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# Structure, Behavior, and Voter Turnout in the United States

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*Electoral participation in the United States is examined to provide a clearer account of the effect of the registration requirement on individual voting behavior. Pooling NES data from 1980, 1984, and 1988, I first model, with traditional and selection bias techniques, the full electorate to distinguish among three groups: nonregistrants, registered nonvoters, and voters. Analyses limited to recent movers are then reported to understand more fully the forces associated with the actual decision calculi of registering and voting. The influences of many factors commonly accepted as important determinants of voting are disentangled, and their effect at each stage is ascertained. Factors yielding inconsistent effects in previous research or believed to be unimportant—such as race, gender, attitudes toward the candidates, and trust in government—are shown to deserve closer scrutiny by electoral scholars.*

More than seventy years ago, in distinguishing among types of electoral nonparticipants, Merriam and Gosnell (1924, 252) observed: "Entirely different reasons were emphasized by those who were not registered than by those who were registered but did not vote in the particular election." Although more recent discussions have demonstrated important distinctions among groups of nonvoters, some have little to say about the relationship between the institutional structure of electoral participation and individual behavior (Conway and Hughes 1993, Marchant-Shapiro 1994, Ragsdale and Rusk 1993). Merriam and Gosnell's seminal work, however, implies that the structural context in which electoral decisions take place may play an important role in citizen's calculi. This article presents a systematic analysis of these forces to gain further insight into electoral participation.

Many studies have acknowledged that registration and administrative forces may create barriers to participation, but these factors are often used in single models of voter turnout. For both theoretic and statistical reasons, this approach may mask or distort some important relationships. While there are distinct traditions in the electoral behavior literature, there has been much convergence in their extensions, and "hybrid" models are now relatively common (Aldrich and Simon 1986, Dalton and Wattenberg 1993, Dennis 1991). The framework used here extends the hybrid approach by more fully incorporating the short-lived (in its independent state) tradition of the legal-institutional model presented by Rusk (1970, 1971, 1974) and

Converse (1972, 1974). "Basically, the theory postulates that legal-institutional properties of the electoral system—ballot and registration systems, voting systems (e.g., plurality, proportional representation), suffrage requirements, and the like—have important effects in influencing and shaping voting behavior" (Rusk 1974, 1044, emphasis added). Despite the compelling logic of this conceptualization, it is often considered as an alternative rather than as an approach that might be integrated with individual-level forces. It was largely absorbed by other approaches that added contextual and legal factors, such as registration, as items for which models should control. Although the majority of turnout models argue for putting first things first (i.e., registration), those that incorporate registration and administrative forces have generally treated these simply as factors to be controlled. This is a reasonable approach in aggregate comparisons, such as across nations (Jackman 1987; Powell 1980, 1986) or within the United States between cities or states (Kelley, Ayres, and Bowen 1967; Kim, Petrocik, and Enokson 1975). Even at the aggregate level, however, recent works have incorporated the two-stage process more directly (Cox and Munger 1989, 1990; Fort 1995). For individual-level behavior, the proper incorporation of the institutional structure in our models is even more important to understand the nature of behavior.<sup>1</sup>

## REGISTRATION IN THE UNITED STATES

While registration initially may seem to be little more than "democratic housekeeping" (Spafford 1991), a number of competing purposes exist, such as preventing electoral fraud, ensuring that all who are eligible

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<sup>1</sup> Elsewhere, I have developed a four-level taxonomy of relationships between aggregate level contextual and institutional forces and individual-level behavior (Timpone 1994, Timpone and Mealy 1996). In this taxonomy, relationships may be simple and straightforward with either no relationship or a general additive influence that does not alter the underlying behavioral dynamics involved. In such situations, comparative systems could be examined in single models controlling for the different systemic factors of interest. Situations may be more complex, however. At the third level, contextual forces may influence macro and individual-level relationships differently. At the fourth level, the one hypothesized to reflect the influence of registration requirements, aggregate forces fundamentally alter the individual-level task and calculus.

are included on the list, supporting other functions of the system, and lending credibility and legitimacy to the election (Courtney 1991, Kimberling 1991). In balancing these, the United States has customarily given a higher priority to minimizing corruption, at the expense of fuller registration. This, along with the tradition of individualism and the distrust of an intrusive government, led to the general acceptance of the two-step process of participation, whereby an individual has the responsibility to register and only then can go to the polls. While scholars of electoral participation in the United States readily acknowledge this structure, its implications are often not fully appreciated. Fuller consideration of the two-step process leads inevitably to questions about traditional approaches to modeling voter turnout in the United States. Although registration and voting are fundamentally linked acts, and the burden of registration is far less than it has been in the past, they still differ in basic ways. Before passage of the National Voter Registration Act, Rosenstone and Hansen (1993, 136) explained: "Registering to vote is often much more difficult than voting itself, requiring a longer journey at a less convenient hour to complete a more complicated procedure before the peak of the campaign." Thus, the institutional requirement of first registering and then voting creates a process in which the two stages differ in place, time, and kind.

## Place

When people decide to cast a ballot on election day, they go to the polling place in their home precinct. This is rarely the same location for registration. Before passage of the National Voter Registration Act of 1993, many states allowed mail registration and deputized registrars, but no universal registration procedure existed. While the need for an onerous trip has been eased over time, registering or obtaining mail registration forms traditionally required a separate trip, even in several states with election-day registration systems. This should not be ignored, since even relatively minor differences in the distance to polling places in cities significantly affects voter turnout (Schlichting and Tuckel 1994).

## Time

The temporal span between the tasks of registering and voting has been found to be the strongest deterrent associated with registration (Wolfinger and Rosenstone 1980, Teixeira 1992). One reason for this was noted nearly a century and a half ago, when Tocqueville ([1850] 1969, 135) observed that "as the election draws near, intrigues grow more active and agitation is more lively and wider spread." He considered the time of a presidential election to be like a moment of national crisis. Efforts to enlist support, general campaigning, and even media emphasis increase over time and peak on election day. In the service of curbing fraud and making the administrative task easier, most states close their registration books weeks before the polls open. In 1992, the average closing date was more

than three weeks in advance, forcing those not registered in most states to make the initial commitment to vote even before the first of the presidential debates.

## Kind

Not only does one need to register significantly in advance of election day in most states, often at locations less convenient than polling places, but also the nature of the registration act is fundamentally different from casting a ballot. Rather than a political decision, a registration form is generally an administrative document. While not overly difficult in recent times, registration remains a fundamentally bureaucratic task with which some people are uncomfortable. President Clinton declared in his remarks at the signing of the National Voter Registration Act of 1993: "Voting should be about discerning the will of the majority, not about testing the administrative capacity of a citizen." This argument underscores the point that registration remains a task fundamentally different from that of actually casting a ballot. And the nature of the task, along with the temporal period when it must be performed, may alter the psychological determinants of each, since "registration usually does not provide the emotional gratification that voting does" (Glass, Squire, and Wolfinger 1984, 52).

