Economy and Turnout: Class Differences in the 2000 U.S. Presidential Election

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For many years, scholars have been examining the role of the economy on voter turnout. Does the economy matter? If it does, how will the economy affect voter turnout and who does it affect more? I address these issues by examining four states during the 2000 U.S. presidential election. Theoretically, it is argued that the effect of economic adversity depends upon the degree of economy security; therefore, the lower class votes at a lesser degree than the non-lower class. Based upon this premise, I explore two hypotheses: (1) The voter turnout of the lower class will be less than that of the non-lower class; and (2) the responsiveness of lower class turnout to macroeconomic conditions will be different from the non-lower class. Furthermore, the non-lower class will be demobilized to a greater degree than the lower class when macroeconomic conditions are poor. I test these hypotheses using a relatively new method, ecological inference.

American citizens have fought to gain voting rights starting from the extension of suffrage to property-less white males in 1840. Women did not secure the vote until the ratification of the Nineteenth Amendment in 1920 and African Americans did not have the full right to vote until Voting Rights Act of 1965. Despite the historical struggle for universal suffrage, low voter turnout in presidential elections remains a persistent problem in American politics.

When Bill Clinton was reelected president in 1996, only 49 percent of the eligible electorate cast ballots. Since the Clinton-Dole race in 1996 was one-sided from the start, many expected turnout would rise in 2000. However, despite being the tightest contest since the 1960 presidential election between Kennedy and Nixon, a mere 51 percent voted in 2000. This was a large difference from the Kennedy-Nixon race when 63 percent of voting age individuals voted. With the slight exception of the 1992 election when an economic recession and Ross Perot's race as a third party candidate increased turnout by five percent, the presidential elections were consistent with lower turnout over time. Although turnout in the 2004 election was the highest since 1952, it was merely close to that of 1992 election and still far from turnout rates during the 1960s. Furthermore, contemporary turnout rates have yet to reach that of the 19th century; between 1880 and 1896, voter turnout rates ranged from 79.2 percent to 84.1 percent in the northern states. Even in the southern states, the average turnout rate during this time period was 60.3 percent (Kornbluh, 2000).

This article examines two specific questions. First, how has the lower class voted compared to the non-lower class? Second, to what degree has their turnout been influenced by contextual factors when compared to the non-lower class? Despite the widespread agreement that "class matters," there is substantial uncertainty about the impact of class on voting behavior when influenced by poor economic conditions. In this paper I estimate the probability of a vote using a Bayesian hierarchical ecological inference model with a covariate and examine the contextual effects of economy on turnout among the lower and non-lower classes. These results were used to test the hypothesis that lower class turnout was stimulated by macro economic conditions to a lesser degree than was non lower class turnout.

CLASS AND TURNOUT

The study of individual characteristics as determining factors in voting turnout emerged widely with the advent of voting surveys. The National Election Study (NES) and other surveys such the Census Population Survey, made it possible for scholars to find empirical correlates of voting (Boyd, 1981; Cassel & Hill, 1981; Campbell, Converse, Miller & Stokes, 1960; Milbrath & Goel, 1977; Shaffer, 1981; Teixeira, 1987; Wolfinger & Rosenstone, 1980). Based on the result of these surveys, researchers have generally found that that individual socio-economic status was correlated with voting turnout. Individuals who have more education and higher incomes tend to vote at higher rates than those with less education and lower incomes. According to Leighley and Nagler (1992), lower class people vote at roughly 60 percent of the rate of upper class people. It seems to be obvious that individual socio-economic status matters.

If there is a significant relationship between turnout and socio-economic status, then what social group or

class contributed the most to the decline of voting turnout in American politics? How and to what extent does individual socio-economic status matter? Early research generally focused on the differences in voter turnout rates between lower class and higher class individuals. (Burnham, 1987; Reiter, 1979; Bennett, 1991; Leighley & Nagler, 1992; Patterson, 2002). On the other hand, more recent literature focuses on the question of why this difference has occurred (Hill, Leighley, & Hinton-Andersson 1995; Verba, Schlozman, & Brady, 1995; Hill & Leighley, 1996; Ringquist, Hill, Leighley & Hinton-Andersson, 1997; Winders, 1999, Leighley, 2001).

In his study of voting turnout in Boston during presidential elections from 1964 through 1984, Burnham (1987) also argued class differences were evident in the decline of voter turnout. His research showed that voter turnout among blue collar workers dropped from 66.1 percent in 1964 to 48 percent in 1980 while the turnout rate of white collar workers dropped from 83.2 percent to 73 percent.

Reiter (1979) also argued that the class bias in voting turnout has increased. Based on NES data from 1960 to 1976, Reiter used income as a measure of class and found that the difference between the voting turnout rates of the top and bottom income quartiles has increased from 18.2 percent in 1960 to 28.7 percent in 1976. Using education as a measure of class, Bennett (1991) also argues that lower class individuals not only show lower rates of voting but that they also contributed to the decline of overall voting turnout. His findings showed that the voter turnout of whites who had a college education dropped from 71 percent in 1964 to 59 percent in 1988. On the other hand, the turnout rate among individuals without a college education dropped from 63 percent to 31 percent.

Although many of the works reviewed above clearly find a relationship between socio-economic class and voting turnout, none of them managed to answer why. Piven and Cloward (2000), however, shed some light on this question. Not only did they find that the lower class had the greatest turnout decline from 1964 to 1980, they also found out why the lower class decline was greater than for other groups. Emphasizing that the lower class had the potential to become strong Democratic partisans, Piven and Cloward found that the mechanism that kept voter turnout rates low for these individuals was linked to the Democratic Party's mobilization practices. According to these authors, the Democratic Party's failure to mobilize new voters was responsible for turnout decline among the lower class. They argued that registration fell among the lower class more than others due to less mobilization by Democratic Party; consequently, this led to the lower turnout among the lower class (Piven & Cloward, 2000).

Leighley and Nagler (1992), however, indicated that Bennett's measurement of education did not accurately capture class since the meaning of a college education in 1964 was quite different from in 1988. Furthermore, it was more common in 1964 for individuals not to have a college education.

On the other hand, some scholars have challenged the conclusion that class differences played a role in the decline of voter turnout in the United States. Using various demographic data from the NES and CPS, Leighley and Nagler (1992) found that the class differences between voters and nonvoters in presidential elections remain the same from 1964 through 1988. They argued that although there was a wide range in turnout across income groups, this fact did not imply that there was a significant change in relative turnout rates over time. Instead, Leighley and Nagler found that, when focusing on income as a measure of class, the turnout rate of the lowest income groups dropped by 6 percent while the rate of the highest income groups dropped by 9.1 percent. This lack of difference between the classes was also found by Shields and Goidel (1997). In their study on congressional elections and class biases in voter turnout, they found that declining voter turnout rates have occurred among all segments of society since the early 1960s, not just among the lower classes.

