The political economy of immigration in a direct democracy: the case of Switzerland

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Abstract

In this paper, we analyze the determination of immigration policy in a direct democracy setting. We formulate a model of voting and participation behavior integrating instrumental and expressive motivations. The model is estimated using data drawn from a survey carried out after a vote in Switzerland in 2000 on a popular initiative proposing to implement immigration restrictions. The model enables us to recover estimates of participation costs and preferences towards immigration and analyze how these preferences are translated into actual voting outcomes. The results reveal a substantial gap ("participation bias") between attitudes towards immigration in the general population (43% favorable to restrictions) and the outcome of the vote (26%).

JEL codes: F22, D72, J61.

Keywords: Immigration policy; political economy; voting; attitudes towards migration.

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1 Introduction

In many countries of the Northern Hemisphere, opinion polls show that a majority of residents would prefer to reduce the number of immigrants to their country. For example, in the 1995 survey of the International Social Survey Programme (ISSP), more than 50 percent of respondents in 20 countries say that the number of immigrants should be reduced a little or a lot. Even in the four countries of the sample where this is not the case (Ireland, Spain, Japan and Canada) more respondents are in favor of reducing immigration than in favor of increasing immigration.

These responses reveal a discrepancy between the immigration policies of these countries and popular demands for tighter immigration control. Here we have a puzzle for the analysis of the political economy of migration: Why is public opinion not accurately reflected in actual policies? According to Chiswick and Hatton (2003) this puzzle should be addressed by answering two questions: (1) what drives public opinion and (2) why is it not reflected in policy?

According to Rodrik (1995), an adequate description of individual preferences should indeed be the first element of a political economy model. However, understanding how preferences on immigration are formed is not enough: the model must also "contain a description of how these individual preferences are aggregated and channeled (...) into political demands for a particular policy or another". Finally, the policymakers' preferences and the institutional setting should be specified. It is in these latter elements that an explanation for the immigration policy puzzle should be sought.

In this paper, we address Chiswick and Hatton's puzzle in a direct democracy setting. We formulate a model of voting and participation behavior in order to analyze the political economy of immigration policy in the Swiss context. The model is estimated using data collected after a vote in September 2000 on a popular initiative proposing to restrict immigration. The model enables us, on the one hand, to recover estimates of preferences towards immigration and to analyze, on the other hand, how these preferences are translated into actual political outcomes in the context of a direct democracy. Let us consider these two aspects in turn.

First, we find that there is a substantial gap between general attitudes towards immigration and the outcome of the vote. The survey provides information on individual attitudes only for those individuals who participated in the vote. However, our structural model enables us to identify the underlying preferences of the entire population. According to our estimations, there is a substantial "participation bias": 43% of Swiss citizens are in favor of immigration restrictions but, among those who

participated in the vote, only 28% voted in favor of the popular initiative. This difference between the outcome of the vote and underlying attitudes can mainly be attributed to unobserved factors: citizens in favor of immigration restrictions tend to have higher participation costs. This can be intuitively understood in the following way: economically literate citizens who fear that the initiative would result in a large aggregate economic loss also have low participation costs because of their informational advantage over other citizens.

Second, the use of a structural model that accounts explicitly for the participation decision is crucial if one wants to analyze the determinants of immigration preferences. Simple descriptive evidence for voters (see Table 1) seems to indicate that individuals with high earnings are *more* inclined to accept immigration restrictions than those with low earnings (0.309 vs. 0.250), the opposite of our findings in the estimated structural model. Moreover, if preferences towards immigration are estimated by a simple probit using only the subsample of voters (see Table 2), human capital variables do not seem to have a significant influence on individual attitudes. By contrast, the structural estimates indicate that attitudes towards immigration restrictions depend negatively and significatively on human capital.

Our empirically oriented model combines instrumental and expressive motivations for voting and is consistent with group-based motivations which figure prominently among recent explanations of voter turnout (Dhillon and Peralta, 2002; Feddersen, 2004). Instrumental theories assume that the individual's contribution to the outcome of the vote is the main motivation for participation. Individuals participate in the vote if the expected benefit from voting is higher than the cost of voting. Although the probability of casting the decisive vote is extremely small in large electorates ("voting paradox"), empirical studies suggest that instrumental motivations matter at the margin.

Group-based models are able to account for these empirical results by postulating a model structure where a reduced number of agents (i.e. groups) interact strategically. Two versions of group-based models can be distinguished. The first one, due to Shachar and Nalebuff (1999), assumes that each group has a leader who expends effort to motivate her followers to vote. The leaders' effort level (measured by political advertising and grassroots campaigning in a later paper, Shachar 2009), is determined by strategic interaction and depends in equilibrium on the pivotalness of the circumscription. In the "ethical" version of group-based models (Coate and Conlin, 2004; Coate et al., 2008), individuals are seen as rule-utilitarians who participate in the vote if the ethical benefit from voting is greater than the cost of voting.

As decisions are based on the outcome for the entire group, these models predict realistic participation rates. Our model can be reinterpreted as a simplified version of an ethical group-based model. In addition, we account for expressive motivations by introducing social identity or self-image (Akerlof and Kranton, 2000).

In our model, the voting decision is endogenously determined and voting preferences influence the participation decision. First, an individual decides whether she is in favor or opposed to the initiative proposing immigration restrictions. Second, she decides to participate in the vote if the *intensity* of her preferences (i.e. absolute value) is greater than the participation costs. As voting decisions are only observed for the individuals who participate in the vote, our econometric model resembles a Heckman selection model with two major differences: (i) both the outcome and selection variables are qualitative and (ii) there is a strong non-linearity in our model (the selection equation depends on the absolute value of the latent preference variable).

Identification conditions require that there is at least one variable in the preference equation that is excluded from the participation cost. In our model, identification is ensured by variables of political identity and is based on the assumption that expressive motivations are relevant for the participation decision only to the extent that they influence the intensity of preferences, in favor or against the popular initiative. This identifying assumption reflects the strong polarization along the left-right spectrum which occurred in Switzerland in the 1990s when an established right-wing party (SVP/UDC) turned to systematic opposition against immigration. This situation is similar to most European countries but differs from the US, where positions on immigration policy cut across party lines.

Most studies on attitudes towards migration rely on opinion polls (Scheve and Slaughter, 2001; Mayda, 2006; O'Rourke and Sinnott, 2006; Hanson et al., 2007; Facchini and Mayda, 2009) that are likely to suffer from the so-called "hypothetical bias" since individuals have little incentive to reveal their true preferences, knowing that their answer will have no real consequences. A vote on a popular initiative, such as ours, provides a context which differs fundamentally from opinion polls. First, the result of the vote is binding: the acceptance of a popular initiative by vote implies a change in the Swiss Constitution.[1] Second, the political discussion preceding a vote enables individuals to take a more informed decision on the issue

[1]There is no exception to this rule: in case of a positive vote, the constitutional amendment is automatic and cannot be prevented by the government. In Switzerland, any population group can use this political instrument in order to propose a change in the Constitution. To be voted upon, a popular initiative must obtain 100,000 signatures.

up for vote than is the case when answering an opinion poll.

In representative democracies, the existence of lobbying groups influencing immigration policies provides an additional explanation of the Chiswick-Hatton paradox, see e.g. Freeman (1992), Joppke (1998) and Facchini et al. (2007). Further, it can also be argued that the government takes into account both social welfare and contributions offered by domestic lobbies when deciding over immigration policy (Facchini and Willmann, 2005).

The remainder of the paper is organized as follows. The next section presents a theoretical framework for our analysis. This is followed by a formulation of the econometric model and a discussion of the estimation method in Section 3. Section 4 describes the data used and empirical results are analyzed in Section 5. Simulations of a fall in voting costs are described in Section 6 and the paper ends with some concluding remarks in Section 7.

2 The model

In order to analyze the political economy of migration in the context of Swiss direct democracy, we formulate a model of voting and participation, with the following elements. First, the decision whether to support the initiative up for vote is shaped by individual attitudes towards immigration which depend both on expected personal gains (or losses) from immigration restrictions and on feelings of political identity. By combining these two elements in the model, we allow for instrumental and expressive motivations for voting.[2] Second, individuals will decide to participate in the vote if the intensity of their preferences (in favor or against the popular initiative) is greater than the voting cost. This section discusses the main economic ingredients of the model: the determinants of individual preferences towards immigration and the decision to participate in the vote.

Two types of models have been traditionally used in the literature in order to evaluate individual attitudes towards immigration.[3] Labor economists traditionally cast their analysis in the framework of factor-proportions analysis, assuming an aggregate production function with a single output and several primary factors: capital

[2]We do not seek to identify the relative importance of instrumental and expressive motivations in the voting decision but to give an empirically adequate description of the voting process. Hence it is crucial to take both types of motivations into account.

[3]Here we focus on the "labor-market" channel through which immigration influences attitudes. Because of the limitations of our dataset, we do not consider the "welfare-state" channel which takes income redistribution effects into account (Facchini and Mayda, 2009 and Hanson et al., 2007).

and labor (which is often disaggregated by skill). In this model, the labor demand schedule for each skill is downward-sloping and immigration tends to decrease wages of similarly skilled natives.

