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Participation and voting behavior
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Abstract

In this paper, we analyze the political economy of immigration policy in a direct democracy setting. We formulate a structural 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 political outcomes. The results reveal a substantial gap (“participation bias”) between attitudes towards immigration in the general population and the outcome of the vote.

JEL codes: F22, D72, J61.

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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 structural 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. We will discuss these aspects in turn.

Let us first consider the problem of identifying attitudes towards immigration. The use of individual survey data on voting behavior allows us to connect two existing strands of literature and to overcome some of the weaknesses inherent in each of these approaches. The first approach (Goldin, 1994; Timmer and Williamson, 1998) focuses on political outcomes and tries to draw conclusions on attitudes towards im-

migration.¹ This approach is not unproblematic since the link between preferences towards immigration and policy outcomes depends on the institutional context and the mapping from attitudes to outcomes might not be unambiguous (Scheve and Slaughter, 2001). This difficulty is not present in our model, since the link between preferences and the outcome of the vote is explicitly modeled.

The second approach in the literature ignores the institutional context and focuses on individual attitudes by analyzing individual opinion polls.² The ambiguities inherent in the first approach are thereby avoided but another problem arises: opinion polls 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.³

A vote on a popular initiative or a referendum in Switzerland 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.⁴ Therefore, citizens are aware that the collective decision will have actual consequences. Second, the political discussion preceding a vote enables individuals to take a more informed decision on the issue up for vote than is the case when answering an opinion poll. Cognitive problems caused by question wording and framing are therefore less likely to occur in the voting context. Moreover, uninformed individuals are less likely to participate in a vote because of the associated costs. In the context of an opinion poll, the same individuals may be reluctant to admit a lack of attitude or may make little mental effort in answering the questions (Bertrand

¹For example, Goldin (1994) analyzes the historical move towards immigration restrictions in the US between 1890 and 1923 (in particular, the repeated tentative to introduce a literacy test for immigrants) by assuming that Senators and Representatives defend policies that represent the views of their local constituents.

²Scheve and Slaughter (2001) use data from different waves of the National Election Studies (NES) surveys in the U.S. whereas Mayda (2005) and O’Rourke and Sinnott (2005) use the 1995 International Social Survey Programme (ISSP). All these authors rely in their analysis on questions asking whether the number of immigrants in the country should be reduced, remain the same or should be increased. Other studies on attitudes to immigration are Citrin et al. (1997) and Espenshade and Hempstead (1996). See also Hanson et al. (2005) and Facchini and Mayda (2006) who analyze the role of the welfare state in the formation of preferences towards immigration.

³Cummings et al. (1995) and Cummings et al. (1997) provide experimental evidence on hypothetical bias in the context of contingent valuation methods. Cummings et al. (1995) test (and reject) the hypothesis that hypothetical surveys are incentive-compatible in the context of dichotomous choice involving private goods. Cummings et al. (1997) arrive at a similar conclusion for hypothetical referenda using majority rule.

⁴In 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 (50,000 signatures before 1977). A second important direct-democracy instrument is the referendum: Laws or Federal orders voted by the Parliament are put to vote if a group obtains 50,000 signatures. Again, the decision is binding for the government.

and Mullainathan, 2001).⁵

Despite the different approaches, our results concerning individual preferences towards immigration confirm the main findings of Scheve and Slaughter (2001), Mayda (2005) and O'Rourke and Sinnott (2005). Indicators of human capital appear to have a significant influence on individual attitudes towards immigration, as predicted by standard economic models. Non-economic factors, in particular political ideology, also play an important role. Interestingly, a simple probit regression on the sample of individuals who expressed their vote does not reveal a significant influence of human capital variables on attitudes towards immigration. Only the joint estimation of the full model uncovers such a relationship.

Let us now turn to the problem of the link between preferences and political outcomes. By modeling a single vote on immigration restrictions, we do not claim to represent the entire political process leading to the formation of immigration policy in Switzerland. In particular, the roles of the Swiss government, Parliament and pressure groups is neglected in our analysis. It should nevertheless be emphasized that the evolution of immigration policy over the last 40 years has been decisively influenced by popular votes (Pigué and Mahnig, 2000; de Melo et al., 2004; Miguet, 2007). In certain circumstances, government decisions even anticipate the outcome of a popular vote. In order to prevent a popular initiative from being accepted, it is common that the government takes decisions in advance that fulfill some of the initiative's demands.⁶

How should the voting and participation decisions be modeled in view of the Chiswick-Hatton puzzle? As the huge literature on the "voting paradox" attests, there is no generally accepted theory of voting.⁷ On the one hand, there are instrumental theories which 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. As the probability of casting the decisive vote is extremely small in large electorates, there is a general consensus that these theories are unable to explain the observed turnout rates.

⁵Surveys on elections or votes, such as the one we use in this paper, are not entirely exempt from this kind of problems. According to Bertrand and Mullainathan (2001), voter participation is overreported because respondents want to avoid looking bad in the eyes of the interviewer. For our purposes, this seems however a minor problem compared to the weaknesses inherent in the results of opinion polls.

⁶An example of such a procedure is the introduction of immigration quotas in the early 1970s, when a xenophobic popular initiative was up for vote.

⁷For recent surveys of this literature, see Aldrich (1993), Blais (2000), Dhillon and Peralta (2002), Mueller (2003) and Dowding (2005).

Empirical studies suggest nevertheless that instrumental motivations matter at the margin. Turnout is higher if the expected outcome is close or if there is more at stake in the vote (Blais, 2000; Dowding, 2005). For empirical purposes, it is therefore useful to combine the instrumental approach with other explanations of voting behavior. Recent research suggests that group-based explanations or theories based on expressive motivations provide better explanations of observed turnout (Coate and Conlin, 2004; Coate et al., 2004).

