Political Participation is More than Just Resources: A New Approach to the Study of Civic Engagement

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*I would like to thank professors R. Michael Alvarez, D. Roderick Kiewiet and Jean-Laurent Rosenthal, as well as fellow graduate students Peter W. Foley and J. Andrew Sinclair for their helpful comments.

Abstract

Existing survey-based studies of political participation can be grouped into those that model participation in each activity independently (with most of them focusing on voter turnout), and those that model overall participation based on aggregate indicators of civic engagement. In this paper I develop and apply a new approach for the study of civic engagement based on simultaneous modeling of participation in multiple political activities. I use finite mixture modeling to allow model parameters to vary across latent citizen types and to classify survey respondents into apathetic and activist classes of citizens. Specifically, I use Bayesian methods to estimate mixture models where the skewness of the linked function is allowed to vary across latent classes, and multilevel modeling to allow coefficients to vary across political activities. Using survey data from the 1990 American Citizen Participation Study, I find that even after controlling for a comprehensive set of individual attributes, large heterogeneities in political participation still remain. Also, I find that the impact of individual attributes such as education varies considerably across citizen types depending on the characteristics of each political activity.

1 Introduction

Voter turnout in the United States decreased almost constantly in elections taking place between 1960 and 1996, creating concerns about a deterioration of civic engagement and its negative impact on the health of America's democracy (Patterson 2002).[1] Some scholars argue that this tendency was not restricted to voting but was also evidenced in declining involvement in other forms of political, organizational and religious activities (Putnam 1995a,b; Rosenstone and Hansen 1993). This phenomenon is puzzling because neither the drop in participation, nor the subsequent recovery observed since 2000, can be explained by standard theories of political participation which claim that liberalization of registration laws and higher socio-economic status lead to greater political participation (Brady et al. 1995; Rosenstone and Wolfinger 1978; Verba and Nie 1972; Verba et al. 1995; Wolfinger and Rosenstone 1980). For instance, the above-mentioned decline in voter turnout occurred amidst loosening of registration requirements and increasing levels of educational attainment within all socio-economic groups (Brody 1978, Leighley and Nagler 1992), suggesting that participation is not only a function of resources and electoral laws, but that variations in civic engagement are explained by factors disregarded by the standard resource model of political participation.

According to Fiorina (2002, 528), a fundamental problem of the resource-mobilization explanation of political participation is that "many people who have the resources don't expend them, many people who have the motivation don't act on it, and many people who are asked refuse—and we are not very good at picking out the small minority who are different." This paper develops a new estimation method that identifies groups of individuals on the basis of participation propensities; that is, who systematically exhibit low, medium, or high tendencies toward participation across political activities, after accounting for differences in a standard set of attributes. The intuition underlying the proposed procedure is the recognition that there are other factors which are heterogeneously distributed across the population and lead to systematic differences in participation rates across groups.[2] After identifying these groups, I study the distribution of variables excluded

[1]This decline is evidenced not only when turnout is computed as a proportion of the voting age population, but also when it is computed as a proportion of the eligible population, although it is less severe and irregular in the latter case (McDonald and Popkin 2002).

[2]This intuition is consistent with Fiorina's (2002, 530) claim that "participatory arguments about improving American democracy have gone astray because they overlook an important feature of participation. Not only is the desire to participate not widely distributed, but even more importantly, it is not randomly distributed."

from the model to determine whether differences in other factors can explain variation in behavior. In addition to differences in political engagement, feelings of political efficacy and strength of partisanship (Abramson and Aldrich 1982; Verba et al. 1995), I focus on differences in the intensity of issue positions (Fiorina 2002) and personal concerns (Sniderman and Brody 1977) which may motivate or inhibit participation.

What does it mean for one group of individuals to have high "participation propensity"? It does not mean that they participate more than expected in *one* particular political activity, but that they participate more than expected in a variety of political activities. Repeatedly, when studying their involvement in a variety of political activities which can be used to affect political outcomes, one finds that they participate more than expected across the board, after controlling for variables such as education, occupation and civic skills. They are activists in the broad sense of the word, and the explanation of this behavior lies in attitudinal, contextual, and potentially unobserved reasons not captured by the resource model. Similarly, groups that have low participation propensity, conditional on the socio-economic status and access to politically relevant resources, under-participate for most forms of civic engagement. In practical terms, as I explain in more detail later, the fact that some individuals tend to over and under-participate across activities allows me to identify individual membership in the different groups, and to estimate group level parameters.

The idea of activist, apathetic and ordinary classes of citizens who behave differently and exhibit different propensities toward participation is not new (Fiorina 1999, 2000; Lohmann 1993; Oliver et al. 1995). However, the way this hypothesis has been tested in empirical studies—assessing to what extent overall participation, or probability of engaging in specific acts, varies as a function of observed attributes unequally distributed in the population such as education, income or other resources, cannot fully account for observed variation in political behavior. As noted by Fiorina (1999), some of the models discussed in the literature (in particular, in Verba et al. 1995) have little explanatory power. After controlling for these factors, common model specifications assume that excluded variables are either irrelevant or homogeneously distributed across the population. A key question motivating my analysis is the following: given our limited knowledge of the determinants of political participation, is it reasonable to assume that there are no systematic differences in other factors which may drive some groups of individuals to participate more than others, and vice-versa? In this paper, I relax the assumption of homogeneous distribution of other factors, and apply a new method which allows identifying groups of individuals who systematically differ in their propensity to participate.

Before moving on, it is important to clarify what activities constitute "political participation." For decades political scientists have have studied the motives underlying individual engagement in political activities, but most efforts have concentrated on understanding the determinants of voting decisions—that is, the *who votes* question as in Wolfinger and Rosenstone (1980)—and in particular, of voting in federal elections in the United States. However, many means can be used to influence political outcomes. Verba and Nie (1972, 2) define participation as "acts that aim at *influencing* the government, either by affecting the *choice* of government personnel or by affecting the *choices made* by government personnel." In the electoral arena, aside from voting in national elections, citizens can also vote in statewide and local elections, or try to influence the nomination of candidates running for office by voting in primary elections or attending caucuses. Alternatively, they can volunteer for working for a candidate or campaign, wear a campaign button or bumper sticker, attempt to persuade others to vote and support a particular candidate or issue position, or contribute money to candidates or political action committees. Unless all forms of electoral participation are intrinsically equal, focusing on the determinants of voting in national elections provides very limited information on the determinants and representativeness of electoral outcomes.

But involvement in the electoral process is not the only available channel for affecting public decisions. Citizens can also try to affect the decisions taken by government officials. When a resident is concerned about issues like community infrastructure, street maintenance, trash and recycling or water usage, she/he can try to directly contact a local official, attend meetings of local government boards or councils, or engage in informal activities with neighbors sharing similar concerns. Similarly, someone wanting to express his/her position on a public issue can directly contact a representative, sign a petition, or become active in a political organization sharing similar issue positions. Moreover, individuals may choose to physically join protests or demonstrations to oppose or show support for a bill or cause. Until recently, involvement in protest and demonstrations was often disregarded for having ceremonial or support character, or for having anti-system or illegal nature (Schonfeld 1975, Verba and Nie 1972). Still, this tendency has changed in recent years, with engagement in protest being one of the "time-based acts" analyzed by authors such as Verba et al. (1995). A final form of participation is that aimed at affecting self or others' psychological involvement, and includes political discussion, exposure to political stimuli, or writing newspaper and magazine articles.[3] According to Schonfeld (1975), psychological involvement may be relevant if it later affects behavioral involvement—that is, it matters when it affects the desire to participate in activities with more direct influence on political outcomes, or the subject of participation.

The types of participation discussed above differ in many ways. They provide varying degrees of information about citizens' preferences, interests and needs. For instance, the act of voting provides very limited information, and an electoral victory hardly implies that a majority of voters stand by the winner on all issues, that they agree on agenda priorities or ways to address every problem (Key 1966).[4] However, involvement in other activities can be used to communicate clear statements about citizens' expectations. A letter sent to an elected official may contain very clear instructions about what the citizen expects from her/his representative. Similarly, signing a petition, or joining a demonstration and holding a banner in opposition to a bill provides unequivocal information about an individual's preference on the issue at hand. Secondly, activities also differ broadly on their influence on public policy. While democratic governments must always accept electoral outcomes, they may choose to pay scant attention or completely disregard messages expressed through non-electoral means.

Additionally, activities are highly heterogeneous in terms of the skills and resources they require (Verba and Nie 1972; Verba et al. 1995), as well as the costs and risks they entail. Among the types of participation mentioned above, costly forms of participation include time consuming activities like volunteering to work for a candidate or campaign, or involvement in community boards. There are also activities that are intensive in monetary resources like contributing money to campaigns or political organizations. Other activities such as contacting elected or appointed government officials, writing newspaper articles or letters, or online activism are not necessarily costly in terms of money and time, but may require considerable vocabulary skills. In contrast, participation in protests is not particularly costly in terms of resources, but may also involve significant risks. Voting, even though it includes costs like registering to vote, mobilizing to the polling place, and

[3] Since the emergence of the Internet, individuals can also communicate their opinions online by commenting on blogs, streaming online videos, discussing or joining groups in social networks or posting comments in response to news stories or other online materials.

[4] In Key's (1966,2) words, "it thus can be a mischievous error to assume, because a candidate wins, that a majority of the electorate shares his views on public questions, approves of his past actions, or has specific expectations about his future conduct.... The election returns establish only that the winner attracted a majority of the votes—assuming the existence of a modicum of rectitude in election administration. They tell us precious little about why the plurality was his."

sending absentee ballots, does not stand out as a particularly costly political activity.[5] Other easy and relatively costless activities include those affecting psychological engagement like political discussion and exposure to political stimuli.[6]

Earlier I mentioned that one feature that distinguishes individuals with high or low propensities toward participation is their tendency to over- or under-participate across political activities. But there is an additional feature that distinguishes these groups, and is their sensitivity to changes in their access to resources—which I argue is linked to participation costs. When activities are relatively inexpensive, eg. participating in political discussion or voting in a general election, individuals in the high propensity group are almost sure to participate, and their behavior is relatively insensitive to marginal changes in their access to resources. For these activities, individuals in the low propensity group, who are unsure about whether to participate or not, are the most sensitive to stimuli. And conversely, when activities are costly, like working for a campaign or involvement in local community boards or councils, individuals in the low propensity group are almost sure not to participate, and are relatively insensitive to marginal changes in their access to resources. For these activities, individuals in the high propensity group, who have non-negligible probabilities of involvement, are the most sensitive to stimuli.

In line with the previous discussion, the following are the four main hypotheses I test in this paper:

H.1.1 There is an activist class of individuals whose voices are loud. These individuals are almost sure to participate in easy activities, and are the only ones exhibiting high probability of participating in costly activities.

H.2.1 Changes in socio-economic variables and civic skills have only minor effects on activists' likelihood of involvement in easy activities (as they are already almost sure to participate, regardless), but considerable effects on the probability of engaging in costly activities.

H.2.1 There is an apathetic class of individuals whose voices are quiet. These individuals almost

[5] Regarding informational costs, it has been argued that voters are unlikely to invest in acquiring more information than the one they are exposed to and assimilate during day-to-day activities (Downs 1957).

[6] In the same way that activities vary in terms of resources required for participation, they vary in the rewards perceived by those who participate. Depending on the individual and activity, rewards may be associated with the likelihood and benefit of affecting political outcomes, or may be affected by hard-to-quantify factors such as non-instrumental benefits (Riker and Ordeshook 1970), incidental 'relational' payoffs (Uhlaner 1989), and expressive incentives such as desire to attach oneself to political outcomes (Schuessler 2000).

never participate in costly activities, and have small but non-negligible probability of participating in easy activities.

H.2.2 Changes in socio-economic variables and civic skills have only minor effects on apathetics' likelihood of involvement in costly activities (as they are very unlikely to participate, regardless), but considerable effects on the probability of engaging in easy activities.

Also, I test the following hypothesis:

H.3 There is a third class of individuals with intermediate tendencies toward participation. In contrast to individuals belonging to the passive or activist class, the standard resource-based model of political participation provides an accurate approximation to their behavior. Depending on the level of socio-economic variables and access to politically relevant resources, these individuals are more or less likely to participate in different political activities, but other factors play no systematic role in their decisions.[7]

Additionally, after identifying the groups, I test whether they differ systematically in terms of intensity of issue positions and personal circumstances which may motivate or inhibit political involvement.

H.4.1 Individuals in higher propensity groups exhibit relatively more extreme issue positions.

H.4.2 Individuals in lower propensity groups experience more difficulties in their personal circumstances.

To test these hypothesis, I estimate a model that combines two different statistical methodologies: (1) finite mixture modeling (Frühwirth-Schnatter 2006, Hill and Kriesi 2001) and (2) a particular generalization of the logistic regression (Nagler 1994). The first of these methods allows clustering respondents into different classes or groups depending on the distribution of unobserved factors. According to Hagenaars and McCutchen (2002, xii), a heterogeneous population is one "consisting of several unidentified groups that behave differently regarding a problem at hand."

[7]By construction, there is always an intermediate propensity group. Still, the behavior of this group need not be accurately explained by the standard resource model of political participation—for a given level of politically relevant resources, they may under- or over-participate. For this reason, hypothesis H.3 may or may not be satisfied, it does not hold by assumption.

The purpose of methodologies akin to latent class analysis is to help identify these groups. The second method, a generalization of the logistic regression model, is appealing because the model contains a parameter regulating individuals' responses to levels and changes in measures of the systematic benefits of participation (Nagler 1994). In combining the two methodologies, I assume a function of this parameter follows a finite mixture of normals distribution, and estimate individual assignment into each component of the mixture distribution—where values of the skewness parameter are estimated based on the data and vary across groups. Thus, this model allows me to identify individual membership in groups with different propensities toward political participation. Finally, I study the relationship between estimates of group assignment and numerous indicators of issue positions and personal concerns, in an attempt to understand variations in behavior across groups.

In the next section of the paper, I discuss the motivation and interpretation of the model specification, and describe the estimation procedure. After that, I move to the empirical section, starting with a description of the 1990 American Citizen Participation Study, discussion of the political activities analyzed in the paper, and a review of some of the main conclusions of Verba et al. (1995) regarding participation in specific political acts. Also, I explain some of the main differences between statistical approaches used in previous studies and the one discussed in this paper. Finally, I present the results of the multivariate analysis and continue to a conclusion where I summarize the main ideas and results discussed in the paper. One of the main results of the paper is that some of the conclusions of Verba et al. (1995) are not robust to changes in the coding of dependent variables and changes in the model specification. Also, regarding the list of hypotheses stated above, I find strong support for the first three hypotheses, and weak evidence in favor of the fourth one. Overall, these results indicate that the comprehensive mixture model of political participation contributes greatly to advancing our understanding of the inequalities in political participation.

