UCD GEARY INSTITUTE DISCUSSION PAPER SERIES

"Does Voting History Matter?

Analysing Persistence in Turnout*

Dr. Kevin Denny (University College Dublin, School of Economics & Geary Institute)

Dr. Orla Doyle (University College Dublin, Geary Institute)

1st December 2005

* Corresponding author: Orla.Doyle@ucd.ie Tel: (+353 1) 716 4637. Fax: (+353 1) 716 1108. Address: Geary Institute, University College Dublin, Belfield, Dublin 4, Ireland. The first named author is also affiliated to the Institute for Fiscal Studies, London. Permission to use the NCDS given by the ESRC Data Archive at Essex is gratefully acknowledged.

Abstract

Individuals who vote in one election are also more likely to vote in the next. Modelling the causal relationship between consecutive voting decisions however is intrinsically difficult, as this positive association can exist due to unobserved heterogeneity (i.e. some fixed, but unobserved, characteristics makes voters consistently turn out to vote) or habit formation (i.e. past turnout decisions influence subsequent turnout decisions). This paper overcomes this problem using longitudinal data from the British National Child Development Study (NCDS) to examine voting behaviour across three elections. Utilising techniques developed in the econometrics literature we find that failing to control for unobserved heterogeneity overestimates the extent of habit formation by almost 100%. Estimating a dynamic model of voter turnout, allowing for unobserved heterogeneity, implies that voting in one election increases the probability of voting in the next by about 13%. This figure is far less than previous studies have identified.

Keywords: Voter turnout, habit formation, dynamic panel models

1 Introduction

An individual who is observed to vote in one election is also likely to be observed to vote in the subsequent election. Voter turnout, therefore, is characterised by persistence, whereby repeated behaviour is observed from one election to the next. Such persistence highlights the dynamic nature of political behaviour. Analysing voting decisions as dynamic rather than static processes allows us to investigate the malleability or rigidity of voters' political actions, which in turn can have important implications for the effectiveness of political party campaigning and policy initiatives to increase electoral participation.

Persistence in voter turnout may be driven by two main factors. First, turning out to vote at election time may be habit forming. Economists often refer to habit formation as true state dependence, for example, when modelling how past unemployment states influence current unemployment states. In the case of voting, state dependence occurs when, other things being equal, the decision to vote is dependent on whether the individual did so in the previous election. Going to the polls may be a self-reinforcing act which becomes stronger over time as voters experience more elections. Therefore persistence in voter turnout may be a result of the habitual nature of voting decisions.

Alternatively, persistence in voter turnout may be observed if the characteristics that influence voting decisions in one election are time invariant (such as gender or parental background), so that the same influences are exerted in each election. As the bulk of the micro-voting literature relies on cross-sectional survey data, which essentially represents a snapshot of the voter's political life, it cannot address the habitual nature of voting behaviour. If persistence in turnout is driven solely by individual factors that are constant over time then such analyses are satisfactory. However, if some proportion of persistence is actually habitual i.e. going to the polls in the previous election affects the probability of voting in the current election, then cross-sectional studies are likely to over-estimate the importance of individual socio-demographic and situational factors.

It is unlikely that persistence in voter turnout is purely habitual or purely situational, rather it is likely to be driven by a combination of the two. Few studies to date however, including those utilising longitudinal survey data, have investigated the extent to which persistence in voter turnout may be attributed to habit formation, on the one hand, and time invariant individual characteristics, on the other. The primary reason for this is that empirically distinguishing between the two potential sources of persistence is fraught with difficulties. This paper overcomes these problems by introducing a dynamic model of voter turnout which takes account of unobserved heterogeneity and initial conditions. These issues are discussed in detail below. This allows us to investigate the extent to which persistence in voting behaviour is driven by habit.

The paper is organised as follows. Section 2 discusses persistence in voter turnout and outlines the problems encountered when modelling this relationship. Section 3 introduces the cohort data used in the analysis. Section 4 presents the dynamic econometric model and discusses the methodology in detail. Section 5 presents the results of a series of dynamic voter turnout models. Finally, Section 6 concludes.

2 Persistence in Voting Behaviour

2.1 Habit Formation and Voter Turnout

Viewing political behaviour as habitual is widely accepted in the turnout literature (see Milbraith, 1965; Verba and Nie, 1972; Brody and Sniderman, 1977; Miller and Shanks, 1996; Green and Shachar, 2000; Gerber, Green and Shachar, 2003; Plutzer, 2002). Green and Shachar (2000) refer to such habit formation as *consuetude*.[1] That is, if two individuals have exactly the same characteristics, but one decides to vote on election day and the other does not, then these decisions will affect their probability of voting in future elections. Gerber *et al.* (2003) find that, all things being equal, an individual is 47% more likely to vote in the current election if they participated in the previous election, while Fowler (2005) notes that more than half of potential voters either always vote or always abstain. Using data from the National Child Development Study (NCDS) we find that 89% of British voters who turned out to vote in the 1997 election also voted in the 1987 election and the 1979 election.

While evidence of persistence in voter turnout exists, non-experimental research determining the extent to which turnout is habitual has been limited. Lack of adequate panel data has led the majority of the literature to side-step the habitual nature of voter turnout and concentrate on the personal/socio-demographic and institutional/situational determinants instead.[2] Habit formation can readily explain why one of the standard socio-demographic determinants –age– is found to have a positive effect of voter turnout. Turnout may increase with age as habits become reinforcing over time.

A study by Franklin (1994), which emphasises the importance of persistence in early voting behaviour, notes that individuals who turn out to vote when they reach eligible voting age continue this behaviour in subsequent elections, while those who fail to vote in this first election are more likely to become persistent non-voters. State dependence or habit formation in voter turnout may occur due to the high transaction costs of voting. Individuals have to initially face very high costs when they first decide to vote, in regards registering to vote, finding the polling station, learning how to cast a vote and differentiating between political parties (Plutzer, 2002). Gerber *et al.* (2003) refer to the positive or negative feelings which potential voters feel towards voting as "conative attitudes", which are directly derived from these costs of voting. However once this initial investment is made and voters overcome these barriers to

[1] Despite the limited nature of this literature, a large number of terms describing the habitual nature of voting behaviour have evolved. While the economics literature refers to it as state dependence, the political science literature has a variety of expressions - Gerber *et al.* (2003) prefer to call it consuetude rather than habit, as they believe habit has unwanted connotations i.e. people generally have bad habits rather than good habits. Plutzer (2002) refers to it as inertia i.e. individuals can be habitual voters or habitual non-voters, and it differ from persistence in that the origins of persistence can be traced back to other prior events, while inertia suggests that one's current voting behaviour is only influenced by their voting behaviour in the recent past. In this paper we will refer to cases whereby one's past behaviour directly influences ones current behaviour as "habit formation".