We account for these expressive and group-based motivations by introducing social identity or self-image. According to Akerlof and Kranton (2000), individuals take identity-related payoffs into account in many situations. Their approach is useful in our context since identity considerations can be expected to play an important role in the act of voting. The role of identity is prominent in the expressive account of voting. Brennan and Hamlin (1998) compare voting to cheering at a football match. According to Schuessler (2000) it is the voter's statement of her preference for the Democratic candidate that makes the voter a Democrat. In other words, the act of voting helps to define the citizen's political identity as a Democrat.

In the framework of Akerlof and Kranton (2000), each individual considers herself part of a social category. There are prescriptions that indicate the ideal behavior for members of each category. In the context of voting on immigration policy, we assume that citizens have a political identity by feeling close to a political group. These groups have varying prescriptions with respect to the voting and participation decisions. For example, an individual who considers herself as belonging to the "left" will feel pressed to participate in the vote and to oppose immigration restrictions. An early contribution that stresses similar motivations for voting is Fiorina (1976). He introduces an expressive factor in the utility function which represents the utility or disutility of satisfying or violating one's party allegiance.

We propose a structural model combining instrumental and expressive motivations in a theoretical framework that explains both voting preferences and participation decisions. Our model represents an improvement on previous empirical studies of individual voting decisions that have used more descriptive modeling approaches (e.g. de Melo et al., 2004; Miguet 2007; Thalmann, 2004). By following a structural approach, we are able to explicitly identify, in particular, the determinants of participation costs in addition to those of voting preferences.

Our econometric results show that both instrumental and expressive factors matter for voting and participation decisions. Moreover, there is a strong positive correlation between the error terms of the two equations describing attitudes towards

immigration and participation costs. As a result, there is a substantial “participation bias”: the outcome of the vote does not reflect the underlying preferences of the whole population because citizens in favor of immigration restrictions tend to participate much less in the vote than those who are against such restrictions.

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. The paper ends with some concluding remarks in Section 6.

2 The model

In order to analyze the political economy of migration in the context of Swiss direct democracy, we formulate a structural model of voting and participation. In this section, we develop our framework in three steps. First, the link between immigration restrictions and individual income (or utility) of citizens is spelled out in a simple framework. This link is fundamental for the instrumental component of the voting model which is presented in the second step. The third step consists in adding political identity considerations to the model.

2.1 Economic consequences of immigration restrictions

Two types of models have been traditionally used in the literature in order to evaluate the economic consequences of immigration. Labor economists traditionally cast their analysis in the framework of factor-proportions analysis (FPA), assuming an aggregate production function with a single output and several primary factors: capital 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 immigrants.

In the following paragraphs, we outline a simple model where human capital is measured as a continuous variable (as in our empirical application) and immigration restrictions imply a finite change in labor supply. This framework is closely related to the FPA and nicely illustrates the relation between redistributive effects and the aggregate welfare impact of immigration restrictions. In our simple framework, there are two production factors (human capital and “raw” labor) and individuals are heterogeneous in their endowments of human capital.

Suppose there are L_N national citizens (who have the right to vote) and L_M immigrants in the economy. Each individual i supplies one unit of “raw” labor and h_i units of human capital. Aggregate output is given by $Y = F(H, L)$, where $L = L_N + L_M$ and $H = \sum_i h_i$ and F is an aggregate production function exhibiting constant returns to scale. Per capita output can be written as $y \equiv Y/L = F(H/L, 1) \equiv f(h)$, where $h = H/L$ is the average per capita human capital stock.⁸

With perfectly competitive factor markets and profit maximization by the representative firm, prices and marginal products of production factors are equalized. Marginal products are given by $f'(h)$ (human capital) and $f(h) - hf'(h)$ (raw labor). Earnings of individual i (with h_i units of human capital and 1 unit of raw labor) can therefore be written as

$$w_i = f(h) - hf'(h) + h_i f'(h_i) = f(h) + (h_i - h)f'(h). \quad (1)$$

Thus in the (h, w) space, individual earnings of all individuals lie on a straight line that is tangent to the aggregate production function f at the average per capita human capital stock, h .

When confronted with a proposal to reduce the number of immigrants in Switzerland, a Swiss citizen will compare the status quo (which will be indicated with superscript 0) with a hypothetical situation that would arise if the popular initiative were accepted (superscript 1). As argued in the introduction, a more restrictive stance with respect to immigration policy is likely to increase the average human capital of immigrants. We therefore assume that $h^1 > h^0$.

⁸Physical capital can be added to the model without changing the qualitative conclusions if perfect international mobility of capital is assumed. To see this, define aggregate output as $Y = G(K, H, L)$, where G is an aggregate production function with constant returns to scale. A factor-price constrained revenue function (Neary, 1985) can be defined as $\tilde{G}(r, H, L) = \max_K \{G(K, H, L) - rK\}$. With the world rental rate of capital r^* given, the optimal stock of physical capital is defined implicitly by $\partial G / \partial K = r^*$ and \tilde{G} has the same properties as an unconstrained revenue (or aggregate production) function, as shown by Neary (1985). Moreover, \tilde{G} is linearly homogeneous with respect to H and L . Therefore, if we assume that r^* does not change with immigration, we can redefine f as follows: $f(h) = \tilde{G}(r^*, H/L, 1)$.

In terms of an individual's earnings, the difference between the two situations can be written as follows:

$$w_i^1 - w_i^0 = -S + (h_i - h^1)\Delta r, \quad (2)$$

where $\Delta r = f'(h^1) - f'(h^0)$ represents the change in the return to human capital and $S = f(h^0) + (h^1 - h^0)f'(h^0) - f(h^1)$ is the (foregone) immigration surplus which is lost as a result of the immigration restriction. Whereas S represents an aggregate efficiency loss, identical for all remaining residents, the second term on the right hand side of (2) varies among individuals; it captures the redistributive impact of immigration restrictions. As the return to human capital falls with the increase in h , those individuals whose human capital stock exceed the average per capita level h lose from the immigration restriction; the others tend to benefit. For the empirical model spelled out below, we retain the fact that the expected change in income from the popular initiative is a linear function of an individual's human capital.

