Economic Retrospection and the Calculus of Voting

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Despite the plethora of studies demonstrating that economic perceptions affect *how* a person votes, relatively little is known about how these perceptions affect *whether* individuals will vote. Using the calculus of voting as our starting point, we develop a simple, but novel, hypothesis regarding the influence of sociotropic evaluations on voter turnout. We argue that this relationship will be curvilinear, with particularly negative and particularly positive evaluations of the economy increasing the likelihood of voting. Using an instrumental variables approach with individual-level data from the eight most recent U.S. presidential elections, we find that economic evaluations affect the decision to vote in the curvilinear manner hypothesized, but—counter to existing theory—only when there is not an incumbent president seeking reelection.

Beginning with Kramer's (1971) pioneering work, a voluminous literature has arisen demonstrating the influence of economics on electoral choice (e.g., Gomez and Wilson 2001; Lewis-Beck and Paldam 2000; Markus 1988). A broad consensus exists that self-reported retrospective evaluations of the national economy are a robust predictor of individuals' votes (Lewis-Beck and Paldam 2000). Thus, voters tend to be "sociotropic" in their outlook, giving the economic performance of the nation more weight in their voting decisions than their personal financial situation (Kinder and Kiewiet 1981). When the national economy has improved, voters are more likely to vote for an incumbent candidate or party. When a worsening economy is perceived, voters reject the incumbent.

Yet, despite the plethora of studies demonstrating that economic perceptions affect *how* a person votes, we know relatively little about how sociotropic evaluations affect *whether* an individual will vote. Our lack of knowledge regarding the connection between economic evaluations and voter turnout is unfortunate, given the possibility that the state of the economy could affect electoral outcomes and accountability in two ways: by altering vote choices and mobilizing voters. Indeed, these alternative routes of economic influence suggest a more nuanced view of electoral accountability, telling us not only whether voters pass judgment for economic variability but also which voters sit in judgment. Compounding the issue, the sparse literature on the effect of the economy on voter turnout is beset by theoretical disagreement over the mechanism by which the phenomena are related, contradictory hypotheses, and a failure to demonstrate empirically any consistent causal relationship. Some scholars show a positive relationship between economic perceptions and voter turnout, while others find a negative one, and still others no relationship at all.

In this paper, we examine the causal relationship between individual-level perceptions of the economy and the decision to turn out to vote. Using the utility model famously known as the calculus of voting (Downs 1957; Riker and Ordeshook 1968) as our starting point, we develop a simple, yet—to our knowledge—novel, hypothesis regarding the influence of sociotropic evaluations on voter turnout. We argue that this relationship will be curvilinear, with particularly negative and particularly positive evaluations of the economy increasing the likelihood of voting. To the extent that voters are retrospective and sociotropic, the utility of voting ought to be at its highest when the incumbent party or candidate is most deserving of reward or punishment, all else equal. There is less incentive for a potential retrospective voter to turn out on election day if that voter believes the economy is neither improving nor worsening.

Using individual-level data from the American National Elections Studies, we examine the effect of sociotropic evaluations on individuals' decisions to vote in eight recent U.S. presidential elections. Suspecting that voter perceptions of economic conditions are likely endogenous with voting, we employ an instrumental variables approach in which we leverage objective county-level economic indicators as instruments for individuals' subjective evaluations of the national economy. We find that the decision to vote is affected by these evaluations in the curvilinear manner hypothesized, but, counter to existing theory and evidence, voters are mobilized only when there is *not* an incumbent seeking reelection. Sociotropic evaluations have no *exogenous* effect on turnout decisions when there is an incumbent president on the ballot. This pattern of results is robust and comports with recent findings by Hansford and Gomez (2011) in their assessment of retrospective voting amongst those who do turn out. It thus appears that retrospective considerations influence both the decision to vote and for whom to vote when neither presidential candidate is the incumbent. These results also join a growing chorus of

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scholars who have shown that endogeneity may significantly cloud the relationship between economic evaluations and voting behavior. We conclude the paper with a discussion of the importance of this result for our understanding of economic voting, voter turnout, and the calculus of voting.

Economic Variables and Voter Turnout

Existing studies of how economic conditions affect voter participation are framed mainly by the work of Rosenstone (1982), who articulates and tests three competing hypotheses: that economically-stressed citizens turn out to vote so as to voice their grievances ("mobilization"), that economically-stressed citizens do not vote because they are too preoccupied to pay attention to politics ("withdrawal"), and that voters see no appreciable link between economic conditions and their political participation ("no effect"). Rosenstone finds weak evidence in support of the withdrawal hypothesis, a result corroborated by others drawing on data from both the U.S. and abroad (Caldeira, Patterson, and Markko 1985; Pacek 1994). Other research, however, demonstrates mobilization in response to poor economic circumstances (Schlozman and Verba 1979), though mobilization may be conditional on contextual or psychological factors (Arceneaux 2003; Radcliff 1992). The empirical picture is further muddled when one considers the ample evidence in support of the third hypothesis predicting that economic considerations have no effect on turnout decisions (Arcelus and Meltzer 1975; Fiorina 1978).

The failure of this literature to converge upon a clear result is likely due to three issues. Many of the studies on economic considerations and voter turnout were published before the literature on economic voting sorted out the economic variables that do the best job of explaining vote choice. A consensus has emerged that retrospective sociotropic evaluations of the national economy are the strongest economic predictor of vote choice (see Lewis and Stegmaier 2000).

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However, scholars examining economic influences on turnout typically test the effect of personal (or egocentric) economic circumstances (e.g., employment status or subjective "pocketbook evaluations") on the decision to vote (e.g., Arceneaux 2003; Fiorina 1978; Rosenstone 1982).[1] Thus the first problem running through much of the literature on economic influences on turnout is a theoretical inconsistency between these turnout models and widely accepted economic models of vote choice. To the extent that intended vote choice ought to influence an individual's decision to vote in the first place, this theoretical disjuncture is problematic.

The second problem with testing the effect of personal economic circumstances on voter turnout is that it is difficult to disentangle the countervailing influences of this type of variable. Some argue that negative pocketbook evaluations, for instance, should mobilize voters. Yet this is at theoretical odds with evidence showing that lower socioeconomic status lowers one's ability to bear or minimize the costs of voting (e.g., Leighley and Nagler 1992; Wolfinger and Rosenstone 1980). The potential for these countervailing effects makes it difficult to interpret the meaning of the null findings often seen in existing models. Does a null finding represent an unwillingness of citizens to turn out and vote in order to punish incumbents who have made them less well-off? Or, are mobilizing effects difficult to observe because worsening personal financial conditions simultaneously make it less feasible for voters to meet the cost of voting?

Third, many of these studies rely on respondents' self-reported evaluations of their personal economic situations (e.g., Arceneaux 2003; Fiorina 1978; Killian, Schoen, and Dusso 2008; Rosenstone 1982). Recent studies suggest that subjective evaluations of the national economy are endogenous to vote choice (e.g., Evans and Anderson 2006). It is entirely possible

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[1] Killian, Schoen, and Dusso (2008) are an exception here, as they examine the interaction between pocketbook and sociotropic evaluations.

that personal evaluations are also endogenous to the decision to vote and thus estimates of the effect of these evaluations may be biased. In sum, there is no consistent empirical or theoretical picture of how or whether economic conditions affect voter turnout. As noted by one author, "[t]he most striking aspect of the literature may be its inconsistency" (Radcliff 1992, 444).

