composition of immigration flows.

Finally, turn now to the political factors which are certainly important in determining attitudes, but are absent from the models that concentrate only on economic effects. Note the high explanatory power of the political variable on the vote outcome in 2000 and the absence of a significant influence in 1988. Indeed, in the voting choice, we notice an increased opposition between the citizens who reported themselves as right- or left-wing. To find a consistent explanation to this increased political polarization on the immigration topic, one must reflect on how the Swiss political landscape changed between 1988 and 2000.34 Until the end of the eighties, Switzerland was known for its very moderate opposition between the right- and the left-wing and its decision-making process was characterized by a very high degree of compromises. Since the beginning of the nineties, with the vote about the EEA and the start of a period of long recession, the confidence in the political elites has been questioned. As a result, the shares of the UDC, a right wing party explicitly opposed to immigration and to the adhesion of Switzerland to the EU, and of the Social Democrats who are much more left-leaning than in parliamentary regimes, increased in the national parliament both in 1999 and in 2003.

2.7 Conclusions

Fears of large inflows of immigrants have been apparent in many economy-wide opinion polls. These fears however are in sharp contrast with studies suggesting a net welfare gain from increased labor mobility and low labor market effects. This paper informs about the debate in three areas.

First, we reviewed Switzerland’s long-standing experience with immigration. The review of the debate and of the votes on initiatives and referenda over the last thirty-five years shows that the results at the election booths have influenced the government policy on immigration. Immigration policy has stayed a course accommodating the conflicting interests of unions, firm’s owners, and the public at large as expressed through regular voting. The resulting flexible system of annual quotas by worker categories combined with limited mobility and exemptions has turned out to be crucial in the case of Switzerland. Indeed, this experience suggests that large immigration flows can be absorbed in the context of a direct democracy since the foreign population share has tripled over a forty-year period. Moreover, the

34For a survey, see for instance Niggli (1999).
benefits of the Swiss accommodating immigration policy has lead Swiss citizens to respond more favorably than their European counterparts to most opinion polls on migration.

Second, confirming past empirical evidence, we found that the education level of an individual significantly influences his attitude towards immigration. Individuals with a high skill level, mostly acquired through non-vocational training, tend to vote for less restrictions on immigration as predicted by the political economy models. Note that this result does not exclude that a part of this positive effect of education can be attributed to more social characteristics such as tolerance or more cosmopolitan social networks. We also found evidence that non-economic arguments - such as political convictions - can have an important influence on individual attitudes towards immigrants.

Third, and perhaps most interestingly, we have been able to show that the observed difference between predictions of pre-vote opinion polls - often very pessimistic with regard to immigration policy - and real vote outcomes - as observed at the exit of the booths - is not linked to turnout but rather to an hypothetical bias. This result may inform us on at least two important facts. On the one hand, results from opinion polls may be overly pessimistic if interpreted as reflecting what people would actually vote if asked to. Indeed, opinion polls may be well adapted to understand better the underlying determinants of attitudes towards immigrants but not to predict the real level of desired immigration. On the other hand, as a policy implication, this result suggests that it is not worth for a government to invest too much money through to encourage citizens to go and vote but rather to continue spending money to inform citizens about the real consequences of a vote.
2.8 Appendices

Appendix I: Survey methodology
To collect individual-level data about the voting behavior, the Gfs institute used a combined random/quota system. In a first step about 100 localities were randomly chosen so as to respect the distribution of agglomeration types and linguistic areas. In a second step, in all the chosen localities, about ten individuals were randomly selected so as to match the distribution of gender, age and occupation. This type of methodology leads generally to an adequate representation between the surveyed sample and the total population. Nevertheless, as voting on immigration policy can be affected by racial arguments, there is often a upward bias in the percentage of surveyed being against of a more restrictive immigration policy, i.e. citizens who voted against immigration sometimes do not reveal it when asked to. In both anti-immigrationist initiatives considered here, the percentage of rejection in the real vote and in the VOX survey was respectively 63.8% versus 71.7% for the 2000 initiative and 67.3% versus 77.4% for the 1988 initiative. The participation rate in the survey sample is also often upward biased. Indeed, it has been shown by the Gfs institute (“Analyse VOX des votations fédérales du 12 juin 1994”, p. 5-6) that the citizens who are more invested in politics are also the citizens who answer to survey questions more often. This bias is confirmed for our two initiatives. For the 2000 initiative, the real participation rate was 45.3% and the survey reported participation rate was 57.5% and, for the 1988 initiative, it was respectively 52.8% and 69.1%.

Appendix II: Descriptive statistics
Table 2.6 summarizes the mean and standard deviation of the variables used for the empirical estimations presented in this paper. For each of these estimations, we considered only the individuals for which no missing or “don’t know” answers were reported among the explanatory variables. It implies a reduction of the entire sample in the range of 20%. Since the random/quota methodology, used to collect the data, gives at a 5% level a ±3% average error between the sample and the real population values, most mean values found in the sample are quite close to the mean values one would get when looking at the entire Swiss population in 1988 and in 2000.

As we are especially interested in testing whether skill or human capital is a significant determinant of attitudes towards immigration - as expressed through voting -, we constructed several measures of skills for each initiative given the availability of data.

For the 2000 initiative, table 2.7 presents the education types reported in the survey and the usual number of study years corresponding to each level of education. Relying on this information, we could construct two different measures of skills to explore the role of economic determinants on attitudes towards immigrants.
Table 2.6: Summary statistics, initiatives 2000 and 1988

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type</th>
<th>Initiative 2000</th>
<th>Initiative 1988</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deviation</td>
<td>Deviation</td>
</tr>
<tr>
<td>Vote</td>
<td>dummy</td>
<td>0.283</td>
<td>0.451</td>
</tr>
<tr>
<td>Participation</td>
<td>dummy</td>
<td>0.575</td>
<td>0.495</td>
</tr>
<tr>
<td>Compulsory school</td>
<td>dummy</td>
<td>0.119</td>
<td>0.323</td>
</tr>
<tr>
<td>High school</td>
<td>dummy</td>
<td>0.068</td>
<td>0.252</td>
</tr>
<tr>
<td>Professional school</td>
<td>dummy</td>
<td>0.089</td>
<td>0.285</td>
</tr>
<tr>
<td>University + HES</td>
<td>dummy</td>
<td>0.179</td>
<td>0.384</td>
</tr>
<tr>
<td>Low education</td>
<td>dummy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High education</td>
<td>continuous</td>
<td>50.478</td>
<td>30.930</td>
</tr>
<tr>
<td>Earnings / 100</td>
<td>dummy</td>
<td>0.205</td>
<td>0.404</td>
</tr>
<tr>
<td>Age</td>
<td>continuous</td>
<td>47.786</td>
<td>17.060</td>
</tr>
<tr>
<td>Married</td>
<td>dummy</td>
<td>0.580</td>
<td>0.494</td>
</tr>
<tr>
<td>Female</td>
<td>dummy</td>
<td>0.483</td>
<td>0.500</td>
</tr>
<tr>
<td>Owner</td>
<td>dummy</td>
<td>0.479</td>
<td>0.500</td>
</tr>
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<td>Political orientation</td>
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<td>1.478</td>
</tr>
<tr>
<td>Foreigners share</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- agglomeration</td>
<td>continuous</td>
<td>19.192</td>
<td>6.689</td>
</tr>
<tr>
<td>- canton</td>
<td>in %</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>French speaking</td>
<td>dummy</td>
<td>0.195</td>
<td>0.397</td>
</tr>
<tr>
<td>Italian speaking</td>
<td>dummy</td>
<td>0.068</td>
<td>0.252</td>
</tr>
<tr>
<td>Political interest very high</td>
<td>dummy</td>
<td>0.196</td>
<td>0.397</td>
</tr>
<tr>
<td>Political interest high</td>
<td>dummy</td>
<td>0.454</td>
<td>0.498</td>
</tr>
<tr>
<td>Political interest low</td>
<td>dummy</td>
<td>0.232</td>
<td>0.422</td>
</tr>
</tbody>
</table>

Notes:  
- for the 2000 initiative, number of observations: 810, except for the vote choice: 466  
- for the 1988 initiative, number of observations: 847, except for the vote choice: 585  

42
Table 2.7: Education levels, 2000 initiative

<table>
<thead>
<tr>
<th>Type of education received</th>
<th>Years of studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory school</td>
<td>9 years</td>
</tr>
<tr>
<td>Apprenticeship</td>
<td>12 years</td>
</tr>
<tr>
<td>High-school</td>
<td>13 years</td>
</tr>
<tr>
<td>Professional school</td>
<td>14 years</td>
</tr>
<tr>
<td>University of applied sciences (HES)</td>
<td>15 years</td>
</tr>
<tr>
<td>University</td>
<td>17 years</td>
</tr>
</tbody>
</table>

First, we created four dummies corresponding to the education types reported in table 2.7. The omitted category was apprenticeship, which is the most common education type in Switzerland, and university and HES were merged given the similarity of the diplomas delivered.

Second, we used a wider measure of skills by including also on-the-job training. The two types of skills, schooling and on-the-job training, can be aggregated into a common indicator by appealing to Mincer’s concept of “potential earnings”. To construct the aggregate skill measure, “earnings”, we ran a standard Mincer wage equation on data from the Swiss Wage Structure (LSE) survey 2000. The standardized monthly “earnings” indicator was constructed using the following equation:

\[
\ln(earnings) = \text{const} - 0.24 \cdot edu\_9 + 0.23 \cdot edu\_13 + 0.27 \cdot edu\_14 \\
+ 0.41 \cdot edu\_15 + 0.54 \cdot edu\_17 + 0.03 \cdot exper - 0.51 \cdot exper^2/1000 \\
+ 0.04 \cdot married - 0.17 \cdot female + 0.09 \cdot public
\]

where experience is defined as: \((age - schooling - 6)\). To improve further on this approach, we set the wage of retired citizens equal to 0 and introduced a dummy variable for the retired individual in the econometric specification. As seen in section two, on theoretical grounds, this is justified by the fact that the rents of the retired are not supposed to depend on labor market adjustments - as for instance to increased immigration - but are fixed at a given level.

For the 1988 initiative, as only a rough classification of the education types is available, we constructed two dummy variables: one for a high level of education (university, HES, professional school and high school) and another for a low level of education (obligatory school). The omitted category is the intermediate level of education (apprenticeship).

---

35 See Heckman et al. (2003) for an overview.
36 Empirically, observed wages and potential earnings have been shown to be highly correlated.
37 The sample we used only contains data on the individuals having the Swiss nationality. This sample contains 282,616 observations. The results of this estimation are available upon request.
38 As the unemployed represent less than 1% of the entire sample, we treat them on the same way as the employed.
In addition to the standard socioeconomic and demographic characteristics, we represented the political beliefs of citizens by a variable based on the individuals’ own judgment of their political position on a scale between −5 (left) and +5 (right). Cultural differences between the German, French and Italian speaking parts of Switzerland were captured by dummy variables for minorities and the macroeconomic context was captured by the prevailing foreigners’ share in the region where the surveyed individual lives.

2.8.1 Appendix III: Voting about immigration in Switzerland

Table 2.8: Votes on immigration policy: Popular initiatives

<table>
<thead>
<tr>
<th>Date</th>
<th>Content</th>
<th>Result</th>
<th>Parti.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 June 1970</td>
<td>Foreigners’ share in population ≤ 10% (25%) in each Canton (Geneva).</td>
<td>rejected</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>74%</td>
</tr>
<tr>
<td>20 Oct. 1974</td>
<td>Foreigners’ share in population ≤ 12% (25%) in each Canton (Geneva) with total in Switzerland ≤ 500’000. Naturalizations ≤ 4’000 per year.</td>
<td>rejected</td>
<td>65.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70%</td>
</tr>
<tr>
<td>13 March 1977</td>
<td>Foreigners’ share in population ≤ 12.5%.</td>
<td>rejected</td>
<td>70.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>13 March 1977</td>
<td>Naturalizations ≤ 4’000 per year.</td>
<td>rejected</td>
<td>66.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>5 April 1981</td>
<td>Abolish seasonal worker status. Indefinite renewal of working permits. Immigration flows to match emigration flows.</td>
<td>rejected</td>
<td>83.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39%</td>
</tr>
<tr>
<td>4 Dec. 1988 *</td>
<td>Immigration flows ≤ 2/3 of emigration flows (including asylum seekers). Limit on seasonal workers and cross-border commuters.</td>
<td>rejected</td>
<td>67.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>52%</td>
</tr>
<tr>
<td>1 Dec. 1996</td>
<td>Illegals cannot ask asylum seeker status. Restrictions on rights of appeal for asylum seekers.</td>
<td>rejected</td>
<td>53.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td>24 Sept. 2000 *</td>
<td>Foreigners’ share in population ≤ 18% (including asylum seekers).</td>
<td>rejected</td>
<td>63.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>24 Nov. 2002</td>
<td>Asylum seekers entering Switzerland by a well-known country will be pent-up directly.</td>
<td>rejected</td>
<td>50.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48%</td>
</tr>
</tbody>
</table>

* initiatives analyzed in this paper.
<table>
<thead>
<tr>
<th>Date</th>
<th>Content</th>
<th>Result</th>
<th>Parti.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 June 1982</td>
<td>Counter project to the initiative from April, 5 1981: indefinite renewal of working permits. Immigration flows to match migration flows.</td>
<td>rejected</td>
<td>50.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>4 Dec. 1983</td>
<td>Tightening of naturalization criteria.</td>
<td>accepted</td>
<td>60.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>4 Dec. 1983</td>
<td>Loosening of naturalization requirements for the foreigners’ children, the refugees, asylum seekers and the nationless.</td>
<td>rejected</td>
<td>55.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>5 April 1987</td>
<td>Distribution of asylum seekers across Cantons. Faster admission process. Tightening of asylum law.</td>
<td>accepted</td>
<td>67.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42%</td>
</tr>
<tr>
<td>5 April 1987</td>
<td>Amendment of the law regulating the stay and establishment of foreigners, e.g. imprisonment of dangerous asylum seekers or who refuse to leave the country.</td>
<td>accepted</td>
<td>65.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42%</td>
</tr>
<tr>
<td>12 June 1994</td>
<td>Easier naturalization’s right for young foreigners who grew up in Switzerland.</td>
<td>rejected</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Dec. 1994</td>
<td>Expanded search rights in asylum-seekers domiciles. Tightening of the foreigners law.</td>
<td>accepted</td>
<td>72.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>43%</td>
</tr>
<tr>
<td>13 June 1999</td>
<td>Amendment of the asylum law, i.e. less restrictive provisory admission rights.</td>
<td>accepted</td>
<td>70.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>13 June 1999</td>
<td>Stricter criteria for asylum status.</td>
<td>accepted</td>
<td>70.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>21 May 2000</td>
<td>Bilateral agreements - free mobility of labor - between Switzerland and EU15 countries.</td>
<td>accepted</td>
<td>67.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48.3%</td>
</tr>
<tr>
<td>24 Sept. 2004</td>
<td>Easier naturalization’s right for young foreigners who grew up in Switzerland.</td>
<td>rejected</td>
<td>56.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54%</td>
</tr>
<tr>
<td>24 Sept. 2004</td>
<td>Automatic naturalization of third generation foreigners.</td>
<td>rejected</td>
<td>51.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54%</td>
</tr>
<tr>
<td>25 Sept. 2005</td>
<td>Extension of the bilateral agreements - free mobility of labor - to the 10 new EU members.</td>
<td>accepted</td>
<td>56.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54.5%</td>
</tr>
<tr>
<td>24 Sept. 2006</td>
<td>Amendment of the law regulating the stay and establishment of foreigners of non EU countries (explicit obligation of integration).</td>
<td>accepted</td>
<td>68.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48%</td>
</tr>
<tr>
<td>24 Sept. 2006</td>
<td>Amendment of the asylum law, i.e. stricter admission rights.</td>
<td>accepted</td>
<td>67.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48%</td>
</tr>
</tbody>
</table>
Bibliography


Chapter 3

Trust: The forgotten factor shaping attitudes towards immigrants?

Over the last decade, analyses of opinion polls to understand better individual attitudes have become more and more frequent. In order to test the political economy predictions, economists focused mainly on the role of skills in the shaping of attitudes towards immigrants and found some evidence in favor of their predictions. However, based on the recent development of experiments showing that “economists fail to understand fundamental economic questions when they disregard social preferences” (Fehr and Fischbacher 2002), this paper is the first, to our knowledge, to introduce trust - a proxy for social values and reciprocity - among the determinants of attitudes towards immigrants. Relying on data from a new European opinion poll, the ESS, we find, in a first step, that education significantly matters in the shaping of attitudes and that this effect is larger for working individuals as predicted by economic models. In a second step, we show that trust is a very significant determinant of preferences towards immigrants. This result suggests that the individual level of trust is a moral value that spreads not only to neighbors or to community members but also to immigrants. Finally, we assess that this result is robust to many alternative specifications. As a policy implication, our findings suggest that both economic and social policy interventions may reduce hostility towards immigrants.

JEL classification: A13, D71, F22, J61, P16, Z13

Key words: Attitudes towards immigrants, political economy, trust, survey data
3.1 Introduction

In the actual context, how to manage immigration occupies a center stage in the political discussions of most developed countries. Indeed, squeezed between economic interests and public pressures, adequately managing the immigration policy represents a challenge for most governments. Contrary to economic interests which are often well organized into lobbies, the public opinion is much more diffuse and not easy to define. However, in a representative democracy in which citizens cannot directly influence their governmental policies, understanding better the citizens opinions is fundamental for the good functioning of the democratic system and for avoiding tensions between natives and immigrants.

Thanks to the recent development of opinion polls, individual attitudes have started to be analyzed more deeply. Given the variety of possible determinants of preferences towards immigration, the empirical literature on this topic has been burgeoning. One of the most recurrent results emphasized is that education significantly matters in the shaping of individual attitudes towards immigration. However, interpreting this result is not easy since education can be considered, among others, as a proxy of labor market effects, of social characteristics, or of fiscal concerns.

The main goal of this paper is to investigate further the determinants of preferences towards immigrants by emphasizing not only the economic arguments but also the role of reciprocity and trust. Indeed, while economic arguments surely matter in the shaping of individual attitudes, behavioral economists have shown that “economists fail to understand fundamental economic questions when they disregard social preferences” (Fehr and Fischbacher 2002). Drawing both on Putnam’s (2000) argument that trust is “a key component of social capital because it acts as a social lubricant that enables a variety of forms of social interaction and cooperation” and on the increasing empirical and experimental evidence showing that social interactions and reciprocity enter significantly in individual choices, this paper improves upon past analyses by focusing on trust as a possible determinant of attitudes towards immigrants.

As a main result, we find a large and significant positive influence of trust on attitudes towards immigrants. We also find that this result is robust to a variety of alternative specifications as well as to a simultaneous modelling of trust and preferences towards immigration by using a Limited Information Maximum Likelihood (LIML) method. These findings inform us that trust is a moral value that spreads not only to neighbors or to community members but also to immigrants.

More broadly, the other results obtained in this paper largely confirm past empirical evidences and are robust to the introduction of our trust variable. For instance, similarly to Mayda (2006), we find that the expected skill structure of immigration flows highly influences actual preferences, i.e. low-skill citizens living in countries with a history of low-(high-)skill immigration are much more against (in favor of) immigration than the high-skill citizens living there.

The remainder of the paper is structured as follows. Section two reviews the recent
development of the empirical studies on attitudes towards immigration and of the literature related to the concept of reciprocity and trust. Section three discusses the survey data used and emphasizes its main features. In section four, we present the main determinants of attitudes towards immigrants and emphasize the role trust plays among these determinants. Section five then discusses some empirical issues important to consider when estimating equations comprising subjective data both as explained and as explanatory variables. The determinants of trust as well as the results obtained by estimating jointly trust and immigration preferences are presented and analyzed further. Finally, robustness checks are provided in section six and conclusions follow in section seven.

3.2 Literature review

With the increasing availability of survey data and the constant improvement of sampling methods, opinion polls data have been more and more widely used to understand better the determinants of individual preferences. At the boundary of economics and social sciences, the determinants of individual attitudes towards immigration as well as the trusting behavior of peoples have awakened an increasing interest among researchers. Since, to our knowledge, evidence on the influence of trust on attitudes towards immigrants is still lacking, the main goal of this paper is to provide a first evidence on this issue.

3.2.1 Classical determinants of attitudes towards immigrants

Opinion poll data - by allowing to isolate empirically the underlying determinants of attitudes which cannot be easily identified otherwise - have recently been considered by many economists as a unique way to test the predictions of theoretical models. For instance, opinion polls have been used to test standard political economy models which predict that a perfectly rational individual will be against immigration if he expects it to have a negative impact on his income, e.g. low-(high-)skill workers are expected to be more against low-(high-)skill immigrant workers competing for the same jobs. Based on the assumption that income and labor market status are closely linked and that immigrants are mostly low skilled, the significant positive influence of the skill level - either proxied by education years or by occupation related wages - on the preferences towards immigrants has been interpreted by economists - Scheve and Slaughter (2001), Mayda (2006), O’Rourke and Sinnott (2006) - and by some social scientists - Espenshade and Hempstead (1996) and Kessler (2001) - as empirical evidence in favor of the labor market competition hypothesis.\footnote{As an additional evidence of labor market effects, Mayda (2006) and O’Rourke and Sinnott (2006) found that in high (low) per capita GDP countries, the highly skilled individuals are more (less) in favor of immigration than the low-skilled. This result confirms the prediction of the standard Heckscher-Ohlin model since countries with a high GDP are also those relatively richly endowed with high-skilled labor and attracting low-skilled immigrants.} Moreover, draw-
ing on the observation that state intervention - either through taxes or redistribution - may also play an important role in the shaping of preferences towards immigrants, Hanson et al. (2004, 2005) and Facchini and Mayda (2006) found some relevant evidence that high-skill individuals, while being favorable to immigration on a labor market basis, are rather hostile to immigrants in a tax perspective.