This model can be easily generalized to the case of the small open economy. If we assume that there is an arbitrary number of goods produced by different technologies in the world economy, the home country produces either one good (specialized case) or two goods (diversified case), depending on the home country's relative human capital endowment. If two goods are produced by the home country, the return to human capital is entirely determined by relative goods prices in the world market and a small immigration restriction does not affect relative wage rates. However, if the immigration restriction is sufficiently strong, the economy is likely to quit the initial diversified zone and enter either a new zone of specialization or a new diversified zone (where two goods, one of them different, are produced). In both cases, the return to human capital increases with the immigration restriction and the variation in income is a linear function of human capital, as in the closed economy case.⁹

2.2 Instrumental motivations for voting

In the next step, we integrate the economic model in a rational voter framework. From the point of view of the voter, there are two "states of nature": the popular

⁹Another extension of this simple model would be the introduction of redistributive taxation and social benefits (as in Hanson et al., 2005; Facchini and Mayda, 2006). In the politico-economic framework that we use here, a meaningful analysis of this issue should take into account the interdependence of migration and redistribution policies. This would imply the introduction of a second dimension in the policy choice of voters which goes beyond the scope of our paper.

initiative will be accepted ($j = 1$) or rejected ($j = 0$). Utility in each of these states is given by $U_i^j = v(w_i^j, X_i^j)$, where X_i^j includes non-economic factors that influence the voter's preferences on immigration.

The individual proceeds in two stages. First, she considers the voting decision, denoted by v_i : individual i is in favor of the popular initiative ($v_i = 1$) if $U_i^1 > U_i^0$. In the opposite case, she prefers the status quo ($v_i = 0$). Second, the individual decides whether to participate in the vote, by comparing the expected benefits from voting with costs of participation. Participation is denoted by $\pi_i = 1$ and abstention by $\pi_i = 0$.

The expected utility of individual i taking action k is

$$EU_{i|k} = P_k U_i^1 + (1 - P_k) U_i^0 = U_i^0 + P_k (U_i^1 - U_i^0), \quad (3)$$

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). In the empirical implementation of the model, it is taken to be a constant.¹⁰

The expected utility gain from participating in the vote can then be written as

$$\text{yes-voters: } EU_{i|y} - EU_{i|a} = (P_y - P_a)(U_i^1 - U_i^0) \simeq pu_i \quad (4)$$

$$\text{no-voters: } EU_{i|n} - EU_{i|a} = (P_a - P_n)(U_i^0 - U_i^1) \simeq -pu_i \quad (5)$$

where $u_i \equiv U_i^1 - U_i^0$ and p is the probability that the individual's vote is decisive (approximately equal to $P_y - P_a \simeq P_a - P_n$). An individual decides to vote if these benefits exceeds his participation costs, denoted by C_i .

The link with the traditional presentation of the rational voter model, initiated by Downs (1957) and surveyed by Blais (2000) and Mueller (2003), can now be made clear. The expected benefit from voting (commonly denoted by B) is given by $|u_i| = |U_i^1 - U_i^0|$ and the individual decides to participate if

$$p|u_i| - C_i > 0. \quad (6)$$

¹⁰Since we apply our framework to a single vote, this seems to be a reasonable assumption to make. Moreover, the survey data that we use in our empirical application does not include a question on the perceived closeness of the vote. In any case, this variable does not appear to be a good predictor of individual participation in cross-sectional studies (Aldrich, 1993; Mueller, 2003).

The probability p that a vote is decisive has been widely discussed in the literature.¹¹ As we focus on immigration policy, the expected benefit from voting can be made more precise by referring to the economic model outlined above. Assuming that individuals are risk-neutral, utility can be defined as a linear function of earnings. Therefore the utility difference between the popular initiative and the status quo can be written as

$$u_i = \beta_0 + \beta_1 h_i, \quad \beta_0 = -S - h^1 \Delta r, \quad \beta_1 = \Delta r \quad (7)$$

Participation costs C_i include resource and time costs that each individual incurs for voting as well as for acquiring the necessary information. The act of voting itself requires little time and effort. There are, however, individual differences in time costs due for instance to voting procedures at the canton level. Moreover, acquiring the relevant information on the issue up for vote might be rather time consuming, especially for citizens with a low level of education.

2.3 Adding political identity to the model

As a last step, we extend the instrumental model in order to account for feelings of political identity. We follow Akerlof and Kranton (2000) who propose a general framework for incorporating identity in the utility function. In their framework, each individual considers herself part of a social category or group g and assigns other individuals to the different social categories. For each social category, there are prescriptions that indicate the behavior which is considered appropriate in different situations for individuals belonging to that category.

We introduce political identity or self-image into the utility function by adding a new term I_i to the expected utility in equation (3). According to Akerlof and Kranton (2000, 2005), an agent's utility from her identity or self-image depends on her assignment to a social category and on the match between her actions and the prescribed ideal actions for her category. In the context of voting and participation decisions, we assume that utility from identity is given by:

$$I_i = \psi(\pi_i, v_i; g) = \tau_{gi} - 2a_g \pi_i |\tilde{v}_g - v_i| - b_g |\tilde{\pi}_g - \pi_i|. \quad (8)$$

¹¹See the references given in footnote 7 and Fischer (1999). Most of these authors point out that, in the context of a large electorate, game-theoretic considerations do not add much to the decision-theoretic explanation of the observed turnout in practical applications. See also Coate et al. (2004) who show that a simple expressive voting model outperforms the pivotal-voter model even in the case of small-scale elections.

This utility function has three components. First, individual i derives a certain utility τ_{gi} from belonging to social category g independently of her actions. The second and third components of equation (8) reflect the consequences of acting according to the prescriptions of one’s social category. Each social category g has a prescribed ideal behavior with respect to participation ($\tilde{\pi}_g$) and voting (\tilde{v}_g) decisions. An individual who identifies herself with group g suffers a utility loss if she does not live up to the ideal. The extent of this loss is captured by parameters a_g and b_g which reflect the importance of living up to the ideal for members of group g .