Incorporating Economic Retrospection into the Calculus of Voting

The calculus of voting focuses on the utility of voting and is often relied upon when developing models of voter turnout (Downs 1957; Riker and Ordeshook 1968). Studies of voting behavior point to the importance of sociotropic economic evaluations in determining the candidate or party for whom a voter casts a ballot. Yet, remarkably, the research on economics and turnout has done little to connect these two theoretical paradigms. This is an unfortunate oversight, especially since the calculus of voting tells us a great deal about how individuals incorporate the costs and benefits (both instrumental and expressive if one adopts the Riker and Ordeshook addendum) of voting into the decisions of voters.[2]

In its full form, the Downsian (1957) calculus of voting expresses a voter's decision rule for voting as $R = PB - C + D$, where R is the net rewards from voting (the voter turns out if $R > 1$ and abstains if $R \leq 0$), P is the probability that one's marginal contribution to the election is decisive, B is the individual's instrumental benefits if participation is successful (e.g., the voter's preferred candidate wins), C is the cost of voting (informational, opportunity, etc.), and D, added by Riker and Ordeshook (1968), is the expressive benefit one receives from voting. As argued above, research on economics and turnout has not disentangled the potentially countervailing influences of *personal* economic circumstances, which could arguable play into the B, C, and D

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[2] Numerous studies provide strong support for the notion that turnout is affected by variation in the costs and benefits of voting (e.g., Jackman 1987; Rosenstone and Wolfinger 1978).

terms. We focus instead on examining how *sociotropic* economic retrospection enters the turnout calculus. This allows us to treat the C term as constant, since it is unaffected by evaluations of the state of the national economy. It also has the benefit of tightly linking our turnout argument with the current understanding of how economics factors into the choice of for whom to vote. We will, however, control for indicators of an individual's personal economic circumstances when estimating our turnout model.

Starting with Downs (1957), B has been conceptualized in terms of how much the voter prefers one candidate to another. In spatial parlance, B increases with the difference between the ideological distance between the voter and the closer candidate and the distance between the voter and the farther candidate. This conception of the instrumental benefits of voting is thus dependent upon the ideological locations of the candidates. D, on the other hand, contains the expressive benefits of voting, such as performing one's civic duty, which could be viewed as being fairly constant for a given voter over time or over elections.

We argue that retrospective economic evaluations may affect both B and D for a given eligible voter in a given election. For a retrospective voter, the instrumental benefit derived from voting depends on the performance of the incumbent president/party. If the retrospective voter believes the national economy is in a poor state, then there is likely to be a greater instrumental benefit associated with voting out the incumbent president/party. Conversely, if the retrospective voter believes the economy is doing very well, then there likely is an instrumental benefit to keeping the incumbent president/party in office. There is little retrospective benefit, however, to voting for or against the incumbent when the state of the national economy is perceived by the voter as not having changed. While the importance of the B term in the calculus of voting is

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diminished greatly by the miniscule objective probability (P) of the voter casting a decisive vote, individuals can greatly overestimate the marginal contribution of their votes (Darmofal 2010).

Assuming a voter's subjective estimate of P is distinguishable from zero, utility-maximizers are more likely to vote as their instrumental benefits increase. We argue that B will increase as a voter views the economy as becoming increasingly good or bad, thus increasing the probability of voting. A view of the economy as neither improving nor worsening is unlikely to affect B. Thus, the retrospective contribution to B implies a non-linear, concave-upward relationship between a voter's perception of the economy and their likelihood of voting.

Retrospective economic evaluations could also affect the D term, which consists of the expressive benefits of voting. While scholars typically view the expressive benefits of voting as consisting of considerations such as complying with civic duty (Riker and Ordeshook 1968), expressive benefits could also result from expressing one's endorsement or rejection of the government's economic performance. Importantly, a retrospective economic component of D for a given voter will vary from election to election, while other components of D should not fluctuate much. Unlike notions of civic responsibility, for instance, the retrospective component could help explain why a particular voter turns out for some elections but not others.

As with instrumental benefits, expressive benefits will be greatest when a voter perceives that the economy is very strong or very weak. In the former case, voting for the incumbent candidate/party allows the opportunity to express an endorsement of positive status quo. In the latter, the act of voting allows for an expression of disapproval of the status quo. Yet, if the voter perceives that the economy has neither improved nor worsened under the incumbent, there is very little expressive benefit, in retrospective terms, to voting either for or against the incumbent.

Thus, the retrospective contribution to *D* also suggests a non-linear, concave-upward relationship between a voter's perception of the state the economy and their likelihood of turning out to vote.

In sum, to the extent that retrospective sociotropic evaluations influence vote choice, they should also influence the initial decision to turn out. These evaluations contribute to both the instrumental and expressive benefits accrued in the voting calculus, and as either type of benefit increases an eligible voter should become more likely to choose to vote. The solid curve in Figure 1 depicts a retrospective voter's theorized utility of voting. We expect the relationship between retrospective evaluations and the probability of voting to be nonlinear, with perceptions of either a notably poor or notably strong economy increasing the likelihood of voting. This curvilinear relationship dictates that the slope/effect of retrospective evaluations will depend on the value of retrospective evaluations under consideration. For poor evaluations, the slope of the effect of these evaluations will be negative; for good evaluations, the slope will be positive.

[FIGURE 1 HERE]

The argument we have made thus far is simple; to the extent that vote choice is based on economic sociotropic retrospection, the decision to vote in the first place will be affected in a curvilinear manner by this form of retrospection. We now need to consider two potential complications to our simple hypothesis. First, considerable evidence suggests that retrospective voting may be most prevalent in elections with an incumbent candidate (Miller and Wattenberg 1985; Nadeau and Lewis-Beck 2001; Norpoth 2002). If this is indeed the case, then contribution of retrospective evaluations to the calculus of voting should likewise be stronger when there is an incumbent seeking reelection. Recent work by Hansford and Gomez (2011), however, suggests that greater levels of economic voting when an incumbent is on the ballot may be a product of endogeneity bias—suggesting that voters cannot easily separate their evaluations of the economy

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from their feelings toward the incumbent. Indeed, they find that once endogeneity is accounted for economic voting for incumbent candidates is effectively absent. To account for these possibilities, we will allow for a conditioning effect for the presence of an incumbent candidate when we estimate our turnout models; we will also attempt to account for possible endogeneity.

A second complication to consider is whether retrospective contributions to the B and D terms of the calculus of voting are symmetrical, meaning that voters are equally affected by both positive and negative economic evaluations. Symmetry is a reasonable assumption for the retrospective component of the instrumental benefits (B), but it is plausible that there is an asymmetry to a retrospective voter's expressive benefits (D). The expressive benefits that voters derive from rewarding an incumbent for positive economic conditions may not be as great as those accrued from expressing discontent (Radcliff 1994). Research in attribution psychology has long noted a "negativity bias" in how individuals evaluate (and respond behaviorally to) negative circumstances (see Hewstone 1989 for an overview). Individuals tend to assign more weight to negative information than positive information and this typically results in an increased propensity for individuals to express blame versus credit (e.g., Baumeister, et al. 2001). Given this tendency, voters on average may gain greater expressive benefits from blaming incumbents for poor economic performance than from crediting them for positive economic gains.

Combining the instrumental and expressive components of the utility of voting could thus lead to the asymmetric function such as the one depicted with the dashed line in Figure 1. This asymmetric utility function would then mean that particularly poor evaluations should lead to a greater probability of voting then particularly positive evaluations, all else equal. We will explore this possibility when empirically testing our primary hypothesis—that people are least

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likely to vote when the economy is perceived as neutral and are more likely to vote when the economy is perceived as either increasingly good or increasingly bad.

Data and Methods

We utilize individual-level data from the Cumulative Data File of the American National Election Study to test our hypothesis regarding the effect of sociotropic evaluations on voter turnout.[3] While these data contain survey information for elections dating back to 1948, 1980 was the first year in which the retrospective sociotropic question was asked. Our study thus includes data from the 1980 through 2008 U.S. presidential elections.[4] Our dependent variable, *Turnout*, is coded 1 if the respondent reported voting and 0 if abstaining.

Our main independent variable is *Sociotropic Evaluation*, which the ANES measures on a five-point scale ranging from the respondent reporting that the national economy is now much worse (-2) to much better (2). We hypothesize that *Sociotropic Evaluation* will have a curvilinear effect on the probability of voting, and the simplest way to test this hypothesis is to include the square of this variable in our model. While a quadratic function is by definition

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[3] The 1948-2008 ANES Cumulative Data File was produced and distributed by Stanford University and the University of Michigan, 2005. These materials are based on work supported by the National Science Foundation under Grant Nos.: SBR-9707741, SBR-9317631, SES-9209410, SES-9009379, SES-8808361, SES-8341310, SES-8207580, and SOC77-08885. Any opinions, findings and conclusions or recommendations expressed in this paper are those of the authors and do not necessarily reflect the views of the ANES or its funding organizations.