2 The Model

Common binary choice models used to study voter decisions assume that individual behavior does not depend on the identity of the respondent after accounting for a set of relevant observed attributes. In other words, they assume that all units are exchangeable. As explained by Ohlssen et al. (2000, 3), it is usually assumed that "any covariates that are expected to lead to predictable differences between (respondents) have been included in the model", and this is "essentially equivalent to assuming (responses) are drawn from a common population distribution." The main purpose of the method implemented in this paper is to relax that assumption in a way that allows testing new hypotheses about voter behavior, such as differences in participation propensities and varying effects of observed individual attributes across unobserved or latent subpopulations. Next, I describe the usual random utility specification used to model involvement in specific political activities, and explain how I extend it to obtain a better model of political participation.

Suppose the latent utility citizen i perceives from participating in activity j, y^*_{ij} , can be expressed as an affine function of the elements of covariate-vector $\mathbf{x}_i$ and random disturbance ϵ_{ij}:

$$(1) \quad y^*_{ij} = a_j + \mathbf{x}_i^{'}\mathbf{b}_j + \epsilon_{ij}$$

where the scalar a_j is an activity-specific intercept and $\mathbf{b}_j$ is a vector of activity-specific slopes. In the rest of this paper I set $z_{ij} = a_j + \mathbf{x}_i^{'}\mathbf{b}_j$ and refer to z_{ij} as an individual i's representative utility of engaging in activity j. Also, suppose citizens behave in accordance with the usual decision rule: if y_{ij} is a binary indicator of involvement in activity j, then:

$$y_{ij} = \begin{cases} 1 & \text{if } y^*_{ij} \geq 0; \\ 0 & \textit{otherwise.} \end{cases}$$

Given these assumptions about the decision-making process, individuals participate whenever $\mathbf{x}_i^{'}\mathbf{b}_j \geq -\epsilon_{ij}$. Thus, the distribution of ϵ_{ij} determines the extend to which the decision depends on observed variables represented in z_{ij} or other factors.

When researchers study binary choices using probit or logistic regressions, they assume ϵ_{ij}'s are drawn from normal or logistic distributions, respectively. According to these models, error terms are homogeneously distributed across the population, and the distribution is symmetric around zero. Since the expected value of ϵ_{ij} is zero, individuals who are indifferent conditional on the estimated level of representative utility—that is, those who have $z_{ij} = 0$ and are predicted to participate 50% of the time—are the ones most sensitive to changes in z_{ij}, as small variations in model covariates may affect their decisions.

Suppose instead that while there is a group of individuals who behave as above, there are other groups for whom the distribution of error terms is symmetric but centered at a value different from zero, such that:

$$\epsilon_{G[i]j} = \overline{u}_{G[i]j} + u_{ij}$$

where $G[i]$ gives the group membership of individual i, $\overline{u}_{G[i]j}$ is a constant giving the mean of the distribution of $\epsilon_{G[i]j}$ for group $G[i]$ and activity j, and u_{ij} is a symmetric and zero-mean distributed error term. At baseline covariates levels, individuals in groups with $\overline{u}_{G[i]j} > 0$ are systematically more likely to participate than individuals in the group with $\overline{u}_{G[i]j} = 0$, and the opposite for those with $\overline{u}_{G[i]j} < 0$. If this were the case, a model assuming error terms are identically distributed across the population would be misspecified. To solve this issue, we could modify expression (1) in the following manner:

$$(2) \quad y^*_{ij} = \widetilde{a}_{G[i]j} + \mathbf{x}'_i\mathbf{b}_j + u_{ij}$$

where $\widetilde{a}_{G[i]j} = a_j + \overline{u}_{G[i]j}$.

The re-specified model captures the heterogeneity in behavior by allowing the intercept to vary across groups, while assuming that the new error term u_{ij} is homogeneously distributed across the population. Suppose for instance, that there were three groups A, B and C with different baseline participation probabilities (with $\widetilde{a}_{Aj} < \widetilde{a}_{Bj} < \widetilde{a}_{Cj}$), that educational attainment were the only variable important for explaining participation, and that participation in activity J were explained by the following model:

$$y^*_{iJ} = \widetilde{a}_{G[i]J} + 0.4\, education + u_{iJ}$$

where u_{iJ} follows a logistic distribution, and $\widetilde{a}_{G[i]J}$ takes values -1, 0 and 1 for individuals in group A, B, and C respectively. The impact of relaxing assumptions of homogeneity can perhaps be seen more readily in the following example. If we find that three individuals a, b, and c, drawn from groups A, B, and C with level of educational attainment equal to 3, then their participation probabilities would be those shown in figure 1 and upper section of table 1. Still, the fact that individuals in the first group have lower baseline participation probabilities does not mean that they always participate less than any individuals in other groups. For instance, if some individual a' in group A is more educated than individual b in group B, it is possible that a' participates more frequently than b, as shown in the lower section of table 1 and location of a' in figure 1.

Individual	Education	Group (G)	$P(y_{ij} = 1 \mid education, G)$
a	3	1	55.0%
b	3	2	76.9%
c	3	3	90.0%

Individual	Education	Group (G)	$P(y_{ij} = 1 \mid education, G)$
a'	6	1	80.2%
b	3	2	76.9%

Table 1: Example of model with varying intercepts.

[INSERT FIGURE 1]

Thus, a characteristic of model (2) is that as long as covariates have significant impact on participation, a change in the value of some individual characteristic may compensate for the under-participation of individuals in low-propensity groups, or for the over-participation of individuals in high-propensity groups. A second characteristic is that while varying intercepts allow for considerable differences in baseline probabilities, they usually do not allow for much flexibility in covariate effects across groups. Among other things, model (2) assumes that individuals in the group with baseline participation probabilities closer to 50% are the most sensitive to changes in covariates (see Nagler 1994). Even though this model accommodates differences in baseline participation probabilities, it imposes restrictions that do not allow testing the set of hypotheses stated in the introduction.

Instead, I use an alternative specification which does not only allow for differences in baseline participation probabilities across groups, but also allows for greater flexibility in the impact of covariates. Specifically, suppose y^*_{ij} is given by expression (1), where the intercept is constant across groups, but ϵ_{ij} are heterogeneously distributed, with the skewness of the distribution of error terms varying across groups, such that:

$$(3)\ p_{ij} = 1 - (1 + e^{z_{ij}})^{-\alpha_{G[i]}}$$

where $\alpha_{G[i]} > 0$ is a skewness parameter regulating the shape of the distribution of error terms, and $z_{ij} = a_j + \mathbf{x}_i^{'}\mathbf{b}_j$. This model is a generalization of Nagler's (1994) scobit, in which skewness parameters are not assumed fixed but are allowed to vary across the population and are estimated based on information about individual involvement in multiple political activities.[8] For example, suppose that there are three groups A, B and C with $\alpha_A < \alpha_B < \alpha_C$, that educational attainment is the only variable important for explaining participation, and that participation in activity J is explained by the following model:

$$y^*_{iJ} = 0.4\ education + \epsilon_{iJ}$$

[INSERT FIGURE 2]

where skewness parameters used to translate y^*_{iJ} to p_{ij} take values 1.57, 1.00 and 0.546 for individuals in group A, B, and C respectively. If we found three individuals a, b, and c, drawn from groups A, B, and C with level of educational attainment equal to 3, then their participation probabilities would be similar to those previously given in the upper section of table 1, and figure 2. In figure 2, the upper curve corresponds to $\alpha = 1.57$, the black curve corresponds to $\alpha = 1$ (where the model becomes equivalent to that shown in figure 1), and the lower curve corresponds to $\alpha = 0.546$. Therefore, similar to the varying-intercepts model, this alternative specification allows for considerable differences in baseline participation probabilities across groups. Still, in contrast to the varying-intercepts model, differences in group membership do not lead to movements along the curve, but to changes in the functional form. This implies that differences in baseline probabilities are more "permanent" and are harder to compensate with changes in covariate values. For instance, figure 2 shows that individuals in group A (lower curve) are usually not expected to participate more

[8] In the binary choice literature, there exist a number of generalizations of common specifications which allow for asymmetries in the distribution of error terms, such as scobit (Nagler 1994) and its reflection power logit (Achen 2002), or skewed probit (Bazán et al. 2006, Chen et al. 1999). In each of these models, a single parameter regulates the shape of the distribution of error terms.

than 90% of the time, not even for very high levels of the representative utility. Thus, in contrast to model (2), even when covariates have significant impact on an individual's representative utility, a change in the value of some individual characteristic is often not enough to compensate the under-participation of individuals in low-propensity groups, or for the over-participation of individuals in high-propensity groups.

[INSERT FIGURE 3]

While the logistic regression imposes the assumption that indifferent individuals are the ones more sensitive to changes in the level of representative utility, this model relaxes this assumption by estimating α for each group based on the data instead of assuming it is fixed at $\alpha = 1$ as in the logit model.[9] Thus, the α parameter determines the baseline value of representative utility (and corresponding choice probability) for which a change in z_{ij} leads to largest effects. In figure 3, I plotted the changes in $P(y_{ij} = 1)$ produced by marginal changes in z_{ij} for several levels of α and baseline z_{ij}, where the thick curve corresponds to $\alpha = 1$ (logistic regression). Several features of the model become apparent when looking at this plot: first, the baseline level of z_{ij} leading to larger changes in $P(y_{ij} = 1)$ is decreasing in α; second, the maximum impact of a marginal change in z_{ij} on $P(y_{ij} = 1)$ is increasing in α; third, when α is large, marginal changes in z_{ij} lead to large changes in $P(y_{ij} = 1)$, but only for relatively low levels of baseline z_{ij}; and conversely, when α is small, marginal changes in z_{ij} lead to relatively larger impact on $P(y_{ij} = 1)$ when baseline z_{ij} is large, but generally $P(y_{ij} = 1)$ is relatively insensitive to changes in the level of representative utility.

Thus, an advantage of models allowing for skewed distributions of error terms is that they allow for model-based estimation of individuals' sensitivity to levels and changes in the representative utility from participation. In much previous research, the similarity of results obtained when alternating between logit and probit specifications has led researchers to believe that functional assumptions are of minor importance for studying binary choices (Koenker and Yoon 2009). But as illustrated in figure 3, if the data were generated by a scobit model with α different from 1, estimating a logistic regression can lead to misleading inferences (Nagler 1994).

[9] This is also true for scobit (single group case), where the skewness parameter is estimated based on the data (see Nagler 1994).

[INSERT FIGURE 4]

One limitation of this model is that identifying the skewness parameter requires sufficient variation in representative utilities across individuals, which sometimes can only be found in large data sets. Suppose, for instance, that no covariate were important for explaining participation in one particular activity, that the true intercept equaled zero, and that skewness parameters equaled 0.4, 1 and 2 for low, middle and high propensity groups, such that expected participation probabilities were 25%, 50% and 75% for individuals a, b, and c drawn from each of these groups, respectively (see first pane of figure 4). In this extreme case, it would be impossible to identify the intercept and skewness parameter based on information about involvement in this activity, as different values of the intercept and skewness parameter yield the same set of expected participation probabilities. For example, the second pane of figure 4 shows that when the intercept equals -1, and skewness parameters equal 0.9, 2.2 and 4.4, expected participation probabilities also equal 25%, 50% and 75%. In this case, since there is absolutely no variation in representative utilities among individuals, it is impossible to identify the model, no matter how large the size of the data set.[10]

In this paper, I take advantage of the fact that I simultaneously model several political activities to borrow information about propensities toward activism across different forms of participation. In doing so, I assume that group membership and skewness parameters are fixed across choices, such that if one respondent is assigned to the lowest propensity group in one activity, she/he is also assigned to the low propensity group in other activities. The consideration of multiple activities and the *stable group assignment* assumption allows pooling information about group behavior across activities and enables the identification of model parameters.[11]

[10] Note that this identification problem does not only come up in multiple-group examples, but also complicates the estimation of the most simple scobit model where all individuals have the same skewness parameter. For instance, the first figure in the appendix shows that when the level of representative utility equals zero for all individuals and the skewness parameter equals one—such that everyone is expected to participate 50% of the time—the scobit model cannot be identified, as an intercept equal to -1 and skewness parameter equal to 0.5 yields the same expected participation probabilities.

[11] I am currently working on an extension of the model where skewness parameters are allowed to vary across activities within groups, and where I assume that α's share a common prior distribution across activities. Since parameters of this prior distribution (termed "hyperparameters") are estimated based on involvement in multiple forms of political participation, this random effects approach allows me to increase the flexibility of the model while at the same time pooling enough information about group behavior across activities. Also, I am working on separate paper where I discuss the properties of the statistical model more in detail and conduct a set of simulations to show how the model can recover true parameters better than more common approaches even when the identification of model parameters is challenged by limited availability of information or lack of separation across groups.

[INSERT FIGURE 5]

Figure 5 gives an example where skewness parameters equal 0.5, 1.1 and 1.9 for low middle and high propensity groups, and there are two activities in which covariates are again not important for explaining participation, although intercepts vary across activities. For the first activity, the intercept equals -1, and for the second one it equals 1, leading to lower expected participation in the first activity relative to the second one. In this example, even though it is possible to find alternative values of the intercept and skewness parameters which leave participation probabilities unchanged for the first activity, modifying skewness parameters diminishes the likelihood of the model as doing so affects expected participation probabilities for the second activity. This example illustrates why is it that simultaneously studying participation in a variety of political activities helps identify model parameters.

When examining real data it often happens that some covariates are important for explaining participation, and since skewness parameters do not only affect baseline probabilities but also mediate the impact of covariates, the presence of variation in values of relevant covariates across the population contributes to identifying skewness parameters for each group. Thus, separation of skewness parameters across groups, variation in relevant covariates, and availability of information about group tendencies toward participation across multiple different activities, are all factors which contribute to identifying model parameters.

3 Estimation

As mentioned previously, I simultaneously model the decision to participate in multiple political activities. In doing so, I allow the propensity toward activism to vary across groups of respondents by assuming the parameter regulating the asymmetry of the scobit link follows a finite mixture distribution, and fit the model using standard Markov Chain Monte Carlo methods. Specifically, I make the following distributional assumptions:

y_{ij} ∼Bernoulli(p_{ij})

where $p_{ij} = 1 - (1 + e^{z_{ij}})^{-\alpha_{G[i]}}$, $\alpha_{G[i]} > 0$, and $z_{ij} = \mathbf{x}_i^{'}\mathbf{b}_j$.