By contrast, trade economists often resort to the Heckscher-Ohlin model with more traded goods than factors. The output mix of national production is determined by the country's endowment in primary factors. If national production is fully diversified (i.e. if the number of goods is equal to the number of factors), factor prices are entirely determined by goods prices on the world market and a small level of immigration changes the output mix without affecting wages and other factor prices. However, if immigration is sufficiently important to change the set of goods produced in the economy, wages will be adversely affected by the arrival of similarly skilled immigrants.

Both models predict that the income of skilled natives decreases with restrictions to (unskilled) immigration whereas the income of unskilled natives tends to increase. Thus, assuming that an individual's preferences towards immigration restrictions depend on the anticipated change in her income, we would expect that attitudes towards immigration restrictions are negatively related to an individual's stock of human capital.

We integrate these economic motivations in a voter framework. From the point of view of the voter, there are two "states of nature": the popular initiative will be accepted ($j = 1$) or rejected ($j = 0$). Income in each of these states is denoted by Y_i^j. Assuming that individuals are risk-neutral, the expected utility of individual i taking action k is

$$EU_{i|k} = P_k Y_i^1 + (1 - P_k) Y_i^0 + A_{i|k} = Y_i^0 + P_k(Y_i^1 - Y_i^0) + A_{i|k}, \tag{1}$$

where P_k denotes the perceived probability that the popular initiative is accepted if the individual takes action k (the different possible actions are: vote yes; vote no; abstain). This probability depends on the individual's prior beliefs on the outcome of the vote, such as opinion polls and results of former referenda (Fischer, 1999).[4]

[4]The rational voter framework has been largely criticized because the pivotal probability (denoted by p below) is close to zero in large electorates. This problem can addressed by reinterpreting our model in the spirit of the recent ethical or group-based voter models (Coate and Conlin, 2004; Coate et al., 2008). To do this, we assume that each individual feels close to other citizens with similar demographic characteristics and political ideology and that she behaves as a rule-utilitarian by choosing a behavior that maximizes the aggregate welfare of the category of citizens she feels close to. If we assume furthermore that social categories are homogeneous (i.e. all individuals of a same social category have identical characteristics), we can interpret each individual in our sample as being the representative citizen of her social category. Then all individuals behave as if the vote

Expressive motivations are captured by the term $A_{i|k}$ which depends only on the individual's action k and not on the outcome of the vote.[5] We assume that an individual's expressive benefits from voting are derived from feelings of political identity and depend on the social category or group she belongs to. According to the identity theory of Akerlof and Kranton (2000), there are prescriptions that indicate the behavior which is considered appropriate in different situations for individuals belonging to a specific category or group.

In Switzerland, the debate on migration policy became increasingly polarized along the right-left axis during the 1990s. As our focus is on political identity, we distinguish three social categories (or political groups) according to their political position. The first two groups that we consider are politically mobilized but occupy opposite positions on the political scale: the "left" (l) and the "right" (r). For the three possible actions, we postulate the following expressive motivations:

$$A_{i|k} = \begin{cases} a_r\delta_{r,i} - a_l\delta_{l,i} & \text{if individual } i \text{ votes yes} \\ 0 & \text{if individual } i \text{ abstains from voting} \\ -a_r\delta_{r,i} + a_l\delta_{l,i} & \text{if individual } i \text{ votes no} \end{cases} \tag{2}$$

where $\delta_{r,i}$ and $\delta_{l,i}$ are dummies for "right" and "left" and a_r and a_l are positive parameters. From an ideological point of view, the "right" is in favor of the popular initiative. Therefore, an individual who identifies herself with this group gets an expressive benefit a_r from accepting immigration restrictions, and suffers a utility loss ($-a_r$) if she votes no. For those who belong to the political left, prescriptions and expressive motivations are of the opposite sign to the right. Finally, the third political group that we consider here are those citizens who locate their political position in the "center" or who are not politically mobilized. We assume that they do not have any expressive motivations for voting.

When deciding whether to vote, the individual proceeds in two stages. First, she considers the voting decision: individual i is in favor of the popular initiative if

$$EU_{i|y} - EU_{i|n} = (P_y - P_n)(Y_i^1 - Y_i^0) + A_{i|y} - A_{i|n} \simeq 2py_i + 2a_r\delta_{r,i} - 2a_l\delta_{l,i} \tag{3}$$

is positive, where $y_i = Y_i^1 - Y_i^0$ is the change in income induced by the acceptance of the popular initiative and p is the probability that the individual's vote is decisive,

were held only among the representative citizens whose number is limited (about one thousand in our sample). In this context, the pivotal probability is small but not zero.

[5] For a similar treatment of expressive motivations for voting, see Feddersen et al. (2009) who find experimental support for the existence of (ethical) expressive motives which do not depend on the outcome of the vote.

approximately equal to $(P_y - P_n)/2 \simeq (P_y - P_a) \simeq (P_a - P_n)$. In the opposite case, she prefers the status quo.

Second, the individual decides whether to participate in the vote, by comparing the expected benefits from voting with costs of participation. For yes-voters, the expected utility gain from participating in the vote can be written as

$$EU_{i|y} - EU_{i|a} = (P_y - P_a)(Y_i^1 - Y_i^0) + A_{i|y} - A_{i|a} \simeq py_i + a_r\delta_{r,i} - a_l\delta_{l,i}. \tag{4}$$

For no-voters, we have

$$EU_{i|n} - EU_{i|a} = (P_a - P_n)(Y_i^0 - Y_i^1) + A_{i|n} - A_{i|a} \simeq -py_i - a_r\delta_{r,i} + a_l\delta_{l,i}. \tag{5}$$

An individual decides to vote if these benefits exceed her participation costs, denoted by $\bar{c}_i$.

$$EU_{i|k} = P_kY_i^1 + (1 - P_k)Y_i^0 + A_{i|k} = b_0 + b_1y_i + A_{i|k}, \tag{6}$$

The model can now be summarized as follows. Define

$$\bar{v}_i = py_i + a_r\delta_{r,i} - a_l\delta_{l,i}. \tag{7}$$

The decisions to participate and to vote are based on the variables $\bar{v}_i$ and $\bar{c}_i$. Individual i participates in the vote if $|\bar{v}_i| > \bar{c}_i$. In case she participates, the individual posts a vote in favor of the popular initiative if $\bar{v}_i > 0$ and a negative vote otherwise.

As we will show below, our model is identified by the fact that the political variables ("right", "left") appear only in the preference equation (7) without directly influencing the cost of voting $\bar{c}_i$. The assumption that there are no expressive benefits from participation by itself, implying the symmetry between the benefit from voting yes and the loss from voting no in equation (2), allows us to identify the model. In our model, expressive motivations are relevant for the participation decision only to the extent that they influence the intensity of preferences, in favor or against the popular initiative.

This model yields an interesting prediction for participation behavior. Individuals are likely to participate in the vote if their personal position (as represented by the sign of y_i) is in agreement with the voting prescription of the political group the individual adheres to. By contrast, "cross-pressured" individuals whose personal interests are in opposition to the recommended vote of their group are more likely to abstain (see Fiorina 1976 for a similar result).

3 Econometric implementation

In order to account for observable and unobservable heterogeneity in preferences and participation costs, we add socio-demographic variables and error terms to voting preferences ($\bar{v}_i$) and participation costs ($\bar{c}_i$) and write them in vector notation as

$$\bar{v}_i = \bar{\alpha}' x_i + \bar{\epsilon}_i \tag{8}$$

$$\bar{c}_i = \bar{\gamma}' z_i + \bar{\xi}_i, \tag{9}$$

Besides socio-demographic characteristics, the vector x_i contains the variables suggested by equation (7) and the vector z_i includes indicators of participation costs at the cantonal level. As we only observe discrete voting and participation behavior, the variances of these errors terms (say, σ_v^2 and σ_c^2) cannot be identified. Therefore, we reparameterize the above two equations in such a way that the error terms have unit variance. The resulting equations are written as:

$$v_i^* = \alpha' x_i + \epsilon_i \tag{10}$$

$$c_i^* = \tilde{\gamma}' z_i + \xi_i, \tag{11}$$

where $\mathrm{Var}(\epsilon_i) = \mathrm{Var}(\xi_i) = 1$ and $\mathrm{Cov}(\epsilon_i, \xi_i) = \rho$. We will assume normality of (ϵ_i, ξ_i) for constructing the likelihood function for our model.

The utility index and participation costs are both latent variables in our model; only the binary variables π_i (participation) and v_i (vote) are observed. Moreover, the vote is observed only if the individual has chosen to participate. Indeed, the data we use in this paper stem from individual surveys carried out during the two weeks following a vote on immigration policy. People were asked whether they had participated in the vote and, if the answer was affirmative, how they had voted.

Let us recall that individual i participates if $|\bar{v}_i| > \bar{c}_i$. Noting that $\bar{v}_i = \sigma_v v_i^*$ and $\bar{c}_i = \sigma_c c_i^*$ and letting $\lambda = \sigma_c/\sigma_v$, the above condition can be rewritten as $|v_i^*| > \lambda c_i^*$. For later use, we define $\gamma = \lambda\tilde{\gamma}$. Thus, participation is given by

$$\pi_i = \begin{cases} 1 & \text{if } |v_i^*| > \lambda c_i^* \\ 0 & \text{otherwise.} \end{cases} \tag{12}$$

The voting decision is

$$v_i = \begin{cases} 1 & \text{if } v_i^* > 0 \\ 0 & \text{otherwise.} \end{cases} \tag{13}$$

Note that π_i is observed for all and v_i is observed only if $\pi_i = 1$.