[4] The respondent's county of residence is required for the creation of our instrument of the respondent's sociotropic evaluation but is only publicly available through 1996. For more recent elections, we obtained this information after filing an ANES Restricted Data Access Application.

symmetrical over an infinite range of an independent variable, *Sociotropic Evaluation* is limited in its range and this allows the location of the minimum to reveal an asymmetric effect on *Turnout*. As discussed in more detail below, we also explore a more flexible specification of the functional form of the relationship between *Sociotropic Evaluation* and *Turnout*.

As explained above, we also allow the effect of *Sociotropic Evaluation* to vary according to whether there is an incumbent president seeking reelection. To do so, we interact *Sociotropic Evaluation* and its square with *Incumbent*, which equals one if the incumbent president is on the ballot.[5] We therefore want to estimate the following model:

$$Pr(Turnout) = F\{b_1 \text{Sociotropic Evaluation} + b_2 \text{Sociotropic Evaluation}^2 +$$

$$b_3(\text{Sociotropic Evaluation} \times \text{Incumbent}) + b_4(\text{Sociotropic Evaluation}^2 \times$$

$$\text{Incumbent}) + Xb + e\},$$

in which *Xb* are control variables and their coefficients and *e* is the error term. We expect b_2 to be positive, which would indicate that high and low values of *Sociotropic Evaluation* increase the probability of voting.

While our theory suggests no explicit expectations regarding b_1 and b_3, we estimate these parameters so as to allow for greater flexibility in the functional form of the relationship between *Sociotropic Evaluation* and *Turnout*. Specifically, estimating these parameters allows for the type of asymmetric effect discussed above. It is also the case that by estimating b_1 and b_3 we allow for alternative hypotheses inferred from the extant literature on economics and turnout. The mobilization hypothesis, for instance, suggests that b_1 will be negative (the worse the respondent's perception of the economy, the more likely they are to vote) while the withdrawal

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[5] Because we include election fixed effects, we do not include *Incumbent* separately in our models. Any "main effect" for *Incumbent* is absorbed by these fixed effects.

hypothesis implies that b_1 should be positive (the worse the respondent's perception of the economy, the less likely they are to vote). It is not clear that either of these alternative hypotheses have implications for b_3.

In keeping with traditional models of turnout (e.g., Verba and Nie 1972; Rosenstone and Hansen 1993; Wolfinger and Rosenstone 1980), we include the following individual-level control variables in our model: *Female*, *Black*, *Latino*, *Asian*, *Age*, *Age^2*, *Education*, *Income*, *Unemployed*, *Married*, *Union Member*, *Religiosity*, *Strength of Party ID*, and *Party Contact*.[6] We also include *Registration Closing Date*, which is known to affect turnout (Highton 2004).[7]

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[6] *Female*, *Black*, *Latino*, *Asian*, *Unemployed*, *Married*, *Union Member*, and *Party Contact* are dummy variables. *Age* is measured in years. *Education* is a seven-category ordinal scale of the respondents' self-reported educational attainment. *Income* is a five-point ordinal scale indicating the respondent's family income percentile at the time of the survey, where the categories are 0-16, 17-33, 34-67, 68-95, and 96-100. Roughly 7.5% of the income percentile data were missing and thus imputed—details are available from the authors. *Religiosity* is a composite of three ANES variables (VCF0130, VCF0130a, and VCF0131) that measure respondents' church attendance. The three variables, which ANES used at different points in time, were collapsed into four temporally consistent categories. *Strength of Party ID* is generated by folding the seven-point party ID scale so that larger values represent stronger partisan identification.

[7] *Registration Closing Date* is measured as the number of days between the last day to register to vote and election day.

To control for all election-specific considerations we include election fixed effects, meaning that dummy variables are included for all elections except for 1980 (which serves as the baseline).[8]

The main issue we confront when estimating our model of turnout is that it is likely that *Sociotropic Evaluation* cannot be considered exogenous to political behavior such as voting (Evans and Anderson 2006). Partisanship affects how people assess the state of the economy (Duch, Palmer, and Anderson 2000), and strong partisans are likely to both report extreme economic evaluations and to vote. It may also be the case that particularly expressive people are simultaneously more likely to report strong opinions about the economy and engage in political activity. Either source of endogeneity might bias our results in the direction of providing false support for our central hypothesis. Alternatively, it is possible that *Sociotropic Evaluation* is contaminated by a respondent's personal economic circumstances and any apparent affect associated with *Sociotropic Evaluation* might be driven by this contamination. Regardless of the precise source of the bias, to the extent that endogeneity is present we cannot properly make causal inferences about the effect of *Sociotropic Evaluation* on the vote decision.

To address the issue of endogeneity, we use an instrumental variables (IV) approach. We thus need instruments for *Sociotropic Evaluation* that are exogenous to turnout decisions and

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[8] The set of control variables excludes psychological correlates of turnout, such as trust in government and external efficacy, because they may be endogenous to *Sociotropic Evaluation*, making their inclusion in the first-stage model problematic. In addition, the inclusion of the ANES trust and external efficacy variables causes a loss of more than 1,000 observations. The inclusion of these two variables in the models reported in Table 1 does not change any inferences about the effect of *Sociotropic Evaluation* on turnout, with the exception that the estimate for (*Sociotropic Evaluation*)$^2 \times$ *Incumbent* is statistically significant in the OLS model (Model 1.2).

successfully predict these evaluations. Objective local economic conditions should satisfy both of these criteria. Specifically, we use *Δ County Income* and *Δ County Unemployment* as instruments for an individual's *Sociotropic Evaluation*. The first of these two instruments is measured as the change in the inflation-adjusted median income in the respondent's county of residence since the last presidential election (in $1,000s). The second is measured as the change in the unemployment rate in the respondent's home county since the last presidential election.[9]

Objective local economic conditions are a highly attractive instrument for individuals' perceptions of national economic conditions. First, because these variables measure changes in *objective* conditions, they are clearly exogenous to an individual's decision to vote. Indeed, it is impractical to think that an individual's decision to turn out during election *t* caused objective economic changes in the individual's county of residence during the preceding period, *t-(t-1)*. Temporal priority is thus established. Second, objective information has been shown to be a useful instrument for subjective perceptions (e.g. Ansolabehere and Jones 2010). Unlike survey respondents' self-reported perceptions of the national economy, *Δ County Income* and *Δ County Unemployment* is not contaminated by the individual's partisanship, perceptions of personal

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[9] County-level unemployment data were provided by the Bureau of Labor Statistics (BLS). The BLS provides "official" civilian labor force data from 1990 to 2009 online at the U.S. Census Bureau's "USA Counties" website (http://censtas.census.gov/usa/usa.shtml). Data from 1976 to 1989 are deemed "unofficial" because they were estimated under an alternative methodological strategy. These data are available for purchase from the BLS. Our analyses show no discernible structural break in the estimates due to BLS's methodological changes. County-level per capita personal income data were provided by the Bureau of Economic Analysis (http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=5).

economic circumstances, or any other individual-level factor that might also correlate with voting. Yet it makes theoretical sense for voters to use local, tangible, and accessible economic information to make inferences about the state of the national economy. Cognitive psychology, for instance, points to the importance of the "availability heuristic," which is a tendency for people to use readily available information to make inferences about distant phenomena (see Nisbett and Ross 1980, 18-23). Books and Prysby (1991, 146) also make this argument and claim that assessments of the national economy are influenced by perceptions of the local economy. Finally, local economic conditions are an attractive instrument because they vary considerably for any given presidential election, offering leverage for explaining the variation in individual-level assessments of the national economy for a particular election. Objective national economic conditions, which are fixed at any point in time, cannot explain this variation.

Our county-level economic variables also meet the so-called exclusion restriction (Angrist, Imbens, and Rubin 1996). For an IV model to estimate the causal effect of an endogenous variable on a dependent variable, the instruments for the endogenous variable must only affect the dependent variable *through* the endogenous variable. Thus, we must ask whether *Δ County Income* and *Δ County Unemployment* have a direct effect on an individual's turnout decision. We think this is theoretically and empirically unlikely. Changes in a county's economy may affect an individual's decision to vote by changing the individual's economic resources, but this indirect effect is accounted for by controlling for the individual's income and employment status in our turnout model. Changes in a county's resources might also affect its election administration—the number of opened voting precincts, early voting centers, etc.—and thus altering the costs of voting. These variations in the cost of voting should affect all individuals in a county equally and can be captured empirically by our inclusion of county-level

fixed effects. With these alternative indirect paths accounted for, we believe the only remaining path of influence for *Δ County Income* and *Δ County Unemployment* on an individual's decision to turn out is through our endogenous variable, the individual's retrospective evaluation of the national economy.