Departing from the economic interpretation of education, the majority of social scientists have emphasized that education should rather be considered as a proxy for some social values or characteristics - such as tolerance,\(^2\) “more diverse and cosmopolitan social networks”\(^3\), or different habits in answering survey questions\(^4\) - which in turn may also fairly well explain the observed positive effect of education on attitudes towards immigrants.

Beyond the debate on the interpretation to give to the education variable, both social scientists and economists agree that “hostility towards immigration may also have racial motives that are unrelated to any economic considerations” (Dustmann and Preston 2004). Taking this argument into account by adding different measures of racial and cultural prejudice or of ideology into their empirical models, almost all the empirical surveys on the determinants of preferences towards immigrants found that these “non-economic” arguments also have a large and significant influence on citizens’ attitudes.

### 3.2.2 Trust and reciprocity as determinants of individual preferences

While most empirical papers on the determinants of preferences towards immigration almost exclusively focus on individual characteristics and ideology, there is growing experimental evidence suggesting that social interactions matter a lot in the shaping of individual attitudes: “recent experimental research has revealed forms of human behavior involving interaction among unrelated individuals that cannot be explained in terms of self-interest” (Bowles et al. 2003). Some additional evidence can be found in Fehr and Fischbacher (2002): “economists fail to understand fundamental economic questions when they disregard social preferences”\(^5\)

Since the end of the eighties, in parallel to the development of experiments designed by behavioral economists to isolate social preferences, social scientists have emphasized and developed the concept of social capital. Among the early contributors in building of this concept, we find Coleman (1988) who first introduced social capital in a similar way as

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\(^2\) For instance, Citrin et al. (1997) argue that a higher level of education leads to “a more tolerant outlook toward all out-groups, including foreigners and ethnic minorities” and Burns and Gimpel (2000) that “the contribution of education to liberal attitudes on racial policies [is] associated with the learning of tolerance”.

\(^3\) See Chandler and Tsai (2001).

\(^4\) According to Burns and Gimpel (2000), “better educated people are simply trained to avoid sounding bigoted when they express opposition to racial policies”.

\(^5\) Where, according to their definition, “a person exhibits social preferences if the person not only cares about the material resources allocated to her but also cares about the material resources allocated to relevant reference agents [i.e.] a particularly important type of social preference is the preference for reciprocity or reciprocal fairness”.

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financial, physical and human capital and Putnam (1993) who gave the first widely used definition of social capital: “social capital [...] refers to features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions”. Some refinement is found in Putnam (2000, p. 19): “social capital refers to connections among individuals - social networks and the norms of reciprocity and trustworthiness that arise from them”.

How can these social preferences affect attitudes towards immigration? As an illustration consider an individual who must decide if he is for or against allowing new immigrants to enter his country. Given that ex-ante this individual does not know the behavior immigrants will have after having settled down, his decision will depend on the expectations he has about their effects. As emphasized by many economists, the expected labor market and fiscal effects of immigration will have a large influence on the individual choice. However, the shaping of the expected effects of immigration - including economic effects - may not only be driven by selfish arguments but also by social norms or trust levels.

The central hypothesis we wish to test in this paper is that an individual who exhibits a large level of trust towards unknown individuals, also supports further immigration. Indeed, if trust captures some kind of moral reciprocity, e.g. you will treat the others as you would wish to be treated by them, a trusting individual will have a higher probability to believe that immigrants are trustworthy and thus will not abuse welfare, harm their labor market perspectives, or have a negative impact on cultural life. If this hypothesis is correct, our empirical estimates should report that trust is a significant determinant of attitudes towards immigrants and that it leads to a more positive view of immigrants.

In the literature, the evidence that trust has an important influence on economic and social outcomes as well as on personal attitudes is growing very rapidly. At an aggregate level, trust has been found, for instance, to have a large and significant influence on the quality of government and of life satisfaction (Björnskov 2006), on subjective well-being (Helliwell 2005), on economic performance, i.e. GDP growth and investment/GDP (Knack and Keefer 1997), and on the performance of large organizations, e.g. government efficiency, participation in civic organization, size of the large firms relative to GDP, social efficiency (La Porta et al. 1997). At the level of an individual, trust has been shown to positively shape his attitudes towards unemployment insurance and welfare (Soroka et al. 2004) and towards the use of financial instruments, e.g. writing checks, investing in stocks, using institutional credits (Guiso et al. 2004).

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6 A similar hypothesis has been emphasized by Uslaner (2002 p. 196): “people with faith in others are also supportive of immigrants".
3.3 The European Social Survey (ESS)

Among the available survey data-sets which report attitudes towards immigrants, we decided to use the ESS which characteristics are discussed in more details in appendix I. While appendix II reports the summary statistics of the variables used for our empirical tests, this section discusses our choice of variables capturing trust and attitudes towards immigrants.

3.3.1 How to measure trust?

To be able to establish that the trusting behavior of an individual influences his attitude towards immigrants, we need to find a survey question which proxies trust as well as possible. However, given that trust cannot be considered as an unidimensional concept, both the choice of the survey question and how this question is on average interpreted by the surveyed individuals have to be discussed further.

Relying on a trust game without face-to-face interaction and on answers to a survey questionnaire, Fehr et al. (2003) could establish that a composite indicator of the level of trust of an individual - composed of the answers to the following survey questions: (i) in general one can trust people, (ii) in these days you can’t rely on anybody else, and (iii) when dealing with strangers it is better to be careful before you trust them - does significantly explain the trusting behavior of this individual in a “trust game”.

Among the questions available in the ESS, we decided to use the following: “Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can’t be too careful and 10 means that most people can be trusted” as a measure of the trusting behavior of an individual. This choice was motivated by the wording of this question being the closest to the questions used by Fehr et al. to construct their composite indicator.

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7According to Uslaner (2002), the two main dimensions underlying trust are: “strategic trust [which] reflects our expectations about how people will behave [and] moralistic trust [which] is the belief that others share your fundamental moral values and therefore should be treated as you would wish to be treated by them”.

8The game they used is called the “trust game”. It goes as follows: a Proposer receives an amount of money $x$ from the experimenter and then can choose to send an amount between zero and $x$ to the Responder. The experimenter then doubles the amount sent and the Responder is then free to return any amount of it to the Proposer.

9Relying on a trust game with face-to-face interaction, Glaeser et al. (2000) found a very different result, i.e. people who answered that they trust others in a survey questionnaire did not act as such in experimental games, i.e. “standard trust questions may be picking up trustworthiness rather than trust”. However it has to be emphasized that using a face-to-face methodology is probably efficient to get information on the strategic behavior of individuals in a typical effort enforcement problem - in labor markets for instance - but not to capture their general reciprocal attitude.

10It has to be emphasized that the two following questions available in the ESS: “Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?” and “Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?”
The advantage of using this question as a proxy of moralistic trust is that it has already often been used in empirical studies and that there is a large body of evidence that assesses that the surveyed individuals interpret it in the way we expect them to do. As an illustration, relying on the 2000 ANES Pilot Survey, Uslaner (2002 pp. 72-74) reports that 57.8% of the surveyed individuals think about this trust question in a general way and only 22.5% as related to life experience. Confirming this result, Helliwell et al. (2006) find that responses to this standard trust question are highly shaped by cultural norms, whereas responses to a “lost wallet” question are influenced by life experience and by the neighborhood context.\textsuperscript{11} Using the Pew Philadelphia Study 1996 and a factor analysis, Uslaner (pp. 52-56) also finds that “most people can be trusted” is closely related to “trust people you meet on the street” or “trust people where you shop”, but not with “trust your family”, “your boss”, or “people at your club”. Finally, Uslaner provides some evidence that the answers to this trust question are “remarkably stable” in time and do not depend on daily experiences what confirms that “moralistic trust does not depend on experience but rather on enduring values or a general feeling about life [and] measures better moral values than considerations about whether to trust someone in particular situation”.

3.3.2 Defining attitudes towards immigrants

The questions available in the ESS to capture preferences towards immigration are: (Q1) “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?”, (Q2) “How about people of a different race or ethnic group from most [country] people?”, and (Q3) “How about people from the poorer countries outside Europe?”. For each question, we codified the answers as follows: (4) allow many to come and live here, (3) allow some, (2) allow a few, and (1) allow none. According to Card et al. (2005), the main advantages of the wording of these questions are the following. First, not explicitly using the word “immigrants” in the question allows a better comparison of the answers between countries. Indeed, the interpretation of this word may substantially differ between countries depending, for instance, on their actual immigration policy. Second, the term “to live” is general enough to refer to both permanent and temporary immigration. Finally, the phrasing of the answers to these questions is also adequate for our study since it avoids any reference to the actual immigration policy implemented by a given country.

For our empirical study, we decided to focus on the question about immigrants from poor non European countries (Q3). Indeed, the two other questions, (Q1) and (Q2), by referring to “race” and “ethnic group”, can be interpreted very differently depending on the

\textsuperscript{11} An additional evidence is provided by Knack and Keefer (1997) who found that the correlation between the regional trust in strangers (in family) and the percentage of wallets returned by strangers in that region is high (low). This result confirms that “trust is primarily capturing ‘generalized’ trust as opposed to ‘specific’ trust placed in people one has repeated interactions with”.

were not found to explain significantly trust in the game of Fehr et al. Therefore, we do not consider these questions in our empirical work.
country in which an individual lives. For instance, a Portuguese may consider the Polish as belonging to a different ethnic group whereas a Czech would not. Moreover, compared with questions linked to geography and wealth, questions linked to race or ethnic attributes are more likely to be driven by cultural motives which are difficult to model.

3.3.3 Some insights on country level averages

Given that foreign born individuals might have a very different perception of immigrants than natives and be influenced by the trust level of their country of origin, all the reported statistics of this paper are exclusively based on the native individuals sub-population which reduces our sample by about 7.4%. Luxembourg, Island and Ukraine were excluded from our sample since their characteristics are too different from those of the other European countries included in the ESS, and Estonia and Slovakia because they were not part of the 2002 ESS survey.

In figures 3-1 and 3-2, we represent the country averages\textsuperscript{12} of trust and of preferences towards immigrants from poor non European countries. As we can notice, these values are highly scattered. Figure 3-1 shows that the differences between the levels of trust are large but closely related to GDP as well as to geographical location and to cultural background. If we suppose that there is no heterogeneity between countries in the way of interpreting and answering survey questions, Denmark should be considered as the most trusting country followed closely by the other Scandinavian countries whereas Greece, Poland and Portugal as the least trusting followed closely by the other southern and eastern European countries.

What about immigration preferences? As shown in figure 3-2, the most restrictive countries are Greece\textsuperscript{13} and Hungary closely followed by Portugal. Sweden is the country the most open to immigration followed by Poland, Switzerland, Ireland and Norway. While geographical and cultural patterns seem to show up when considering trust, preferences towards immigrants seem to be more complex and need for sure a deeper analysis. In addition to the result presented in table 3-2, it has to be emphasized that, at a country level, the answers to the questions about immigrants from poor non European countries and belonging to racially different group are highly correlated (0.988) whereas answers to the question about immigrants of the same race are less correlated with the two former questions (0.832 and 0.861). For every country, immigrants of the same race are also, on average, more welcomed than immigrants of a different race or from poor non European countries.

The large disparities observed in the levels of trust and in the attitudes towards immigrants are certainly linked to the large differences in historical backgrounds, in languages, in legal structures, in experiences with immigration, in economic developments, etc. existing amongst European countries. To take these differences into account, we have two

\textsuperscript{12}Each country sample comprises on average 2'000 individuals.

\textsuperscript{13}The very recent immigration pressure - especially from Albania - is probably highly responsible for the very negative perception Greek natives have about immigration.
Figure 3-1: Trust and GDP

Figure 3-2: Attitudes towards immigrants from poor non European countries and GDP
possibilities: we can use either country fixed-effects, or country and regional\textsuperscript{14} observed characteristics. Using country fixed-effects allows one to control for all kind of unobserved country specific characteristics but at the expense of understanding better the driving forces behind these effects. Using country and regional observed characteristics has the advantage to help identify the most important aggregate factors influencing attitudes. However, the drawback of this approach is that we may omit to control for some relevant country characteristics. Since it is not possible to assess which approach is better, all our estimations were done once using country fixed-effects and once using country and regional characteristics.

Which country and regional characteristics should be included in our estimations instead of the fixed-effects? As is quite standard GDP per capita can been seen as a proxy of the level of economic development and of the wealth of a country which in turn probably significantly affect the quality of living of an individual and his attitudes. In addition to GDP, the level of income inequality as well as the unemployment rate can also significantly affect the environment of living. Departing from economic characteristics, heterogeneity can play an important role in explaining both trust and attitudes towards immigrants. In this paper, we consider ethnic and religious fractionalization\textsuperscript{15} as well as the foreigners’ share in the population as proxies for heterogeneity.

3.4 Determinants of attitudes towards immigrants

In this section, we start by estimating the impact of the standard socioeconomic and demographic characteristics on the attitudes towards immigration. To test our hypothesis that the trusting behavior of an individual matters in the shaping of his attitude towards immigrants, we then add a trust variable in all our estimations. Given the encouraging results obtained, we then look at a more specific setup which controls better for the effect of education on attitudes.

3.4.1 Classical determinants

In most of the empirical papers on the determinants of attitudes towards immigrants, individual preferences ($y_1$) have been assumed to depend on a whole set of socioeconomic and demographic characteristics ($x$) as well as on ideology or on political beliefs. Given that the two latter variables may be endogenous,\textsuperscript{16} we do not include any of such variables in

\textsuperscript{14}The regional decomposition reported in the ESS questionnaire correspond to the Eurostat NUTS classification at the levels 2 or 3 depending on the country.

\textsuperscript{15}See Alesina and La Ferrara (2005) for an overview of the importance to consider fractionalization among the country characteristics.

\textsuperscript{16}For instance, in many European countries, the self-reported political orientation of an individual is largely determined by his perception about immigrants.
where \(\varepsilon\) is an error term. Given that the answers to the question about attitudes towards immigrants are qualitative, we used an ordered probit for all our estimations. The results obtained by estimating the above mentioned specification are reported in columns [1], [3] and [5] of table 3.1 and the corresponding marginal effects in table 3.2.

Confirming past empirical evidence, all our estimations report that the education level strongly influences the attitudes towards immigration, i.e. the higher the education level, the higher the openness to immigration. In addition to this result, education has a significantly higher influence on working individuals. As reported in table 3.2, working can affect the probability of being in a given category of preferences towards immigration from less than 5% to more than 35%. These results can interpreted as follows. On the one hand, the positive impact of education on the working individuals can be considered - as emphasized by economists such as Scheve and Slaughter (2000), Mayda (2005), O’Rourke and Sinnott (2005) - as a confirmation of the standard economic theory on the labor market effects of immigration.\(^{17}\) On the other hand, the overall positive effect of education can be seen - as suggested by social scientists such as Citrin et al. (1997) or Haimmueller and Hiscox (2006) - as proxying some social effects or different habits in answering survey questions.\(^{18}\)

Among the additional results, age and being student have a significant impact on attitudes towards immigrants whatever the specification chosen. Contrary to the students who often get to know many foreigners during their formation and are stimulated to analyze critically the actuality, the older citizens are rather opposed to immigration. In some specifications, women, individuals who are married, and those who live in a town have a positive view of immigrants.

Looking at the country and region characteristics, we find that a high level of GDP, a large foreigners’ share, a high rate of unemployment and a low religious fragmentation all lead to a significantly more positive view of immigration. The first result can be explained by citizens of richer countries either having a sufficiently good quality of life to be more generous towards foreigners, or feeling less threatened by immigration. The second result indicates that citizens who are surrounded by foreigners are less afraid about them since they know them better and hence are also less opposed to new immigrants entering the country. The third result is probably the most surprising. Indeed, according to economic theory, if

\(^{17}\)The hypothesis usually tested is: if education is a good proxy of labor market fears, it should significantly enter in the preferences of the working individuals.

\(^{18}\)For instance, Chandler and Tsai (2001) suggest that “the greater tolerance of persons with higher levels of education has been attributed to their wider knowledge, more critical habits of thought, greater security, or merely a more sophisticated defence of their class interests” and Haimmueller and Hiscox (2006) that “more educated respondents might feel more pressure to respond in a more politically correct way to these survey questions, understating their anti-immigrant sentiments and overstating their commitments to tolerance and cultural diversity”.

59
Table 3.1: Ordered probit, immigration estimations

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<td>0.053***</td>
<td>0.060***</td>
<td>0.054***</td>
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<tr>
<td></td>
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<td>[23.47]</td>
<td>[20.75]</td>
<td>[21.83]</td>
<td>[19.55]</td>
</tr>
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<td>Education × working</td>
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<td>0.009***</td>
<td>0.011***</td>
<td>0.009***</td>
<td>0.009***</td>
<td>0.008***</td>
</tr>
<tr>
<td></td>
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<td>[7.30]</td>
<td>[6.07]</td>
<td>[6.11]</td>
<td>[5.20]</td>
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<td>Unemployed</td>
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<td>0.031</td>
<td>0.009</td>
<td>0.018</td>
<td>0.028</td>
<td>0.04</td>
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<td></td>
<td>[0.45]</td>
<td>[0.87]</td>
<td>[0.27]</td>
<td>[0.51]</td>
<td>[0.78]</td>
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<td>0.426***</td>
<td>0.364***</td>
<td>0.404***</td>
<td>0.350***</td>
</tr>
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<td></td>
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<td>[10.77]</td>
<td>[13.11]</td>
<td>[11.11]</td>
<td>[12.15]</td>
<td>[10.44]</td>
</tr>
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<td>Age</td>
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<td>-0.005***</td>
<td>-0.005***</td>
<td>-0.005***</td>
<td>-0.005***</td>
<td>-0.005***</td>
</tr>
<tr>
<td></td>
<td>[8.39]</td>
<td>[10.14]</td>
<td>[9.28]</td>
<td>[10.29]</td>
<td>[9.71]</td>
<td>[10.34]</td>
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<td>Female</td>
<td>0.017</td>
<td>0.021</td>
<td>0.021</td>
<td>0.025*</td>
<td>0.031**</td>
<td>0.034**</td>
</tr>
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<td></td>
<td>[1.32]</td>
<td>[1.58]</td>
<td>[1.62]</td>
<td>[1.90]</td>
<td>[2.30]</td>
<td>[2.53]</td>
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<td>Married</td>
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<td>-0.009</td>
<td>0.011</td>
<td>0.004</td>
<td>0.028**</td>
<td>0.02</td>
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<td></td>
<td>[0.70]</td>
<td>[0.62]</td>
<td>[0.74]</td>
<td>[0.30]</td>
<td>[1.97]</td>
<td>[1.38]</td>
</tr>
<tr>
<td>Town</td>
<td>-0.017</td>
<td>0.003</td>
<td>-0.02</td>
<td>-0.003</td>
<td>0.095***</td>
<td>0.101***</td>
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<td>[1.27]</td>
<td>[0.23]</td>
<td>[1.50]</td>
<td>[0.24]</td>
<td>[6.77]</td>
<td>[7.15]</td>
</tr>
<tr>
<td>Foreigners’ share</td>
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<td>0.014***</td>
<td></td>
<td></td>
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<tr>
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<td>[6.99]</td>
<td>[8.01]</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
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<td>0.017***</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>[7.36]</td>
<td>[9.37]</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.204***</td>
<td>0.189***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[10.49]</td>
<td>[6.62]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnic fractionalization</td>
<td>0.028</td>
<td>0.054</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.55]</td>
<td>[1.06]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious fractionalization</td>
<td>-0.304***</td>
<td>-0.270***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[8.38]</td>
<td>[7.42]</td>
<td></td>
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<tr>
<td>Inequality measure 10%</td>
<td>-0.006*</td>
<td>-0.001</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>[1.89]</td>
<td>[0.40]</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Country fixed-effects</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

$t$-statistics in brackets, country fixed-effects and cuts not reported, 33 603 observations

* significant at 10%; ** significant at 5%, *** significant at 1%
Table 3.2: Marginal effects (evaluated at sample means), immigration estimations

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Increase of trust ($\pm 1/2 \sigma$), working</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>-2.83</td>
<td>-</td>
<td>2.44</td>
</tr>
<tr>
<td>Allow some</td>
<td>-4.14</td>
<td>-</td>
<td>4.06</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-3.01</td>
<td>-</td>
<td>-2.98</td>
</tr>
<tr>
<td>Allow none</td>
<td>-3.96</td>
<td>-</td>
<td>-3.52</td>
</tr>
<tr>
<td>Increase of education ($\pm 1/2 \sigma$), working</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>3.86</td>
<td>3.28</td>
<td>3.51</td>
</tr>
<tr>
<td>Allow some</td>
<td>4.80</td>
<td>4.33</td>
<td>5.08</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-3.98</td>
<td>-3.51</td>
<td>-4.14</td>
</tr>
<tr>
<td>Allow none</td>
<td>-4.68</td>
<td>-4.10</td>
<td>-4.45</td>
</tr>
<tr>
<td>Increase of education ($\pm 1/2 \sigma$), non working</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>2.76</td>
<td>2.43</td>
<td>2.62</td>
</tr>
<tr>
<td>Allow some</td>
<td>4.48</td>
<td>4.00</td>
<td>4.76</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-2.74</td>
<td>-2.53</td>
<td>-3.05</td>
</tr>
<tr>
<td>Allow none</td>
<td>-4.50</td>
<td>-3.90</td>
<td>-4.33</td>
</tr>
</tbody>
</table>

immigrants and natives are competing on the same labor market, immigrants may either have a detrimental effect on natives wages or increase unemployment. Combined with the fact that being unemployed has no significant influence on attitudes towards immigrants, the positive influence of the regional unemployment rate does not support the economic prediction. It is also possible that the positive influence of the unemployment rate is linked to a problem of omitted variables. The fourth result is confirming that heterogeneity in religious beliefs may exacerbate fears against foreigners and immigrants. Finally, there is only a little evidence (at a 10% level), that inequality makes people less open to foreigners.