Equations (12) and (13) constitute our empirical model. Although it closely resembles a Heckman selection model, one can note two major differences: (i) both the participation variable and the outcome (vote) variable are binary; (ii) the threshold applies on a nonlinear function of the latent variable (absolute value) with participation happening when $|v_i^*| > \lambda c_i^*$.

The probability of being in favor of the popular initiative is

$$\Pr(v_i = 1) = \Pr(v_i^* > 0) = \Phi(\alpha' x_i)$$

where $\Phi(\cdot)$ denotes the cumulative distribution function of a standard normal variable. Therefore the probability of being opposed to the proposal up for vote is

$$\Pr(v_i = 0) = \Pr(v_i^* < 0) = 1 - \Phi(\alpha' x_i)$$

The individuals surveyed can be classified into three categories: those who vote and say yes ($\pi_i = 1, v_i = 1$, say group G_1), those who vote and say no ($\pi_i = 1, v_i = 0$, group G_2) and those who do not vote ($\pi_i = 0$, group G_0). Let us calculate these three probabilities needed for writing the likelihood.

The first group G_1 is characterized by the two conditions $v_i^* > 0$ and $v_i^* > \lambda c_i^*$. These two conditions can be restated as $-\epsilon_i < \alpha' x_i$ and $\lambda \xi_i - \epsilon_i < \alpha' x_i - \gamma' z_i$. The variables $s_i = -\epsilon_i$ and $t_i = \lambda \xi_i - \epsilon_i$ jointly follow a bivariate normal distribution with variance-covariance matrix

$$\Sigma_1 = \begin{bmatrix} 1 & 1 - \lambda\rho \\ 1 - \lambda\rho & 1 + \lambda^2 - 2\lambda\rho \end{bmatrix}$$

Therefore, the probability of participating in the vote and voting yes is

$$\Pr(\pi_i = 1, v_i = 1) = \Phi_2 \left(\alpha' x_i, \frac{\alpha' x_i - \gamma' z_i}{\sqrt{1 + \lambda^2 - 2\lambda\rho}}, \frac{1 - \lambda\rho}{\sqrt{1 + \lambda^2 - 2\lambda\rho}} \right), \qquad (14)$$

where $\Phi_2(\cdot, \cdot, r)$ denotes the joint cumulative distribution of a standard bivariate normal with correlation r.

Individuals belong to category G_2 if the conditions $v_i^* < 0$ and $-v_i^* > \lambda c_i^*$ are satisfied. These two conditions can be reformulated as $\epsilon_i < -\alpha' x_i$ and $\lambda \xi_i + \epsilon_i < -\alpha' x_i - \gamma' z_i$. The variables ϵ_i and $\tilde{t}_i = \lambda \xi_i + \epsilon_i$ jointly follow a bivariate normal

distribution with variance-covariance matrix

$$\Sigma_2 = \begin{bmatrix} 1 & 1+\lambda\rho \\ 1+\lambda\rho & 1+\lambda^2+2\lambda\rho \end{bmatrix}$$

Consequently, the probability of participating in the vote and voting no is

$$\Pr(\pi_i = 1, v_i = 0) = \Phi_2\left(-\alpha' x_i, \frac{-\alpha' x_i - \gamma' z_i}{\sqrt{1+\lambda^2+2\lambda\rho}}, \frac{1+\lambda\rho}{\sqrt{1+\lambda^2+2\lambda\rho}}\right). \tag{15}$$

Finally, the probability of not participating in the vote is

$$\Pr(\pi_i = 0) = 1 - \Pr(\pi_i = 1, v_i = 1) - \Pr(\pi_i = 1, v_i = 0).$$

Thus the log-likelihood is given by

$$\begin{aligned} \log L &= \sum_i [\pi_i v_i \log \Pr(\pi_i = 1, v_i = 1) + \pi_i(1 - v_i) \log \Pr(\pi_i = 1, v_i = 0) \\ &\quad + (1 - \pi_i) \log \Pr(\pi_i = 0)] \end{aligned}$$

As we show in the appendix, all parameters of the model can be identified if there is at least one variable that is in x but not in z. This is similar to the identification condition for the generic labor supply model (Gronau, 1973; Nelson, 1977). In a Heckman selection model, it is often necessary to have one variable in the selection equation that is not present in the outcome equation in order to avoid problems of collinearity. As our model is highly nonlinear (due to the absolute value of the vote that enters the participation condition), such a condition is not required here.

In our implementation of the model, the political variables "left" and "right" are in x but not in z. In economic terms, the identification condition amounts to assuming that politically mobilized voters like to express their identity by casting a specific vote which corresponds to their group's prescription. The simple fact of participating is not valued in itself by these groups (exclusion restriction).

4 Data

The data used in our empirical application were collected after the vote in September 2000 on a popular initiative asking for a limitation of the number of foreigners in Switzerland. The proposed change in the Constitution stated that the share of

foreigners in the Swiss population could not exceed 18 percent. Some categories of resident foreigners would have been excluded from this count (e.g. academics, artists), but some non-residents would have been included (e.g. asylum seekers). According to this definition, the share of foreigners was 19.3 percent at the time of the vote. Therefore the initiative would have forced the government to limit immigration severely. As the debate during the campaign made clear, immigration limits would have been expected to apply to less-skilled workers in particular. The popular initiative was rejected by 63.7 percent of voters and the participation rate was 43.6 percent.

The individual-level VOX survey was carried out during the two weeks following the vote and includes 1024 Swiss citizens over 18 years old. After elimination of missing data, our sample consists of 953 individuals of which 507 reported that they had participated in the vote. Among the latter, 28.8 percent said they had voted in favor of the popular initiative. Therefore the participation rate in our sample (53.2 percent) is higher and the share of yes-votes is lower than in the general population.

According to the theoretical model, human capital (or skill) is a crucial variable that determines attitudes towards immigration. We carefully explore the role of this variable by using alternatively two different measures of skill. The first one, a measure of educational attainment, was constructed as an indicator of years of schooling according to the education types reported in the survey (descriptive statistics of variables are given in Table 1).

Second, we use a wider measure of human capital 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. In Mincer's framework, observed wages and potential earnings are closely linked. To construct an indicator of *Potential earnings*, we ran a standard Mincer wage equation on data from the 2000 Swiss wage structure survey, including only Swiss citizens between the ages of 18 and 65 years, giving us a sample of 319830 workers. The earnings indicator is constructed using the following equation:

$$\log(\textit{earnings}) = \text{cst} + 0.04\,\textit{experience} - 0.0005\,\textit{experience}^2 + 0.09\,\textit{schooling}$$

where *experience* is defined as: *age-schooling*-6. As this measure of *Potential earnings* is by construction highly collinear with the variables *Years of education* and *Age*, we use the two measures of skill alternatively in the model.

In the survey, political beliefs of citizens are measured by a variable based on the individual's self-assessment of her political position on a scale between 0 (left) and

10 (right). The dummy variables defining political identity in our model are derived from this variable. Those who pick a number between 0 and 4 are classified as being on the "left" and numbers between 6 and 10 indicates adherence to the "right". Almost half of the population choose to represent their position at the center of the scale. Finally, those citizens who answer this question by "Don't know" form a group of politically indifferent citizens. In our regression, we do not distinguish the two latter groups.

It is often argued that attitudes towards immigration depend on an individual's personal contacts with immigrants. To account for this possibility, we use a variable measuring the share of foreigners in the population of the agglomeration where the individual lives. There is also a regional dummy variable which allows for differences in cultural and political attitudes between the German-speaking and French-speaking regions of the country.[6] In order to control for other types of heterogeneity in attitudes, we add demographic variables (age and gender) to the preference equation of the model. Note that these variables may also capture differences in belief about the decisiveness of the vote.

Participation costs include resource and time costs that each individual incurs for voting as well as for acquiring the necessary information. Information costs are an important component of participation costs and are likely to depend inversely on the level of education. The act of voting itself requires little time and effort but not all cantons send automatically the voting material to all citizens. Hence the facilitated vote by correspondence is included as a dummy variable defined at the cantonal level. In some cantons, there are also other (cantonal) objects up for vote. When citizens vote simultaneously about several objects (at the federal and cantonal levels), we can assume that voting costs for each object are reduced. An appropriate dummy accounts for this possibility.

5 Empirical results

We are interested in identifying the determinants of attitudes towards immigration, on the one hand, and in analyzing how these attitudes translate into actual political decisions, on the other hand. For this purpose, we estimate our structural model composed of equations (10) and (11), which enables us to identify the determinants of both voting preferences and participation costs. Thus our model represents an

[6]Our sample is too small to define also a dummy for the Italian-speaking minority. As the Italian-speaking part has been closer to the German-speaking part in votes on migration issues, we do not distinguish these two regions, similar to Thalmann (2004).

improvement on earlier studies of individual voting decisions such as de Melo et al. (2004), Thalmann (2004) and Miguet (2008).[7]

Our model yields two important results which will be discussed in detail in the remainder of the section. First, there is a large difference between the outcome of the vote and attitudes towards immigration restrictions. This "participation bias" amounts to 17 percentage points and can be largely attributed to the positive correlation between unobserved factors in the voting and participation cost equations. Second, the use of a structural model that accounts explicitly for the participation decision has an important influence on the results regarding immigration preferences. Simple descriptive statistics given in Table 1 show that individuals with high earnings are *more* inclined to accept immigration restrictions than those with low earnings, the opposite of our findings in the estimated structural model. Furthermore, a simple probit estimation, using only the subsample of 507 individuals who participated in the vote, leads to coefficients of human capital variables that are biased downward and are not significantly different from zero even at the 10 percent level (see Table 2).