[2] Such personal characteristics include age, gender, education, parental background, civic duty, political interest and social networks (see Verba and Nie, 1972; Wolfinger and Rosenstone, 1980; Nie, Junn and Stehlik-Barry, 1996). Situational/institutional determinants include the degree of competitiveness in a given election (Blais, 2000; Pattie and Johnson, 2001) and the timing of elections (Oppenhuis, 1995).

voting, the transaction costs are thus reduced for each subsequent election, which in turn increases the probability of participating in future elections.

Another stream of research proposes that once voters enter the political realm they become targets for party campaigns, and in the political parties attempt to mobilise electoral support they consequently mobilise electoral participation. Individuals who abstain from voting in past elections, on the other hand, are less likely to be canvassed by parties or interest groups in subsequent elections, and are therefore not directly encouraged to participate. Huckfeldt and Sprague (1992) find, using US data, that only 25% of individuals who never voted in a primary were contacted by a political party during an election campaign compared to 40% of those who did participate in previous primaries. In addition, a number of experimental studies find that being contacted prior to an election increases the likelihood of voting (Kraut and McConahay, 1973; Yalch, 1976; Niven, 2002; Gerber *et al.* 2003). Therefore, becoming a voter induces an individual to remain a voter as they become part of the political environment.

There are also several psychological arguments that help explain why persistence in voting behaviour exists. Electoral participation may become a habit as the act of voting can be self-reinforcing, as voters derive psychological benefits from voting. Finkel (1985) notes that participating in an election increases one's familiarity and confidence with the process, which in turn changes one's sense of political efficacy. It also enhances the voter's interest in politics and increases their sense of civic duty, all of which strengthen the positive connotations associated with voting. Indeed, Nickerson (2004) finds that voting is habit forming as the act of voting generates positive thoughts which reinforces its continued behaviour. Using experimental data, he finds that an individual is 29% more likely to vote in the next election if they voted in the previous one. Voters, in a sense, do become "addicted" to voting. Habit formation may also exist as the theory of cognitive consistency posits that individuals try to maintain consistency in their behaviour, beliefs and attitudes, as being inconsistent generates psychological discomfort which voters try to minimise (Festinger, 1957). Therefore, in order to align their behaviour over time voters may continue turning out to vote in elections.

2.2 Unobserved Heterogeneity and Voter Turnout

An alternative explanation for persistence in voter turnout is that it may simply be driven by individual characteristics which are relatively constant over time, such as parental background, education etc. The extensive literature on electoral participation is mainly concerned with identifying such underlying socio-economic determinants (see Wolfinger and Rosenstone, 1980; Verba, Lehman Schlozman and Brady, 1995; Nie *et al*. 1996). While these factors are observable, and can therefore be controlled for, persistence in voter turnout may also be influenced by individual characteristics which are unobserved, such as personality traits. Thus, one may detect persistence in voter turnout if these fixed factors are omitted. This, unobserved heterogeneity, will therefore generate *spurious* state dependence in the data.

Naïve models which try to capture the relationship between past and future turnout decisions by simply including the lagged dependent variable i.e. turnout in the

previous election, as an explanatory variable, fail to distinguish between persistence in turnout caused by *true* state dependence and unobserved heterogeneity. Indeed, as such models do not control for unobserved heterogeneity, they tend to overestimate the extent of state dependence or "habit" in electoral turnout.

Two studies (Green and Shachar, 2000; Shachar, 2003) have attempted to overcome this unobserved heterogeneity problem when using panel data to analyse political behaviour.[3] Green and Shachar (2000) adopt an instrumental variables approach to deal with this issue when examining voter turnout using the American National Election Study. They find that turnout in the past does influence turnout in the future, even when they control for the inclusion of the lagged dependent variable by replacing it with predicted values derived from regressing past turnout on exogenous variables from the same year. In some cases, they find that those who voted in the past were 50% more likely to vote in the future. The technique they employ is an implementation of the method developed by Heckman (1981b).

2.3 Initial Conditions and Voter Turnout

Plutzer (2002) presents a developmental theory of voting which maps the evolution of voters' political behaviour. Two stages are specified - the starting level i.e. the probability that an individual will vote in their first election, and inertia i.e. the probability that they become a consistent voter or non-voter. The developmental model posits that most young adults start off as habitual non-voters, but over time certain life factors make them become habitual voters. Plutzer employs a latent growth curve analysis to model voting habits over time. He finds that variables which are measured prior to voting age have a greater impact on the starting level i.e. parental socio-economic status, parental involvement, education, and that once voters reach inertia, the influence of these factors diminish. Plutzer however does not directly estimate the extent of persistence in voting behaviour.

Plutzer's (2002) stress on the importance of the first election and his attempts to model both the starting point and subsequent growth highlights another prevalent issue when studying persistence using panel data – the 'initial conditions' problem. This problem occurs when the time at which individuals are observed in the first wave of the panel does not coincide with the start of the stochastic process generating the individual voting experiences (Arulampalam, Booth and Taylor, 2000). That is, the data obtained in the first wave may not be the respondents' first experience with the political system. To the best of our knowledge no study to date within the voting literature has tried to overcome the initial conditions problem. In relation to vote choice, a voter may have certain political orientations in the first period because they voted for that party in a previous, but unobserved, period i.e. the habit formation process had already begun, or alternatively, due to unobserved characteristics that

[3] Shachar (2003) analyses persistence in vote choice in two US presidential elections using panel data. He finds that voting decisions in 1976 are a function of voting decisions in 1972, even when the endogeneity of lagged dependent variable was controlled. It is found that the probability that an individual will support the Democrats is 50% if she voted for them in the previous election and only 34.4% if she voted for the Republicans in the previous election. Shachar also finds that the probability of voting for different parties falls with age, suggesting that voting is indeed a self-reinforcing act.

formed those opinions. A similar argument may be made in the case of voter turnout – while the first stage of a panel captures the respondents' turnout decisions within that period, it cannot determine whether this decision is influenced by turnout decisions in the previous, but unrecorded, period or unobserved individual characteristics. This initial conditions problem is therefore another form of unobserved heterogeneity.

2.4 Addressing Unobserved Heterogeneity and Initial Conditions Problems

It is the aim of this paper to incorporate techniques, which were developed in the econometrics literature, into the political science literature, in order to investigate the extent of habit formation in voter turnout. The unobserved heterogeneity problem, discussed in section 2.2, can be addressed using a technique developed by Chamberlain (1984), which proposes including the averages of the time-varying covariates as regressors in the dynamic panel model. While Arulampalam *et al.* (2000), who model unemployment persistence in the UK, argue that the best way to deal with the initial conditions problem is to model the initial outcome explicitly. They implement an estimator developed by Orme (2001), building on work by Heckman (1981a, b), which deals with this issue by adopting a two-step pseudo-maximum likelihood approach that first estimates an initial conditions reduced form equation, from which a probit generalised error term is extracted and then included in the dynamic panel estimation. Modelling both the unobserved heterogeneity and initial conditions problems explicitly is dealt with in Section 3.

As a departure from previous studies of persistence in voter turnout, which have relied on US data, we use unique panel data from the British National Child Development Study (NCDS). Using this data we estimate dynamic models of voter turnout over the course of three elections. This paper, therefore, develops work initiated by Green and Shachar (2000) and Plutzer (2002) to analyse the habitual nature of voting behaviour by utilising new panel data techniques.