The New American Voter (Miller & Shanks 1996), directly inspired by *The American Voter* (Campbell, Converse, Miller & Stokes, 1960), gives researchers thoughtful information about voter turnout. Miller and Shanks (1996) noted that it is puzzling that voter turnout rates have declined while educational levels have increased and voter registration laws have become moderated. However, they contend that generational differences accounted for these lower turnout rates. Dividing voters into two separate groups, pre-New Deal and post-New Deal, they argued that the turnout variation had been explained not by socio-economic factors, but rather by psychological political involvement in different areas. In their research, the pre-New Deal group showed a very high interest in politics while the post-New Deal generation was not as involved in politics.

It is widely accepted that economic conditions are associated with turnout. Wolfinger and Rosenstone (1980) argued that rich individual have a bigger stake in the system and are more highly motivated to make the appropriate choice on Election Day and to support the political system by participating in it. Hill and Leighley (1996) noted that lower class turnout can be increased when the economic condition of the state is stable, while the economic recession demobilizes the lower class. Radcliff (1992) also argued that when economic conditions are poor, voters would be demobilized. According to Radcliff, when economic conditions are poor, people tend to skew their attention to personal

concerns. Consequently they withdraw from the political process. Radcliff also argued that under poor economic conditions, uneducated and lower income people tend to be affected by macroeconomic conditions at higher degree than other people. On the other hand, people are not affected by poor economic conditions if economic security programs are well-funded (Radcliff, 1992).

CONCEPTUALIZATION OF CLASS

As a matter of fact, the conceptualization of class has not been easy. As reviewed before, there are many ways to define different classes, varying from educational level, occupational location, income, and "collar" types. Manza and Brooks (1999) did an excellent job of summarizing the various types of class definitions. According to them, the voting behavior literature has typically defined class in one of three distinct ways. The most common approach is to distinguish between blue-collar and white-collar workers. The assumption behind this conceptualization of class is "between the middle class as a whole and the lower or working class" (Manza & Brooks, 1999, p. 55). Despite its popularity, defining class based on collar types has some problems. Manza and Brooks (1999, p. 55) write that:

> It is relatively easy to see the limitations of such an assumption. First, there are important sources of class divisions within both the middle class(es) and the working class(es) that cannot be identified with a two-class mode. For example, it is very difficult to place routine white-collar employees working in service industries. While such workers do not have manual employment, they hardly enjoy the benefits of the employment relations typical of professional or managerial occupations. Further, important changes in the class structures of capitalist societies since World War II are difficult to identify with such a model.

The second approach, according to Manza and Brooks (1999), is most often used by contemporary sociologists, but is not commonly used in voting studies. This approach defines class in terms of occupational location and/or employment situation. They contend that this approach contains two different conceptions of class, gradational and relational. The latter approach is more widely accepted in the study of voting behavior. As stated by Manza and Brooks (1999, p. 56):

> In relational approaches, different clusters of occupations are viewed as having similar – though not identical – employment situations and/or life chances. Rather than generating a scale of all occupations, relational approaches define classes in terms of either market or production relations. The result is a set of categorical distinctions among actors based on their employment situation.

TABLE 1. Geographical Units of Sample States

State	Aggregation Type	Number of Observations
California	Precinct	7003
	County	2
Michigan	Minor Civil Division	1493
	County	1
Minnesota	Minor Civil Division	2617
	Minor Civil Division with Multi County	43
	County	2
New York	County Subdivision	989
	County	5

The third approach is to distinguish classes on the basis of an individual's income. The basic logic behind this approach is straightforward. Manza and Brook (1999, p. 56) argue that "[h]igher-income people have different material interests than lower-income people. They are better able to fend for themselves in the market, and thus should have much less use for government-provided social provision or progressive taxation. Conversely, lower-income people should be expected to have the opposite interests." However, Manza and Brooks (1999) argue that there is a problem with this approach, stating that individuals with the same level of income might have different long-term economic interests. For example, a semi-skilled factory worker and a college student who is employed part-time as a computer programmer might report the same income, but their expectations in the long term might be quite different.

Despite this problem, there is enough justification to conceptualize the class with income. Leighley and Nagler (1992) argued that income is more preferable to occupation as the relevant measure of socioeconomic status because of three reasons. First, income is the more relevant measure with regard to government policy. Second, some occupations are difficult to categorize as white- or blue-collar jobs. Finally, occupational rankings may not be stable over time.

DATASET AND METHODOLOGY

In this research, I estimate individual lower class voting turnout in the 2000 presidential election for four states: California, Michigan, Minnesota, and New York.

TABLE 2. Difference between Federal Election Commission and Merged Data

		Voting Age Population		Voting Turnout Rate		
States	**Year**	**FEC Report**	**Merged Data**	**FEC Report**	**Merged Data**	**Difference**
California	2000	24,873,000	24,558,105	44.10%	45.30%	1.20%
Michigan	2000	7,358,000	7,329,016	57.50%	57.66%	0.16%
Minnesota	2000	3,547,000	3,857,460	68.80%	63.75%	- 5.05%
New York	2000	13,805,000	14,279,854	50.40%	48.82%	- 1.58%

Election returns are electronically archived in one of two locations depending upon the state: (1) on the individual state's Secretary of State's website or (2) on a major university website for that state. This data is at the MCD, precinct level, or subcounty level.. California was useful since its geographical aggregation is quite low at the precinct level. Minnesota was added to the sample for comparison purposes as its registration requirements are fairly moderate when compared to other states. The selection of Michigan and New York was based solely on data availability at the time of the research. I make no claim that this small number of states can be generalized for the entire American electorate.

Merging Data: The electoral variables (i.e., election returns) were merged with available demographic data published by the U.S. Census Bureau. Merging the electoral data with census information required several steps. First, the electoral information (such as election returns and total registration) was saved with the geographical identification. Second, the census information with the geographical identification was saved at the corresponding level of aggregation with the electoral information. Third, both census information and electoral information were merged together based on their geographical identification. At this stage, some geographical units had to be aggregated due to the characteristics of the geographic units.

Measurement Errors: When electoral data are merged with the census information, measurement errors are inevitable. After merging the census data with the 2000 election returns, some precincts, MCDs, and county subdivisions had to be excluded because the number of total votes exceeded the total voting age population. This happened because the census was not conducted at the same time that the election occurred. Despite its intrinsic errors, there are relatively small errors exist for 2000 data due to the short gap between election date and census date. Table 2 shows the existing measurement errors in each state.

Variables and Data Collection: The variables used in this research included: voting age population, unemployment rate, number of below poverty thresholds, total votes for presidential candidate in the general elections, and total registration.