5.1 Determinants of voting and participation behavior

Consider first the question whether skill or human capital is a significant determinant of attitudes towards immigration, as the theoretical model predicts. Table 3 gives the estimated coefficients for different specifications, the top half of the table containing the participation cost equation and the bottom half the vote equation. In all four specifications estimated on the entire sample (specifications (1) to (4)), the influence of the human capital variable on the attitude towards immigration is significant at the 1 or 5 percent level. These coefficients have the expected sign (recall that the initiative proposes to restrict immigration) and are determined in the presence of political and demographic controls. Women have less restrictive attitudes towards immigration, although this effect is only marginally significant. The linguistic region and the share of foreigners in the individual's agglomeration do not seem to have a significant impact on attitudes.[8]

[7]These studies adopt a descriptive approach in which the selection (i.e. participation choice) is taken into account in the estimation of the voting equation through a bivariate probit model with censoring. Their approach neither reflects a structural model nor can it be interpreted as a reduced form.

[8]Scheve and Slaughter (2001) use a similar variable to test the "area-analysis" model which assumes that labor markets are geographically segmented. As our results make clear, we do not find any support of this theory for the Swiss case.

Returning to the results of the full model in Table 3, it is obvious that the role of age depends on the choice of the human capital indicator. In specifications (1) and (3) where skill is measured by *Years of education*, attitudes towards immigration become less restrictive with age until the age of 53 years; beyond that age attitudes revert again to a more restrictive position. This age profile is close to an earnings profile; it is therefore not surprising to find that age has a smaller (but still significant) influence on attitudes when *Potential earnings* are used as an indicator of skills.

This result points to an identification problem: with our data it is very difficult to identify separately the influence of education, human capital and age on preferences towards immigration. It is also possible that higher education leads to greater openness and tolerance towards other cultures. Therefore, there might be two channels that lead from education to immigration preferences: the tolerance channel and the human capital or economic channel. An interesting way out of this dilemma has been suggested by Scheve and Slaughter (2001). According to the theoretical model, human capital should matter only for those who are in the labor force. Therefore it is instructive to estimate separately the model on two sub-samples: those who are in the labor force and those who are not.

If the "human capital channel" is more influential than increased tolerance due to education, then the variables *Years of education* and *Potential earnings* should have a significant influence on attitudes towards immigration only for those individuals in the labor force. We find some evidence in support of this conjecture, with lower significance levels possibly due to the smaller sample size. When we estimate specifications (3) and (4) on the sub-sample of individuals in the labor force, the coefficients of *Years of education* and *Potential earnings* are significant at the 10 resp. 5 percent level (see columns (5) and (6) in Table 3). For the remainder of the sample, we were unable to estimate the parameters of the model due to numerical problems.

Returning again to the full sample in Table 3, "right" and "left" political identities significantly influence attitudes towards immigration. The estimated coefficients reveal a strong polarization of political opinions on the immigration issue between these two groups. This result reflects a recent evolution in Swiss politics. In the 1980s, attitudes towards immigration were hardly influenced by political partisanship. With the rise of a populist right-wing party in Switzerland, the issue of migration became increasingly politicized during the 1990s. An established right-wing party, the Swiss People's party (SVP/UDC), became more radical by adopting a

program with strong national-populist elements, including a tough stance on immigration.

In order to compare our results on attitudes towards immigration with the findings of Scheve and Slaughter (2001) for the US, we address the question as to how changes in skill levels or human capital affect the probability of supporting immigration restrictions in a quantitative sense. Scheve and Slaughter (2001) evaluate the importance of skill variables by simulating the effect of the increase from the mean to the maximum observed in the sample, holding other variables constant at their sample means. According to our model, increasing *Potential earnings* from the mean (5.848) to the maximum observed in the sample (10.278) decreases the probability of being in favor of immigration restrictions by 21 percentage points. This value is in the range of the estimates obtained by Scheve and Slaughter for their variable *Occupation wage* in the US.[9]

Another interesting question is how the quantitative impact of political variables on attitudes towards immigration compares with the effect of human capital. The value found for *Potential earnings* is indeed comparable to the difference between the preferences of a centrist individual and a member of the right (the probability of being in favor of immigration restrictions is 21.8 percentage points higher) or a member of the *Left* (the probability is 16.5 percentage points lower). These figures can be found in Table 4 which reports the marginal effects of selected variables.

Before discussing the relation between voting preferences and the outcome of the vote, it is useful to examine the determinants of participation costs. The results of specifications (1) to (4) in Table 3 make clear that a higher level of education reduces significantly the costs of participation, presumably because of its impact on information costs. It has also been conjectured that higher educated citizens are better integrated in society and therefore feel a greater sense of civic duty.

Finally, the structural model enables us to address the question whether the possibility of voting by correspondence reduces the costs of participation. According to our results, the introduction of facilitated postal voting increases the probability of participating in the vote by 11.5 percentage points (see Table 4). This effect will be at the heart of the simulations in the next section where the size of the coefficient will be discussed further. The fact that other objects are up for vote in a canton increases participation rates in comparable proportions.

As the estimated value of the correlation ρ is relatively large, one might wonder

[9] In Scheve and Slaughter(2001), the estimated decrease in the probability of supporting immigration restrictions range from 8.6 percent (in 1992) to 33.7 percent (in 1994). Our value is closest to their estimate for 1996 (20.1 percent).

whether an important variable has been omitted from the model. A possible candidate is the amount of interest in politics expressed in the survey (Brady et al., 1995; Miguet, 2008). When this variable is added to the participation cost equation, ρ turns out to be non significant. However, the subjective nature of this variable makes it potentially endogenous. If we instrument it by using dummy variables capturing membership of different types of association (church, arts and crafts, trade union, employees), ρ becomes significant and even greater than our previous estimate.[10]

Descriptive evidence on some additional questions asked in the survey may give some hints about the economic mechanisms underlying the positive correlation between preferences for immigration restrictions and voting costs. There seems to be a great deal of heterogeneity concerning the beliefs whether the initiative would harm the Swiss economy, and these beliefs seem to be correlated with the voting decisions.[11] In our model, the loss of the aggregate immigration surplus is captured by the constant in the voting equation and individual heterogeneity in beliefs about this loss by the error term ϵ_i. A possible explanation of the positive correlation between ϵ_i and ξ_i could then be that there is a group of citizens — the economically and politically literate — who fear that the initiative would result in a large aggregate economic loss and who have low participation costs because of their informational advantage over other citizens.

Other interpretations that can be drawn from recent work by political scientists point in a similar direction. Kriesi (2005) observes that among conservative voters, who tend to be in favor of restrictive immigration policies, a certain number are inclined to resist any change in policies because they identify with the "status quo". As their conservative identity is in contradiction with their attachment to the "status quo", it seems reasonable to assume that their intensity of preference for voting yes is smaller than their cost of participation, leading to an abstention. A similar situation arises for another group of conservative citizens who trust the government and tend to follow its voting recommendation. As the government recommended rejection of the popular initiative, this group would be subject to similar cross-pressures as

[10] Estimation results are available from the authors upon request.

[11] Those who took part in the vote were asked whether they considered that there were *"too many foreigners in Switzerland"*. Among those who answered positively this question, only 54 percent voted in favor of the initiative (whereas among those who answered negatively, 93 percent rejected the initiative). Only a small proportion (17 percent) of individuals who thought that there were *too many foreigners in Switzerland* accepted the initiative if they also believed that the initiative would *harm the Swiss economy*. By contrast 88 percent accepted the initiative among those who thought that there were *too many foreigners in Switzerland* and that the initiative would not *harm the Swiss economy*. Unfortunately, the survey contains no information about non-participants regarding these questions.

the "status-quo" group. In our model, such asymmetry in unobserved expressive preferences gives rise to a positive correlation between preferences for immigration restrictions and voting costs.

Another source of correlation could arise from the discrepancy between the declared and true behaviors of participation and voting. If some people say they participated when they actually did not, and if we assume that these people are also ashamed to say that they voted for immigration restrictions, then the correlation between attitudes and voting costs would probably be overestimated. This is consistent with the observation that the participation rate is greater in our sample (53.2%) than in the population (43.6%) and likewise for the proportion of no-voters (71.2% versus 63.7%). However, as the two types of "dishonesty" may not necessarily be related, one should be cautious in not giving too much importance to this argument. In addition, the observed differences seem to indicate that this bias, if at all, would only be minor.

5.2 Outcome of the vote and participation bias

Does the outcome of the vote reflect underlying preferences in the population? If this is not the case, the voting process exhibits a "participation bias". We define the participation bias as the difference between the outcome of the vote and the (estimated) attitudes towards immigration restrictions in the entire population. As attitudes are not observed among non-voters, this bias can only be estimated with the help of a structural model.