This discussion of differences in the tasks of registration and voting should not be interpreted as a claim that either is necessarily onerous. The point remains, however, that they are distinct acts, and an individual must first register and only then can go to the polls in most states. Combining this well-accepted fact with the argument that the two steps differ in regard to place, time, and kind points to a need for closer scrutiny of how this institutional requirement affects individual-level behavior.

## ANALYSIS

The ideas set forth above lead to the conclusion that registration, for a variety of theoretical reasons, plays a more complex role in electoral behavior than is sometimes acknowledged. Moreover, this conclusion has statistical implications. The most common approach in turnout models combines the two groups of nonvoters (i.e., nonregistered and registered nonvoters) and compares this combined group to voters, thus collapsing the two-stage process into one (Abramson and Aldrich 1982; Ashenfelter and Kelley 1975; Campbell et al. 1960; Cassel and Luskin 1988; Downs 1957; Ferejohn and Fiorina 1974; Kim, Petrocik, and Enokson 1975; Riker and Ordeshook 1968; Rosenstone and Hansen 1993; Rosenstone and Wolfinger 1978; Teixeira 1987, 1992; Wolfinger and Rosenstone 1980). While these works have greatly extended our understanding of individual-level turnout, explicitly modeling the two-stage nature of the process may yield further insights into participatory behavior. For instance, truly independent factors that affect only one part of the decision calculus (e.g., voting at the polls) will be attenuated to a degree reflected by the size of the group not affected

(e.g., nonregistrants).<sup>2</sup> If these factors are correlated with others in the model, then the problem becomes less predictable and more troublesome. Not only will some forces appear to have different effects on behavior than actually exists, but also the substantively important role of the registration process and behavioral characteristics cannot be separated, clouding our understanding.

The traditional approach is also problematic for understanding behavior if the underlying nature of the relationship between a factor and electoral behavior differs between the two decisions. Some factors not only may affect just one stage of electoral participation but also may influence the two stages in opposite directions. Some people, for instance, may be less likely to vote in general; yet, once they overcome the initial barrier and register, these individuals may be more likely to vote.

More appropriate specifications of the two-step process of voter turnout in the United States reflect the procedure of first registering and then voting among the subsample of the electorate that is registered. Several studies of individual-level behavior have adopted this approach in their analyses (Erikson 1981, Jackson 1996, Mitchell and Wlezien 1995, Uhlaner 1989).<sup>3</sup> Although these specify the two models of registration and turnout of those registered, they treat them as independent models. This is potentially problematic because the universe for the registration equation is the entire electorate, while that for the turnout model only includes those registered, which is clearly not a random subsample of the entire electorate. Problems can occur if the errors in the two equations are correlated. If this is the case, then the error in the second equation—turnout among the registered—will not have an expected value equal to zero, violating standard statistical assumptions and leading to biased results. The appropriate method for examining whether this problem exists is selection bias techniques (Achen 1986, Breen 1996, Dubin and Rivers 1989/1990,

Greene 1993, Heckman 1979, King 1989, Maddala 1983).<sup>4</sup>

Dubin and Rivers (1989/1990) developed the technique, used in the analyses below, that explicitly models selection bias in probit models. This approach uses a full information maximum likelihood procedure to estimate the registration stage for the full electorate and then estimates the turnout stage for those registered, correcting for any correlation in the errors between the two stages. Thus, the registration stage of the selection bias model will be practically identical to an individual model of registration. The degree to which the second stage—turnout among the registered—differs from an independent model of turnout that uses this subsample depends on the magnitude of the correlation of the errors. A correlation of zero is equivalent to running the two independent models, while correlations diverging from zero lead to differences based on corrections of the second-stage estimates. The approach addresses both the nonnormality of the errors due to the dichotomous nature of the dependent variables and the nature of the bias between the equations.

In sum, a two-step approach to the analysis of turnout is the most appropriate for theoretical reasons, and a selection bias model is needed to examine and deal with the relationship between the errors. In deciding what factors to include in the models, I use the hybrid approach mentioned earlier, which integrates the classic models of voter turnout. The items included have been examined previously, but the critical issue addressed here is the manner in which the two-stage process operates in the electorate. The dependent variables are the validated *Registration* and *Turnout* measures from the 1980, 1984, and 1988 National Election Study.<sup>5</sup> Five general groups of factors are

<sup>2</sup> While there is disagreement over group size, registered nonvoters cannot be ignored if one is concerned with nonparticipation. According to state election statistics in 1988, registrants account for 42% of nonvoters, compared to 22% in Census data. Regardless of the data source, the group of registered nonvoters in each is too large a proportion of nonparticipants to ignore, as is often the case, and the size of both groups of nonvoters has increased over time. The merits and problems of each data source are debated elsewhere (Bennett 1990a, 1990b; Gans 1990; Piven and Cloward 1988, 1989, 1990).

<sup>3</sup> Ferejohn and Fiorina's (1975) defense of their minimax regret model of voting also made this distinction. They did not explore the issue of registration, but their turnout model only examined those registered. Ignoring the issue of registration, however, leads to the same potential problem from a nonrandom sample seen in the other studies in which the two steps are treated independently. Also, while the work of Mitchell and Wlezien (1995) is the most systematic attempt thus far to study the influence of administrative barriers in both registration and turnout models, their models of turnout use the traditional approach of combining the two groups of nonvoters. In addition to these works, Nagler (1991) demonstrates the appropriate manner for testing for the interaction of such features as education and registration laws, but he also uses the single model approach. Thus, while some previous work has made the distinction between the two stages, the fuller specification and paired analyses presented here allow greater insight into the behavioral mechanisms.

<sup>4</sup> While I argue that selection bias modeling is the appropriate technique for dealing with the problems in the second stage, different models can be employed that reflect distinct underlying processes. The choice rests on theoretic assumptions about the nature of the relationships. The selection bias model is the logical extension of the two-model approach used in the past to incorporate the nature of the process more thoroughly into models of participation (Erikson 1981, Jackson 1996, Mitchell and Wlezien 1995, Uhlaner 1989). The discussion of registration in this article, which distinguishes it from going to the polls in terms of place, time, and kind, not only strengthens the argument for moving beyond the unitary models of turnout but also reinforces the selection bias model as the appropriate likelihood function. Specifications such as an ordered probit ignore the uniqueness of the two tasks and the nonordinal nature of the categories, since some nonregistrants might be more likely to vote on election day, if they were eligible, than registered nonvoters. I believe the difference between these nonregistrants and those who would still fall below the threshold in this case is one of degree rather than kind, maintaining the appropriateness of a two-stage model. While other specifications can deal with the multicategory groups in the electorate and their interrelationship, the selection bias model most directly maps onto the process as theorized in the literature and is capable of dealing with the statistical consequences.

<sup>5</sup> Although past work has demonstrated that self-report and validated measures lead to few substantial differences in studies of turnout, one must be wary when making finer distinctions between the groups, as is done here. In order to avoid the possibility that factors related to the probability of misreporting are included in the model and lead to biases, validated registration and vote measures are used. Unfortunately, the NES decided not to continue validation

included in the analyses: demographics, items that tap social connectedness, general and election-specific political attitudes, and administrative barriers (variable coding is presented in Appendix A). Some of the specific factors included here have appeared only weakly or inconsistently related to participation in past research. This suggests that the finer distinctions made by incorporating the actual structural process involved yields a clearer image of relationships than in previous work, due to the potential attenuation caused by combining groups that may differ behaviorally.