Voting Age Population.[1] The voting age population is defined as the number of people who are 18 years or older. The voting age population for 2000 is obtained from 2000 Census.[2]

Lower Class. The operational definition of class is based on the amount of income a particular family makes a year. Since poverty status is used by federal agencies in their statistical work to implement aid programs, currently the most suitable way to define a class is to look at the poverty status. In their study entitled "Lower-Class Mobilization and Policy Linkage in the U.S. States," Hill, Leighley, and Hinton-Andersson (1995) collected a number of indicators to produce an index of class status, including Jackman and Jackman's (1983) occupations, income levels, and Duncan's Socioeconomic Index scores. Combining all of the data together, Hill, Leighley and Hinton-Andersson found that their index was quite close to federal estimates of individuals living in poverty. The authors claimed that their "measure of lower class turnout is valid" (Hill, Leighley, & Hinton-Andersson, 1995, p. 78). Table 3 describes the poverty thresholds for 2000 provided by the U.S. Census Bureau. [3]

The number of persons who are 18 years or more and below the poverty level is calculated based on these census variables for each year. Using this method, I have calculated the size of the lower class in for the four states under study. This data can be seen in Table 4. Throughout the states, the size of the lower class is fairly small consisting of around 10 percent of the entire population. Minnesota has the smallest lower class at 7.3 percent of the state's total population compared to 12 percent in California and 12.4 percent in New York.

Voting Turnout. The number of total votes for presidential candidates in the 2000 election is obtained from each state's election result table.

TABLE 3. Poverty Thresholds in 2000, by size of Family & Number of Related Children Under 18 (Dollars)

Size of Family Unit	Weighted Average Thresholds	Related children under 18 years								
		None	One	Two	Three	Four	Five	Six	Seven	8 or more
One person	8,794									
Under 65 years	8,959	8,959								
65 years and over	8,259	8,259								
Two persons	11,239									
Householder under 65 years	11,590	11,531	11,869							
Householder 65 years and over	10,419	10,409	11,824							
Three persons	13,738	13,470	13,861	13,874						
Four persons	17,603	17,761	18,052	17,463	17,524					
Five persons	20,819	21,419	21,731	21,065	20,550	20,236				
Six persons	23,528	24,636	24,734	24,224	23,736	23,009	22,579			
Seven persons	26,754	28,347	28,524	27,914	27,489	26,696	25,772	24,758		
Eight persons	29,701	31,704	31,984	31,408	30,904	30,188	29,279	28,334	28,093	
Nine persons or more	35,060	38,138	38,322	37,813	37,385	36,682	35,716	34,841	34,625	33,291

Source: U.S. Bureau of the Census, Current Population Survey.

Unemployment Rate. According to the Bureau of Labor Statistics and the U.S. Census Bureau, unemployed persons can be defined as all persons who had no employment during the reference week, were available for work, except for temporary illness, and had made specific efforts to find employment some time during the 4-week-period ending with the reference week (Joint Project between the Bureau of Labor Statistics and the Bureau of the Census, 1996). The Census Bureau provides the employment status for the population 16 years and over by gender. [4] The unemployment rates for each state are provided in Table 5.

In 2002, New York had the lowest unemployment rate (3.6 percent) of the four states, compared to 7.5 percent in California and 6.2 percent in Michigan. Since the U.S. Census only provides average unemployment rates for the previous year, it is not possible to observe the amount of change in the unemployment rate which may better capture the economic fluctuations relevant to voters.

TABLE 4. Size of the Lower Class by State, 2000

State	Lower Class	Non-Lower Class
California	0.120	0.880
Michigan	0.091	0.909
Minnesota	0.073	0.927
New York	0.124	0.876

TABLE 5. Unemployment Rate by State*

State	Unemployment Rate
California	7.5%
Michigan	6.2%
Minnesota	4.9%
New York	3.6%

*** 2000 unemployment rate was calculated from the U.S. Census Summary File 3.**

A Description of Ecological Inference: Given data on the lower class and Presidential votes in each observation (MCD, sub county, or precinct), I turned to the task of estimating turnout by class by using *ecological inference*. The basic structure of ecological inference is that each observation (MCD, subcounty, or precinct) is treated as a separate 2x2 table with known marginals (number of lower class/non-lower class voting age population by number of voters/nonvoters) and with unknown inner cells (the number of lower class voters). Table 6 shows the basic 2x2 structure of ecological inference used in this research.

N_{0i}, N_{1i}, Y_i, and N_i - Y_i are non-negative integers that are observed representing the number of the lower class voting age population, number of non-lower class voting age population, number of voters, and number of non-voters in MCD *i*. The inner cell entries Y_{0i} and Y_{1i} are not observed. Y_{0i} represents the Number of the votes by the lower class and Y_{1t} represents the number of the votes by the non lower class. It is assumed that:

$$Y_{oi} \mid N_{0i} \sim Binomial(N_{0i}, p_{0i}) \text{ and}$$
$$Y_{1i} \mid N_{1i} \sim Binomial(N_{1i}, p_{1i})$$

where p_{0i}, and p_{1i} are ultimate quantities of interests representing the probability of a vote by the lower class and the probability of a vote by the non lower class respectively. Since the probability that an individual votes, q_i, is the weighted sum of two independent probabilities: the probability of a vote by the lower class, p_{0i}, and the probability of a vote by non lower class, p_{1i}, we can express the marginal probability that an individual votes as follow:

$$q_i = p_{0i} x_i + p_{1i}(1 - x_i)$$

where, $x_i = N_{0i} / N_i$ and 1- $x_i = N_{1i} / N_i$, are respectively the observed proportions of the lower class and non-lower class. This basic structure of ecological inference and its notations will be revisited often as I discuss the Bayesian approach below.

Bayesian Hierarchical Model. The basic model elaborated in Table 6, describes the observed total number of vote in the MCD as a draw from a binomial distribution with parameters x_i and N_i. As indicated in Table 6, the probability that an individual votes, x_i, is the weighed sum of two independent probabilities: the probability of a vote by the lower class, p_{0i}, and the probability of a vote by non lower class, p_{1i}. As indicated previously, this step introduces an accounting identity, the logical boundaries that are implied by the data. Three pieces of information from the MCD data enters the likelihood: the number of vote, *V*; the number of the lower class, *L*; and the number of non lower class, *U*. The probabilities of a vote by the lower class and non-lower class, p_{0i}, and p_{1i} are normalized through

TABLE 6. 2x2 Ecological Inference Table

	$Y = 0$ (non-vote)	$Y = 1$ (vote)	
$X = 0$ (lower class)		Y_{0i}	N_{0i}
$X = 1$ (non-lower class)		Y_{1i}	N_{1i}
	N_i - Y_i	Y_i	N_i

transformation to the logistic. The formal representtation of this process is straightforward:

$$V_i \sim bin(x_i, N_i)$$
$$q_i = p_{0i} x_i + p_{1i}(1 - x_i)$$
$$N_i = U_i + L_i$$
$$x_i = L_i / (U_i + L_i)$$
$$p_{0i} = \exp(\theta_{0i}) / (1 + \exp(\theta_{0i}))$$
$$p_{1i} = \exp(\theta_{1i}) / (1 + \exp(\theta_{1i}))$$

The primary assumptions of the modeling process are that the logit of the lower class turnout in each MCD observation is drawn from a single underlying normal distribution and that the logit of non-lower class turnout in each MCD is drawn from a separate underlying normal distribution. Although there are a number of alternative distributional assumptions to this binomial-normal model, scholars used this strategy most often to estimate voter turnout in ecological inference applications (Corder & Wolbrecht, 2004a).