We assume that an individual who disagrees with the ideal voting decision of her group will suffer a loss in utility only if she expresses this preference by participating in the vote. If she abstains from voting, the difference in opinion does not become salient and does not result in a utility loss (the individual may not even be aware of this difference in opinion since she does not express her opinion in a vote).

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 four 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 both groups, we would expect that the ideal behavior consists in participating in the election ($\tilde{\pi}_r = \tilde{\pi}_l = 1$). From an ideological point of view, the “left” rejects the idea of restricting immigration ($\tilde{v}_l = 0$) whereas the “right” is in favor of the popular initiative ($\tilde{v}_r = 1$).

The third political group that we consider here are those citizens who locate their political position in the “center” (c). Political participation is positively perceived in this group ($\tilde{\pi}_c = 1$) but we would expect no prescription with respect to the issue up for vote ($a_c = 0$).¹² Finally, there are individuals who are not politically mobilized and who do not belong to these three groups (they are denoted by n). We assume that there are no prescriptions with respect to participation and voting decisions in this group ($a_n = 0, b_n = 0$). The econometric framework will enable us to test these economic intuitions.

The voting and participation choices of individuals belonging to these four political groups can be summarized as follows:

$$\bar{v}_i = pu_i + a_r\delta_{r,i} - a_l\delta_{l,i}, \tag{9}$$

¹²In the empirical implementation of the model, we test this assumption that the “center” group does not give any prescription with respect to the vote.

$$\bar{c}_i = C_i + a_r \delta_{r,i} + a_l \delta_{l,i} - b_r \delta_{r,i} - b_l \delta_{l,i} - b_c \delta_{c,i}. \quad (10)$$

where u_i is given by (7), $\delta_{r,i}$, $\delta_{l,i}$ and $\delta_{c,i}$ are dummies for political right, left and center respectively. 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.

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 u_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).

Finally it is worth noting that equations (9) and (10) enable us to test whether the extended political-identity model provides a more adequate explanation of voting and participation behavior than the “pure” rational voter model. Indeed, the case where only instrumental motivations matter for the vote on migration policy is obtained by setting $a_c = b_c = 0$ for all c .

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 equations (9) and (10), and write them in vector notation as

$$\bar{v}_i = \bar{\alpha}' x_i + \bar{\epsilon}_i \quad (11)$$

$$\bar{c}_i = \bar{\gamma}' z_i + \bar{\xi}_i, \quad (12)$$

The vectors x_i and z_i contain the variables suggested by our model as well as socio-demographic characteristics. 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:

$$v_i^* = \alpha' x_i + \epsilon_i \quad (13)$$

$$c_i^* = \tilde{\gamma}' z_i + \xi_i, \quad (14)$$

where $\text{Var}(\epsilon_i) = \text{Var}(\xi_i) = 1$ and $\text{Cov}(\epsilon_i, \xi_i) = \rho$. 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

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

The voting decision is

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

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

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

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

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

$$\Pr(\pi_i = 1, v_i = 0) = \Phi_2 \left(-\alpha'x_i, \frac{-\alpha'x_i - \gamma'z_i}{\sqrt{1 + \lambda^2 + 2\lambda\rho}}, \frac{1 + \lambda\rho}{\sqrt{1 + \lambda^2 + 2\lambda\rho}} \right). \quad (16)$$

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

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

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 Swiss wage structure survey. The earnings indicator is constructed using the following equation:

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

where *experience* is defined as: *age-schooling-6*.

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. Almost half of the population choose to represent their position at the center of the scale. 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”. Finally, those citizens who answer this question by “Don’t know” form a (fourth) group of politically indifferent citizens.

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 are also two regional dummy variables that allow for differences in cultural and political attitudes between the three linguistic regions of the country. In order to control for other types of heterogeneity in attitudes, we add demographic variables (age, gender and marital status) 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. The act of voting itself requires little time and effort but not all cantons provide the possibility to vote by correspondence. Hence the effects of the absence of this possibility can be tested using an appropriate dummy. Information costs are an important component of participation costs and are likely to depend inversely on the level of education. Finally a rural/urban distinction is also specified in the equation.

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 (13) and (14), which enables us to identify the determinants of both voting preferences and participation costs. Thus our model represents an improvement on earlier studies of individual voting decisions such as de Melo et al. (2004), Thalmann (2004) and Miguet (2007). 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 (Van de Ven and van Praag; 1981). Their approach neither reflects a structural model nor can it be interpreted as a reduced form.

5.1 Determinants of voting and participation behavior

As our 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. A similar problem arises with the dummy variable *No postal vote* since cantons without the possibility to vote by correspondence are almost exclusively located in the French and Italian speaking parts of Switzerland. Therefore, we also estimate a version of the model where the *French part* and *Italian part* are excluded from the model. Finally, we estimate a reduced version of the model which excludes the political variables in order to compare a purely instrumental rational-voter model with the extended formulation including political identity. Table 2 gives the estimated coefficients for the six specifications, the top half of the table containing the participation cost equation and the bottom half the vote equation.

Consider first the question whether skill or human capital is a significant determinant of attitude towards immigration, as the theoretical model predicts. In all four specifications that also include political identity variables (specifications (1) to (4)), the influence of the human capital variable on the attitude towards immigration is significant at the 10 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 and married individuals have significantly less restrictive attitudes towards immigration. The linguistic region and the share of foreigners in the individual’s agglomeration do not seem to have a significant impact on attitudes.¹³

It should be emphasized that the use of a structural model that accounts explicitly for the participation decision has an important influence on the results. If preferences towards immigration are estimated by a simple probit using only the subsample of 507 individuals who participated in the vote, the coefficients of human capital variables are biased downward and are not significantly different from zero even at the 10 percent level (see Table A1 in the Appendix). By contrast, the impact of political variables seems to be overestimated in this partial model.

Returning to the results of the full model in Table 2, 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

¹³Scheve 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.