Although some have argued that demographic factors should be avoided in models that attempt to understand behavior, these factors are still useful proxies for items not measured and remain important controls in behavioral models (Achen 1992, Timpone n.d.). General demographics included in this analysis are *Region* (southern versus nonsouthern states), *Age*, *Race*, *Education*, *Income*, and *Length of Residence in One's Home*.<sup>6</sup> Due to the background nature of demographic items, they are expected to have a greater influence on registration, because of their tie to more general predispositions regarding participation, than do those centering on the specific election.

A number of researchers have argued that some demographic factors reflect individual ties to the community (Knack 1993; Merriam and Gosnell 1924; Miller 1992; Pomper and Sernekos 1989, 1991; Rosenstone and Hansen 1993; Straits 1990; Teixeira 1992; Verba, Schlozman, and Brady 1995; Wolfinger and Rosenstone 1980). Recent work has demonstrated empirically that a number of these factors reflect an individual's integration into the social milieu (Timpone n.d.), such as frequency of *Church Attendance*, *Membership in Formal Groups*, *Marital Status*, *Home Ownership*, and *Length of Residence in One's Town*. Whether social integration reflects personal self-interest or social norms, the items tapping it are expected to be related to more general political predispositions and to have a greater effect on the act of registration than on turnout at the polls.

Political attitudes linked to longer term predispositions are expected to be distinct from those specific to the election at hand. The more lasting attitudes may be responsive to short-term factors but are likely to be far more stable than those tied to election-specific choices. The long-term predispositions are *External Efficacy* (views of system responsiveness), *Internal Efficacy* (an individual's belief about his or her own political abilities), *Party Differential* (views of whether one party is better able to handle the individual's subjectively perceived most important problem), the *Strength of Party*

*Identification*, and level of *Trust in Government*. The election-specific attitudes are the perceived difference between the major party candidates and whether both candidates are perceived favorably. The general long-term predispositions are expected to be more closely related to registration, whereas the election-specific attitudes are expected to exert a stronger influence on the decision to vote among those registered.

The final set of factors included to distinguish among the electoral groups reflect the administrative barriers faced by individuals in their state. These two factors are the closing date to register and the number of years before individuals are purged from the books. These items were compiled for each election and merged with the individual-level data. In contrast to previous models, here it is conjectured that they should only influence the probability that individuals are registered, not whether they go to the polls once they are registered.<sup>7</sup>

### Electoral Participation in the Full Electorate

The two-step selection bias model of the entire electorate is presented in Table 1, along with the traditional single model of turnout that compares all non-voters to voters (a discussion of the selection bias model is provided in Appendix B). In addition to this comparison, it is useful to compare the independent models of registration and turnout among the registered. As noted, the registration model is almost identical to the selection bias first stage and is thus not presented; the probit model and effect estimates for an independent model of turnout among the registered are provided in the Appendix B table.<sup>8</sup>

While some forces may be overlooked by the traditional operationalization, even those items considered important in past electoral models may not have provided a full understanding of how behavior is related to the two-stage process in the United States. While the results of the single model are sometimes interpreted as demonstrating various forces related to the acts of registering and turning out at the polls, without more sensitive analyses these can be no more than conjecture. The results shown in Table 1 demonstrate, however, that many of the items commonly included in electoral participation models only influence one of the

with the 1992 election, and studies validated before 1980 did not correct for those who were registered out of their district and may still have participated. Thus, the NES studies from 1980, 1984, and 1988 were pooled for analysis in this work. Dummy variables in models comparing 1984 and 1988 to 1980 were insignificant and were eliminated in the final models.

<sup>6</sup> While length of residence in one's home is often discussed as an item tapping one's integration into the social milieu, recent work demonstrates it is a relatively weak indicator of social connectedness that continues to exert a strong effect on turnout, even after social connectedness is more directly controlled (Timpone n.d.).

<sup>7</sup> While the closing date of registration will only affect those who need to register, the number of years before a state purges its records can be related to both the likelihood of being registered and the decision to vote once registered (Mitchell and Wlezien 1995). As Erikson (1981, 274) states, "one reason that people vote may be to stay registered." Thus, the number of years before purging would have a negative effect on going to the polls. Adding the purging variable to the turnout stage of the selection bias model for the full electorate had a negative but insignificant influence on turning out (first difference effect of .01). For comparability between models for the full electorate and recent movers, and due to this weak substantive effect, it is not included in the models presented here.

<sup>8</sup> While the parameter estimates and substantive effects are almost identical for an independent registration model and the registration stage of the selection bias model, there are minor variations in the standard errors estimated from the independent probit and the bootstrapped selection bias model. Length of time in town is significant at the .05 level in the independent model but not in the selection bias model ( $p = .09$ ).

TABLE 1. Pooled Turnout Models for Full Electorate, 1980–88

Variable	Single Model Turnout	Selection Bias Model	
		Registration	Turnout
Intercept	−2.1467** (.1838)	−1.9678** (.2118)	.1824 (.6056)
Administrative Barriers			
Closing date	−.0066* (.0029)	−.0078* (.0031)	—
Purge records	.0171* (.0086)	.0295** (.0090)	—
Demographics			
South	−.3788** (.0543)	−.3274** (.0567)	−.2302* (.0944)
Age	.0130** (.0019)	.0127** (.0022)	.0064 (.0033)
Age-squared	−.0002* (.0001)	−.0001 (.0001)	−.0002 (.0001)
Education	.0973** (.0108)	.1031** (.0126)	.0366 (.0202)
Race (black)	−.0843 (.0803)	.1041 (.0891)	−.2910** (.1122)
Gender (female)	−.0433 (.0496)	−.0641 (.0598)	.0059 (.0724)
Income	.0035* (.0014)	.0046** (.0017)	.0003 (.0021)
Time in home	.0129** (.0031)	.0136** (.0036)	.0070 (.0042)
Social Connectedness			
Church attendance	.5765** (.0678)	.4511** (.0735)	.4739** (.1204)
Group membership	.1477** (.0552)	.1512** (.0580)	.0628 (.0861)
Marital status	.1842** (.0535)	.0827 (.0601)	.2390** (.0725)
Time in home	.0010 (.0018)	.0039 (.0021)	−.0038 (.0023)
Home ownership	.2731** (.0591)	.3210** (.0595)	.0115 (.0973)
Political Attitudes: General			
External efficacy	.4884** (.0882)	.5139** (.0949)	.2075 (.1372)
Internal efficacy	.1721** (.0557)	.1473* (.0632)	.1231 (.0795)
Party differential	.1047* (.0496)	.1193* (.0503)	.0171 (.0693)
Strength of party identification	.1607** (.0263)	.1689** (.0268)	.0585 (.0469)
Trust in government	−.1081 (.1090)	−.1841 (.1216)	.0413 (.1503)
Political Attitudes: Election Specific			
Candidate differential	.0044** (.0011)	.0036** (.0012)	.0033* (.0016)
Candidate satisfaction	−.1032 (.0624)	−.0459 (.0663)	−.1361 (.0839)
RHO		−.3550 (.3937)	
n	3598	3598	
LLF initial	−2493.9	−4326.6	
LLF final	−1896.2	−2588.4	

