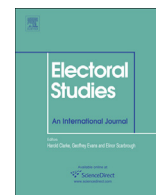




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## Two types of economic voting: How economic conditions jointly affect vote choice and turnout



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### ABSTRACT

The economic voting literature mostly looks at vote choice, ignoring potential effects on turnout. Studies that do focus on the latter often ignore the former, and come to contradictory conclusions. I develop a model of economic voting that jointly incorporates vote choice and abstention due to alienation or indifference. Analyzing ten elections with validated turnout data and conducting empirically informed simulations, I make two contributions. First, I show that “turnout switching” accounts for up to one third of total economic voting. This second type of economic voting is more common when the number of parties is low and responsibility is dispersed. Second, I show that a bad economy moves some people to abstain while having the opposite effect on others. The aggregate effect is ambiguous and related to macro-conditions in a non-linear way. This explains contradictory findings in the literature.

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### 1. Introduction

The central message of the voluminous literature on economic voting is simple: If the economy is doing well, citizens tend to vote for the incumbent, and if the economy is doing poorly, they cast their votes for the opposition. This ignores an alternative mechanism through which voters can express their opinion: namely, whether they turn out or abstain. Studies have criticized this omission and contend that the economic voting literature misses important dynamics (Lacy and Burden, 1999; Taylor, 2000; Stevens, 2006; Tillman, 2008). While there exists a separate literature on the connection between economic conditions and the decision to turn out, it tends to ignore vote choice. It also offers inconsistent empirical results at the micro and macro-level, finding in turn positive, negative, and non-existent correlations between economic indicators and turnout (Blais, 2006).

In this paper, I develop a model of economic voting that jointly incorporates vote choice and turnout. To do so, I use insights from the spatial voting literature, in which abstention is conceptualized as a function of two mechanisms: alienation and indifference (Enelow and Hinich, 1984; Hinich and Munger, 1994; Sanders, 1998; Adams et al., 2006). A citizen is alienated if none of the parties provide her with sufficiently high utility. Someone is indifferent if the differences between the utilities for the parties are not large enough. Using these concepts, I argue that citizens' evaluation of the economy interact with their evaluation of other party characteristics, such as policy positions, to jointly determine vote choice and abstention. If the governing party manages the economy badly, voters are more likely to be alienated, which increases their probability to abstain. Economic mismanagement also affects indifference, but in two different ways. On the one hand, citizens who evaluate the governing parties positively might not want to vote for them anymore because of their poor handling of the economy. At the same time, they may not want to cast a ballot for other parties either, e.g. because they oppose their

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policies. These voters are likely to become indifferent and thus abstain. On the other hand, citizens who are indifferent between the parties and abstain under “normal” circumstances will receive important additional information when the governing parties manage the economy badly. They now see that these parties lack competence, which makes opposition parties preferable. This makes them less likely to be indifferent, and more likely to turn out. I use this unified model of economic voting with abstention due to alienation and/or indifference in two ways. First, I estimate the model statistically for ten election studies from four countries with validated turnout data. Second, I conduct a series of exploratory computer simulations that are calibrated using the empirical estimates from the statistical models. In the absence of reliable survey data for a large number of elections, such empirically informed simulations are a second-best option for providing insights into how macro-level conditions affect economic voting.

The paper makes two novel contributions. First, it shows that there are indeed two types of economic voting. In all ten elections that are analyzed, a non-negligible part of the population reacts to worsening economic conditions by changing their probability to abstain. Macro-level conditions systematically influence the prevalence of turnout switching compared to vote switching. If the number of parties is low, a substantial part of economic voting happens through changes in the probability of turning out. In the US elections analyzed, up to one third of total economic voting happens through turnout switching. “Traditional” economic voting through vote switching is more dominant when there are many parties. But even in the elections with four major parties analyzed in this paper (Sweden and New Zealand), more than ten percent of the total impact of changing economic conditions happens through turnout switching. The exploratory computer simulations additionally suggest that “traditional” economic voting is dominant when there is high clarity of responsibility. When responsibility is dispersed, however, voters are more likely to react through their turnout decision. The paper shows that studies that ignore turnout run the risk of significantly and systematically underestimating the effect of the economy on elections.

Second, the paper provides an explanation for the contradictory findings in the literature on the relation between the economy and turnout at the micro and macro-level. The empirical analysis shows that in each given election, some voters are more likely to abstain in reaction to changing economic conditions because they become alienated or indifferent. Others, however, are less likely to be indifferent and therefore more likely to turn out. Existing studies constrain the effect of the economy on the decision to abstain to be equal for all voters. The sign and magnitude of this effect then depends on how prevalent the changes in alienation and indifference are. Indeed, I find that worsening economic conditions can lead to higher or lower aggregate turnout rates. In the sample of ten elections, a worse economy leads to lower turnout in four cases, to higher turnout in three, and has a null effect in another three. The exploratory simulations suggest that when the number of parties is high, a worse

economy leads to lower turnout. When the number of parties is low, the effect is expected to be non-linear, especially if governing responsibility is concentrated. Turnout decreases under moderately bad conditions, and then stays constant or even increases again as conditions get even worse because the positive effect of indifference outweighs the negative impact of alienation and indifference. This provides an explanation for why existing studies, which test for simple linear effects, come to contradictory conclusions.