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 no 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. This is indeed what we find when we estimate specifications (3) and (4) on the two sub-samples. If the ratio of variances is fixed at the level which was found when we were using the entire sample¹⁴, the coefficients of *Years of education* and *Potential earnings* are significant at the 5 resp. 1 percent level for the sub-sample of individuals in the labor force (see Table 3). For the remainder of the sample, these two variables have no significant influence on immigration preferences.¹⁵

Returning again to the full sample in Table 2, it is instructive that hardly any parameter is significantly different from zero when political variables are completely dropped from the model (specifications (5) and (6)). The influence of human capital variables on immigration restrictions cannot be identified with a model taking only economic factors into account. A likelihood-ratio test confirms the conclusion that political variables should not be removed from the model. This implies that a pure rational voter model, based solely on instrumental motivations, does not offer a sufficient explanation of observed behavior.

This result reflects a recent evolution in Swiss politics. In the 1980s, attitudes

¹⁴We were unable to estimate all parameters of the model for the two sub-samples due to numerical problems. Therefore we fixed λ at the level reported in Table 2. In order to test the sensitivity of the results to the value of λ chosen, we reestimated the model fixing $\lambda = 1$, which did not alter the coefficient estimates of the vote equation in a significant manner (results are available upon request).

¹⁵It is interesting to note that the effect of *Years of education* on participation costs is identical (and highly significant) in the two sub-samples.

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 (Kriesi and Lachat, 2004).

“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. As we had conjectured, there do not seem to be particular prescriptions for the voting behavior of the centrist group (i.e. these prescriptions do not significantly differ from those of politically indifferent individuals).

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 18.4 percent. This value is in the range of the estimates obtained by Scheve and Slaughter for their variable *Occupation wage* in the US.¹⁶

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 13.8 percent higher) or a member of the *Left* (the probability is 20.0 percent lower). These figures can be found in Table A2 (in the appendix) 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 2 make clear that a higher level of education reduces significantly the costs of participation, presumably because of its impact on

¹⁶The 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).

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.¹⁷ The same might be the case for married individuals who face lower participation costs than unmarried individuals according to our estimations.

The structural model enables us to address the question whether the possibility of voting by correspondence reduces the costs of participation. Because of the problems of collinearity with regional variables discussed above, it is not easy to disentangle this effect from cultural differences in our sample. The results reflect this difficulty: the absence of the possibility to cast a postal vote indeed seems to increase the cost of participation, but this effect is only significant at the 10 percent level in specification (1) of the model.

What is the role of political identity in the participation decision? The results in Table 2 suggest that politically indifferent individuals feel no particular obligation to vote, as we had conjectured above. Hence they face significantly higher (implicit) participation costs than the members of the centrist group. On the other hand, those who belong to the politically engaged groups of the right and the left tend to feel more pressured to vote than the centrist group (but this difference is only statistically significant for the group of the left in specifications (3) and (4) of the model).

A clearer interpretation of these results can be obtained by considering the structural parameters of the identity-related part of the utility function (see equation (8)). These parameters can be identified using a priori assumptions on group prescriptions for the voting decision.¹⁸ Table 4 reports estimated values of these parameters for specification (4) of the model (we take this model to illustrate as it has the highest likelihood values and the lowest AIC value; other specifications yield similar results). With the reference group being the “center”, prescriptions seem to be slightly stronger for the left than for the right. Interestingly, for both groups the intensity of the prescription for voting behavior is approximately equal to the intensity of prescription for participation behavior. This implies that casting the “wrong” vote (according to the prescription of the group) yields the same utility

¹⁷Interestingly, the total impact of a marginal change in education on the outcome of the vote is negligible (see Table A2). Although such a change tilts preferences against immigration restrictions, this is compensated by a fall in participation costs which benefits more the yes-voters than the no-voters (see Table A2).

¹⁸The assumptions of the groups of the right and the left are discussed in section 2.3 above. The only difference with the theoretical discussion concerns the group of politically indifferent voters. As we did not want to constrain the parameters of the econometric model, we assume implicitly that the voting prescription of this group is “vote yes” but this effect is not significantly different from the prescription of the centrist group.

than not participating in the vote. Therefore, the estimation results imply that cross-pressured citizens — whose economic interests are in contradiction with their political identity — are unlikely to vote. Finally, the parameters of the politically indifferent group do not differ significantly from those of the centrist group.

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 46 percent of the population are in favor of the popular initiative, the outcome of the vote is very different: only 27 percent of those who participate cast a positive vote.¹⁹ Obviously, 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

¹⁹Interestingly, an opinion poll commissioned by Swiss television and carried out shortly before 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.)

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, 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 2 (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 dispersion 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.²⁰ 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 (15)). It has the opposite impact on the probability of participating and voting no (see equation (16)) which explains the asymmetry of dispersion in Figure 2 (c).

We end this section with a few remarks on the value of ρ used in our calculations.

²⁰As 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.

From Table 2 one can observe that the best specification in terms of log-likelihood and AIC values (specification (4)) is also the only one with a ρ significantly different from zero (0.705). The participation bias was calculated using this value of ρ . Note that a lower (higher) value of ρ would have led to a lower (higher) participation bias.

As the value of ρ explains such an important share of the participation bias, one might wonder 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, 2007). 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 close to our previous estimate.

6 Conclusions

This paper is a novel attempt to explain participation and voting behavior in a direct democracy by formulating and estimating a structural model. 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 expressive motivations for voting by introducing political identity into the model. The pure rational voter model, including only instrumental motivations for voting, can be obtained as a special case.

The direct democracy in Switzerland provides an institutional context that avoids the hypothetical bias which hampers the analysis of opinion polls. In our empirical application, the pure rational voter model turns out to be inadequate although the variables that capture instrumental motivations are found to explain a significant part of the voting and participation decisions. In particular, 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 democ-

racy. 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.

