

# Why is Voting Habit-Forming? Evidence from Sweden\*

James Melton<sup>†</sup>

james.melton@imtlucca.it

Draft Date - December 30, 2010

## Abstract

For decades, scholars of electoral behavior have noted persistence in individuals' turnout decisions and hypothesized that such persistence is the result of habit. Recent empirical studies provide persuasive evidence supporting the habitual voting hypothesis, but we still do not know why individuals develop habits for voting. One theory is that voting causes individuals' to view themselves as "voters," increasing their future probabilities of voting. Another theory asserts that voting may ease institutional barriers, making future voting less costly and changing conative attitudes towards voting. This study seeks to disentangle these two causal mechanisms by testing the habitual voting hypothesis in Sweden. Since institutional barriers to voting are minimal in Sweden, evidence in favor of the habitual voting hypothesis will lend credence to a psychological mechanism. The opposite result will point to an institutional mechanism. Ultimately, habitual voting is found in Sweden, which suggests the psychological mechanism is valid.

---

\*Prepared for presentation at the 2011 Annual Meeting of the Southern Political Science Association in New Orleans, LA, January 6-8, 2011.

<sup>†</sup>Assistant Professor, Economics and Institutional Change, IMT Institute for Advanced Studies, Piazza San Ponziano 6, 55100 Lucca (LU), ITALY.

One of the most consistent findings in the voter turnout literature is that individuals' turnout decisions are connected. Individuals who voted in past elections are consistently more likely to vote in the present election. Numerous theories have been posited to explain the connection between individuals' turnout decisions but no explanation has been as influential as the habitual voting hypothesis. According to this hypothesis, individuals' underlying probabilities of voting are updated by the act of casting a ballot, or not. Although the presence of unobserved heterogeneity and state dependence make testing the habitual voting hypothesis difficult, recent studies have yielded persuasive empirical evidence in support of this notion (Gerber, Green and Shachar 2003; Denny and Doyle 2009; Meredith 2009).

Based on this recent evidence, there seems to be a growing consensus that voting is habitual. This realization has the potential to revolutionize the study of voter turnout. Scholars will be able explicate more complete theoretical and empirical models of voter turnout, and policy-makers will be able to develop both more effective initiatives to enhance turnout and better tools for assessing the success of these initiatives. Unfortunately, this potential cannot be fully realized until the mechanism through which habit formation occurs is identified, and although several mechanisms have been proposed, existing accounts of habitual voting have been unable to determine which ones are valid.

The purpose of this study is to assess the validity of the two most likely mechanisms for habitual voting. The first is that voting may reinforce feelings of civic mindedness, encouraging one to view him or herself as a "voter" and making future voting more likely (Green and Shachar 2000; Gerber, Green and Shachar 2003). The second is that voting lowers institutional barriers. Individuals face very high costs the first few times they turn out to vote – e.g. registration, learning the voting procedure, locating their polling place, remembering the date of the election, etc. (Plutzer 2002), but as individuals gain experience voting, these costs dissipate and individuals' conative attitudes towards voting become more positive (Gerber, Green and Shachar 2003; Denny and Doyle 2009).

I test the validity of these two mechanisms using data from the Swedish Election Study

(SES). The SES utilizes a rolling panel design that spans two elections and provides data on interviewees turnout decisions from three elections. In addition, validated turnout data is available for all interviewees, which means that overreporting is not an issue. Both of these features make the SES ideal for studying habitual voting. Furthermore, Sweden is the perfect context for the present study because institutional barriers to voting there are minimal. As a result, any evidence of habitual voting can be interpreted as indirect evidence that the psychological mechanism is valid. If habitual voting is not observed in Sweden, however, then the results of this study will provide strong evidence that the only valid mechanism is the institutional one.

The next section defines habitual voting and explains the four explanations provided for habitual voting in the literature. The second section outlines an indirect empirical test that can be used to assess the validity of the two most plausible mechanisms for habitual voting. This test relies on identifying a context with few institutional barriers to voting, and I argue in this section that Sweden provides such a context. The remaining sections outline a statistical model that can be used to test for the presence of habitual voting, describe the data used to estimate this model, and provide the results. These results suggest that habitual voting is present in Sweden, which supports the notion that psychological changes are one cause of habitual voting.

## **Defining Habitual Voting**

Numerous scholars have argued that voting is habitual (Milbrath 1965; Verba and Nie 1972; Brody and Sniderman 1977; Miller and Shanks 1996; Green and Shachar 2000; Franklin 2004; Gerber, Green and Shachar 2003; Fowler 2006; Aldrich, Montgomery and Wood 2008; Denny and Doyle 2009). Yet, habitual voting is rarely well defined.<sup>1</sup> Most definitions conflate persistence and habit. For instance, individuals who consistently vote in elections are often

---

<sup>1</sup>There has been little agreement about the proper term to describe what I am calling habitual voting, and as a result, a plethora of terms have evolved. Besides habit, scholars have referred to this phenomena as consuetude (Green and Shachar 2000), inertia (Plutzer 2002),

termed "habitual voters" (Plutzer 2002; Franklin 2004; Fowler 2006), but as discussed below, there are a variety of reasons why we might observe persistence that are unrelated to habit formation. Even Plutzer (2002), who explicitly argues that persistence and habit are not synonymous, only differentiates the two concepts by the factors used and the number of elections one must observe to explain persistence.

Perhaps the best definition of habit (and the one used here) is that elaborated by Green and Shachar (2000), who define voting as habitual if, other things being equal, voting in one election increases the probability that one will vote in the next election. However, even this definition is incomplete. More formally, if  $p_t$  is one's underlying probability of voting at time  $t$ ,  $y_t$  indicates one's voting decision at time  $t$ , and  $\delta$  is the effect of habit, then this definition implies:

$$p_t = p_{t-1} + \delta y_{t-1} \tag{1}$$

The definition of habitual voting formalized in equation 1 has two important implications. First, it is very explicit. The definition specifies precisely how voting causes individuals' to have a higher future probability of voting: casting a ballot updates their underlying probability of voting. Second, the definition makes clear exactly how hard it is to test for habitual voting. The equation makes clear that habitual voting only affects individuals' *true* underlying probabilities of voting. Thus, one need to adjust individuals' observed probabilities of voting for any persistence that results from observed or unobserved time and state dependence (Denny and Doyle 2009). None of these terms, not even habit, perfectly describes the phenomena. For instance, psychological definitions of habit imply both that the behavior is frequently repeated and reinforced and that the action occurs automatically (Betsch, Haberstroh and Hohle 2002, 456), but individuals' turnout decisions satisfy neither of these criteria. At the risk of creating yet another term, routine, or an option that comes to mind as a solution when the decision maker recognizes a particular decision problem (Betsch, Haberstroh and Hohle 2002), is a perhaps a more accurate term. In any case, I will not enter into this debate here and use the terms habit and habitual voting throughout.

invariant individual characteristics, or heterogeneity – e.g. gender or education – that might cause them to make the same turnout decisions in across elections (Green and Shachar 2000; Gerber, Green and Shachar 2003; Denny and Doyle 2009). Furthermore, the equation stipulates that it is only possible to detect the presence of habit if one has sufficient data to estimate *two* latent variables: individuals’ initial and updated probabilities of voting. The former probability is often overlooked in models of habitual voting (for an exception, see Denny and Doyle 2009), but unless this probability is explicitly accounted for, the estimated effect of habit will be biased (Hsiao 1986; Denny and Doyle 2009).

Despite the difficulties that arise when estimating the effect of habit, several studies have managed to provide convincing evidence that turning out to vote changes individuals’ underlying probabilities of voting. Both Gerber, Green and Shachar (2003) and Nickerson (2004) provide experimental evidence supporting this hypothesis. These studies rely on experimental randomization to balance both participants’ initial probabilities of voting and time-invariant heterogeneity between individuals. As a result, any difference in turnout between the treatment and control groups in future elections can be attributed to changes in participants’ underlying probabilities of voting that are caused by the treatment. Meredith (2009) uses discontinuities imposed by voting age restrictions to estimate the difference in turnout between individuals whose birthday is just before the voting age cut-off and those whose birthday is just after the voting cut-off. Assuming individuals birthdays are orthogonal to their underlying probabilities of voting, the fact that individuals eligible to vote in the previous election turnout at a higher rate in the present election suggests that voting is habitual. Lastly, a more recent study uses panel data from the United Kingdom to estimate the effect of habit (Denny and Doyle 2009). After statistically controlling for both time invariant heterogeneity and individuals’ initial probabilities of voting, the authors still find that habit has a statistically and substantively significant effect on turnout. The results of these four studies provide substantial support for the notion that voting is habitual, but none of these studies is able to identify why individuals develop habits for voting.

## **Explanations of Habitual Voting and Their Implications**

Green and Shachar (2000) provide four explanations for habitual voting that have been frequently reiterated in subsequent studies. The first mechanism is psychological and involves changes in individuals' broad political orientations – e.g. partisanship, interest in politics, political efficacy. Many of these broad political orientations are thought to affect turnout, so if voting affects these orientations, then there would be a reciprocal causal link between them and turnout. Finkel's (1985) findings about political efficacy are a potential example of this reciprocity. He finds that voting increases individuals' familiarity and confidence in the electoral process, which increases their sense of political efficacy. These individuals are then more likely to vote as a result. Nevertheless, this mechanism seems fairly unlikely. In general, these broad political orientations tend to be relatively stable over time. For instance, partisanship is traditionally thought to be very stable (Miller and Shanks 1996), and in a recent multi-country study, Prior (2010) finds that interest in politics is similarly stable over time. Even if individuals' political orientations change as a result of voting, though, indicators of these orientations are typically included in statistical models of voter turnout, so they are unlikely to explain habitual voting (Green and Shachar 2000; Gerber, Green and Shachar 2003).