Note: The dependent variables in these models are *Validated Registration* and *Validated Vote*. The full sample size of 3,598 is composed of 954 nonregistrants, 343 registered nonvoters, and 2,301 voters. The administrative barriers were not included in the second stage of the selection bias model. \* $p < .05$ , \*\* $p < .01$ . Standard errors are in parentheses (bootstrapped estimates for the selection bias models).

two stages. In fact, many of the conclusions resulting from traditional turnout models primarily reflect the relationships distinguishing between registrants and nonregistrants (Erikson 1981, Uhlaner 1989). By collapsing opposing influences in the two stages, it is not possible to disentangle where forces are exerted, and substantive relationships can be masked. This is clearly evident with race, which is neither substantively nor statistically significant in the traditional unitary model; once the process is disentangled, however, important relationships are revealed. Thus, if one is interested in fully understanding individual-level behavior, adequate specification of the structural process is clearly necessary.

Table 1 not only shows the usefulness of separating the acts of registering and going to the polls but also provides important information about the relationship between the two stages. The correlation between the two equations in the selection bias model is  $-.355$ , which is substantively meaningful, though modest and not statistically significant.<sup>9</sup> A negative correlation sug-

<sup>9</sup> While the fully specified selection bias models presented in the text are consistent with those run with more constraints, the correlation's

gests that nonregistrants would be *more* likely to go to the polls, if they were eligible to do so, than those who are registered but did not vote.

In order to understand electoral behavior in the two stages, it is necessary to examine the effects of the forces in the model. Although the estimation procedure is more complex, the parameters can be treated as standard probit estimates. Because probit models are not linear and additive, the coefficients presented in Table 1 cannot be substantively compared, since the influence of each variable is dependent on the values of the others. Setting all other variables to their mean value (or base level for dichotomous variables) allows comparison of the effect of each variable on the probability of registering and voting (King 1989).

Table 2, which presents the relative effects of the

standard errors were more influenced by specification. While the correlation coefficients were insignificant in these fully specified models, in models with more constraints and fewer variables, they were of similar substantive magnitude (although slightly larger in some constrained models) but statistically significant. This further highlights the importance of conducting the selection bias estimation in less fully specified models.

TABLE 2. Influence of Forces on Probability of Participation from Models for Full Electorate

Variable	Single Model Turnout	Selection Bias Model	
		Registration	Turnout
Administrative Barriers			
Closing date	-.0867	-.0912	—
Purge records	.0659	.1004	—
Demographics			
South <sup>a</sup>	-.1498	-.1204	-.0482
Age <sup>b</sup>	.2568	.2380	.0601
Education	.3443	.3299	.0642
Race (black) <sup>a</sup>	-.0328	.0345	-.0631
Gender (female) <sup>a</sup>	-.0168	-.0223	.0011
Income	.0961	.1114	.0043
Time in home	.1539	.1396	.0383
Social Connectedness			
Church attendance	.2185	.1522	.0856
Group membership <sup>a</sup>	.0556	.0493	.0110
Marital status <sup>a</sup>	.0689	.0276	.0373
Time in town	.0222	.0741	-.0415
Home ownership <sup>a</sup>	.1003	.0988	.0021
Political Attitudes: General			
External efficacy	.1869	.1750	.0380
Internal efficacy	.0656	.0494	.0218
Party differential <sup>a</sup>	.0397	.0393	.0031
Strength of party identification	.1864	.1768	.0328
Trust in government	-.0308	-.0468	.0055
Political Attitudes: Election Specific			
Candidate differential	.1468	.1052	.0510
Candidate satisfaction <sup>a</sup>	-.0402	-.0159	-.0270

Note: Values in the table represent the change in probability of participation due to varying the value of each variable while holding the others constant. The administrative barriers were not included in the second stage of the selection bias model.

<sup>a</sup>Represents a dichotomous independent variable.

<sup>b</sup>The value of the age effect comes from the joint effect of changing both age variables in the model used to tap possible nonlinear effects.

variables, allows the forces in the models to be compared. Values of two standard deviations below and above the mean are used for comparability of the general range of the influence for each variable.<sup>10</sup> The results presented in Table 2 show that the variables in the models generally distinguish between registrants and nonregistrants to a greater degree than between registered nonvoters and voters.<sup>11</sup> This is especially clear with a number of items emphasized in past models of turnout. Two factors considered important determinants of turnout, including its decline in recent decades, have been the strength of an individual's party identification and beliefs about the responsiveness of

the system reflected in the measure of external efficacy (Abramson and Aldrich 1982). As seen in tables 1 and 2, both forces are only significant, statistically and substantively, in the model for registration, not in the actual decision to go to the polls on election day. This is also the case with the other long-term political attitudes, as was expected.

For the most part, the registration model for the full electorate parallels the findings of the traditional single model. Clearly, as in the single model of turnout, the most influential force in distinguishing between registrants and nonregistrants is education. The next most influential is age. A number of other items also exert an important influence: region, church attendance, income, both ownership of and length of residence in one's home, and long-term political attitudes. Finally, the administrative items of closing date of registration and purging records are also significant determinants of registration, as would be expected.

The second stage of the selection bias model, distinguishing between registered nonvoters and voters, provides greater insight into the nature of electoral participation than does past work. As can be seen in Table 2, the forces influential at this stage generally have a smaller effect than those in the first stage, but the relationships are clearer than those revealed in previous research. The weaker effects are not surprising given the nonlinear estimation technique and the gen-

<sup>10</sup> Several variables had skewed distributions, leading the value at two standard deviations from the mean to exceed the variable range. In these cases the value was set at the range endpoint.

<sup>11</sup> Table 2 presents the first-difference estimates, which provide the probability effects of changing the values of variables. While these are intuitive, caution must be used when comparing effects across the stages. This is due to the nonlinear nature of the likelihood functions and the fact that the base probabilities differ (i.e., the mean probability of a person voting once registered is higher than being registered). Using a derivative approach avoids this problem but is less intuitive than first differences (King 1989). While most influences are smaller in the second stage using derivative methods as well as first differences, the gaps are sometimes smaller, and in the case of church attendance they reverse. Thus, at the probability of .5, using the derivative approach, the influence of church attendance is greater in the turnout stage than in the registration stage (for both the full electorate and recent movers), and the effect of candidate differential is comparable in both stages for the full electorate.



erally high likelihood of turnout among registrants. One of the more influential items at this stage is race, which, as already noted, does not even approach standard levels of statistical significance in the single model. It has been argued that racial differences in turnout no longer exist once other factors are controlled, but this conclusion appears to be incorrect. The analyses presented here suggest that, during the 1980s, African Americans were less likely than others to go to the polls once they were registered, which supports the view that they lacked desirable choices in the general elections of this period (Tate 1993).