3 The Model

The statistical analysis involves estimating a binary choice model using longitudinal (panel) data allowing for one's previous voting decisions to affect one's current decisions. This type of data generates several complications which do not occur in conventional cross sectional data. Consider the following generic model[4]:

$$y_{it}^{*} = x_{it}^{'}\beta + \gamma y_{it-1} + \nu_{it} \qquad \text{i = 1,2,…,n and t = 2,…, } T_i \qquad (1)$$

[4] This exposition draws on Arulampalam *et al.* (2000) which provides more details on the statistical properties of the estimator, see Henley (2000) also.

y_{it}^{*} is a latent variable representing the unobserved propensity to vote. x_{it} is a set of independent variables, some of which may not be time varying , y_{it-1} is a binary variable indicating one's decision to vote or not in the previous election and v_{it} is an error term. An individual votes if their unobserved propensity to vote is positive: y_{it} = 1 if y_{it}^{*} >0 and = 0 otherwise.

Including the lagged dependent variable allows one to measure state dependence/habit formation, the extent to which current decisions are affected by one's previous decisions. However as discussed earlier, estimates of the parameter of interest, γ , are sensitive to two problems: unobserved heterogeneity and the initial conditions problem. The former may arise if we do not have adequate controls for characteristics that determine voter turnout. Say there is some characteristic that increases the probability of an individual voting in general. Excluding this variable will generate a spurious positive correlation between past and current turnout decisions. The initial conditions problem arises if the start of the data (when one first records behaviour) does not correspond to the actual start of the underlying activity.

3.1 Unobserved Heterogeneity

To deal with unobserved heterogeneity we decompose the error term into an individual specific term and a random error. The former is treated as a random effect. Unlike linear models, one cannot treat this as a fixed effect because of the incidental parameters problem (Neyman and Scott, 1948).

$$v_{it} = \varepsilon_i + u_{it} \tag{2}$$

Unless ε_i is independent of the x's then maximum likelihood estimates are inconsistent. So we follow Chamberlain (1984) and assume that the ε_i is a linear function of the means of the time varying independent variables with an error term (α_i) which is normally distributed and independent of the x's and u_{it} .

$$\varepsilon_i = a_0 + a_1^{'}\overline{x}_i + \alpha_i \tag{3}$$

This generates an underlying model which can be estimated by standard random effects probit methods.

$$y_{it}^{*} = x_{it}^{'}\beta + \gamma y_{it-1} + a_1^{'}\overline{x}_i + \alpha_i + u_{it} \qquad \text{i = 1,2,…,n and t = 2,…, } T_i \tag{4}$$

Therefore, including the means of all the time varying variables addresses the potential unobserved heterogeneity problem.

3.2 Initial Conditions

The methods used in this paper have typically been applied to labour market data, such as modelling unemployment spells where it is highly unlikely that one will observe all individuals from the start of their labour market history. With respect to the voting data in the NCDS, it is not obvious that an initial condition problem will arise since we observe individuals from the first general election that they could have voted in, i.e. 1979, when all respondents were 21 years of age. However, thinking of actual voting decisions as representations of underlying propensities, then it is possible that individuals become politised at different times so observing them from the same point (and in this case, age) may still generate an initial condition problem.

We address the problem by estimating a reduced form equation for the initial voting decision in wave 1 (see Orme, 2001). The covariates in the reduced form equation, z_i, are strictly exogenous and include variables relevant to period 1, some pre-sample information and the means of the time varying covariates in x_{it}. The pre-sample information variables are the equivalent of "instrumental variables" and are required for identification.

$$y_{i1}^{*} = \lambda' z_i + \eta_i \qquad (5)$$

The correlation of the η_i and α_i is ρ. Estimating the initial outcome by probit, one generates the following generalized error term:

$$e_i = \frac{(2y_{i1} - 1)\phi(\lambda' z_i)}{\Phi(\{2y_{i1} - 1\}\lambda' z_i)}$$

where ϕ, Φ are the normal density and distribution functions respectively, and the functions are evaluated using the estimated values of λ. The generalized error term can simply be added to equation (4) and estimated as a conventional random effects probit.

$$y_{it}^{*} = x_{it}'\beta + \gamma y_{it-1} + a_1'\overline{x}_i + \delta e_i + w_i + u_{it} \qquad \text{i = 1,2,…,n and t = 2,…, } T_i \quad (6)$$

The individual specific random effect is w_i .The usual t test for the statistical significance of the additional term (i.e. δ=0) is a test for non zero ρ .

4 Data

The data for the analysis is based on the 1958 National Child Development Study (NCDS). This is a longitudinal study of all persons living in Great Britain who were born between 3rd and 9th of March 1958. The 1958 perinatal mortality survey has been followed by 6 subsequent waves (NCDS 1-6) at ages 7, 11, 16, 23, 33 and the most recent, at ages 41-42. NCDS 1-3 comprised of interviews with the child, his parent's,

his school and the report of a medical examiner. This data is an exceptionally rich source on child development from birth to early adolescence, child care, medical care, health, physical statistics, home environment, educational progress, parental involvement, cognitive and social growth, family relationships, etc. NCDS 4-6 is based largely on interviews with the cohort member and his/her partner. They document economic activity, income, training, housing as well as the development of the cohort member's own family.

The last three waves collected data on the political behaviour of the cohort, including past electoral participation, party alignment, vote choice and voting intentions. The fourth follow-up, conducted in 1981 when the cohort were aged 23, collected information on the 1979 general election; the fifth follow-up conducted in 1991 when the cohorts were 33, collected information on the 1987 general election; and finally the 1999/2000 follow-up, conducted when the cohorts were aged 41/42, collected information on the 1997 general election.[5] The panel nature of this data therefore allows us to study the respondents' voting behaviour over three elections, at ages 21 (when we observe participation in their first election), 29 and 39. This therefore allows us to test Plutzer's (2002) development theory of voting, which posits that different factors influence voting in the first election and voting in subsequent elections.

4.1 Voter Turnout

The dependent variable is voter turnout in the 1979, 1987 and 1997 election and it is based on responses to the following question: *"Did you vote in the last General Election in XXX?"*. As we estimate a balanced panel we restrict our sample to individuals whose turnout activity was recorded for each of the three elections. From our sample of 5,298 respondents, 70.7%, 80.0% and 79.8% stated they did vote in the 1979, 1987 and 1997 elections respectively (see Table 1). While reported turnout for the 1979 election is below the national aggregate turnout rate of 76%, given the relatively young age of the cohort at the time of the first election this is unsurprising. Reported turnout for the 1987 and 1997 elections, on the other hand, is higher than the official turnout rates of 75.3% and 71.6% respectively.[6] These differences are somewhat less than is frequently found in British studies of turnout, where participation is generally overestimated. For example, Swaddle and Heath (1989) find that reported turnout in the 1987 British General Election Study was 10 percent points higher than the official rate. Turnout may be overstated in survey data for several reasons, for example, respondents may misreport their turnout as they are embarrassed about not fulfilling their civic duty, in addition, abstainers are less likely than voters to

[5] Note that between the period 1979-1997 five general elections were held in Britain, however as only three NCDS surveys were conducted in this period we do not have information on the voting behaviour of the cohort in the 1983 election and the 1992 election.