The ranking of the country fixed-effects, not reported, is closely related to the ranking of the country averages reported in table 3-2. All things equal, Hungary and Greece are the countries most opposed to immigration. Following them, we find the Czech Republic, Denmark and Finland. Sweden, Switzerland, Ireland and Poland are the most open countries.

3.4.2 Trust: A determinant of attitudes towards immigrants?

Based on our discussion about the importance of reciprocity in the shaping of attitudes, we introduce trust ($y_2$) as an additional determinant of preferences towards immigrants. The specification to estimate is now given by:

$$y_1 = \alpha y_2 + \beta' x + \varepsilon$$
In this section, we consider trust as exogenous. However, next section discusses further eventual problems of endogeneity and provides a more sophisticated framework to isolate the influence of trust on preferences towards immigrants.

As shown in columns [2], [4] and [6] of table 3.1, trust is a very significant and important determinant of preferences towards immigrants, i.e. an individual who is more trusting has also a more positive view of immigrants. As already mentioned, this result could be explained by trusting citizens having more positive expectations about the impact of immigrants on their daily life or on the country in general. For instance, trusting individuals may be more confident that immigrants are trustworthy and won’t have a negative effect on their host country.

Interestingly, introducing a measure of trust - which is highly and significantly determined by education as will be discussed in next section - lowers only slightly the size of the direct effect of education on preferences towards immigration as shown in table 3.2. This result suggests that the social content of education emphasized by social scientists cannot persuasively be linked to subjective expectations about reciprocity.

In addition to lowering the direct influence of education on attitudes towards immigrants, trust also lowers the effect of GDP per capita and makes the inequality measure loose its significance. Finally, comparing the estimations without and with trust included as a regressor, all country fixed-effects - except for Denmark, Finland and Norway - are attenuated which implies that the individual level of trust explains a part of the unobserved country characteristics.

3.4.3 Education as a proxy for labor market fears: Further evidence

According to the standard political-economy models, if native and immigrant workers are substitutes, an arrival of low-(high-)skill immigrants may have a negative impact on the labor market wages of the low-(high-)skill natives, thus we expect low- and high-skill natives to have systematically a different attitude towards immigration. Supposing that immigrants are expected to be mostly low-skill, natives should be more against immigration than high-skill natives which indeed has widely been confirmed by empirical analyses. However, since all the countries included in our sample have not the same level of economic development, nor the same immigration policy, the expectations about the skill level of the immigrants may differ, and simply considering education as a proxy for labor market characteristics may be overly simplistic.

Given that we don’t know the individual expectations about the skill mix of the new immigrants, we assume that native citizens expect future immigration flows to have the same structure as past immigration flows. Thus, we should observe high-skill natives in countries which experienced relatively large inflows of (low-) high-skill immigrants to be significantly less (more) favorable to immigration than low-skill natives. To test this hypothesis, we follow Mayda’s (2006) work and consider the actual ratio of skilled to unskilled individuals in the native relative to the immigrant population as a proxy for the expected structure.
of immigration flows. To test for robustness, we also used GDP per capita as an indirect proxy for the expected immigration flows.\textsuperscript{19}

Table 3.3: Ordered probit, immigration estimations, decomposition of the education effect

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</thead>
<tbody>
<tr>
<td>Trust</td>
<td>0.075***</td>
<td>0.071***</td>
<td>0.066***</td>
<td>0.066***</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Education</td>
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<td>0.059***</td>
<td>-0.156***</td>
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<td></td>
<td>[25.07]</td>
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<td>[6.81]</td>
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<td>[5.91]</td>
<td>[5.16]</td>
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<td>[0.20]</td>
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<tr>
<td>Edu. × rel. skill</td>
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<td>-0.002</td>
<td>0.032***</td>
<td>0.029***</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>[1.97]</td>
<td>[1.02]</td>
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<tr>
<td>Edu. × rel. skill × work</td>
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<td>0.007***</td>
<td>0.006***</td>
<td>0.005***</td>
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<td>[4.29]</td>
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<tr>
<td>Edu. × GDP</td>
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<td>0.014***</td>
<td>0.008***</td>
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<td></td>
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<td>[2.98]</td>
<td>[2.27]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edu. × GDP × work</td>
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<td>0.001***</td>
<td>0.001***</td>
<td>0.001***</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>[7.25]</td>
<td>[6.08]</td>
<td>[6.10]</td>
<td>[5.22]</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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</tbody>
</table>

\textit{t}-statistics in brackets, 33 603 observations
Country fixed-effects, cuts and other control variables not reported
* significant at 10%; ** significant at 5%, *** significant at 1%

Referring to estimations [7] and [8] of table 3.3 - which control for country and regional characteristics -, we find a large and significant influence of education on attitudes towards immigrants but this effect is significantly lowered in countries relatively richly endowed with low-skill immigrants. However, once we consider only the working individuals, the influence of education in countries with relatively many low-skill immigrants becomes, as expected, clearly positive. The estimations controlling for country fixed-effects, reported in columns [11] and [12], show that the education level, whatever the skill mix, has a positive influence on preferences towards immigrants. Moreover, high-(low-)skill citizens in countries which are expecting immigrants to be relatively low skilled are also more (un)favorable to immigration and this effect is even larger for currently working individuals.

If we now consider our indirect measure of the expected skill structure of immigration flows, columns [9], [10], [13] and [14] of table 3.3 report that the interaction term between education and GDP has a positive influence on preferences towards immigrants, i.e. high-skill natives in high (low) GDP countries are more (un)favorable to immigration than low-

\textsuperscript{19}Following the assumption of O’Rourke and Sinnott (2006): “GDP per capita is positively correlated with countries’ human capital endowments”, individuals in a country should expect, according to a standard Heckscher-Ohlin model, unskilled workers to migrate from unskilled-labor abundant (low GDP) countries to skilled-labor abundant (high GDP) countries.
skill natives.\textsuperscript{20} When we control for country fixed-effects, the level of education has no longer a direct effect on immigration preferences whereas, when we consider country and regional characteristics, the direct effect of education is negative. Taking into account that the lowest GDP level (in log) in our sample is 8.737, the negative direct impact of education can never offset the positive effect of our interaction term, thus, in none of our countries, the low-skill individuals are more favorable to immigration than the high-skill individuals. As an additional result, we find that the interaction term between education, GDP and working is always significantly positive which suggests that working individuals are more reactive to economic arguments.

Departing from our estimations of the impact of education on preferences towards immigrants, the other results obtained are strikingly close to those reported in table 3.1 and therefore are not reported. The only thing we wish to emphasize one more time is that trust has a large and significant influence on immigration preferences.

3.5 Endogeneity of trust: Some evidence

Given that we used answers to subjective survey questions to proxy both the attitudes towards immigrants and the individual level of trust, we cannot exclude that some unobserved characteristics may have a systematic influence on them. If this is indeed the case, our estimations may be affected by an endogeneity problem.\textsuperscript{21} Moreover, even if we suppose that the level of trust is an important determinant of preferences towards immigrants, nothing guarantees us that the level of trust is not itself influenced by attitudes towards immigrants. In this case, we may be confronted with a simultaneity bias.

In this section, we start by providing an empirical framework to take into account both of these potential biases. Then, we discuss the exclusion restrictions needed to identify our model as well as the determinants of trust. Finally, we present and analyze the results obtained by estimating simultaneously trust and attitudes towards immigrants.

3.5.1 A Limited Information Maximum Likelihood (LIML) framework

Since our main interest is to understand the determinants of preferences towards immigrants and since we want our estimations to be robust to a possible simultaneity bias, we decided to rely on a LIML estimation which has, at least, two advantages over the Full Information

\textsuperscript{20}Contrary to O’Rourke and Sinnott’s (2006) results replacing the inequality index by an interaction term between this index and education never revealed significant.

\textsuperscript{21}Subjective survey questions can be flawed by attempts at controlling one’s self-image, cultural biases, interactions with the surveyor, memory and lucidity failures, question formulation, order effects, answers to irrelevant questions, mood effects, difficulty of interpreting the answers. See Bertrand and Mullainathan (2001) for an overview of these problems.
Maximum Likelihood (FIML). First, it is robust to an eventual simultaneity bias\(^{22}\) and, second, it implies that we need only to find a relevant identification variable for the trust equation as will be discussed further on.\(^{23}\) The only drawback of using a LIML instead of a FIML is a possible loss of efficiency.

The system of equations to be estimated simultaneously and jointly is composed of a structural form for the individual preferences for immigration \((y_1)\) and of a reduced form for the level of trust \((y_2)\):

\[
y_1^* = \alpha y_2 + \beta' x + \varepsilon_1 \text{ where } y_1 = \begin{cases} 1 & \text{if } y_1^* < k_1 \\ 2 & \text{if } k_1 < y_1^* < k_2 \\ \vdots & \vdots \\ N & \text{if } y_1^* > k_{N-1} \\ \end{cases} \quad (3.1)
\]

\[
y_2 = \delta' x + \eta' z + \varepsilon_2
\]

where \(y_1^*\) is the dependent latent variable, \(y_2\) is the endogenous variable, \(x\) is a set of common explanatory variables, \(z\) is a set of exogenous identification variables, \(k_1, \ldots, k_{N-1}\) are unknown threshold parameters to be estimated along with \(\alpha, \beta, \delta, \eta\) and \(\varepsilon_1, \varepsilon_2\) are error terms.

It has to be mentioned that we decided to treat our trust variable as continuous. Indeed, given that the answers to our trust question were coded on a scale from 0 to 10 - which implies a very large number of cases to consider - using another latent variable would have dramatically hampered the interpretation of our results.\(^{24}\) To estimate this model, we also assumed that the errors \((\varepsilon_1, \varepsilon_2)\) follow a bivariate normal law:

\[
\begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{21} & \sigma_2^2 \end{bmatrix}\right)
\]

where \(\sigma_{12} = \sigma_{21} = \sigma\) is an unknown coefficient of covariance and \(\sigma_1^2, \sigma_2^2\) are the variances of \(y_1^*, y_2\) respectively. Furthermore, to identify the parameters of our model, the following normalization was made:\(^{25}\) \(\sigma_1^2 = 1\).

To estimate this setup by maximum likelihood, we have to write equation (3.1) in a reduced form. Substituting equation (3.2) into equation (3.1) and then dividing the resulting expression by \(\xi = (1 + \alpha^2 \sigma_2^2 + 2\alpha \sigma)^{1/2}\) to normalize the variance of the error term to 1, we

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\(^{22}\)Since the LIML relies a reduced from of the trust equation, this allows us to control for a possible influence of attitudes towards immigrants on trust.

\(^{23}\)Rivers and Vuong (1988) also show that the LIML is the most efficient limited information estimator.

\(^{24}\)As a robustness check, we estimated most of our specifications with a bivariate ordered probit. Since the results we obtained were similar - both in terms of signs and of significance levels - to the one obtained with trust considered as continuous, we do not report them here but they are available upon request.

\(^{25}\)This normalization does not change the results as \(y_1^*\) is a qualitative variable.
get:
\[
\tilde{y}_1^* = \frac{\alpha}{\xi} (\delta' x + \eta' z) + \frac{1}{\xi} (\beta' x) + \nu_e
\]  
(3.3)
where \(\nu_e = \frac{\varepsilon_1 + \alpha \varepsilon_2}{\xi}\). Considering the system of equations (3.3) and (3.2), the matrix of variances-covariances is:
\[
V = \begin{bmatrix}
1 & \frac{\sigma + \alpha \sigma_2^2}{\xi} \\
\frac{\sigma + \alpha \sigma_2^2}{\xi} & \sigma_2^2
\end{bmatrix}
\]
To derive the maximum likelihood function, we need to know the joint distribution of \(\tilde{y}_1^*\) and \(y_2\):
\[
f(\tilde{y}_1^*, y_2 \mid x, z) = f(\tilde{y}_1^* \mid y_2, x, z) \cdot f(y_2 \mid x, z)
\]
The marginal distribution of \(y_2\) is:
\[
f(y_2 \mid x, z) = \frac{1}{\sigma_2} \phi \left( \frac{y_2 - \omega}{\sigma_2} \right)
\]  
(3.4)
where \(\omega = \delta' x + \eta' z\) and \(\phi(.)\) is the standard normal distribution. Given that both \(\tilde{y}_1^*\) and \(y_2\) follow a normal law, the conditional pdf of \(\tilde{y}_1^*\) given \(y_2\) can be written as:
\[
f(\tilde{y}_1^* \mid y_2, x, z) = \frac{1}{(1 - \rho^2)^{1/2}} \phi \left( \frac{\tilde{y}_1^* - \left[ \psi + \frac{\theta}{\sigma_2^2} (y_2 - \omega) \right]}{(1 - \rho^2)^{1/2}} \right)
\]
where \(\psi = \frac{\alpha}{\xi} (\delta' x + \eta' z) + \frac{1}{\xi} (\beta' x)\), \(\theta = \frac{\sigma + \alpha \sigma_2^2}{\xi}\) and \(\rho = \frac{\theta}{\sigma_2}\) is the coefficient of correlation between the errors \(\nu_e\) and \(\varepsilon_2\). Taking into account that \(y_1\) is a qualitative variable, we have:
\[
\Pr (\tilde{y}_1^* = i \mid y_2, x, z) = \Pr \left( \tilde{k}_{i-1} < \tilde{y}_1^* \leq \tilde{k}_i \mid y_2, x, z \right)
\]
\[
= \Phi \left( \frac{\tilde{k}_i^* - \left[ \psi + \frac{\theta}{\sigma_2^2} (y_2 - \omega) \right]}{(1 - \rho^2)^{1/2}} \right) - \Phi \left( \frac{\tilde{k}_{i-1}^* - \left[ \psi + \frac{\theta}{\sigma_2^2} (y_2 - \omega) \right]}{(1 - \rho^2)^{1/2}} \right)
\]  
(3.5)
where \(\Phi(.)\) is the standard normal CDF. Considering expressions (3.4) and (3.5), the maximum likelihood function is straightforward to get.

### 3.5.2 Discussing the exclusion restrictions

The main difficulty to be handled when estimating a LIML is to find at least one exogenous variable \(z\) which explains - relevantly - the individual level of trust but not the attitudes towards immigration. Finding such a variable is fundamental to identify correctly our model
and is not an easy task.

Given that we couldn’t find any individual level variable in the ESS which potentially satisfy all the conditions mentioned above, we considered the average regional level of trust as a possible identification variable. Drawing on the social interactions models, it is customary to suppose that the utility of an individual depends on his own attributes, on the exogenous environment in which he lives and on his region- (group-) specific attributes and/or behavior. The last argument of this utility function, if interpreted as an endogenous effect, implies that the behavior - not the exogenous characteristics - of a given reference group can have an influence on the behavior of an individual. In our context, it could be illustrated as follows: if most of the inhabitants of a region exhibit high levels of trust towards strangers, the transactions costs may be low, the economic efficiency high, the government less corrupted, etc., which, in turn, creates positive incentives for each inhabitant of this region to be also individually more trusting. Some support for this prediction has been provided by Guiso et al. (2004) who found, in a first step, that the level of social capital of both the origin and the residence country has an influence on the behavior of an individual and, in a second step, that the level of social capital of the residence country represents 2/3 of this influence.

Since the variance of trust between regions (4.9) is much larger than the variance within regions (1.0), the average regional level of trust may not be the most appropriate instrument to be used. However, by taking into account that the main source of variance in the individual level of trust is to be found at the regional level, we focused on regional cultural and institutional features to find alternative relevant instruments. First, following the argumentation of Guiso et al. (2004) which suggests that the regional participation rate should be a good proxy of the level of regional trust since participating in an election is highly driven “by social pressure and internal norms”, we considered the regional participation rate in the elections as an instrument. Second, relying on La Porta et al. (1997) who have shown that the level of trust in a country with a majority of citizens belonging to a hierarchical religion - catholic, eastern orthodox, muslim - is significantly smaller, an index of the predominance of the hierarchical Christian religions, i.e. catholic and orthodox, in a given region was also used as instrument. Finally, drawing on Guiso et al. (2003) who emphasized

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26 See Brock and Durlauf (2001) for an overview.

27 See Manski (1993) for a distinction between endogenous and contextual effects.

28 As noted by Guiso et al. (2004): “in high-social-capital communities, people may trust each other more because the networks in their community provide better opportunities to punish deviants [or] people may rely more on others’ keeping their promises because of the moral attitude imprinted with education”.

29 From an econometric point of view, two points need to be discussed further. First, depending on the criteria used to define peer or neighborhood groups, social interaction models may be contaminated by a problem of self-selection. Second, as shown by Manski (1993), the reflection problem may induce a non identification of social effects. To circumvent the first problem, we used geographical regions whose composition is independent of the level of trust and to avoid the second problem, we used the past levels of regional trust computed with data from the ESS which took place in 2002.

30 LaPorta et al. also emphasize that “hierarchical religion and distrust [...] both reflect some underlying basic factor in a society”.

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67
that being member of the dominant religion can induce a different social attitudes, a term of interaction between the hierarchical index and the individual membership in these religions has been added amongst the instruments.

3.5.3 Determinants of trust

Since our trust variable is qualitative, we should use an ordered probit model to identify its main determinants. However, since the results we obtained by using an ordered probit\textsuperscript{31} are very similar to those obtained by using OLS adjusted for heteroscedasticity,\textsuperscript{32} we only report the latter. Indeed, OLS estimations are easier to interpret. Table 3.4 summarizes the results of different specifications of the trust equation.

Confirming past empirical evidence,\textsuperscript{33} we find that the level of education has a very significant and positive impact on the level of trust in all the specifications, i.e. the higher the level of education of a citizen, the higher his probability to be trusting others. To explain this recurrent result many hypotheses have been evoked. For instance, Freitag (2003 a, b) suggests that “education expands the horizons of individuals and makes people more open minded to accept otherness” and Uslaner (2002) that “education, especially through university, broadens one’s perspective on the world and brings one into contact with a wider variety of people”. Helliwell et al. (2006) argue that “ignorance breeds fear, which can then be dispelled by education”. It is also possible that “the positive effect of education on trust might occur because more educated people associate with other more educated people who are, for some reason, more trustworthy [...] alternatively, education might create individual social capital by raising social skills or because high status increases the ability to reward and punish others” (Glaeser et al. 2000). Another interesting result is that education has a greater impact on the trust level of individuals who are currently working. Among the other significant individual characteristics, we find that age, being student, not living in a town and being married make more trusting. Being unemployed and being a woman have a negative effect on trust but not always significantly so.

When looking at the estimations including regional and country characteristics - columns [16], [18], [20] and [21] -, we notice that adding these variables considerably increases the overall fit of the estimations, e.g. the $R$-squared of estimation [16] is more than the double of that of the benchmark estimation [15]. As main results, we find that living in a region with a high foreigners’ share and in a country with a large level of religious fractionalization have a negative impact on the individual trust level. These effects have both already

\textsuperscript{31}To test for robustness, all the specifications presented in this section were also estimated by using an ordered probit, but, since all the results obtained revealed similar, both in terms of sign and of level of significance, to those obtained by using OLS, we do not present them here. Results are available upon request.

\textsuperscript{32}The standard errors have been corrected by using White’s estimator of the variance.

\textsuperscript{33}At an individual level, see Glaeser et al. (1997), Li et al. (2005), Freitag (2003 a, b), Helliwell et al. (2003), Uslaner (2002), Alesina and La Ferrara (2002) and, at an aggregate level, see Knack and Keefer (1997).
been emphasized in the literature. For instance, Knack and Keefer (1997) argue that “in polarized societies, individuals are less likely to share common backgrounds and mutual expectations about behavior, so it is more difficult to make self-enforcing agreements”, and Alesina and La Ferrara (2002) that “the effect of heterogeneity on trust is in large part due to the fact that individuals trust those more similar to themselves”. Following the same argumentation, it is also no surprise that column [16] reports a significantly negative influence of ethnic fractionalization on trust. However, when looking at columns [20] and [21] which control for hierarchical religions, this variable becomes significantly positive. This result suggests that it is not the ethnic differences between individuals which harm trust but the religious affiliations associated with the members of different ethnic groups. The prediction of Uslaner (2002), i.e. “a more equitable distribution of income creates stronger bonds between different groups in society [i.e.] when some people have far more than others, neither those at the top nor those at the bottom are likely to consider the other as part of their moral community”, finds only very little support in our estimations. In addition to heterogeneity issues, individuals living in a region with a high unemployment rate as well as with a low GDP per capita are also less trusting.

Replacing regional and country characteristics by country fixed-effects - columns [17], [19] and [22] -, increases the overall fit of the estimations but the estimated values of the variables change very little. This result suggests that the omitted variables bias should not be a source of concerns when using regional and country characteristics instead of country fixed-effects. The size of the country fixed-effects - not reported here - confirms the clustering of trusting attitudes, all things equal, individuals living in the Scandinavian countries - Finland, Norway and Denmark - are the most trusting whereas individuals living in the eastern countries - Poland, Slovenia, Hungary and the Czech Republic - and in Greece are the least trusting.