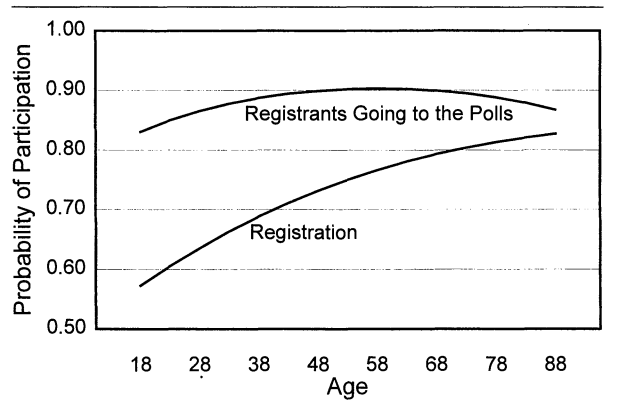
Other significant forces are candidate differential, region, marital status, and church attendance. Marital status operates differently from the other demographic and social connectedness factors in that it only influences the turnout stage. This is consistent with the idea that marriage has a "contagion" effect: Less interested and unlikely voters are spurred to the polls by a more involved spouse, since married couples tend to vote or abstain together (Stoker and Jennings 1995, Straits 1990).

Also notable in the turnout model is the smaller effect of education. Its influence on participation is overwhelmingly focused on the registration stage. Once the systematic relationship between the two stages is controlled, education as a factor in turnout is comparable to such factors as race and church attendance but fails to reach traditional levels of significance ( $p = .070$ ).

It is also evident that the traditional unified approach may enhance relationships that run in the same direction in each stage but fail to attain significance in the finer analysis. This can be seen with the nonlinear relationship between age and participation. While age is among the factors with the largest substantive influence in both stages, the nonlinear term does not reach conventional levels of significance in either stage, whereas it is significant in the unitary model.<sup>12</sup> The connection between age and participation has been well investigated, and the source of the relationship has sparked some controversy (Miller and Shanks 1996, Teixeira 1992, Wolfinger and Rosenstone 1980). Figure 1, which plots the probability of participation by age for each stage of the selection bias model, shows that while age is monotonically related to being registered (over the normal life span), the nonlinear relationship is driven by the probability of going to the polls among registrants. In addition, the critical point occurs at a lower age in the finer analysis (58 years), once the effect of registration is separated, than in the traditional unitary model (75 years).

<sup>12</sup> The parameter for the age variable is significantly different from zero at the .001 level in the registration stage of the selection bias model, but it just misses conventional significance in the second stage ( $p = .054$ ). As Figure 1 shows, the nonlinear relationship in the unitary model of turnout is mainly driven by the relationship in the second stage of the selection bias model (the parameter on age-squared in the second stage also approaches conventional levels of statistical significance at  $p = .099$ ). Both the age and age-squared relationships are statistically significant in the independent model presented in Appendix B.

**FIGURE 1. Influence of Age on Participation in the Full Electorate**



### Electoral Participation among Recent Movers

To this point it is clear that a number of forces distinguish among the three groups in the electorate, but the idea that this reflects decision calculi is a less tenable assumption. A problem with interpreting the above models as reflections of the underlying decision process is that, while the turnout decision is proximal to the surveys, the act of registering is likely to have occurred at some point in the (possibly distant) past. This is highlighted by the monotonically increasing likelihood of being registered over the life span, seen in Figure 1. Other research has shown that the causality between the behavioral forces in these models and participation is not simply unidirectional. Previous research focuses on the potential influence of participation on such attitudes as strength of party identification, beliefs about system responsiveness, and political interest (Brady, Verba, and Schlozman 1995; Converse 1969; Finkel 1985, 1987; Jennings and Markus 1984). While reciprocity between behavior and attitudes may be a "minor" dilemma when examining a decision proximal to measures of the "independent" factors, it becomes a serious concern when examining a behavior that may have occurred years or even decades before. Thus, closer scrutiny would be required for factors that may systematically change after one has registered, such as political interest, campaign attention, and a perceived difference between candidates.

To obtain a clearer picture of the relationship between the two-step institutional structure and individual voting behavior, the models estimated above were repeated with only the subsample of those who had moved in the past two years.<sup>13</sup> This period avoids the potential problem of people registering before the

<sup>13</sup> While all individuals who moved may not have reregistered, and some may have voted in their past precinct, this approach gives a cleaner portrait than the previous model of the determinants of both behavioral calculi. It also is the best proxy available for registration proximal to the survey as opposed to the more distant past. This is true despite the fact that movers, like survey respondents, are not a random subsample of the electorate, but these third- and fourth-stage selection bias issues are beyond the scope of this article (see Brehm 1993).



TABLE 3. Pooled Turnout Models for Recent Movers, 1980–88

Variable	Single Model Turnout	Selection Bias Model	
		Registration	Turnout
Intercept	−2.8420** (.3253)	−2.4625** (.3950)	−.4136 (.1724)
Administrative Barriers			
Closing date	−.0128** (.0047)	−.0116** (.0042)	—
Purge records	.0228 (.0155)	.0300 (.0169)	—
Demographics			
South	−.3671** (.0935)	−.2786** (.0979)	−.2949 (.1526)
Age	.0197** (.0050)	.0149** (.0054)	.0192 (.0101)
Age-squared	−.0002 (.0002)	−.0001 (.0002)	−.0004 (.0003)
Education	.1453** (.0200)	.1358** (.0251)	.0706 (.0486)
Race (black)	.0271 (.1387)	.2320 (.1439)	−.3191 (.2185)
Gender (female)	−.0226 (.0848)	−.1800* (.0873)	.2837* (.1355)
Income	.0002 (.0024)	.0024 (.0031)	−.0021 (.0038)
Time in home	.1629** (.0533)	.2088** (.0668)	−.0349 (.0962)
Social Connectedness			
Church attendance	.5754** (.1198)	.4670** (.1169)	.5164** (.1979)
Group membership	.1856 (.0999)	.1486 (.1149)	.1827 (.1367)
Marital status	.2108* (.0904)	.1112 (.1111)	.2506 (.1353)
Time in town	.0008 (.0034)	.0051 (.0034)	−.0051 (.0052)
Home ownership	.2515** (.0935)	.2572* (.1031)	.0991 (.1505)
Political Attitudes: General			
External efficacy	.5864** (.1536)	.5682** (.1588)	.2298 (.2533)
Internal efficacy	.1979* (.0912)	.2043* (.0993)	.0749 (.1386)
Party differential	.0356 (.0851)	.1044 (.1022)	−.1279 (.1448)
Strength of party identification	.0777 (.0468)	.1080* (.0459)	−.0160 (.0778)
Trust in government	−.3882* (.1873)	−.3554* (.1788)	−.2835 (.2726)
Political Attitudes: Election Specific			
Candidate differential	.0062** (.0018)	.0031 (.0019)	.0086** (.0028)
Candidate satisfaction	.0238 (.1118)	.0144 (.1337)	.0093 (.1695)
RHO		−.222 (.5259)	
n	1166	1166	
LLF initial	−808.21	−1301.73	
LLF final	−647.49	−921.14	

Note: The dependent variables in these models are *Validated Registration* and *Validated Vote*. The full sample size of 1,166 is composed of 454 nonregistrants, 124 registered nonvoters, and 588 voters. The administrative barriers were not included in the second stage of the selection bias model. \**p* < .05, \*\**p* < .01. Standard errors are in parentheses (bootstrapped estimates for the selection bias model).

previous midterm election, thus not reflecting the specific election analyzed, and past work has determined that two years is the critical period for determining the influence of mobility on participation (Rosenstone and Wolfinger 1978; Squire, Wolfinger, and Glass 1987; Wolfinger and Rosenstone 1980). The single turnout and selection bias models for these recent movers are presented in Table 3.