[6] The 1997 British general election experienced the lowest turnout in the post-war period of 71 percent (turnout continued to fall in the 2001 election where only 59.4 percent of the electorate voted). British electoral participation until recent years has been high compared to other advanced democracies. Average turnout in Britain between 1945 until 1997 has been 76 percent (Clarke, Sanders, Stewart and Whiteley, 2003).

participate in surveys (see Heath and Taylor, 1999). The low level of misreporting in our samples suggests that the NCDS is a good alternative source of voting data.

As this paper is concerned with persistence in voting behaviour, Figure 1 maps out turnout patterns for all three elections. It shows that 54.9% of the sample voted in all three elections, while only 6.3% consistently abstained. This suggests that there is positive persistence in turnout rates i.e. individuals who vote in one election, especially the first, are likely to continue participating in future elections, while abstainers from all elections is rare. For example, the second largest group (14.9%) are those that did not participate in the first election of 1979 but turned out to vote in the following two elections. In addition a further 4.5% of those who abstained from the first two elections voted in the 1997 election. This suggests that voting is an absorbing state. The term *circumstantial voter* (see McKenzie and Delaney, 2005) refers to voters who do not consistently abstain from voting, rather than may fail to turnout at one election due to impeding circumstances, such as being out of the country on election day. 38.8% of our sample changed their participation patterns over the observed period i.e. they participated/abstained in one or two elections, and thus may be defined as circumstantial voters. The raw data therefore displays evidence of persistence in voter turnout, however only by estimating a dynamic structural model can we determine the extent to which this persistence is driven by habit formation or unobserved characteristics.

4.2 Additional Variables

Our explanatory variables can be divided into time invariant and time varying covariates. The former characteristics are those which remain constant throughout the analysed period and the majority of them were measured prior to the first election. They include the following - gender, education, cognitive ability and parental social class. Education is one of the primary determinants of turnout (see Wolfinger and Rosenstone, 1980; Rosenstone and Hansen, 1993; Nie *et al*., 1996). We include two measures of education. The first is the age at which the respondent left full-time education and the second is a dummy variable indicating whether the respondent stayed on beyond the minimum school leaving age of 16. Table 1 which provide the descriptive statistics for the data, shows that the average school-leaving age was 17 and that only about 41% of the sample stayed beyond age 16. In addition to formal education, we also include a measure of cognitive ability. While including ability in voting models is relatively new, several recent studies (e.g. Hauser, 2002; Denny and Doyle, 2005a) have found that cognitive ability works in a similar manner to education - higher ability individuals are more likely to turn out to vote. Our ability measure is based on the first principal component from four ability measures taken at age 11: mathematics, comprehension, verbal and non-verbal abilities. The ability measure is standardised to have a mean of zero and a standard deviation of one.

As previous research (Parry, Moyser and Day, 1992; Crewe, 1981) has identified a relationship between turnout and the voter's social background, we include a

categorical variable representing parental social class in 1958 (i.e. at birth). [7] Several recent studies have examined the psychological underpinnings of voter turnout and have found that certain personality types are more likely to turnout to vote than others.[8] While the NCDS includes six measures of personality[9], only one is statistically significant in the analysis, therefore we restrict our results to the following personality measure - whether the individual is Lazy or Hardworking. The indicator is measured on a scale of 1 to 5, whereby a value of 5 corresponds to the highest level of the characteristic given. The individual's teacher made these evaluations when the respondent was 16 years old.

While one may expect the time invariant characteristics to have a constant impact on voting behaviour, it is also likely that voter turnout may be influenced by events that occur throughout the respondent's life. Indeed Plutzer (2002) finds that life events, such as marriage, home ownership, having children of school-going age, all influence the likelihood that individuals will participate in elections and can therefore switch individuals from being habitual non-voters to habitual voters. To capture these time-varying factors we include a number of characteristics measuring whether the respondent is married, has children, is a trade union member, their mental health status and their region of residence at each election period.

The voting behaviour of married individuals may differ from the non-married as firstly, being married can reduce the costs of turnout, especially if one partner has more information about the political process than the other. For example, Zuckerman, Kotler-Berkowitz and Swaine (1998) identify the household as being the centre of political discussion. In addition, Zuckerman, Fitzgerald and Dasovic (2005) find that partners influence each other political preferences. Being married may also affect turnout decisions due to peer effects e.g. if one partner votes this may induce the other partner to also vote. While, some studies identify a positive relationship between marriage and turnout (Strate, Parrish, Elder and Ford, 1989; Timpone, 1998), others find a modest negative effect (Stoker and Jennings (1995); Highton and Wolfinger (2001). To control for marital influences on political behaviour we include a dummy variable indicating whether the respondent is married in 1979, 1987 or 1997. As expected, Table 1 indicates that as the sample ages, the proportion classified as married increases.

Having children may also affect both turnout decisions. Plutzer (2002) argues that individuals with young children are less likely to turnout due to the exhaustion and time demands associated with raising young children, while having children of school-going age could actually increase electoral participation as parents get

---

[7] The parental class variable is based on seven categories, ranging from Professional, Intermediate, Skilled non-manual, Skilled manual, Semi-skilled non-manual, Semi-skilled manual and Unskilled manual. The original variable was recoded such that higher values represent a higher social class. Note that this scale does not separately report the self-employed. While we could have used this to generate a set of dummy variables, we found that treating it as a continuous variable was satisfactory in that the estimated parameters of interest were invariant to this choice.

[8] Fowler (2004) identifies a relationship between patience and voter turnout. In addition, Denny and Doyle (2005a) find that certain personality types are more likely to turn out to vote than others i.e. hardworking and even-tempered individuals are more likely to vote than lazy and moody individuals.

[9] These include the extent to which the respondent is Cautious/Impulsive, Moody/Even-tempered, Timid/Aggressive, Flexible/Rigid, Sociable/Withdrawn and Lazy/Hardworking.

involved in school life which activates the networks that encourage political mobilisation. To capture these effects we include a dummy indicating whether the respondent has children at each election. As with being married, having children increases with the respondents age, only 23% of the sample have children in the first period, however this rises to 72% in the 1987 and 77% in the subsequent period.

Previous research (e.g. Radcliff, 2001) has also found that trade union members are more likely to turn out to vote at election time as they are typically more politicised than non-members and are encouraged to vote by their unions. Therefore, we include a dummy variable indicating union membership in the three election periods. Table 1 shows that the proportion of union members among our sample falls slightly over time.