The hierarchical model can be used when information is available on several different levels of observational units. In this research, mainly MCD level and state level observations were available. The hierarchical structure of the model was introduced by specifying the normal distribution that describes the MCD logits. At the second stage, for each MCD level probability, the prior distribution is treated as a draw from a normal distribution with mean μ and variance σ^2 where:

$$\theta_{0i} \sim N(\mu_0, \sigma_0^2),\ \theta_{1i} \sim N(\mu_1, \sigma_1^2).$$

θ_{0i} is assumed to be a priori independent of θ_{1i} for all *i*s. In addition, we assume the following hyper-priors:

$$\mu_0 \sim N(m_0, M_0),$$
$$\mu_1 \sim N(m_1, M_1),$$

TABLE 7. Proportion of Voting Turnout by Class

State	Observed Total Turnout Rate*	Lower Class Posterior Median	Lower Class 95% BCI	Non-Lower Class Posterior Median	Non-Lower Class 95% BCI
Michigan	0.577	0.375	[0.358 - 0.395]	0.601	[0.595 - 0.606]
Minnesota	0.637	0.309	[0.294 - 0.324]	0.657	[0.652 - 0.662]
New York	0.564	0.333	[0.309 - 0.357]	0.589	[0.584 - 0.594]
California	0.453	0.248	[0.245 - 0.251]	0.478	[0.477 - 0.479]

* Observed turnout rate could be different from the actual turnout rate reported from Secretary of State Office due to measurement errors as discussed in the earlier section.

$$\sigma_0^2 \sim \mathrm{IG}(\nu_0/2, \sigma_0/2),$$
$$\sigma_1^2 \sim \mathrm{IG}(\nu_1/2, \sigma_1/2).$$

This hyper prior state-level mean and variance are specified in a way that adds no information to the model. A uniform distribution or relatively flat normal distribution centered around zero would be appropriate for the mean. A similarly flat prior would be introduced for the variance.

According to Corder and Wolbrecht (2004b), the Bayesian strategy both incorporates information about and permits a test of the impact of contextual factors. The probability of a vote by the lower class and non lower class and the regression coefficients for the contextual effects were simultaneously estimated for the entire set of available data at each election year.

In order to estimate the contextual effects, it is additionally assumed that the probability of a vote by the lower class is conditional on a contextual variable, which allows the probability of a vote by lower class and non lower class vary over MCDs according to the unemployment rate, covariate employed in this research (King 1997).

After a vector of acceptable candidate values for the probability of a vote by the lower class and the probability of a vote by the non lower class are selected, the binomial probability of a vote by lower class and non-lower class are transformed via the logistic. The logits are independently regressed on the contextual factor. Once we obtain the vector of population-weighted linear regression coefficients, the vectors were retained and used in the calculation of the likelihood in the subsequent iteration of the model (Corder & Wolbrecht 2004b). Once they enter the likelihood, new candidate values were selected, regression coefficients were updated, and this process was repeated. Candidate values and regression parameters were updated via Markov Chain Monte Carlo (Corder & Wolbrecht, 2004b).

Markov Chain Monte Carlo methods are implemented in the MCMCpack, an R package authored by Martin and Quinn (2003). I also used a modified MCMCpack R package authored by Corder and Wolbrecht (2004b) to implement constrained models (the probability of a vote by the lower class would not exceed the probability of a vote by non-lower class).

Starting from an uninformed prior, an MCMC simulation iterates a number of times to converge on model solutions. For this research each simulation was 70,000 iterations with the first 15,000 iterations discarded as the burn-in. The median from each monitored chain was treated as a point estimate for each quantities of interest. The point estimates are reported in the next section of the article. In addition, the tables include the region of 95 percent highest posterior density, also known as the Bayesian Credible Interval (BCI).

RESULTS AND DISCUSSION

Turnout Estimates: An examination of the turnout model resulted in a number of findings which have been summarized in Table 7. The estimates suggest that there was a significant difference between lower class participation and non-lower class participation. In most states, the voter turnout of the lower class is lower than that of the non-lower class. The estimation of the probability of a vote by lower class was consistently lower than the probability of a vote by non-lower class.

Diagnosis of the Turnout Model: The empirical results from a given MCMC analysis may not be reliable until the chain has reached its stationary distribution. A possible way to see the model's performance is to observe convergence properties. In this section, the City of Kalamazoo was used to observe convergence

TABLE 8. Heidelberger and Welch Test for Selected MCDs in States

	Stationarity test	Halfwidth Test	Mean	Halfwidth
Michigan				
Lower Class	Passed	Passed	0.300	0.00299
Non-Lower Class	Passed	Passed	0.427	0.00089
Minnesota				
Lower Class	Passed	Passed	0.357	0.00526
Non-Lower Class	Passed	Passed	0.694	0.00391
New York				
Lower Class	Passed	Passed	0.360	0.00309
Non-Lower Class	Passed	Passed	0.538	0.00141
California				
Lower Class	Passed	Passed	0.281	0.0047
Non-Lower Class	Passed	Passed	0.36	0.0017

properties for the point estimate of the probability of a vote in 2000 presidential election.

If the posterior distribution is not converged, multimodality of the posterior density would be shown; this is a classic sign of nonvergence (Gill 2002). Figure 1 [See appendix] revealed no multimodality for either lower class or non-lower class posterior distribution. It was also evident that the posterior distribution for non-lower class turnout was narrowly focused around the point estimate while the posterior distribution for lower class turnout was a bit wider. This narrow posterior distribution is another indicator of the model's convergence.

Figure 2 and 3, which are included in the appendix to this article, indicate that the model has converged. Figure 2 shows the horizontally flat trend line indicating that there is no visible trend in the simulation. Figure 3 shows no sign of autocorrelation in the posterior distribution. Both of these figures which represent the properties of the convergence show that the simulated chain is stationary.

The Heidelberger and Welch diagnostic was used to see if the estimates were drawn from a chain that has converged. MCDs from Michigan and Minnesota, a subcounty division from New York, and a precinct from California were arbitrarily selected to test convergence. It is virtually impossible to test convergence for all units. Table 8 reports the results of the diagnostic. In this table, it is fairly obvious that the models pass the basic convergence diagnosis. Based on the graphical diagnosis of the convergence and the Heidelberger and Welch test, it can be concluded that the point estimates were drawn from a chain that has converged.