This is a mixture model where parameters in z_{ij} do not vary across groups—that is b_j's are constant across respondents—but skewness parameters are allowed to change depending on $G[i]$. Note that except for $G[i]$ and $\alpha_{G[i]}$, all parameters are allowed to vary across activities. In specifying the distribution of the parameters of the linear predictor , I use a random effects approach that allows borrowing information about individual behavior across different forms of political participation:

$\mathbf{b}_j \sim MVN(\overline{\mathbf{b}}, \Sigma)$

Also, in specifying the distribution of skewness parameters, I take into account the fact that the latter must take positive values for all groups and impose an order restriction to address the well-known "label-switching problem", a common identification problem arising during the estimation of mixture models.[12] To address these estimation difficulties, I set $\alpha_k = exp(\tilde{\alpha}_k)$ to ensure that skewness parameters are always positive, assume $\tilde{\alpha}_1 \sim N(\overline{\alpha}_1, \sigma_{\alpha 1})$, and impose the following order restriction (following Spiegelhalter 1996, 9):

$\tilde{\alpha}_k = \tilde{\alpha}_{k-1} + \theta_k$ for $k > 1$

where

$\theta_k \sim HN(\overline{\theta}_k, \sigma_{\theta_k})$

Since θ_k's are restricted to be positive (assumed drawn from a half-normal distribution), this assumption implies that if the mixture distribution contains K components, then:

$\alpha_1 \geq \alpha_2 \geq ... \geq \alpha_K$

Finally, I assume indicators of group assignment follow a categorical distribution, and mixing probabilities $\mathbf{P}$ follow a truncated Dirichlet process (a distribution over the space of probabilities)

[12]Specifically, problems may arise during the estimation of mixture models due to the fact that the model likelihood is invariant to re-assignment of group labels (Jasra et al. 2005).

with a finite number of components or groups:

$$G_i \sim \text{Categorical}(\mathbf{P})$$

$$\mathbf{P} \sim \text{Dirichlet}(\mathbf{P}_0)$$

[INSERT FIGURE 6]

Figure 6 gives a directed graphical representation of the model (based on Spiegelhalter 1996), useful for understanding its structure as well as conditional independence assumptions used to factorize posterior distributions. In each iteration, the MCMC algorithm (implemented using WinBUGS) samples from the conditional distribution of model parameters: draws vectors of latent group assignment (G_i) conditional on mixing probabilities (P); draws skewness parameters for each group (α_k, θ_k) conditional on hyperparameters ($\overline{\alpha_k}, \overline{\theta_k}, \tau_{\alpha_k}, \tau_{\theta_k}$); and draws coefficients of the linear predictor (B) also conditional on hyperparameters ($\overline{B}, \Sigma$). After making sure that models parameters converged to their stable posterior distribution, I summarize posterior distributions of model parameters using the second half of saved MCMC samples.

4 American Citizen Participation Study (1990)

4.1 Introduction

In this section I study the determinants of participation in a series of political activities using data from an in-person survey conducted as part of the 1990 American Citizen Participation Study (ACPS, Verba et al. 1995). This national-level survey was conducted during the Spring of 1990 by the National Opinion Research Center, and includes data gathered from interviews with 2,517 adults 18 years and older. In addition to a rich set of questions related to political attitudes, politically relevant resources and civic voluntarism, this survey oversampled racial minorities and political activists, making it an ideal source of information for studying political participation. Additionally, this data has been throughly analyzed in the past in a series of influential publications (Verba et al. 1995, Brady et al. 1995, Schlozman et al. 1995). In this paper, I use the model described in sections two and three to extend the analysis done in previous studies. The alternative specification leads to different conclusions relative to those found by Verba et al. (1995) and allows learning about systematic differences in behavior across groups of respondents which remain unaccounted for after controlling for socio-economic status and politically relevant resources.

The first two political activities that I consider are voting in the 1988 presidential election (67.6% participation) and voting in a local election since November 1988 (65.9% participation).[13] In 'Voice and Equality', Verba, Schlozman and Brady (1995) construct a scale measuring tendencies to vote in national and local elections, and estimate an OLS regression to explain voting habits in terms of individual attributes.[14] In contrast to what they found in their model of overall participation, one of the main results of the voting regression is that education is not significant after accounting for measures of political engagement, suggesting that "the effect (of education) is not direct, but occurs through engagement" (page 360), although the effect of language skills remain significant. Also, they find that job level, involvement in non-political organizations and an aggregate measure of civic skills are all not significant, leading them to conclude that "resources play virtually no role for voting" and that "civic skills are unimportant" (page 359). Among political engagement variables, they find that political interest and information have the largest effects on voting habits.[15] According to VSB (1995), in contrast to other activities, the act of voting is mainly driven by a desire to fulfill civic duties—as opposed to a desire for socialization or material rewards—and therefore it is not surprising that what matters for voting are "civic orientations" reflected in the degree of interest in politics and political engagement. In this section, I show that changes in the model specification lead to substantially different conclusions. In particular, education remains significant for explaining voter turnout even after controlling for measures of political engagement.

The third and fourth political activities are monetary contributions to candidates, parties, political action committees and other organizations supporting candidates (23.6% participation), and donations made in response to mail requests sent by political organizations, causes or candidates (9.8% participation). In their book, VSB (1995) model the overall size of monetary contributions, and find that "income is overwhelmingly the dominant factor" (page 361), but other politically

[13] Percentages reported in this section are computed using sample weights.

[14] From this point onwards I refer to Verba, Scholzman and Brady's 1995 book as VSB (1995).

[15] They also find that different to other activities, citizenship has a large positive effect on voting habits. I omit this variable in my analysis because the survey sample contains only 5% non-citizens (unweighted) and the small number of foreign-born non-naturalized respondents does not allow computing reliable estimates.

relevant resources (including education) play no role. Additionally, they find that measures of political engagement have minor impact (specially political efficacy and information), and conclude that "writing checks for political causes demands little political interest and political information and even less of efficacy" (page 361). In contrast to VSB (1995), I model the binary decision of making a donation (regardless of its size), and find considerably different substantive results.

Also, I consider a set of political activities which VSB (1995) characterize as "time based acts". These activities include voluntary campaign work (8.5% participation), voluntary activity in official local boards or councils (16.6% participation), informal activity in the respondent's community or neighborhood (17.0% participation), contacting local elected or appointed officials (18.0% participation), contacting national elected or appointed officials (28.7% participation), participation in portests, marches or demonstrations (5.7% participation), and membership or contribution to an organization taking stands on public issues (48.1% participation). For these variables, the results I find in this paper are largely consistent with those found by VSB (1995) in their model of overall participation in time-based acts: significant effects of politically relevant resources (including education) and civic skills, as well of measures of political engagement (except for strength of partisanship), although results vary considerably across activities. Finally, I study the determinants of engagement in political discussion (52.5% report discussing *local* politics and affairs at least once or twice a week, and 59.8% report discussing *national* politics and affairs at least once or twice a week). In their book, VSB (1995) argue that this activity does not constitute political participation because it is not aimed at affecting political outcomes, but still estimate a model of political discussion to use it as a basis of comparison. They find that resources play no important role, to the extent that "even vocabulary skill does not have an impact on the propensity to chat about politics" (page 362) and that measures of political engagement are of outmost importance.

Before proceeding to the discussion of results of the multivariate analysis, it is important to note that the methodology used in this paper differs considerably from the one used in VSB (1995) as well as common statistical methods applied in the participation literature. For instance, the analysis of the determinants of political involvement done in VSB (1995) makes use of the following type of dependent variables: an additive indicator of overall political participation; a voting scale based on reported tendency to vote in local and national elections; the amount of money contributed to candidates and campaigns; and additive index of participation in time based-acts (similar to the overall index, except that it excludes voting habits and monetary contributions). The limitation of using additive indices is that doing so imposes the strong assumption that a one-step increase in involvement in one activity has the same impact on underlying participation propensities as a one-step increases in other components of the additive index (Treier and Jackman 2008). If this assumption does not hold, using additive indices as proxies to overall participation may lead to inaccurate inferences. Also, another limitation of this approach is that it completely pools information across activities and does not allow assessing the impact of covariates on specific forms of participation. Alternatively, another methodology commonly used in the literature is the estimation of separate binary dependent variable models for each political activity (and in particular, voting). A shortcoming of this procedure is that it is inefficient, in the sense that it ignores common patterns of behavior existing across activities, and therefore ignores information which can help decrease the uncertainty about covariate effects. The approach used in this paper does not only differ from the ones used in previous studies of political participation in that it allows overall propensities to vary across groups, but also is more efficient due to the use of a random effects procedure to partially-pool information across activities.[16]

The multivariate analysis I conduct in this section has two objectives. First, I consider the impact of a set of covariates, including socio-demographic indicators like education, age, gender and job level; indicators of politically relevant resources like language skills, family income and availability of free time; variables related to involvement in social networks like church attendance and involvement in non-political activities and organizations; and finally a set of measures of civic skills accumulated at work, through involvement in organizations, or as part of church activities (specific skills include having ever written letters, attended meetings where decisions are made, planned or chaired meetings, and given presentations or speeches). Second, after controlling for all of these indicators, I use the model to classify individuals into high, middle and low propensity groups, depending on the distribution of other factors, and study differences in baseline participation probabilities and covariate effects across groups. Third, I re-estimate the model after incorporating several measures of political engagement, including political interest, political information, feelings of political efficacy and partisanship, and study how this leads to changes in group assignments and covariate effects. Finally, I study the relationship between group assignment and indicators of

[16]In this sense, the methodological approach discussed in this paper exhibits similarities with that proposed by Revelt and Train (1998).

positions on numerous issues and personal concerns. Among other things, the statistical procedure allows measuring the size of each group, obtaining group-level indicators of propensity to participation in political activities, finding out whether significant differences in covariate effects exist across groups, and studying the determinants of group assignment.

4.2 Results

I used the model specification discussed in sections two and three to explain the decision to participate in the above mentioned political activities, and classified individuals into three groups as a function of their propensity to get involved in civic voluntarism. In this section, I focus on the discussion of a simple model specification which excludes measures of political engagement and other variables (which I call the "main model") although I also discuss the robustness of results to inclusion of additional covariates in a second model specification (which I call the "extended model").[17]

[INSERT TABLE 2]

[INSERT FIGURE 7]

Table 2 gives estimates of group assignment and skewness parameters for the three groups. Starting with estimates of group assignment, the upper plot in figure 7 gives MCMC draws for two individuals: the usual pattern is that each respondent is assigned to one group most of the time, although she/he is also assigned to other groups with a lower frequency. The lower plot in figure 7 gives a ternary plot with the distribution of estimated assignment-probabilities across the

[17] The dependent variables in the main model specification include binary indicators of participation in eight political activities: voting in the 1988 presidential election, campaign work, campaign donations, participation in formal community activities (like local boards or councils), participation in informal community activities, contacting local *or* federal officials, involvement in protests, and involvement in political organizations. The extended model specification includes a similar set of dependent variables, except that I model contacting local officials separately from contacting federal officials, and also study the determinants of voting in local elections since 1988, by-mail donations and frequency of political discussions (12 activities in total). With respect to covariates, the main model specification controls for education, age, vocabulary skills, family income, availability of free time, job level, job skills, organizational skills, church skills and active involvement in non-political activities. The extended model specification includes a similar set of covariates (substituting age-group by age), and additionally controls for age^2, gender, church attendance, political information, political interest, feelings of political efficacy, and strength of partisanship.

whole sample: 58% of respondents are assigned to the middle propensity group more frequently than to the lower or high propensity groups, and among the latter the high-propensity group is assigned the lowest proportion of respondents (4.1%). Regarding skewness parameters, I find that the first two groups exhibit lower values of α compared to that of a logit specification (where the parameter is assumed fixed at one), while the third group exhibits a larger value. After extending the model to account for a number of excluded covariates, the proportion of individuals assigned to the middle-propensity group increases considerably to 66.5% (see table 2). Further, the skewness parameter for the middle-propensity group becomes indistinguishable from one, suggesting a logit model is appropriate for learning about this group after taking into account differences in other factors. Still, significant heterogeneities remain as large proportion of individuals are still assigned to groups with relatively low or high propensities toward participation.

[INSERT FIGURE 8]

Even though α's are assumed fixed across activities, coefficients of the linear predictor are allowed to change. Figure 8 gives 90% posterior intervals intervals and mean values for the coefficients of the main model specification, for each political activity. Additionally, I overlay the results from the scobit-mixture model (black posterior intervals) with those arising from a simple logit estimation (grey posterior intervals), to help visualize differences in inferences across methodologies. An observation that immediately comes out of figure 8 is that both approaches differ little in terms of estimated coefficients, although the logit model consistently underestimates the impact of variables such as education and organizational skills. Another result that becomes quickly apparent is that the impact of covariates on the linear predictor is mostly symmetric across activities, with education, organizational skills and political interest (in the extended model) consistently exhibiting positive and significant effects, and variables such as age, job skills, non-political activism, vocabulary skills, family income and other measures of political engagement (in the extended model) usually exhibiting positive and significant effects.

Regarding differences with respect to the findings of VSB (1995) the most clear discrepancy is that the impact of education and organizational skills remains strong and significant for the twelve forms of political participation considered in the extended model, even after controlling for several measures of political engagement;[18] contradicting the argument that education and civic skills have little impact on participation in some political activities, or that only indirect effects remain. Another important discrepancy is that all measures of political engagement (including political efficacy) have positive and significant effect on the decision to contribute money to campaigns (including by-mail contributions), and this contradicts the claim that family income is the only important factor for explaining campaign donations.[19] Most interestingly, these discrepancies are not a result of the model specification suggested in this paper, but also come up in the estimation of logistic regressions. Thus, differences are most probably due to the fact that VSB (1995) use aggregate indicators of voluntarism, which might lead to an underestimation of the relationship between each participation decision and relevant covariates.

Moving on to the results obtained for specific activities, one of the most interesting deviations from the overall pattern occurs for protests, where older people participate significantly less (and the effect remains significant, although nonlinear in the extended model). Another deviation occurs in the extended model for church attendance, where the impact is positive for voting in national and elections but negative for other activities after controlling for civic skills acquired during church activities and involvement in religious activism (included in the overall measure of participation in non-political activities). Also, even though the impact of interest in politics is large and significant for all activities (according to the extended model), the effect is particularly large for political discussions, a result consistent with the conclusions of VSB (1995). Thus, even though the effect of covariates on the linear predictor is relatively similar across activities, there are also important deviations which should be taken into account in explaining each particular form of civic voluntarism.