In future work it would be interesting to search for explanations of the participation bias at a deeper level and address the question whether it occurs in other votes. The evidence accumulated by political scientists might be helpful in this respect. Analyzing a large number of direct democratic votes in Switzerland, Kriesi (2005) argues that citizens with a low level of political awareness and little cognitive abilities tend to use simple heuristic strategies when deciding how to vote and whether to participate. Following this line of thinking, it can be conjectured that individuals who are opposed to immigration in a rather vague sense also tend to use simple heuristic strategies in their voting and participation decisions. Voting in favor of an initiative that proposes to restrict immigration is in contradiction with the two simplest heuristic strategies described by Kriesi (2005), the “status quo” heuristic and the “trust” heuristic.²¹ This contradiction gives rise to cross-pressures, which might have led these individuals to abstain.

By contrast, citizens with a high level of political awareness might have been particularly motivated to participate (and vote no) by the fact that the proposed initiative would have put in danger the ratification of the bilateral agreements between Switzerland and the European Union. These bilateral agreements, which included the free movement of persons, had been massively accepted in a popular vote four months earlier and members of the main political parties had emphasized their overruling importance during the campaign. Thus it may be useful to extend our model to take into account the strategies of information acquisition and the role of the political elite in the direct democratic context.

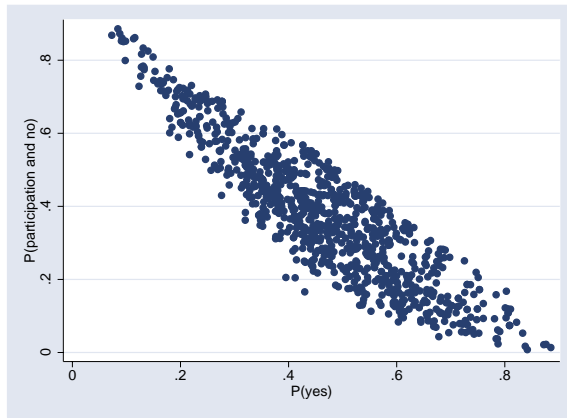
²¹The “status quo” heuristic consists in voting systematically “no”, favoring thereby the current state of affairs when the alternative is uncertain. This strategy reflects a high degree of risk aversion. Individual using the “trust” heuristic put their trust in the government and generally follow its propositions. In our case, the government had recommended to reject the initiative.

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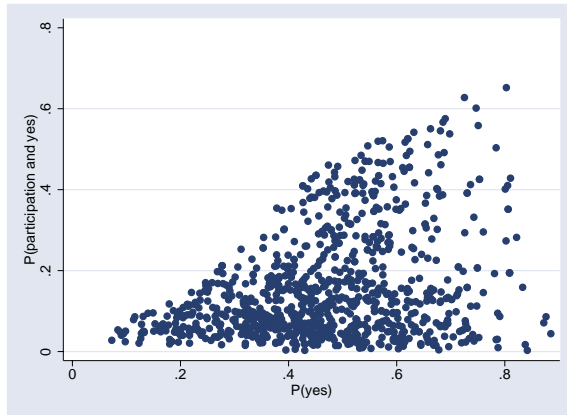
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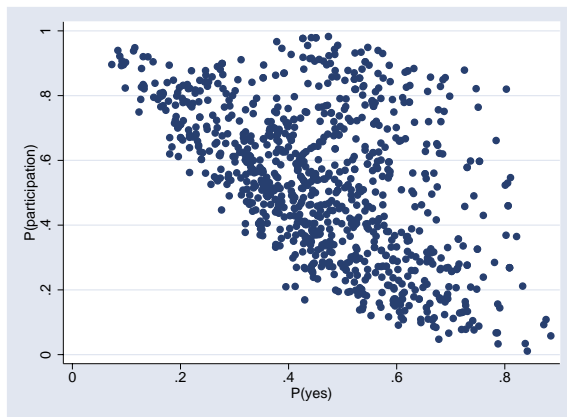
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(a) Probability of participating and voting no



(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

Table 1: Summary statistics ^a

Variable	Mean	Standard deviation
Vote	0.288	
Participation	0.532	
Education (years)	12.488	2.128
Potential earnings	5.848	1.570
Political: right	0.190	
Political: left	0.208	
Political: center	0.461	
Political: don't know	0.142	
No postal vote	0.222	
Rural	0.331	
Share foreigners in agglomeration	0.196	0.066
French part	0.228	
Italian part	0.068	
Age	47.805	17.522
Female	0.498	
Married	0.563	

^a There are 953 observations for all variables except the Vote (507 observations). Standard deviations are only given for continuous variables.