As in the case with the entire electorate, separating the stages enhances our understanding of behavior.<sup>14</sup>

<sup>14</sup> The correlation between the errors in the two models is also statistically insignificant and is substantively smaller for those individuals for whom both tasks are more immediate concerns than for the full electorate, −.222 compared to −.355, respectively. The general magnitude of the correlation among recent movers was even smaller in models with more constraints and never attained statistical significance. In all cases, the magnitude of the correlation was smaller among recent movers than for the full electorate. Thus, there may be less systematic variation among the unmeasured factors for those who have moved recently, and systematic differences may grow as individuals continue to participate or abstain over time. Rather than systematic alteration of the measured items, the differences could be due to the force of habituation of past decisions, consistent with the view of the inertial impetus of continued participation or abstention as self-reinforcing behavior (Brody 1980, Rosenstone and Hansen 1993).

This can be seen with gender, which is another example of a variable that behaves in the opposite direction in each stage. Thus, the null findings of the single model of turnout are the result of countervailing forces canceling each other out. When the two steps are taken into account, women who have moved in the past two years are less likely to register than men in the same situation; once women pass this threshold, however, they are more likely to go to the polls.

As with the model for the entire electorate, the parameter estimates cannot simply be compared to understand their influence. Estimates of effect were created for the recent mover models in the manner discussed previously, and these are presented in Table 4.

Overall, the registration model for recent movers is generally consistent with that for the entire electorate. There is substantial overlap in the findings of the two models, although several items gain greater influence among those needing to register at a time more proximal to the survey. Education, for instance, re-

TABLE 4. Influence of Forces on Probability of Participation from Models for Recent Movers			
Variable	Single Model Turnout	Selection Bias Model	
		Registration	Turnout
Administrative Barriers			
Closing date	-.1791	-.1584	—
Purge records	.0900	.1153	—
Demographics			
South <sup>a</sup>	-.1392	-.1101	-.0867
Age <sup>b</sup>	.2823	.2224	.1742
Education	.4640	.4370	.1633
Race (black) <sup>a</sup>	.0107	.0863	-.0946
Gender (female) <sup>a</sup>	-.0089	-.0708	.0640
Income	.0060	.0639	-.0376
Time in home	.1285	.1602	-.0181
Social Connectedness			
Church attendance	.2259	.1769	.1283
Group membership <sup>a</sup>	.0739	.0561	.0434
Marital status <sup>a</sup>	.0839	.0423	.0575
Time in town	.0121	.0719	-.0510
Home ownership <sup>a</sup>	.1000	.0952	.0245
Political Attitudes: General			
External efficacy	.2289	.2173	.0598
Internal efficacy	.0786	.0781	.0192
Party differential <sup>a</sup>	.0141	.0397	-.0351
Strength of party identification	.0920	.1254	-.0125
Trust in government	-.1122	-.1017	-.0556
Political Attitudes: Election Specific			
Candidate differential	.2179	.1070	.1851
Candidate satisfaction <sup>a</sup>	.0095	.0056	.0024

Note: Values in the table represent the change in probability of participating due to varying the value of each variable while holding the others constant. The administrative barriers were not included in the second stage of the selection bias model.

<sup>a</sup>Represents a dichotomous independent variable.

<sup>b</sup>The value of the age effect comes from the joint effect of changing both age variables in the model used to tap possible nonlinear effects.

mains the most influential force in the registration decision, but the centrality of this factor for participation is even stronger among those who moved recently than in the electorate as a whole. This is consistent with past work demonstrating the influence of education in overcoming the hurdles of moving on participation (Squire, Wolfinger, and Glass 1987). Age and external efficacy also continue to exert a substantively important influence. The closing date of registration exerts an effect comparable to that of a number of other influential attributes in these decision models, such as region, length of residence in one's home, and church attendance. In addition, trust in government attains statistical significance among recent movers, that is, those *less trusting* were more likely to register once other forces are controlled.

Several differences are worth noting between the model of recent registrants and the full electorate in the turnout stage. Consistent with expectations, the single most influential force in bringing recent registrants to the polls is the perceived candidate differential. While this force also exerts an influence on the decision to register, it is central to the decision to vote. Although the effect has been inconsistent in some past studies, examining the two-stage process for those who register shortly before voting supports the intuitive notion that political competition is central to voting behavior (cf. Brody and Page 1973, Rosenstone and Hansen 1993, Weisberg and Grofman 1981). While

candidate differential is a significant determinant for both the full electorate and recent movers, the comparatively stronger influence in the second stage among the latter supports the idea of reciprocal causation for long-term residents; that is, those registered farther in the past grow to see greater differences as they participate more.

While church attendance exerts a strong influence on recent mover turnout, several other factors also deserve further investigation in the second stage. Region, marital status, race, and education are substantively related to turnout among registrants, although each fails to attain statistical significance in the selection bias model (*p* values of .053, .064, .144, and .146, respectively).<sup>15</sup>

Again, the unitary model generally combines the forces in the two stages. This masks some important factors, such as gender and race, whose effects are in the opposite direction in each stage, but it may accentuate the relationship of others. Marital status among recent movers, for example, does not attain statistical significance in either stage of the selection bias model; but in the single model, by combining the effects that

<sup>15</sup> Again, comparison with the independent models in Appendix B is useful, particularly since the correlation between the errors in the two stages cannot be statistically distinguished from zero in this model. In the independent model of turnout among recent movers, region, marital status, and education attain statistical significance.

go in the same direction, its relationship with participation can be statistically distinguished from zero.

## CONCLUSION

This study has shown that the distinct electoral groups clearly differ enough to warrant closer examination than they are generally given. By specifying analyses that accurately reflect the nature of structural relationships and that test for potential statistical biases, we can better understand individual-level behavior. The idea that the relationship between structure and behavior may be interactive is far from original or startling, but the implications for our models and understanding of voting behavior may be.

While a number of forces are known to be related to voter turnout, the present analyses provide an even finer portrait, such as the relationship between age and each stage of participation (refer to Figure 1). It is also clear that long-term predispositions are more closely tied to registration than to turnout. It was predicted that those with little general attachment to politics in the United States would be less likely to overcome the first hurdle, registration. While one would expect such factors as education, political efficacy (both external and internal), and strength of party identification to play a large role in registration, it is still surprising to see their effects so concentrated on the first stage. Furthermore, the differential effects between stages are not just due to short- and long-term predispositions. Length of residence in one's home has a substantial influence on registration, which is a function of both eligibility and the lesser role given to politics during important life changes, such as moving (Stoker and Jennings 1995). Other factors, such as marital status, further highlight how individual attributes interact with structural factors more broadly than is often conceived. While previous studies accurately found these forces to be related to electoral participation, they did not illuminate the important differences that exist due to the structural environment.