[INSERT FIGURE 9]

[INSERT FIGURE 10]

[18] The second figure in the appendix contains a replication of figure 8 for the extended model.

[19] Although it is important to take into account that VSB (1995) model the amount of money contributed to candidates, campaigns or political organizations; not the binary decision of whether to make a donations (regardless of the amount).

[INSERT FIGURE 11]

Turning to estimates of covariate effects, figures 9 gives the relationship between participation probabilities (vertical axis) and education (horizontal axis, figure 9) for each political activity; and figures 10 and 11 give similar information for organizational skills and age-group, respectively.[20] The smooth line corresponds to predictions arising from a logistic regression, and the other three lines corresponds to predictions for each group in the scobit-mixture model. Even though the results from the logistic model closely approximate the behavior of the middle-propensity group (except for voting in national elections and involvement in political organizations), this model severely underestimates baseline participation probabilities for respondents in the high propensity group, and overestimates participation probabilities for those respondents in the low propensity group.[21] Most interestingly, since the logistic regression underestimates parameters of the linear predictor for education and organizational skills, covariate effects are also underestimated for these variables.[22] This phenomenon is most noticeable for the involvement of the high propensity group in campaign work, monetary contributions, informal activity, participation in protests, and is also observed for the middle propensity group for contacting officials, monetary contributions and involvement in political organizations.

Overall, results give strong support in favor of the first three hypotheses stated in the introduction. First, the high propensity group is the only one exhibiting above 20% participation probability for median covariate levels.[23] Further, respondents in this group are almost sure to participate in relatively easy activities like voting in national elections. Second, the last result stands in contrat to the behavior of the low propensity group which exhibits below 50% probability of participation in voting. Also, respondents in this group are almost sure to abstain from costly activities like campaign work, forman and informal community activities and participation in protests. Third, the behavior of the intermediate propensity group is approximated pretty accurately by a standard logistic regression, suggesting that the assumption of zero-mean disturbances is relatively harmless for this group. Fourth, after extending the model to explicitly account for differences in political

[20] The appendix includes a replication of figures 9 and 11 for the extended model.

[21] This observation remains valid for the extended model, although in that case differences are of lower magnitude (see appendix figures).

[22] In taking about "covariate effects" I refer to the change in participation probabilities resulting from changes in covariate levels, reflected in the slop the curves drawn in figures 9 through 11.

[23] The median level of education is "some college".

engagement, there is a decrease in group differences in baseline participation probabilities (see figure 9 and it counterpart for the extended model included in the appendix) and an increase in the size of the intermediate group. After controlling for political engagement, the skewness parameter associated with the intermediate group becomes indistinguishable from that of a standard logistic regression.

[INSERT TABLE 3]

[INSERT TABLE 4]

Still, considerable heterogeneities in participation probabilities across groups remain after extending the model to account for differences in political engagement, specially for voting and membership in political organizations. To conclude the analysis, I study the relationship between group assignment and and issue positions, as well as personal economic concerns. Table 3 gives the proportion of respondents in each group expressing more or less support for a series of statements on issues including attitudes toward welfare policy, affirmative action, religion in public schools, and abortion. Interestingly, the high propensity group has the maximum proportion of respondents in the full agreement category (7) for all activities, as well as the maximum proportion of respondents in the maximum disagreement category (1) for four of the seven issues listed in table 3, giving some support to the hypothesis that those more prone toward activism tend to exhibit relatively extremist views. Nonetheless, group differences are usually not significant, except for "government provision of services" where the low propensity group exhibits moderate views relative to intermediate- and high- propensity respondents. Table 4 gives further evidence about the relationship between group assignment and positions on other public issues, including removal of pro-gay and racist books from public libraries, allowing authoritarian and anti-religious speeches in local communities, and requiring permits to buy a handgun. For the first two and the last of these issues, the high propensity group exhibits relatively high opposition to restricting some of these liberties. Even though tables 3 and 4 provide some evidence in favor of hypothesis 4.1, the fact that group differences are usually not statistically significant suggests that relationships between issue positions and participation propensities are weak in the 1990 ACPS.

[INSERT TABLE 5]

[INSERT TABLE 6]

Finally, table 5 gives the relationship between group assignment and personal concerns, including education, health, day care, housing and employment problems. The striking result coming out of table 5 is that group differences are large and significant, but the direction of the differences contradicts expectations. In particular, the high propensity group exhibits relatively larger proportions of troubled respondents, except for employment where group differences are not significant. Thus, table 5 gives strong evidence against hypothesis 4.2, which claims that personal concerns inhibit participation. Further, table 6 gives the relationship between group assignment and cash difficulties experienced during the last year, where this measure is constructed based on responses regarding problems paying medical or dental treatments, paying the rent, needing to cut back the amount or quality of food, needing to cut back on entertainment and recreation, or needing to work extra hours. Consistent with the results of table 5, the high propensity group exhibits a larger proportion of respondents with non-zero difficulties. Conversely, the low propensity group exhibits the largest proportion of respondents who do not experience any kind of trouble. In sum, results from tables 5 and 6 reinforce each other in giving evidence against hypothesis 4.2.

5 Conclusions

The study of the determinants of political outcomes is challenging because multiple channels can be used to affect collective decisions. In aiming to affect a particular political outcome some individuals may decide to participate in the election of officials representing their interests, others may donate money in support of a candidate or political organization, and yet others may choose to join demonstrations in support of a particular position on a public issue. If different forms of political participation attract different types of activists, obtaining reliable estimates of the impact of individual attributes on overall participation and political outcomes requires a comprehensive examination of the determinants of involvement in all relevant political activities.

Still, most studies of political participation have focused on explaining voting in presidential elections, or on conducting independent analyses of the decision to participate in different activities. Alternatively, others have modeled overall tendencies toward participation using aggregate indicators of the decision to participate in multiple activities. The first approach is limited because it ignores patterns of behavior which remain mostly constant across different forms of political participation, and therefore does not make efficient use of all the available information. Conversely, the second approach is also limited, but for the opposite reasons: it completely pools information across activities and does not allow measuring the extent to which impacts of individual attributes vary across political activities.

Additionally, the standard resource model of political participation assumes that respondent identities do not matter after accounting for socio-economic variables and politically-relevant resources. However, this assumption is violated whenever significant heterogeneities in individual behavior remain due to differences in excluded factors affecting individual motivations to get involved in politics, such as issue positions and personal concerns. In this paper, I use finite mixture modeling to relax this assumption and generalize the specification of a particular binary choice model, allowing a parameter regulating propensities to get involved in political activities to vary across clusters of respondents. Additionally, in modeling coefficients affecting the systematic utility from participation, I use a random effects approach which allows borrowing information regarding common patterns of individual behavior across political activities.

To evaluate the ability of the proposed model specification to provide new insights about the determinants of political participation, I applied it to data from the 1990 American Citizen Participation Study, and found that some conclusions discussed in Verba et al. (1995) regarding the impact of politically relevant resources and measures of political engagement on specific political acts are not robust to changes in variable coding and model specification. In particular, I found evidence against the claim that education has only indirect effects on voting, and that measures of political engagement have little impact on the decision to donate money to campaigns. Additionally, I found that considerable heterogeneities remain after controlling for an extended number of individual attributes.

Among other things, I found that there is an activist group who exhibits high likelihood of participating in easy activities, and also considerable probability of engaging in more costly activities. Additionally, for respondents in this group, changes in observed attributes have the largest effects for costly activities. Conversely, the low propensity group tends to exhibit the opposite behavior. This result is not only important for the implications for political representation—given that groups differ slightly on issue positions, and sensibly on personal concerns—but also for the design of political campaigns. For instance, a candidate whose basis of support lies among those in the low-propensity group might want to invest campaign resources in motivating them to participate in easy activities like voting, instead of spending resources in getting them to participate in costly activities, as recruitment efforts aimed at involving them in other forms of participation are likely to be unsuccessful. Also, the converse holds for campaign efforts intended to mobilize those in the activist group, where candidates might want to avoid wasting resources in getting them to participate in easy activities, as they are likely to participate regardless of their exposure to mobilization efforts. Asides from political issues and personal concerns, it is likely that groups vary considerably in terms of factors usually excluded from the resource model, so further research needs to be done to get fuller understanding of the determinants of civic engagement.

References

[1] Abramson, Paul R. and William Claggett. Recruitment and Political Participation. *Political Research Quarterly.* 54(4):905-16.

[2] Achen, Christopher H. 2002. Toward a New Political Methodology: Microfoundations and ART. *Annual Review of Political Science.* 5: 423-50.

[3] Almond, Gabriel Abraham and Sidney Verba. 1963. *The Civic Culture: Political Attitudes and Democracy in Five Nations.* Princeton: Princeton University Press.

[4] Bazán, Jorge L., Márcia D. Branco and Heleno Bolfarine. 2006. A Skew Item Response Model. *Bayesian Analysis.* 1(4):861-92.

[5] Berinsky, Adam J. . 2004. *Silent voices: public opinion and political participation in America* Princeton: Princeton University Press.

[6] Banks, Jeffrey S. and D. Roderick Kiewiet. 1989. Explaining Patterns of Candidate Competition in Congressional Elections. *American Journal of Political Science.* 33(4):997-1015.

[7] Brady, Henry E., Sidney Verba, and Kay Lehman Schlozman. 1995. Beyond SES: A Resource Model of Political Participation. *American Political Science Review.* 89:271-94.

[8] Brady, Henry E., Kay Lehman Schlozman and Sidney Verba. 1999. Prospecting for Participants: Rational Expectations and the Recruitment of Political Activists. *American Political Science Review.* 93(1):153-68.

[9] Brehm, John. 1993. *The Phantom Respondents: Opinion Surveys and Political Representation.* Ann Arbor: University of Michigan Press.

[10] Brehm, John and Wendy Rahn. 1997. Individual-Level Evidence for the Causes and Consequences of Social Capital. *American Journal of Political Science.* 41(3):999-1023.

[11] Brody, Richard A. and Paul M. Sniderman. 1977. From Life Space to Polling Place: The Relevance of Personal Concerns for Voting Behavior. *British Journal of Political Science.* 7(3): 337-60.

[12] Downs, Anthony. 1957. *An Economic Theory of Democracy.* New York: Harper.

[13] Fiorina, Morris P. 1999. A Dark Side of Civic Engagement. In *Civic Engagement in American Democracy,* ed. Theda Skocpol and Morris Fiorina. Washington, DC: Brookings. 395-425.

[14] Fiorina, Morris P. 2002. Parties, Participation, and Representation in America: Old Theories Face New Realities. In *Political Science: The State of the Discipline,* ed. Ira Katznelson and Helen Milner. New York: Norton. 511-541.

[15] Frühwirth-Schnatter, Sylvia. 2006. *Finite Mixture and Markov Switching Models* New York: Springer.

[16] Hagenaars, Jacques A. and Allan L. McCutcheon. Preface. In *Applied Latent Class Analysis*, ed. Jacques A. Hagenaars and Allan L. McCutcheon. Cambridge: Cambridge University Press.

[17] Hill, Jennifer L. and Hanspeter Kriesi. 2001. Classification by Opinion-Changing Behavior: A Mixture Model Approach. *Political Analysis.* 9(4):301-24.

[18] Key, V. O., Jr. 1966. *The Responsible Electorate: Rationality in Presidential Voting, 1936-1960.* Cambridge: Harvard University Press.

[19] Koenker, Roger and Jungmo Yoon. 2009. Parametric links for binary choice models: A FisherianBayesian colloquy. *Journal of Econometrics.* 152(2):120-30.

[20] Lohmann, Susanne. 1993. A Signaling Model of Informative and Manipulative Political Action. *American Political Science Review.* 87(2):319-33.

[21] McDonald, Michael P. 2008. Voter Turnout. `http://elections.gmu.edu/voter_turnout.htm` (August 17 2010).

[22] McDonald, Michael P. and Samuel L. Popkin. 2001. The Myth of the Vanishing Voter. *American Political Science Review.* 95(4):963-74.

[23] Miller, Arthur H., Patricia Gurin, Gerald Gurin and Oksana Malanchuk. 1981. Group Consciousness and Political Participation. American Journal of Political Science. 25(3):494-511.

[24] Mutz, Diana C. 2002. The Consequences of Cross-Cutting Networks for Political Participation. *American Journal of Political Science.* 46(4):838-55.

[25] Nagler, Jonathan. 1994. Scobit: An Alternative Estimator to Logit and Probit. *American Journal of Political Science.* 38(1):230-55.

[26] Ohlssen, David I., Linda D. Sharples. and David J. Spiegelhalter. 2007. Flexible Random-Effects models using Bayesian Semi-Parametric Models: Applications to Institutional Comparisons. *Statistics in Medicine.* 26(9):2088-112.

[27] Oliver, Pamela, Gerald Marwell and Ruy Teixeira. A Theory of the Critical Mass. I. Interdependence, Group Heterogeneity, and the Production of Collective Action. *American Journal of Sociology.* 91(3):522-56.

[28] Olson, Mancur. 1965. *The Logic of Collective Action.* Cambridge: Harvard University Press.

[29] Page, Benjamin I. and Robert Y. Shapiro. 1983. *Effects of Public Opinion on Policy.* American Political Science Review. 77(1):175-90.

[30] Pateman, Carole. 1970. *Participation and Democratic Theory.* Cambridge: Cambridge University Press.

[31] Patterson, Thomas E. 2002. *The Vanishing Voter: Public Involvement in an Age of Uncertainty.* New York: Alfred A. Knopf.

[32] Putnam, Robert D. 1995a. Bowling Alone: America's Declining Social Capital. *Journal of Democracy.* 6(1):65-78.

[33] Putnam, Robert D. 1995b. Tuning In, Tuning Out: The Strange Disappearance of Social Capital in America. *PS: Political Science and Politics.* 28(4):664-83.

[34] Revelt, David and Kenneth Train. 1998. Mixed Logit with Repeated Choices: Households' Choices of Appliance Efficiency Level. *Review of Economics and Statistics.* 80(4):647-57.

[35] Riker, William H. and Peter C. Ordeshook. 1970. A Theory of the Calculus of Voting. *American Political Science Review.* 62(1):25-42.

[36] Roh, Jongho and Donald P. Haider-Markel. 2003. All Politics is Not Local: National Forces in State Abortion Initiatives. *Social Science Quarterly.* 84(1):1531.