In formal terms, the participation bias B is equal to the difference between the probability of being in favor of the popular initiative conditional on participation, $\Pr(v = 1|\pi = 1)$, and the marginal probability of being in favor of the popular initiative, $\Pr(v = 1)$. The participation bias measures the difference between the outcome of the vote and the result that would have been obtained if the voting and participation decisions were independent:

$$PB = \Pr(v = 1|\pi = 1) - \Pr(v = 1) = \frac{\Pr(\pi = 1, v = 1) - \Pr(v = 1)\Pr(\pi = 1)}{\Pr(\pi = 1)}$$

When evaluated at the means of the explanatory variables, these probabilities reveal a strong negative participation bias (see Table 5). Whereas 43 percent of the population are in favor of the popular initiative, the outcome of the vote is very different: only 26 percent of those who participate cast a positive vote.[12] Obviously,

[12]Interestingly, an opinion poll commissioned by Swiss television and carried out shortly before

such a large bias can only result from large differences in turnout rates between advocates and opponents of the popular initiative. The formal relation between the participation bias and the difference in turnout rates is

$$PB = \left(\frac{\Pr(\pi = 1|v = 1) - \Pr(\pi = 1|v = 0)}{\Pr(\pi = 1|v = 1)} \right) \Pr(v = 0) \Pr(v = 1|\pi = 1)$$

and the numbers in Table 5 confirm that there is a huge difference in participation probabilities between the two sides.

What is the source of this difference in turnout rates? To answer this question, it is instructive to decompose the participation bias into two components, isolating thereby the influence of the correlation ρ between unobserved factors in the voting preference equation and unobserved factors in the participation cost equation. This decomposition is defined as follows:

$$PB = \underbrace{\Pr(v = 1|\pi = 1; \rho) - \Pr(v = 1|\pi = 1; 0)}_{\text{bias due to correlation}} + \underbrace{\Pr(v = 1|\pi = 1; 0) - \Pr(v = 1)}_{\text{bias due to other factors}}$$

As the result of the decomposition in Table 5 makes clear,[13] almost the entire participation bias is due to the correlation between unobserved factors in the two equations. In economic terms, this correlation can be interpreted as follows. Individuals who are in favor of restrictions to immigration for reasons not taken into account by the variables of the model also tend to have high participation costs.

Further insights can be gained by calculating predicted probabilities of participation for every individual in the sample. In Figure 1 (c), these predicted probabilities are plotted against predicted probabilities of voting yes. Among supporters of the initiative, the predicted probability of participation is obviously much more dispersed (and in general smaller) than among opponents.

The source of this dispersion can be found by decomposing the predicted probability of participation into a sum of the probability of participating and voting yes, and the probability of participating and voting no. These two predicted probabilities are depicted in panels (a) and (b) of Figure 1. As these predicted probabilities are shown for given probabilities of voting in favor of the initiative, vertical dis-

the vote in July 2000 came to the conclusion that almost half of Swiss voters were in favor of the popular initiative: 40% of respondents were in favor of the popular initiative, 42% against and 17% did not have an opinion (See the newspaper article "Un sondage sur l'initiative des 18% secoue ses opposants", *Le Temps*, 17 July 2000.)

[13]The probability $\Pr(v = 1|\pi = 1; 0)$ is computed using equations (14) and (15) and setting $\rho = 0$.

persion can only be explained by heterogeneous participation costs. There is little dispersion in the predicted probability of participating and voting no, whereas the predicted probability of participating and voting yes is highly dispersed among supporters of the initiative.[14] A positive correlation ρ between unobserved factors acts as an amplifier of observed heterogeneity in participation costs with respect to the probability of participating and voting yes (see equation (14)). It has the opposite impact on the probability of participating and voting no (see equation (15)) which explains the asymmetry of dispersion in Figure 1 (c).

6 Simulations

In this section, we use the structural model to simulate changes in participation costs and investigate their impact on the outcome of the vote and the participation bias. First, we explore the impact of a generalization of facilitated postal voting to all Swiss cantons. This will reduce participation costs for those Swiss citizens who live in cantons where facilitated voting by correspondence did not exist in the year 2000. Second, we simulate the introduction of e-voting in all cantons by reducing the cost of voting for all citizens in the sample by half of the postal vote cost. Both simulations are compared to a base case which is given by the predicted probabilities of specification (4) of the model. We find that facilitated postal voting for all cantons will increase the participation rate by two percentage points and the percentage of yes-votes by 1.1 percentage points. The introduction of e-voting yields similar results with slightly higher percentage differences.

In the year 2000, the material necessary for voting by correspondence was automatically sent (without preliminary request) to all Swiss citizens in all but five cantons. It is this automatic procedure and not the mere possibility of a postal vote, that seems to raise participation rates (Luechinger et al., 2007). At first sight, this is confirmed in our sample where the average probability of participation was lower in the five cantons without facilitated postal voting (42.6 percent) than in the other cantons (56.4 percent). It is interesting to note that the probability of accepting the initiative was also smaller in these cantons (21.8 percent vs. 29.6 percent).[15]

[14] As the predicted probability of participating and voting no is always smaller than the predicted probability of voting no, all points in panel (a) of Figure 1 lie below a straight line relating the points (0,1) and (1,0). For similar reasons, in panel (b) all points lie below a straight line going through the origin with slope 1.

[15] See *Base case* in Table 6. Note that these numbers are the average *predicted* probabilities by the model for the two subsets of cantons. These predictions are close to the *observed* turnout and voting patterns in our sample: in the five cantons, participation was 41.0 percent (vs. 56.7 percent

In the first simulation, we assume that facilitated postal voting (FPV) is also introduced in the remaining five cantons, thus reducing participation costs for citizens residing in these cantons (about 22 percent of individuals in our sample). The extent of the decrease in participation costs is determined by the estimated coefficient of postal voting (model (4), Table 3), according to which the introduction of facilitated postal voting is equivalent to an increase in education by almost two years. As a result, the introduction of facilitated postal voting increases the probability of participation in the five affected cantons by 10 percentage points (see Table 6, last column). Although this estimate, which is obtained from a single vote, might seem large, it is not in contradiction with other estimates using time-series data.[16]

The overall participation rate at the national level increases from 53.3 to 55.6 percent (see Table 6) and the outcome of the vote is slightly changed: the probability of voting yes increases by 1.1 percentage points, reducing the participation bias by the same amount. Figure 2(a) illustrates the link between these results: voters who tend to be in favor of the popular initiative see their participation probability increase more than those who are against immigration restrictions.[17]

In a second step, we simulate the introduction of e-voting in all Swiss cantons. Here we cannot rely on structural estimates of past behavior because only a very limited number of internet votes have been carried out in a few Swiss municipalities on an experimental basis. However, there is some preliminary descriptive evidence that e-voting might increase participation rates. In a survey carried out after an experimental internet vote in four municipalities in the canton of Geneva, Christin and Trechsel (2005) find that occasional voters seem to use the internet voting facility more frequently than others. In the model, we assume, somewhat arbitrarily, that the reduction in participation costs induced by the introduction of e-voting amounts to half of the cost reduction that is obtained by postal voting and that that it affects

in the other cantons) and the share of voters accepting the initiative was 25.5 percent (vs. 29.5 percent).

[16]Luechinger et al. (2007) use aggregate data at the cantonal data over the period 1970 to 2005 and estimate that facilitated postal voting increases participation rates in Switzerland by 4.1 percentage points. Our own preliminary estimates using individual data from 1981 to 2006 yield an increase in participation rates by 4.7 percentage points. Moreover, the French-speaking cantons (which introduced postal voting later) react more strongly to the introduction of postal voting: participation rates increase by 8.5 percentage points. Closer to our setting, if we only consider cantons which introduced facilitated postal voting after the year 2000, participation increased by 7.7 percentage points (detailed results are available upon request).

[17]In Figure 2(a), the vertical axis represents the difference in the probability of participation between the counterfactual (introduction of facilitated postal vote) and the base case. Individuals who reside in cantons where there is no change in voting conditions are represented by points on the horizontal axis.

all citizens equally.[18]

According to our simulation (EV+FPV), the introduction of e-voting increases participation by more than 5 percentage points (compared to the case with postal voting). Again, those who are in favor of immigration restrictions tend to increase their probability of participation more than their opponents (see Figure 2(b)) and the probability of a yes-vote increases by more than 2 percentage points, reducing the participation bias by the same amount. Overall, facilitated postal voting and e-voting decrease the participation bias by more than 3 percentage points but the outcome of the vote (31 percent yes) still remains quite far from the underlying preferences in the general population (43 percent in favor of the initiative).

The Geneva experiment with e-voting seems to indicate that e-voters are younger than those who use other means of voting (Christin and Trechsel, 2005). To check whether age plays an important role in the voting process as represented by our model, we look at the (simulated) behavior of the young and the old by splitting population into two equally sized groups (median age is 46 years). In both groups, the probability of participation increases by more than 5 percentage points. However, the conditional probability to vote yes increases slightly more for the younger half of the population (2.4 percentage points vs. 1.9 percentage points for the old). The reason for this difference probably lies in the lower initial participation probability of the young (45 percent vs. 62 percent for the old) and cannot be attributed to different underlying preferences (the marginal probability of being in favor of the initiative is 43.8 percent for the young and 42.5 percent for the old). These results seem to indicate that e-voting might diminish the participation bias even further because it favors participation by young voters who are currently underrepresented among voters.

7 Conclusions

In this paper, we analyze the determination of immigration policy in a direct democracy by formulating and estimating a model of participation and voting behavior. The model is used to uncover determinants of attitudes towards immigration, on the one hand, and to analyze the link between attitudes and political outcome, on the other. We account for instrumental and expressive motivations for voting by introducing political identity into the model.