## 2. The economy, vote choice, and abstention

The connection between the economy and elections has been one of the most active research agendas in political science over the past three decades. Since the seminal contribution by Fiorina (1981), hundreds of studies have looked at economic voting from the micro and macro-angle; in countries across all regions of the world; and from a variety of perspectives, e.g. political economy, political behavior, or political psychology (Lewis-Beck and Stegmaier, 2000, 2007; Duch and Stevenson, 2008). Due to the profound impact of the “Great Recession,” economic voting has received increased attention again in the past years (see the contributions summarized in Scotto, 2012). While the research program has been criticized periodically (Paldam, 1991; Cheibub and Przeworski, 1999; Anderson, 2007; van der Brug et al., 2007; Evans and Pickup, 2010), it has taken up the posed challenges and sought to address the problems that were pointed out. An important development has been the increased quantity and quality of studies that look at economic voting in a comparative context. As a consequence, it is fairly well understood under what circumstances economic conditions influence vote choice in what way. Most importantly, the “clarity of responsibility” hypothesis (Powell and Whitten, 1993) has received ample support. It states that when several parties share executive and/or legislative powers, voters have difficulties identifying who is responsible for the (mis-)management, and there is less economic voting (Anderson, 2000; Nadeau et al., 2002; Duch and Stevenson, 2008). Whereas clarity of responsibility focuses on citizens’ ability to identify who to vote *against* in case of economic mismanagement, the “availability of alternatives for dissent” hypothesis stresses that for economic voting to be high, voters also need someone to vote *for* (Lewis-Beck, 1988; Anderson, 2000, 2007; Anderson and Hecht, 2012). It emphasizes that citizens “will desert the governing party only when they have somewhere to go to express their discontent” (Anderson, 2007, p. 285). Other contributions have identified a number of additional factors that influence the strength of economic voting, such as multilevel governance (Anderson, 2006; Queralt, 2012), economic openness (Hellwig and Samuels, 2007; Duch and Stevenson, 2010; Anderson and Hecht, 2012), or the state of the economy in comparable countries (Kayser and Peress, 2012).

Nevertheless, important open questions remain. One is the connection between economic voting and turnout. The dependent variable in economic voting studies is typically

individuals' decisions for the government at the micro-level, and the change in vote share of the government party or parties at the macro-level. Such setups sidestep the fact that in most countries, the share of citizens that decide to stay at home on election day is considerable. In advanced industrial countries, average turnout rates lie around 80 percent (Franklin, 2004), but in some countries, such as the US, only slightly more than half of the citizens cast their vote in even the most important elections. Turnout also varies across countries and time. A growing number of studies criticize this omission, arguing that the state of the economy also influences citizens' decision whether to turn out. They contend that focusing only on vote choice is tantamount to selecting on the dependent variable (Lacy and Burden, 1999) and ignores a potentially large share of the population that does indeed engage in economic voting, just not in the way it is traditionally defined.

The limited number of studies that do focus on the connection between the economy and abstention make two causal arguments at the micro-level, which produce opposite empirical implications. On the one hand, it is posited that a bad economy will cause people to abstain at higher rates (Rosenstone, 1982). Both Taylor (2000) and Tillman (2008) find that clarity of responsibility mediates the relationship. In clear settings, voters know exactly who is responsible and vote for the opposition. In unclear settings, Taylor argues, voters cannot identify responsible parties easily and therefore channel their frustration by not participating. Tillman finds that in clear settings, vote switching is high except among partisans, who oscillate between voting for "their" party and abstaining. In unclear settings, people are not sure about whom to vote for to remove the incumbent from office and thus abstain to a higher degree, even when they are non-partisans. On the other hand, a different argument states that people's frustration over economic mismanagement motivates them to turn out at higher rates to install a new government (Schlozman and Verba, 1979; Lau, 1985). In the US context, Stevens (2006) shows that partisans whose party is not in government have more motivation to turn out and cast their vote if the incumbent performed very poorly, i.e. the economy is very bad. Congruently, Arceneaux (2003) finds that among those who suffer the most from economic hardship turnout is higher when they feel the government is to blame.

A number of studies have investigated the link between the state of the economy and turnout using macro-level data. Rosenstone (1982) analyzes US elections from 1896 to 1980 and concludes that adverse economic conditions depress turnout. Radcliff (1992) finds the same for a panel of industrialized countries, but provides evidence that a bad economy increases turnout in developing countries (see also Pacek and Radcliff, 1995). Pacek et al. (2009) come to the same conclusion for Eastern Europe. Finally, most aggregate-level studies find no effect at all, no matter whether the elections analyzed are from the US (Arcelus and Meltzer, 1975), Eastern Europe (Kostadinova, 2003; Fauvelle-Aymar and Stegmaier, 2008), Latin America (Fornos et al., 2004), or from all over the world (Blais and Dobrzynska, 1998; Blais, 2000). Because of these

contradictory findings, Blais (2006) in his extensive review of the turnout literature concludes that "there is no clear relationship between the economic conjuncture and turnout" (Blais, 2006, p. 117).

### 3. Alienation, indifference, and the economy

Some micro-level studies find that voters are more likely to turn out when the economy is worse, while others find that they are less likely to do so. This suggests that these effects are not mutually exclusive – some voters may be dissuaded from voting by a bad economy, while others respond by voting when they usually abstain. The challenge is to develop a theoretical framework that allows for a conditional (positive or negative) effect of changing economic conditions on the decision to turn out. In this section, I argue that citizens' evaluation of the parties' other characteristics, such as their policy positions, play an important role. The evaluations condition the effect of the state of the economy on peoples' turnout decisions. To connect the economic and non-economic evaluation of parties to abstention in a principled way, I employ the concepts of alienation and indifference from the spatial voting literature (Enelow and Hinich, 1984; Hinich and Munger, 1994).

The usage of alienation and indifference to think about turnout has become more popular in recent years in theoretical as well as empirical studies (e.g. Thurner and Eymann, 2000; Adams et al., 2005, 2006; Callander and Wilson, 2007; Plümper and Martin, 2008). A voter is alienated when she perceives that no party represents her to a sufficient degree. A voter is indifferent when she does not see significant differences between the parties. When either one or both of these conditions are present, voters do not cast a ballot. Using these two motives allows for the systematic incorporation of characteristics of the party system into the turnout decision. At the same time, it does not negate the important effects of individual-level factors like demographic characteristics, political interest, or sense of civic duty (e.g. Franklin, 2004; Geys, 2006; Blais, 2006, 2007; Söderlund et al., 2011). These are incorporated through different alienation and indifference thresholds that need to be met for a citizen to turn out.