Turning now to the identification variables, we find - in column [18] - that the past average regional level of trust has a very strong and significant impact on the individual level of trust. This result confirms that social interactions are strongly present at a regional level. Moreover, once regional trust has been controlled for, the direct effect of all the regional and country level variables decreases. This is not a surprise since the regional trust level itself depends on these variables. The size of the impact of the average regional trust presented in column [19] is much lower than that discussed above. Indeed, as the average regional levels of trust are highly correlated with the country averages (0.95), a large part of their effect is captured by the country fixed-effects which may, in turn, induce problems of identification for our LIML estimations.
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<td>-0.128***</td>
<td>-0.075**</td>
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<td>[8.20]</td>
<td>[7.61]</td>
<td>[2.44]</td>
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<td>-0.007***</td>
<td>-0.027***</td>
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<td>0.403***</td>
<td>1.114***</td>
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</tr>
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<td>Religious fractionalization</td>
<td>-0.533***</td>
<td>-0.163**</td>
<td>-0.370***</td>
<td>-0.285***</td>
<td>-0.370***</td>
<td>-0.285***</td>
<td>-0.370***</td>
<td>-0.285***</td>
</tr>
<tr>
<td></td>
<td>[7.33]</td>
<td>[2.24]</td>
<td>[4.86]</td>
<td>[3.69]</td>
<td>[4.86]</td>
<td>[3.69]</td>
<td>[4.86]</td>
<td>[3.69]</td>
</tr>
<tr>
<td>Inequality measure 10%</td>
<td>-0.062***</td>
<td>0.008</td>
<td>-0.005</td>
<td>-0.007</td>
<td>-0.005</td>
<td>-0.007</td>
<td>-0.005</td>
<td>-0.007</td>
</tr>
<tr>
<td></td>
<td>[10.11]</td>
<td>[1.18]</td>
<td>[0.77]</td>
<td>[1.14]</td>
<td>[0.77]</td>
<td>[1.14]</td>
<td>[0.77]</td>
<td>[1.14]</td>
</tr>
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<td>[15]</td>
<td>[16]</td>
<td>[17]</td>
<td>[18]</td>
<td>[19]</td>
<td>[20]</td>
<td>[21]</td>
<td>[22]</td>
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<tr>
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<td>------</td>
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<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Regional trust 2002</td>
<td></td>
<td></td>
<td></td>
<td>0.716***</td>
<td>0.209***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[40.01]</td>
<td>[4.94]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional participation</td>
<td></td>
<td></td>
<td></td>
<td>0.174</td>
<td>0.059</td>
<td>-0.088</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>[1.16]</td>
<td>[0.39]</td>
<td>[0.28]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hierarchical religion</td>
<td></td>
<td></td>
<td></td>
<td>-1.217***</td>
<td>-1.392***</td>
<td>0.071</td>
<td></td>
<td></td>
</tr>
<tr>
<td>share</td>
<td></td>
<td></td>
<td></td>
<td>[31.77]</td>
<td>[28.92]</td>
<td>[0.57]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member hier. × hier.</td>
<td></td>
<td></td>
<td></td>
<td>0.241***</td>
<td>0.062</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>religion</td>
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<td></td>
<td></td>
<td>[5.80]</td>
<td>[1.43]</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Country fixed-effects</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.06</td>
<td>0.14</td>
<td>0.19</td>
<td>0.18</td>
<td>0.19</td>
<td>0.16</td>
<td>0.16</td>
<td>0.19</td>
</tr>
</tbody>
</table>

_t*-statistics in brackets, country fixed-effects and constants not reported, 33 603 observations

* significant at 10%; ** significant at 5%, *** significant at 1%
The estimations in columns [20], [21] and [22] all report that the average regional electoral participation rate has no significant influence on trust. This implies that a high electoral participation rate does not contribute to create a favorable environment to enhance the individual level of trust. If we now focus on columns [20] and [21], we notice that individuals living in regions populated with a majority of citizens belonging to a hierarchical Christian religion are significantly less trusting confirming the argument of LaPorta et al. (1997). However, as shown in column [21], the members of the hierarchical Christian religions are more trusting if they are living in a region in which their religion is dominant. If we now look at specification [22] which rely on the same set of instruments as specification [21], we notice that none of them has a significant influence on the individual level of trust. Similarly to the problem discussed above, our regional level variables are strongly correlated within a country and thus adding country fixed-effects in our estimation removes the effect of these variables.

Given the very small explanatory power of our instruments when relying on estimations with fixed-country effects and given that using weak instruments may highly bias our estimations, we will only use our LIML method to estimate specifications including country and regional level characteristics.34

3.5.4 LIML estimations


If we first look at estimation [23b] of table 3.5, we find that trust has a positive and significant influence on attitudes towards immigration. However, compared to the ordered probit results reported in table 3.2, we notice that the estimated size of the influence of trust on preferences towards immigrants is much larger when using the LIML as can be seen in table 3.6. Moreover, we also find that the effect of education, once trust has been instrumented for, is significantly reduced compared to estimation [4] of table 3.2. As an illustration, in an ordered probit estimation considering trust as exogenous, a 1 standard deviation increase in education has a slightly larger influence on preferences towards immigrants than a 1 standard deviation increase in trust. When using a LIML, the size of

---

34 According to a Shea’s partial-$R^2$ test-statistic (used to identify weak instruments), we found, for specification [18], a value of 0.0509 which is statistically different from 0 according to a F-test and, for specification [19], a value of 0.0009 also statistically different from 0, thus the average regional trust variable should not be a weak instrument (see Bound et al. (1995) for more details on these tests). However, given that we are working with a very large sample of individuals, our F-test may be too powerful and thus reject $H_0$ even if correct. In our case, since the latter partial $R^2$ is very small, the problem of weak instrument should be seen as relevant. While specifications [20] and [21] report no evidence of weak instruments, specification [22] significantly does.
Table 3.5: LIML estimations

<table>
<thead>
<tr>
<th></th>
<th>Trust</th>
<th>Immig.</th>
<th>Trust</th>
<th>Immig.</th>
<th>Trust</th>
<th>Immig.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>[23a]</td>
<td>[23b]</td>
<td>[24a]</td>
<td>[24b]</td>
<td>[25a]</td>
<td>[25b]</td>
</tr>
<tr>
<td>Trust</td>
<td>0.174***</td>
<td>0.057***</td>
<td>0.047***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[16.14]</td>
<td>[3.27]</td>
<td>[2.69]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional trust 2002</td>
<td>0.716***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[40.01]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional participation</td>
<td>0.211</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[1.24]</td>
<td></td>
<td>[0.71]</td>
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<td></td>
</tr>
<tr>
<td>Hierarchical religion share</td>
<td>-1.217***</td>
<td>-1.394***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[31.70]</td>
<td></td>
<td>[29.02]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member hier. × hier. religion</td>
<td></td>
<td></td>
<td>0.246***</td>
<td></td>
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<td>[5.88]</td>
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<tr>
<td>Education</td>
<td>0.093***</td>
<td>0.040***</td>
<td>0.097***</td>
<td>0.054***</td>
<td>0.098***</td>
<td>0.055***</td>
</tr>
<tr>
<td></td>
<td>[18.33]</td>
<td>[13.91]</td>
<td>[19.05]</td>
<td>[17.83]</td>
<td>[19.22]</td>
<td>[18.36]</td>
</tr>
<tr>
<td>Education × working</td>
<td>0.023***</td>
<td>0.006***</td>
<td>0.023***</td>
<td>0.009***</td>
<td>0.023***</td>
<td>0.010***</td>
</tr>
<tr>
<td></td>
<td>[7.46]</td>
<td>[3.83]</td>
<td>[7.46]</td>
<td>[6.02]</td>
<td>[7.54]</td>
<td>[6.20]</td>
</tr>
<tr>
<td>Foreigners’ share</td>
<td>-0.006*</td>
<td>0.016***</td>
<td>-0.025***</td>
<td>0.014***</td>
<td>-0.027***</td>
<td>0.014***</td>
</tr>
<tr>
<td></td>
<td>[1.72]</td>
<td>[9.22]</td>
<td>[6.75]</td>
<td>[7.55]</td>
<td>[7.19]</td>
<td>[7.40]</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>-0.019***</td>
<td>0.022***</td>
<td>-0.045***</td>
<td>0.016***</td>
<td>-0.047***</td>
<td>0.016***</td>
</tr>
<tr>
<td></td>
<td>[5.10]</td>
<td>[11.67]</td>
<td>[12.01]</td>
<td>[8.17]</td>
<td>[12.48]</td>
<td>[7.90]</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.403***</td>
<td>0.022</td>
<td>1.109***</td>
<td>0.210***</td>
<td>1.131***</td>
<td>0.225***</td>
</tr>
<tr>
<td></td>
<td>[6.25]</td>
<td>[0.65]</td>
<td>[17.13]</td>
<td>[5.24]</td>
<td>[17.51]</td>
<td>[5.67]</td>
</tr>
<tr>
<td>Ethnic fractionalization</td>
<td>0.061</td>
<td>0.090*</td>
<td>0.605***</td>
<td>0.049</td>
<td>0.715***</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>[0.59]</td>
<td>[1.79]</td>
<td>[5.63]</td>
<td>[0.96]</td>
<td>[6.55]</td>
<td>[0.89]</td>
</tr>
<tr>
<td>Religious fractionalization</td>
<td>-0.163***</td>
<td>-0.205***</td>
<td>-0.362***</td>
<td>-0.277***</td>
<td>-0.271***</td>
<td>-0.283***</td>
</tr>
<tr>
<td></td>
<td>[2.24]</td>
<td>[5.60]</td>
<td>[4.69]</td>
<td>[7.41]</td>
<td>[3.44]</td>
<td>[7.57]</td>
</tr>
<tr>
<td>Inequality measure 10%</td>
<td>0.008</td>
<td>0.005*</td>
<td>-0.005</td>
<td>-0.002</td>
<td>-0.007</td>
<td>-0.003</td>
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<tr>
<td></td>
<td>[1.18]</td>
<td>[1.73]</td>
<td>[0.72]</td>
<td>[0.64]</td>
<td>[1.09]</td>
<td>[0.83]</td>
</tr>
<tr>
<td>Correlation</td>
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<td>0.032</td>
<td>0.055</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

$t$-statistics in brackets, country/region characteristics, cuts and individual level control variables (unemployed, student, age, female, married, town) not reported, 33 603 observations

* significant at 10%; ** significant at 5%, *** significant at 1%

73
Table 3.6: Marginal effects (evaluated at sample means), immigration equation

<table>
<thead>
<tr>
<th></th>
<th>[23b]</th>
<th>[24b]</th>
<th>[25b]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase of trust ($\pm 1/2 \sigma$), work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>7.06</td>
<td>2.59</td>
<td>2.13</td>
</tr>
<tr>
<td>Allow some</td>
<td>9.92</td>
<td>3.04</td>
<td>2.50</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-7.14</td>
<td>-2.69</td>
<td>-2.21</td>
</tr>
<tr>
<td>Allow none</td>
<td>-9.84</td>
<td>-2.94</td>
<td>-2.42</td>
</tr>
<tr>
<td>Increase of education ($\pm 1/2 \sigma$), work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>2.33</td>
<td>3.61</td>
<td>3.69</td>
</tr>
<tr>
<td>Allow some</td>
<td>3.34</td>
<td>4.22</td>
<td>4.31</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-2.41</td>
<td>-3.73</td>
<td>-3.81</td>
</tr>
<tr>
<td>Allow none</td>
<td>-3.26</td>
<td>-4.10</td>
<td>-4.19</td>
</tr>
<tr>
<td>Increase of education ($\pm 1/2 \sigma$), non work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow many</td>
<td>1.85</td>
<td>2.67</td>
<td>2.71</td>
</tr>
<tr>
<td>Allow some</td>
<td>3.06</td>
<td>3.96</td>
<td>4.04</td>
</tr>
<tr>
<td>Allow a few</td>
<td>-1.86</td>
<td>-2.71</td>
<td>-2.74</td>
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<tr>
<td>Allow none</td>
<td>-3.05</td>
<td>-3.92</td>
<td>-4.01</td>
</tr>
</tbody>
</table>

these effects reverses and the difference between them becomes very large. If this result is correct, it could mean that a part of the positive effect of education on attitudes towards immigrants is due to positive expectations about reciprocity. Finally, the negative and significant coefficient of correlation ($\sigma/\sigma_2$) obtained when estimating specification [23] informs us that endogeneity is present in our estimation and that it is linked to some unobservable - omitted - characteristics which influences, in an opposite manner, immigration preferences and trust.

Turning to estimations [24] and [25] which report very similar results, trust has a positive and significant influence on attitudes towards immigration but this effect is rather smaller, in terms of marginal effects, than the one obtained without explicitly considering trust as endogenous. Moreover, since the coefficient of the correlation between the errors is not significant, endogeneity may not be a problem and running separate estimations of our trust and immigration equations should not affect the results.\(^{35}\) This is confirmed since the results obtained in columns [24b] and [25b] are similar to those obtained in column [4] of table 3.1.

How can we reconcile the contrasted results obtained in specification [23] and in specifications [24b] and [25b]? Since the only thing which differs between these two sets of estimations is the choice of instruments, this issue has to be considered further. Given that the variance of trust within regions is rather small, specification [23] which uses the past average of trust in a region as an instrument may be misspecified. Therefore, the

\(^{35}\)Note that running two separate estimations may even be more efficient.
estimations of the alternative specifications [24] and [25] may be better identified and their results be considered as more relevant. Finally, it has to be emphasized that whatever the specification considered, our variable of interest, trust, has always a positive and significant influence on attitudes towards immigrants.

3.6 Robustness checks

This section starts by replicating our main estimations by using alternative measures of the individual level of skill as well as of the attitudes towards immigrants. Then, we focus on sub-samples of more homogeneous countries to assess the importance of considering trust amongst the determinants of preferences towards immigration. It has to be emphasized that, following the preceding section discussion, all the results presented in this section rely on the assumption that trust is exogenous.

3.6.1 Alternative ways to define skill levels

In all our preceding estimations, we used the median years of education necessary to get a given degree in a country region as a proxy for the individual level of skill. Even if this indicator is probably the best suited to make comparisons across countries, we tested the robustness of our results by using two alternative measures of skills.

First, we decomposed the variable identifying the highest level of education attained into five categories: primary (ISCED 0, 1), low secondary (ISCED 2), high secondary (ISCED 3, reference group), post secondary (ISCED 4) and tertiary (ISCED 5, 6).

Second, following O’Rourke and Sinnott’s (2001) argument, we used the ISCO88 (International Standard Classification of Occupations) of the ILO as a proxy for the skill level of an individual. The advantage of this indicator is that, in addition to formal schooling, it captures the role of on-the-job training and of the nature of the work. Its disadvantage is that it may not be very relevant for individuals not active on the labor market since a long time. The coding was made as follows: elementary occupations, i.e. manual labour, jobs with simple and routine tasks (ISCO 9), plant and machine operators and assemblers, craft and related trades workers, skilled agricultural and fishery workers, service workers and shop and market sales workers, clerks (ISCO 4 to 8, reference group), technicians and associate professionals (ISCO 3) and professionals (ISCO 2). The legislators, senior officials and managers (ISCO 1) - which do not have a specific skill coding - were included as a separate skill category and members of the armed forces (ISCO 0) were excluded since it is unclear what their skill levels are.

The specifications [26a] and [27a] of the trust equation reported in table 3.7 correspond to specification [18] of table 3.4, the specifications [26b] and [27b] of the immigration equation correspond to specification [3] of table 3.1 and [26c] and [27c] to specification [4]. Focusing
Table 3.7: Trust and immigration estimations, alternative education variables

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Trust</td>
<td>0.072***</td>
<td></td>
<td></td>
<td></td>
<td>0.076***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[23.59]</td>
<td></td>
<td></td>
<td></td>
<td>[23.55]</td>
<td></td>
</tr>
<tr>
<td>Edu. primary</td>
<td>-0.405***</td>
<td>-0.191***</td>
<td>-0.151***</td>
<td>Legislator/manager</td>
<td>0.025</td>
<td>0.103**</td>
</tr>
<tr>
<td></td>
<td>[8.26]</td>
<td>[8.08]</td>
<td>[6.33]</td>
<td></td>
<td>[0.30]</td>
<td>[2.48]</td>
</tr>
<tr>
<td>Edu. low secondary</td>
<td>-0.268***</td>
<td>-0.090***</td>
<td>-0.071***</td>
<td>Professional</td>
<td>0.619***</td>
<td>0.380***</td>
</tr>
<tr>
<td></td>
<td>[5.85]</td>
<td>[4.05]</td>
<td>[3.20]</td>
<td></td>
<td>[8.61]</td>
<td>[9.58]</td>
</tr>
<tr>
<td>Edu. post secondary</td>
<td>0.206**</td>
<td>0.086*</td>
<td>0.081</td>
<td>Technician</td>
<td>0.248***</td>
<td>0.191***</td>
</tr>
<tr>
<td></td>
<td>[2.09]</td>
<td>[1.73]</td>
<td>[1.61]</td>
<td></td>
<td>[4.15]</td>
<td>[6.19]</td>
</tr>
<tr>
<td>Edu. tertiary</td>
<td>0.428***</td>
<td>0.269***</td>
<td>0.241***</td>
<td>Elementary occ.</td>
<td>-0.318***</td>
<td>-0.102***</td>
</tr>
<tr>
<td></td>
<td>[7.33]</td>
<td>[8.69]</td>
<td>[7.85]</td>
<td></td>
<td>[4.90]</td>
<td>[3.36]</td>
</tr>
<tr>
<td>Primary × work.</td>
<td>0.086</td>
<td>0.089**</td>
<td>0.082**</td>
<td>Legislator × work</td>
<td>0.333***</td>
<td>0.155***</td>
</tr>
<tr>
<td></td>
<td>[1.12]</td>
<td>[2.44]</td>
<td>[2.25]</td>
<td></td>
<td>[3.25]</td>
<td>[3.03]</td>
</tr>
<tr>
<td>Low sec. × work.</td>
<td>0.065</td>
<td>0.044</td>
<td>0.043</td>
<td>Professional × work</td>
<td>0.178**</td>
<td>0.151***</td>
</tr>
<tr>
<td></td>
<td>[1.07]</td>
<td>[1.49]</td>
<td>[1.45]</td>
<td></td>
<td>[2.16]</td>
<td>[3.66]</td>
</tr>
<tr>
<td>Post sec. × work.</td>
<td>0.052</td>
<td>0.196***</td>
<td>0.185***</td>
<td>Technician × work</td>
<td>0.201***</td>
<td>0.146***</td>
</tr>
<tr>
<td></td>
<td>[0.43]</td>
<td>[3.28]</td>
<td>[3.08]</td>
<td></td>
<td>[2.78]</td>
<td>[4.00]</td>
</tr>
<tr>
<td>Tertiary × work.</td>
<td>0.252***</td>
<td>0.186***</td>
<td>0.165***</td>
<td>Elementary × work</td>
<td>0.163*</td>
<td>0.084*</td>
</tr>
<tr>
<td></td>
<td>[3.90]</td>
<td>[5.38]</td>
<td>[4.78]</td>
<td></td>
<td>[1.66]</td>
<td>[1.77]</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.18</td>
<td></td>
<td></td>
<td></td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>33,603</td>
<td></td>
<td></td>
<td></td>
<td>29,741</td>
<td></td>
</tr>
</tbody>
</table>

$t$-statistics in brackets, cuts, country characteristics and other control variables not reported

* significant at 10%; ** significant at 5%, *** significant at 1%

First on the estimations [26], we notice that the use of educational dummies does not change the main results obtained so far, i.e. more educated individuals are significantly more trusting and open to immigration. However, being active on the labor market does not affect preferences on a similar smooth manner. The trust equation reports that working only influences the attitude of individuals with a tertiary degree. For the estimation of the preferences towards immigrants, the influence of being active on the labor market is more surprising. As expected, we find that being working and having a high education level has a positive influence on accepting more immigrants, however, we also find that being working and having a very low level of education has a positive influence. This puzzling result may suggest that the positive effect of social interactions linked with working with other peoples more than compensate economic fears.\textsuperscript{36}

Turning now to the estimation of specification [27], we find results similar to those

\textsuperscript{36}Note that the argument that low-skilled workers are more favorable to immigrants since they are often themselves immigrants, is not relevant here because we excluded the foreign born individual from our sample.
just discussed, e.g. the higher the individual skill level, the more trusting and open to immigration. Moreover, as expected, the legislators and managers - whose skill level is hard to assess - show almost the same attitudes as the majority of the population which has been used as reference group. On what concerns the influence of working, we find that its effect is positive for the individuals highly skilled and for the legislators and managers. As before, we find the puzzling result that the working individuals with the lowest skill level are rather more favorable to immigration than the non working. However, this result is only significant at a 10% level in specification [27b] and is non significant in specification [27c].

As expected, the country characteristics and the other control variables - not reported here - have a similar influence on attitudes as already discussed. One significant difference is nevertheless worth mentioning. Compared to our preceding estimations which reported a negative impact of age on trust, specifications [26a] and [27a] both report a non significant impact. The latter result is very informative since using the ISCO classification - which combine formal schooling with on-the-job training - allows to control for the impact of age on the kind of occupation in the labor market and hence to isolate the “non-economic” influence of age on attitudes.

3.6.2 Alternative questions about immigration

As already mentioned earlier, the ESS provides two alternative questions about preferences towards immigrants. The results obtained with the question about immigrants of the same race or ethnic group are reported in columns [28] of table 3.8 and those about immigrants of a different race or ethnic group are reported in columns [29].37 Confirming the results reported in table 3.1, changing the wording of the question has almost no impact on the size of the effect of education and of trust on attitudes towards immigration. However, some other interesting results are worth emphasizing.