[37] Rosenstone, Steven J. and John Mark Hansen. 1993. *Mobilization, Participation, and Democracy in America.* New York: Macmillan Publishing Company.

[38] Schuessler, Alexander A. 2000. *A logic of Expressive Choice.* Princeton: Princeton University Press.

[39] Schlozman, Kay Lehman, Sidney Verba, and Henry E. Brady. 1995. Participation's Not a Paradox: The View from American Activists. *British Journal of Political Science.* 25:1-36.

[40] Schonfeld, William R. 1975. Review: The Meaning of Democratic Participation. *World Politics.* 28(1):134-58.

[41] Spiegelhalter, David J., Andrew Thomas, Nicky G. Best and Wally R. Gilks. 1996. BUGS Examples Volume 2, Version 0.5.

[42] Stimson, James A., Michael B. Mackuen and Robert S. Erikson. 1995. Dynamic Representation. American Political Science Review. 89(3):543-65.

[43] Tarrow, Sidney. 1998. *Power in Movement: Social Movements and Contentious Politics.* Cambridge: Cambridge University Press.

[44] Treier, Shawn and Simon Jackman. 2008. Democracy as a Latent Variable. *American Journal of Political Science.* 52(1):201-17.

[45] Uhlaner, Carole J. 1989. “Relational Goods” and Participation: Incorporating Sociability into a Theory of Rational Action. *Public Choice.* 62(3):253-85

[46] Verba, Sidney and Norman H. Nie. 1972. *Participation in. America: Political Democracy and Social Equality.* New. York: Harper and Row.

[47] Verba, Sidney, Kay Lehman Schlozman, and Henry E. Brady. 1995. *Voice and Equality: Civic Voluntarism in American Politics.* Cambridge: Harvard University Press.

[48] Wolfinger, Raymond E. and Steven J. Rosenstone. 1980. *Who votes?* New Haven: Yale University Press.

	Main Model		
	Skewness parameter (α)	Average Assignment Probability	Predicted Proportion
Low propensity	0.18 (0.03)	37.9	37.8
Middle propensity	0.59 (0.11)	54.1	58.1
High propensity	2.01 (0.57)	8.0	4.1

	Extended Model		
	Skewness parameter (α)	Average Assignment Probability	Predicted Proportion
Low propensity	0.50 (0.06)	29.1	21.2
Middle propensity	1.06 (0.13)	53.7	66.5
High propensity	2.60 (0.37)	17.2	12.2

Table 2: Estimates of skewness parameter and group assignment (Main Model).

	People should get ahead on their own (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	8.8	7.4	12.5	26.0	22.5	12.0	10.8
Middle propensity	9.9	8.5	14.9	22.4	18.5	13.8	12.0
High propensity	10.2	9.7	15.7	21.6	16.5	13.6	12.7
	Government should provide more services (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	5.9	9.4	16.5	29.6	16.5	10.1	12.1
Middle propensity	6.9	8.7	13.7	25.0	16.3	13.3	16.1
High propensity	9.7	9.3	13.9	24.5	14.8	11.4	16.5
	No affirmative action for Blacks (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	10.3	5.7	12.0	30.7	14.5	13.3	13.5
Middle propensity	10.5	6.0	10.6	29.4	14.2	13.8	15.5
High propensity	10.1	8.0	8.4	28.3	13.5	12.7	19.0
	No affirmative action for women (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	9.4	7.4	15.3	29.6	15.3	11.3	11.8
Middle propensity	11.6	5.9	12.9	29.2	15.3	13.2	11.8
High propensity	10.1	8.9	14.3	25.3	13.1	12.2	16.0
	No affirmative action for Hispanics (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	7.1	5.4	12.3	33.0	13.8	13.3	15.0
Middle propensity	9.1	5.5	10.6	29.5	13.6	15.0	16.8
High propensity	9.3	8.4	8.9	30.0	12.7	13.9	16.9
	No religion in public schools (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	34.9	6.8	8.8	13.4	5.6	9.0	21.5
Middle propensity	35.2	10.2	7.3	14.8	4.4	7.8	20.3
High propensity	33.3	8.1	7.3	13.7	3.4	6.0	28.2
	Abortions should never be permitted (%)						
	Disagree					Agree	
	1	2	3	4	5	6	7
Low propensity	38.9	10.3	7.4	11.8	8.6	9.1	13.8
Middle propensity	40.8	9.8	7.7	12.2	5.4	9.5	14.6
High propensity	43.4	11.1	5.1	12.8	2.6	10.2	14.9

Table 3: Group assignment and issue positions (Extended Model).

	Remove pro-gay book (%)	
	No	Yes
Low propensity	71.5	28.5
Middle propensity	71.3	28.7
High propensity	77.2	22.8
	Remove racist book (%)	
	No	Yes
Low propensity	69.8	30.2
Middle propensity	70.3	29.7
High propensity	76.5	23.5
	Allow authoritarian speech (%)	
	No	Yes
Low propensity	28.7	71.3
Middle propensity	27.8	72.2
High propensity	27.4	72.6
	Allow anti-religious speech (%)	
	No	Yes
Low propensity	29.0	71.0
Middle propensity	27.2	72.8
High propensity	23.6	76.4
	Require permit for handgun (%)	
	No	Yes
Low propensity	10.1	89.9
Middle propensity	10.9	89.1
High propensity	15.8	84.2

Table 4: Group assignment and issue positions (Extended Model).

	Education Problem (%)	
	No	Yes
Low propensity	85.7	14.3
Middle propensity	85.0	15.0
High propensity	78.2	21.8

	Health Problem (%)	
	No	Yes
Low propensity	72.3	27.7
Middle propensity	69.2	30.8
High propensity	62.2	37.8

	Day Care Problem (%)	
	No	Yes
Low propensity	94.1	5.9
Middle propensity	95.3	4.7
High propensity	92.3	7.7

	Housing Problem (%)	
	No	Yes
Low propensity	96.8	3.2
Middle propensity	93.1	6.9
High propensity	92.0	8.0

	Problem Finding Employment (%)	
	No	Yes
Low propensity	90.3	9.7
Middle propensity	88.6	11.4
High propensity	89.9	10.1

Table 5: Group assignment and personal concerns (Extended Model).

	Number of Cash Problems(%)				
	0	1	2	3	4
Low propensity	67.0	12.4	10.7	6.3	3.6
Middle propensity	59.3	16.9	13.1	6.7	4.0
High propensity	57.6	19.7	9.2	10.5	2.9

Table 6: Group assignment and personal economic difficulties (Extended Model).

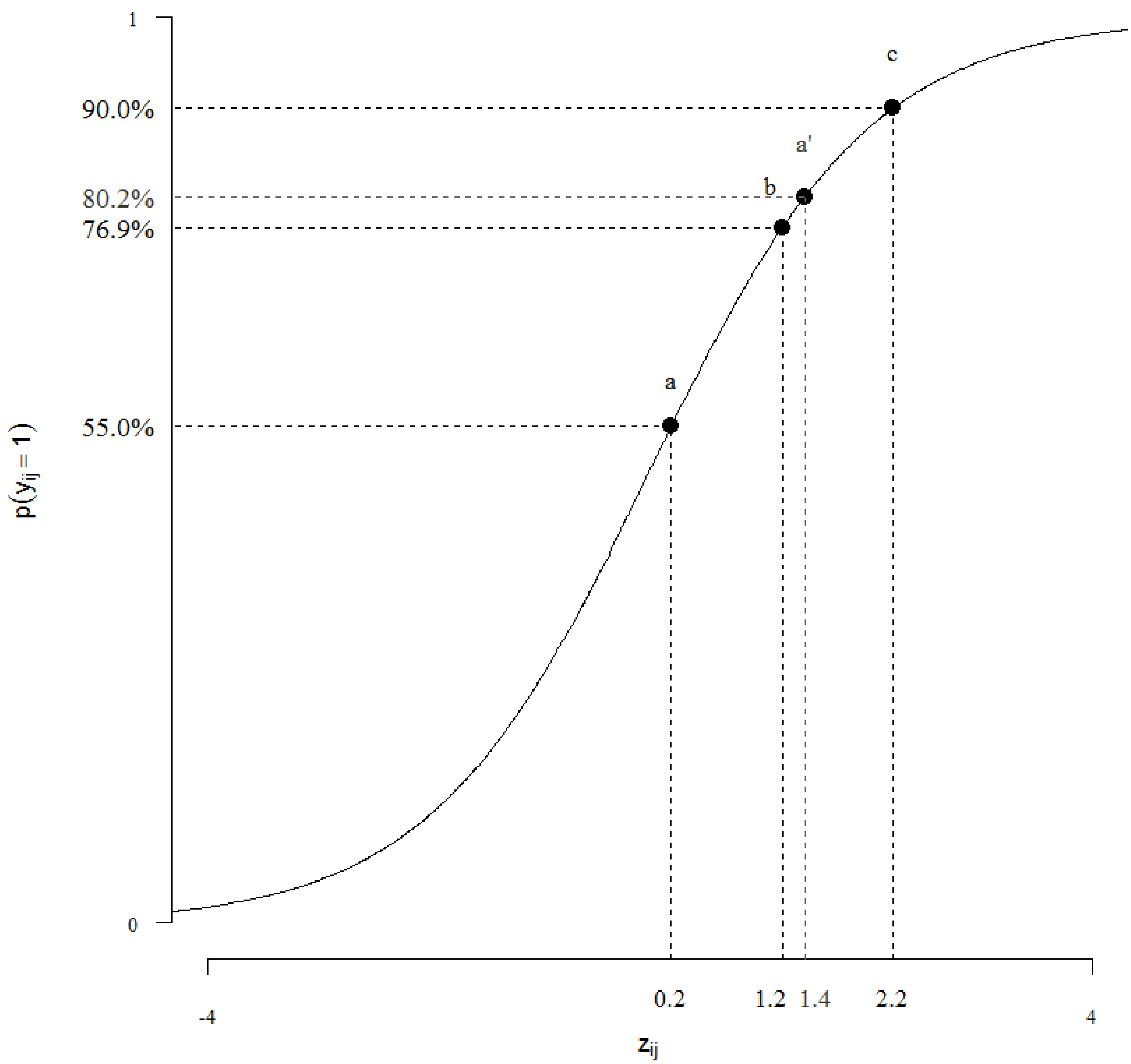

Figure 1: Example of logit mixture model with varying intercepts.

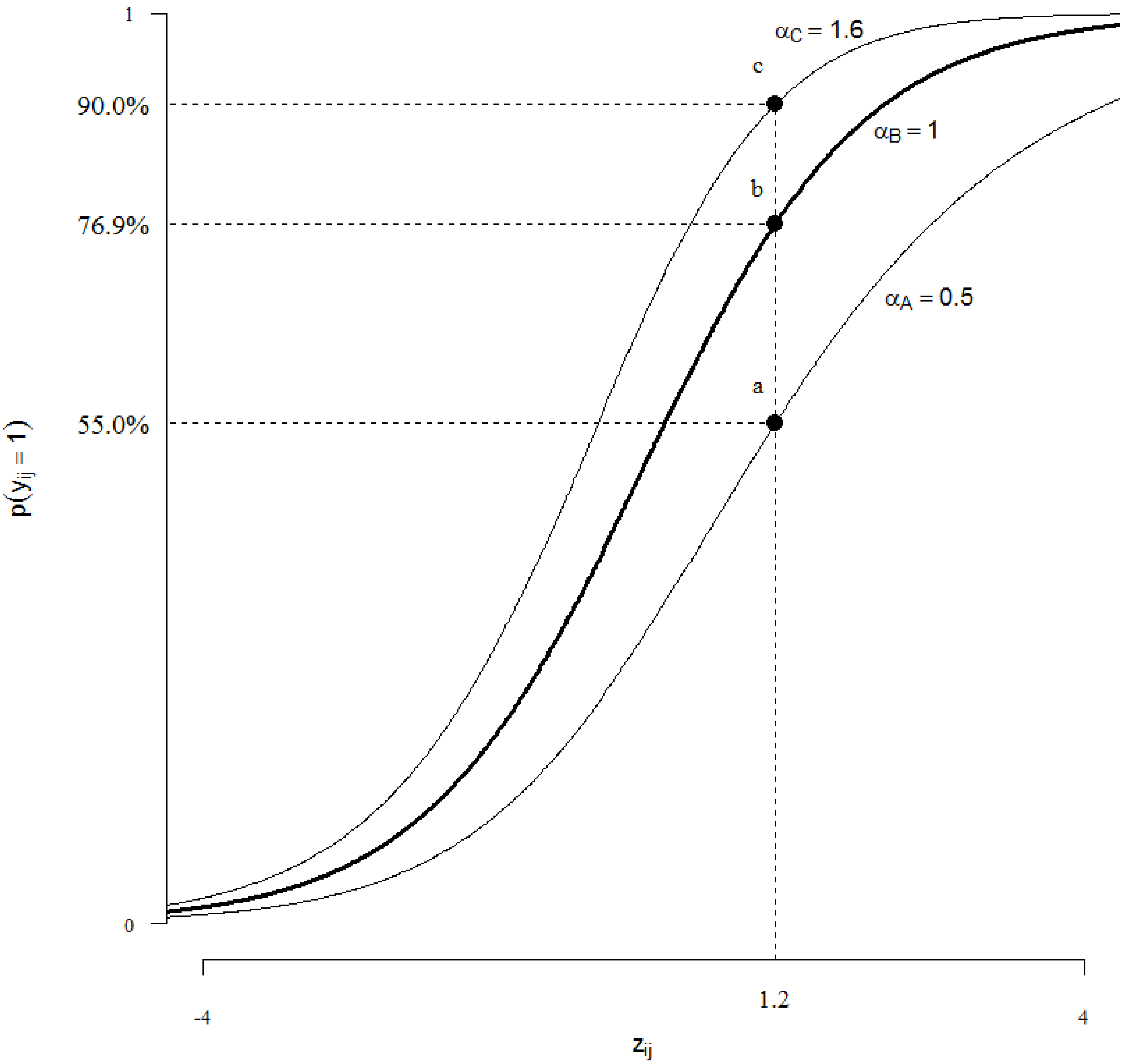

Figure 2: Example of scobit mixture model with varying skewness parameter.