For illustrative purposes, consider a simple situation in which voters only care about a single policy dimension and there are only two parties, positioned to the left and right of the center. Voters at the extreme left and the extreme right will likely be alienated but not indifferent. An extreme leftist will prefer the left to the right party, but will still perceive that party as too moderate to represent her views sufficiently. A voter in between the two parties is likely to be indifferent. She evaluates both parties roughly equally and it makes little difference for her which one is in government. If the parties are relatively far away from the middle, a centrist voter may also be indifferent *and* alienated, perceiving both parties as too extreme (Hinich and Munger, 1994).

Connecting these two motives to economic conditions, I argue that citizens' evaluation of the parties' policies condition their decision to turn out. If the governing party

manages the economy badly, voters are more likely to be alienated, leading to lower turnout. These are the frustrated voters described by Taylor (2000). Economic mismanagement also affects indifference, but in two different ways. On the one hand, it will increase indifference among voters who support the government party otherwise. They will not necessarily vote for the opposition party as it may be too far away programmatically, and they will also be hesitant to vote for the governing party because economic mismanagement signals a lack of competence. They are therefore more likely to be indifferent (and also possibly alienated) and stay at home on election day. This is the effect described by Tillman (2008). On the other hand, voters who are indifferent between the parties on policy grounds will receive important additional information when the governing party manages the economy badly. They now see that one party lacks competence, which makes the opposition party preferable. They are then more likely to turn out, as hypothesized by Arceneaux (2003) and Stevens (2006).

Using the framework of alienation and indifference, it becomes clear that changing economic conditions can have a positive or negative impact on the individual probability to turn out, and that the effect is conditioned by the evaluation of parties' other characteristics. The argument is straightforward at the level of the individual voter. But the larger implications are more complicated. How prevalent is turnout-switching versus changing which party to vote for? Is the positive or the negative effect on abstention more common? What are the implications for overall turnout? To investigate these questions, a mathematical representation of the voters' decision calculus is useful. In the following section, I present a probabilistic voting model that incorporates vote choice and abstention jointly. It explicitly acknowledges that the voters' decisions also depend on other characteristics, such as the parties' policy positions, and that those characteristics condition the impact of a changing economy. The model is then translated into a statistical framework in order to address the connection between the economy and the two types of economic voting empirically.

#### 4. Probabilistic economic voting with turnout

There are  $n$  citizens and  $m$  parties. The utility function of voter  $i$  for party  $j$  has the form

$$U_i(j) = \alpha_j \lambda_i + \beta_j^T \eta_i + \gamma^T \psi_{ij} + \varepsilon_{ij} \quad (1)$$

where  $\lambda_i$  denotes individual  $i$ 's evaluation of the state of the economy, which is positive if the economy is doing well and negative if it is not. This evaluation has different effects on the parties' utilities, e.g. depending on their responsibility share (Powell and Whitten, 1993; Anderson, 2000; Duch and Stevenson, 2008). The positive or negative effect will be larger for a party that has a high share of governing responsibility. The utility of parties that have little to no role in government will be mostly unaffected by the economic evaluation. This difference is captured by a party-specific coefficient  $\alpha_j$ . Other individual-specific attributes

such as age or gender are represented by the vector  $\eta_i$ , and  $\beta_j$  is the associated vector of party-specific coefficients. Attributes that vary across parties are denoted by the  $\psi_{ij}$ , and the vector of coefficients  $\gamma$  is the same for all parties. Examples of variables in  $\psi_{ij}$  are the difference between the citizens' and the parties' ideal points on the left–right scale or the citizens' evaluations of the party leaders. The effect is constant across parties, implying that all else equal, a citizen derives the same utility from voting for either of two parties whose leaders she likes equally well. Finally,  $\varepsilon_{ij}$  is a random error term.

There are two motives for abstaining: alienation and indifference. I denote the citizen's alienation threshold by  $T_i(A)$  and her indifference threshold by  $T_i(I)$ . Alienation occurs when the voter's utilities do not exceed the alienation threshold for any party. A citizen is indifferent if the differences between the utilities do not exceed her indifference threshold for at least one pair of parties. The alienation threshold of voter  $i$  is:

$$T_i(A) = \gamma_A^T \kappa_i + \varepsilon_{ij} \quad (2)$$

where  $\kappa_i$  is a vector of person-specific attributes that influence the alienation threshold and  $\gamma_A$  is the associated vector of coefficients. The indifference threshold of voter  $i$  is kept positive by modeling it exponentially (Adams et al., 2006):

$$T_i(I) = \exp(\gamma_I^T \tau_i) \quad (3)$$

where  $\tau_i$  is again a vector of person-specific attributes and  $\gamma_I$  is the associated vector of coefficients. Examples of attributes in  $\kappa_i$  and  $\tau_i$  are age, income, interest in politics, or other variables that have been shown to affect turnout.

Assuming that the errors are independent and identically distributed draws from a Gumbel distribution (also known as the Type-I extreme-value distribution), the random utilities and thresholds in Equations (1)–(3) can be translated into a probabilistic voting model (for details see Sanders, 1998; Schofield and Sened, 2006; Adams et al., 2006). If there are only two parties, the probability that voter  $i$  turns out and votes for e.g. party 1 is:

$$P_i(1) = \frac{\exp(U_i(1))}{\exp(U_i(1)) + \exp(U_i(2)) \exp(T_i(I)) + \exp(T_i(A))} \quad (4)$$

If there are three parties, the probability voter  $i$  turns out and votes for party 1 is<sup>1</sup>:

If there are four (or more) parties, the individual probabilities can be calculated in an analogous way. The probability that a citizen abstains is:

<sup>1</sup>  $P_i(1) = P[U_i(1) - U_i(2) > T_i(I) \text{ and } U_i(1) - U_i(3) > 0 \text{ and } U_i(1) > T_i(A)] + P[U_i(1) - U_i(2) > 0 \text{ and } U_i(1) - U_i(3) > T_i(I) \text{ and } U_i(1) > T_i(A)] - P[U_i(1) - U_i(2) > T_i(I) \text{ and } U_i(1) - U_i(3) > T_i(I) \text{ and } U_i(1) > T_i(A)]$ .

$$\begin{aligned}
 P_i(1) &= \frac{\exp(U_i(1))}{\exp(U_i(1)) + \exp(U_i(2))\exp(T_i(I)) + \exp(U_i(3)) + \exp(T_i(A))} \\
 &+ \frac{\exp(U_i(1))}{\exp(U_i(1)) + \exp(U_i(2)) + \exp(U_i(3))\exp(T_i(I)) + \exp(T_i(A))} \\
 &- \frac{\exp(U_i(1))}{\exp(U_i(1)) + \exp(U_i(2))\exp(T_i(I)) + \exp(U_i(3))\exp(T_i(I)) + \exp(T_i(A))}
 \end{aligned} \tag{5}$$

$$P_i(A) = 1 - \sum_{j=1}^m P_i(j) \tag{6}$$

The vote shares for the different parties and the rate of abstention can then be easily computed by summing over the individual probabilities and dividing by the size of the electorate. The proportion of citizens who cast a vote for party  $j$  is:

$$V(j) = \frac{1}{n} \sum_{i=1}^n P_i(j) \tag{7}$$

The model introduced in this section can be estimated statistically using conditional multinomial logit. This differs from the approach of most research in economic voting. Studies that focus on vote choice usually reduce the problem to a decision between the government and the opposition and estimate a logit or probit model; or they use a multinomial logit/probit to model multiparty choice. The latter has been the standard approach in recent years and is the workhorse model in [Duch and Stevenson \(2008\)](#). The drawback of such models is that they can only incorporate unit-specific variables. Choice-specific variables can only be included in a somewhat unnatural way. For example, [Duch and Stevenson \(2008\)](#) include the evaluation of the party leaders in some of their regressions by letting them affect the probability of voting for every party. This means that the evaluation of the leader of party  $x$  influences the utility the voter gains from voting for party  $y$ . The conditional multinomial model allows for the inclusion of unit-specific as well as choice-specific variables at the appropriate level. That is, the economic evaluation can be included in the utility function of voting and have a different effect for each party. Party leader evaluations or other choice-specific variables are only incorporated in the utility function for the appropriate party. Only recently have studies of economic voting started to use this more flexible approach (see [Queralt, 2012](#)). The few studies that incorporate abstention as well as vote choice also rely on the multinomial logit/probit approach (e.g. [Tillman, 2008](#); [Clarke et al., 2009](#)). Again, this forces somewhat unnatural specifications of the voters' utility functions. Factors that should only affect vote choice (e.g. party leader evaluation) are included in the turnout decision, and variables that should only have an effect on abstention (e.g. feelings of civic duty) can affect vote choice.

The model used in this paper has several advantages over the standard approach. The abstention decision is systematically linked to individual-level factors such as age or civic duty, and to the voter's overall evaluations of the parties. The most important advantage, however, is

that the model developed here makes the abstention decision dependent on two factors: alienation and indifference. As I have argued above, a worsening economy can affect these two components differently, *depending* on the overall evaluation of the parties on factors other than their handling of the economy. This makes it possible for voters to react in all possible ways to worsening economic conditions: they can be more or less likely to vote for certain parties, they can be less likely to turn out, or they can be more likely to do so. Under what circumstances are citizens more prone to react by voting for a different party, and when do they change their turnout behavior? If they change their turnout behavior, when are they more likely to cast a ballot, and when are they less likely? What are the consequences for overall turnout? In the remainder of the paper, I use two approaches to address these questions. In Section 5, the model is estimated statistically through conditional multinomial logit regressions using validated turnout data from ten elections. To better explore the aggregate consequences, Section 6 reports the results of a series of exploratory simulations that are calibrated using the empirical estimates from the statistical models.

## 5. Empirical analysis

In this section, I use ten election studies with validated turnout data from four countries to statistically estimate the model introduced in the previous section. I investigate how worsening economic conditions change the probability of voting for a different party and the probability of turning out. I show that economic voting through changes in the probability to abstain is prevalent in all elections, and that it is more important when there are fewer parties. Furthermore, I show that there is wide variance in individuals' change in probability to turn out. Some citizens are more likely to abstain in response to worsening economic conditions, while others are less likely to do so. The aggregate effect is ambiguous.

### 5.1. Data and statistical approach

Using self-reported turnout as (part of) the dependent variable is highly problematic. It is well known that survey respondents are prone to claim that they did cast a vote on election day when in fact, they did not. The percentage of respondents who reported that they voted in election studies can be up to 45 percent higher than the official turnout rate ([Karp and Brockington, 2005](#)). There also is evidence that conditions at the micro-level ([Bernstein et al., 2001](#)) and macro-level ([Karp and Brockington, 2005](#)) systematically influence over-



reporting. This means that the measurement error in self-reported turnout is not random and would thus likely bias the results. To make things worse, it is unknown if coefficients are biased upwards or downwards. I therefore only use surveys that have independently validated whether the respondents voted. This severely shrinks the number of elections that can be analyzed. After excluding a small number of studies that had validated turnout data but were unsuitable for other reasons,<sup>2</sup> I am left with a total of ten elections to analyze: the United States elections 1980, 1984, and 1988 with two parties; the United Kingdom 1992 and 1997 with three parties; New Zealand 1993 and 1996; and Sweden 1991, 1994 and 1998 with four parties.<sup>3</sup> This is a much smaller sample than the survey data from 163 elections used by [Duch and Stevenson \(2008\)](#) and other recent work in comparative electoral research. Those studies, however, focus exclusively on vote choice. The small number of election surveys used here nevertheless provide valuable insights at the micro-level as well as the macro-level.