Another mechanism that has been proposed to explain habitual voting posits that political actors (e.g. political parties, candidates, and issue activists) treat voters and non-voters differently. For instance, voters are much more likely to be contacted by these actors than non-voters (Huckfeldt and Sprague 1992). Part of this difference may be due to the difficulty involved in contacting non-voters, but as a result of this difficulty and the fact that non-voters may be perceived as less likely to be susceptible to such efforts, political actors are presumably less likely even to attempt to contact non-voters. Since individuals who are contacted by such mobilization efforts are significantly more likely to vote (Gerber and Green 2000), this differential in mobilization efforts may explain habitual voting. However, this mechanism is as unlikely as the first. The effect of voter mobilization efforts is typically small,

especially when the method of contact is phone calls or direct mail (Gerber and Green 2000), and habitual voting is still observed when contact by a political campaign is included as a covariate in the statistical model (Green and Shachar 2000).

The third mechanism is that voting lowers institutional barriers. Countries' election laws establish the procedure through which votes are cast, and it takes time for inexperienced voters to learn these procedures. In the meantime, they face a variety of costs not shared by experienced voters. For instance, in countries where registration is not automatic, first-time voters must register to vote, a potentially costly obstacle to voting (Rosenstone and Wolfinger 1978). Even if registration is automatic, however, inexperienced voters must find the polling location, learn how to cast a vote, remember the day of the election, differentiate between political parties, etc. (Plutzer 2002). These institutional barriers slowly dissipate as one gains experience voting, leaving experienced voters with fewer costs to pay and also possibly with more positive "conative attitudes" towards voting (Gerber, Green and Shachar 2003). In either case, voting becomes more likely as individuals become more experienced voters.

Lastly, individuals may develop habits for voting if the act of voting reinforces feelings of civic mindedness. According to this mechanism, turning out to vote causes individuals to increasingly think of themselves as "voters" and regard turning out to vote as "what people like me do on election day" (Green and Shachar 2000, 571). Non-voters, on the other hand, experience similar psychological reinforcement and increasingly come to think of themselves as "non-voters."

Thus, we are left with one psychological mechanism and one institutional mechanism to explain habitual voting. These two mechanisms have very different implications in terms of how habit affects individuals underlying probabilities of voting. If habitual voting is psychological, then the effect of habit should be symmetric. Voting causes individuals' to see themselves more as voters and increases their underlying probabilities of voting, and abstaining causes individuals' to see themselves more as non-voters and decreases their underlying probabilities of voting. Conversely, the institutional mechanism predicts that

the effect of habit is generally asymmetric. As inexperienced voters turn out and become more familiar with the voting process, their costs of voting decrease and attitudes towards voting become more positive, leading to higher underlying probabilities of voting. Under no circumstances is abstention expected to reverse this process. Though one can envision situations when experienced voters may revert to inexperienced voters (e.g. when changes are made to the electoral rules or when one moves to a new district), abstention should not be a cause of reversion.

The two mechanisms also imply different conditions under which the effect of habit will be observed. The psychological mechanism predicts that the effect of habit will be universal. Regardless of ones personal characteristics or the context in which one votes, individuals turnout decisions should *always* change their underlying probabilities of voting in future elections. The magnitude of the change may depend on individual or contextual factors, but there should always be at least a small change, even among individuals with high underlying probabilities of voting. Alternatively, according to the institutional mechanism, the effect of habit should be highly dependent on both personal characteristics and context. Once individuals become experienced voters, their underlying probabilities of voting are no longer expected to change as a result of casting a ballot. Practically speaking, this means the effect of habit will be conditional on personal characteristics, such as age and education. Similarly, one might expect the effect of habit to be conditional on the difficulty of the voting procedure. Hard procedures should lead to large changes in individuals' underlying probabilities of voting, and easy procedures should lead to small, or even no, changes in individuals' underlying probabilities of voting.

## **Disentangling the Two Mechanisms**

Evidence supporting either the psychological or the institutional mechanism is quite limited. The institutional mechanism has the most evidence supporting it. Cohort analyses performed in the United States and abroad provide evidence that habits are either established, or not,

after individuals have had an opportunity to participate in three elections (Miller and Shanks 1996; Franklin 2004). Similarly, using data from childhood development studies, Plutzer (2002) finds evidence that it takes about three elections for the average probabilities of those who participate in the first election they are eligible to vote and those who do not to converge. In general, it seems that most individuals fall into patterns of habitual voting or habitual non-voting after only after only a few elections (Fowler 2006), suggesting that voting is no longer habitual after individuals are eligible to participate in a few elections. Even if a psychological mechanism exists, then, it seems likely that, at least in some contexts, the institutional mechanism is also valid.

There is little evidence for or against the psychological hypothesis. Only suggestive evidence exists. Those who believe that voting is a duty are consistently more likely to vote (Blais 2000). Similarly, research on adherence to the law suggests that adherence to social norms, like voting, is symmetric (Tyler 1990); adherence to norms in the past increases the likelihood of future adherence, and vice versa. Lastly, Denny and Doyle (2009) note that the effect of voting in the prior election in Britain is *not* conditional on certain individual characteristics (e.g. gender, education, and ability). Their results suggest the effect of habit is universal, but their study is limited to three elections and one cohort of voters. Despite the lack of direct evidence for the psychological mechanism, intuitively, it still seems like a plausible explanation for habitual voting.

The primary limitation to testing the validity of these two mechanisms is data availability. Both individuals' feelings about the voting process and their self-images with respect to voting are rarely, if ever, explored in existing surveys (Gerber, Green and Shachar 2003). This lack of data makes creating a direct test of these two hypotheses using existing data virtually impossible. Moreover, even if one had the resources to collect original survey data, it would take years to collect panel data necessary to test for the presence habitual voting.

Due to these data limitation, only an indirect test of these two mechanisms is possible

at present. Since the institutional mechanism is conditional on the difficulty of the voting rules, observing habitual voting in a context where institutional barriers to voting are minimal can be interpreted as indirect evidence that the psychological mechanism is valid. Failure to observe habitual voting in such a context would be strong evidence that no psychological mechanism exists. Being that this test is indirect, its validity relies on two (untestable) assumptions: 1) the institutional barriers to voting, in whatever context is chosen, are sufficiently small to leave only one viable mechanism – the psychological one, and 2) there are no other mechanisms that can explain habitual voting.

The difficulty is finding a context with minimal institutional barriers to voting. Virtually all existing studies of habitual voting use data from the United States. The sole exception is Denny and Doyle (2009), who use data from the United Kingdom. These two countries are primarily used out of convenience and data availability, but both have a variety of institutional barriers to voting that make the indirect test described in the previous paragraph virtually impossible.<sup>2</sup> As an alternative to these two commonly used countries, this study uses data from Sweden. Not only is the necessary panel data available in Sweden, but as discussed in the next section, voting is extremely easy there.

### **Voting in Sweden**

According to one first-time voter in the 2010 Swedish election, "it's a quick and simple process" (Demstader 2010). Contrast this assessment with that of a New York voter, who describes the process there as "difficult and frustrating" ("How to Turn Off Voters." 2010). The difference in these two opinions is primarily the result of differences in the electoral rules between the two contexts. In Sweden, voting is remarkably simple, while in the United States

---

<sup>2</sup>Since in the United States the electoral rules are left to the states, one might be able to utilize variance in these rules between states to disentangle the two mechanisms. However, there are certain electoral rules that are either dictated by the federal government (e.g. federal elections being held on a Tuesday in November) or that do not vary much (e.g. voluntary voter registration), which would make finding a state with no institutional barriers difficult.

(U.S.) and, to a lesser extent, in the United Kingdom (U.K.), it is not.<sup>3</sup>

The most striking difference between the election rules in Sweden and these other two countries is voter registration. Registration is automatic in Sweden. The Swedish Tax Agency determines who is eligible to vote 30 days prior to the election, and all eligible citizens and residents are sent voting cards from the Swedish Election Authority that contain information about the date of the election and the location of their polling station (Swedish Election Authority 2010). Registration is not automatic in the U.S. or in the U.K. (Declare Yourself 2010; British Election Commission 2010), which is a significant barrier to voting that has large effect on voter turnout (Rosenstone and Wolfinger 1978). Recent changes in both countries has made registering easier. Traditionally, however, in both countries, one had to either mail their registration form to or go to the local election office, and registration had to be completed about a month before the election for one to be eligible to vote.

Once registered, voters in all three countries are ready to go to the polls. For Swedish voters, elections for all three levels of government take place on the third Sunday of September, every four years (Swedish Election Authority 2010).<sup>4</sup> To vote, they can go to the polling station for their district on election day, go to any of the advance polling locations up to 18 days before the election, or vote by proxy, allowing a third-party (e.g. a mailman) to take their ballot to either a polling station or an advance polling location (Swedish Election Authority 2010). Although polling stations are traditionally at town halls or libraries, advance polling locations are often in more convenient locations, like post offices or, more recently, train stations and shopping malls (Demstader 2010).