So, do local economic conditions actually predict subjective evaluations of the national economy? To test this, we regressed *Sociotropic Evaluation* on *Δ County Income* and *Δ County Unemployment*, as well as all of the control variables and fixed effects we ultimately include in our model of *Turnout*. This model serves as the first-stage estimation in our IV regression—the results of which are presented in the Supplemental Information (Table S1). The model estimates reveal that both *Δ County Income* and *Δ County Unemployment* are statistically significant predictors of *Sociotropic Evaluation*. While there is no bright line test for determining if a set of instruments have sufficient explanatory power, the *t*-statistics for *Δ County Income* and *Δ County Unemployment* are a relatively impressive 3.6 and -5.6, respectively. Moreover, an *F*-test of their joint significance yields an *F*-statistic of 27.3, well above the econometric literature's admittedly rough rule of thumb ($F \geq 10$) for a set of excluded instruments to yield consistent estimates in the main equation (see Staiger and Stock 1997).

For the above reasons, *Δ County Income* and *Δ County Unemployment* are useful instruments for estimating the effect of *Sociotropic Evaluation* on *Turnout*. We use these instruments, and all of the control variables and fixed effects listed above, to predict *Sociotropic Evaluation*.[10] We then also square these predicted values and use them for (*Sociotropic Evaluation*)^2 in our turnout model. Because we include these generated regressors in our model of turnout, we estimate and present both robust and bootstrapped standard errors (Pagan 1984).

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[10] Again, the details of this first-stage model are presented in the Table S1.

Results

Table 1 presents two sets of results. Model 1.1 is our instrumental variables (IV) model, while Model 1.2 simply uses the "raw," uninstrumented, and likely endogenous version of *Sociotropic Evaluation*. The IV results, of course, are preferable due to the endogeneity of Model 1.2, but we include the latter for purposes of comparison. Though probit is a standard estimator when modeling a binary choice variable such as *Turnout*, Miguel, Satyanath, and Sergenti (2004, 738) contend that the "IV-2SLS method is typically preferred even in cases in which the dependent variable is dichotomous." Accordingly, we use two stage least squares to estimate our IV model. The second stage model can thus be considered a linear probability model. To allow for comparison, Model 1.2 is estimated with OLS.[11] Both models include the host of control variables discussed above, but for the purposes of clarity and simplicity the estimates for these variables are not presented here.[12]

[TABLE 1 HERE]

The positive and statistically significant estimate for (*Sociotropic Evaluation*)[2] in Model 1.1 supports our central claim. Individuals who view the state of the national economy in either strongly positive or strongly negative terms have an increased likelihood of voting. Particularly positive or negative evaluations of the economy increase the probability of turning out, presumably because of the greater benefits associated with either voting against the party of the incumbent president when the economy is bad or voting for the party of the incumbent president when the economy is strong. When the economy is perceived as having neither improved nor declined there is less incentive for the retrospective voter to turn out. The "naive" results of

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[11] The inferences drawn from Model 1.2 do not change if is it estimated as a probit model.

[12] The full model estimates are presented in the Supplemental Information (Tables S2 and S3).

Model 1.2 would lead us to a very different conclusion—that *Sociotropic Evaluation* has no effect, linear or curvilinear, on turnout (e.g., Arcelus and Meltzer 1975; Fiorina 1978).

Interestingly, the estimate for $(Sociotropic\ Evaluation)^2 \times Incumbent$ is negative and statistically significant in Model 1.1, revealing that when there is an incumbent president seeking reelection, the positive, significant effect of $(Sociotropic\ Evaluation)^2$ is no longer present.[13] When a president is seeking reelection, we find no evidence of a retrospective component to the calculus of voting. This suggests that other factors aside from economic perceptions motivate turnout decisions when the incumbent is on the ballot. Undoubtedly, this will strike many as an interesting and perhaps unexpected result. (To be sure, the result is robust to various specifications of the model.) We will elaborate on this finding shortly, but for now it is imperative to present our evidence in the clearest fashion possible.

Given the quadratic specification of our key independent variable and the inclusion of interaction terms, it is useful to plot the conditional marginal effects (i.e., conditional coefficients) and the uncertainty surrounding these effects. Figures 2a plots the effect of *Sociotropic Evaluation* when there is not an incumbent candidate, while Figure 2b plots this effect when there is a president seeking reelection. These estimated marginal effects are based on the IV 2SLS results presented in Model 1.1. The confidence intervals for the conditional marginal effects are also included in these figures.

[FIGURE 2 HERE]

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[13] In the IV 2SLS model, the conditional coefficient or effect for $(Sociotropic\ Evaluation)^2$ is .078 when there is not an incumbent candidate and -.003 when there is an incumbent candidate. The former conditional coefficient is statistically significant while the latter is not. See Brambor, Clark, and Golder (2006) for a discussion of conditional coefficients and standard errors.

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The nonlinear effect of *Sociotropic Evaluation* when there is not an incumbent candidate is revealed in Figure 2a. When a respondent perceives that the economy is much or somewhat worse, the conditional coefficient for *Sociotropic Evaluation* is negative. This means that moving from somewhat negative to very negative evaluations of the economy will increase the probability of voting (as the increasingly negative coefficient reveals that decreasing values of *Sociotropic Evaluation* will raise the likelihood of turning out). The effect of *Sociotropic Evaluation* becomes increasingly positive when the respondents think the economy is improving, revealing that moving from somewhat positive to very positive evaluations of the economy leads to an increase in the probability of voting. In sum, the IV results suggest that the biggest effects occur at the extreme ends of the *Sociotropic Evaluation* scale, just as we predict.

There is an important caveat here, though. While many ANES respondents report that they believe the economy is "much worse," "somewhat worse," "the same," or "somewhat better," very few (only four percent over the eight elections analyzed) report that the economy is "much better." While our instruments for *Sociotropic Evaluation* have a good deal of explanatory power, the first stage of our IV 2SLS does not produce predicted values that correspond with the "much better" response due to the infrequency of this response. The effect of *Sociotropic Evaluation* associated with believing that the economy is much better should thus be treated with caution, as if it were an out-of-sample projection.

Figure 2b reveals the absence of a statistically significant effect for *Sociotropic Evaluation* when there is an incumbent presidential candidate, regardless of the value of this independent variable. The conditional coefficients are all quite close to zero, and zero is in the confidence intervals for all of the coefficients under this condition. Is it surprising that there would be a retrospective component to the calculus of voting when a member of the president's

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party, but not the president himself, is on the ballot? On the one hand, this is a provocative result

given the studies suggesting that retrospective voting is strongest when the president seeks

reelection (e.g., Miller and Wattenberg 1985; Nadeau and Lewis-Beck 2001; Norpoth 2002). On

the other hand, a recent study that is attentive to causal identification only finds individual-level

retrospective voting in elections when the president is not a candidate. Hansford and Gomez

(2011) use an IV approach to reevaluate the sociotropic economic retrospections and individual

vote choice and find that the endogeneity between the two variables is strongest when incumbent

presidents are on the ballot. This suggests that what appears to be economic voting when

incumbents are on the ballot is likely a biased response—one clouded by the individual's affinity

toward the incumbent—rather than an untainted retrospective judgment. Our result here

regarding retrospection and turnout is thus fully consistent with this recent work.[14] The result

also demonstrates the importance of accounting for endogeneity in models that link individuals'

economic retrospections and their voting behavior.

To further illustrate our results, Figure 3 presents predicted probabilities of voting as

generated by Model 1.1. For ease of comparison, we center these predicted probabilities at .5.[15]

Two sets of probabilities are plotted—one for when there is an incumbent and one for when there

is not. The predicted probability of voting does not vary much at all based on *Sociotropic*

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[14] An analysis of the effect of objective national economic conditions over a longer time span

yields results that are consistent with our IV models, providing reassurance that this somewhat

counterintuitive result is not driven by the eight elections under analysis in our IV models. See

the Supplemental Information for this alternative research design and results (Table S5).

[15] This has no implication for the substantive effect sizes displayed, since these predictions are

generated with a 2SLS model instead of a probit model.