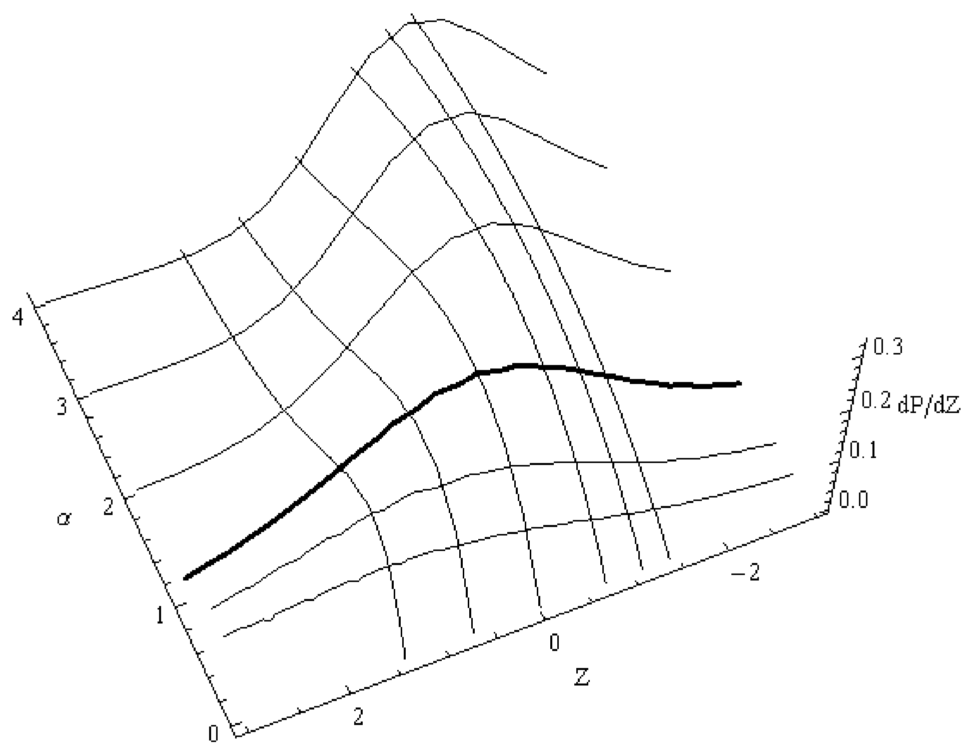

Figure 3: Effect of Changes in z_i on $P(y_i = 1)$ (Scobit Model)

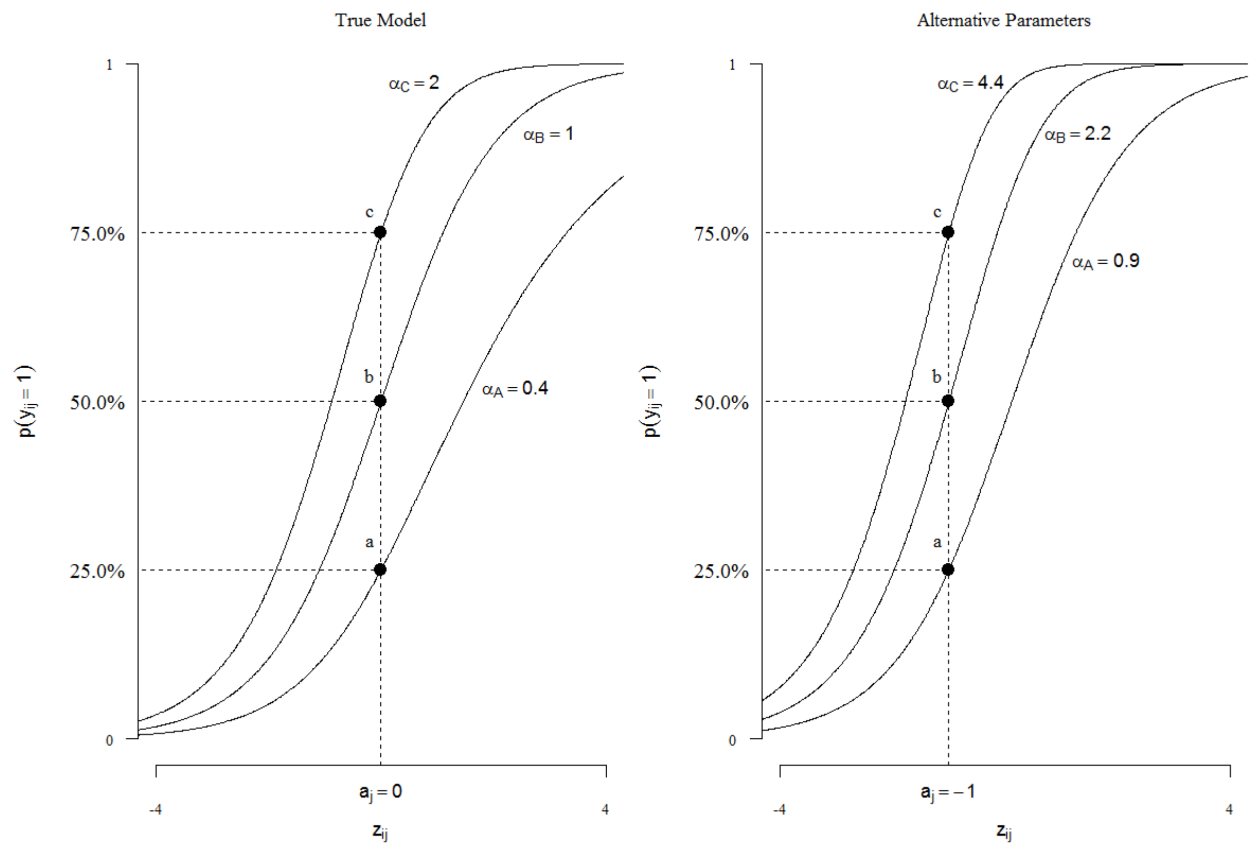

Figure 4: Example of identification difficulties with a single activity.

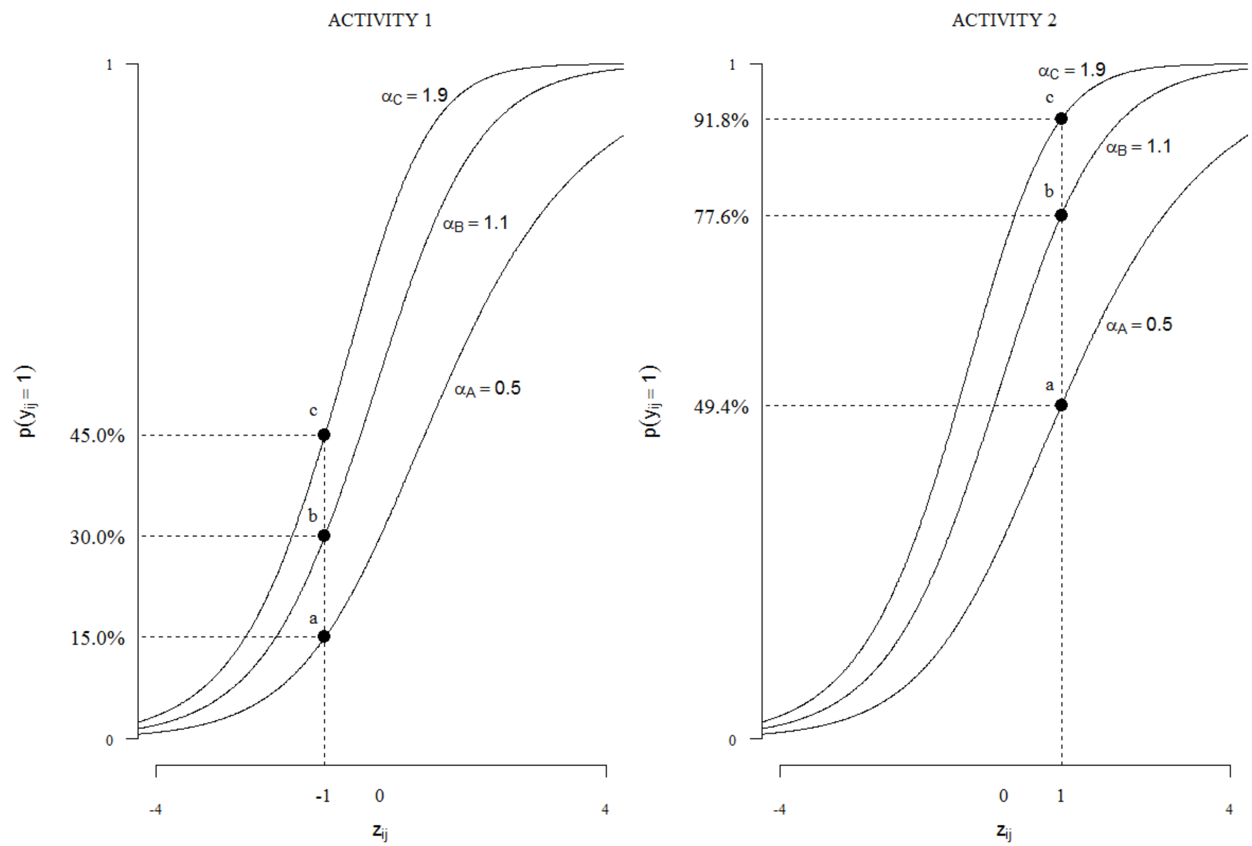

Figure 5: Example of participation in multiple activities.

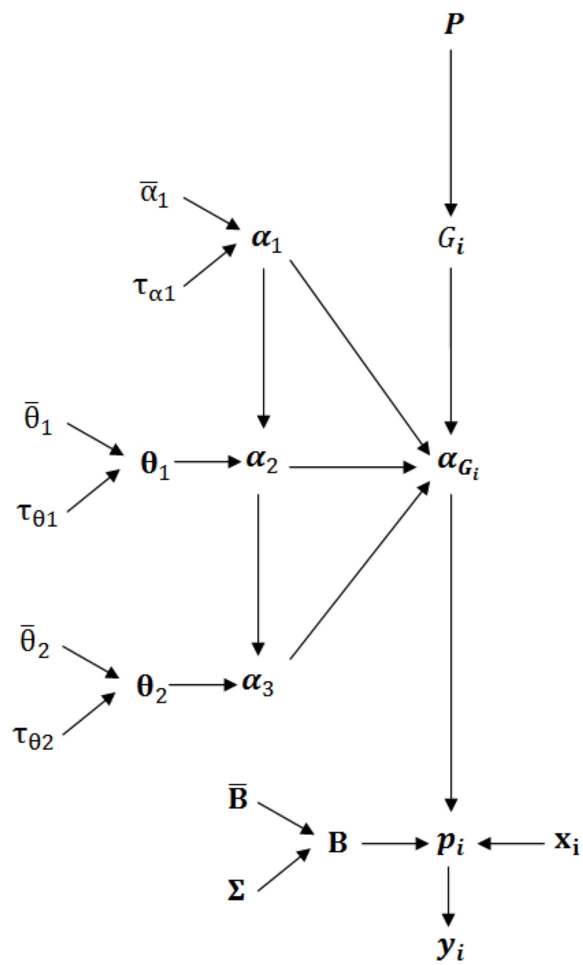

Figure 6: Graphical Model

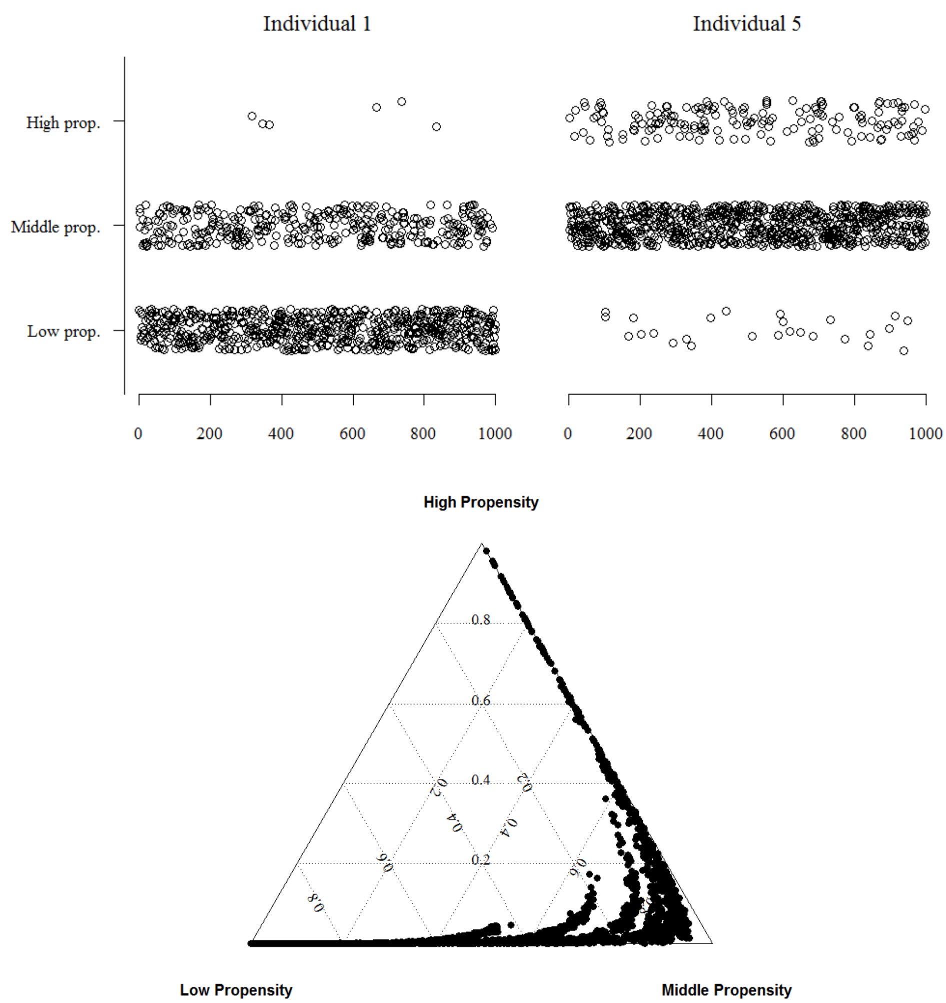

Figure 7: American Citizen Participation Study (Main Model). The upper plot gives MCMC draws of group assignment for two individuals. The lower plot gives the estimated distribution of group assignments using a ternary plot, where a 'group assignment' is defined as a vector of probabilities of being assigned to each group (with low-, middle- and high-propensities to participate). In the ternary plot, each vertex corresponds a group, and for each vertex lines parallel to the opposite side give group assignments where the probability of being assigned to the group remains constant.