The voting date and location are far more restrictive in the U.S. and the U.K. Both

---

<sup>3</sup>In the United States, voting procedures are decided by the states, and as a result, there is a lot of variance in procedures between states (for examples of some of these differences, see Declare Yourself 2010). Nonetheless, the average level of difficulty in the United States is still greater than the level of difficulty in Sweden.

<sup>4</sup>Prior to 1994, elections in Sweden occurred every three years.

countries have elections during the week. In the U.S., federal elections are generally held every 2 years on the Tuesday after the first Monday of November, and in the U.K., although there is no set election day, every election since World War II has been held on a Thursday. Equally problematic is that neither country has allowed early voting until very recently. Only a handful of states in the U.S. allowed some non-excuse form of early voting prior to 2000 (Gronke, Galanes-Rosenbaum and Miller 2007), and postal voting was allowed for the first time in the U.K. only in 2004. This severely limits both the time period and the number and types of polling locations available to American and British citizens. Hence, while Swedes are allowed to vote for 18 days at a variety of polling locations and by mail without excuse, their American and British counterparts have been forced to cast their ballot on a specific day at the polling station in their district. Even the recent reforms in the U.S. and the U.K. do not come close to offering their citizens the ease with which Swedish citizens have been able to go to the polls for decades.

Casting a ballot in Sweden is easier than in the other two countries too. Given the number of polling locations and the presence of early voting in Sweden, lines are traditionally short on election day (Demstader 2010). In contrast, reports of long lines are common, at least in recent elections, in both the U.S. and the U.K. (for example, see "Election 2010: Voters' Frustrations at Polling Problems" 2010). Once inside the voting booth, even the ballot papers are easier to understand in Sweden. Examples of ballot papers for each country are available in figure 1. In Sweden, each country has its own ballot paper with its name on the top in large print and, sometimes, also with the party list below. To vote, Swedish citizens simply need to place a ballot paper with the name of the party they want to vote for in an envelope (Swedish Election Authority 2010).<sup>5</sup> Citizens in the other two countries are required to put a mark next to the candidate they wish to vote for. Although it is hard to argue that marking a ballot in the U.K. is substantially more difficult than putting a sheet of paper in an envelope in Sweden, as illustrated in figure 1, the sheer number of elections on a

---

<sup>5</sup>If they wish, they can also mark a candidate from the party-list, but this is not required.

typical ballot in the U.S. makes ballots there difficult to interpret.

[Figure 1 about here.]

To summarize, in Sweden, voter registration is automatic, the election day is fixed and on a weekend, early voting is allowed for 18 days, numerous polling locations are available, no-excuse absentee voting is possible, lines are rare at polling locations, and the actual ballot casting procedure is simplistic. All of these features make voting in Sweden significantly easier than voting in either the U.S. or the U.K., where previous studies of habitual voting have taken place. Given ease of the voting process in Sweden, it is little wonder that Sweden has a significantly higher average turnout rate than either the U.S. or the U.K. (International Institute for Democracy and Electoral Assistance 2006). Since so few institutional barriers to voting exist in Sweden, any habitual voting observed there is unlikely to be caused by the dissipation of institutional barriers. Thus, the only plausible explanation of habitual voting in Sweden is the psychological one. The remaining sections assess the validity of these two mechanisms by testing for the presence of habitual voting among Swedish citizens.

## Estimating the Effect of Habit

Estimating the effect of habit on individuals' underlying probabilities of voting is no easy task. Since the dependent variable is binary, one has to use a probability model – typically a probit model – and since the estimation requires panel data, a dynamic non-linear panel data model is necessary. Thus, for  $i$  individuals and  $t = 0, 1, 2, \dots, T$  time periods, the following probit equation is typically estimated:

$$y_{it}^* = \delta y_{i,t-1} + \beta x_{it} + v_{it} \tag{2}$$

where  $y_{it}^*$  is a latent variable representing the unobserved propensity to vote,  $y_{i,t-1}$  is a binary indicator of individuals' voting decisions in the previous election,  $x_{it}$  is a set of independent variables, and  $v_{it}$  is an error term. An individual votes (i.e.  $y_{it} = 1$ ) if  $y_{it}^*$  is greater than zero and abstains otherwise. In this equation, the effect of habit is represented by  $\delta$ .

There are two problems with this equation – unobserved heterogeneity and initial conditions.<sup>6</sup> First, individuals might possess time invariant characteristics that affect their underlying probabilities of voting. If these characteristics are omitted from  $x_{it}$  or they are unobservable, then this will cause a spurious correlation between past and present turnout. We can correct for this possibility by incorporating a random intercept term ( $\epsilon_i$ ) into the model:<sup>7</sup>

$$v_{it} = \epsilon_i + u_{it} \quad (3)$$

It is well-known that maximum likelihood estimates will be inconsistent if  $\epsilon_i$  is not independent of all the independent variable in the equation. One to correct for this possibility by assuming  $\epsilon_i$  is a linear function of the means of the time-varying independent variable and an error term ( $\sigma_i$ ), which is normally distributed and independent of both the independent variables and  $u_{it}$  (Chamberlain 1984):

$$\epsilon_i = \alpha_0 + \alpha \bar{x}_i + \sigma_i \quad (4)$$

Given equations 3 and 4, equation 2 can be rewritten as:

$$y_{it}^* = \delta y_{i,t-1} + \beta x_{it} + \alpha \bar{x}_i + \sigma_i + u_{it} \quad (5)$$

Incorporating the means of all time-varying independent variables and an individual specific error term in equation 5 corrects for the unobserved heterogeneity problem.

There is also an initial conditions problem. Since individuals' voting behavior is observed after the start of the stochastic process generating that behavior, the lagged dependent variable will be correlated with the individual specific error term ( $\sigma_i$ ) (Arulampalam, Booth and Taylor 2000; Arulampalam and Stewart 2009). Unless this correlation is corrected for, it will cause  $\delta$  to be severely overestimated (Hsiao 1986; Denny and Doyle 2009). To correct for this bias, Wooldridge (2005) developed a conditional maximum likelihood estimator

---

<sup>6</sup>See Denny and Doyle (2009) for a thorough review of these problems and their remedies.

<sup>7</sup>Fixed effects cannot be used here due to the incidental parameters problem (Neyman and Scott 1948).

that removes the correlation between  $y_{i,t-1}$  and  $\sigma_i$  by conditioning on the initial observation of the dependent variable ( $y_{i0}$ ) and the means of all time-varying independent variables.<sup>8</sup> Since the means of the time-varying independent variables are already incorporated in equation 5, one only needs to add  $y_{i0}$  to solve the initial conditions problem:

$$y_{it}^* = \delta y_{i,t-1} + \gamma y_{i0} + \beta x_{it} + \alpha \bar{x}_i + \sigma_i + u_{it} \quad (6)$$

Equation 6 is used to estimate the effect of voting in the previous election. The effect of habit is denoted by  $\delta$ , so according to the habitual voting hypothesis,  $\delta$  should be positive and statistically significant. The next section describes the data used to estimate this equation and the following sections present and discuss the results..

## The Swedish Election Study

The data used here are from the Swedish Election Study (SES). The SES has been conducted for Swedish election since 1973, but due to changes made after the 1976 survey, we only use the surveys conducted from 1979 to 2006.<sup>9</sup> Between 2,400 and 3,000 Swedes responded to the survey at each election, for a total of 21,517 interviews and an average response rate of about 83.7%.

The SES is ideal for assessing habitual voting for two reasons. First, validated turnout data are available for all interviewees for each election. Turnout is both the dependent variable and the key independent variable, so a valid and reliable measure of turnout is essential; otherwise, the estimated effect of habitual voting will be biased (Greene 2008). Since survey respondents' self-reports of turnout are plagued by over reporting (Silver, Anderson and Abramson 1986; Belli, Traugott and Beckmann 2001; Karp and Brockington 2005), they are

---

<sup>8</sup>Other corrections include Orme (2001) and Arulampalam and Stewart (2009). There is little theoretical basis to choose one method over the others, but monte carlo evidence suggests that the Wooldridge (2005) method is less biased when the number of time periods is small (Arulampalam and Stewart 2009).

<sup>9</sup>As of this writing, data from the 2010 SES has not yet been released.

unreliable measures of individuals' turnout decisions. Validated turnout data are significantly more reliable, because they are created using official records. This is demonstrated in figure 2, where the turnout rate of the interviewees is compared with actual turnout for each election. Interviewee turnout is higher than actual turnout for each election but the difference is small – only 3.9% on average compared to differences of 20-40% when using self-reports (Karp and Brockington 2005) – and results from a slightly biased sample, not overreporting.<sup>10</sup>

[Figure 2 about here.]

The second benefit of the SES is its panel design. Testing for the presence of habitual voting involves tracking changes in individuals' underlying probabilities of voting across elections. To do this, one must estimate individuals' underlying probabilities of voting at two (or more) elections, which requires panel data (Green and Shachar 2000). The SES makes this possible through its rolling panel design. At each election, half of the interviewees are surveyed for the first-time and the other half were first surveyed in the previous election. The data being assessed are from nine panels – 1979-1982, 1982-1985, 1985-1988, 1988-1991, 1991-1994, 1994-1998, 1998-2002, and 2002-2006, so the actual number of interviewees is about half of the number of interviews reported above.

