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# A COST BENEFIT ANALYSIS OF VOTING

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## Abstract

This study empirically estimates the determinants of aggregate voter participation rates between 1960 and 1996 using instrumental variables. Other things equal, an increase in the public's dissatisfaction with politicians decreases voter participation, an increase in the highest marginal tax rate increases voter participation, and Watergate had a sustained negative effect on voter participation.

## Introduction

Since Downs (1957) introduced the idea of the rational voter there have been numerous empirical studies to test the construct. Typically, these studies have employed cross-section data to ascertain the predictive ability of various demographic and election-specific variables on the probability of voter participation (Brazel and Shapiro, 1994; Green and Shapiro, 1994; Lapp, 1999; and Green and Nikolaw, 1999).

This investigation seeks to provide an additional dimension to the empirical study of voter participation rates. Namely the purpose of this study is to empirically investigate the determinants of aggregate voter participation rates over time. The present study includes the use of a dissatisfaction index and the use of aggregated time series data. The dissatisfaction index is constructed as an equally weighted average of three normalized indices reflecting responses to the University of Michigan's Institute for Social Research (ISR) surveys concerning whether government wastes tax dollars. Values for this index lie within a range of negative 1.5, which corresponds to least dissatisfied, to positive 1.5 which corresponds to most dissatisfied. Thus, the higher the value of this index, the higher the public's dissatisfaction with government. The voter dissatisfaction index potentially allows for the measurement of voter attitudes toward government and potentially proxies for voter beliefs regarding the importance and effectiveness of their votes. The time series framework also includes other variables that are expected to affect voter participation rates through time.

## A Simple Rational Voter Model of Participation

The original rational choice model calculated the rewards to voting,  $R$ , as

$$R = P \cdot B - C, \tag{1}$$

where  $P$  is probability of the supported candidate winning,  $B$  is the net benefit between the preferred candidate's winning and the opposing candidate's winning, and  $C$  is the cost of voting (Downs, 1957; Riker and Ordeshook, 1968).

The purpose here is to use the rational voter theory as a basis to test changes in voter participation using a time series model employing national data from 1960 to 1996. Consequently, we formulate the determinants of P and B into a general model and derive the expected signs. The determinants of benefits are

$$B = f(I, CH, D) \quad (2)$$

where I is the importance of the office for which the election is being held, CH is the desire for change and a proxy for the distance between two candidates on identifiable issues, and D is the voter's evaluation of the political system's functioning efficacy:  $BI > 0$ ,  $BCH > 0$ , and  $BD < 0$ .

Combining equations 2 and 3 into 1 yields,

$$R = P * B(I, CH, D) - C \quad (3)$$

First derivatives for each argument in equation (3) are  $RBI > 0$ ,  $RCCH > 0$ ,  $RBD < 0$ . Thus, we expect that the importance of the election and the perceived difference in benefits between the candidates will both increase voter turnout, while reduced confidence in the system or increased dissatisfaction with governmental efficacy will reduce voter participation.

### **Data, Empirical Model and Results**

Since presidential elections offer an opportunity to vote for an important policy maker in conjunction with other elected offices, in presidential election years the benefits of voting are presumably increased. Thus the expected net benefits from voting presumably rise during presidential election years (PRESUMt). This is because the marginal cost of voting for President are effectively zero for anyone who has already appeared to cast a ballot whereas the perceived benefits from voting for President are larger to the extent that one believes that one has a potential (however minute) impact on the election to the most important political office in the world.

Dissatisfaction or reduced confidence in the operation of government will result in declining perceived benefits of voting. The perception that a candidate will be unresponsive or ineffectual in pursuing favored policies reduces the perceived benefits of voting. Watergate (WATERGATE) may have engendered such cynicism among the voting eligible population that they perceived diminished value in making the effort to elect officials who were likely to be unresponsive or ineffectual. Indeed, the Watergate scandal may have created an increased expectation among potential voters of "betrayal" by politicians in general.

An additional measurement of the public's dissatisfaction (DIS) with (or distrust of) government is included in the model to systematically measure voter dissatisfaction with government officials (elected or not) over the entire test period. Again, increased dissatisfaction with government performance arguably will reduce the perceived benefits of voting and hence reduce voter participation.

Finally, since higher federal income tax rates reduce disposable real incomes and have numerous negative consequences for individuals and the aggregate economy, higher income tax rates will magnify voting benefits.