Table 2: Estimation results for the popular initiative in 2000

Specification	(1)	(2)	(3)	(4)	(5)	(6)
<i>Participation costs</i>						
Education (years)	-0.135** (0.065)	-0.129** (0.065)	-0.121*** (0.046)	-0.111*** (0.038)	-0.102 (0.083)	-0.109 (0.091)
No postal vote	0.494* (0.287)	0.474 (0.295)	0.025 (0.150)	0.008 (0.135)	0.019 (0.126)	0.023 (0.139)
Rural	0.258 (0.160)	0.252 (0.159)	0.225* (0.121)	0.205* (0.112)	0.130 (0.163)	0.144 (0.168)
Political: right	-0.421 (0.326)	-0.403 (0.335)	-0.386 (0.284)	-0.325 (0.266)		
Political: left	-0.389 (0.260)	-0.375 (0.243)	-0.412* (0.247)	-0.396** (0.190)		
Political: don't know	0.620** (0.293)	0.604** (0.291)	0.512** (0.201)	0.484*** (0.176)		
French part			0.232 (0.162)	0.216 (0.148)	0.374** (0.186)	0.376* (0.197)
Italian part			1.029*** (0.376)	0.964*** (0.331)	0.690 (0.438)	0.726 (0.477)
Age	-0.041 (0.026)	-0.039 (0.025)	-0.038 (0.023)	-0.037* (0.019)	-0.021 (0.037)	-0.024 (0.037)
Age2/1000	0.232 (0.227)	0.222 (0.214)	0.228 (0.220)	0.229 (0.187)	0.062 (0.338)	0.091 (0.319)
Female	0.145 (0.151)	0.140 (0.151)	0.093 (0.133)	0.074 (0.121)	0.272 (0.178)	0.268 (0.172)
Married	-0.487** (0.247)	-0.471* (0.245)	-0.407** (0.174)	-0.379*** (0.147)	-0.205 (0.259)	-0.229 (0.269)
Constant	3.779*** (1.429)	3.640*** (1.405)	3.437*** (1.018)	3.232*** (0.814)	2.796 (1.765)	2.958 (1.907)
<i>Voting preferences</i>						
Education (years)	-0.055* (0.030)		-0.058* (0.034)		-0.003 (0.061)	
Potential earnings		-0.100* (0.051)		-0.111** (0.051)		-0.015 (0.098)
Share foreigners in agglom.	-1.059 (0.713)	-1.040 (0.707)	-1.154 (0.752)	-1.049 (0.748)	-0.567 (0.900)	-0.610 (0.857)
Political: right	0.413*** (0.154)	0.414*** (0.150)	0.360** (0.183)	0.349** (0.162)		
Political: left	-0.548*** (0.144)	-0.543*** (0.145)	-0.534*** (0.140)	-0.523*** (0.131)		
Political: don't know	0.202 (0.208)	0.197 (0.201)	0.236 (0.202)	0.243 (0.181)		
French part			0.003 (0.138)	-0.003 (0.125)	-0.210 (0.240)	-0.195 (0.208)
Italian part			0.416 (0.321)	0.422 (0.269)	0.022 (0.530)	0.064 (0.470)
Age	-0.050*** (0.018)	-0.025 (0.020)	-0.051*** (0.018)	-0.024 (0.019)	-0.027 (0.027)	-0.025 (0.020)
Age2/1000	0.470*** (0.173)	0.287 (0.191)	0.480*** (0.165)	0.273 (0.183)	0.338 (0.221)	0.325* (0.185)
Female	-0.200* (0.110)	-0.200* (0.109)	-0.184* (0.105)	-0.179* (0.100)	-0.283** (0.137)	-0.279** (0.130)
Married	-0.247** (0.122)	-0.236** (0.118)	-0.255** (0.124)	-0.246** (0.111)	-0.118 (0.177)	-0.129 (0.159)
Constant	2.102** (0.866)	1.303** (0.557)	2.237** (0.968)	1.408*** (0.509)	0.163 (2.018)	0.226 (1.079)
Rho	0.539 (0.371)	0.543 (0.360)	0.645 (0.422)	0.705** (0.340)	-0.562 (1.174)	-0.445 (1.151)
Lambda	1.026* (0.585)	0.979* (0.590)	0.851** (0.421)	0.775** (0.335)	0.684 (0.524)	0.698 (0.580)
Log likelihood	-828.531	-828.438	-818.712	-818.430	-870.202	-870.191
AIC	1703.06	1702.88	1691.42	1690.86	1782.40	1782.38

Notes: Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%, N = 953.

Table 3: Estimation results for working and not working individuals

Specification	Working individuals		Not working	
	(3)	(4)	(3)	(4)
<i>Participation costs</i>				
Education (years)	-0.126*** (0.032)	-0.114*** (0.027)	-0.111*** (0.039)	-0.101** (0.044)
No postal vote	-0.076 (0.149)	-0.081 (0.109)	0.103 (0.280)	0.071 (0.264)
Rural	0.161 (0.108)	0.124 (0.083)	0.350* (0.183)	0.305 (0.225)
Political: right	-0.168 (0.251)	-0.057 (0.169)	-0.676** (0.321)	-0.672*** (0.223)
Political: left	-0.437*** (0.153)	-0.431*** (0.126)	-0.423 (0.364)	-0.326 (0.408)
Political: don't know	0.300 (0.204)	0.263 (0.182)	0.681*** (0.263)	0.605** (0.292)
French part	0.363* (0.190)	0.308** (0.150)	0.068 (0.336)	0.127 (0.308)
Italian part	0.913** (0.375)	0.765*** (0.275)	1.321** (0.590)	1.154* (0.651)
Age	-0.064** (0.031)	-0.069*** (0.026)	-0.037 (0.031)	-0.032 (0.031)
Age2/1000	0.589* (0.355)	0.661** (0.300)	0.172 (0.308)	0.129 (0.305)
Female	-0.022 (0.122)	-0.048 (0.103)	0.264 (0.263)	0.285 (0.210)
Married	-0.488*** (0.126)	-0.431*** (0.113)	-0.298 (0.184)	-0.258 (0.202)
Constant	3.902*** (0.704)	3.766*** (0.642)	3.430*** (0.866)	3.233*** (0.951)
<i>Voting preferences</i>				
Education (years)	-0.074** (0.034)		-0.033 (0.059)	
Potential earnings		-0.174*** (0.052)		-0.038 (0.087)
Share foreigners in agglom.	-1.157 (0.922)	-0.819 (0.747)	-0.839 (1.398)	-0.754 (1.372)
Political: right	0.378** (0.181)	0.357** (0.157)	0.242 (0.328)	0.302 (0.297)
Political: left	-0.599*** (0.145)	-0.564*** (0.139)	-0.359 (0.263)	-0.325 (0.265)
Political: don't know	0.105 (0.214)	0.125 (0.197)	0.375 (0.441)	0.282 (0.445)
French part	0.135 (0.154)	0.128 (0.142)	-0.242 (0.223)	-0.259 (0.216)
Italian part	0.215 (0.293)	0.251 (0.242)	0.982 (0.777)	0.794 (0.778)
Age	-0.093*** (0.028)	-0.050* (0.030)	-0.024 (0.033)	-0.012 (0.031)
Age2/1000	0.976*** (0.321)	0.651** (0.322)	0.256 (0.282)	0.181 (0.289)
Female	-0.166 (0.117)	-0.163 (0.112)	-0.230 (0.212)	-0.253 (0.203)
Married	-0.342** (0.135)	-0.341*** (0.123)	-0.134 (0.190)	-0.105 (0.187)
Constant	3.477*** (0.800)	2.341*** (0.586)	0.908 (2.024)	0.173 (1.313)
Rho	0.854*** (0.183)	0.932*** (0.071)	0.212 (1.234)	-0.098 (1.240)
Lambda (fixed)	0.851	0.775	0.851	0.775
Number of observations	592	592	359	359
Log likelihood	-503.323	-501.839	-301.928	-301.901