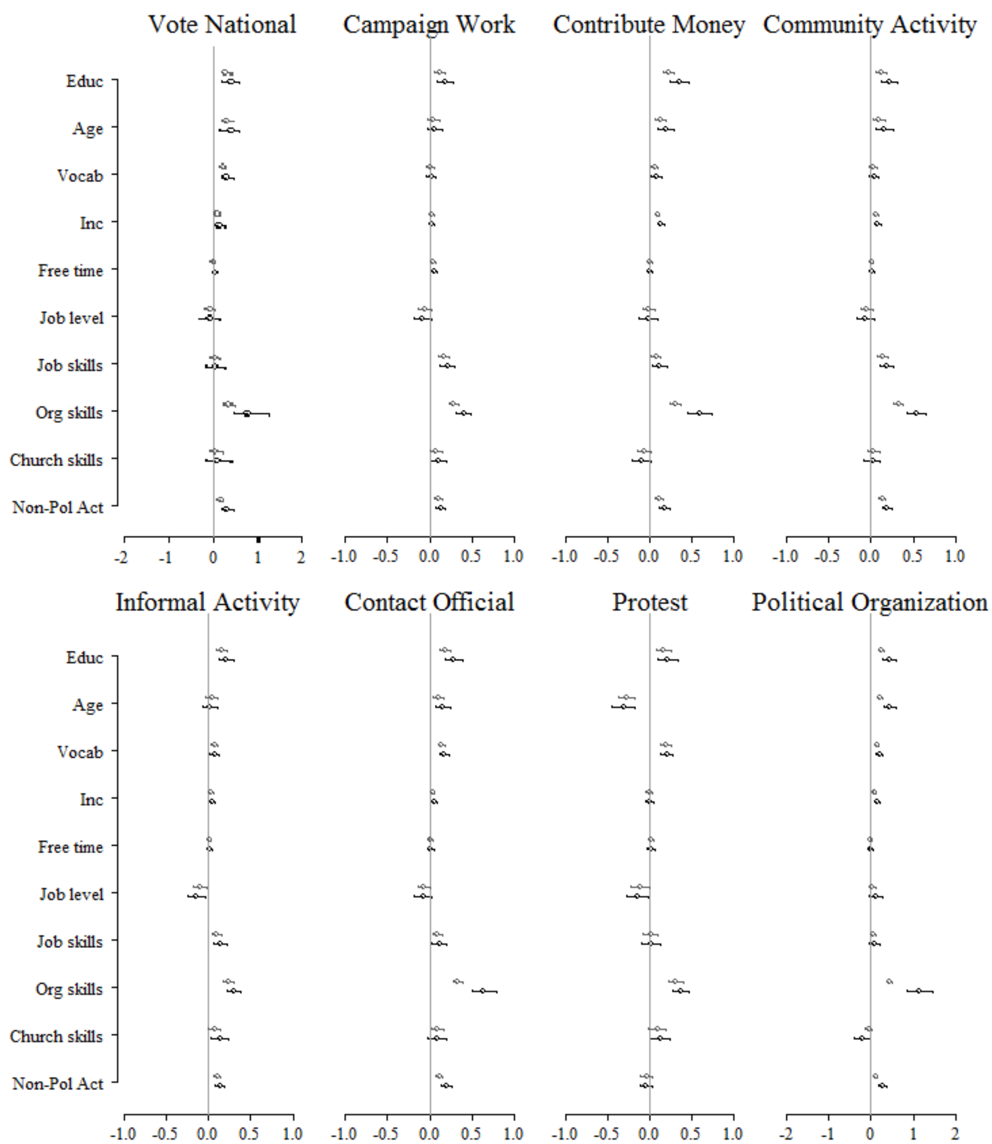

Figure 8: American Citizen Participation Study (Main Model). Grey lines give 90% posterior intervals for coefficients from a logit model, and black lines give 90% posterior intervals for coefficients from a scobit-mixture model.

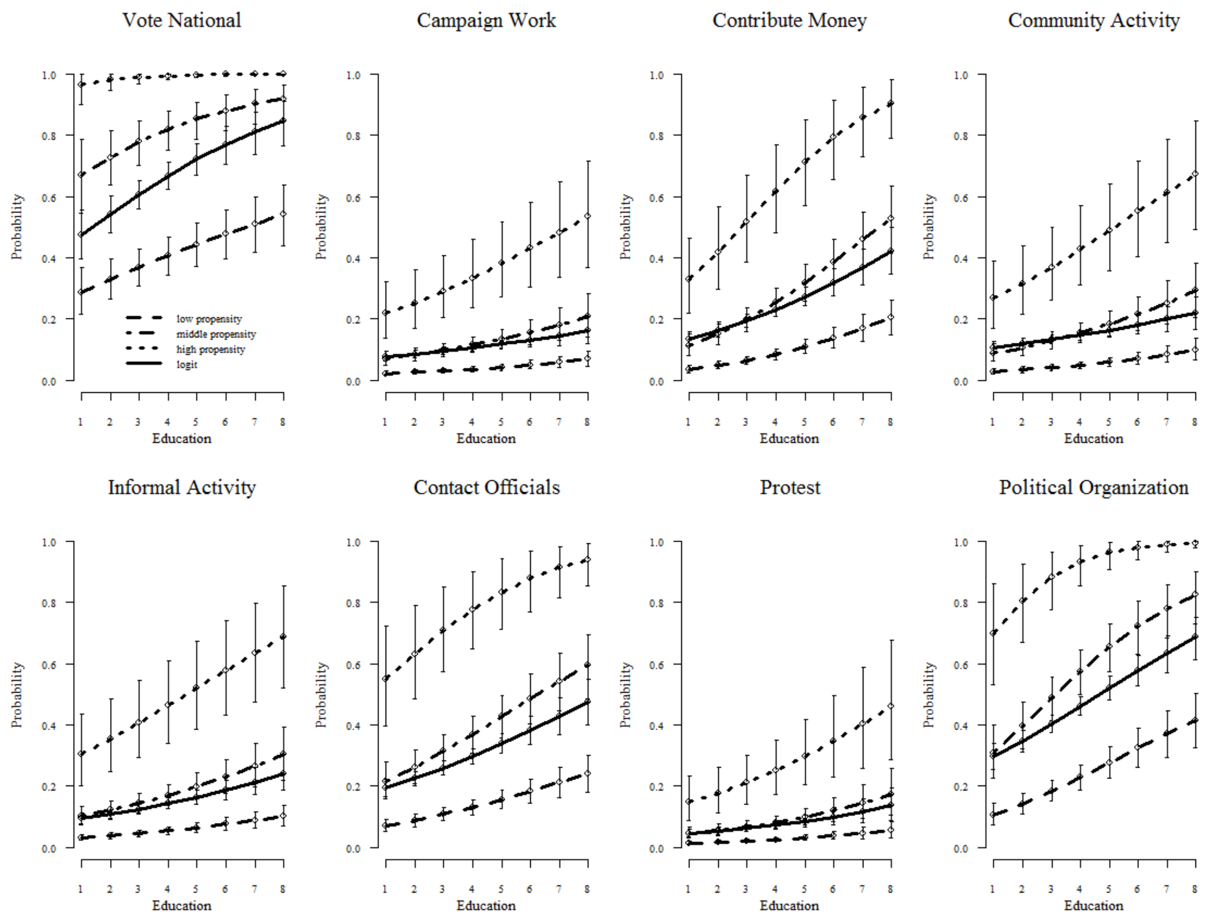

Figure 9: American Citizen Participation Study (Main Model). Lines give participation probabilities for different levels of education for low-, middle- and high-propensity groups. The coding of education is: (1) Grammar and less; (2) Some high school; (3) High school/GED; (4) Some college; (5) College degree; (6) Some graduate work; (7) Master's degree; (8) Phd/Profe degree.

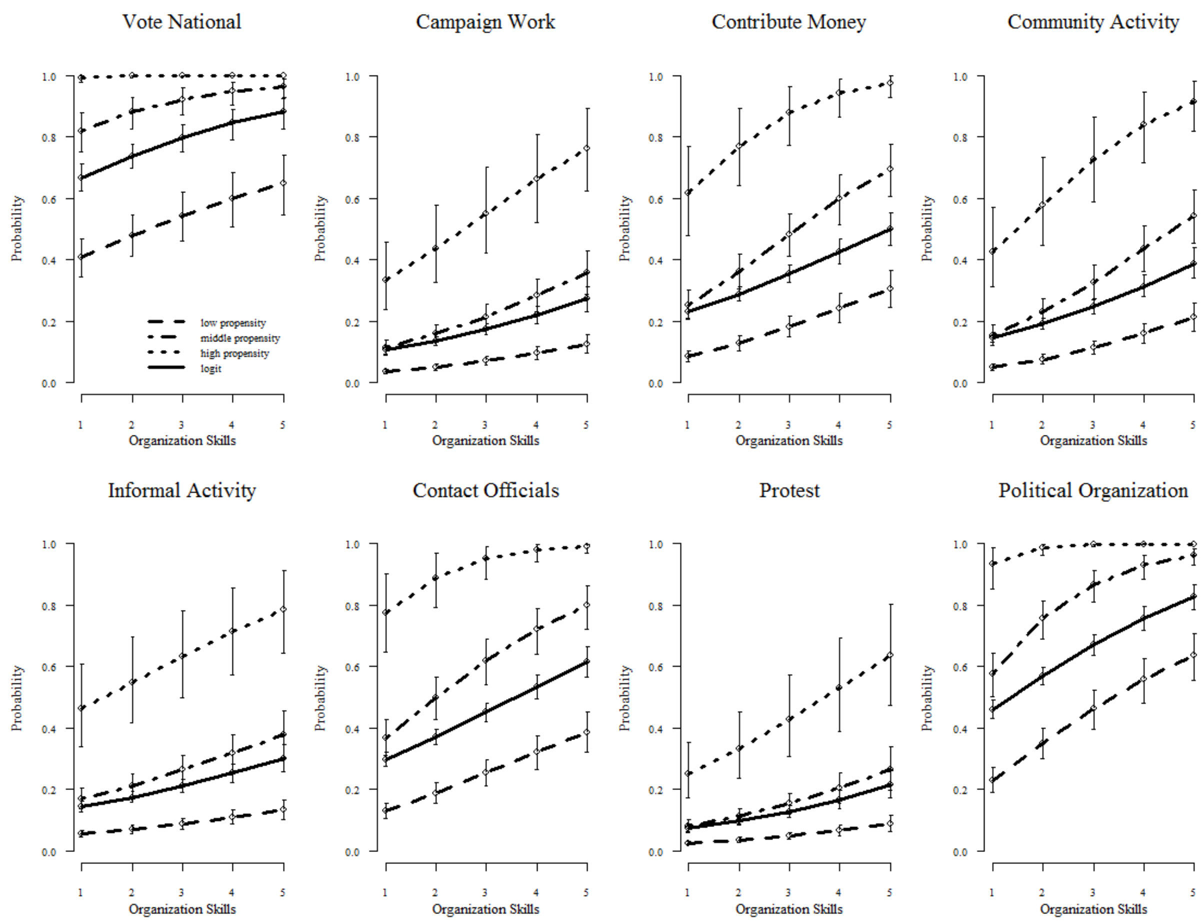

Figure 10: American Citizen Participation Study (Main Model). Lines give participation probabilities for different levels of organizational skills for low-, middle- and high-propensity groups. The indicator of organization skills is constructed as the sum of zero/one indicators of whether the individual has ever written letters, attended meetings where decisions are made, planned or chaired meetings, or given presentations or speeches as part of organizational activities.

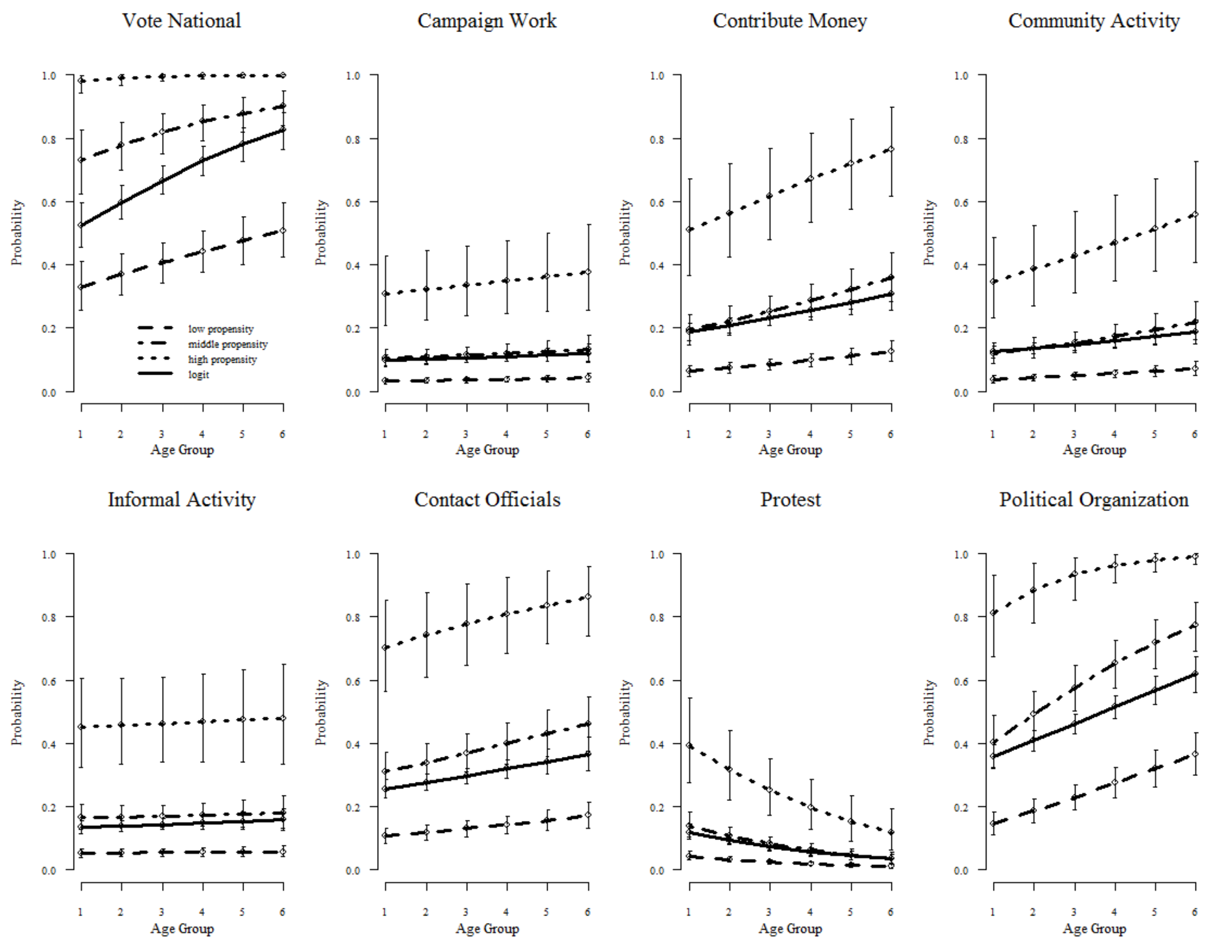

Figure 11: American Citizen Participation Study (Main Model). Lines give participation probabilities for different age groups for low-, middle- and high-propensity groups. The coding of age groups is: (1) $\leq$ 24, (2) 25-35, (3) 35-44, (4) 45-54, (5)55-64, (6) $\geq$ 65.