First, men and married individuals are significantly more open to immigrants of the same ethnic group whereas this positive effect vanishes once immigrants from poor non European countries or of different race are concerned. Second, the effects of the country and regional level characteristics show a very different pattern depending on the wording of the question. Contrary to the estimations of the preferences towards immigrants of a different ethnic group or from poor non European countries, the measures of ethnic fractionalization and of inequality show a significantly negative influence on attitudes towards immigration of the same ethnic group. Moreover, compared to specification [29], specification [28] reports that the positive influence of GDP and of the unemployment rate has significantly decreased whereas the positive effect of the foreigners share has significantly increased. These results are worth emphasizing since they informs us that country characteristics do not only shape

37We do not report the results obtained with country fixed-effects since they are similar to those presented here.
Table 3.8: Ordered probit, immigration estimations, alternative questions

<table>
<thead>
<tr>
<th></th>
<th>Same ethnic group</th>
<th>Different ethnic group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[28a]</td>
<td>[28b]</td>
</tr>
<tr>
<td>Trust</td>
<td>0.074***</td>
<td>0.078***</td>
</tr>
<tr>
<td></td>
<td>[23.78]</td>
<td>[25.42]</td>
</tr>
<tr>
<td>Education</td>
<td>0.076***</td>
<td>0.069***</td>
</tr>
<tr>
<td></td>
<td>[29.52]</td>
<td>[26.79]</td>
</tr>
<tr>
<td></td>
<td>0.071***</td>
<td>0.064***</td>
</tr>
<tr>
<td></td>
<td>[28.30]</td>
<td>[25.36]</td>
</tr>
<tr>
<td>Education × working</td>
<td>0.008***</td>
<td>0.007***</td>
</tr>
<tr>
<td></td>
<td>[5.55]</td>
<td>[4.31]</td>
</tr>
<tr>
<td></td>
<td>0.013***</td>
<td>[8.60]</td>
</tr>
<tr>
<td></td>
<td>[7.28]</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>-0.032</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>0.029</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>[0.91]</td>
<td>[0.65]</td>
</tr>
<tr>
<td></td>
<td>[0.81]</td>
<td>[1.09]</td>
</tr>
<tr>
<td>Student</td>
<td>0.418***</td>
<td>0.354***</td>
</tr>
<tr>
<td></td>
<td>[12.79]</td>
<td>[10.76]</td>
</tr>
<tr>
<td></td>
<td>0.424***</td>
<td>[13.18]</td>
</tr>
<tr>
<td></td>
<td>[3.87]</td>
<td>[10.99]</td>
</tr>
<tr>
<td>Age</td>
<td>-0.002***</td>
<td>-0.002***</td>
</tr>
<tr>
<td></td>
<td>-0.004***</td>
<td>-0.004***</td>
</tr>
<tr>
<td></td>
<td>[3.30]</td>
<td>[4.31]</td>
</tr>
<tr>
<td></td>
<td>[7.58]</td>
<td>[8.73]</td>
</tr>
<tr>
<td>Female</td>
<td>-0.036***</td>
<td>-0.032**</td>
</tr>
<tr>
<td></td>
<td>-0.01</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>[2.68]</td>
<td>[2.43]</td>
</tr>
<tr>
<td></td>
<td>[0.72]</td>
<td>[0.45]</td>
</tr>
<tr>
<td>Married</td>
<td>0.031**</td>
<td>0.025*</td>
</tr>
<tr>
<td></td>
<td>0.008</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>[2.16]</td>
<td>[1.73]</td>
</tr>
<tr>
<td></td>
<td>[0.55]</td>
<td>[0.07]</td>
</tr>
<tr>
<td>Town</td>
<td>0.005</td>
<td>0.023*</td>
</tr>
<tr>
<td></td>
<td>0.011</td>
<td>0.030**</td>
</tr>
<tr>
<td></td>
<td>[0.35]</td>
<td>[1.69]</td>
</tr>
<tr>
<td></td>
<td>[0.83]</td>
<td>[2.23]</td>
</tr>
<tr>
<td>Foreigners’ share</td>
<td>0.027***</td>
<td>0.029***</td>
</tr>
<tr>
<td></td>
<td>0.012***</td>
<td>0.014***</td>
</tr>
<tr>
<td></td>
<td>[14.45]</td>
<td>[15.66]</td>
</tr>
<tr>
<td></td>
<td>[6.58]</td>
<td>[7.67]</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.003*</td>
<td>0.007***</td>
</tr>
<tr>
<td></td>
<td>0.011***</td>
<td>0.015***</td>
</tr>
<tr>
<td></td>
<td>[1.67]</td>
<td>[3.60]</td>
</tr>
<tr>
<td></td>
<td>[5.96]</td>
<td>[8.09]</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.162***</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>0.281***</td>
<td>0.166***</td>
</tr>
<tr>
<td></td>
<td>[5.36]</td>
<td>[1.63]</td>
</tr>
<tr>
<td></td>
<td>[10.10]</td>
<td>[5.86]</td>
</tr>
<tr>
<td>Ethnic fractionalization</td>
<td>-0.175***</td>
<td>-0.149***</td>
</tr>
<tr>
<td></td>
<td>-0.066</td>
<td>-0.036</td>
</tr>
<tr>
<td></td>
<td>[3.38]</td>
<td>[2.88]</td>
</tr>
<tr>
<td></td>
<td>[1.29]</td>
<td>[0.70]</td>
</tr>
<tr>
<td>Religious fractionalization</td>
<td>-0.314***</td>
<td>-0.279***</td>
</tr>
<tr>
<td></td>
<td>-0.232***</td>
<td>-0.193***</td>
</tr>
<tr>
<td></td>
<td>[8.69]</td>
<td>[7.68]</td>
</tr>
<tr>
<td></td>
<td>[6.53]</td>
<td>[5.44]</td>
</tr>
<tr>
<td>Inequality measure 10%</td>
<td>-0.030***</td>
<td>-0.026***</td>
</tr>
<tr>
<td></td>
<td>-0.004</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>[10.26]</td>
<td>[8.78]</td>
</tr>
<tr>
<td></td>
<td>[1.25]</td>
<td>[0.39]</td>
</tr>
<tr>
<td>Observations</td>
<td>33 662</td>
<td>33 662</td>
</tr>
<tr>
<td></td>
<td>33 644</td>
<td>33 644</td>
</tr>
</tbody>
</table>

t-statistics in brackets, cuts not reported
* significant at 10%; ** significant at 5%, *** significant at 1%

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citizens’ preferences over a given group of immigrants but also over different groups of immigrants.

3.6.3 Evidence from sub-samples of countries

Even if in the preceding estimations we controlled, alternatively, for country fixed-effects and for country and regional characteristics, it is nevertheless possible that the specificity of some groups of countries was hidden by this aggregation. Indeed, the explanatory variables - such as education - were supposed to have exactly the same impact on the attitudes of the Scandinavian citizens as of the citizens of southern European countries. By disaggregating our estimations into sub-samples of similar countries we will be able to gain some refinement in the understanding of the determinants of attitudes.

In order to get more homogeneous groups of countries, we split our sample of countries as follows. The Scandinavian countries: Norway, Denmark, Finland and Sweden, which are characterized by large public sectors, a high GDP and moderate inflows of foreigners. The Western European countries: Switzerland, Austria, Belgium, Germany, France, Netherlands, Great-Britain and Ireland, which almost all have a long history of immigration and high GDP levels. The Eastern European countries: Hungary, the Czech Republic, Poland and Slovenia, which have a common communist background and rather low but highly growing GDP levels. Finally, the Southern European countries: Spain, Greece, and Portugal, which are rather new countries of immigration and have the lowest GDP levels amongst the EU15 countries.

The regional level estimations of the preferences towards immigrants we report in table 3.9 correspond to estimations [5] and [6] of table 3.1.\textsuperscript{38} Interestingly, our sub-sample estimations report that the impact of all the explanatory variables - except the gender dummy - go in the same direction as in the aggregated estimations presented earlier but not always significantly so.

If we now look at trust as a determinant of preferences towards immigrants, we notice that its impact is always significantly positive and that its marginal effect - not reported - is similar for all the groups of countries. The robustness of this result is striking and confirms that reciprocity and social preferences have to be considered as serious determinants of attitudes. The usual view about citizens behaving in a purely selfish manner has thus to be taken with caution.

\textsuperscript{38}We decided to report only the estimations with country fixed effects since the variability of our country and regional characteristics is too small to get accurate estimates of their effects.
Table 3.9: Ordered probit, immigration estimations, by countries sub-samples

<table>
<thead>
<tr>
<th></th>
<th>North</th>
<th>North</th>
<th>West</th>
<th>West</th>
<th>East</th>
<th>East</th>
<th>South</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>0.066***</td>
<td>[9.63]</td>
<td>0.071***</td>
<td>[14.96]</td>
<td>0.060***</td>
<td>[8.60]</td>
<td>0.056***</td>
<td>[7.20]</td>
</tr>
<tr>
<td>Education</td>
<td>0.053***</td>
<td>[9.11]</td>
<td>0.048***</td>
<td>[8.26]</td>
<td>0.085***</td>
<td>[19.16]</td>
<td>0.077***</td>
<td>[17.26]</td>
</tr>
<tr>
<td>Education × working</td>
<td>0.012***</td>
<td>[3.67]</td>
<td>0.010***</td>
<td>[2.97]</td>
<td>0.005**</td>
<td>[2.33]</td>
<td>0.004*</td>
<td>[1.91]</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.065</td>
<td>[0.85]</td>
<td>0.068</td>
<td>[0.88]</td>
<td>-0.018</td>
<td>[0.32]</td>
<td>0.013</td>
<td>[0.22]</td>
</tr>
<tr>
<td>Student</td>
<td>0.337***</td>
<td>[5.02]</td>
<td>0.302***</td>
<td>[4.50]</td>
<td>0.335***</td>
<td>[6.74]</td>
<td>0.284***</td>
<td>[5.67]</td>
</tr>
<tr>
<td>Age</td>
<td>-0.008***</td>
<td>[7.51]</td>
<td>-0.009***</td>
<td>[7.98]</td>
<td>-0.006***</td>
<td>[7.50]</td>
<td>-0.005***</td>
<td>[7.89]</td>
</tr>
<tr>
<td>Female</td>
<td>0.192***</td>
<td>[7.11]</td>
<td>0.191***</td>
<td>[7.08]</td>
<td>0.036*</td>
<td>[1.81]</td>
<td>0.043**</td>
<td>[2.12]</td>
</tr>
<tr>
<td>Married</td>
<td>0.012</td>
<td>[0.41]</td>
<td>0.003</td>
<td>[0.10]</td>
<td>0.015</td>
<td>[0.71]</td>
<td>0.003</td>
<td>[0.14]</td>
</tr>
<tr>
<td>Town</td>
<td>0.073***</td>
<td>[2.54]</td>
<td>0.073***</td>
<td>[2.53]</td>
<td>0.117***</td>
<td>[5.66]</td>
<td>0.129***</td>
<td>[6.22]</td>
</tr>
<tr>
<td>Observations</td>
<td>6 647</td>
<td>6 647</td>
<td>14 740</td>
<td>14 740</td>
<td>6 808</td>
<td>6 808</td>
<td>5 408</td>
<td>5 408</td>
</tr>
</tbody>
</table>

$t$-statistics in brackets, country fixed-effects and cuts not reported

* significant at 10%; ** significant at 5%; *** significant at 1%
Confirming our preceding estimations, education shows a significant and positive influence on preferences towards immigration in all the groups of countries, however, the size of this effect is not statistically identical for all these groups. For instance, the level of education has a much larger influence on native citizens of western countries than of southern, confirming the hypothesis tested in the last sub-section. Indeed, all the western countries - except Ireland - experienced inflows of relatively low-skill migrants whereas all the southern countries experienced inflows of rather high-skill migrants. In addition to this result, the interaction term between education and working also shows an interesting pattern. In the eastern countries - which all have a common communist background - being working has no influence on the way of judging immigration. This evidence suggests either that eastern citizens are not aware of the possible economic impacts of immigration or have a sufficiently discriminating labor market so that immigrants can never have access to the “good” jobs offered in the country. Similarly to our aggregated estimations, once trust has been controlled for, the influence of education diminishes.

Finally, the significant variation in the attitudes of women between the sub-groups of countries is certainly due to the very different role they play in these regions. For instance, compared to women living in southern countries, women living in northern countries are much more active on the labor market and also much more invested in political life.

3.7 Concluding remarks

Over the last ten years, substantial progress has been made to better understand individual attitudes towards immigration. Nevertheless, concerned about testing political economy predictions as well as the impact of political and national ideology on preferences towards immigrants, a wide range of possible determinants of these preferences have been neglected in recent empirical analyses. Drawing on the rapidly growing experimental evidence stating that “economists fail to understand fundamental economic questions when they disregard social preferences” (Fehr and Fischbacher 2002), we focused on social preferences and reciprocity beliefs - proxied by individual trust attitudes - as possible determinants of attitudes towards immigration.

This paper provides new and robust evidence that the individual level of trust has a positive and large influence on the openness to immigration. This result suggests that trust can be seen as a moral value that spreads not only to neighbors or to community members but also to immigrants. Indeed, trusting individuals may be more confident about the economic and social effects immigrants may have for their country or region. Interestingly, introducing a measure of trust - which is highly and significantly determined by education - does not significantly affect the size of the direct effect of education on preferences towards immigration. This result suggests that the social content of education emphasized by social scientists cannot persuasively be linked to subjective expectations about reciprocity.

What policy implications can be drawn from these results? While economic policy
interventions to reduce job insecurity or welfare concerns are certainly adequate to reduce hostility towards immigrants, a large increase in efficiency could be gained by coupling these economic interventions with more social actions. For instance, promoting a better integration of immigrants, fighting discriminations, enhancing access to education, reducing income disparities or prompting legal enforcement may be seen as effective ways to increase the individual level of trust and, in turn, affect positively the perception natives have on immigrants.

Moreover, since at the regional and the country level, large differences in trusting attitudes have been observed, our results suggests that, contrary to economic predictions, we could observe two countries having exactly the same structure of human capital implementing very different immigration policies. As for further research, based on the fact that trust enters strongly in individual attitudes towards immigrants, it would be interesting to look at the effects of the country level of trust on real policy outcomes linked to migration. For instance, a high level of regional trust may induce a higher naturalization rate, a shorter delay for immigrants to get welfare benefits, more political rights for foreigners, etc.
3.8 Appendices

3.8.1 Appendix I: Survey methodology and sampling design

For this paper, we chose to use the ESS database which provides many interesting features. Contrary to the Eurobarometer, to the European Values Survey (EVS) and to the World Values Study (WVS), the ESS has not been designed to focus on specific issues as mostly required by policy-oriented institutions paying for these surveys. Indeed, the ESS’s main goal is to serve more “academically-orientated or curiosity-driven concerns” and to measure changes over time in the underlying attitudes, values, perceptions and behavior patterns of European citizens.\(^{39}\) Furthermore, contrary to the International Social Survey Protocol (ISSP) which covers only one topic per year and is restricted to a 15 minute self-completed questionnaire, the ESS both covers a larger set of issues with a follow-up in time and relies on standardized face-to-face interviews. Indeed, one of the most relevant qualities of the ESS is that it has been designed so as to achieve uniform methodological standards among countries and to make it at least as rigorous as most national surveys within Europe. Moreover, it has been conceived to conform as closely as possible to the standards of the Eurostat time-series.\(^{40}\)

Given that the ESS seeks to contribute to the development of a uniform cross-national methodology, all participating countries had to adhere to a detailed specification about all aspects of conducting the survey. Among these specifications some are worth emphasizing: (i) every country-level sample has to be selected by a strict random probability methods at every stage, (ii) neither quota sampling nor substitution can be used, (iii) all interviews have to be conducted face-to-face, and (iv) the translated questionnaires have to be rigorously pre-tested in order to minimize interpretation problems.

From a methodological point of view, depending on the frames and funding used in each country, the sampling designs used in the ESS are more or less complex, ranging from simple random sampling (e.g. Finland) to multistage stratified and clustered sampling (e.g. Poland, Spain). Since every sampling design which deviates from a random sampling based on a register of the entire population may attribute a slightly different probability of selection to a given surveyed individual, we used probability weights for every statistical estimation we report in this paper.\(^{41}\)

3.8.2 Appendix II: Descriptive statistics

In table 3.10, the mean and the standard deviation of our endogenous variables are provided.

\(^{39}\)The financing of the ESS is assured by the European Commission, the European Science Foundation and diverse national funding bodies which all warrant a large level of autonomy to the coordinating team in charge of the implementation of the questionnaire.

\(^{40}\)For a more complete description of the ESS, see Jowell et al. (2003).

\(^{41}\)A complete description of the country level sampling design and of the computation of the probability
Table 3.10: Summary statistics, trust and immigration variables, ESS 2004

<table>
<thead>
<tr>
<th>Trust</th>
<th>More poor non EU</th>
<th>More same race</th>
<th>More different race</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10</td>
<td>Mean</td>
<td>Std Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>5.07</td>
<td>2.48</td>
<td>2.42</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Table 3.11 reports the summary statistics of the socioeconomic and demographic variables used as individual level explanatory variables in this paper. All these variables are issued from the ESS database 2004 and do not include data for the foreign born surveyed individuals. The education and occupation dummies reported in this table are described in details in the robustness checks section (6.1). The only variable which deserve some additional explanations is education. To make the comparison of the education levels between countries easier, we focused on the self-reported years of education accomplished by an individual. However, since this variable may be affected by a measurement bias, we computed an indicator of the median\textsuperscript{42} years of education needed in a given country region\textsuperscript{43} to reach a given education degree (coded according to 7 ISCED categories).

Table 3.11: Summary statistics of individual level explanatory variables, ESS 2004

<table>
<thead>
<tr>
<th>Education [years]</th>
<th>Mean</th>
<th>Std Dev.</th>
<th>Unemployed [%]</th>
<th>Mean</th>
<th>Std Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.43</td>
<td>3.10</td>
<td>19.02</td>
<td>40.08</td>
<td>23.94</td>
<td>45.73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Edu. primary [%]</th>
<th>Edu. low secondary [%]</th>
<th>Edu. post secondary [%]</th>
<th>Edu. tertiary [%]</th>
<th>Working [%]</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.02</td>
<td>40.08</td>
<td>23.94</td>
<td>45.73</td>
<td>5.35</td>
<td>24.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elementary occupation [%]</th>
<th>Technician [%]</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.15</td>
<td>32.88</td>
<td>Professional [%]</td>
</tr>
<tr>
<td>12.84</td>
<td>36.07</td>
<td>8.37</td>
</tr>
</tbody>
</table>

Observations: 33 603

Countries: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, IE, NL, NO, PL, PT, SE, SI
All the means are weighted by the probability weights reported in the ESS

Finally, the regional and country characteristics - which are the only variables not issued

\textsuperscript{42}We chose to use the median instead of the mean to avoid outliers to have too big an influence on the value of this variable.

\textsuperscript{43}The regional decomposition reported in the ESS questionnaire correspond to the Eurostat NUTS classification at the levels 2 or 3 depending on the country.
from the ESS - are reported in table 3.12. Given that both Norway and Switzerland do not belong to EU, the Eurostat database - when mentioned - has been completed with data from Statistics Norway and from the Swiss Federal Statistical Office.

Table 3.12: Summary statistics of regional and country characteristics, by country

<table>
<thead>
<tr>
<th></th>
<th>GDP per capita $a$</th>
<th>Unemp. rate $b$</th>
<th>Foreigners' share $c$</th>
<th>Ethnic frac. $d$</th>
<th>Religious frac. $e$</th>
<th>Inequality 10% $f$</th>
<th>Relative skill $g$</th>
</tr>
</thead>
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<tr>
<td>AT</td>
<td>10.137</td>
<td>4.061</td>
<td>8.092</td>
<td>0.1068</td>
<td>0.4146</td>
<td>7.6</td>
<td>1.421</td>
</tr>
<tr>
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<td>0.5554</td>
<td>0.2127</td>
<td>7.8</td>
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<tr>
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<td>3.585</td>
<td>19.564</td>
<td>0.5314</td>
<td>0.6083</td>
<td>9.9</td>
<td>1.824</td>
</tr>
<tr>
<td>CZ</td>
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<td>7.880</td>
<td>1.247</td>
<td>0.3222</td>
<td>0.6591</td>
<td>5.2</td>
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<tr>
<td>DE</td>
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<td>10.196</td>
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<td>0.1682</td>
<td>0.6571</td>
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</tr>
<tr>
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<td>0.0819</td>
<td>0.2333</td>
<td>8.1</td>
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<tr>
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<td>3.753</td>
<td>0.4165</td>
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<td>0.2531</td>
<td>5.6</td>
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<td>0.1032</td>
<td>0.4029</td>
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<td>1.506</td>
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<tr>
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<td>0.5244</td>
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<td>0.2048</td>
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<td>0.1712</td>
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<tr>
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<td>9.655</td>
<td>6.668</td>
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</tr>
<tr>
<td>SI</td>
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<td>6.882</td>
<td>1.902</td>
<td>0.2216</td>
<td>0.2868</td>
<td>5.9</td>
<td>0.868</td>
</tr>
</tbody>
</table>

Observations: 222 regions and 19 countries

$a$ GDP per capita: regional level, in log, Eurostat completed for CH and NO, 2003

$b$ Unemployment rate: regional level, in %, Eurostat completed for CH and NO, 2003

$c$ Foreigners’ share: regional level, in %, Eurostat completed for CH and NO, 2001

$d$ Ethnic fractionalization: country level, Alesina et al. (2003), various years

$e$ Religious fractionalization: country level, Alesina et al. (2003), various years

$f$ Inequality 10%: country level, ratio of richest 10% to poorest 10%, World Bank, 2005

$g$ Relative skill: country level, ratio of skilled (ISCED 0-2) to unskilled labor (ISCED 3-6) in the native relative to the immigrant populations, in log, OECD SOPEMI, 2002/03

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Bibliography


Chapter 4

Does fiscally induced migration enhance tax competition ?
Evidence from Switzerland

Abstract

The impact of migration on fiscal policies has become an important subject of concern among countries wanting to allow free mobility of persons with some foreign countries, as is the case for instance for EU members, or for countries wishing to decentralize fiscal competencies. Indeed, there is a fear that fiscally induced migration might enhance fiscal competition between communities and lead to an inefficiently low level of taxes. This paper analyzes the problem of strategic tax setting at the local level in a direct democracy using Swiss data for a canton (Vaud). This setting is useful to isolate the determinants of tax rates and to test the predictions of the political economy models as both the fiscal autonomy of the Swiss municipalities and the internal migration rate are very high. Using spatial econometrics and instrumental variables, we provide strong evidence that municipal income taxes interact positively. However, only a small part of these interactions can be explained by a tax base effect linked to fiscally induced migration. These results suggest that concerns about a “race to the bottom” of tax rates should be minimal and alleviate fears of “excessive” fiscal competition induced by migration.