Table 9. Correlation Coefficients between Lower Class and Non-Lower Class*

State	Correlation Coefficients
California	0.63
Michigan	0.68
Minnesota	0.71
New York	0.56

* Correlation coefficients are calculated by STATA 7.0 for windows based on point estimates of the lower class turnout and non lower class turnout

Effects of the Unemployment Rate on the Probability of a Vote: One simple way to see if there is any difference between the lower class and the non-lower class in responding to external stimuli is to observe how the lower class turnout varies with non-lower class turnout. Table 9 shows the correlation coefficients between the lower class turnout and non-lower class turnout in the various states. The highest correlation coefficient was observed among the Minnesota voters (r =0.71) and the lowest was found among the New York voters (r =0.56). The correlation coefficients between the lower class turnout and non-lower class turnout in Michigan were moderate; this suggested that both classes response to contextual stimuli to some degree. The lower class in New York responded to contextual stimuli differently from the non-lower class which is shown by the correlation coefficient (r=0.56). This simple observation confirms the initial assumption that each class responds to contextual stimuli differently.

For the 2000 presidential election, the regression coefficients were obtained by using the Bayesian

Table 10. Explaining Variation in Lower Class and Non-Lower Class Turnout by Unemployment Rate

	California	Michigan	Minnesota	New York
Lower Class				
Regression Coefficient	-6.044 [-6.476 -5.637	-2.811 [-9.596 - 1.364]	-6.746 [-10.591 - 2.295]	-7.011 [-15.233 -0.206]
Constant	-0.784 [-0.819 -0.748]	-0.340 [-0.608 - 0.024]	-0.712 [-0.929 - 0.512]	-0.359 [-0.779 - 0.130]
Non Lower Class				
Regression Coefficient	-7.477 [-7.677 -7.291]	-6.341 [-7.244 - 4.826]	-11.139 [-11.978 - 10.331]	-9.064 [-10.162 - 7.19]
Constant	0.422 [0.408 - 0.436]	0.753 [0.684 - 0.796]	1.075 [1.041 - 1.108]	0.697 [0.631 - 0.760]

Notes: Dependent variable: logit of the proportion of age eligible population casting votes for President. Estimated via Markov Chain Monte Carlo. 95% Bayesian Credible Interval (BCI) in brackets.

Hierarchical model. Each table shows the estimates from each state by class. The Bayesian Credible Intervals (BCI) indicated that the values of the highest posterior density regions covering the 95 percent of the posterior distribution with the highest probability (Gill, 2002). If zero lies in the BCI, then the effect of the contextual effect is trivial. If zero is not in the BCI, then the unemployment rate provides information about MCD level variation in turnout.

Effects of Unemployment. Table 10 shows the regression coefficients of the unemployment rate in each state. In 2000, the lower class in Minnesota and New York did respond to economic conditions. BCIs exclude zero. Once the unemployment rate increased, the probability of the lower class turnout decreased.

The Michigan, Minnesota, and New York cases all showed that the unemployment rate is negatively related to the probability of non-lower class turnout. The direction of the function was consistently downward, which indicated that the higher the unemployment rate, the lower the probability of that the non-lower class will vote. We can see the effects of the unemployment rate on the probability of lower class and non-lower class turnout in a graphical way by introducing regression coefficients and constants into the specification of the logit model:

$$E(Y) = \frac{1}{1 + e^{-\alpha - \beta X_i}}$$

where *E(Y)* is the probability of a vote by the lower class, α and β are constant and regression coefficient respectively, and *X* is the unemployment rate for each MCD.

Figures from Figure 4 through Figure 7, which are included in the appendix, show the same characteristics: the non-lower class responded more sharply to the unemployment rate change than the lower class did. This also is an expected result. Overall, the estimates indicate non-lower class voters respond strongly to macroeconomic conditions. Lower class voters do not.

Diagnosis. Table 11 reports the results of the Heidelberger and Welch Test. As Table 11 demonstrates, all regression coefficients are drawn from stationary which suggests that the interpretations and analyses based on these point estimates are reliable.

CONCLUSION

When the National Voter Registration Act, more commonly known as the Motor Voter Act, was passed in 1993, higher registration and consequently higher voting turnout were naturally expected. The first goal seemed to be achieved when the Federal Election Commission reported at least 10 million newly registered individuals after law's passage (FEC, 1997). Voting turnout, however, did not follow the same direction. The turnout rate in the first presidential election after the Motor Voter Act was only 49 percent – the lowest turnout rate since World War II.

The National Voter Registration Act was just the most recent effort to make registration easier. Since the 1960s, registration has become significantly easier. There is, however, a fundamental puzzle when observing overall voter turnout levels in American presidential elections. Despite various efforts to reduce the barriers to voting, individuals do not vote as much as they did before. Who votes and who does not? These are the enduring questions in American politics. This research quantitatively tested two hypotheses that provide answers to these central questions along with effects of contextual factors on the turnout. First, I hypothesized that lower class voter turnout is lower than non-lower class voter turnout. Second, turnout

TABLE 11. Heidelberger and Welch Test for Coefficients in States

	Stationarity Test	Halfwidth Test	Mean	Halfwidth
Michigan				
Lower Class	Passed	Passed	-3.550	0.1440
Non-Lower Class	Passed	Passed	-6.200	0.0314
Minnesota				
Lower Class	Passed	Passed	-6.780	0.094
Non-Lower Class	Passed	Passed	-11.100	0.0184
New York				
Lower Class	Passed	Passed	-7.530	0.1860
Non-Lower Class	Passed	Passed	-9.030	0.0319
California				
Lower Class	Passed	Passed	-6.060	0.0111
Non-Lower Class	Passed	Passed	-7.480	0.0048

among the lower classes is less responsive to economic conditions than the non-lower class. Two Bayesian hierarchical ecological inference methods were employed to test these hypotheses: the basic and extended models.

Findings: The results of this research confirmed the first hypothesis. The probability of a vote by the lower class is lower than that of the non-lower class. As discussed previously in this article, the lower class in all states voted at lower rates than did the non-lower class. Furthermore, the probabilities of a vote by the lower class are statistically different from those by the non-lower class. This result is consistent with the findings of previous researchers.

The most valuable advantage of having a covariate in the model is that we can estimate the effects of a contextual factor on voting turnout. In this article, the second hypothesis dealt with the macroeconomic context. In general, I found that the responsiveness of lower class voter turnout was different from that of the non-lower class. That is, voter turnout for the non-lower class decreased as unemployment increased. This effect was much weaker for the lower class.