An additional, but often unexplored, factor that may influence political behaviour is the voters' physical and mental health. As voting requires a physical, and to some extent, a mental effort, having adverse health conditions may reduce the probability of voting. Several studies (Davey Smith and Dorling, 1996; Schur and Douglas, 2000; Blakely, Kennedy and Kawachi, 2001; Reitan, 2003 and Denny and Doyle, 2005b) have found a negative relationship between health and voter turnout. Therefore, we include a self-assessed measure of general health and an index of mental health in the model. As the measure of general health is not statistically significant we exclude it from our final model. Our measure of mental health is called the "malaise inventory score", developed by Rutter *et al*. (1970), and is based on the Cornell medical index. This self-completion scale is derived from summing 24 psychological and somatic items, such as anxiety, problems sleeping, and irritability. High scores represent those with poor mental health, while scores above 7 are classified as having a high risk of psychiatric morbidity i.e. depression.[10] Table 1 indicates that the malaise score of our sample is quite low (averaging 2.6 in the 1979 period, then falling to 2.3 in the 1987 period) however it increases to 3.4 in the 1997 period, which suggest that mental health become worse as respondents' age.[11]

As explained in the above methodology section, including the averages of the time varying covariates allows us to control for unobserved heterogeneity. Therefore, the mean of each time varying covariates is calculated over the period 1979-1997 and is included in the model.

4.3 Identifying Variable in the Reduced Form Equation

Estimating the reduced form initial conditions equation requires us to include one or more variables that influence the turnout decision in the first election, but has no impact on voting decisions in later elections. Residential mobility is one such

[10] Other studies using the "malaise" score in the NCDS include Llena-Nozal, Lindeboom and Portrait (2004) and Cheung, Khoo, Karlberg and Machin (2002). See Rodgers, Power, Collishaw and Maughan (1999) for the validity of the malaise score.

[11] Another potential determinant of the propensity to vote is economic status, in particular, unemployment status. Being unemployed may increase electoral participation as it reduces the costs of voting as such respondents have more time available, however the unemployed may also be less likely to vote if they are apathetic about the political system. As our empirical results indicated that unemployment has no statistical effect on turnout we exclude it from our model.

variable. Squire, Wolfinger and Glass (1987) and Highton (2000b) note that residential mobility is associated with lower turnout. We therefore include a variable capturing the number of places the respondent lived between the ages of 16 and 23 (note the 1979 election took place when the respondents were 21 years of age and this is a period which is usually associated with a high degree of mobility i.e. moving out of the family home, going to university, getting married). We argue that respondents who displayed a high degree of mobility during this period were less like to turn out to vote than more settled respondents, as they must re-register each time they move. Therefore those who moved frequently during this period may not have remained in any one place long enough to register. Indeed a study by Squire *et al.* (1987) finds that the low turnout rates associated with residential movers in the US is due to the administrative burden of registering rather than differences in civic virtues. They estimate that turnout could be increased by as much as 9% if the burden of registration was eased. Table 1 indicates that respondents in our sample moved on average 3 times between the ages 16 and 23.

5 Results

Table 2 presents five models of voter turnout. Model 1 estimates the static probit model. Model 2 estimates the naïve random effects probit model where the lagged dependent variable is included alongside a combination of time invariant and time varying characteristics. Model 3 extends model 2 by also including the averages of all the time varying covariates in order to control for unobserved heterogeneity. Model 4 estimates the initial conditions probit model of the 1979 election. From this the generalised probit error term is calculated and finally model 5 re-estimates model 3, but includes the generalised probit error term in order to control for initial conditions.

Model 1, which includes both time varying and time invariant factors, but excludes voter turnout in the previous election, is estimated in order to compare the magnitude of the explanatory variables in the static and dynamic models i.e. to examine whether failing to account for persistence artificially inflates the socio-demographic determinants. It shows that the characteristics that make one economically successfully i.e. having high levels of education, being hardworking as opposed to lazy, and having high cognitive ability, are also likely to induce turnout. Several of the personal characteristics also influence turnout - being married, having children, being a trade union member and having parents from a high social class are all associated with a higher probability of voting, while being male and having poor mental health has the opposite effect. Trade union membership, followed by being married, has the largest substantive impact on turnout, such that it increases the probability of voting by 5.5% and 4.8% respectively. This static model assumes that turnout can only be influenced by individual characteristics and that past voting behaviour is essentially irrelevant for current voting decisions. In order to test the strength of this assumption the next model allows for a relationship between past and current voting behaviour.

Model 2 therefore estimates a dynamic random effects probit model, which controls for persistence in voter turnout by including the lagged dependent variable. Doing so allows us to examine whether electoral participation in the past election influences participation in the current election, while controlling for socio-demographic and psychological characteristics. Lagged turnout exerts a positive and highly significant

influence on current turnout: individuals who turned out to vote in the previous election are 26% more likely to turnout in the current election. This suggests a substantial amount of voting behaviour is driven by persistence, and indeed its effect dwarfs all the additional explanatory variables. Surprisingly however, its inclusion leaves the additional covariates largely unchanged from model 1. While the substantive impact of several of the variables have fallen slightly, and staying on beyond the minimum school leaving age is no longer significant, the changes are modest given the inclusion of lagged turnout.

As discussed earlier one of the main problems with this dynamic model is that it fails to take account of unobserved heterogeneity. Therefore, the apparent high level of persistence in voter turnout may be driven by factors which are not included in the model. By failing to control for these unobserved characteristics we cannot determine whether the high level of persistence is really habit formation. Essentially model 2 is therefore a naïve dynamic model. We overcome this problem in model 3 by controlling for unobserved heterogeneity by including the means of the time varying covariates as discussed in Section 3. Model 3 therefore re-estimates model 2 but also includes the averages of the time varying covariates over the three election periods. The results in model 3 indicate that unobserved heterogeneity is not substantially driving the apparent persistence in turnout. If unobserved heterogeneity were an issue, then controlling for it by including the averages should reduce the magnitude of the coefficient on the lagged dependent variable. While this parameter does fall, it is by a relatively modest amount: 26% to 25.6%. As the averages are only included as controls for heterogeneity the coefficients themselves are of no direct interest. The time varying and time invariant covariates remain largely unchanged, with the exception of union membership whose impact on turnout falls from 4.8% to 2.9%, and poor mental health which is no longer statistically significant. The marginal effect of turning out to vote if the respondent has children however, has actually increased.

The r coefficient, and its corresponding likelihood test, which are reported at the end of Table 2, show the proportion of the total variance accounted for by the panel-level variance component. A r of zero would indicate that the panel estimator is no different from the pooled estimator. The likelihood test reported at the end of model 2 rejects the null hypothesis that r is zero, albeit only significant at the 10% level, however the corresponding test of model 3 which rejects the null hypothesis (at the 5% level), suggests that estimating the model as a panel is appropriate once unobserved heterogeneity is taken into account.