[Figure 3 about here.]

For each panel, interviewees' turnout decisions are provided for three elections – the election prior to the one for which they are first interviewed (election 0), and the two elections for which they are interviewed (elections 1 and 2). Figure 3 illustrates the patterns in voter turnout for the interviewees. As one might expect, many interviewees (approximately 83%) consistently turned out to vote, while only about 3% of interviewees consistently abstained.

---

<sup>10</sup>The SES contains validated turnout data for both respondents and interviewees who failed to respond, so the bias in turnout depicted in figure 2 is results from the sample of interviewees, not which interviewees actually responded.

This leaves about 14% who were inconsistent in their turnout behavior. Even among these 14%, though, individuals who voted in the prior election are always more likely to vote in the next election than those who abstained in the prior election. Clearly, there is a significant degree of persistence in individuals' turnout decisions across elections in Sweden. Before any portion of this persistence can be attributed to habit, however, one first must account for any unobserved characteristics that might be driving this persistence.

### **Covariates**

In addition to individuals' voting histories, the models incorporate a number of additional covariates that are typically thought to affect individuals' turnout decisions. These covariates can be divided into time invariant and time varying covariates. Only two covariates are time invariant: age and gender. Both of these variables are traditionally included in models of voter turnout, with males expected to vote at a higher rate than females and younger and older individuals expected to turnout at a lower rate than middle age individuals (Verba, Nie and on Kim 1978; Wolfinger and Rosenstone 1980; Leighley and Nagler 1992*a*). The effect of age is particularly important for the present study. Since age is almost perfectly correlated with the number of elections one has been eligible to participate in, according to the institutional mechanism, habit should have the strongest effect when individuals are young and institutional barriers to voting are the highest. To check the assumption that institutional barriers are minimal in Sweden, then, age can be interacted with previous turnout to see if the effect of habit is constant or if it varies by ones age.

A number of time variant covariates are included in the analysis. Many of these are characteristics of individuals. Socioeconomic status is often considered one of the strongest predictors of individuals turnout decisions (Verba, Nie and on Kim 1978; Powell 1986; Leighley and Nagler 1992*a,b*). To account for this correlation, measures of both income and education are included in the analysis below. Since married couples may influence each others' political beliefs, marriage is also thought to affect turnout (Zuckerman, Fitzgerald and Dasovic 2005). Some studies find that marriage has a positive effect on turnout (Strate et al. 1989; Timpone

1998), while others find that it has a negative effect (Stoker and Jennings 1995; Highton and Wolfinger 2001). In any case, marriage is included below to account for whatever effect it has. Individuals' political orientations have also been linked to their turnout decisions. For instance, many studies assess find that political interest, political efficacy, and party identification all increase voter turnout (Sigelman 1982; Powell 1986; Pattie and Johnston 1998; Timpone 1998). All three of these variables are included below.

Aside from these individual characteristics, many time variant covariates result from the political system and vary between elections. For instance, parties' ideological positions may change between elections. As a result, individuals feelings towards the parties might change. In particular, some individuals may feel alienated and other individuals might feel indifferent towards the parties, and at least according to rational choice theory, these feelings should cause individuals' to abstain from voting (Downs 1957; Brody and Page 1973; Riker and Ordeshook 1973; Zipp 1985; Adams, Dow and Merrill 2006). Alienation and indifference are measured using 10-point scales indicating individuals' feelings towards the parties participating in each election. Similarly, individuals' given a pre-election survey are more likely to turn out (Kraut and McConahay 1973; Yalch 1976). For each election, half of the respondents are assigned to take a pre-election survey and the other half are assigned to take the post-election survey. A variable indicating this assignment is included in the analysis below.

There are admittedly many more individuals characteristics included as covariates than election characteristics. Notably absent is an indicator of whether or not individuals have been contacted by a vote mobilization drive. A question asking about such contact is simply not asked on the SES. One potential reason is that voter mobilization drives are simply not common in Sweden. For instance, data from the Comparative Survey of Electoral Systems (2008) indicates that only about 7% of Swedes were contacted by political parties during the 2002 election campaigns versus almost 50% of Americans in the 2004 Presidential Election and more than 30% of Brits during the 2005 Parliamentary Election. Still, one might

worry that omitting this and other election characteristics (e.g. competitiveness, feelings toward the incumbent, or feelings about the economy) might bias the estimated effect of habit. To help alleviate these concerns, election fixed effects are included in the models estimated below. Omitted individual characteristics are accounted for by the individual specific random intercept, as discussed in the previous section.

## Missing Data

Most covariates have missing data for some observations, at the very least, for individuals who did not respond to the survey. The exceptions are voter turnout, assignment to the pre-election survey, gender, age, and income, which are collected from the Swedish Tax Authority and are available for virtually all interviewees in all years. The precise number of missing observations varies a lot between questions. The answers to some questions – e.g. interest in politics – are missing for as few as 20% of interviewees, and the answers to other questions – e.g. political efficacy – are missing for more than 35% of interviewees. Overall, roughly 40% of observations are missing data for at least one of the covariates included in the analysis below. Compared to other national election studies, the rate of missing data is pretty low. Nonetheless, there are still a sufficient amount of missing data to bias estimates if listwise deletion is used (Little and Rubin 1987; King et al. 2001). Furthermore, Wooldridge’s (2005) correction for the initial conditions problem requires the data to be balanced across panels, which exacerbates the missing data problem because individuals, not observations, must be deleted from the sample. This raises the percent of missing observations to 55%.

In the present analysis, single imputation is used to deal with these missing observations. Although multiple imputation is preferable (Allison 2001; King et al. 2001), existing Stata packages to merge the statistical results – Clarify and MIM – are not compatible with random effects probit models, so single imputation is used in this iteration of the paper.<sup>11</sup> To perform

---

<sup>11</sup>I recently discovered the MIEST package written by Ken Scheve to combine random effects probit estimates from multiple imputation datasets. Future iterations of this paper will use this package and multiple imputation to handle the missing data problem. One can

the imputation, a dataset was created for each panel. Each of these datasets contained the all of the aforementioned variables plus lags and leads of all the variables, in order to take advantage of the panel structure of the data during imputation. One imputed dataset was created for each of these datasets using the Amelia II program (Honaker, King and Blackwell 2009). After imputation, the imputed datasets for each panel were stacked, and all the panels were analyzed together.

## Results

The results of six statistical models are displayed in table 1. The first two models are based on equation 2; the second two models are based on equation 5; and the last two models are based on equation 6. For each equation, two models are estimated that differ only in the covariates included in the model (i.e.  $x_{it}$ ). The base specification uses only the covariates with no (or at least few) missing observation - gender, age, income, assignment to the pre-election survey, and election dummies. The full specification includes all of the covariates discussed in the previous section. For each model, only prior turnout, initial turnout, and the random intercept term are displayed.<sup>12</sup>

[Table 1 about here.]

As expected, turnout in the previous election has a positive and statistically significant effect across all of the models in table 1. The magnitude is the highest in the simple probit model and decreases only slightly in the random effects probit model. When applying Wooldridge's correction for the initial conditions problem (2005), though, the size of the coefficient dramatically decreases. This decrease as well as the positive and statistically significant initial turnout variable indicate the presence of an initial conditions problem. Hence, the Wooldridge random effects probit model is the correct specification. Comparing

---

also use Stata 11 to perform and merge the estimates from multiple imputation datasets.

<sup>12</sup>Full model results are available from the author upon request.

the base and full models, the effect of turnout in the previous election decreases slightly in the fully specified model, but the effect is pretty robust between the two models.

Since the estimates in table 1 are from a probability model, they tell us little about the change in individuals' underlying propensities to vote as a result of voting in the prior election. The estimates in table 1 can be used to calculate this change in probability. One simply has to estimate the underlying propensities to vote for an average citizen who voted in the previous election and an average citizen who abstained in the previous election.  $\delta$  can be calculated by subtracting these two quantities. These estimated probabilities of voting, their 95% confidence intervals, and delta are provided in table 2 for each of the models from table 1.

[Table 2 about here.]

As one might expect, both the probit and normal random effects probit models predict that habit has a huge effect – approximately, a 0.12 and 0.40 change in the underlying probability of voting, respectively. The estimates from the model that corrects for the initial conditions problem is significantly smaller, a 0.03 change in the underlying probability of voting. This effect is significantly smaller than the effect of habit found in the United Kingdom by Denny and Doyle (2009). When using Wooldridges' correction for the initial conditions problem, they report a change in the probability of voting of only 0.11. This is about four times larger than the effect found in the present study for Sweden. Assuming that none of the effect in Sweden is due to the institutional mechanism, these findings suggest that the psychological mechanism explains at least a small part of the effect of habit.

Of course, one might not believe that no institutional barriers to voting exist in Sweden. After all, Swedes still have to find their polling location and learn the voting procedure the first time that they go to the polls, and even though the costs of this learning are significantly reduced in Sweden, they are still present to a minimal extent. To assess if these costs are responsible for observing habitual voting in Sweden, table 3 assesses the effect of voting in the

previous election for each age group. If any of the observed effect of habit can be attributed to the institutional mechanism, then one would expect voting in the previous election to have a much larger effect on younger voters.