These results confirmed Radcliff's (1992) conclusion that the voters would be demobilized when macroeconomic conditions were poor; however, this research does not support Radcliff's conclusion that voter turnout among the lower classes would be most affected. This may be explained by the existence of economic security programs. Radcliff (1992) argued that when economic security is provided, the degree of demobilization would be smaller although macroeconomic conditions are poor. Since the lower class, in this research, was defined based on the poverty status and these individuals tend to receive welfare benefits, they would not be demobilized as much as non-lower class.

Contributions: This research confirmed and strengthened the previous conclusions about American voting behavior by using a relatively new method, Bayesian hierarchical ecological inference. The article demonstrated how economic class is associated with voter turnout. Furthermore, it increased our knowledge of how macroeconomic conditions affect voting turnout among people from different economic standings. If, as I confirmed, the low turnout rate among the lower class is persistent, these individuals would have less of a chance to impact public policy. In the end, the primary accomplishment of this research has been to reveal how and to what extent economic class and macroeconomic conditions are associated with voting turnout in the United States.

NOTES

[1] Recently some scholars raised a question of using the voting age population to calculate the turnout rate (McDonald & Popkin, 2001; Martinez, 2003). According to them, the *Voting Eligible Population* should be used to calculate turnout rate instead of *Voting Age Population* because the VAP includes noncitizens and felons who are not eligible to vote. Due to data availability, the VAP is used in this research. Given the fact that the VAP is used, ecological inference models might underestimate lower class turnout since the VEP is almost identical with

VAP for nonlower class while the VEP tends to be smaller than the VAP for lower class.

[2] Census 2000 Summary File 3 provides sex by age at P8. For voting age population, both the male and female 18 years and over population are extracted and calculated.

[3] The Bureau of Census provides the previous year's poverty status by age in P87 for 2000 census.

[4] P43 for 2000 Census Summary File 3 provides the number of people in labor force, employed, and unemployed for both gender.

REFERENCES

Bennett, S. E. (1991). Left behind: Exploring declining turnout among noncollege young whites, 1964-1988. *Social Science Quarterly, 72*, 314-333.

Boyd, R. W. (1981). Decline of U.S. voter turnout: Structural explanations. *American Politics Quarterly, 9*, 133-159.

Burnham, W. D. (1987). The turnout problem. In Schlozman, K. L. (ed.). *Elections American Style*. Washington, D.C.: Brookings.

Campbell, A., Converse, P. E., Miller, W. E., & Stokes, D. E. (1960). *The American voter*. New York: Wiley.

Cassel, C. A. & Hill, D. B. (1981). Explanations of turnout decline: A multivariate test. *American Politics Quarterly, 9*, 181-195.

Corder, J. K. & Wolbrecht, C. (2004a). Using prior information to aid ecological inference: A Bayesian approach. In King, G., Rosen, O. & Tanner, M. (eds.). *Ecological inference: New Methodological Strategies*. New York: Cambridge University Press.

Corder, J.K. & Wolbrecht, C. (2004b). *Incorporating women voters after suffrage*. Forthcoming publication.

Federal Election Commission (n.d.). *Statistical Highlights of the Federal Election Commission Report to the Congress on the Impact of the National Voter Registration Act 1995-1996*. Retrieved January, 2005, from http://www.fec.gov/votregis/nvraintr.htm

Gill, J. (2002). *Bayesian methods: A social and behavioral sciences approach*. New York: Chapman & Hall/CRC.

Hill, K.Q. & Leighley, J.E. (1996). Political parties and class mobilization in contemporary United States elections. *American Journal of Political Science, 40*, 787-804.

Hill, K.Q., Leighley, J.E. & Hinton-Andersson, A. (1995). Lower-class mobilization and policy linkage in the U.S. states. *American Journal of Political Science, 39*, 75-86.

Jackman, M. R. & Jackman, R. W. (1983). *Class awareness in the United States.* Berkeley, CA: University of California Press.

King, G. (1997). *A solution to the ecological inference problem: Reconstructing individual behavior from aggregate data*. Princeton, N.J.: Princeton University Press.

Kornbluh, M. L. (2000). *Why America stopped voting: The decline of participatory democracy and the emergence of modern American politics*. New York: New York University Press.

Leighley, J. E. & Nagler, J. (1992). Socioeconomic class bias in turnout, 1964-1988: The voters remain the same. *American Political Science Review, 86*(3), 725-736.

Leighley, J. E. (2001). *Strength in numbers? The political mobilization of racial and ethnic minorities.* Princeton, M.J.: Princeton University Press.

Manza, J. & Brooks, C. (1999). *Social cleavages and political change: Voter alignments and U.S. party coalitions*. New York: Oxford University Press.

Martin, A. D. & Quinn, K. M. (2003). *MCMCPack.* A package distributed by the R project for Statistical Computing. Last retrieved December 5, 2007, from http://www.r-project.org

Martinez, M. D. (2003). Comments on "Voter turnout and the National Election Studies." *Political Analysis, 11*, 187-192.

McDonald, M. P. & Popkin, S. L. (2001). The myth of the vanishing voter. *American Political Science Review,* 95, 963-74.

Milbrath, L. W. & Goel, M. L. (1977). *Political participation*. Chicago: Rand McNally.

Miller, W. E. & Shanks, J. M. (1996). *The New American voter*. Cambridge, MA: Harvard University Press.

Patterson, T. E. (2002). *The vanishing voter: Public involvement in an age of uncertainty*. New York: Random House.

Piven, F. F. & Cloward, R. A. (2000). *Why Americans still don't vote: And why politicians what it that way*. Boston, MA: Beacon Press.

Radcliff, B. (1992). The welfare state, turnout, and the economy: A comparative analysis. *American Political Science Review, 86*, 444-454.

Reiter, H. L. (1979). Why is turnout down. *Public Opinion Quarterly*, *43*, 297-311.

Ringquist, E.J., Hill, K.Q., Leighley, J.E. & Hinton-Andersson, A. (1997). Lower-class mobilization and policy linkage in the U.S. states: A correction. *American Journal of Political Science*, *41*, 339-344.

Shaffer, S. D. (1981). A multivariate explanation of decreasing turnout in presidential elections 1960 – 1976. *American Journal of Political Science*, *25*, 68-95.

Shields, T. G. & Goidel, R. K. (1997). Participation rates, socioeconomic class biases, and congressional elections: A crossvalidation. *American Journal of Political Science*, *41*, 683-691.

Teixeira, R. A. (1987). *Why Americans don't vote: Turnout decline in the United States 1960 – 1984.* New York: Greenwood.

Verba, S., Schlozman, K. L. & Brady, H. E. (1995). *Voice and equality: Civic voluntarism in American politics*. Cambridge, MA: Harvard University Press.

Winders, B. (1999). The roller coaster of class conflict: Class segments, mass mobilization, and voter turnout in the U.S., 1840-1996." *Social Forces*, *77*(3), 833-862.