[18] We assume (realistically) that e-voting is introduced only when all cantons have adopted facilitated postal voting.

The direct democracy in Switzerland provides an institutional context that avoids the hypothetical bias which hampers the analysis of opinion polls. According to our estimations, human capital is an important determinant of attitudes towards immigration. This result is confirmed by the fact that education is only significant in the subsample of individuals in the labor force, which tends to exclude the possibility that our education variable captures other influences such as openness and tolerance towards other cultures.

Our results show that Chiswick and Hatton's (2003) observation (as to the discrepancy between immigration policies and popular demands for tighter immigration control) also applies in the direct democracy case where the link between individual attitudes and political outcome is much more direct than in a representative democracy. In the particular vote that we analyze in this paper, there seems to have been a weak mobilization of citizens in favor of immigration restrictions and a relatively strong mobilization of individuals opposed to such restrictions. Our model, and the available data, do not allow to identify the factors that were responsible for this participation bias since it is mainly explained by the positive correlation between the error terms in the voting and participation cost equations. Simulation experiments generalizing postal voting (and introducing e-voting) show that the resulting increase in participation would lead to a slight increase in the percentage of yes-votes without changing the outcome of the vote.

Before broader policy conclusions can be drawn from our results, future work should address the question whether the participation bias occurs in other votes on migration issues in Switzerland. One should also be cautious before generalizing our findings to other countries since Switzerland differs from other European countries in several respects.[19] First, most immigrants to Switzerland have European origins (there was a large immigration flow from ex-Yougoslavia during the 1990s preceding our vote) and therefore cultural and religious differences were less of an issue than in other European destination countries. Second, the Swiss naturalization law was (and is) among the most restrictive in Europe (an immigrant must have lived for at least 12 years in Switzerland and be well integrated into Swiss society) resulting in comparatively low naturalization rates in the 1990s. Swiss voters might therefore

[19]To our knowledge, the only study that is related to this question is Facchini and Mayda (2008). Using international data on attitudes towards immigration, they find that those individuals who gain from immigration are the least likely to provide their opinion on migration policy. They interpret this result as confirming the idea that "those who lose are more vocal". It is not clear whether their result contradicts our finding on the participation bias (in our case, those who would lose from immigration restrictions have the highest participation rates) and providing an answer in an opinion survey cannot be compared with voting in a direct democracy.

be less concerned about immigrants becoming future citizens than voters in other countries where individual preferences about immigration should take into account the consequences of current decisions on the composition of the future electorate (Ortega, 2005). Third, the direct democratic process analyzed in our paper differs from the political process in representative democracies. It would be interesting to address the question whether the link between individual attitudes and the political outcome differs in the two political systems.

Appendix

Identification of the econometric model

Our likelihood function involves the following expressions:

$$\Phi_2\left(\alpha' x_i, \frac{\alpha' x_i - \gamma' z_i}{\sqrt{1+\lambda^2-2\lambda\rho}}, \frac{1-\lambda\rho}{\sqrt{1+\lambda^2-2\lambda\rho}}\right)$$

and

$$\Phi_2\left(-\alpha' x_i, \frac{-\alpha' x_i - \gamma' z_i}{\sqrt{1+\lambda^2+2\lambda\rho}}, \frac{1+\lambda\rho}{\sqrt{1+\lambda^2+2\lambda\rho}}\right)$$

where Φ_2 denotes a standard bivariate normal cumulative distribution function.

Let us assume, without loss of generality, that there are two variables in x and two in z but they both have one variable that is not in the other. We will later see that we only need a variable in x that is not in z for identification. Incorporating this in the above expressions, calling the common variable x_1 and omitting the subscript i, we get

$$\Phi_2\left(\alpha_1' x_1 + \alpha_2' x_2, \frac{\alpha_1' x_1 + \alpha_2' x_2 - \gamma_1' x_1 - \gamma_2' z_2}{\sqrt{1+\lambda^2-2\lambda\rho}}, \frac{1-\lambda\rho}{\sqrt{1+\lambda^2-2\lambda\rho}}\right)$$

and

$$\Phi_2\left(-\alpha_1' x_1 - \alpha_2' x_2, \frac{-\alpha_1' x_1 - \alpha_2' x_2 - \gamma_1' x_1 - \gamma_2' z_2}{\sqrt{1+\lambda^2+2\lambda\rho}}, \frac{1+\lambda\rho}{\sqrt{1+\lambda^2+2\lambda\rho}}\right)$$

Thus the following functions of parameters are directly identified:

$$\alpha_1, \quad \alpha_2$$

$$\theta_1 = \frac{\alpha_1 - \gamma_1}{\sqrt{1+\lambda^2-2\lambda\rho}}, \qquad \theta_2 = \frac{\alpha_2}{\sqrt{1+\lambda^2-2\lambda\rho}}, \qquad \theta_3 = \frac{\gamma_2}{\sqrt{1+\lambda^2-2\lambda\rho}}$$

$$\delta_1 = \frac{-\alpha_1 - \gamma_1}{\sqrt{1+\lambda^2+2\lambda\rho}}, \qquad \delta_2 = \frac{\alpha_2}{\sqrt{1+\lambda^2+2\lambda\rho}}, \qquad \delta_3 = \frac{\gamma_2}{\sqrt{1+\lambda^2+2\lambda\rho}}$$

$$r_1 = \frac{1-\lambda\rho}{\sqrt{1+\lambda^2-2\lambda\rho}}, \qquad r_2 = \frac{1+\lambda\rho}{\sqrt{1+\lambda^2+2\lambda\rho}}$$

Further, let us denote $a = \sqrt{1+\lambda^2-2\lambda\rho}$; $\qquad b = \sqrt{1+\lambda^2+2\lambda\rho}$.

The solution for the structural parameters can be found as follows. First

$$a = \frac{\alpha_2}{\theta_2}; \qquad b = \frac{\alpha_2}{\delta_2}; \qquad \gamma_2 = a\theta_3 = b\delta_3.$$

Then we have the system for α_1 and γ_1:

$$\alpha_1 - \gamma_1 = a\theta_1 \qquad \text{and} \qquad -\alpha_1 - \gamma_1 = b\delta_1$$

This gives the following solution:

$$\gamma_1 = -\frac{a\theta_1 + b\delta_1}{2}; \qquad \alpha_1 = a\theta_1 + \gamma_1.$$

Finally for λ and ρ we have :

$$\lambda^2 = \frac{a^2+b^2-2}{2} \qquad \text{and} \qquad \rho = \frac{b^2-a^2}{4\lambda},$$

with $a^2 + b^2 > 2$ which is satisfied.

Two final points. First, the existence of α_2 (x_2) is crucial to identify a and b which in turn identifies λ and ρ. Second, though γ_2 is obtained from a and δ_2, it is not used elsewhere in the derivation, hence we see that z_2 is not required for identification.

References

Akerlof, G. and R.E. Kranton (2000), Economics and Identity, *Quarterly Journal of Economics* 115(3), 715–753.

Brady, H.E., S. Verba, K. Lehman Schlozman (1995), Beyond SES: A Resource Model of Political Participation, *American Political Science Review* 89(2), 271–294.

Chiswick, B.R. and T.J. Hatton (2003), International Migration and the Integration of Labor Markets, In: M. Bordo, A. Taylor and J. Williamson (eds.) *Globalization in Historical Perspective,* Cambridge: National Bureau of Economic Research, 65–119.

Christin T. and A. Trechsel (2005), Analysis of the 26th September 2004 ballot as held in four Geneva municipalities, State of Geneva, available at `www.ge.ch/evoting/english/doc/rapports/rapport_26sept_english_final.pdf`.

Coate S., and M. Conlin (2004), A Group Rule-Utilitarian Approach to Voter Turnout: Theory and Evidence, *American Economic Review* 94 (5), 1476–1504

Coate S., M. Conlin and A. Moro (2008), The Performance of the Pivotal-Voter Model in Small-Scale Elections: Evidence from Texas Liquor Referenda, *Journal of Public Economics*, 92 (3-4), 582–596.

Dhillon, A. and S. Peralta (2002) Economic theories of voter turnout, *Economic Journal* 112, F332-F352.

Facchini, G. and A.M. Mayda (2008), From individual attitudes towards migrants to migration policy outcomes: Theory and evidence, *Economic Policy* 56, 651–713.

Facchini, G. and A.M. Mayda (2009), Does the welfare state affect individual attitudes toward immigrants? Evidence across countries, *Review of Economics and Statistics* 91(2), 295-314.

Facchini, G., A.M. Mayda and P. Mishra (2007), Do interest group affect immigration?, IZA Discussion paper no. 3183.

Facchini, G. and G. Willmann (2005), The political economy of international factor mobility, *Journal of International Economics* 67, 201-219.

Feddersen, T. (2004), Rational Choice Theory and the Paradox of Not Voting, *Journal of Economic Perspectives* 18(1), 99-112.

Feddersen, T., S. Gailmard and A. Sandroni (2009), Moral Bias in Large Elections: Theory and Experimental Evidence, *American Political Science Review* 103(2), 175–192.

Fischer, A.J. (1999), The probability of being decisive, *Public Choice* 101, 267–283.

Fiorina, M.P. (1976), The voting decision: instrumental and expressive aspects, *Journal of Politics* 38, 390-413.