While model 3 suggests that the extent of habit formation is quite large and that estimating the model in a dynamic form is appropriate, it does not address the initial conditions problem. As discussed earlier this can arise when the first wave of the panel does not coincide with the respondent's first experience with the electoral system. Therefore, the respondent's voting behaviour may already be formed prior to the first observed period, and this in turn will influence whether they will vote in all subsequent elections. One can overcome this problem by modelling the first observed period i.e. 1979 election, within a static framework and using the predicted values from this model to generate a generalised error term which can then be included in the dynamic model. Including one (or more) variables that influences the first election, but not the rest, allows us to identify the model. Model 4 therefore presents the estimates for the initial conditions probit regression of the 1979 election, and includes

the time varying covariates, time invariants covariates, the averages of the time varying covariates and the instrument - the number of places the respondent lived between the ages 16 and 23.

The determinants of the initial election differ somewhat from those in the dynamic models. Being male, married, a union member, having children or having a high level of education exerts no influence on the probability of voting in the first election. The impact of all the remaining variables increase in magnitude. Being hardworking as opposed to lazy, having high ability and staying in education beyond 16 all increase the probability of voting in the 1979 election by 3.5%, 3.5% and 6.5% respectively. They all have a greater impact on voting in the first election than in subsequent elections, which somewhat confirms Plutzer's (2002) hypothesis that there are certain characteristics that influence voters' decisions in their first election, but yet these factors diminish in importance over time. Finally, the instrument, i.e. the number of places the respondent lived between the ages 16 and 23, also exerts a negative and significant impact on turnout, such that a respondent who lived in 7 or more places was 27.6% less likely to have voted in the first election compared to someone who lived in one place throughout the period (6 x 0.046).

Using equation (11) outlined in Section 3, a generalised probit error term was calculated using the predicted values from model 4. Model 5 then replicates model 3 but also includes this term. While all the other covariates remain largely unchanged from model 3, controlling for initial conditions in this way has a major impact on the lagged dependent variable. The probability that a respondent will vote in the current election if they voted in the previous one has roughly halved-from 25.6% to 13.0%. This suggests that a large part of the correlation over time between persistence in voter turnout can be accounted for by initial conditions. However there is still a significant portion of persistence which can be attributed to habit formation. Controlling for all other factors, both observed and unobserved, simply turning out to vote in one election, increases ones probability of voting in the next election by 13%. This is substantially lower than the approximately 50% figure which has been found in both experimental (Gerber *et al.*, 2003) and panel (Green and Shachar, 2000) studies. In additional analysis we also investigated whether the degree of persistence varies among different populations.[12] By interacting lagged turnout with gender and education, for example, we found that persistence does not differ between males and females or individuals with different levels of education.

6 Conclusions

In voting, history matters, however not as much as previous studies have suggested. While much of the literature on voter turnout is concerned with identifying why people turn out to vote, this paper addresses why people consistently turn out to vote. Analysing the extent of persistence in voter turnout is important, especially given recent concerns about declining turnout rates among young adults (see Highton and

[12] Available upon request from the authors.

Wolfinger, 2001, Plutzer, 2002). Persistence in voter turnout can have significant implications for policies designed to increase electoral participation. For example, if individuals are consistently likely to either vote or abstain from elections it is importance for them to enter a voting state early in life (Franklin, 1994). Therefore investments made to policies targeting young adults should yield the greatest return, as they will be able to vote in more elections.

However, to successfully implement these policies it is first necessary to know the extent to which persistence in voter turnout can be attributed to habit. It is likely that campaigns to increase voter turnout will be more effective if persistence is driven by habit formation rather than unobserved individual characteristics. While evidence of persistence in turnout exists, few studies have distinguished between these two drivers of persistence, as doing so is empirically difficult. Only one study to date (Green and Shachar, 2000) has dealt with the unobserved heterogeneity problem when using panel data to explain voter turnout, while the initial conditions problem has gone unnoticed within the literature.

This paper therefore draws from the econometrics literature to apply suitable techniques to deal with both issues. It finds that the impact of unobserved heterogeneity is the lesser of the two problems. Our naïve model of turnout i.e. failing to control for unobserved heterogeneity or initial conditions, suggests that an individual who voted in the previous election is 26% more likely to vote in the current election. While controlling for unobserved heterogeneity does little to change this result (only reducing it by 0.5%), taking account of initial conditions reduces the impact of previous turnout decisions on current turnout decisions by a half.

That initial conditions have such an impact implies that individuals were politicised long before the first election at age 21. This suggests that young adults do not come to their first election as 'political virgins'. Rather, similar to the political socialization literature which emphasises the importance of family background in influencing political orientations, it appears that young adults are also socialised with respect to electoral participation. Certain factors, such as education, which encourages political mobilisation by fostering democratic values and beliefs, and indeed parental encouragement, creates civic minded citizens long before such citizens enter the polling booth. Indeed Verba, Schlozman and Burns (2005) note that there is an intergenerational transmission of political participation, whereby politically active parents generate political active children, while Horwitt (1999) finds that non-voters are more likely to come from families of non-voters.

A priori, one may have expected the impact of initial conditions to be less severe in this study, as the respondents are observed prior to their first election. This suggests that the initial conditions problem may even be greater in studies where the first wave of the panel does not correspond with the voters first experience of elections i.e. they may have voted in previous, but unobserved, elections. Therefore, the initial conditions problem may be even more pronounced when using such data.

This study finds that once one controls for socio-economic, demographic and psychological factors, unobserved additional characteristics and initial conditions, an individual who voted in the previous election is 13% more likely to vote in the current election. The results in this paper shed some light on the common finding in the literature that turnout increases as the respondent get older. Moreover, Rosenstone and

Hansen's (1993, 137) explanation of "life experiences" or Highton and Wolfinger's explanation of "pure learning" (2001, 208), could actually be a result of habit, such that the more an individual engages in an act, the more that act becomes self-reinforcing, and hence it becomes a habit.

While the degree of persistence in voter turnout is large (as has been shown by other studies), this paper shows that the amount which can be attributed to habit formation is relatively small. However it is still a multiple of any of the other common determinants of turnout which are cited in the literature. For example, education only increases the probability of voting by 0.08% for each additional year, while union membership only increases it by 2.8%. Therefore, while this study shows that the extent of habit formation in voter turnout is smaller than previous studies have identified, once suitable procedures have been taken into account, the fact that one voted in a previous election, is still by far the largest determinant of turnout in the future.

References

Arulampalam, Wiji, Alison L. Booth and Mark P. Taylor. 2000. "Unemployment Persistence." *Oxford Economic Papers* 54:24-50.

Blaise, Andre. 2000. *To Vote or Not to Vote. The Merits and Limits of Rational Choice Theory*. Pittsburgh: University of Pittsburgh Press.

Blakely T.A, Kennedy B.P, Kawachi I. 2001. "Socioeconomic Inequality in Voting Participation and Self-Rated Health." *American Journal of Public Health* 91:99-104.

Brody, Richard A. and Paul M. Sniderman. 1977. "From Life Space to Polling Station: The Relevance of Personal Concerns for Voting Behaviour." *British Journal of Political Science* 7:337-360.

Chamberlain, Gary. 1984. "Panel Data." In *Handbook of Econometrics*, eds. Griliches, S. and Intriligator, M. Amsterdam: North-Holland, 1247-1318.