The approach employed here demonstrates that a number of participation variables considered unimportant or inconsistent in recent elections deserve closer examination. Some have argued that gender and racial differences in turnout largely disappear once other factors, such as socioeconomic status, are controlled. The analysis presented here shows that once the structural process of registration is taken into account, these factors are still significantly related to the participatory process in recent elections. When other factors are controlled, it appears that African Americans were more likely to register but less likely to go to the polls during the 1980s, possibly due to the candidate options available.<sup>16</sup> In addition, it was seen that moving affects

men and women differently. While the registration barrier is more of a hindrance for women who have recently moved than men, females who overcome the barrier are more likely to vote than their male counterparts. This may be due to resources of finances, civic skills, and time, which have been shown to differ for men and women (Schlozman, Burns, and Verba 1994). In short, it is clear that the traditional unified model of participation has concealed the relationship of race and gender to voter turnout because the direction of the influence is different for each in the two stages.

Another insight concerns the relationship between trust in government and turnout. That relationship is generally thought to exist but often eludes researchers. An interesting finding of this study is that trust in government and satisfaction with both major party candidates may be consequential, but the direction of influence is opposite to what is generally expected. In the 1980s, it appears that discontent had a mobilizing effect on participation among recent movers, consistent with Eulau's (1956) view of a "politics of happiness."<sup>17</sup> This warrants further study in light of the fact that both turnout and trust in government have declined since 1960, which raises the question of whether the relationship between the two may have changed in recent times.

Election-specific forces also were found to have a substantial influence on electoral participation in the United States, underscoring the importance of politics in the fundamental act of political participation. The greater the perceived difference between the candidates in the election, the greater are the benefits—instrumental and/or expressive—of participation. The findings raise interesting questions of whether this relationship is a combination of true mobilization in both stages and possible reciprocal causation between behavior and attitudes for long-time registrants. Whatever the case, the short-term mobilization effect of perceived candidate differences was clearly the primary determinant in whether recent movers who were registered went to the polls.

The distinctions that emerge between the full electorate and recent movers emphasize the utility of the paired analyses. While the primary interest of scholars is generally the full electorate, when studying behavior it is worth considering the processes for people performing the acts currently rather than in the (possibly distant) past. It was through the analyses of recent

Americans (Ong and Nakanishi 1996). Citizenship and language explain part of the registration differences, but other factors influence the second stage of participation (United States Commission on Civil Rights 1992).

<sup>17</sup> Eulau's (1956) discussion of the 1956 election involved a political landscape far different from ours. He viewed the way the game of politics was played then as a "happy people's politics." While this does not seem to reflect the present era, his comparative discussion is still insightful. He stated that "overpoliticization" was not necessarily an unmitigated good in other countries and that greater involvement may reflect that people are politically unhappy. This view is consistent with the finding in the 1980s that the less trustful and more politically dissatisfied were more likely to participate, while those more content were more likely to abstain (see also Hadley 1978, Weisberg and Grofman 1981).

<sup>16</sup> The utility of distinguishing between influences at each stage of electoral participation can be seen in other ethnic groups in the United States as well. For instance, while Asian Americans tie with Latinos for the lowest rate of registration (53%), they are more likely than any other group to vote once registered. Thus, 76% of Asian Americans who were registered claimed to have voted in 1994, compared to 73% of whites, 64% of Latinos, and 63% of African

movers, who had to register close to the election in order to participate, that a number of the interesting findings in this study were revealed, such as those dealing with gender, trust in government, and candidate differential.

While this study clarifies our understanding of individual-level behavior and structural requirements, it also raises a number of questions. In particular, what is the likely effect of easing registration requirements through the National Voter Registration Act of 1993? The NVRA (a.k.a. Motor Voter) was credited with registering millions of new voters for the 1996 election, and once fully implemented it will fundamentally alter registration in the United States.<sup>18</sup> This will have implications for the level of turnout and its behavioral causes. Several key determinants of participation—particularly long-term political attitudes and education—play a much stronger role in the act of registration than in going to the polls. To some extent, the influence of these forces will be displaced to the second stage. Disinterested chronic nonparticipants are not likely to flood the polls simply because registration barriers diminish. I suspect that the displacement will be only partial, however. As de Tocqueville's "moment of national crisis" approaches, without the barrier of registration, a number of traditional abstainers are likely to go to the polls. Regardless of the NVRA's ultimate effects, this study has demonstrated that its implications may be more different than anticipated. The determinants of behavior at each stage are fairly distinct, and only by fully studying the operation of institutional forces can we understand how individuals will be influenced by such changes as the NVRA.

## APPENDIX A: VARIABLES AND CODING

### Demographics

*South* is a dichotomous variable coded one for individuals living in southern states and zero for all others. *Race* (black) is also a dichotomous variable coded one for African Americans and zero for all others. *Income* is in thousands of constant 1988 dollars. *Education* and *Length of Residence in One's Home* were coded in years. While *Age* was also coded in years, it was centered by subtracting the mean value to reduce collinearity between *Age* and *Age-squared*.

### Items Tapping Social Connectedness

*Church Attendance* is a scale of the frequency of church attendance ranging from zero to one: 0 = never/no religious preference; .25 = a few times a year; .5 = once or twice a

month; .75 = almost every week; 1 = every week. *Group Membership* is a dichotomous variable coded one if the respondent is a member of any organizations that represent the groups to which s/he feels closest. *Marital Status* is coded one for respondents who are married and living with their spouse, zero otherwise. *Home Ownership* is a dichotomous variable coded one if the respondent is a homeowner; zero otherwise. *Length of Residence in One's Town* is coded in years.

### Political Attitudes: General

*External Efficacy* is a scale ranging from zero (low) to one (high) combining responses to (level of agreement with) three items: "People like me don't have any say about what the government does"; "I don't think public officials care much what people like me think"; and the response to "Over the years, how much attention do you feel the government pays to what people think when it decides what to do?" Each item was scaled from zero to one (high efficacy), and the average of the items was used for the scale. *Internal Efficacy* is a scale from zero (low) to one (high) reflecting the level of agreement with "Sometimes politics and government seem so complicated that a person like me can't really understand what's going on." *Trust in Government* is a scale ranging from zero (low) to one (high) combining responses to four items: "How much of the time do you think you can trust the government in Washington to do what is right?"; "Do you think that people in government waste a lot of the money we pay in taxes, waste some of it, or don't waste very much of it?"; "Would you say the government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?"; and "Do you think that quite a few of the people running the government are crooked, not very many are, or do you think that hardly any of them are crooked?" The scale was created in the same manner as that for external efficacy by averaging the rescaled individual items (zero to one). *Party Differential* is a dichotomous variable coded one if the respondent feels that one party is more likely to do a better job dealing with the problem that the respondent perceives as the most important one facing the country. *Strength of Party Identification* is coded zero (independents and apoliticals), one (independents leaning toward a party), two (weak partisans), or three (strong partisans).