Wolfinger, R. E. & Rosenstone, S. J. (1980). *Who votes?* New Haven: Yale University Press.

APPENDIX

FIGURE 1. Posterior Distribution of the Fraction of Lower Class and Non-Lower Class Turnout: Kalamazoo City, Michigan, 2000

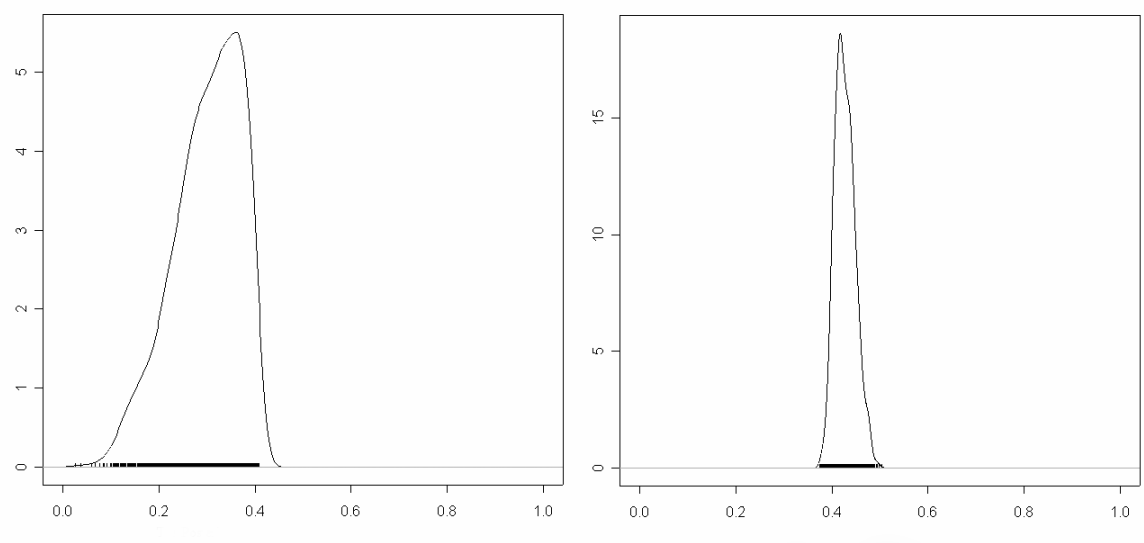

FIGURE 2. Trace of Simulated Values of Lower Class and Non-Lower Class Turnout: Kalamazoo City, Michigan, 2000

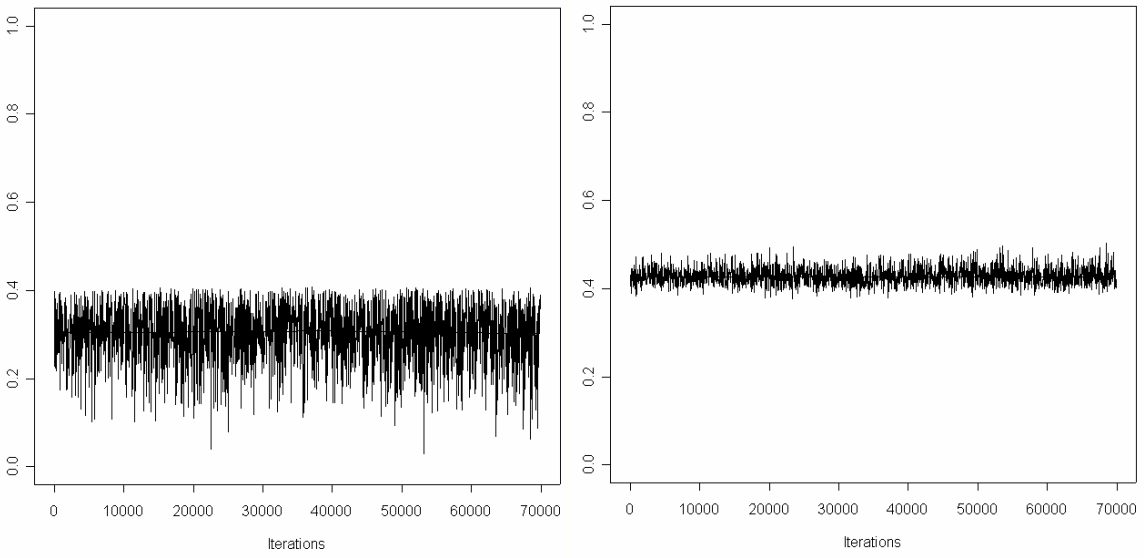

FIGURE 3. Posterior Autocorrelation, Non-Lower Class and Lower Class Turnout: Kalamazoo City, Michigan, 2000

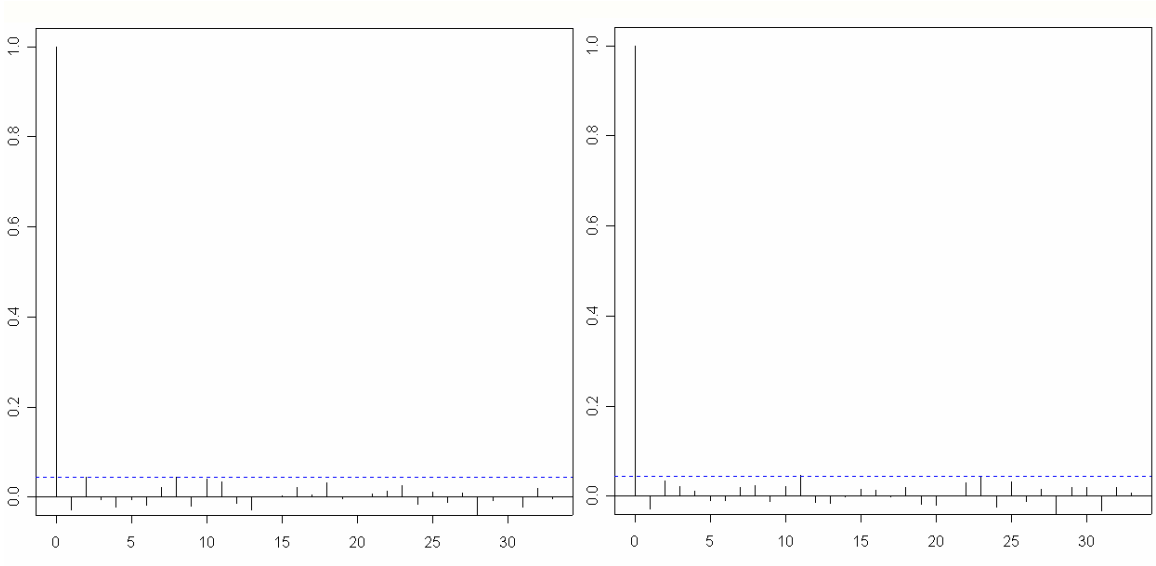

FIGURE 4. Probability of a Vote by the Unemployment Rate: Minnesota 2000 Presidential Election