The probabilistic model of economic voting with turnout, outlined in the previous section, can be estimated statistically using conditional multinomial logit ([Adams et al., 2006](#)). The voters' utilities for the different parties depend on their assessment of the state of the economy, their squared ideological distance from the respective party, and a number of other characteristics that are commonly used in the literature. The alienation and indifference thresholds are specified based on insights from the literature on individual-level determinants of turnout (e.g. [Franklin, 2004](#); [Geys, 2006](#); [Adams et al., 2006](#); [Blais, 2006, 2007](#); [Söderlund et al., 2011](#)):

$$U_i(j) = \beta_{1,j} + \beta_{2,j}(\text{retrospective economy}) \\ + \beta_3(\text{squared ideological distance}) \\ + \beta_4(\text{candidate evaluation}) + \beta_{5,j}(\text{income}) \\ + \beta_{6,j}(\text{female})$$

$$T_i(A) = \beta_7 + \beta_8(\text{education}) + \beta_9(\text{married}) + \beta_{10}(\text{race}) \\ + \beta_{11}(\text{efficacy}) + \beta_{12}(\text{canvassed}) \\ + \beta_{13}(\text{interest in politics})$$

<sup>2</sup> I restrict the analysis to elections in which there have been at most four major parties. Modeling a large number of small parties would potentially yield unreliable parameter estimates due to the small number of cases in many categories of the dependent variable. Finally, a small number of election studies cannot be analyzed because key variables (e.g. evaluation of the state of the economy) were not included in the survey.

<sup>3</sup> The parties are: Democrat and Republican for the US; Labour, Conservative and Liberal Democrat for England (I exclude Wales, Scotland and Northern Ireland because of the presence of strong regional parties); National, Labour, Alliance, NZ First for New Zealand; Social Democrat, Moderate, Liberal People's Party and Centre for Sweden in 1991 and 1994; Social Democrat, Moderate, Left and Christian Democrat for Sweden in 1998.

**Table 1**  
Variables used in the statistical models.

Variable name	Variable description
Retrospective economy	R's perceived change in economic conditions over past year on 3-point scale
Squared ideological distance	Squared difference between left-right positions of R and mean perceived position of party
Candidate evaluation	R's evaluation of the party's main candidate
Income	R's annual household income
Female	1 if female, 0 otherwise
Education	R's highest degree or years of schooling
Married	1 if married or cohabitating, 0 otherwise
Race	1 if respondent is black, 0 otherwise (US only)
Efficacy	Additive index: questions on whether people have say in government, whether public officials care, good understanding of politics
Canvassed	1 if R was contacted by any party, 0 otherwise
Interest in politics	Whether R is generally interested in politics/campaigns
Cares who won	Whether R cares who won the election (not available for NZ, instead whether R thinks it is a duty to vote; not available for US, instead if R believes election in his state will be close; not available for SWE 1994)

$$T_i(I) = \exp(\beta_{14} + \beta_{15}(\text{education}) + \beta_{16}(\text{married}) \\ + \beta_{17}(\text{race}) + \beta_{18}(\text{efficacy}) + \beta_{19}(\text{canvassed}) \\ + \beta_{20}(\text{interest in politics}) + \beta_{21}(\text{cares who won}))$$

The variables are described in more detail in [Table 1](#). Notice that the coefficients of some variables are estimated for each party separately, while others are restricted to be the same for all parties. This reflects that there are unit-specific as well as choice-specific variables that enter the voters' utility functions. In particular, a separate parameter is estimated for the impact of economic conditions for each party. To make the model identifiable, I set  $\beta_{1,1} = 0$ . The likelihood function can be easily derived from the equations given in the previous section. I use a Bayesian framework with default non-informative priors on the coefficients as well as their precision. The models are estimated via MCMC sampling in four parallel chains with a total of 10,000 iterations, a thinning interval of 10 and a burn-in period of 1000.<sup>4</sup> The standard diagnostics show adequate mixing behavior, suggesting that there are no convergence problems.

To explore the impact of economic conditions on voting and turnout behavior simultaneously, I employ a procedure similar to [Duch and Stevenson \(2008\)](#). I calculate the predicted probabilities of voting for the different parties ( $\hat{p}_{ij}$ ) and abstaining ( $\hat{p}_{i,A}$ ) for each respondent. Then I move each respondent's economic perception one point lower, i.e. a worsening perception. I recalculate the predicted probabilities (denoted by  $\tilde{p}_{ij}$  and  $\tilde{p}_{i,A}$ ). Total economic voting for

<sup>4</sup> The models were estimated using JAGS 3.2.

individual  $i$  is defined as one half the average absolute percentage change<sup>5</sup>:

$$\Delta_i^{\text{Total}} = \frac{1}{2} \left( \left| \hat{p}_{i,A} - \tilde{p}_{i,A} \right| + \sum_{j=1}^m \left| \hat{p}_{i,j} - \tilde{p}_{i,j} \right| \right) \quad (8)$$

Total economic voting can then be decomposed into two parts: the change in the probabilities of voting for the different parties and the change in the probability of abstaining:

$$\Delta_i^{\text{Parties}} = \frac{1}{2} \sum_{j=1}^m \left| \hat{p}_{i,j} - \tilde{p}_{i,j} \right| \quad (9)$$

$$\Delta_i^{\text{Turnout}} = \frac{1}{2} \left| \hat{p}_{i,A} - \tilde{p}_{i,A} \right| \quad (10)$$

To take estimation uncertainty into account, I compute (9) and (10) for each of the 1000 draws from the posterior distribution.