Evaluation when there is an incumbent candidate. Yet when there is no incumbent, the probability of voting is highest when the economy is perceived as much better or much worse.

[FIGURE 3 HERE]

In our theory section, we discussed the possibility of a negativity bias in retrospective influence on the calculus of voting. We noted that potential voters may be more motivated to punish when they think the economy is worsening than reward when they think the economy is improving. Figure 3, however, provides no evidence of any negativity bias. Potential voters are not responding more to negative evaluations of the economy than to positive evaluations. If anything, the predicted probabilities might imply that voters are responding more to positive evaluations than to negative ones. But, the above caveat remains in place and the predicted probabilities associated with the upper end of *Sociotropic Evaluation* should be treated with caution. The fainter components of the curves plotted in this figure correspond to the predictions beyond the range of our instrument. If this region of the figure is ignored, then the predicted probabilities for the elections in which there is not an incumbent candidate could be considered consistent with the presence of a negativity bias.

To further assess whether the negative evaluations of the economy might have a greater effect on the decision to vote than positive evaluations, we estimate a second IV 2SLS model in which we adopt a different functional form for *Sociotropic Evaluation*. Instead of using a quadratic specification, we now use a more flexible spline specification that allows the instrumented *Sociotropic Evaluation* to have different slopes for different ranges of values of this variable. After some experimentation, a very simple two-segment spline function appears to be a suitable specification. We locate the "knot" for these two spline segments at -.418 (roughly halfway between the "somewhat worse" and "same" responses), which is the value of

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Sociotropic Evaluation associated with the minimum of the quadratic function in Model 1.1.

Remember that *Sociotropic Evaluation* is instrumented here and thus can take on continuous

values between the original discrete response options. All of the control variables in Model 1.1

are again included and the key results from this estimation are reported in Table 2.[16]

[TABLE 2 HERE]

Sociotropic Evaluation 1 is the first spline segment and its coefficient estimate reveals

the slope for *Sociotropic Evaluation* from its minimum value to the knot. The coefficient for

Sociotropic Evaluation 2 reveals the slope from the knot to its maximum value. Per our

hypothesis, the estimate for the first segment should be negative and the estimate for the second

segment should be positive. This is exactly the pattern we see when there is not an incumbent on

the ballot, though the estimate for *Sociotropic Evaluation 2* is not statistically significant. Again,

the estimates for the interaction terms reveal that *Sociotropic Evaluation* has no effect on the

probability of voting when there is a president seeking reelection. The probability of voting, as

predicted by this model, is graphically depicted in Figure 4.[17]

[FIGURE 4 HERE]

The pattern displayed by these predicted probabilities is fairly similar to that found in the

results generated by our quadratic specification. Here, the slope for *Sociotropic Evaluation* is

steeper for the negative evaluations than for the positive evaluations, when there is not an

incumbent candidate, which again is consistent with the presence of negativity bias. But, while

we can conclude that the slopes of these two spline segments are statistically distinguishable

from one another we cannot formally reject the null hypothesis that the steepness (i.e., the

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[16] The entire set of results is presented in the Supplemental Information (Table S4).

[17] As with Figure 3, we center these predicted probabilities at .5.

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absolute value of the slopes) is the same. In sum, Models 1.1 and 1.2 both suggest that particularly negative and positive evaluations of the economy will increase the likelihood of an individual turning out to vote but only when there is not an incumbent on the ballot. The results under this scenario are also consistent with the presence of a negativity bias that amplifies the importance of negative evaluations, but in this regard our results are less conclusive.

On a final empirical note, the IV estimates presented in Tables 1 and 2 and the graphical illustrations of these results reveal there is no support for either of the main hypotheses found in the extant literature. Perceptions of the state of the economy do not exert a linear influence, either negative (i.e., the mobilization hypothesis) or positive (i.e., the withdrawal hypothesis), on the likelihood of voting. In fact, a researcher who includes solely the linear version of *Sociotropic Evaluation* in a model of vote choice would conclude that there is no relationship between these economic evaluations and turnout.

Conclusion

While a long line of studies confirm the importance of the state of the economy in determining vote choice, there is far less consensus on how economic considerations might affect voter turnout. We develop a theory of economic retrospection and turnout by combining contributions of two distinct paradigms, the calculus of voting and retrospective voting, and argue that to the extent that economic retrospection affects vote choice it should also influence the voter's initial decision to turn out. For retrospective voters, there are both instrumental and expressive benefits to voting when they believe that the economy is either doing very well—and thus they benefit from rewarding the incumbent party or candidate—or very poorly—in which case they benefit from punishing the incumbent party/candidate. We therefore predict a U-shaped relationship between perceptions of the state of the economy and the likelihood of voting.

Using an instrumental variables approach to address potential endogeneity in subjective assessments of the economy, we find empirical support for our hypothesis when the election does not directly involve an incumbent president. The probability of someone turning out to vote increases if their evaluation of the economy is either particularly positive or particularly negative. When the president is seeking reelection, there is no relationship between sociotropic evaluations and the decision to vote. We also provide limited evidence suggesting that negative evaluations may have a greater effect than positive evaluations, which is consistent with research showing that individuals assign more weight to negative information than positive and thus express blame more than credit (e.g., Baumeister, et al. 2001).

The main implication of this analysis is that for a subset of presidential elections economic retrospective considerations may influence individuals' decisions to vote, instead of just affecting the type of votes they cast. Moreover, these economic considerations matter in a different way than previously thought. Instead of having a relatively linear positive or negative effect, as implied by the traditional withdrawal and mobilization hypotheses, economic evaluations have a curvilinear effect on voter turnout, whereby both particularly positive or negative evaluations lead to a greater probability of voting all else equal.

The presence of a retrospective influence on turnout in elections without an incumbent candidate has another interesting implication for the venerable calculus of voting. To the degree that retrospective influence is operating through the D term, it is different from other contributions to this part of the calculus. The D term, which consists of the expressive benefits of voting, is typically thought of as varying systematically across voters, as some voters value democracy (Downs 1957) or feel that voting is a civic duty (Riker and Ordeshook 1968) more than others. An economic retrospective component to the D term should vary from election to

election for a given voter, which then allows this key component of the calculus of voting to provide greater leverage in explaining within-voter variation in turnout.

Finally, the fact that retrospective considerations only influence the decision to vote when there is not an incumbent candidate on the ballot is intriguing, counterintuitive, and at odds with much of the literature on retrospective voting (e.g., Miller and Wattenberg 1985; Nadeau and Lewis-Beck 2001; Norpoth 2002). This result is, however, entirely consistent with what Hansford and Gomez (2011) find when they try to pin down the causal relationship between perceptions of the economy and vote choice. They find evidence of an exogenous retrospective effect on vote choice, but only when there is not an incumbent candidate. The consistency of this result across both the decision to vote and the decision of for whom to vote suggests that economic retrospection, at least in terms of perceptions of the state of the economy, is only operating *exogenously* when neither candidate is the incumbent president.

Why would this be? It could be the case that sociotropic evaluations are particularly endogenous when the president is seeking reelection. In this situation, voters project their overall affinity for or evaluation of the president onto their assessments of the state of the economy. Voters may have a more hardened, more information-saturated (and biased) view of the president, but a more malleable impression of a candidate from the president's party. This overall level of affect for the president may then dominate the vote calculus, leaving little room for any exogenous component of sociotropic evaluations to matter. In the absence of an incumbent on the ballot, voters may find genuine sociotropic evaluations to be a more important information shortcut by which to structure their calculus of voting. These conjectures, of course, are largely speculative at this point, but we hope that they provoke further work on the topic of retrospective economic evaluation and voter turnout. A full determination of why the causal

effects of retrospective evaluations vary based on whether a reelection-seeking president is on the ballot is beyond the scope of this (or, likely, any one) paper.