### Political Attitudes: Election Specific

*Candidate Differential* is coded as the absolute value of the difference in values given to the two major party candidates on the 100-point thermometer scale. *Candidate Satisfaction* is a dichotomous variable coded one if both major party candidates are evaluated more than 50 on the thermometer scale, otherwise zero.

### Administrative Barriers

The administrative variables were compiled from the *Book of States*. *Closing Date* is coded as the number of days before the general election that states close their books for registration; states with no registration requirements or election-day registration are set at zero. *Purging* is coded as the number of years of nonparticipation before a state removes an individual's name from the registration list. States that do not purge their books are set to a value of ten years, which represents the most liberal value for this period.

<sup>18</sup> The League of Women Voters and Human SERVE credit Motor Voter with a net increase of 9 million registrants in its first 18 months, from January 1995 through June 1996 (Duskin 1997b). In the first two years, an estimated 28 million people used the law's provisions to register or update their records (Duskin 1997a). A number of reasons have been given for the decline in turnout in 1996, despite Motor Voter, such as lower involvement and interest, the campaign itself, decline in community, and the absence of the surge Perot inspired in 1992 (Woodwell 1997). Examining the behavioral change in the wake of the rule reforms will have implications for our general understanding of electoral behavior as well as the level of turnout.

APPENDIX B: SELECTION BIAS MODEL ESTIMATION

The selection bias models were estimated using the routine provided by SST. “The first equation (the selection equation) specifies which values of the dependent variable in the second equation are to be treated as uncensored. The second equation (the outcome equation) is estimated after correcting for selectivity bias” (Dubin and Rivers 1990, 127). The uncorrected independent probit models for the second stage are provided in Table B-1 for comparison. The Dubin and Rivers (1989/1990) routine provides a simplified optimization of the selection bias log-likelihood function:

$$L(\beta_1, \beta_2, \rho) = \sum y_{2i} (y_{1i} \log P_i(\beta_1, \beta_2, \rho) + (1 - y_{1i}) \log (Q_i(\beta_2) - P_i(\beta_1, \beta_2, \rho))) + (1 - y_{2i}) \log (1 - Q_i(\beta_2)).$$

In this case,  $y_{2i}$  is the selection variable (registration), and  $y_{1i}$  is the outcome variable (turnout at the polls).  $Q_i(\beta_2)$  is the probability that an observation is not censored (that an individual is registered), and  $P_i(\beta_1, \beta_2, \rho)$  is the probability of an “uncensored success” (an individual is registered and goes to the polls).

While the parameter estimates are robust, this estimation technique is sensitive to model specification and the starting values used to estimate the parameters (i.e., if the starting values are far off, the likelihood function does not converge).

The starting values for the estimation procedure were produced by estimating the two stages independently using the relevant samples—the entire electorate for registration, and only registrants for turnout. Readers may be concerned with the robustness of the selection bias models, since the only variables that distinguish between the two stages are a pair of highly aggregated administrative variables. Yet, selection bias models with more constraints (based on preliminary analysis and theoretic expectations) between the two stages were run, and the substantive conclusions about the nature of registration and turnout were quite consistent (these are available from the author on request). For completeness, anonymous reviewers recommended the presentation of the full models with only the administrative constraints. In theory this does not seem problematic, as the closing date of registration will clearly only influence registration, and purging also should have a stronger influence on the first stage. Placing the burden of identification on these aggregate variables does not appear to be a problem for the parameter estimation, as the models converged smoothly with stable parameter estimates (for both the more constrained models and those with only the administrative exclusions), and the substantive results are consistent across both approaches. Given the stability of these parameter estimates, the fuller models are presented here.

While the parameter estimates were quite robust, and one

TABLE B-1. Independent Probit Models and Estimated Effects for Turnout among Registrants, 1980–88

Variable	Full Electorate		Recent Movers	
	Parameter	Effect	Parameter	Effect
Intercept	-.3515 (.2381)	—	-.8883* (.4527)	—
Demographics				
South	-.2864** (.0744)	-.0727	-.3367* (.1353)	-.1103
Age	.0084** (.0027)	.0986 <sup>a</sup>	.0213** (.0076)	.2160 <sup>a</sup>
Age-squared	-.0002* (.0001)	—	-.0004 (.0003)	—
Race (black)	-.2834** (.1068)	-.0718	-.2938 (.1947)	-.0951
Gender (female)	-.0031 (.0692)	-.0007	.2646* (.1258)	.0689
Education	.0517** (.0149)	.1095	.0868** (.0293)	.2244
Income	.0009 (.0019)	.0140	-.0019 (.0034)	-.0381
Time in home	.0085* (.0040)	.0561	-.0118 (.0804)	-.0069
Social Connectedness				
Church attendance	.5466** (.0954)	.1184	.5781** (.1802)	.1612
Group membership	.0868 (.0749)	.0181	.2024 (.1464)	.0542
Marital status	.2541** (.0753)	.0482	.2648* (.1336)	.0689
Time in town	-.0034 (.0024)	-.0434	-.0047 (.0047)	-.0515
Home ownership	.0648 (.0856)	.0137	.1273 (.1410)	.0352
Political Attitudes: General				
External efficacy	.2878* (.1232)	.0635	.3009 (.2311)	.0880
Internal efficacy	.1416 (.0776)	.0301	.0960 (.1330)	.0276
Party differential	.0365 (.0689)	.0078	-.1167 (.1260)	-.0356
Strength of party identification	.0840* (.0365)	.0570	-.0029 (.0701)	-.0025
Trust in government	.0119 (.1512)	.0019	-.3342 (.2744)	-.0737
Political Attitudes: Election Specific				
Candidate differential	.0039** (.0015)	.0723	.0090** (.0028)	.2177
Candidate satisfaction	-.1465 (.0864)	-.0347	.0095 (.1644)	.0028
n	2644		712	
LLF initial	-1832.7		-493.5	
LLF final	-920.1		-286.1	

Note: The dependent variable in these models is validated vote. These are probit models of voter turnout for the censored sample of respondents who were validated as registered. The first column for each analysis has the probit coefficient estimates, the second their standard errors (in parentheses), and the third the estimated effects, which represent the change in probability of participating due to varying the value of each variable while holding the others constant.

<sup>a</sup>Represents the joint effect of age from shifting values for both age and age-squared at the same time.

\*p < .05, \*\*p < .01. Standard errors in parentheses.

can be confident in the substantive conclusions drawn, the estimates for the standard errors were less stable in the selection bias models. I employed bootstrapping as an alternative to empirical estimation of standard errors in the selection bias models. Bootstrapping is based on the analogy that the observed data assume the role of an underlying population for repeated sampling (Stine 1989/1990). While bootstrapping is more computationally intensive, it has the advantage of allowing researchers to estimate sampling distributions directly without stringent assumptions often known to be implausible (Bartels and Brady 1993). Given the large number of variables in these fully specified models, few constraints between the two stages, and the relatively smaller size of the groups in the models for recent movers, about 20% of these bootstrapped samples did not converge smoothly, although the results are consistent with models with more constraints that did not have this problem. The standard errors for the selection bias models for the full electorate and recent movers are based on results from about 100 bootstrapped samples.

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