### 5.2. Analysis: two types of economic voting

How do individuals react to worsening economic conditions in the ten elections? Fig. 1 shows the densities of the two types of economic voting for each election. The change in the probabilities of voting for a different party  $\Delta_i^{\text{Parties}}$  is in gray, and the change in the probability of abstaining  $\Delta_i^{\text{Turnout}}$  is in black. The vertical lines show the respective mean values in the entire sample. Total economic voting in all three US elections is relatively low, especially in 1980 and 1988. The economic voting that takes place, however, clearly manifests itself in both changing party preferences and changes in the probability of abstaining. In 1980, the mean value of  $\Delta_i^{\text{Parties}}$  is only slightly higher than the mean of  $\Delta_i^{\text{Turnout}}$ . In 1984 and 1988, reacting to the economy by changing the probability of voting for a different party is roughly twice as common as changing the probability of abstaining. In each of the three elections, the densities overlap to a substantial degree, making it clear that both types of economic voting are important. Studies that ignore turnout run the risk of significantly underestimating the effect of the economy on elections.

In the two UK elections with three major parties, total economic voting is higher than in the US, and happens more so through changes in who to vote for, rather than changes in whether to vote at all. The averages of  $\Delta_i^{\text{Parties}}$  are about 13 and 7 percent, respectively; the averages of  $\Delta_i^{\text{Turnout}}$  are only about 2 percent in both cases. Nevertheless, the turnout changes are not negligible. Especially in 1997, a worse economy manifests itself in a change in the probability of abstaining that lies between two and five percent for a large share of voters. Finally, the two elections in New Zealand and the three in Sweden featured four major parties. In all cases,  $\Delta_i^{\text{Parties}}$  is larger than  $\Delta_i^{\text{Turnout}}$ , but the latter is of undeniable importance. Total economic

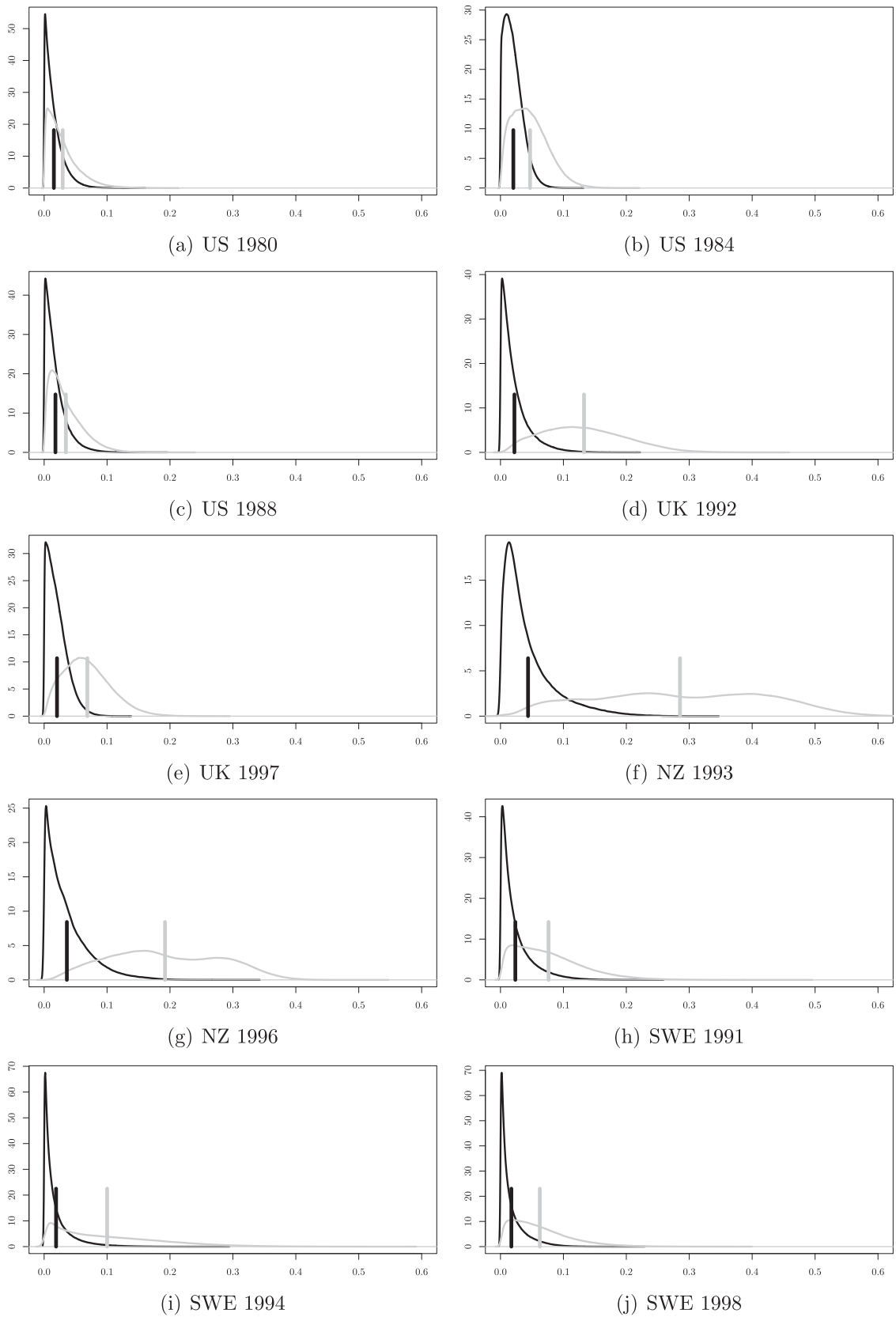
voting is high in both New Zealand elections. The mean changes in the probability of voting for a different party are 28 and 19 percent, respectively. The mean change in the probability of abstaining is slightly less than five percent in both cases. Similarly, in the elections in Sweden,  $\Delta_i^{\text{Parties}}$  is more sizable than  $\Delta_i^{\text{Turnout}}$ , but the latter still accounts for about one quarter of total economic voting.