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TABLE 1. IV Model of the Effect of Subjective Sociotropic Evaluations on the Decision to
Vote (1980-2008), Quadratic Specification.

| Independent Variables	Model 1.1	Model 1.2
Sociotropic Evaluation	.065 (.062) [.062]	.005 (.006)
Sociotropic Evaluation × Incumbent	-.044 (.053) [.051]	.001 (.008)
(Sociotropic Evaluation)^2	.078* (.026) [.025]	-.004 (.004)
(Sociotropic Evaluation)^2 × Incumbent	-.081* (.034) [.034]	.009 (.005)
Sociotropic Evaluation instrumented?	Yes	No
Estimator	IV 2SLS	OLS
N	12,842	12,842

Note: * $p \leq .05$ (two-tailed). For the instrumental variable model, both robust (clustered on
county-election, in parentheses) and bootstrapped standard errors (also clustered on county-
election, in brackets) are presented. For the OLS model, only robust standard errors (clustered
on county-election) are presented. Control variables included in the model are *Female*, *Black*,
Latino, *Asian*, *Age*, *Age^2*, *Education*, *Income*, *Unemployed*, *Married*, *Union Member*, *Religiosity*,
Strength of Party ID, *Party Contact*, and *Registration Closing Date*. Estimates for these
variables are included in the Supplemental Information (Tables SI1 and SI2). Election fixed
effects are also included, which absorb the direct effect of an *Incumbent* on the ballot.

TABLE 2. IV Model of the Effect of Subjective Sociotropic Evaluations on the Decision to Vote (1980-2008), Spline Specification.

Independent Variables	Model 2.1
Sociotropic Evaluation 1	-.178*
	(.089)
	[.088]
Sociotropic Evaluation 1 × Incumbent	.195*
	(.084)
	[.084]
Sociotropic Evaluation 2	.082
	(.063)
	[.063]
Sociotropic Evaluation 2 × Incumbent	-.048
	(.058)
	[.057]
Sociotropic Evaluation instrumented?	Yes
Estimator	IV 2SLS
N	12,842

Note: * $p \leq .05$ (two-tailed). *Sociotropic 1* and *Sociotropic 2* are the two spline segments that are knotted at -.418. Both robust (clustered on county-election, in parentheses) and bootstrapped standard errors (also clustered on county-election, in brackets) are presented. Control variables included in the model are *Female*, *Black*, *Latino*, *Asian*, *Age*, *Age²*, *Education*, *Income*, *Unemployed*, *Married*, *Union Member*, *Religiosity*, *Strength of Party ID*, *Party Contact*, and *Registration Closing Date*. Estimates for these variables are included in the Supplemental Information (Table SI3). Election fixed effects are also included, which absorb the direct effect of *Incumbent*.

FIGURE 1. The Sociotropic Retrospective Voter's Utility of Voting.
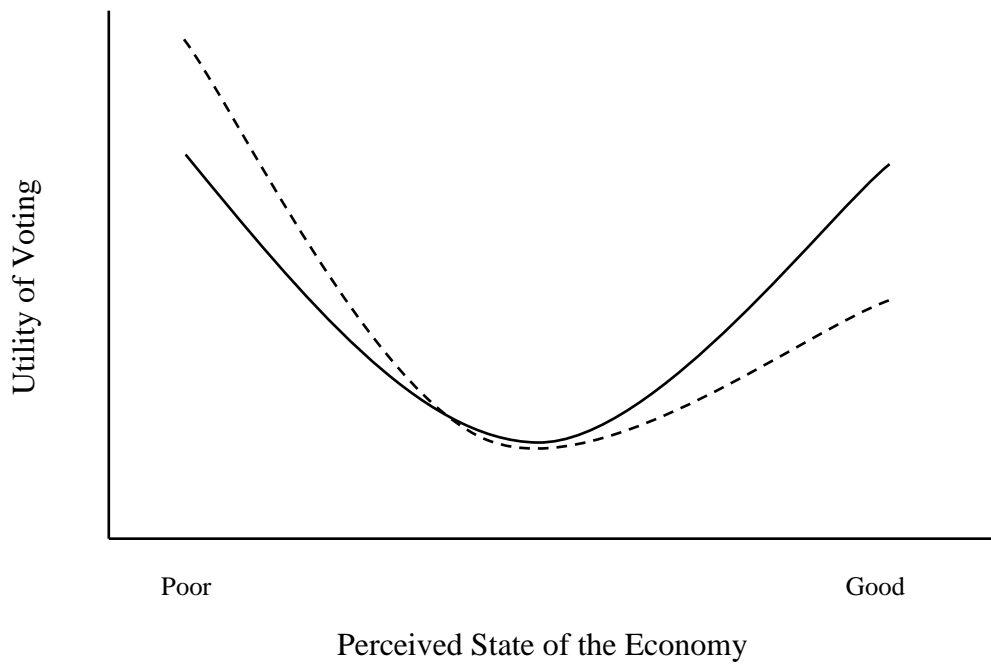
Note: The solid line represents the utility of voting under the assumption that the influence of economic perceptions on expressive benefits is symmetric. The dashed line represents the utility with a degree negativity bias-induced asymmetry.

FIGURE 2. Conditional Effect of Retrospective Sociotropic Evaluation on Decision to Vote.