*JEL classification: D72, H2, H3, H7, P16, R23*

*Key words: Strategic interactions, tax competition, residential choice, spatial econometrics, political economy, Switzerland*
4.1 Introduction

Between countries as well as within countries, disparities in tax levels are rather large. With the ever decreasing migration costs and the opening of borders to migration - as is the case for instance within the EU - fears about a “race to the bottom” of the tax levels as well as of the redistributive expenditures have become an important subject of debate in many developed countries. Indeed, big differences in tax rates between jurisdictions might have a significant impact on the residential decision of households, thus fostering tax competition between them.

Since the beginning of the eighties, there has been an outpouring of literature on the determinants of tax rates. In their influential 1981 article, Meltzer and Richard have argued that the tax rate set by a jurisdiction governed by a median voter is negatively influenced by its median to mean income ratio. However, empirical evidence in favor of this prediction is at best mixed.\(^1\) Based on the observation that, in an ever more globalized world, jurisdictions cannot be considered as independent from each other, Case et al. (1993) have opened the way to a strategic interaction modelling of public expenditures. At the theoretical as well as at the empirical level, strategic interactions seem to have an important role to play among the determinants of fiscal policy.\(^2\) Nevertheless, even if many reasons governing fiscal interactions have been evoked in the literature, there is almost no evidence on the channels through which these strategic interactions occur.\(^3\) Finding answers to this question may yet have significant implications from a fiscal federalism point of view. For instance, if fiscal interactions occur mainly through spillover effects, i.e. residents of one jurisdiction consume or pay for the public goods provided by neighboring jurisdictions, or mainly through tax induced migration, the policy implications may be quite different. In the case of fiscally induced migration, the fear of a “race to the bottom” might have to be taken seriously and decentralization of fiscal competencies might be inefficient.

The main goal of this paper is to attempt to fill this gap by explicitly considering tax induced migration as a potential vector of strategic tax interaction between jurisdictions in Switzerland. Moreover, relying on a unique municipal level data-set, we could also improve

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\(^2\)For instance, Case et al. (1993), Heyndels and Vuchelen (1998), Figlio et al. (1999), Saavedra (2000), Brueckner and Saavedra (2001), Revelli (2002), Baiker (2005), Feld and Reulier (2005), Solé-Ollé (2006) find that strategic interactions of tax rates or of expenditures levels between geographically close jurisdictions are strong and significantly positive. See also Brueckner (2003) for an overview.

\(^3\)To our knowledge, the few exceptions are Besley and Case (1995), Solé-Ollé (2006) and Brett and Pinkse (2000). The firsts emphasize that, in a representative democracy, an incumbent politician who can run for reelection considers his neighbor jurisdictions’ tax rate as a “yardstick” to determine his own. The second tests local crowding spillovers against benefit spillovers but without considering fiscally induced migration. The thirds find some evidence that tax base competition among local jurisdictions is small and that it does not have a detrimental effect on business property taxes in Canada.
upon past empirical evidence by controlling better for the institutions governing fiscal policy making.

First, the Swiss political system is built on direct democracy with Swiss citizens having extended rights to participate in the policy-making process and to influence the political outcome according to their preferences. Hence, compared with most developed countries, Switzerland provides without doubt one of the most adequate settings to test the predictions of the median voter model.

Second, using Swiss municipal data reduces considerably the problem of comparability of decentralized fiscal competencies which usually hampers empirical papers. Indeed, the Swiss municipalities located within a given canton all have the same public services to provide and the same constraints on the way of setting taxes. Basically, every year, every municipality has to choose a percentage to levy - a tax multiplier - on an exogenously given income tax schedule. This means that the fiscal competition between municipalities is restricted to an unidimensional choice. However, despite this constraint, differences in municipal tax multipliers have remained large during the last two decades.

Third, as Swiss municipalities rely heavily on income taxes to finance their expenditures, the tax multiplier chosen by a municipality might have a substantial impact on households’ residential choice. Combined with a high migration rate between municipalities, the database used in this paper should be very informative to isolate the effect of fiscally induced migration on local tax rates. Worth noting is that the municipalities chosen are geographically very close together, thus households are supposed to be exposed to the same labor market conditions wherever they choose to reside.

As main results, we find no significant evidence in favor of the Meltzer and Richard model but a strong and significant evidence that taxes interact positively within a given geographical area. Moreover, we were also able to identify that tax base effects - largely driven by fiscally induced migration - are only a minor channel through which taxes interact strategically.

The remainder of the paper is structured as follows. Section two illustrates Switzerland’s federal system and its unique direct democracy set-up. It also presents the advantages of using Swiss communal data for testing the tax setting behavior of local communities and summarizes some stylized facts about fiscally induced migration in Switzerland. Section three then discusses a political economy model of fiscal policy and of residential choice that provides an appropriate set-up to be tested empirically in section four. Section four reviews the relations to be estimated and discusses further the empirical methodology to be used. It also presents the main results obtained, analyses them in light of the theoretical predictions and discusses some robustness checks. Conclusions follow in section five.
4.2 Fiscal autonomy and direct democracy: Considering the Swiss communes

Thanks to its federal structure and to its direct democracy, Switzerland provides a unique setting to study the shaping of tax and redistributive policies. The Swiss federal structure is built on three levels of jurisdictions: the confederation, the cantons and the communes, which all have a great level of fiscal autonomy. Furthermore, in the context of the Swiss direct democracy, at every level of jurisdiction, Swiss citizens have extended rights to participate in the fiscal policy making.

4.2.1 Fiscal policy in an homogeneous setting

In Switzerland, the tax and redistributive competencies are spread almost equally among the three levels of jurisdictions. The local jurisdictions, even if submitted to the limits imposed by their cantonal Constitution, must provide diverse public services and have the obligation to finance them. On the income side of their budget, the Swiss communes rely mainly on personal income taxes which represent about 60% to 70% of their fiscal revenues.\(^4\) However, their ability to raise income taxes is limited to setting an annual tax multiplier, i.e. to levy a surcharge on the cantonal tax schedule. Hence, the level of progressivity of local taxes is totally independent of the communal policy. On the expenditure side of their budget, the communes have large expenditures on education (especially primary school), environment, culture and recreation, health and social security. Interestingly, this well defined fiscal set-up has not prevent very large disparities in tax rates and in expenditures per capita to be observed between the Swiss communes.

To avoid having to deal with the multidimensional nature of personal income taxes - level and progressivity -, we chose to focus only on the communes located in one canton.\(^5\) Moreover, as the distribution of competencies between the communes and the canton differ from one canton to the other, choosing a unique canton should also help to avoid this source of bias.

The canton we focused on is Vaud. Vaud is interesting because it is composed of not less than 384 communes, i.e. a sufficiently large number to avoid dealing with small sample statistics, and the level of variability in the communal tax multipliers is one of the highest in Switzerland, i.e., in 2000, an unmarried individual with a yearly taxable income of 60'000 Frs had to pay up to 6'075 Frs communal income taxes in Fontanezier and only 1'800 Frs in Dully. Moreover, in 2000, the intercommunal migration rate in the canton of Vaud

\(^4\)Wealth taxes represent about 10% of their fiscal revenues and corporate and capital taxes about 14%. Moreover, the communes have a rather low dependence - on average 14% of total revenues - on transfer payments.

\(^5\)To circumvent this problem, Feld and Reulier (2005) chose to estimate simultaneously the Swiss cantonal tax interactions for 11 different income intervals.
was about 17%\(^6\) which by large exceed the intercantal and international migration rates. Finally, from a political-economy point of view, as reported by Feld and Kirchgissner \[7\], the budget draft, the tax rate and the budget deficits of the communes of the canton Vaud were mainly “controlled by the voters in an obligatory referendum, an optional referendum or a local assembly”.

### 4.2.2 A first insight on strategic tax interactions

According to the recent strategic interaction models, spillover effects, a tax mimicking behavior of authorities, or fiscally induced migration may all lead to tax interdependencies between neighboring communes. How does this prediction fit the data for the communes of Vaud?

To assess a possible spatial correlation between communal tax multipliers, we represent them in a Moran scatterplot. The Moran scatterplot reports the standardized communal tax multipliers (on the horizontal axis) against the standardized weighted average of neighbors tax multipliers (on the vertical axis). To obtain the weighted average of neighbor tax multipliers, we considered as neighbor the communes geographically close together and used a geographical weight matrix as described in appendix II. The Moran scatterplot reported in figure 4-1 shows that most observations are located on the upper right and on the lower left, suggesting that spatial dependences between communal tax multipliers seem to be strongly present, i.e. a commune with a low (high) tax rate is mostly surrounded by other communes with low (high) tax rates.

Supporting the observed pattern of figure 4-1, the Moran \(I^7\) and the Geary’s \(C^8\) statistics - \(I(d = 15km) = 0.439\) and \(C(d = 15km) = 0.552\) - report that the communal tax multipliers are significantly and positively spatially autocorrelated. Note that the Moran \(I\) statistic can be represented in figure 4-1 by a regression line passing through the origin.\(^9\)

\(^6\)This information is based on individual information about the place of residence five years before the census.

\(^7\)The Moran \(I\) is a spatially weighted autocorrelation measure given by: \(I(d) = \frac{\sum_{i} \sum_{j} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{S^2 \sum_{i} \sum_{j} w_{ij}}\) where \(S^2 = \frac{1}{N} \sum_{i} (x_i - \bar{x})^2\). Its theoretical mean in the absence of serial autocorrelation is \(-\frac{1}{N-1}\) so that it follows a normal law.

\(^8\)The Geary’s \(C\) is a spatially weighted sum of square differences between observation as given by: \(C(d) = \frac{(N-1) \sum_{i} \sum_{j} w_{ij}(x_i - x_j)^2}{2 \sum_{i} \sum_{j} w_{ij}(x_i - \bar{x})^2}\). Its theoretical mean in the absence of serial correlation is 1 and it follows a normal law.

\(^9\)Appendix III provides some additional statistics on communal tax multipliers of the canton of Vaud.
4.2.3 Fiscally induced migration: Some evidence from Switzerland

The two central conditions to be satisfied for tax competition over the mobile tax base to occur are, first, that tax rates significantly enter the residential choice of an individual (this assumption also needs to be satisfied in the Tiebout-like sorting of population model\(^{10}\)) and, second, that the communal authorities significantly take into account changes in their tax base when deciding upon their tax rates. The latter condition implies that tax base effects may strongly limit the ability of communes to raise revenues and/or to redistribute resources adequately.

Given that tax multipliers can influence the tax base available for a commune and vice-versa, both variables should be highly negatively correlated. This is indeed the case since the correlation coefficient, in 2000, is \(-0.71\), i.e., on average, the low tax communities are also the communities with the highest tax base. Moreover, when mapping these variables in a geographical space, clustering of low tax/high income and high tax/low income communities seems to be strongly present. For instance, the low tax and the high income communities are mainly clustered around lake Geneva, especially on its western coast.

By now, is there some evidence of fiscally induced migration in Switzerland? By using alternatively the 26 Swiss cantons and the 137 biggest Swiss communes, Feld and Kirchgässner (2001) find some evidence that the level of taxation influences significantly the distribution

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\(^{10}\)Tiebout (1956) main argument is the following: “the consumer-voter may be viewed as picking that community which best satisfies his preference pattern for public goods”, i.e. migration flows between communities will reveal citizens’ preferences for local fiscal policy and hence sorting of population according to intrinsic preferences will lead to an efficient combination of fiscal burden and of local public goods provided.
of income in a given jurisdiction. The higher the tax rate, the lower the share of high income earners in a jurisdiction, which confirms that fiscal incentives on average matter in the residential choice of Swiss citizens.\textsuperscript{11} This conclusion holds both at the cantonal or at the communal level but it is stronger at the communal level. Furthermore, they find that tax differentials mainly affect the residential choice of the high income group and that fiscal incentives rather affect tax rates than transfer levels. Using a random utility model on individual residential choices for a set of Swiss communes within the same area, Schmidheiny (2006a) establishes that “rich households are substantially and significantly more likely to move to low-tax municipalities than poor households”.

4.3 The political economy of fiscal policy in a direct democracy: A framework

In Switzerland, self-interested nationals can vote on tax levels both in the voting booth - in their residential locality - and with their feet since barriers to mobility are low and internal migration rates are high. Moreover, at a communal level, the median voter’s tax choice is unidimensional as he only chooses the tax level and not the shape of the tax schedule.

4.3.1 Tax setting in a median voter framework without relocation

To start our analysis, suppose that the economy is composed of $J$ jurisdictions which are populated by a continuum of individuals $i$ who can move freely between these jurisdictions and locate only in one. Suppose also that each local jurisdiction $j$ finances the supply of its local public services $g_j$ exclusively by a proportional income tax $t_j$ on its residents. Given that the local jurisdiction’s budget has to be balanced, we get:

$$g_j = (t_j - \frac{1}{2}t_j^2)y_j$$

where $y_j$ is the mean income in jurisdiction $j$ and $t_j \in [0,1]$ is the local jurisdiction’s proportional income tax level. Note that levying public funds entails a cost\textsuperscript{12} represented by the term $\frac{1}{2}t_j^2y_j$.

Individuals derive utility from the consumption of a private good $c_i$ and from local public services $g_j$ where the amount of public services received is supposed to be the same for every individual in a given jurisdiction. Further assume that the individuals are heterogeneous with respect to their exogenously given income $w_i$ and to their preference intensity for

\textsuperscript{11}Kirchgässner and Pommerehne (1996) reached the same conclusion using earlier data.

\textsuperscript{12}Without this assumption, the median voter could vote for a tax rate of 100%. For an overview of the other reasons explaining the limits to redistribution, see Harms and Zink (2003).
public services $\gamma_i \geq 1$.\footnote{This assumption has been borrowed from Kessler and Lüllesmann’s (2005) framework on residential and political choice.} If these preferences are supposed to be distributed uniformly and independently from income, the utility of individual $i$ is given by:

$$U_i(c_i, g_j \mid \gamma_i) = c_i + \gamma_i g_j$$

and his budget constraint is the following:

$$c_i = (1 - t_j)w_i$$

Subject to the local jurisdiction budget constraint, the median individual living in jurisdiction $j$ - with income $w_j^m$ and preference $\gamma_j^m$ - will choose the tax level $t_j$ so as to maximize his indirect utility function:

$$V(t_j, g(t_j \mid y_j) \mid w_j^m, \gamma_j^m) = (1 - t_j)w_j^m + \gamma_j^m(t_j - \frac{1}{2}t_j^2)y_j$$

Under the constraint that $t_j \in [0, 1]$, this maximization problem yields the following solution:

$$t_j = 1 - \frac{w_j^m / \gamma_j^m}{y_j} \quad (4.1)$$

where the local tax rate is decreasing in the ratio of median to mean income. Similarly to the early contribution of Meltzer and Richard (1981), equation (4.1) predicts that the higher the income inequality the higher the tax burden.\footnote{However, in the Meltzer and Richard model, the tax rate depends on the median to mean income through a labor-leisure choice and not through an efficiency cost due to redistributive taxation.} Not surprisingly, the tax rate is also positively influenced by the median voter’s preference for public services. As an illustration, by supposing that preferences $\gamma_i$ can either be low or high, Kessler and Lüllesmann (2005) have shown that an asymmetric tax equilibrium with (imperfect) sorting of population according to intrinsic preferences exists.\footnote{“The smaller the taste differential, the stronger the motive for wealthy individuals to escape taxation and the stratification into rich and poor communities is more pronounced.” However, if preferences are identical for all individuals, no sorting equilibrium can exist and hence no migration equilibrium.}

In this ‘simple’ political economy framework on the determination of the equilibrium tax rate, the average income $y_j$ in a local community was considered as given by the median voter. This assumption could correspond either to a situation where individuals cannot move freely across jurisdictions after tax rates in every locality have been chosen or to a “myopic voter” case - where voters in each jurisdiction ignore the effects of taxes on migration. However, as both assumptions seem quite unrealistic, the next subsection relaxes them by introducing a relocation stage in the model and by considering a non “myopic” median voter.\footnote{One of the main results of Epple et al. (2001) is that “empirical findings reject myopic voting models” for explaining the provision of local public goods.}
4.3.2 Adding relocation

Adding a relocation stage to the framework described above, implies - by using backward induction - that the average income of a given jurisdiction cannot be assumed to be exogenous anymore. As every individual might move in response to own and neighbor tax rates, the tax base of a given jurisdiction might depend on these tax rates. This relation can be summarized as follows:

\[ y_j = y_j(t_j, t_{-j}, X_{jG}, X_{-jG}) \]  \hfill (4.2)

where the subscript \(-j\) is used to index neighboring communities and \(X\) are vectors of exogenous variables. Since the tax base is supposed to be highly influenced by the individual residential choices, both the communal and the neighbors geographical characteristics\(^{17}\) were considered as relevant \(X\) variables.

Supposing further that the mobile part of the population mostly consists of rich households and that their number is relatively small compared to lower income households, then - regardless of the migration equilibrium - the median voter will always be one of the poorer households which allows us to treat the median community income as exogenous. Given this assumption, the local tax level - chosen by the median voter who maximizes his utility taking into account the expected migration response - can be written as:

\[ t_j = t_j(y_j, X_{jP}, X_{jG} \mid w_j^m, \gamma_j^m) \]  \hfill (4.3)

where \(y_j\) depends on the outcome of the preceding stage of the game and \(X\) are vectors of exogenous variables. Which variables should be included in \(X\)? As communal expenditures are mainly devoted to financing proximity services, the communal population characteristics \((X_P)\) are surely important determinants of tax multipliers.\(^{18}\)

For instance, the proportion of school-age children in a commune may highly influence its expenditures as one of the commune’s main role is to finance public schools. Another set of variables to be considered includes the geographical characteristics of the communes \((X_G)\) such as their altitude or their share of industrial area.

Finally, replacing equation (4.2) into equation (4.3), the reduced form of the tax setting equation can be written as:

\[ t_j = t_j(t_{-j}, X_{jP}, X_{jG}, X_{-jG} \mid w_j^m, \gamma_j^m) \]  \hfill (4.4)

where \(X_j\) are vectors of exogenous variables composed of all the variables discussed above.

In the strategic interaction literature, this equation has been referred to as a “reaction

\(^{17}\)If \(X_{j\epsilon}\) is a characteristic of commune \(j\), \(X_{-j\epsilon} = \sum_{k \neq j} w_{jk} X_{ke}\) is the weighted average of the neighbors characteristics where \(w_{jk}\) is a weight as described in appendix II.

\(^{18}\)Since the communal tax multipliers may influence the households residential choice, it may also influence the communal population characteristics. Due to the lack of available data on lagged population characteristics, we had to use the contemporaneous values of these variables in our empirical part and tested for an eventual endogeneity problem.
function” and has often been estimated empirically. It has to be emphasized that in the framework developed here this reaction function is supposed to depend only on the migration choice of the individuals through a tax base effect.\textsuperscript{19}

4.4 Results

Guided by the predictions of our theoretical framework, this section starts by estimating the determinants of communal tax multipliers as predicted by a standard median voter model which does not consider relocation issues. Since the results obtained are not conclusive, we then estimate a “reaction function” which takes explicitly into account possible strategic interactions between communes. Given the encouraging results obtained, we go one step further and decompose the strategic interaction effect into a tax base and a “residual” effect by estimating the two “structural” equations (4.2) and (4.3) first separately and then jointly.

The summary statistics and some explanations on the construction of the variables used in this section are given in appendix I.

4.4.1 Estimating the standard median voter model without relocation

To open the discussion about the empirical determinants of the tax setting behavior of communes, we start by estimating a specification close to equation (4.1). Assuming that the communes set their tax level independently from each other and that the tax setting behavior of a commune can be approximated by a linear relationship, the empirical counterpart to equation (4.1) can be written as:

\[
t_j = \delta \frac{u_j^{m}}{y_j} + \beta_j p X_j p + \beta_j G X_j G + \varepsilon_j
\]

(4.5)

where \( t_j \) is the tax multiplier of commune \( j = 1, ..., 384 \), \( \frac{u_j^{m}}{y_j} \) the ratio of median to mean income, \( X_j \) are vectors of exogenous variables as described in the preceding section and \( \varepsilon_j \) is an error term. Given that, in the theoretical part, we supposed that no relocation was possible, the ratio of the median to mean income was considered as exogenous and OLS with robust standard errors\textsuperscript{20} were used to estimate this specification.