Despite the small sample of only ten elections, Fig. 1 suggests that there is a connection between the number of parties and the relative prevalence of the two types of economic voting. When the number of parties is high, such as in the case of New Zealand, voters mostly react to worsening economic conditions by altering who they vote for. When the number of parties is low, like in the US, many voters react not by voting for someone else, but instead by changing whether they vote at all. In other words, the idea that people vote for the government when the economy is doing well and for the opposition otherwise is a less accurate description when the number of alternatives to choose from is small (Lewis-Beck, 1988; Anderson, 2007). If a party mismanages the economy, voters are less likely to vote for them, even if they like the party otherwise, e.g. they agree with them programmatically. When there is a large number of parties, voters are likely able to find an alternative party they like on programmatic grounds, but that comes without the “baggage” of having mismanaged the economy. When there are only two parties, it is much harder for voters to find an alternative. For example, a liberal voter in the most recent US elections may have been disappointed with how President Obama and the Democratic party handled the economy and thus be less inclined to vote for them. This does not necessarily imply that she will vote for Republican candidates, whose policy position might be perceived as too far away from her own. This absence of alternatives, however, does not mean that the economy has no influence on voting behavior. The results instead suggest that it influences voter decisions by making them more or less likely to turn out. This second mechanism of economic voting has been largely ignored in the economic voting literature.

### 5.3. Analysis: changes in abstention and turnout rates

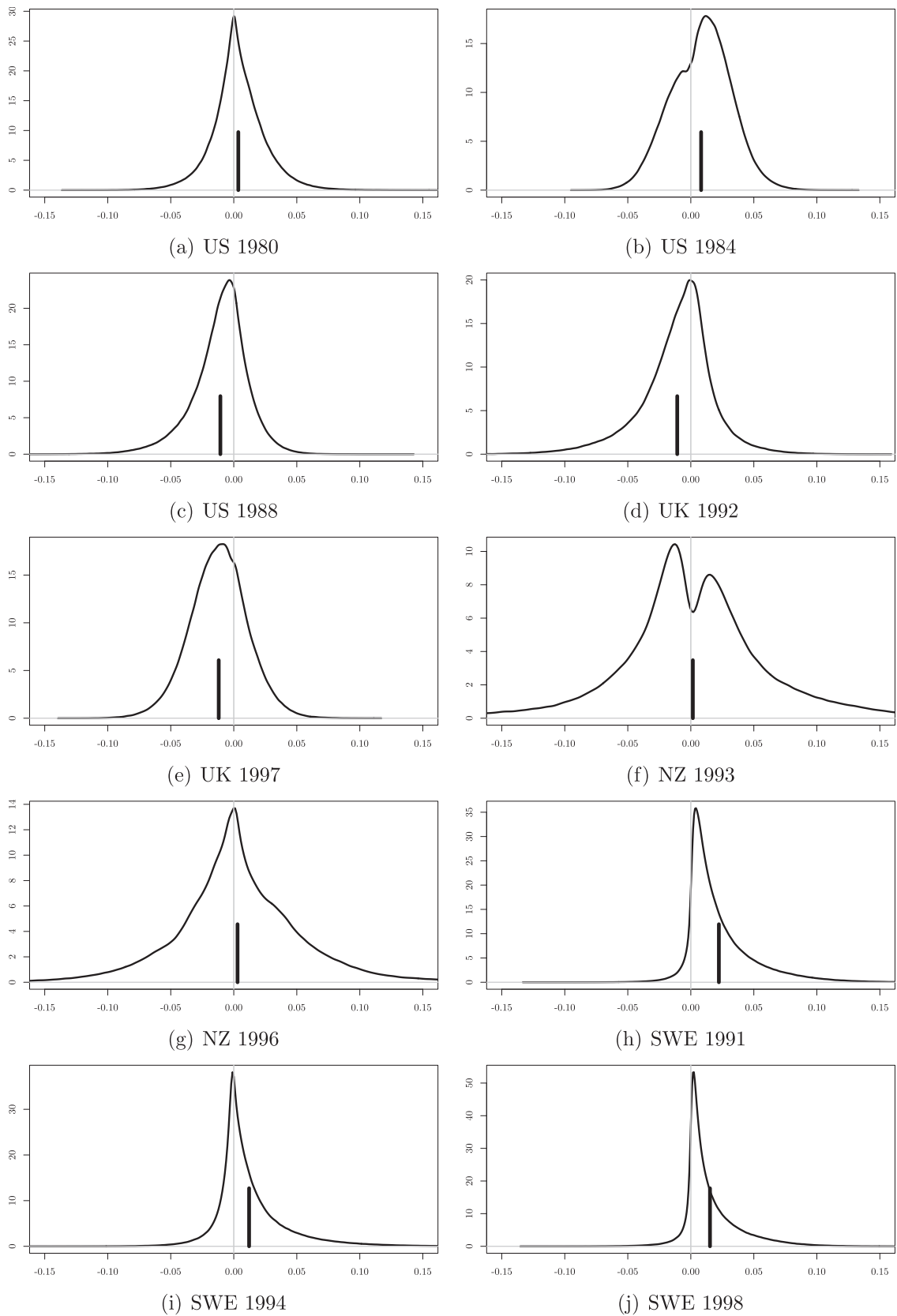
In the previous section, it was shown that the economy affects the turnout decision of citizens. In all elections, the absolute change in the probability of abstaining was larger than zero. But does a bad economy make people more or less likely to vote? Part of the literature finds that a worse economy makes people more likely to turn out (Schlozman and Verba, 1979; Lau, 1985; Stevens, 2006), while another part presents evidence that it makes people less likely to cast a ballot (Rosenstone, 1982; Taylor, 2000; Arceneaux, 2003; Tillman, 2008). These contradictory findings at the micro-level are mirrored by studies looking at aggregate turnout. Again, there is evidence that a bad economy increases turnout, decreases it, or has no effect at all (Blais, 2006). Fig. 2 shows that all and none of these studies are correct. It plots the density of the change in the predicted probability of abstaining that results from moving the economic evaluation one point lower. Fig. 2 differs from

<sup>5</sup> The division by two is included to not double-count the movement between the options.