a) No Incumbent Candidate
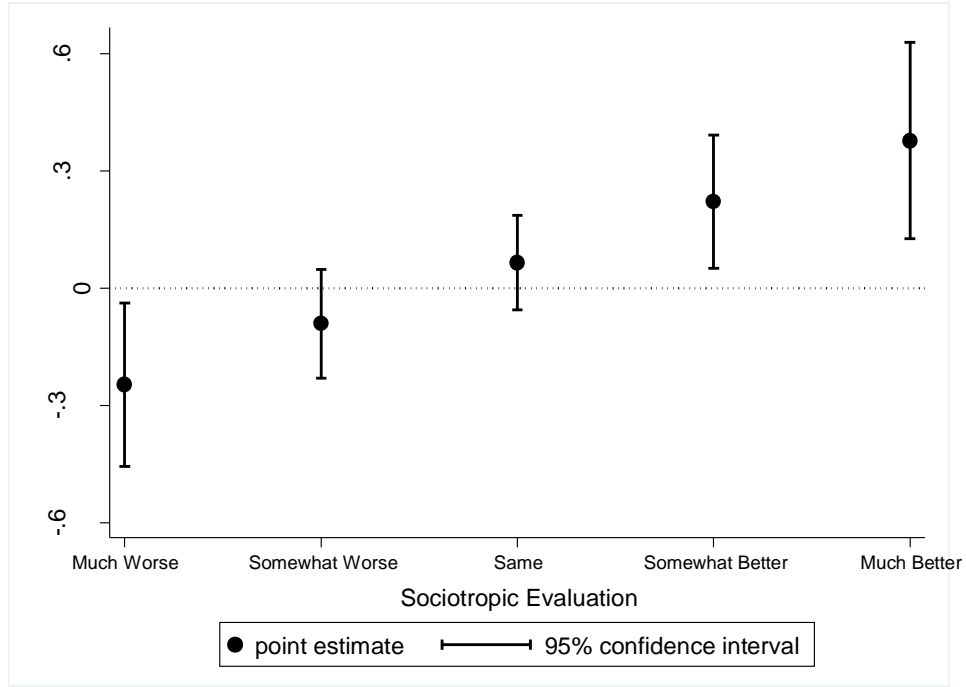
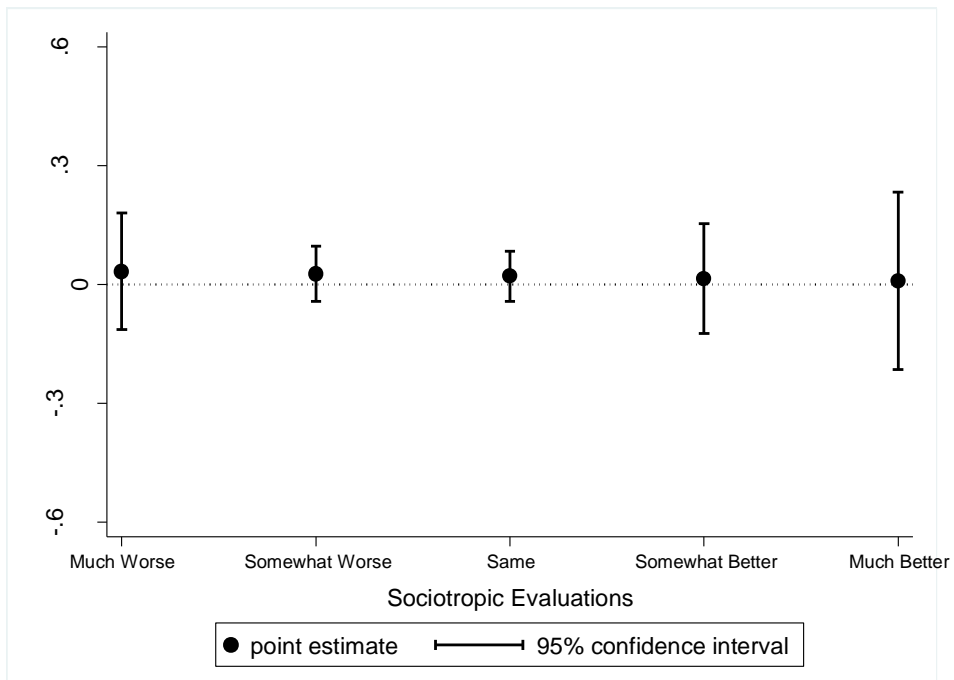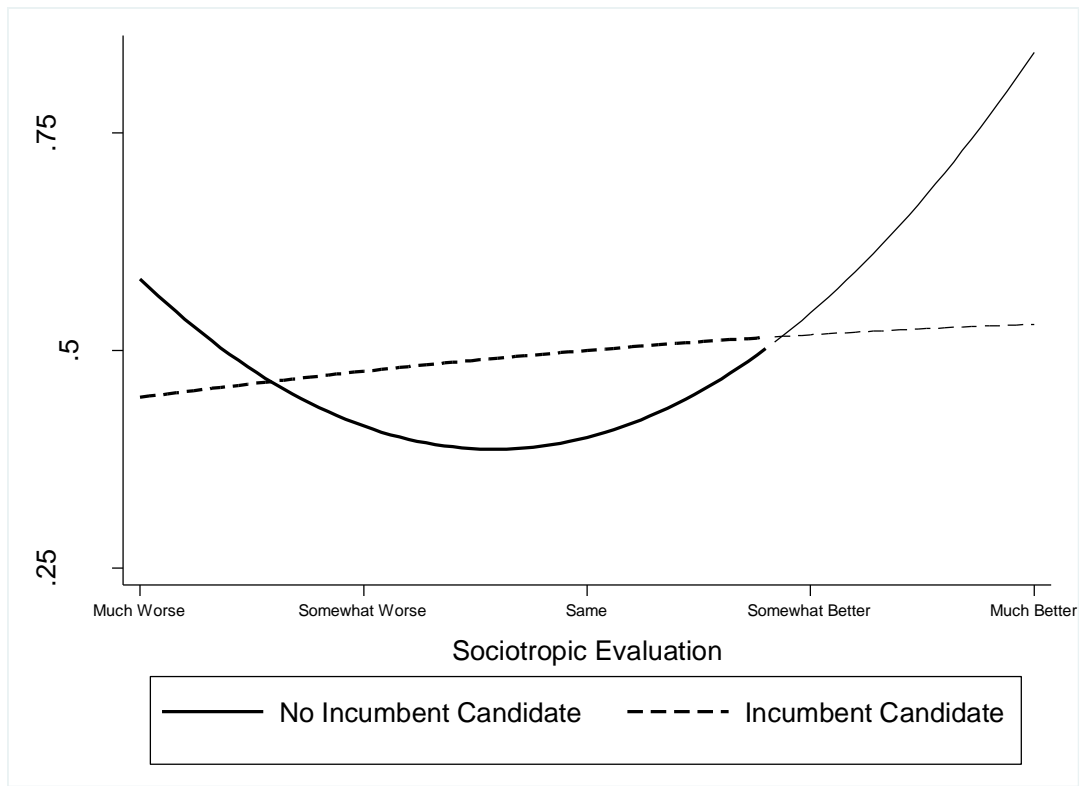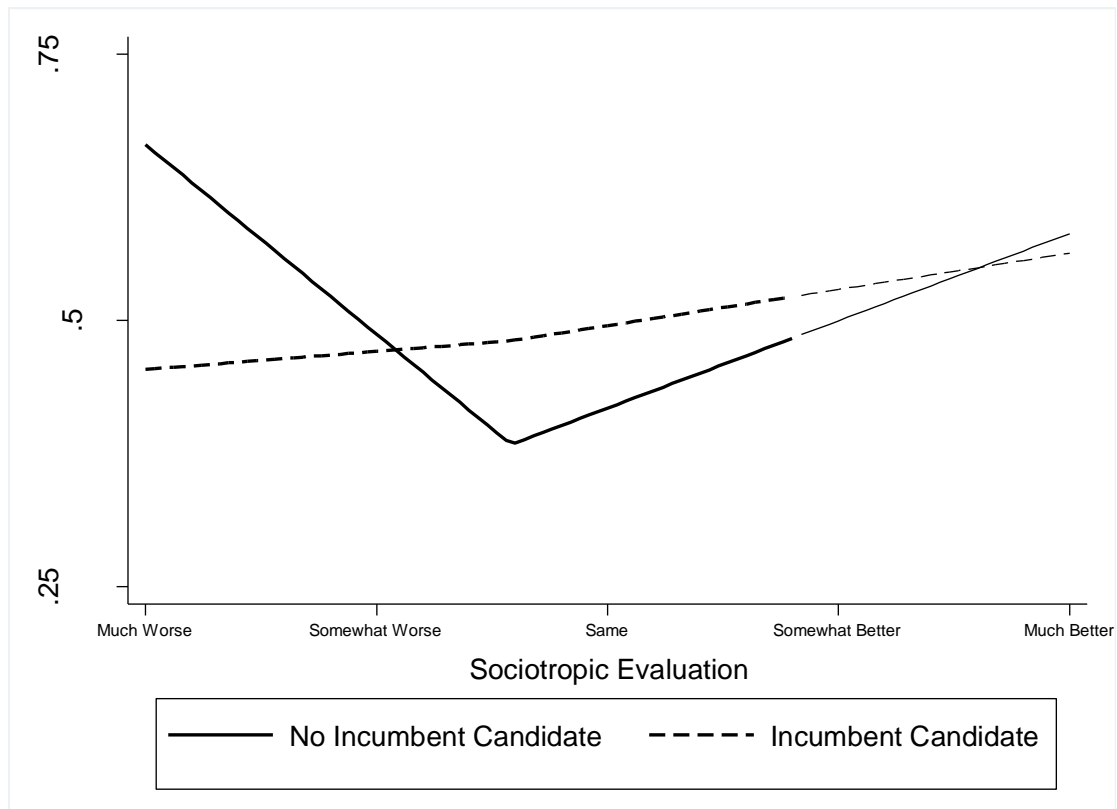*b) Incumbent Candidate on Ballot*

FIGURE 3. Predicted Probability of Voting, Quadratic Specification.

Note: The fainter components of the curves represent out of sample predictions beyond the range of our instrument.

FIGURE 4. Predicted Probability of Voting, Spline Specification.

Note: The fainter components of the curves represent out of sample predictions beyond the range of our instrument.

Economic Retrospection and the Calculus of Voting

*** Supplemental Information ***

Details of the First Stage Model

When testing our hypothesis regarding the effect of retrospective economic evaluations on the decision to vote we rely on individual-level subjective assessments of the state of the economy. There two main advantages to this approach. First, the most appropriate and proximate economic variables are the voters' subjective evaluations of national economic performance. To the extent that the state of the national economy affects the decision to vote, it will do so through voter perceptions of the economy. Second, subjective evaluations of the economy vary from voter to voter, unlike the objective state of the economy, which is a constant for any given election. This within-election variation allows for the potential of explaining variation in individual-level turnout for any given election.

The principal disadvantage to using subjective evaluations of the state of the economy is that these subjective assessments are likely endogenous to various political activities, including turnout. To negate this disadvantage we employ an IV approach that relies on objective local economic conditions as instruments for subjective assessments of the national economy. Table S1 presents the full first stage results in which we predict *Sociotropic Evaluation*.

TABLE S1. First Stage Model Predicting Sociotropic Evaluations.