[Table 3 about here.]

The magnitude of the coefficients are about the same across all the age groups, but there is some variance across the age groups in the statistical significance of voting in the previous election. Nonetheless, there is little pattern to this variation. The underlying probability of voting of 41-50 year olds and 61-70 year olds is not affected by voting in the previous election, and the effect is only significant at the 10% level for individuals who are older than 71 years of age.

The estimates from table 3 are further assessed in figure 4, which illustrates the estimated change in the underlying probability of voting for each age group. The effect is clearly strongest for 23-30 year olds. This is what one would predict if the institutional mechanism caused habitual voting. However, the next strongest effect is for individuals 71 years of age and older, and aside from the 41-50 year olds, the change in individuals' probabilities of voting as a result of voting in the previous election is about the same for all of the other age groups. This pattern (or lack thereof) is not predicted by the institutional mechanism.

[Figure 4 about here.]

Even the differences that do exist in individuals' probability of voting are small. To assess whether they are statistically significant, I estimated a model that interacts age with individuals' prior voting decision. The results from this model are presented in table 4. The reference category in the figure is individuals who are 71 years of age and older. The effect of voting in the previous election is statistically significant, but none of the interaction terms are not. This indicates that the effect of voting in the previous election is statistically the

same across all of the age groups. Notably, the same is not true of individuals' underlying probabilities of voting. 23-30 year olds have a significantly lower initial underlying probability of voting than individuals who are older than 71, indicating the cumulative effect that voting has on individuals' underlying probabilities of voting. 61-70 year olds have a significantly higher underlying probability of voting than individuals who are older than 71. Although I cannot be certain, I suspect that 65 year olds probability of voting significantly increases as a result of retirement, and this effect is compounded by the deterioration of individuals' health once individuals fall into the oldest age category.

[Table 4 about here.]

To summarize, habitual voting is present in Sweden. On average, individuals who vote in one election are about three percentage points more likely to vote in the subsequent election. Since there are few institutional barriers in Sweden, the presence of habitual voting there is evidence that the psychological mechanism is causing individuals to develop habits for voting there. Moreover, since the magnitude of the effect of habit so small in Sweden compared to the effect found in the U.S. and the U.K., one might also interpret the results of this study to mean that the institutional mechanism explains the majority of the effect of habit in previous studies.

## **Conclusions**

The purpose of this study has been to disentangle the two most likely mechanisms for habitual voting: the institutional mechanism and the psychological mechanism. To accomplish this goal, I assessed the presence of habitual voting in Sweden. Since Sweden has few institutional barriers to voting, at least compared to other countries where habitual voting has been studied, observing habitual voting in Sweden can be interpreted as indirect evidence of the psychological mechanism.

The results indicate that habitual voting is present in Sweden. Swedes are about three percentage points more likely to vote if they voted in the previous election. These

results suggest that the psychological mechanism at least partially explains habitual voting. However, the effect of habit is significantly smaller in Sweden than in the U.S. or the U.K., where previous studies of habitual voting have been conducted. This suggests that the strong effect of habit observed in previous studies can mostly be attributed to the institutional mechanism. When institutional barriers are absent, habit has only a small effect.

## References

- Adams, James, Jay Dow and Samuel Merrill. 2006. "The Political Consequences of Alienation-Based and Indifference-Based Voter Abstention: Applications to Presidential Elections." *Political Behavior* 28(1):65–86.
- Aldrich, John H., Jacob M. Montgomery and Wendy Wood. 2008. "Turnout as a Habit." *unpublished manuscript* .
- Allison, Paul. 2001. *Missing Data*. Thousand Oaks: Sage.
- Arulampalam, Wiji, Alison L. Booth and Mark P. Taylor. 2000. "Unemployment Persistence." *Oxford Economic Papers* 51(1):24–50.
- Arulampalam, Wiji and Mark B. Stewart. 2009. "Simplified Implementation of the Heckman Estimator of the Dynamic Probit Model and a Comparison with Alternative Estimators." *Oxford Bulletin of Economics and Statistics* 71(5):659–681.
- Belli, Robert F, Michael W Traugott and Matthew N Beckmann. 2001. "What Leads to Voting Overreports? Contrasts of Overreports to Validated Voters and Admitted Nonvoters in the American National Election Studies." *Journal of Official Statistics* 17(4):479–498.
- Betsch, Tilmann, Susanne Haberstroh and Cornelia Hohle. 2002. "Explaining Routinized Decision Making: A Review of Theories and Models." *Theory & Psychology* 12(4):453–488.
- Blais, Andre. 2000. *To Vote or Not to Vote: The Merits and Limits of Rational Choice Theory*. Pittsburgh: University of Pittsburgh Press.
- British Election Commission. 2010. "About My Vote." Available at <http://www.aboutmyvote.co.uk/default.aspx>.
- Brody, Richard A. and Paul M. Sniderman. 1977. "From Life Space to Polling Station: The Relevance of Personal Concerns for Voting Behavior." *British* 7(3):337–360.

- Brody, Richard and Benjamin Page. 1973. "Indifference, Alienation and Rational Decisions." *Public Choice* 15(1):1–17.
- Chamberlain, Gary. 1984. *Handbook of Econometrics*. Amsterdam: North-Holland chapter Panel Data, pp. 1247–1318.
- CSES. 2008. "Comparative Study of Electoral Systems." Available at <http://www.cses.org>.
- Declare Yourself. 2010. "State by State Info." Available at [http://www.declareyourself.com/voting\\_faq/state\\_by\\_state\\_info\\_2.html](http://www.declareyourself.com/voting_faq/state_by_state_info_2.html).
- Demstader, Christine. 2010. "How to Vote in Sweden – A Personal Diary." Available at <http://www.sweden.se/eng/Home/Society/Government-politics/Reading/How-to-vote-in-Sweden-a-personal-diary/>.
- Denny, Kevin and Orla Doyle. 2009. "Does Voting History Matter? Analyzing Persistence in Turnout." *American Journal of Political Science* 53(1):17–35.
- Downs, Anthony. 1957. *An Economic Theory of Democracy*. New York: Harper & Row.
- "Election 2010: Voters' Frustrations at Polling Problems". 2010. *BBC News*. Available at [http://news.bbc.co.uk/2/hi/uk\\_news/politics/election\\_2010/8666537.stm](http://news.bbc.co.uk/2/hi/uk_news/politics/election_2010/8666537.stm).
- Finkel, Stephen. 1985. "Reciprocal Effects of Participation and Political Efficacy." *American Journal of Political Science* 29(4):891–913.
- Fowler, James. 2006. "Habitual Voting and Behavioral Turnout." *The Journal of Politics* 68(2):335–344.
- Franklin, Mark. 2004. *Voter Turnout and the Dynamics of Electoral Competition*. New York: Cambridge University Press.

- Gerber, Alan and Donald Green. 2000. "The Effects of Canvassing, Telephone Calls, and Direct Mail on Voter Turnout: A Field Experiment." *American Political Science Review* 94(3):653–663.
- Gerber, Alan, Donald Green and Ron Shachar. 2003. "Voting May Be Habit Forming: Evidence from a Randomized Field Experiment." *American Journal of Political Science* 47(3):540–550.
- Green, Donald and Ron Shachar. 2000. "Habit Formation and Political Behaviour: Evidence of Consuetude in Voter Turnout." *British Journal of Political Science* 30(4):561–573.
- Greene, William. 2008. *Econometric Analysis*. 6th ed. Upper Saddle River: Prentice Hall.
- Gronke, Paul, Eva Galanes-Rosenbaum and Peter A. Miller. 2007. "Early Voting and Turnout." *PS: Political Science & Politics* 40(4):639–645.
- Highton, Benjamin and Raymond E. Wolfinger. 2001. "The First Seven Years of the Political Life Cycle." *American Journal of Po* 45(1):202–209.
- Honaker, James, Gary King and Matthew Blackwell. 2009. "Amelia II: A Program for Missing Data." User's Manual Available at <http://gking.harvard.edu/amelia/>.
- "How to Turn Off Voters.". 2010. *New York Times*. Available at <http://www.nytimes.com/2010/12/15/opinion/15wed3.html>.
- Hsiao, Cheng. 1986. *Analysis of Panel Data*. Cambridge: Cambridge University Press.
- Huckfeldt, Robert and John Sprague. 1992. "Political Parties and Electoral Mobilization: Political Structure, Social Structure, and the Party Canvass." *American Political Science Review* 86(1):70–86.
- International Institute for Democracy and Electoral Assistance. 2006. "Voter Turnout." Available from <http://www.idea.int/vt/>.