The results of the estimation of equation (4.5) are reported in column [1] of table 4.2. Interestingly, we notice that the ratio of median to mean income has the expected negative

\textsuperscript{19}Relying on a similar set-up, Kessler and Lilleshallm (2005) have shown that explicitly modelling relocation does not necessarily destroy sorting of population if preferences between individuals are sufficiently heterogeneous: “Sorting thus remains a robust outcome if one extends the traditional Tiebout multi-community model to a more dynamic framework which allows individuals to migrate again after local policies have been determined”.

\textsuperscript{20}Robust to heteroscedasticity by using White’s estimator of the variance.
sign but it is not significant. This result confirms that relying on a myopic voting model is not adequate to explain the tax setting behavior of communes and that a more complex model is needed. For this reason, we do not discuss the other coefficients obtained for this specification any further.

### 4.4.2 Spatial interaction tests

In order to assess that modeling the tax setting behavior of municipalities by the way of a strategic interactions model - such as given by equation (4.4) - is relevant, we calculated the Lagrange multiplier (LM) and the robust Lagrange multiplier (RLM) test statistics\textsuperscript{21} on the residuals of the OLS estimation reported in column [2] of table 4.2.

<table>
<thead>
<tr>
<th>LM lag</th>
<th>RLM lag</th>
<th>LM error</th>
<th>RLM error</th>
</tr>
</thead>
<tbody>
<tr>
<td>126.863***</td>
<td>48.295***</td>
<td>80.995***</td>
<td>2.428</td>
</tr>
</tbody>
</table>

\( H_0 \) (no spatial interaction) rejected: *** at 1%

Since under the hypothesis of no spatial interaction \( (H_0) \) both test statistics follow a \( \chi^2_1 \), we could reject - at a 1\% level - the hypothesis of no spatial spatial lag dependence between the communal tax rates. This result confirms our theoretical prediction, i.e. the tax rate set by a given commune depends on the tax rates set by its neighboring communes, and implies that we have to consider that communes set their tax interdependently. Similarly to Revelli (2002), the RLM test reports no significant evidence of spatial error dependence\textsuperscript{22} once spatial lag dependence has been controlled for.

### 4.4.3 A “reaction function” estimation

Since the LM and RLM tests for spatial lag dependence significantly indicate that communal tax multipliers are spatially correlated, we estimated a “reaction function” as given by equation (4.4). Taking for simplicity a linear approximation, the specification to estimate can be written as:

\[
    t_j = \phi \sum_{k \neq j} w_{jk} t_k + \beta'_p X_{jp} + \beta'_G X_{jG} + \beta'_- X_{-jG} + \varepsilon_j
\]

\( (4.6) \)

\textsuperscript{21}To compute these tests, we used a 15 km weight matrix as described in appendix II. See Anselin et al. (1996) for a description of these tests.

\textsuperscript{22}The type of spatial error dependence we tested can be written as follows: \( \varepsilon_j = \lambda \sum_{k \neq j} w_{jk} \varepsilon_k + u_j \) where \( w_{jk} \) is a weight coefficient and \( u_j \) is an iid error term.

99
where \( w_{jk} \) represents the weight assigned to the “neighbor” commune \( k \) and \( \varepsilon_j \) is an error term. Given the large number of weights \( w_{jk} \) - 73\times536 - to determine, it is not possible to estimate them along with the other parameters of equation (4.6). This implies that we must assume them to be known and therefore specify them a priori. Supposing that fiscally induced migration occurs mostly at a very local level and that communes have larger social ties with communes nearby, we consider geographical distance between communes as a good proxy for neighborliness. For all the estimations reported in this paper, a 15 km threshold is used.\(^{23}\) The construction of the weights is described in appendix II.

The main econometric concern when estimating equation (4.6) is that the neighbor tax multipliers are endogenous. The reason is that all the communal tax multipliers are simultaneously determined in exactly the same fashion. As a result, the OLS estimates of the parameters of equation (4.6) may be affected by a simultaneity bias. This endogeneity can be addressed by using either an instrumental variable (2SLS) approach or a maximum likelihood (ML) method. For our estimations, we rely on the 2SLS technique as used, for instance, by Besley and Case (1995), Brett and Pinkse (2000), Fiva et al. (2006), Solé-Ollé (2006). The main advantage of using 2SLS instead of ML is that, even in the presence of spatial errors dependence, the estimated coefficients remain consistent.\(^{24}\) Moreover, given the set-up of the model, finding relevant instruments is not too difficult. Indeed, as all the communes are considered as setting their tax rate in a perfectly identical way, the most straightforward set of instruments to use is the weighted average of neighbor population characteristics.

Before starting our analysis of the results, various tests were made. First, according to the Shea’s partial \( R \)-squared, the instruments we used for the weighted average of neighbor tax rates are not weak. Second, we could not reject the null that the instruments are uncorrelated with the error term and correctly excluded from the 2\(^{nd} \) stage equation.\(^{25}\) Third, to assert the utility of instrumenting for neighbor tax multipliers, we computed a Hausman test\(^{26}\) and we could not reject the null that OLS yield consistent estimates, i.e. endogeneity among the regressors has no deleterious effect on OLS estimates. Given this result, OLS and 2SLS are both consistent but OLS should be more efficient.\(^{27}\) Finally, the overall fit of our OLS estimation is very good since the \( R \)-squared is 59%.

\(^{23}\) Using a 10 km or a 20 km threshold does not change the results significantly.

\(^{24}\) See Kelejian and Prucha (1998) for a formal proof of this argument.

\(^{25}\) The Hansen \( J \) statistic reports a value of 11.231 which does not allow us to reject \( H_0 \) (excluded instruments are valid instruments).

\(^{26}\) Under \( H_0: \hat{\beta}_{OLS} \) and \( \hat{\beta}_{2SLS} \) are both consistent but \( \hat{\beta}_{OLS} \) is more efficient, the Hausman test is given by: \( (\hat{\beta}_{2SLS} - \hat{\beta}_{OLS})' \text{var}(\hat{\beta}_{2SLS})^{-1} \text{var}(\hat{\beta}_{OLS})(\hat{\beta}_{2SLS} - \hat{\beta}_{OLS}) \overset{d}{\rightarrow} \chi^2_m \) where \( m \) is the number of instrumented variables.

\(^{27}\) We also tested for the possible endogeneity of communal population characteristics and we were never able to reject the null of exogeneity.
Table 4.2: Tax setting and tax base estimations

<table>
<thead>
<tr>
<th></th>
<th>Model without relocation</th>
<th>Strategic interactions model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M-R mod.</td>
<td>Benchmark</td>
</tr>
<tr>
<td>[1] OLS</td>
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<td></td>
</tr>
<tr>
<td>[2] OLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[3] OLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[4] 2SLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[5] OLS</td>
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<tr>
<td>[6] 2SLS</td>
<td></td>
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<td>[7] 3SLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[8] OLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[9] 2SLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[10] 3SLS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>|                      | [0.49]          |      | Neighbor tax    | [5.55]      | [3.94]      | [7.13]      |
|                      | 0.922***        | 0.942*** | 0.550***      | 0.696***   | 0.546***   | -55.066***  |
|                      | [8.76]          | [8.51] | [5.67]         | [5.10]     | [4.44]     | [8.18]      |
|                      | -0.095***       | -0.03*  | -0.004**       | [0.631]    | [1.85]     | [2.30]      |
|                      | -7.142          | -2.172  | 8.574          | 8.804      | -6.95      | 1.453       |
|                      | [0.24]          | [0.08]  | [0.33]         | [0.34]     | [0.29]     | [0.06]      |
|                      | Age ≤ 7         | 69.330*** | 58.158***    | 49.306*    | 49.117**   | 38.295      |
|                      | [0.2]           | [0.09]  | [1.93]        | [1.98]     | [1.60]     | [1.84]      |
|                      | 7 &lt; age ≤ 15    | 49.306*    | 49.117**     | 38.295     | 43.391*    | 29.813      |
|                      | [2.19]          | [2.03]   | [1.93]        | [1.98]     | [1.60]     | [1.84]      |
|                      | Age ≥ 65        | -0.625    | -1.462        | -33.629*   | -43.314**  | -46.033**   |
|                      | [0.02]          | [0.09]   | [1.87]        | [1.97]     | [2.84]     | [2.39]      |
|                      | Foreigner       | -59.035*** | -43.246***   | 2.811      | 3.793      | 13.916      |
|                      | [3.98]          | [2.82]   | [0.21]        | [0.29]     | [1.16]     | [0.74]      |
|                      | 47.830***       | 37.785*** | 35.810***    | 35.767***  | 24.814***  | 30.076***   |
|                      | [0.54]          | [0.38]   | [4.16]        | [4.28]     | [3.32]     | [3.53]      |
|                      | Public          | 59.210*** | 48.190***    | 29.338     | 28.936     | 36.861**    |
|                      | [3.04]          | [2.44]   | [1.55]        | [1.56]     | [2.09]     | [1.84]      |
|                      | Unemployed      | 81.150*** | 75.846       | 40.475     | 39.721     | 26.609      |
|                      | [1.66]          | [1.55]   | [0.93]        | [0.94]     | [0.70]     | [0.86]      |
|                      | Owner           | -47.859*** | -40.403***   | -24.899*** | -24.568*** | -4.097      |
|                      | [6.41]          | [5.41]   | [3.51]        | [3.49]     | [0.60]     | [1.36]      |</p>
<table>
<thead>
<tr>
<th>Density</th>
<th>1 OLS</th>
<th>2 OLS</th>
<th>3 OLS</th>
<th>4 2SLS</th>
<th>5 OLS</th>
<th>6 2SLS</th>
<th>7 3SLS(^a)</th>
<th>8 OLS</th>
<th>9 2SLS</th>
<th>10 3SLS(^a)</th>
</tr>
</thead>
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<tr>
<td>0.310***</td>
<td>0.365***</td>
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<td>0.379***</td>
<td>0.394***</td>
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<td>0.002***</td>
<td>0.002***</td>
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<tr>
<td>Altitude</td>
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<td>0.006</td>
<td>0.013*</td>
<td>0.013**</td>
<td>0.006</td>
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<td>1.57</td>
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<tr>
<td>Industry</td>
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<td>-1.386***</td>
<td>-1.535***</td>
<td>-1.482***</td>
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<td>-85.517***</td>
<td>-118.526***</td>
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<td>3.14</td>
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<td>4.43</td>
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<td>0.042</td>
<td>0.086**</td>
<td>0.068*</td>
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<tr>
<td>R-squared</td>
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<td>0.66</td>
<td>0.63</td>
<td></td>
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</tr>
</tbody>
</table>

Neighbor control: no yes yes yes no no no yes yes yes

Robust t-statistics in brackets, Constants not reported, \(^a\) jointly estimated

* significant at 10%; ** significant at 5%, *** significant at 1%

Notes:
Neighbor controls: density, altitude, industry, agriculture, lake
IV for neighbor tax (specif. [4]): neighbor age dummies, foreigner, primary, public, unemployed, owner, acreage
Shea’s partial R-squared: 0.8941***
IV for neighbor tax and tax base (specif. [6]): neighbor age dummies, foreigner, primary, public, unemployed, owner, acreage, neighbor controls:
Shea’s partial R-squared: 0.3944*** (neighbor tax) and 0.1085*** (tax base)
IV for tax (specif. [9]): age dummies, foreigner, primary, public, unemployed, owner, acreage
Shea’s partial R-squared: 0.1239***
The estimated coefficients of the “reaction function” are reported in columns [3] and [4] of table 4.2. The result of main interest is that the coefficient on the weighted neighbor tax multiplier is significant at a 1% level with an estimated coefficient close to 0.9, i.e. an increase [decrease] in the weighted neighbor tax multiplier leads to an almost similar increase [decrease] of the own tax multiplier. This result seems to confirm that tax interactions are quite high at a municipal level, thus omitting to take them into account may strongly bias the estimations.28

Among the communal characteristics having a significant influence on the tax multiplier, we find that the share of young between 7 and 15 has a positive impact on the tax multiplier. This result confirms that the financing of primary schools29 weighs on the budget constraint of the communes and hence compels them to increase their revenues by setting higher taxes. The share of people over 64 has surprisingly a negative impact on tax multiplier. Generally, we would expect citizens over 64 to be on average less mobile than the younger and to need more public services such as health care. However, this negative impact could be explained by older people being also more conservative and hence favoring lower taxes at the booths. We also find that the share of primary sector workers has a positive impact on tax multipliers. This result is quite in line with the theoretical predictions since primary sector employees are on average less mobile than secondary or tertiary sector employees. A high owner share in a commune has a significant negative impact on its tax multiplier which could be explained by owner being on average richer and voting more. Relying on the median voter theorem, a high share of foreigners - without voting rights and earning low incomes - should decrease the level of taxes. In the case of Switzerland, since the foreigners are on average either very high or very low skilled, their impact on the income distribution is not clear cut which may explain that the foreigners share has no significant influence on the communal tax multipliers.

What about geographical characteristics? First, the higher the communal density and size, the higher the tax rate. The result associated with density is not surprising as the communes with a high density are mostly urban and have proportionally more to spend for social security, culture and infrastructure than the communes with a low density. Second, the communes lying at the side of a lake set significantly lower taxes than the other. The lake dummy may capture some unobservable feature such as a high property value - entry barrier - which prevent poorer household to settle in such a commune. Finally, the share of industrial area in a commune has a very significant negative influence on its tax multiplier. One explanation could rely on the complementarity between the taxes collected: for a given level of communal expenditures, if the corporate income taxes collected are high, the personal income taxes can be set at a lower level.

Contrary to the estimation without strategic interaction presented in column [2], the

28 For instance, an almost 1 to 1 reaction has been found by Brett and Pinkse [7] for municipal tax rates in British Columbia. Fiva et al. [7] have found a coefficient of 0.8 and Revelle [7] of 0.6.
29 As parents have not the choice to which public primary school to send their children, the share of children between 7 and 15 is highly correlated with the observed share of primary schoolchildren in a commune.
neighbor geographical characteristics - not reported - have no significant influence on the
tax multiplier set by a commune. This result informs us that neighbor geographical char-
acteristics only have an indirect effect - through neighbor taxes - on the own tax multiplier.

Even if these “reaction function” estimations give some very interesting insights on the
determinants of the tax rates and on the size of strategic interactions, no information on
the channels through which tax interactions occur can be extracted from them. A positive
$\phi$ could reflect either tax competition for the mobile tax base, or public spillover, or a
tax mimicking behavior of communes. To get a further intuition about the underlying
determinant of tax interactions, the coefficient $\phi$ should be split into two components as
follows:

$$\phi = \phi_1 + \phi_2$$  \hspace{1cm} (4.7)

where $\phi_1$ is the direct effect of neighbor tax rates on own tax rates - such as for instance
tax mimicking or spillover effects\(^{30}\) - and $\phi_2$ is an indirect effect possibly associated with a
tax base effect as emphasized in the theoretical part.

### 4.4.4 Estimation of the “structural form” of the tax setting equation

Relying on the “structural” equation (4.3), it is possible to get an estimation of the coeffi-
cient $\phi_1$ which is the direct effect of neighbor taxes on own taxes. The explanation goes as
follows. The linearized empirical counterpart of equation (4.3) can be written as:

$$t_j = \varphi y_j + \zeta S_j + \varepsilon_j$$  \hspace{1cm} (4.8)

where $y_j$ is the taxable income per capita of commune $j$, $S_j$ is a vector of explanatory
variables and $\varepsilon_j$ is an error term. Given that the weighted neighbor tax level can have
a direct effect on the own tax level, it should also be included among the explanatory variables
$S_j$. Thus, splitting $S_j$ into a weighted neighbor tax rate and communal characteristics, we
can rewrite equation (4.8) as:

$$t_j = \varphi y_j + \phi_1 \sum_{k \neq j} w_{jk} t_k + \beta_P X_{jp} + \beta_G X_{jG} + \varepsilon_j$$  \hspace{1cm} (4.9)

where $\phi_1$ is the direct effect of neighbor taxes on own taxes.\(^{31}\) Even if equation (4.9) and
equation (4.6) look alike, it has to be kept in mind that the former is a structural form
relation and the latter a reduced form.

Before estimating equation (4.9), we tested for spatial lag and spatial error dependence of
the tax rates using the LM and RLM tests statistics described earlier. According to these

\(^{30}\) Alternatively, as noted by Saavedra (2000), “strategic behavior may [also] arise if welfare migration is
negligible, but if state officials think that it occurs”.

\(^{31}\)Carlson et al. (2005) have used a similar method to identify the determinants of infrastructure fee in
Norway.
tests, we could reject the hypothesis of no spatial lag dependence which implies that neighbor
taxes have to be considered among the determinants of communal taxes.\footnote{The value of the RLM for spatial lag dependence is: 42.735, thus $H_0$ (no spatial interaction) can be rejected at a 1% level.} Moreover, we
found no evidence of spatially correlated errors.\footnote{The value of the RLM for spatial lag dependence is: 0.012, thus $H_0$ cannot be rejected.}

For the estimation of equation (4.9), we rely alternatively on OLS and on 2SLS. Indeed, as emphasized in the theoretical section, the communal tax base (taxable income per taxpayer) may be endogenous since tax rates may induce a migration of rich households. Moreover, relying on the same explanation as given in last subsection, the weighted neighbor
tax level is also endogenous. To instrument both of these variables, we used the weighted
neighbor characteristics.

The estimations of equation (4.9) are reported in columns [5] and [6] of table 4.2. As
expected, the taxable income per capita has a significantly negative effect on the tax rate
set by a commune, i.e. the higher the taxable income per taxpayer, the less the commune
has to tax its residents in order to the get the sufficient amount of money to provide its
public services. The weighted neighbor tax rate has also a significant influence on the own
tax rate with an estimated coefficient $\hat{\phi}_1$ around 0.6 and very close to the one estimated by
Heyndels and Vuchelen (1998) for Belgian municipal taxes and by Feld and Reulier (2005)
for Swiss cantonal taxes.

Referring to relation (4.7), some additional results are worth emphasizing. First, since
$(\hat{\phi} - \hat{\phi}_1) < \hat{\phi}_1$, the direct effect of neighbor tax rates on own taxes is stronger than their
indirect effect. Unfortunately, without additional informations, we cannot identify more
precisely the nature of this direct effect, it can be for instance a spillover or a tax mimicking
effect. Second, as $(\hat{\phi} - \hat{\phi}_1) > 0$ and $\varphi > 0$, there is also some evidence that one part of the
positive interactions between communal tax rates can be explained by an indirect tax base
effect.

\subsection{Some insights on the determinants of the tax base}

With the estimation of the structural equation (4.9), we were able to disentangle the direct
effect of neighbor taxes on own taxes from the indirect tax base effect. However, to fully
assess that the indirect effect of neighbor taxes on own taxes is due to a tax base competition
linked to fiscally induced migration, we must also show that tax rates have a significant
influence on the communal tax base.\footnote{A similar assumption has been used by Buettner (2003) for estimating the determinants of the local
capital tax base in Germany.} In order to do so, we estimated the structural relation (4.2) which can be written, in a linearized form, as:

$$y_j = \theta t_j + \xi \sum_{k \neq j} w_{jk} l_k + \beta G X_{jG} + \beta_{-G} X_{-jG} + \varepsilon_j$$

(4.10)
Given that the tax base can have an influence on the communal tax multiplier, we instrumented for the tax multiplier by using the population characteristics of both the commune itself and of the neighboring communes.

\[ y_j = \theta t_j + \xi \sum_{k \neq j} w_{jk} t_k + \beta X_j + \varepsilon_j \]  

(4.11)

Columns [8] and [9] of table 4.2 summarize the results obtained for the estimation of equation (4.10). The communal tax multiplier has, as expected, a significant negative effect on the communal taxable income per taxpayer but this effect is rather small. Indeed, for a given commune, a decrease of 10 percentage points in its tax multiplier will increase its annual taxable income per taxpayer by about 4'440 Frs. But, at the same time, since the tax rate applied to its whole tax base has decreased, the final impact of this change is ambiguous.\(^{35}\) The only possible benefit a commune can obtain by lowering its tax multiplier is to attract individuals with above average taxable income who will also pay proportionally more taxes due to the underlying progressive tax schedule.

As an additional result, we find that the weighted neighbor tax multiplier has also a significant negative effect on the taxable income per taxpayer. How can it be explained? If an individual chooses first the region where to locate and then a specific commune within this region, it may explain this simultaneous negative effect of own and neighbor taxes on the communal taxable income per taxpayer. Another explanation could be found when looking at the robustness checks reported later on. Indeed, when the average rent level is added as an explanatory variable in the taxable income equation, the neighbor tax level loses its significance. As neighbor taxes and rents are highly negatively correlated (−0.72), it may be that neighbor taxes have captured a large part of the rent effect. Indeed, the higher the rents in a commune, the less the poorer individuals are able to reside in such a commune, thus the higher the taxable income per taxpayer.

Among the other significant results, the lower the industrial area in a commune and the higher the neighbor density - not reported here -, the higher taxable income per taxpayer. These results can well be explained by high income individuals rather setting in “nice” areas not too industrialized but close to high density area providing numerous commodities. This may also be the reason explaining that communes having agricultural neighbors and being located close to high altitude neighbor - not reported - have higher taxable incomes.