Cheung, Y.B, Khoo K.S., Karlberg J., Machin D. 2002. "Association between Psychological Symptoms in Adults and Growth in Early Life: Longitudinal Follow up Study." *British Medical Journal* 325:749.

Clarke, Harold D., David Sanders, Marianne C. Stewart and Paul F. Whiteley. 2003. "Britain (Not) at the Polls, 2001." *Political Science & Politics*, XXXVI.

Crewe, Ivor. 1981. "Electoral Participation." In *Democracy at the Polls, a Comparative Study of Competitive National Elections*, eds. David Bulter, Howard R. Penniman and Austin Ranney. Washington DC: American Enterprise Institute for Public Policy Research.

Davey Smith, George and Daniel Dorling. 1996. "I'm all Right, John": Voting Patterns and Mortality in England and Wales." *British Medical Journal* 313:1573-1577.

Denny, Kevin and Orla Doyle. 2005a. "Political Interest, Cognitive Ability and Personality: Determinants of Voter Turnout in Britain." UCD Geary Institute Discussion Paper No. 2005/7.

Denny, Kevin and Orla Doyle. 2005b. "Take up thy Bed, and Vote: Measuring the Relationship between Voting Behaviour and Indicators of Health." UCD Geary Institute Discussion Paper No 2005/11.

Festinger, Leon. 1957. *A Theory of Cognitive Dissonance.* Stanford, CA: Stanford University Press.

Finkel, Stephen E. 1985. "Reciprocal Effects of Participation and Political Efficacy." *American Journal of Political Science* 29:891-913.

Fowler, James H. 2005. "Habitual Voting and Behavioral Turnout." Forthcoming in *Journal of Politics*.

Franklin, Mark. 1994. *Voter Turnout and the Dynamics of Electoral Competition in Established Democracies since 1945*. Cambridge: Cambridge University Press.

Gerber, Alan S., Donald P. Green, and Ron Shachar. 2003. "Voting May be Habit Forming: Evidence from a Randomized Field Experiment." *American Journal of Political Science* 47:540-550.

Green, Donald P. and Ron Shachar. 2000. "Habit Formation and Political Behaviour: Evidence of Consuetude in Voter Turnout." *British Journal of Political Science*

30:561-573.

Hauser, Seth M. 2002. “Education, Ability, and Civic Engagement in the Contemporary United States.” *Social Science Research* 29:556-582.

Heath, Anthony and Bridget Taylor. 1999. “New Sources of Abstention?” in *Critical Elections: British Parties and Voters in Long-Term Perspective*, eds. Geoffrey Evans and Pippa Norris. London: Sage.

Heckman, James J. 1981a. “The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process.” In *Structural Analysis of Discrete Data with Econometric Analysis*, eds. Charles F. Manski and Daniel McFadden. MIT Press, Cambridge, MA, 179-195.

Heckman, James J. 1981b. “Statistical Models for Discrete Panel Data.” In *Structural Analysis of Discrete Data with Econometric Analysis*, eds. Charles F. Manski, and Daniel McFadden. Cambridge, MA: MIT Press, 115-177.

Henley, Andrew (2000). “Self-Employment Choice: State Dependence, Initial Conditions and Unobserved Heterogeneity”. School of Management and Business Research Paper 2000-7.

Highton, Benjamin. 2000b. “Residential Mobility, Community Mobility and Electoral Participation.” *Political Behavior* 22:109-120.

Highton, Benjamin and Raymond E. Wolfinger. 2001. “The First Seven Years of the Political Life Cycle.” *American Journal of Political Science* 45(1):202-209.

Horwitt, Sanford. 1999. *New Millennium Project: American Youth Attitudes on Politics, Citizenship, Government and Voting*. Lexington, KY: National Association of Secretaries of State.

Huckfeldt, Robert and John Sprague. 1992. “Political Parties and Electoral Mobilization: Political structure, Social Structure, and the Party Canvass.” *American Political Science Review* 86(March):70-86.

Kraut, Robert E. and John B. McConahay. 1973. “How Being Interviewed Affects Voting: An Experiment.” *Public Opinion Quarterly*, 37: 398-406.

Llena-Nozal, Ana, Maarten Lindeboom and France Portrait. 2004. “The Effect of Work on Mental Health? Does Occupation Matter?” *Health Economics* 13:1045-1062.

Parry, Geraint, George Moyser and Neil Day. 1992. *Political Participation and Democracy in Britain*. Cambridge: Cambridge University Press.

Pattie, Charles and Ron Johnston. 2001. “A Low Turnout Landslide: Abstention at the British General Election of 1997.” *Political Studies* 49:286-305.

Plutzer, Eric. 2002. “Becoming a Habitual Voter: Inertia, Resources, and Growth in Young Adulthood.” *American Political Science Review* 96(1):41-56.

McKenzie, Kenneth and Liam Delaney. 2005. “Persistent and Occasional Non-Voting in Ireland: Evidence from the First Irish National Election Study.” mimeo, Geary Institute, UCD.

Milbrath, Lester, W. 1965. *Political Participation*. Chicago: Rand McNally.

Miller, Warren E. and Merrill Shanks. 1996. *The New American Voter*. Cambridge, MA: Harvard University Press.

Neyman J. and Elizabeth L Scott. 1948. “Consistent Estimates Based on Partially

Consistent Observations." *Econometrica* 16:1-32.

Nickerson, David W. 2004. "Just How Addictive is Voting and Why?" Yale University, mimeo.

Nie, Norman, Jane Junn and Ken Stehlik-Barry. 1996. *Education and Citizenship in America.* Chicago: Cambridge University Press.

Niven, David. 2002. "The Mobilization Calendar – The Time-Dependent Effects of Personal Contact on Turnout." *American Politics Research* 30(3):307-322.

Oppenhuis Erik. 1995. Voting Behaviour in Europe. *A Comparative Analysis of Electoral Participation and Party Choice*. Amsterdam: Het Spinhuis.

Orme, Chris D. 2001. "The Initial Conditions Problem and Two-Step Estimation in Discrete Panel Date Models." Department of Economics Discussion Paper No. 9633, University of Manchester.

Radcliff, Benjamin. 2001. "Organized Labor and Electoral Participation in American National Elections." *Journal of Labor Research* 22(2):405-415.

Reitan Therese C. 2003. "Too Sick to Vote? Public Health and Voter Turnout in Russia During the 1990's." *Communist and Post-Communist Studies* 36:49-68.

Rodgers B, Power C, Collishaw S, Maughan B. 1999. "Validity of the Malaise Inventory in General Population Samples." *Social Psychiatry and Psychiatric Epidemiology* 34:333–341.

Rosenstone, Stephen and John M. Hansen, M. 1993. *Mobilization, Participation and Democracy in America*. New York: Macmillan Publishing Company.

Rutter Michael, Jack Tizard and Kingsley Whitmore. 1970. *Education, Health and Behaviour*. London: Longmans.

Shachar, Ron. 2003. "Party Loyalty as Habit Formation." *Journal of Applied Econometrics* 18:251-269.