- Karp, Jeffrey A and David Brockington. 2005. "Social Desirability and Response Validity: A Comparative Analysis of Overreporting Voter Turnout in Five Countries." *The Journal of Politics* 67(3):825–840.
- King, Gary, James Honaker, Anne Joseph and Kenneth Scheve. 2001. "Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation." *American Political Science Review* 95(1):49–69.
- Kraut, Robert E. and John B. McConahay. 1973. "How Being Interviewed Affects Voting: An Experiment." *The Public Opinion Quarterly* 37(3):398–406.
- Leighley, Jan E. and Jonathan Nagler. 1992a. "Individual and Systemic Influences on Turnout: Who Votes? 1984." *The Journal of Politics* 54(3):718–740.
- Leighley, Jan E. and Jonathan Nagler. 1992b. "Socioeconomic Class Bias in Turnout, 1964–1988: The Voters Remain the Same." *American Political Science Review* 86(3):725–736.
- Little, Roderick J.A. and Donald B. Rubin. 1987. *Statistical Analysis with Missing Data*. New York: Wiley and Sons.
- Meredith, Marc. 2009. "Persistence in Political Participation." *Quarterly Journal of Political Science* 4(3):187–209.
- Milbrath, Lester. 1965. *Political Participation*. Chicago: Rand McNally.
- Miller, Warren E and J. Merrill Shanks. 1996. *The New American Voter*. Cambridge: Harvard University Press.
- Neyman, J. and Elizabeth L. Scott. 1948. "Consistent Estimates Based on Partially Consistent Observations." *Econometrica* 16(1):1–32.
- Nickerson, David. 2004. "Just How Addictive is Voting and Why?" *Unpublished Manuscript*.
- Orme, Chris D. 2001. "Two-Step Inference in Dynamic Non-Linear Panel Data Models." *Un .*

- Pattie, Charles and Ron Johnston. 1998. "Voter Turnout at the British General Election of 1992: Rational Choice, Social Standing or Political Efficacy?" *European Journal of Political Research* 33(2):263–283.
- Plutzer, Eric. 2002. "Becoming a Habitual Voter: Inertia, Resources, and Growth in Young Adulthood." *American Political Science Review* 96(1):41–56.
- Powell, G. Bingham. 1986. "American Voter turnout in Comparative Perspective." *American Political Science Review* 80(1):17–43.
- Prior, Markus. 2010. "You've Either Got It or You Don't? The Stability of Political Interest over the Life Cycle." *The Journal of Politics* 72(3):747–766.
- Riker, William H. and Peter C. Ordeshook. 1973. *An Introduction to Positive Political Theory*. Englewood Cliffs: Prentice Hall.
- Rosenstone, Steven J and Raymond E Wolfinger. 1978. "The Effect of Registration Laws on Voter Turnout." *American Political Science Review* 72(1):22–45.
- Sigelman, Lee. 1982. "The Nonvoting Voter in Voting Research." *American Journal of Political Science* 26(1):47–56.
- Silver, Brian D, Barbara A Anderson and Paul R Abramson. 1986. "Who Overreports Voting?" *American Political Science Review* 80(2):613–624.
- Stoker, Laura and M. Kent Jennings. 1995. "Life-Cycle Transitions and Political Participation: The Case of Marriage." *American Political Science Review* 89(2):421–433.
- Strate, John M., Charles J. Parrish, Charles D. elder and Coit Ford. 1989. "Life Span Development and Voting Participation." *American Political Science Review* 83(2):433–464.
- Swedish Election Authority. 2010. "Elections in Sweden." Available at [http://www.val.se/pdf/electionsinsweden\\_webb.pdf](http://www.val.se/pdf/electionsinsweden_webb.pdf).

- Timpone, Richard J. 1998. "Structure, Behavior and Vote Turnout in the United States." *American Political Science Review* 92(1):145–158.
- Tyler, Tom R. 1990. *Why People Obey the Law*. New Haven: Yale University Press.
- Verba, Sidney and Norman H. Nie. 1972. *Participation in America: Political Democracy and Social Equality*. Chicago: University of Chicago Press.
- Verba, Sidney, Norman H. Nie and Jae on Kim. 1978. *Participation and Political Equality*. Cambridge: Cambridge University Press.
- Wolfinger, Raymond E and Steven J Rosenstone. 1980. *Who Votes?* New Haven: Yale University Press.
- Wooldridge, Jeffrey M. 2005. "Simple Solutions to the Initial Conditions Problem in Dynamic, Nonlinear Panel Data Models with Unobserved Heterogeneity." *Journal of Applied Econometrics* 20:39–54.
- Yalch, Richard F. 1976. "Pre-election Interview Effects on Voter Turnout." *Public Opinion Quarterly* 40(3):331–336.
- Zipp, John. 1985. "Perceived Representativeness and Voting: An Assessment of the Impact of "Choices" vs. "Echoes"." *American Political Science Review* 79(1):50–61.
- Zuckerman, Alan S., Jennifer Fitzgerald and Josip Dasovic. 2005. *Do Couples Support the Same Political Party? Sometimes: Evidence from British and German Household Surveys*. Philadelphia: Temple University Press chapter The Social Logic of Politics, pp. 75–94.

Table 1. Estimated Effect of Prior and Initial Turnout on Present Turnout

Variable	Probit		RE Probit		Wooldridge RE Probit	
	<i>Base</i>	<i>Full</i>	<i>Base</i>	<i>Full</i>	<i>Base</i>	<i>Full</i>
$Turnout_{t-1}$	1.58*** (0.03)	1.46*** (0.03)	1.57*** (0.03)	1.44*** (0.03)	0.44*** (0.10)	0.41*** (0.10)
$Turnout_0$					1.71*** (0.15)	1.50*** (0.14)
$\rho$			1.6e-06 (1.6e-05)	6.8e-06 (4.1e-05)	0.53*** (0.04)	0.53*** (0.04)
Individuals	11303	11303	11303	11303	11303	11303
Observations	22606	22606	22606	22606	22606	22606

Notes: The table displays coefficient estimates for previous and initial turnout as well as the random intercept term from six probit models with standard errors in parentheses. All other covariates are excluded. This includes gender, age, income, assignment to the pre-election survey, and election dummies in the base models, and these variables as well as education, marital status, alienation, indifference, party identification, political efficacy, and political interest in the fully specified models. Statistical significance is denoted as follows:  $\Pr(z=0) < 0.01 = ***$ ,  $\Pr(z=0) < 0.05 = **$ ,  $\Pr(z=0) < 0.1 = *$ .

Table 2. Estimated Probability of Voting by Prior Turnout

<b>Model</b>	<b>Turnout<sub>t-1</sub></b>		$\delta$	<b>N</b>
	<b><i>Vote</i></b>	<b><i>Abstain</i></b>		
Probit - Base Model	0.70 (0.68 - 0.72)	0.83 (0.82 - 0.84)	0.13	22,606
Probit - Full Model	0.72 (0.70 - 0.74)	0.83 (0.82 - 0.84)	0.11	22,606
RE Probit - Base Model	0.52 (0.50 - 0.55)	0.95 (0.95 - 0.95)	0.43	22,606
RE Probit - Full Model	0.60 (0.57 - 0.62)	0.95 (0.95 - 0.96)	0.35	22,606
Wooldridge RE Probit - Base Model	0.96 (0.92 - 0.98)	0.99 (0.98 - 0.99)	0.03	22,606
Wooldridge RE Probit - Full Model	0.96 (0.93 - 0.98)	0.99 (0.98 - 0.99)	0.03	22,606

Notes: The table contains the estimated underlying propensity to vote of individuals who voted and individuals who abstained in the last election with the 95% confidence intervals for these estimates in parentheses. These probabilities were calculated using the estimates from table 1, while holding all covariates at their mean.  $\delta$  represents the effect of habit and is calculated by subtracting the probability of someone who abstained in the previous election from the probability of someone who voted in the previous election.

Table 3. Estimated Effect of Prior and Initial Turnout on Present Turnout For Each Age Group

Variables	Age = 23-30		Age = 31-40		Age = 41-50		Age = 51-60		Age = 61-70		Age = 71+	
	Base	Full										
$Turnout_{t-1}$	0.53*** (0.17)	0.53*** (0.17)	0.46** (0.21)	0.47** (0.21)	0.28 (0.25)	0.31 (0.24)	0.59** (0.28)	0.60** (0.27)	0.40 (0.31)	0.49 (0.30)	0.63* (0.34)	0.62* (0.35)
$Turnout_0$	1.08*** (0.23)	0.78*** (0.20)	1.61*** (0.33)	1.33*** (0.30)	2.23*** (0.44)	1.99*** (0.40)	1.76*** (0.47)	1.54*** (0.43)	2.28*** (0.54)	1.87*** (0.48)	1.97*** (0.61)	1.83*** (0.61)
$\rho$	0.44*** (0.09)	0.38*** (0.09)	0.50*** (0.09)	0.46*** (0.10)	0.63*** (0.09)	0.61*** (0.09)	0.53*** (0.12)	0.49*** (0.13)	0.49*** (0.13)	0.41*** (0.15)	0.54*** (0.14)	0.54*** (0.15)
Individuals	2222	2222	2439	2439	2170	2170	1949	1949	1621	1621	902	902
Observations	4444	4444	4878	4878	4340	4340	3898	3898	3242	3242	1804	1804

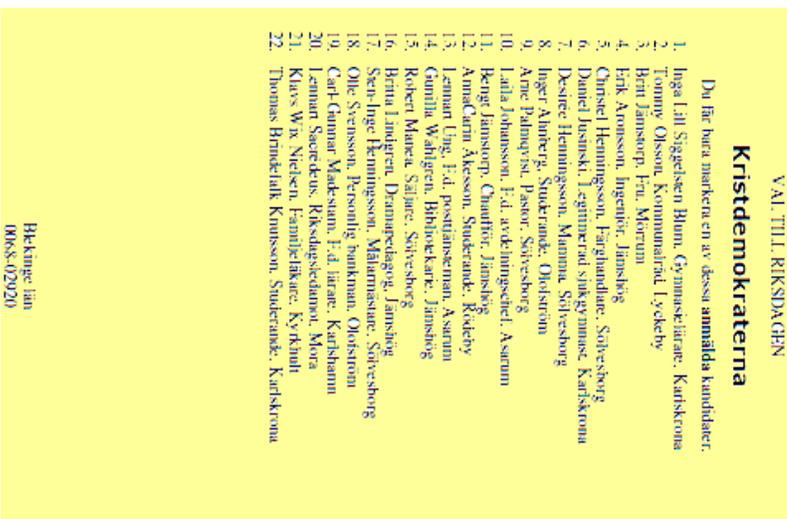
Notes: The table displays coefficient estimates for previous and initial turnout as well as the random intercept term from twelve random-effects probit models with standard errors in parentheses. All other covariates are excluded. This includes gender, age, income, alienation, indifference, party identification, political efficacy, and political interest in the fully specified models. Statistical significance is denoted as follows:  $\Pr(z=0) < 0.01 = ***$ ,  $\Pr(z=0) < 0.05 = **$ ,  $\Pr(z=0) < 0.1 = *$ .