Notes: Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Estimates of structural parameters related to political identity ^a

Political group ^b		Coefficient	Std. error
<i>Vote</i>			
Right	$2\hat{a}_r$	0.697**	0.324
Left	$2\hat{a}_l$	1.045***	0.263
Don't know	$2\hat{a}_i$	0.486	0.362
<i>Participation</i>			
Right	\hat{b}_r	0.674*	0.350
Left	\hat{b}_l	0.919***	0.278
Don't know	\hat{b}_i	-0.240	0.212

^a Estimates are derived from model (4) in Table 2.

^b Reference group is "Center"

Table 5: Participation bias and its explanations

<i>Participation bias and its elements</i>		
Participation bias	$\Pr(v = 1 \pi = 1) - \Pr(v = 1)$	-0.193
Voting preferences	$\Pr(v = 1)$	0.459
Outcome of the vote	$\Pr(v = 1 \pi = 1)$	0.266
<i>Probabilities of participation by group of voters</i>		
Participation among yes-voters	$\Pr(\pi = 1 v = 1)$	0.293
Participation among no-voters	$\Pr(\pi = 1 v = 0)$	0.685
<i>Decomposition: role of correlation</i>		
- Bias due to correlation	$\Pr(v = 1 \pi = 1; \rho) - \Pr(v = 1 \pi = 1; 0)$	-0.180
- Bias due to other factors	$\Pr(v = 1 \pi = 1; 0) - \Pr(v = 1)$	-0.012

Note: All probabilities are calculated on the basis of model (4) using sample averages. Details of the decompositions are given in the text

Table A1: Estimation results for the popular initiative in 2000
(Simple probit of voting preferences)

Model	Complete (1)	Complete (2)	Complete (3)	Complete (4)	RV model (5)	RV model (6)
<i>Voting preferences</i>						
Education (years)	-0.038 (0.031)		-0.037 (0.031)		-0.026 (0.029)	
Potential earnings		-0.079 (0.055)		-0.081 (0.055)		-0.057 (0.052)
Share foreigners in agglom.	-1.125 (1.050)	-1.092 (1.051)	-0.818 (1.149)	-0.742 (1.154)	-0.720 (1.104)	-0.670 (1.108)
Political: right	0.602*** (0.147)	0.606*** (0.147)	0.606*** (0.148)	0.611*** (0.148)		
Political: left	-0.672*** (0.187)	-0.674*** (0.188)	-0.662*** (0.188)	-0.663*** (0.188)		
Political: don't know	0.005 (0.265)	-0.003 (0.266)	0.028 (0.269)	0.021 (0.270)		
French part			-0.117 (0.181)	-0.129 (0.181)	-0.189 (0.174)	-0.197 (0.174)
Italian part			-0.103 (0.356)	-0.122 (0.357)	0.072 (0.333)	0.060 (0.333)
Age	-0.048* (0.025)	-0.029 (0.027)	-0.048 (0.025)	-0.029 (0.027)	-0.039 (0.024)	-0.025 (0.026)
Age2/1000	0.512** (0.235)	0.375 (0.248)	0.513** (0.235)	0.374 (0.249)	0.458** (0.225)	0.358 (0.240)
Female	-0.327** (0.135)	-0.337** (0.135)	-0.321** (0.135)	-0.332** (0.135)	-0.382*** (0.129)	-0.390*** (0.129)
Married	-0.208 (0.147)	-0.198 (0.148)	-0.206 (0.147)	-0.196 (0.148)	-0.207 (0.140)	-0.200 (0.141)
Constant	1.332* (0.745)	0.787 (0.606)	1.287* (0.749)	0.744 (0.609)	0.886 (0.699)	0.501 (0.571)
Observations	507	507	507	507	507	507
Log_likelihood	-267.887	-267.572	-267.656	-267.287	-290.768	-290.562

Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%

Table A2: Marginal effects of selected variables ^a

	$\Pr(v = 1)$	$\Pr(v = 1 \pi = 1)$	$\Pr(\pi = 1, v = 1)$	$\Pr(\pi = 1, v = 0)$	$\Pr(\pi = 1)$
<i>Marginal effects of variables in voting equation (x)</i>					
Potential earnings	-0.044	-0.063	-0.033	0.028	-0.006
Political: right	0.138	0.210	0.122	-0.086	0.036
Political: left	-0.200	-0.241	-0.123	0.130	0.007
Political:don't know	0.097	0.146	0.082	-0.060	0.023
Married	-0.097	-0.140	-0.075	0.061	-0.014
<i>Marginal effects of variables in participation cost equation (z)</i>					
Education (years)		0.029	0.028	0.023	0.051
Political: right		0.081	0.089	0.064	0.154
Political: left		0.097	0.109	0.078	0.187
Political:don't know		-0.130	-0.100	-0.099	-0.200
Married		0.100	0.094	0.077	0.171
<i>Combined marginal effects: variables in voting and participation cost equations</i>					
Education ^b	-0.023	-0.004	0.011	0.037	0.048
Political: right	0.138	0.291	0.211	-0.021	0.189
Political: left	-0.200	-0.144	-0.014	0.208	0.194
Political:don't know	0.097	0.016	-0.018	-0.159	-0.177
Married	-0.097	-0.040	0.018	0.138	0.156

^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.

^b Includes the indirect effect of education through an increase in potential earnings. One additional year of schooling increases average potential earnings by 0.09 * (average potential earnings).

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