Freeman, G.P. (1992), Migration Policy and Politics in the Receiving States, *International Migration Review* 26(4), 1144–1167.

Gronau, R. (1973), "The Effect of Children on the Housewife's Value of Time", *Journal of Political Economy*, 81, 168-199.

Hanson, G.H., K.F. Scheve and M.J. Slaughter (2007), Local public finance and individual preferences over globalization strategies, *Economics and Politics* 19, 1–33.

Joppke, C. (1998), Why Liberal States Accept Unwanted Immigration, *World Politics* 50(2), 266–293.

Kriesi, H. (2005), *Direct-Democratic Choice. The Swiss Experience,* Lexington, Lanham (MD).

Luechinger, S., M. Rosinger and A. Stutzer (2007), The Impact of Postal Voting on Participation, Evidence for Switzerland. *Swiss Political Science Review* 13(2), 167-202.

Mayda, A.M. (2006), Who is Against Immigration? A Cross-Country Investigation of Individual Attitudes towards Immigrants, *Review of Economics and Statistics* 88(3), 510–530.

de Melo, J., F. Miguet and T. Müller (2004), The Political Economy of Migration and EU Enlargement: Lessons from Switzerland. In: H. Berger and T. Moutos, *Managing European Union Enlargement*, MIT Press.

Miguet, F. (2008), Voting about immigration policy: What does the Swiss experience tell us? *European Journal of Political Economy* 24(3), 628–641.

Nelson, F.D. (1977), "Censored Regression Models with Unobserved Stochastic Censoring Threshold", *Journal of Econometrics*, 6, 309-327.

O'Rourke, K.H. and R. Sinnott (2005), The determinants of individual attitudes towards immigration, *European Journal of Political Economy*, forthcoming.

Ortega, F. (2005), Immigration quotas and skill upgrading, *Journal of Public Economics* 89, 1841-1863.

Rodrik, D. (1995), Political economy of trade policy, In: G. Grossman and K. Rogoff (eds.), *Handbook of International Economics*, Vol. 3. Elsevier, Amsterdam, 1457-1494.

Scheve K. and M. Slaughter (2001), Labor-market competition and individual preferences over immigration policy, *Review of Economics and Statistics* 83(1), 133–145.

Shachar, R. (2009), The Political Participation Puzzle and Marketing, *Journal of Marketing Research* 46(6), 798–815.

Shachar, R. and B. Nalebuff (1999), Follow the Leader: Theory and Evidence on Political Participation, *American Economic Review* 89(3), 525–547.

Thalmann, P. (2004), The Public Acceptance of Green Taxes: 2 Million Voters Express Their Opinion, *Public Choice* 119 (1-2), 179–217.

Table 1: Summary statistics[a]

Variable		Mean	Standard deviation
Vote		0.288	
Politics:	*- left*	*0.098*	
	- center / indifferent	*0.270*	
	- right	*0.508*	
Earnings:	*- low*	*0.250*	
	- high	*0.309*	
Participation		0.532	
Politics:	*- left*	*0.616*	
	- center / indifferent	*0.451*	
	- right	*0.696*	
Earnings:	*- low*	*0.377*	
	- high	*0.687*	
Education (years)		12.488	2.128
Potential earnings		5.848	1.570
Political: right		0.190	
Political: left		0.208	
Facilitated postal vote		0.778	
Vote at the Canton level		0.780	
Share foreigners in agglomeration		0.196	0.066
French part		0.228	
Age		47.805	17.522
Female		0.498	

[a] There are 953 observations for all variables except the Vote (507 observations). Standard deviations are only given for continuous variables. Earnings are classified as “low” if they are below the median.

Table 2: Simple probit estimation results for the popular initiative in 2000 [a]
(Dependent variable: voting preferences[b])

Model	(1)	(2)	(3)	(4)	(5)	(6)
	Voting preferences					
Education (years)	-0.040		-0.039		-0.029	
	(0.031)		(0.031)		(0.029)	
Potential earnings		-0.086		-0.086		-0.063
		(0.054)		(0.054)		(0.052)
Share foreigners in agglom.	-0.975	-0.949	-0.710	-0.652	-0.497	-0.454
	(1.026)	(1.026)	(1.109)	(1.112)	(1.071)	(1.074)
Political: right	0.620***	0.624***	0.616***	0.620***		
	(0.143)	(0.143)	(0.143)	(0.143)		
Political: left	-0.652***	-0.654***	-0.646***	-0.648***		
	(0.183)	(0.183)	(0.183)	(0.183)		
French part			-0.113	-0.125	-0.204	-0.212
			(0.176)	(0.176)	(0.172)	(0.171)
Age	-0.063***	-0.042*	-0.063***	-0.042*	-0.053**	-0.038
	(0.022)	(0.025)	(0.022)	(0.025)	(0.021)	(0.024)
Age2/1000	0.651***	0.496**	0.652***	0.496**	0.595***	0.479**
	(0.213)	(0.231)	(0.213)	(0.232)	(0.205)	(0.224)
Female	-0.304**	-0.317**	-0.297**	-0.310**	-0.362***	-0.372***
	(0.133)	(0.134)	(0.134)	(0.134)	(0.127)	(0.128)
Constant	1.541**	0.952	1.501**	0.920	1.097	0.672
	(0.726)	(0.591)	(0.729)	(0.593)	(0.684)	(0.557)
Log_likelihood	-268.883	-268.471	-268.674	-268.218	-291.879	-291.595

[a] Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, N = 507.

[b] The binary variable of the probit equation is coded as follows: yes for immigration restrictions =1, no =0.

Table 3: Structural model estimation results for the popular initiative in 2000

Specification	(1)	(2)	(3)	(4)	(5)	(6)
	All individuals				In the labor force	
Participation costs						
Education (years)	-0.134***	-0.126***	-0.136***	-0.127***	-0.174***	-0.173***
	(0.030)	(0.030)	(0.031)	(0.032)	(0.050)	(0.050)
Facilitated postal vote	-0.316**	-0.297**	-0.272**	-0.248*	-0.325*	-0.300*
	(0.124)	(0.126)	(0.134)	(0.138)	(0.184)	(0.180)
Additional vote at cantonal level	-0.269***	-0.263***	-0.264**	-0.255**	-0.370**	-0.357**
	(0.103)	(0.100)	(0.103)	(0.101)	(0.163)	(0.158)
French part			0.086	0.087	0.168	0.174
			(0.105)	(0.099)	(0.167)	(0.164)
Age	-0.062***	-0.059***	-0.062***	-0.058***	-0.097***	-0.100***
	(0.016)	(0.015)	(0.017)	(0.016)	(0.037)	(0.037)
Age2/1000	0.474***	0.449***	0.470***	0.443***	0.840**	0.883**
	(0.153)	(0.142)	(0.157)	(0.145)	(0.410)	(0.412)
Female	0.108	0.103	0.108	0.100	0.108	0.095
	(0.093)	(0.090)	(0.094)	(0.092)	(0.127)	(0.126)
Constant	4.471***	4.266***	4.426***	4.196***	5.763***	5.745***
	(0.734)	(0.756)	(0.771)	(0.818)	(1.301)	(1.283)
Voting preferences						
Education (years)	-0.066**		-0.066**		-0.071*	
	(0.028)		(0.028)		(0.038)	
Potential earnings		-0.121***		-0.122***		-0.163**
		(0.046)		(0.047)		(0.075)
Share of foreigners in agglomer.	-0.417	-0.403	-0.331	-0.271	-0.918	-0.742
	(0.682)	(0.668)	(0.744)	(0.730)	(0.952)	(0.940)
Political: right	0.560***	0.560***	0.555***	0.554***	0.645***	0.635***
	(0.093)	(0.092)	(0.093)	(0.093)	(0.129)	(0.131)
Political: left	-0.456**	-0.451**	-0.448**	-0.437**	-0.550**	-0.505**
	(0.210)	(0.204)	(0.217)	(0.214)	(0.223)	(0.243)
French part			-0.024	-0.038	0.091	0.089
			(0.112)	(0.110)	(0.151)	(0.150)
Age	-0.066***	-0.035*	-0.066***	-0.034*	-0.118***	-0.080**
	(0.015)	(0.018)	(0.015)	(0.018)	(0.033)	(0.035)
Age2/1000	0.618***	0.382**	0.618***	0.380**	1.221***	0.943**
	(0.146)	(0.164)	(0.147)	(0.165)	(0.382)	(0.384)
Female	-0.151	-0.152*	-0.151	-0.153*	-0.161	-0.165
	(0.093)	(0.092)	(0.093)	(0.092)	(0.119)	(0.119)
Constant	2.328***	1.327***	2.311***	1.315***	3.542***	2.515***
	(0.582)	(0.370)	(0.593)	(0.372)	(0.911)	(0.678)
Rho	0.623***	0.632***	0.624**	0.643**	0.613***	0.666***
	(0.233)	(0.234)	(0.244)	(0.250)	(0.210)	(0.205)
Lambda	0.705***	0.645***	0.707***	0.640***	0.939***	0.933***
	(0.155)	(0.167)	(0.167)	(0.186)	(0.221)	(0.235)
Number of observations	953	953	953	953	600	600
Log likelihood	-854.199	-853.987	-853.730	-853.387	-526.167	-525.328

Notes: Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Marginal effects of selected variables [a]

	$\Pr(v=1)$	$\Pr(v=1 \mid \pi=1)$	$\Pr(\pi=1, v=1)$	$\Pr(\pi=1, v=0)$	$\Pr(\pi=1)$
Marginal effects of variables in voting equation (x)					
Potential earnings	-0.048	-0.065	-0.033	0.032	-0.001
Political: right	0.218	0.323	0.187	-0.141	0.047
Political: left	-0.165	-0.197	-0.098	0.116	0.019
Female	-0.060	-0.081	-0.041	0.040	-0.001
Marginal effects of variables in participation cost equation (z)					
Education (years)		0.031	0.031	0.030	0.061
Postal vote		0.061	0.056	0.059	0.115
Cantonal vote		0.062	0.057	0.060	0.117
Female		-0.024	-0.024	-0.024	-0.048

[a] Marginal effects are calculated using model (4). For a continuous variable, we report the marginal effect. For a dummy variable, we report the impact of a change in its value from 0 to 1. All other variables are evaluated at their sample means.