Table 4. Estimated Probability of Voting by Prior Turnout and Age

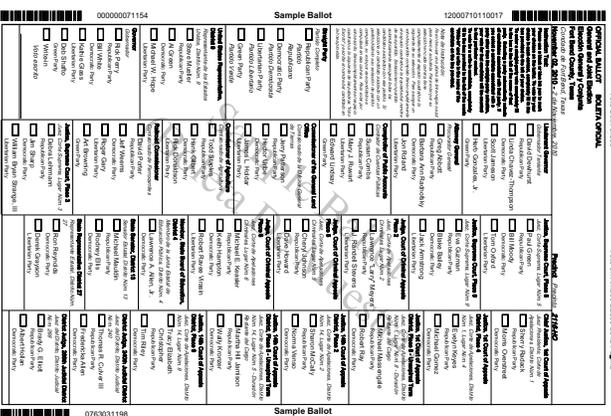
Variables	Wooldridge RE Probit	
	Base	Full
$Turnout_{t-1}$	0.65*** (0.20)	0.60*** (0.20)
$Turnout_{t-1} \times Age = 23 - 30$	-0.28 (0.21)	-0.26 (0.21)
$Turnout_{t-1} \times Age = 31 - 40$	-0.22 (0.21)	-0.20 (0.21)
$Turnout_{t-1} \times Age = 41 - 50$	-0.15 (0.22)	-0.13 (0.22)
$Turnout_{t-1} \times Age = 51 - 60$	-0.045 (0.24)	-0.043 (0.24)
$Turnout_{t-1} \times Age = 61 - 70$	-0.33 (0.24)	-0.30 (0.25)
$Turnout_0$	1.91*** (0.28)	1.73*** (0.27)
$Turnout_0 \times Age = 23 - 30$	-0.64** (0.26)	-0.66** (0.26)
$Turnout_0 \times Age = 31 - 40$	-0.23 (0.27)	-0.29 (0.27)
$Turnout_0 \times Age = 41 - 50$	-0.17 (0.28)	-0.18 (0.28)
$Turnout_0 \times Age = 51 - 60$	-0.20 (0.30)	-0.14 (0.29)
$Turnout_0 \times Age = 61 - 70$	0.51* (0.30)	0.44 (0.30)
$Age = 23 - 30$	-0.31** (0.13)	-0.34*** (0.13)
$Age = 31 - 40$	-0.38*** (0.14)	-0.44*** (0.14)
$Age = 41 - 50$	-0.28* (0.16)	-0.38** (0.16)
$Age = 51 - 60$	-0.67*** (0.17)	-0.68*** (0.17)
$Age = 61 - 70$	-0.80*** (0.20)	-0.80*** (0.20)
$\rho$	0.52*** (0.04)	0.49*** (0.04)
Individuals	11303	11303
Observations	22606	22606

Notes: The table displays coefficient estimates for previous and initial turnout interacted with age dummies as well as the random intercept term from two random-effects probit models with standard errors in parentheses. All other covariates are excluded. This includes gender, age, income, assignment to the pre-election survey, and election dummies in the base models, and these variables as well as education, marital status, alienation, indifference, party identification, political efficacy, and political interest in the fully specified models. Statistical significance is denoted as follows:  $\Pr(z=0) < 0.01 = ***$ ,  $\Pr(z=0) < 0.05 = **$ ,  $\Pr(z=0) < 0.1 = *$ .

### A. Swedish Ballot



### B. U.S. Ballot



### C. U.K. Ballot

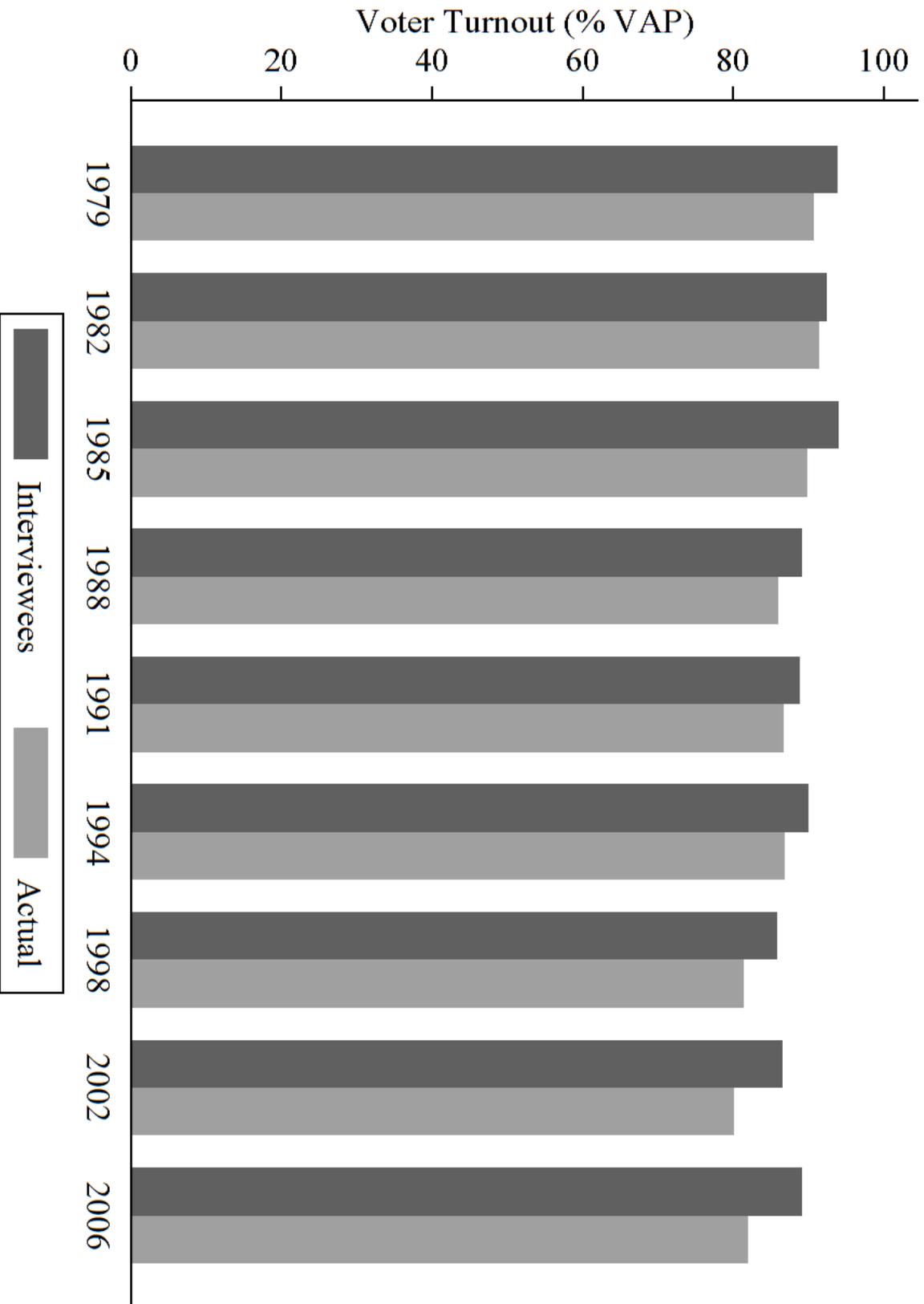
Commented No.  
The counterfoil is  
to have a number  
corresponding  
with that on the  
back of the ballot  
paper

**VOTE FOR ONE CANDIDATE ONLY**

<b>BROWN</b> William Ian 23 High Street, Anytown [Emblem] Scottish Green Party	
<b>CRANSTON</b> Heleen 912 Main Street, Anytown [Emblem] Scottish Liberal Democrats	
<b>MACDONALD</b> Donald Alexander 4 Eglon Avenue, Anytown [Emblem] Scottish Labour Party	
<b>MASTERS</b> Peter Martin 93 Holyrood Road, Anytown [Emblem] Scottish Conservative & Unionist Party	
<b>MCKAY</b> Michael Gordon 45 Easter Road, Anytown Independent	
<b>WALLACE</b> Walter Alan 112 South Gyle Avenue, Anytown [Emblem] Scottish National Party Candidate	