Shachar, Ron and Michal Shamir. 1996. "Estimating Vote Persistence Sources without Panel Data." *Political Analysis* 6:107-124.

Schur Lisa A. and Douglas L. Kruse. 2000. "What Determines Voter Turnout? Lessons from Citizens with Disabilities." *Social Science Quarterly* 81:571-587.

Squire, Peverill, Raymond E. Wolfinger and David P. Glass. 1987. "Residential Mobility and Voter Turnout." *American Political Science Review* 81(1):45-66.

Stoker, Laura, M. Kent Jennings. 1995. "Life-Cycle Transitions and Political Participation: The case of Marriage." *American Political Science Review 89:421-433.*

Strate, John M., Charles J. Parrish, Charles D. Elder and Coit Ford. 1989. "Life Span Development and Voting Participation." *American Political Science Review* 83:433-464.

Swaddle, Kevin and Anthony Heath. 1989. "Official and Reported Turnout in the British General election of 1987". *British Journal of Political Science,* 19(4): 537-551.

Timpone, Richard J. 1998. "Structure, Behavior and Vote Turnout in the United States." *American Political Science Review* 92:145-158.

Verba, Sidney and Norman H. Nie. 1972. *Participation in America: Political Democracy and Social Equality*. Chicago: University of Chicago Press.

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

Verba, Sidney, Kay Lehman Schlozman, and Nancy Burns. 2005. "Family Ties: Understanding the Intergenerational Transmission of Political Participation". In *The Social Logic of Politics,* ed. Alan S Zuckerman. Temple University Press.

Wolfinger, Raymond E. and Stephen J. Rosenstone. 1980. *Who Votes?* New Haven: Yale University Press.

Yalch, Richard F. 1976. "Pre-Election Interview Effects on Voter Turnout." *Public Opinion Quarterly*, 40:331-6.

Zuckerman, Alan S., Laurence A. Kotler-Berkowitz and Lucas A. Swaine. 1998. "Anchoring Political Preferences: The Importance of Social and Political Contexts and Networks in Britain." *European Journal of Political Research.*33:285-321.

Zuckerman, Alan S., Jennifer Fitzgerald and Josip Dasovic. 2005. "Do Couples Support the Same Political Party? Sometimes: Evidence from British and German Household Surveys." In *The Social Logic of Politics,* ed. Alan S Zuckerman. Temple University Press.

Tables

Table 1 Descriptive Statistics for Turnout Model

	1979	1987	1997
Dependent Variable			
NCDS- Turnout	70.65%	80.03%	79.80%
Official Turnout	75.98%	75.34%	71.60%
Time Varying Covariates			
Married	0.458 (0.498)	0.733 (0.442)	0.733 (0.442)
Has Children	0.233 (0.423)	0.715 (0.451)	0.772 (0.420)
Union member	0.361 (0.480)	0.306 (0.461)	0.299 (0.458)
Poor mental health	2.581 (2.851)	2.287 (2.852)	3.395 (3.429)
Time Invariant Covariates	**1979-1997**		
Male	0.467 (0.499)		
Age left education	17.186 (1.901)		
Stayed in education after 16	0.408 (0.491)		
Hardworking personality	3.398 (1.195)		
Cognitive ability	0.000 (1.000)		
Parental social class	3.090 (1.233)		
No. of places lived between ages 16-23	2.988 (1.653)		
N	5298		

Note: Means and standard deviations (in parenthesis) reported.

Table 2 Persistence and Voter Turnout

Dependent variable: Voter turnout	**Model 1** Static Probit	**Model 2** RE Probit	**Model 3** RE Probit	**Model 4** Initial Probit	**Model 5** RE Probit
Lagged dependent variable: Voted in previous election	~	0.261*** (0.014)	0.256*** (0.014)	~	0.130*** (0.015)
Time invariant covariates					
Male	-0.022*** (0.008)	-0.022*** (0.008)	-0.030*** (0.009)	0.005 (0.014)	-0.030*** (0.009)
Age left education	0.008** (0.004)	0.009** (0.004)	0.009** (0.004)	-0.004 (0.006)	0.008** (0.004)
Stayed in education after 16	0.024* (0.013)	0.014 (0.013)	0.010 (0.013)	0.065*** (0.020)	0.016 (0.013)
Hardworking personality	0.017*** (0.004)	0.011*** (0.004)	0.010*** (0.004)	0.035*** (0.006)	0.012*** (0.004)
Cognitive ability	0.030*** (0.005)	0.023*** (0.005)	0.020*** (0.005)	0.035*** (0.008)	0.024*** (0.005)
Parental social class	0.009*** (0.003)	0.007** (0.003)	0.007** (0.003)	0.016*** (0.005)	0.008** (0.003)
Time varying covariates					
Married	0.042*** (0.010)	0.036*** (0.010)	0.037** (0.015)	0.015 (0.019)	0.037** (0.015)
Has Children	0.018* (0.010)	0.023** (0.010)	0.052*** (0.017)	-0.035 (0.022)	0.052*** (0.016)
Union member	0.056*** (0.008)	0.048*** (0.008)	0.029** (0.013)	0.026 (0.019)	0.028** (0.013)
Poor mental health	-0.004*** (0.001)	-0.004*** (0.001)	-0.001 (0.002)	-0.003 (0.004)	-0.001 (0.002)
Averages of time varying covariates from 1979-2000					
Average married	~	~	-0.002 (0.020)	0.035 (0.028)	0.004 (0.020)
Average of having children	~	~	-0.048** (0.022)	-0.021 (0.030)	-0.052** (0.022)
Average union status	~	~	0.033* (0.018)	0.044* (0.026)	0.043** (0.018)
Average poor mental health	~	~	-0.004 (0.003)	0.002 (0.004)	-0.004 (0.003)
Identifying variable for initial (1979) probit					
No. of places lived between ages 16-23	~	~	~	-0.046*** (0.004)	
Probit generalised error	~	~	~	~	0.060*** (0.007)
r (proportion of total variance contributed by panel-level variance component)	~	0.058 (0.040)	0.067 (0.040)	~	0.246 (0.021)
Likelihood ratio test of r=0	~	2.12*	2.80**	~	45.93***
No. of observations	10596	10596	10596	5298	10596
No. of individuals	5298	5298	5298	5298	5298

Note: The dependent variable in Models 1, 2, 3 and 5 is voter turnout in the 1987 and 1997 elections. Model 1 estimates a static probit regression. Models 2, 3 and 5 estimate dynamic models using Random-Effects Probit regressions covering 2 waves (1987 and 1997 election). Model 4 estimates the initial conditions model i.e. voter turnout in the 1979 election, using a probit regression. Marginal effects are reported with standard errors in parenthesis. Regional and year dummies are included but not reported for Model 1 and 2. Average regions, regional and year dummies are included but not reported for Model 3, 4 and 5. Models 3, 4 and 5 allow for correlation between the time-varying covariates and the unobservable heterogeneity by including the time means of these variables. Model 5 allows for endogenous initial conditions and is estimated due to Orme (2001).

Figure 1 Turnout 1979-1997