Table 5: Participation bias

Participation bias and its elements		
Participation bias	$\Pr(v=1 \mid \pi=1) - \Pr(v=1)$	-0.171
Voting preferences	$\Pr(v=1)$	0.427
Outcome of the vote	$\Pr(v=1 \mid \pi=1)$	0.256
Probabilities of participation by group of voters		
Participation among yes-voters	$\Pr(\pi=1 \mid v=1)$	0.301
Participation among no-voters	$\Pr(\pi=1 \mid v=0)$	0.653
Role of correlation		
- Bias due to correlation	$\Pr(v=1 \mid \pi=1) - \Pr(v=1 \mid \pi=1;0)$	-0.146
- Bias due to other factors	$\Pr(v=1 \mid \pi=1;0) - \Pr(v=1)$	-0.025

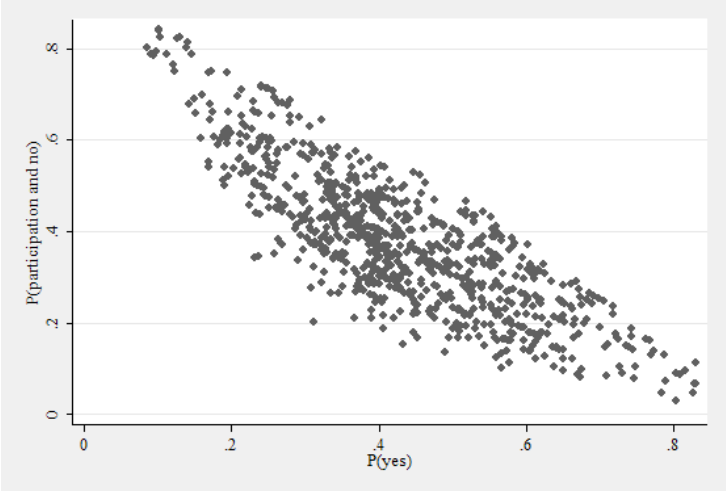
Note: All probabilities are calculated on the basis of model (4) using sample averages. Details of the decompositions are given in the text. The probability $\Pr(v=1 \mid \pi=1; 0)$ is computed using equations (14) and (15) and setting $\rho = 0$.

Table 6: Simulation results [a]

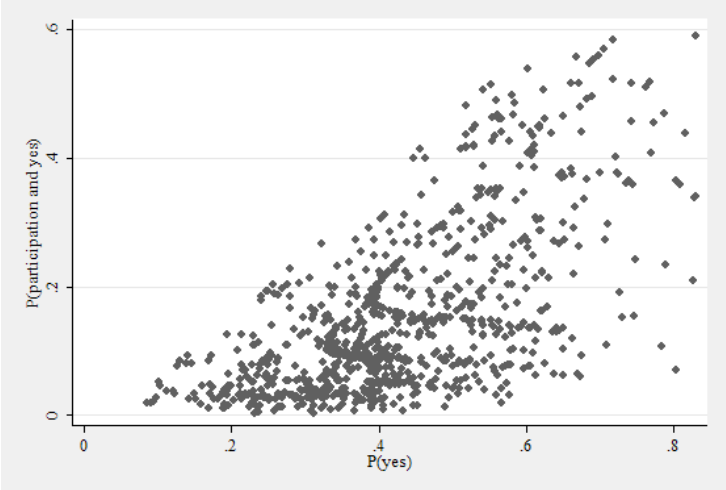
	All cantons	Cantons with postal vote [b]	Cantons without postal vote [b]
Participation rate: $\Pr(\pi = 1)$			
Base case (B)	0.533	0.564	0.426
Facilitated postal voting in all cantons (FPV)	0.556	0.564	0.528
E-voting and facilitated postal voting (EV+FPV)	0.609	0.617	0.582
Outcome of the vote: $\Pr(v = 1 \mid \pi = 1)$			
Base case	0.278	0.296	0.218
Facilitated postal voting in all cantons	0.289	0.296	0.264
E-voting and facilitated postal voting	0.310	0.317	0.287
Underlying preferences: $\Pr(v = 1)$			
Voting preferences	0.431	0.435	0.418
Participation bias: $\Pr(v = 1 \mid \pi = 1) - \Pr(v = 1)$			
Base case	-0.153	-0.139	-0.200
Facilitated postal voting in all cantons	-0.143	-0.139	-0.154
E-voting and facilitated postal voting	-0.121	-0.118	-0.132

[a] All probabilities are calculated on the basis of model (4) using averages of individual predicted probabilities.

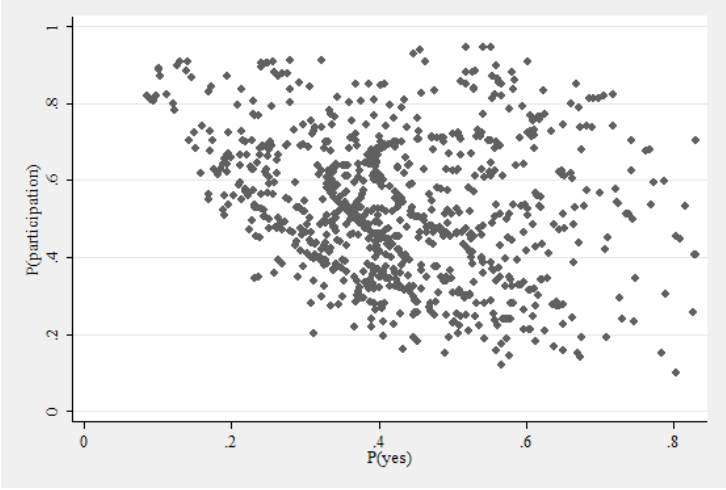
[b] Cantons *without* the possibility of facilitated postal voting in 2000 are Schwyz, Neuchâtel, Vaud, Valais and Ticino. Of our sample, 212 individuals live in these five cantons and 741 in the other cantons.



(a) Probability of participating and voting no

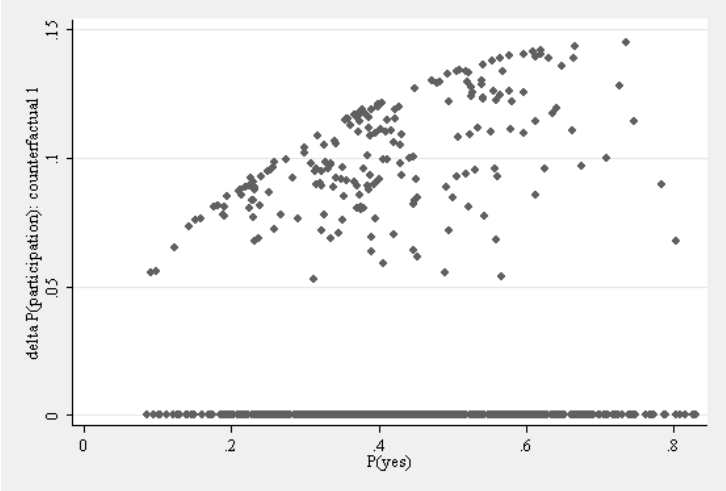


(b) Probability of participating and voting yes

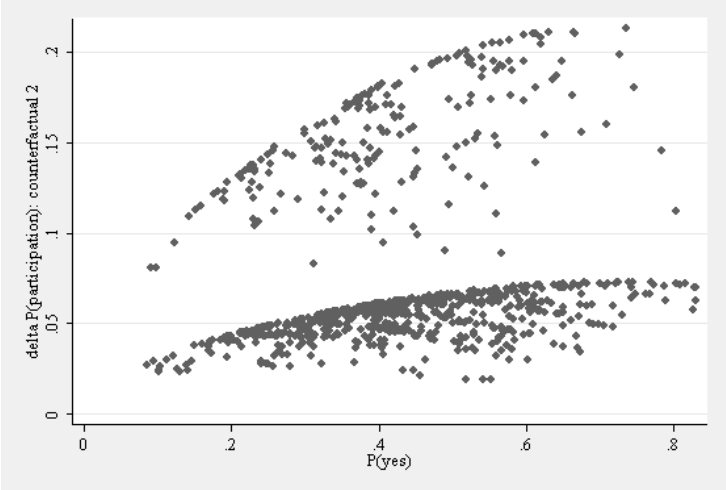


(c) Probability of participating

Figure 1: Probability of participation and probability of being in favor of immigration restrictions



(a) Facilitated postal voting in all cantons



(b) E-voting

Figure 2: Immigration preferences and change in participation probability: the effect of generalized postal voting and e-voting