\(^{35}\) As an illustration, let us consider the commune of Aigle which initial monthly taxable income per taxpayer is 4'240 Frs and tax multiplier is 100. If this commune had decreased its tax multiplier by 10 percentage points, its monthly taxable income per taxpayer would have increased by about 370 Frs. However, since the tax multiplier has decreased for all the taxpayers, ceteris paribus, the annual tax revenue collected by that commune would have increased by only 7 Frs per taxpayer!
4.4.6 Joint estimation of the tax setting and tax base equations

As emphasized in the theoretical part of this paper, the “structural” equations (4.3) and (4.2) both enter in the determination of the equilibrium communal tax multiplier. To take this information into account, we estimated our equations (4.9) and (4.10) simultaneously by using 3SLS. Contrary to 2SLS, 3SLS allows to estimate both equations jointly by taking into account that the errors between the two equations might be correlated. The 3SLS are constructed according to a three steps procedure. In the first step, the coefficients of both equations are estimated by 2SLS. In the second step, a matrix of variances-covariances is constructed by using the residuals obtained from the first stage estimation. The last step consists of reestimating the two equations by GLS by using the matrix of variances-covariances computed in the second step and the instrumented values of the endogenous variables. The main advantage of using 3SLS is an increase in the efficiency of the estimations, but it comes at a cost: as it relies on the consistency of the variances-covariances matrix, if one equation of the system is misspecified, all the coefficients estimates will be inconsistent.

The results of this joint estimation are reported in columns [7] and [10] of table 4.1. The estimated coefficients found are very close to the one obtained by running two separate estimations\[^36\] and do not affect our main conclusions, i.e. the communes geographically close set their tax interdependently but only a small part of these interdependencies can be explained by a tax base effect linked to fiscally induced migration.

4.4.7 Robustness checks

In order to validate the results obtained so far, we ran different robustness checks.\[^37\]

First, even if the RLM test for spatial error dependence provided some evidence against the need to control for spatially correlated errors in the estimation of the “reaction function”, we re-estimated equation (4.6) by using Kelejian and Prucha’s (1998) method.\[^38\] As expected, taking explicitly into account a possible spatial correlation of the errors barely affects our results. This result confirms that the Swiss communes only react on observed changes in the tax setting behavior of their neighbors.

Second, as suggested by Schmidheiny’s (2006a,b) analyses of the individual residential choices in Switzerland, we added rents amongst the determinants of the communal tax

[^36]: One interesting exception is that the joint estimation reports that the effect of own taxes on the tax base is stronger than the effect of neighbor taxes. This result is probably more realistic as the one found when running two separate estimations.

[^37]: The results of these robustness checks are reported in table 4.7 of appendix IV.

[^38]: This method is based on a three steps procedure:
(i) estimate equation (4.6) by 2SLS
(ii) use the residuals of (i) to get a consistent estimate of \( \lambda \) via the nonlinear least square procedure proposed by Kelejian and Prucha
(iii) re-estimate the regression model in (i) by using 2SLS on a Cochrane-Orcutt type transformation that takes into account possible spatial correlation.
The results we obtain show that rents always have a significantly positive effect on the municipal tax base and that the effect of the own tax multiplier, even if lowered, remains significantly positive. In a specification where both rents and taxes have been instrumented for, the effect of the neighbor tax multiplier on the tax base becomes insignificant.

Third, considering the migration flows between communes as an alternative way to define neighborliness and to weight neighbor variables, we find that when estimating a “reaction function” - as defined by equation (4.6) - the neighbor tax multipliers have a significant positive impact on the own tax multiplier but this impact is smaller than when using geographical weights. Moreover, using the same weights, the estimation of the “structural form” of the tax equation - given by relation (4.9) - reports that the weighted neighbor tax rate has no significant influence on the tax setting behavior of a commune while the taxable income per taxpayer is very significant.\textsuperscript{40} Taking both of these results into account suggests clearly that the direct effect of neighbor tax rates - found in the preceding section - only exists between geographically close communes.

Finally, we find that the determinants of the tax rates and of the tax base in 1990 are similar to those reported in our analyze of the year 2000.

\subsection{4.5 Concluding remarks}

As emphasized by Oates (1999) “[f]iscal decentralization is in vogue”. The main appeal of fiscal decentralization is an increased efficiency both in the provision of public goods - as local jurisdictions better know the preferences of their population - and in the management of public revenues - local jurisdictions are better controlled by their citizens and hence have less power to act as a leviathan. Hampering these advantages is the fear that fiscal decentralization would lead to a “race to the bottom” of the tax levels as well as of the redistributive expenditures. Indeed, a high level of tax competition aiming at attracting the mobile tax base, could lead to an inefficiently low level of taxation and of redistribution. The observed actual trend in freeing migration between countries - such as for instance between EU members - has strongly reinforced the need to find the “optimal” level of decentralization of fiscal competencies. However, despite an ever increasing political discussion on the effects of fiscally induced migration on the levels of taxes and hence on public spending, the empirical literature on this issue is still scarce.

\textsuperscript{39}Given the lack of availability of data on the average rent level on the dwellings newly rented during the year - reflecting current market conditions such as market tightness -, we used the average communal rent level on all the rented dwellings. Moreover, due to a collinearity problem between neighbor rents and neighbor tax rates (correlation: −0.92), we could not use both variables simultaneously in our estimations.

\textsuperscript{40}Using the same migration weights, the estimation of the determinants of the communal tax base shows that the own and neighbor taxes still have a significant negative influence. As emphasized earlier, this result may be attributed to the large correlation existing between taxes and rents.
This paper aimed to fill this gap. The highly decentralized Swiss fiscal system combined with well defined fiscal competencies at every level of jurisdiction provides an adequate set-up to test the importance of strategic interactions between local tax rates and also to test if tax base effects play a role in these interactions. Drawing on a unique communal level data-set, we find that strategic interactions between Swiss communes are very high over geographically close communities. While this result is in line with past empirical evidence, we have been able to control much better for the institutional setting underlying local jurisdictions fiscal choices.

In addition, we could improve on past empirical findings by decomposing the communal strategic interactions into a tax base effect and an tax mimicking/spillover effect. As a main result, we find that the tax base effect only explains a small part of the communal strategic interactions. The largest part of strategic interactions is explained by other effects such as for instance tax mimicking effects, i.e. local governments consider their neighbors’ taxes as a “yardstick” to help them to choose their own, or by strong social ties between communes geographically close together, or by spillover effects. Confirming the results of Feld and Kirchgässner (2001) and Schmidheiny (2006a), we also find that the tax multipliers have a statistically significant influence on the tax base available to a commune, though this effect is quite small.

What can be inferred from these results? Can they inform us about policy issues? The Swiss experience suggests that concerns about fiscally-induced migration having a detrimental effect on tax rates should not be a main source of concern for communities wanting to allow free mobility of workers with some neighboring communities having a similar level of economic development. However, it should be recalled that Swiss communes are submitted to an exogenously given tax schedule which implies that they cannot offer substantial tax cuts exclusively to the high-earner individuals whose residential choice is significantly influenced by taxes.

Second, in interpreting the low impact of tax rates on the tax base, it seems that heterogeneity of preferences is present among Swiss citizens, i.e. a Tiebout-like sorting of population may exist. According to Schmidheiny (2006b) who studied the residential choice of citizens in another Swiss region: “some rich households can also be found in poor communities and vice-versa. [T]aste heterogeneity reduces the distributional effects of local tax differences”. If this interpretation is correct, fiscally induced migration should not lead to an inefficiently low level of taxes.

Combining these two results, this paper suggests first that the fiscal decentralization trends observed in many European countries should not be slowed down because of public fears of a “race to the bottom”, and second that the tax progressivity should be set at a higher jurisdictional level, e.g. EU, in order to avoid a detrimental tax competition for high-earner individuals.
4.6 Appendices

4.6.1 Appendix I: Data description

Communal tax multipliers come from the Cantonal Statistical Office of Vaud (Service Cantonal de Recherche et d’Information Statistique SCRIS). The communal taxable income and the number of taxpayers are issued by the Swiss Financial Department. The taxable income per taxpayer is the monthly taxable income divided by the number of taxpayers. To be underlined, the taxpayers who have earned part of their income abroad, who did not work the whole year, or who were taxed according to their expenditures are not included in these statistics.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax multiplier</td>
<td>96.63</td>
<td>17.33</td>
<td>40</td>
<td>135</td>
</tr>
<tr>
<td>Taxable income / t. [Fr.]</td>
<td>5'069</td>
<td>1'353</td>
<td>3'036</td>
<td>16'038</td>
</tr>
<tr>
<td>Taxpayers</td>
<td>599</td>
<td>2'480</td>
<td>8</td>
<td>44'582</td>
</tr>
<tr>
<td>Mean income [Fr.] a</td>
<td>4'763</td>
<td>436</td>
<td>3'656</td>
<td>6'371</td>
</tr>
<tr>
<td>Median / mean income [Fr.] a</td>
<td>0.96</td>
<td>0.07</td>
<td>0.69</td>
<td>1.15</td>
</tr>
<tr>
<td>Age ≤ 7</td>
<td>0.10</td>
<td>0.03</td>
<td>0.04</td>
<td>0.22</td>
</tr>
<tr>
<td>7 &lt; age ≤ 15</td>
<td>0.11</td>
<td>0.03</td>
<td>0.03</td>
<td>0.27</td>
</tr>
<tr>
<td>Age ≥ 65 [%]</td>
<td>14.33</td>
<td>4.72</td>
<td>3.72</td>
<td>32.85</td>
</tr>
<tr>
<td>Foreigners [%]</td>
<td>13.63</td>
<td>9.69</td>
<td>9.69</td>
<td>53.57</td>
</tr>
<tr>
<td>Primary sector [%]</td>
<td>13.89</td>
<td>10.10</td>
<td>1.00</td>
<td>64.29</td>
</tr>
<tr>
<td>Public employee [%]</td>
<td>12.96</td>
<td>4.21</td>
<td>0.00</td>
<td>31.82</td>
</tr>
<tr>
<td>Unemployed [%]</td>
<td>3.11</td>
<td>1.69</td>
<td>0.00</td>
<td>10.16</td>
</tr>
<tr>
<td>Owner [%]</td>
<td>52.92</td>
<td>13.63</td>
<td>3.61</td>
<td>81.40</td>
</tr>
<tr>
<td>Population</td>
<td>1'668</td>
<td>6'926</td>
<td>33</td>
<td>124'914</td>
</tr>
<tr>
<td>Density [pop./ha]</td>
<td>3.02</td>
<td>7.19</td>
<td>0.08</td>
<td>69.24</td>
</tr>
<tr>
<td>Rent [average Fr.] b</td>
<td>1'161</td>
<td>321</td>
<td>447</td>
<td>2'408</td>
</tr>
<tr>
<td>Agriculture [%] c</td>
<td>58.69</td>
<td>21.69</td>
<td>0.75</td>
<td>94.34</td>
</tr>
<tr>
<td>Industry [%] c</td>
<td>1.22</td>
<td>2.08</td>
<td>0.00</td>
<td>16.78</td>
</tr>
<tr>
<td>Altitude [m] c</td>
<td>600</td>
<td>163</td>
<td>374</td>
<td>1'320</td>
</tr>
<tr>
<td>Acreage [ha] c</td>
<td>731</td>
<td>1'192</td>
<td>30</td>
<td>11'250</td>
</tr>
<tr>
<td>Lake [%] c</td>
<td>0.16</td>
<td>0.37</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Unweighted mean, 384 communes

a constructed (see text)

b based only on 378 observations

c averages over 1992/1997

Due to the unavailability of the communal median income, we had to construct it. Thanks to the Swiss Wage Structure Survey (LSE) conducted by the Swiss Statistical Office.
(OFS), we were able to estimate a standard Mincer wage equation at the Swiss level.\footnote{The Mincer equation is given by: $$\ln(w) = X\beta + \varepsilon$$, where $w$ is a standardized monthly wage, $X$ is a matrix containing dummies for the level of education, for married, for foreigner and for the sector of activity, and continuous variables for experience ($age - schooling - 6$) and for experience squared, and $\varepsilon$ is an error term.} Based on the estimated coefficients of the Mincer wage equation and on the individual characteristics reported in the Census, we could construct, for every individual of the canton, an expected monthly wage value.\footnote{Adjustments have been done in order to take into account the individual status on the labor market such as: part time worker, unemployed, retired, etc.} Using these individual values, we could then easily calculate the communal mean income of the resident population over 17 and the communal median income of the Swiss - only Swiss have voting rights - residents over 17.

Except if otherwise cited, the communal population characteristics summarized in table 4.3 were constructed thank to data issued from the Swiss Harmonized Census 2000. The total population in each commune also comes from Census and the variable density is total population divided by acreage. The average rents are issued from the Swiss Federal Census of Buildings and Housing 2000 and the owner rates are issued from the Swiss Statistical Office.

The geographical characteristics of the communes summarized at the bottom of table 4.3 come from Geostat (a department of the Swiss Statistical Office) and are an average value over the period 1992/1997.

<table>
<thead>
<tr>
<th></th>
<th>Tax mult</th>
<th>Tax base</th>
<th>Mean inco.</th>
<th>Med./mean</th>
<th>Rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax mult.</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax base</td>
<td>-0.71</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean inco.</td>
<td>-0.62</td>
<td>0.77</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med./mean</td>
<td>-0.12</td>
<td>0.15</td>
<td>0.36</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Rent</td>
<td>-0.61</td>
<td>0.80</td>
<td>0.80</td>
<td>0.21</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Notes: Unweighted correlation / 384 communes

### 4.6.2 Appendix II: Constructing geographical weights

A central issue to be addressed when working with spatial data is how to determine the neighbor characteristics such as the neighbor tax multiplier. One way to address this problem is to construct a variable of weighted neighbor characteristics by using a spatial weight matrix $W$.

Using the information on the centroid of each commune,\footnote{Provided by Geostat.} we constructed the weighting...
matrix $W$ as follows:

$$w_{jk} = \frac{1}{d_{jk}} \sum_l (1/d_{lj}) \quad \text{if } j \neq k \text{ and } d_{jk} \leq T$$
$$= 0 \quad \text{otherwise}$$

where $d_{jk}$ is the euclidean distance between commune $j$ and $k$, and $T$ is a given distance threshold in kilometers. By construction, this matrix is squared and row-standardized, i.e. the weights for each line - each commune - must sum up to one.

This matrix has been row-standardized in order to allow us to consider the values assigned to neighbor commune as weighted averages of their characteristic which are easily interpretable.

### 4.6.3 Appendix III: Some descriptive statistics of the communes of Vaud

As summarized in table 4.5, the average tax multipliers of the communes of Vaud have remained quite stable over the last 20 years.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>96.75</td>
<td>22.81</td>
<td>20</td>
<td>160</td>
</tr>
<tr>
<td>1985</td>
<td>94.88</td>
<td>20.89</td>
<td>30</td>
<td>160</td>
</tr>
<tr>
<td>1990</td>
<td>95.70</td>
<td>21.08</td>
<td>40</td>
<td>150</td>
</tr>
<tr>
<td>1995</td>
<td>96.67</td>
<td>19.26</td>
<td>40</td>
<td>140</td>
</tr>
<tr>
<td>2000</td>
<td>96.63</td>
<td>17.33</td>
<td>40</td>
<td>135</td>
</tr>
</tbody>
</table>

Source: Vaud’s Statistical Office (SCRIS)

The correlation matrix given by table 4.6 indicates that changes in communal tax multipliers are rather smooth. Indeed, the correlation coefficients are very close to 1 at a five years interval, but, as time passes, this correlation coefficient decreases, i.e. the ranking of the communes in term of standardized tax multiplier shows some smooth evolution.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>0.89</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>0.77</td>
<td>0.92</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>0.69</td>
<td>0.86</td>
<td>0.94</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>0.62</td>
<td>0.80</td>
<td>0.87</td>
<td>0.94</td>
<td>1</td>
</tr>
</tbody>
</table>

112
To get a visual insight on the relationship between communal tax multipliers and taxable income per taxpayer, we represented them geographically in the following two figures: figure 4-2 shows the distribution of the tax multipliers and figure 4-3 shows the distribution of the taxable incomes per taxpayer. In both figures the dark (light) points represent the tercile of the highest (lowest) values of tax multipliers or of taxable incomes per taxpayer. As a first reading of these figures, we notice that, on average, the low tax communities are also the communities with the highest tax base. Moreover, geographical clustering of low tax/high income and high tax/low income communities seems to be strongly present. For instance, the low tax and the high income communities are mainly clustered around the lake of Geneva, especially on its western coast.

Figure 4-2: Geographical distribution of tax multipliers per tercile, 2000

Figure 4-3: Geographical distribution of taxable income per taxpayer per tercile, 2000
4.6.4 Appendix IV: Robustness checks estimations
Table 4.7: Tax setting and tax base estimations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[a]</td>
<td>[b]</td>
<td>[c]</td>
<td>[c]</td>
</tr>
<tr>
<td>K-P.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[4.47]</td>
<td>[2.24]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighbor tax</td>
<td>0.960***</td>
<td>0.686***</td>
<td>-22.350***</td>
<td>-19.522</td>
</tr>
<tr>
<td></td>
<td>[11.08]</td>
<td>[6.60]</td>
<td>[2.91]</td>
<td>[0.83]</td>
</tr>
<tr>
<td>Taxable income</td>
<td>-0.003**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[2.32]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≤ 7</td>
<td>7.727</td>
<td>-0.552</td>
<td>7.314</td>
<td>-22.482</td>
</tr>
<tr>
<td></td>
<td>[0.29]</td>
<td>[0.02]</td>
<td>[0.26]</td>
<td>[0.82]</td>
</tr>
<tr>
<td>7 &lt; age ≤ 15</td>
<td>49.635**</td>
<td>42.856**</td>
<td>53.291*</td>
<td>31.565</td>
</tr>
<tr>
<td></td>
<td>[2.12]</td>
<td>[1.97]</td>
<td>[1.87]</td>
<td>[1.29]</td>
</tr>
<tr>
<td></td>
<td>[2.06]</td>
<td>[2.53]</td>
<td>[0.43]</td>
<td>[2.36]</td>
</tr>
<tr>
<td>Foreigner</td>
<td>2.423</td>
<td>7.134</td>
<td>-23.372</td>
<td>7.301</td>
</tr>
<tr>
<td></td>
<td>[0.21]</td>
<td>[0.65]</td>
<td>[1.62]</td>
<td>[0.52]</td>
</tr>
<tr>
<td>Primary</td>
<td>35.709***</td>
<td>29.023***</td>
<td>43.735***</td>
<td>21.891***</td>
</tr>
<tr>
<td></td>
<td>[4.54]</td>
<td>[3.64]</td>
<td>[4.68]</td>
<td>[2.39]</td>
</tr>
<tr>
<td>Public</td>
<td>30.190*</td>
<td>35.101**</td>
<td>49.756**</td>
<td>52.346***</td>
</tr>
<tr>
<td></td>
<td>[1.88]</td>
<td>[2.46]</td>
<td>[2.42]</td>
<td>[2.93]</td>
</tr>
<tr>
<td>Unemployed</td>
<td>34.296</td>
<td>25.621</td>
<td>35.089</td>
<td>21.203</td>
</tr>
<tr>
<td></td>
<td>[0.88]</td>
<td>[0.72]</td>
<td>[0.80]</td>
<td>[0.56]</td>
</tr>
<tr>
<td>Owner</td>
<td>-25.813***</td>
<td>-13.259*</td>
<td>-34.088***</td>
<td>2.678</td>
</tr>
<tr>
<td></td>
<td>[4.21]</td>
<td>[1.77]</td>
<td>[4.70]</td>
<td>[0.24]</td>
</tr>
<tr>
<td></td>
<td>[a]</td>
<td>[b]</td>
<td>[c]</td>
<td>[c]</td>
</tr>
<tr>
<td>------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Rents</td>
<td>1.579***</td>
<td>2.071***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.69]</td>
<td>[2.63]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>0.358***</td>
<td>0.355***</td>
<td>-6.209</td>
<td>-8.78</td>
</tr>
<tr>
<td></td>
<td>[2.94]</td>
<td>[3.33]</td>
<td>[1.06]</td>
<td>[1.31]</td>
</tr>
<tr>
<td>Acreage</td>
<td>0.002***</td>
<td>0.001***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[2.99]</td>
<td>[2.60]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>0.015***</td>
<td>0.008*</td>
<td>-0.157</td>
<td>-0.101</td>
</tr>
<tr>
<td></td>
<td>[2.64]</td>
<td>[1.74]</td>
<td>[0.57]</td>
<td>[0.26]</td>
</tr>
<tr>
<td>Industry</td>
<td>-1.351***</td>
<td>-1.444***</td>
<td>-40.535**</td>
<td>-17.83</td>
</tr>
<tr>
<td></td>
<td>[3.43]</td>
<td>[4.30]</td>
<td>[2.13]</td>
<td>[0.69]</td>
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<tr>
<td>Agriculture</td>
<td>0.047</td>
<td>0.070**</td>
<td>-1.496</td>
<td>-2.831</td>
</tr>
<tr>
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<td>[1.10]</td>
<td>[2.04]</td>
<td>[0.53]</td>
<td>[0.78]</td>
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<td>[2.70]</td>
<td>[2.80]</td>
<td>[0.39]</td>
<td>[0.92]</td>
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<tr>
<td>Neighbor control</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Observations</td>
<td>384</td>
<td>384</td>
<td>378</td>
<td>378</td>
</tr>
</tbody>
</table>

Robust t-statistics in brackets, Constants not reported
* significant at 10%; ** significant at 5%, *** significant at 1%
[a] tax rate (reduced form), [b] tax rate (structural form), [c] tax base (structural form)
K.-P. = Kelejian and Prucha’s (1998) method
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