Independent Variables	Estimate (Robust Standard Error)
Δ County Median Income (in $1,000s)	**.037***
	(.010)
Δ County Unemployment	**-.032***
	(.006)
Female	-.175*
	(.016)
Black	-.160*
	(.034)
Latino	-.073*
	(.037)
Asian	.118
	(.072)
Age	-.011*
	(.003)
Age^2	.000*
	(.000)
Education	.012
	(.006)
Income	.040*
	(.010)
Unemployed	-.057
	(.034)
Married	-.005
	(.019)
Union Member	-.092*
	(.024)
Religiosity	.009
	(.007)
Strength of Party ID	.040*
	(.009)
Party Contact	-.009
	(.019)
Registration Closing Date	.003*
	(.001)
Constant	-1.12
	(.080)
N	12,846
F (df: 26, 1271)	229.49*
R^2	.372

* $p \leq .05$ (two-tailed). Entries are OLS estimates (with robust standard errors clustered on county-election). Election fixed effects are included in the model.

Complete Results for the Models Presented in the Paper

Tables S2, S3, and S4 report all of the coefficient estimates for the models reported in Tables 1, 2, and 3 in the manuscript.

TABLE S2. Full Results of Model 1.1 (IV Model of the Effect of Subjective Sociotropic Evaluations on the Decision to Vote, Quadratic Specification).

Independent Variables	Coefficient Estimate	(Robust Stand. Error)	[Bootstrap Stand. Error]
Sociotropic Evaluation	.065	(.062)	[.062]
Sociotropic Evaluation × Incumbent	-.044	(.053)	[.051]
(Sociotropic Evaluation)^2	.078*	(.026)	[.025]
(Sociotropic Evaluation)^2 × Incumbent	-.081*	(.034)	[.034]
Female	.004	(.011)	[.011]
Black	.013	(.016)	[.016]
Latino	-.032	(.016)	[.017]
Asian	-.136*	(.032)	[.032]
Age	.011*	(.001)	[.001]
Age^2	-.0001*	(.0000)	[.0000]
Education	.058*	(.003)	[.003]
Income	.040*	(.005)	[.005]
Unemployed	-.055*	(.015)	[.015]
Married	.015	(.008)	[.008]
Union Member	.033*	(.010)	[.010]
Religiosity	.035*	(.003)	[.003]
Strength of Party ID	.075*	(.004)	[.004]
Party Contact	.108*	(.007)	[.007]
Registration Closing Date	-.002*	(.000)	[.000]
N	12,842		
F (df: 26, 1271)	115.8*		
R^2	.220		

Note: * $p \leq .05$ (two-tailed). Election fixed effects are also included, which absorb the direct effect of an *Incumbent* on the ballot.

TABLE S3. Full Results of Model 1.2 (OLS Model of the Effect of Subjective Sociotropic Evaluations on the Decision to Vote, Quadratic Specification).

Independent Variables	Coefficient Estimate	(Robust Stand. Error)
Sociotropic Evaluation	.005	(.006)
Sociotropic Evaluation $\times$ Incumbent	.001	(.008)
(Sociotropic Evaluation)^2	-.004	(.004)
(Sociotropic Evaluation)$^2 \times$ Incumbent	.009	(.005)
Female	.005	(.007)
Black	.017	(.013)
Latino	-.034*	(.016)
Asian	-.135*	(.031)
Age	.011*	(.001)
Age^2	-.0001*	(.0000)
Education	.059*	(.003)
Income	.041*	(.004)
Unemployed	-.053*	(.015)
Married	.015	(.008)
Union Member	.033*	(.009)
Religiosity	.035*	(.003)
Strength of Party ID	.075*	(.004)
Party Contact	.109*	(.007)
Registration Closing Date	-.002*	(.000)
N	12,842	
F (df: 26, 1271)	114.4*	
R^2	.220	

Note: * $p \leq .05$ (two-tailed). Election fixed effects are also included, which absorb the direct effect of an *Incumbent* on the ballot.

TABLE S4. Full Results of Model 2.1 (IV Model of the Effect of Subjective Sociotropic Evaluations on the Decision to Vote, Spline Specification).

Independent Variables	Coefficient Estimate	(Robust Stand. Error)	[Bootstrap Stand. Error]
Sociotropic Evaluation 1	-.178*	(.089)	[.088]
Sociotropic Evaluation 1 × Incumbent	.195*	(.084)	[.084]
Sociotropic Evaluation 2	.082	(.063)	[.063]
Sociotropic Evaluation 2 × Incumbent	-.048	(.059)	[.057]
Female	.005	(.011)	[.011]
Black	.014	(.016)	[.016]
Latino	-.032	(.016)	[.017]
Asian	-.135*	(.032)	[.032]
Age	.011*	(.001)	[.001]
Age^2	-.0001*	(.0000)	[.000]
Education	.058*	(.003)	[.003]
Income	.040*	(.005)	[.005]
Unemployed	-.055*	(.015)	[.015]
Married	.015	(.008)	[.008]
Union Member	.034*	(.010)	[.010]
Religiosity	.035*	(.003)	[.003]
Strength of Party ID	.075*	(.004)	[.004]
Party Contact	.108*	(.007)	[.007]
Registration Closing Date	-.002*	(.000)	[.000]

N	12,842		
F (df: 26, 1271)	115.6*		
R^2	.220		

Note: * $p \le .05$ (two-tailed). *Sociotropic 1* and *Sociotropic 2* are the two spline segments that are knotted at -.418. Election fixed effects are also included, which absorb the direct effect of an *Incumbent* on the ballot.

Using Objective National Conditions Instead of Subjective Perceptions

As a robustness check, we also estimate our model using objective national conditions instead of individual-level perceptions. Specifically, we use *Δ U.S. Median Income* (in 10,000s of inflation-adjusted dollars) and *Δ U.S. Unemployment* as our national economic indicators. To test for the presence of the curvilinear relationship that we theorize, both of these variables are squared and we expect these squared variables to have positive coefficients. To allow these effects to vary according to whether one of the candidates is the incumbent president, we interact these variables with *Incumbent*. All of the control variables included in Models 1.1, 1.2, and 2.1 are also included in this model. The important exception that we cannot include the election fixed effects since the economic variables are election-specific. This is a clear disadvantage, yet by using national economic conditions instead of *Sociotropic Evaluation* we are able to include six more presidential elections (we add 1956 through 1976), yielding a total of 14 elections. The inclusion of these earlier elections leads us to add three additional control variables related to voter registration requirements: *Property Requirement*, *Literacy Test*, and *Poll Tax*. These variables indicate whether individuals resided in a state with one or more of these restrictive voting laws.

The results for this model estimation are presented in Table S5. The pattern of results for *Δ U.S. Unemployment* is fully consistent with what we find with *Sociotropic Evaluation*. Large increases or decreases in the unemployment rate increase the probability of voting, as long as there is not an incumbent candidate. The results for *Δ U.S. Median Income* are not as similar, though the estimate for $(\Delta~U.S.~Median~Income)^2$ is in the predicted direction.

TABLE S5. Effect of National Economic Circumstances on Individual-Level Turnout, 1956-2008.

Independent Variables	Coefficient Estimate	(Robust Stand. Error)
Δ U.S. Median Income (in $10,000s)	1.25*	(.551)
(Δ U.S. Median Income)^2	.0002	(.0002)
Δ U.S. Unemployment	.209*	(.026)
(Δ U.S. Unemployment)^2	.017*	(.007)
Δ U.S. Median Income × Incumbent	-1.42*	(.625)
(Δ U.S. Median Income)^2 × Incumbent	.0003	(.0002)
Δ U.S. Unemployment × Incumbent	-.197*	(.029)
(Δ U.S. Unemployment)^2 × Incumbent	-.016*	(.007)
Incumbent	.395	(.260)
Female	-.086*	(.022)
Black	-.049	(.040)
Latino	-.136*	(.051)
Asian	-.474*	(.105)
Age	.046*	(.004)
Age^2	-.0003*	(.0000)
Education	.218*	(.008)
Income	.154*	(.012)
Unemployed	-.128*	(.041)
Married	.076*	(.025)
Union Member	.118*	(.028)
Religiosity	.157*	(.010)
Strength of Party ID	.250*	(.011)
Party Contact	.470*	(.027)
Registration Closing Date	-.006*	(.001)
Property Requirement	-1.45*	(.151)
Literacy Test	-.043	(.062)
Poll Tax	-.894*	(.086)
Constant	-2.63	(.263)
N	21,182	
Log likelihood	- 9469.0	
Wald (df: 27)	3,466.4*	

Note: * $p \leq .05$ (two-tailed). Entries are probit estimates (with robust standard errors clustered on county-election).