Based on the above framework, the model of voter participation rates involves estimating the following reduced-form equation:

$$VPRT = \alpha_0 + \beta_1 PRESUM_t + \beta_2 MAXTAX_{t-1} + \beta_3 WATERGATE_t + \beta_5 TREND + \epsilon_t \quad (4)$$

where:

VPRT = the voter participation rate in year t, as a percent;

$\alpha_0$  = constant term;

PRESUM<sub>t</sub> = 1 during presidential election years and 0 otherwise;

MAXTAX<sub>t-1</sub> = the maximum marginal federal personal income tax rate in year t-1, as a percent;

WATERGATE<sub>t</sub> = 1 for years after the Watergate scandal and = 0 otherwise;

DIS<sub>t</sub> = the level of the public's dissatisfaction with government over year t, as measured by the dissatisfaction index, ranging from -1.5 for least dissatisfied to +1.5 for most dissatisfied;

TREND = a linear trend;

$\epsilon_t$  = stochastic error term;

The study period runs from 1960 through 1996. The VPR, is measured for even numbered years. This is because even numbered years are when all members of the House and one-third of the U.S. Senate are elected and, on alternate even numbered years when the President is elected. The odd numbered years typically do not correspond to the election of "significant" officials. The VPR, data were obtained from IDEA: Voter Turnout from 1945 to 1997(1999). The variable DIS, is represented by the "dissatisfaction" index. The data for the maximum marginal federal personal income tax (MAXTAX) variable, which is used as a measure of the progressivity of the federal personal income tax rate schedule, are obtained from <http://www.taxpolicycenter.org/TaxFacts/individual/schedule.cfm>.

The ADF (Augmented Dickey-Fuller) and P-P (Phillips-Perron) tests both confirm that the variable VPRT is stationary in levels with a trend variable and that variables MAXTAX<sub>t-1</sub> and DIS<sub>t</sub> are stationary only in first differences. Hence, in the estimation provided below, a trend (TREND) is included, and the variables MAXTAX<sub>t-1</sub> and DIS<sub>t</sub> are expressed in first differences.

Given that VPRT is contemporaneous with the dissatisfaction index DIS<sub>t</sub>, the possibility of simultaneity bias exists. To account for this possibility, the model in equation (5) was estimated using an instrumental variables (IV) technique, with the instrument being the two year lag of the inflation rate of the PPI for total finished goods, i.e., PPINF<sub>t-2</sub>. The choice of instrument was based on the finding that DIS<sub>t</sub> and PPINF<sub>t-2</sub> are highly correlated whereas the two period lagged instrument is not contemporaneous with the error terms in the system. The PPINF<sub>t-2</sub> data were obtained from the Council of Economic Advisors (1999, Table B-68; 1995, B-67).

Estimating equation (4) by IV, using the White (1980) heteroskedasticity correction yields:

$$VPRT = 49.16 + 14.21 PRESUM_t + 0.072 zMAXTAX_{t-1} - 7.48 WATERGATE_t - 3.7 zDIS_t - 0.26 TREND$$

(23.65)                      (1.84)                      (-7.04)                      (-2.83)      (-2.23)

$$DW = 1.88, Rho = -0.03, F = 102.5 \quad (5)$$

where terms in parentheses are t-values and z is the first differences operator.

In equation (5), all four of the estimated coefficients exhibit the expected signs and are statistically significant at the ten percent level or beyond. The D-W and Rho statistics indicate the absence of serial correlation.

The coefficient on variable PRESUMt is positive and significant at the one percent level. This confirms that voters increase participation rates when the outcome of the election is considered more important. The coefficient on the variable WATERGATet is negative and statistically significant at the one percent level. Arguably, the Watergate scandal acted to raise voter apathy, perhaps because the scandal discouraged the public who had thought they had been empowered by the act of voting when in fact their voting efforts were rewarded with betrayal. The coefficient on the variable DIS is also negative, as expected, and significant at the two percent level, implying that the more dissatisfied the voting eligible population is with government and the performance of government officials, the more discouraged from participation in the voting process they become. Like the Watergate variable, the DIS variable reflects disillusionment with the system. The coefficient on the tax rate variable is positive but significant at only the nine percent level, so that there is only very modest evidence that this tax rate variable (as a proxy for personal federal income tax progressivity) raises voter participation.

The coefficient on the trend variable, which had been included in order to ensure that the VPR variable would be stationary, is negative and significant at the five percent level. This finding presumably reflects the often made observation that there has been a general long term downward trend in voter participation in the United States.

### **Summary and Conclusions**

The purpose of this study was to throw some light on how the degree to which time variation in voter participation could be explained. The aggregate voter participation rate appears to be positively and significantly affected by the opportunity to vote in Presidential elections. Alternatively, the Watergate scandal and increased public dissatisfaction with government appear to have significantly discouraged voter participation. In addition, there is modest evidence that the maximum marginal federal personal income tax rate, as a measure of federal personal income tax progressivity, affects voter participation positively. Finally, there is evidence of a long-term downward trend in aggregate voter participation rates during the period under study.

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