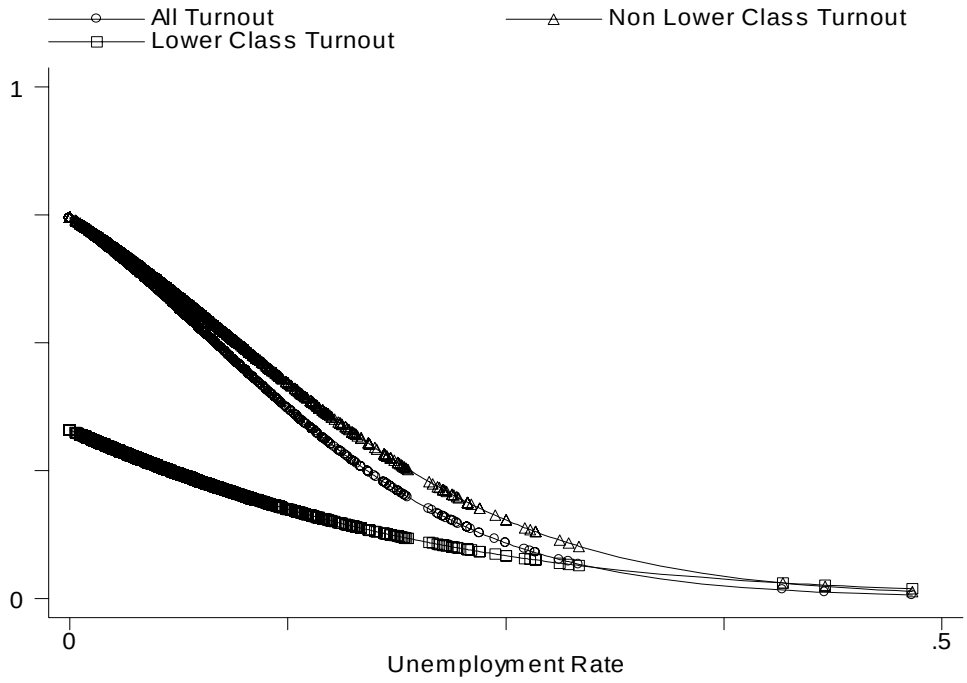

FIGURE 5. Probability of a Vote by the Unemployment Rate: Michigan 2000 Presidential Election

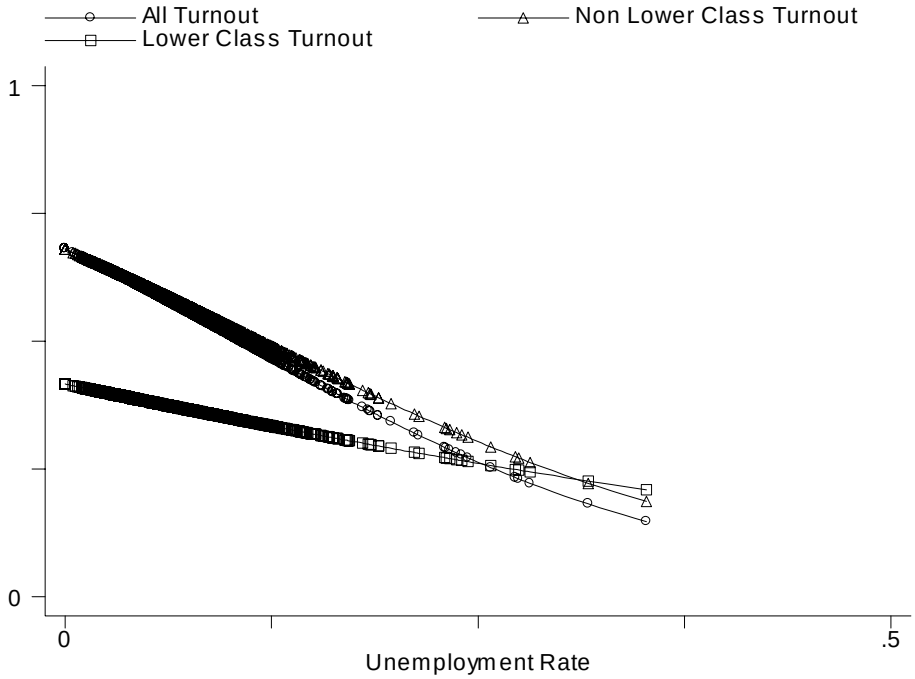

FIGURE 6. Probability of a Vote by the Unemployment Rate New York 2000 Presidential Election

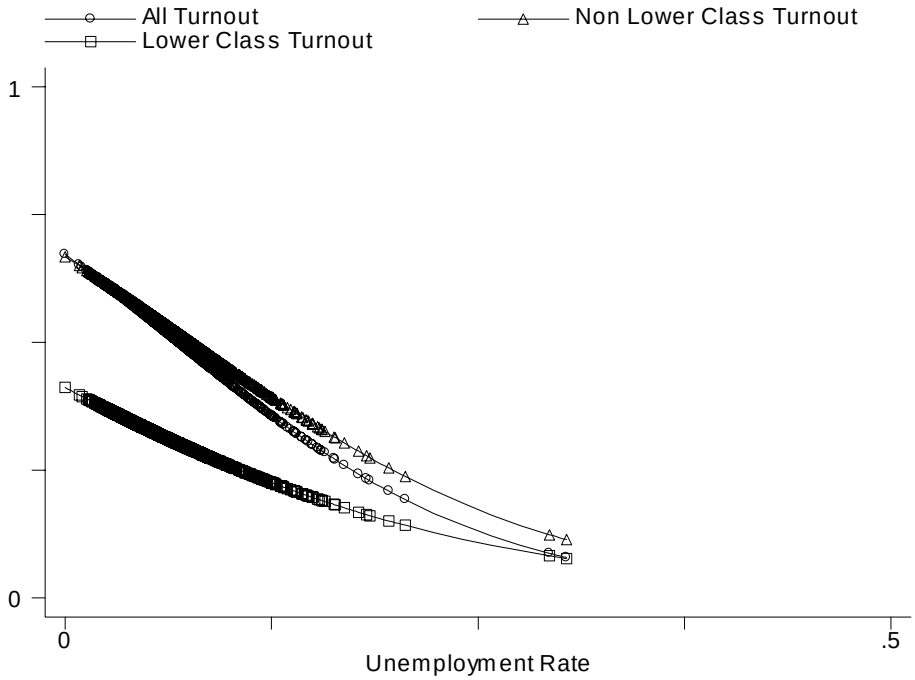

FIGURE 7. Probability of a Vote by the Unemployment Rate
California 2000 Presidential Election