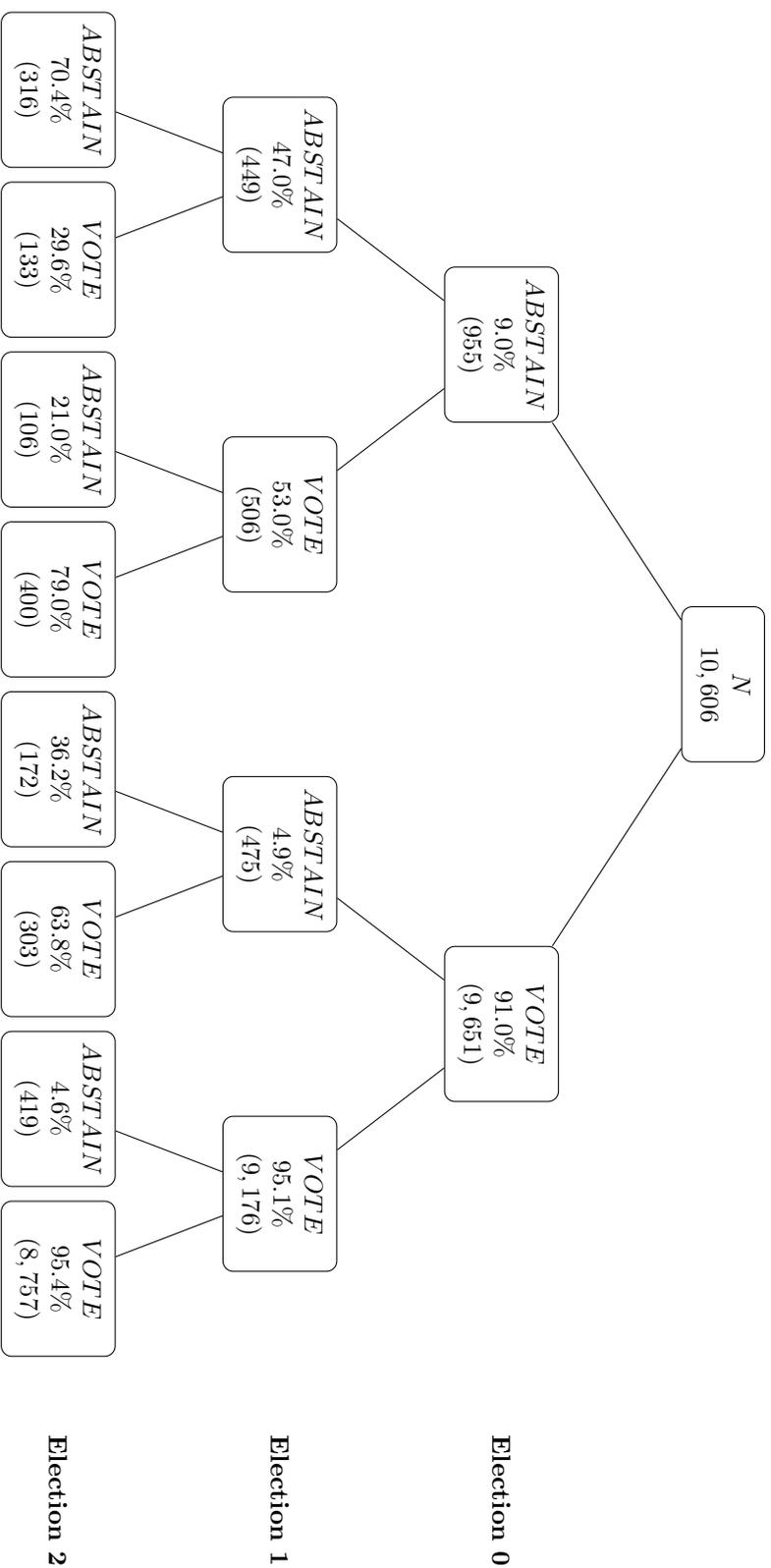
Notes: The Swedish example is the Christian Democrat's ballot paper from the 2010 parliamentary election and was retrieved from the Swedish Election Authorities' website – <http://www.val.se/>. The U.S. example is from a district in Fort Bend County, TX for the 2010 mid-term election and was retrieved from the county's official website – <http://www.co.fort-bend.tx.us/>. The U.K. example is from a generic local election in Scotland and was retrieved from the Office of the Queen's Printer for Scotland's website – <http://www.oqps.gov.uk/>.

Figure 2: Respondent Turnout versus Actual Turnout



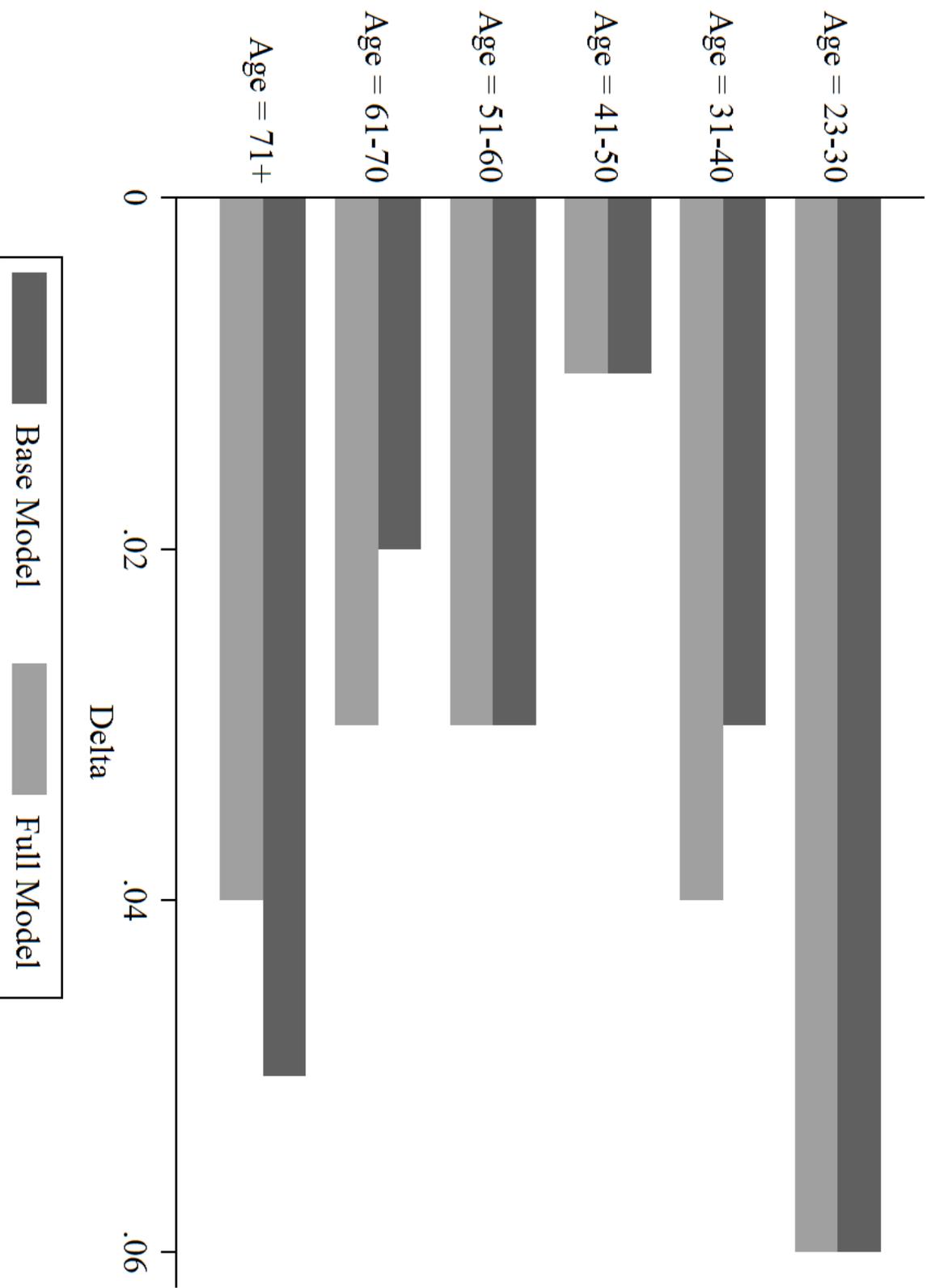
Notes: Interviewee turnout from the 1979, 1982, 1985, 1988, 1991, 1994, 1998, 2002, and 2006 Swedish Election Studies. Actual turnout from the International Institute for Democracy and Electoral Assistance (2006).

Figure 3: Voter Turnout by Voting History



Notes: Each node contains the percentage of interviewees who voted, or abstained, in that election given their turnout decision in the previous election. The number of interviewees in each cell are in parentheses. Data from the 1979, 1982, 1985, 1988, 1991, 1994, 1998, 2002, and 2006 Swedish Election Studies.

Figure 4: Estimated Effect of Voting in the Previous Election



Notes: The figure contains  $\delta$ , which represents the effect of habit, for each of the models from table 4.  $\delta$  is calculated by subtracting the estimated underlying propensity to vote of individuals who voted in the previous election from the estimated underlying propensity to vote of individuals who abstained in the last election. These quantities are calculated while holding all covariates at their means.