A Additional figures

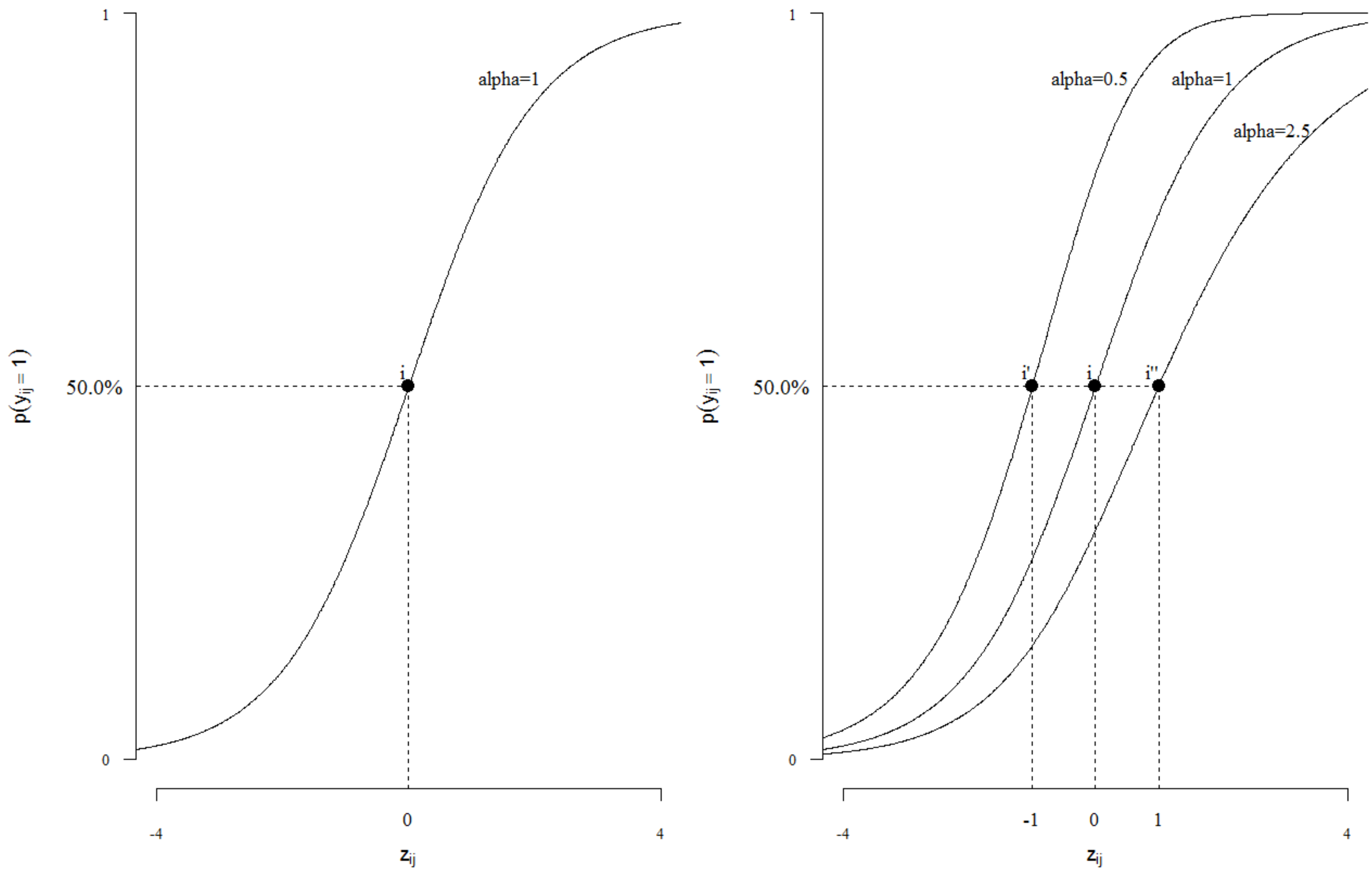

Figure 12: Example of identification difficulties in scobit model.

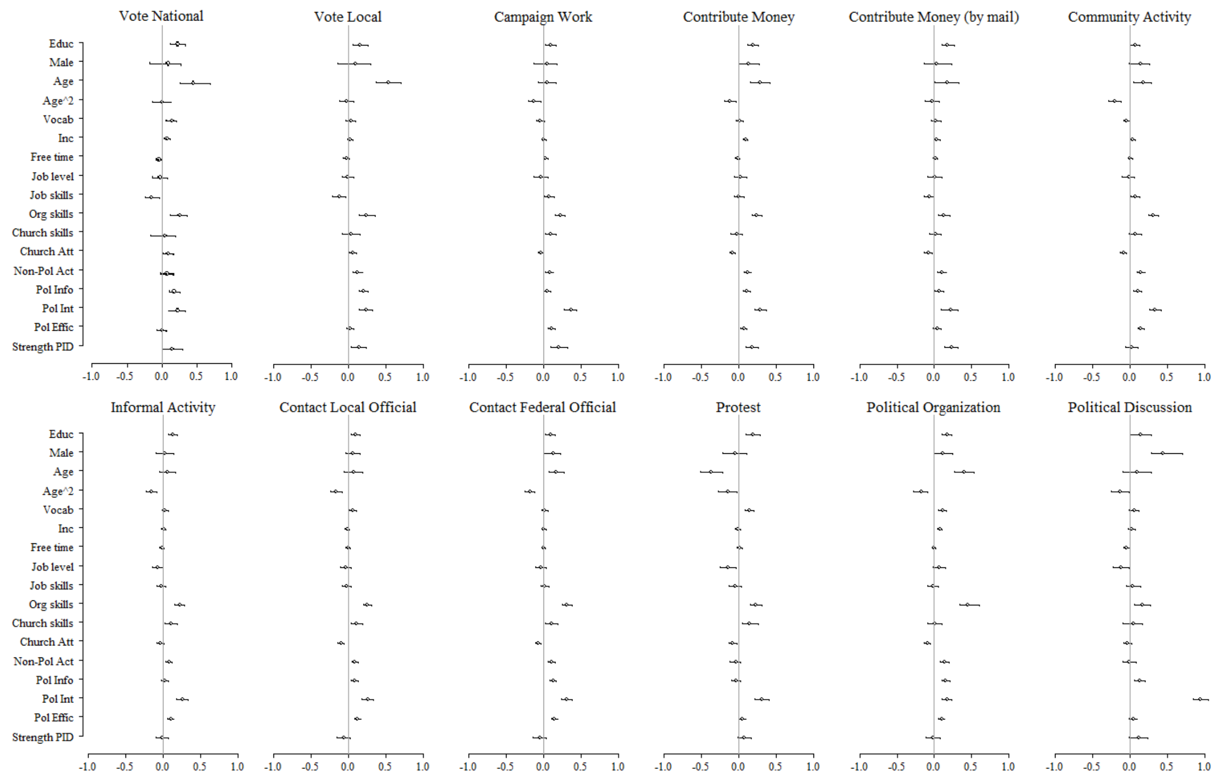

Figure 13: American Citizen Participation Study (Extended Model). Horizontal lines give 90% posterior intervals for coefficients from a scobit-mixture model.

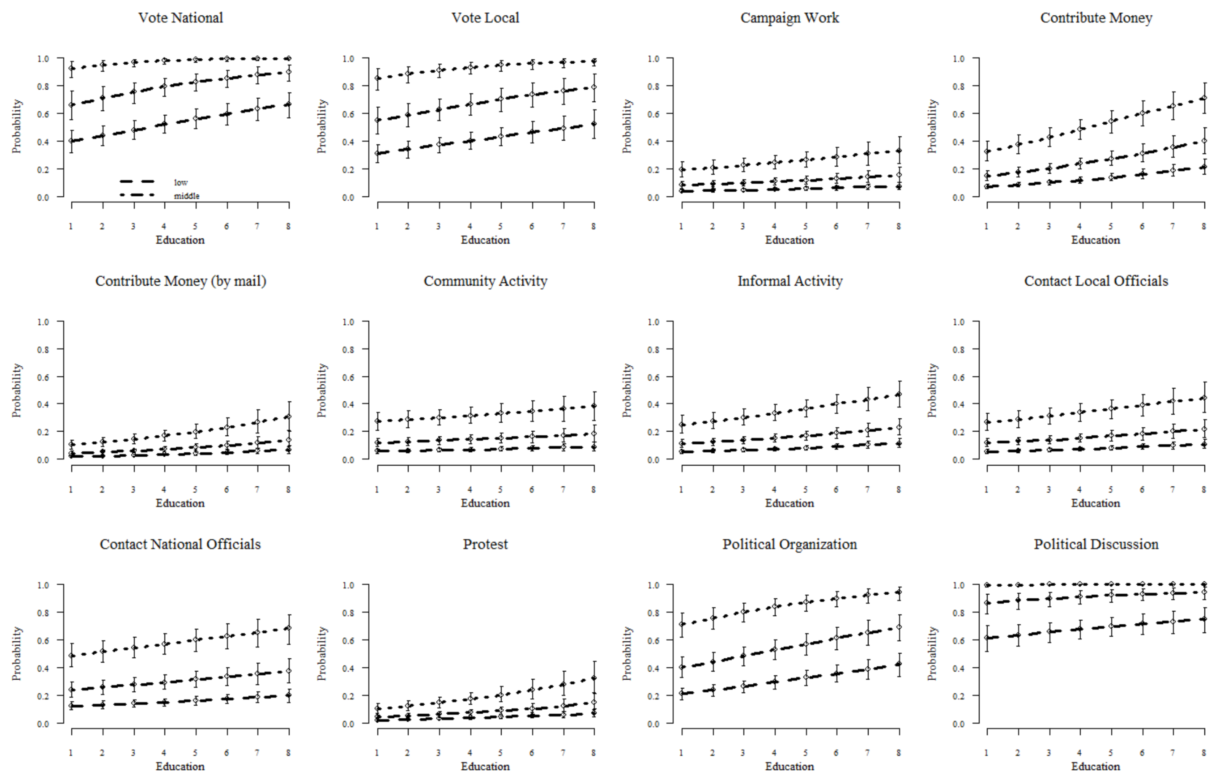

Figure 14: American Citizen Participation Study (Extended Model). Lines give participation probabilities for different levels of education for low-, middle- and high-propensity groups. The coding of education is: (1) Grammar and less; (2) Some high school; (3) High school/GED; (4) Some college; (5) College degree; (6) Some graduate work; (7) Master's degree; (8) Phd/Profe degree.

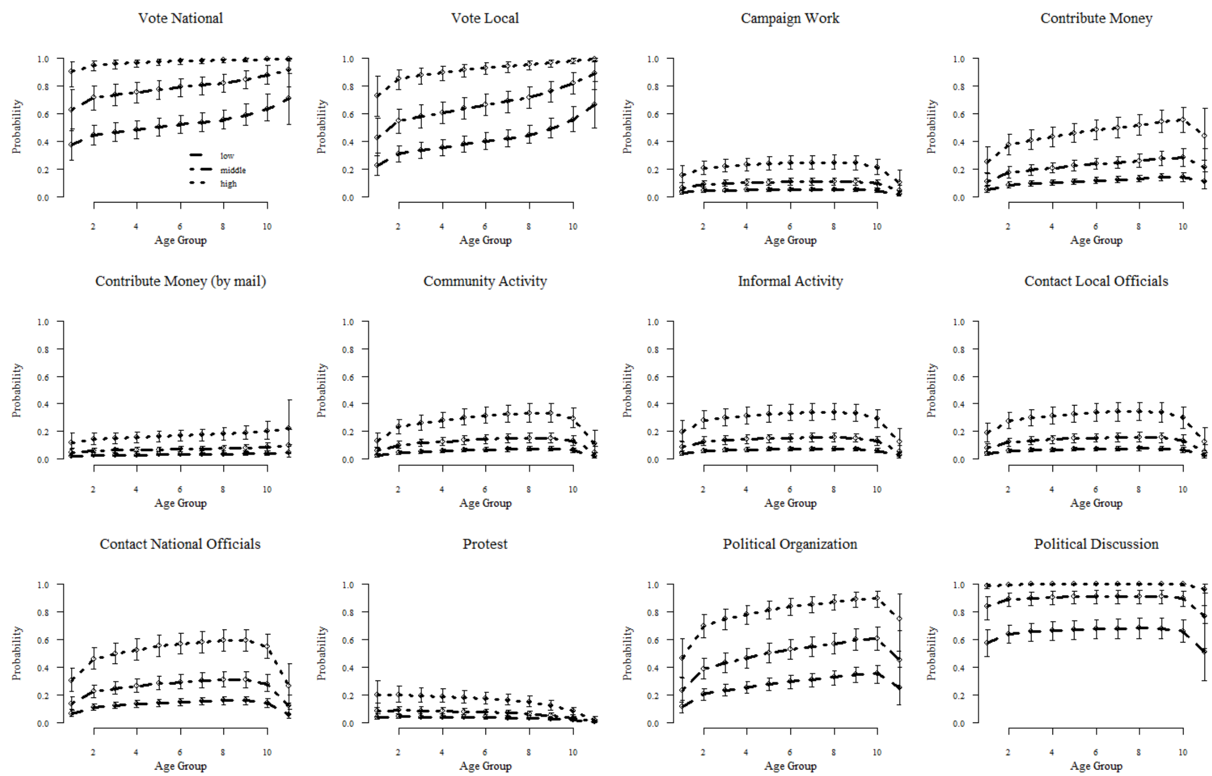

Figure 15: American Citizen Participation Study (Extended Model). Lines give participation probabilities for different age quantiles for low-, middle- and high-propensity groups.