**Fig. 1.** Densities of absolute change in predicted party shares (gray) and absolute change in predicted abstention (black). The vertical bars show the mean values. Horizontal axes display absolute percentage change, vertical axes display the density.





**Fig. 2.** Densities of predicted change in the probability to abstain. Positive values mean that the probability of abstention is higher in the scenario where the economy is worse. The vertical bars show the aggregate change in abstention. Horizontal axes display percentage change, vertical axes display the density.

Fig. 1 in that it displays the direction of the change in the probability to abstain. The previous section focused on the absolute change in the probability of abstention and compared it to “traditional” economic voting, that is changes in vote choice. Positive values in Fig. 2 stand for a higher probability of abstaining (lower turnout). The vertical line indicates the mean value, which is equivalent to the overall change in turnout. For almost all elections, the densities span both negative and positive values. This means that in reaction to worse economic conditions, some citizens are more likely to turn out, while others are less likely to do so.

The individual changes in the probability of abstaining are substantial. In most cases, they range between minus and plus five percent, but in some elections there are changes of more than 15 percent in both directions. The effect is one-sided only for the Swedish elections in 1991 and 1998, with a bad economy leading to a higher probability of abstaining for (almost) all voters. At the individual level, bad economic conditions can lead to a lower or a higher probability of abstaining. Previous analyses have missed this because the effect of the economy was modeled in a way that only allowed for either a positive or a negative effect. The conditional multinomial logit model that incorporates abstention due to alienation and/or indifference into the likelihood function allows for a positive or negative individual-level effect of a bad economy. The same conditions can make different people react in completely opposite ways. Some will be disappointed by the way a governing party handled the economy and not vote for it any longer. If they cannot find a suitable alternative, they are *more* likely to abstain. Others who may have abstained in past elections may now see a competency difference between the parties, making them *less* likely to abstain. The effect on aggregate turnout depends on the prevalence of each of these reactions and is therefore ambiguous. Indeed, the mean effect of a worsening economy is very different in the ten elections: aggregate abstention is higher in four cases, lower in three, and close to zero in another three.

The flexibility of the unified model with abstention due to alienation and/or indifference thus provides important new insights into the connection between the economy, vote choice, and turnout. Different people can react differently to the same economic conditions. Some will be more likely to vote for a different party, while others will react by changing their turnout behavior. Despite the small number of election studies analyzed, there is evidence that the relative prevalence of the two types of economic voting is systematically related to features of the party system. When there are many parties, voters are likely to find alternative parties to cast a ballot for. When there are only few parties, this is less likely and voters react by changing their turnout behavior to a greater degree. For those that do react by changing their probability to abstain, some will be more likely to stay at home on election day, while others are more motivated to cast a ballot. The aggregate effect is ambiguous. It is therefore not surprising that existing studies exploring the connection between economic conditions and abstention find negative, positive, and null effects.

## 6. Simulations

In the previous section, I have empirically demonstrated that there are large differences in how individuals react to worsening economic conditions: some vote for a different party, some stay at home when they would vote under “normal” conditions, and others who would have abstained are now more likely to turn out. I have also provided some tentative evidence about the macro-level conditions that determine the relative prevalence of the different reactions. However, a sample of ten elections from four countries clearly does not offer enough variance to answer these questions sufficiently. In this section, I thus present the results from a series of computer simulations that use the unified model with abstention due to alienation and/or indifference.<sup>6</sup> I systematically explore the impact of macro-level conditions on the relative prevalence of the two types of economic voting, as well as on aggregate turnout. In line with the evidence in the previous section, the simulations focus on the effect of the number of parties. Additionally, I explore the impact of the distribution of responsibility between parties, which takes a prominent place in the literature. To calibrate the simulations’ parameter values, I use the empirical estimates from the statistical model in the previous section. This ensures that the simulated elections match real-world elections on a number of important characteristics. It is important to note that the results in this section should not be taken as empirical evidence. Rather, they illustrate the consequences of the macro-level conditions *assuming* that the theoretical model outlined above and used for the statistical estimation in the previous section is correct. In the absence of reliable survey data for a large number of elections, empirically informed simulations are a second-best option that can provide insight into how macro-level variables commonly used in the literature affect the two types of economic voting.

### 6.1. Setup

I use a reduced-form of Equation (1) for the voter’s utility function:

$$U_i(j) = \alpha_1 \theta_j \lambda_i - \alpha_2 (x_i - z_j)^2 + H_{ij} + \varepsilon_{ij} \quad (11)$$

where  $\lambda_i$  denotes the voter’s evaluation of the state of the economy. The responsibility share attributed to party  $j$  is denoted by  $\theta_j$ , subject to  $\theta_j \geq 0$  and  $\sum_{j=1}^m \theta_j = 1$ . That is, the shares of the parties must be non-negative and sum to one. The set  $\{\theta_j\}$  can be thought of as the voter’s assessment of responsibility shares for the different parties. If there is high clarity of responsibility and one party is in power alone, it will receive a responsibility share of one, while all other parties receive zero. If there is a coalition government or different parties are in control of different branches of government, responsibility is more widely dispersed (for a similar approach see Duch and Stevenson, 2008). For simplicity, I assume that the evaluation of the economy is

<sup>6</sup> For a good argument on the usefulness of simulations in the study of elections, see Laver and Sergenti (2012).

the same for all voters, denoted by  $\lambda$ . The voter's ideal policy position on a unidimensional scale is  $x_i$  and the party's policy is  $z_j$ . I assume a standard quadratic loss function. The weight voters give to the economic evaluation is given by  $\alpha_1$  and the weight associated with the spatial policy term is  $\alpha_2$ . Other attributes that influence the voter's utility for the party, such as their assessment of candidate characteristics, are summarized by the scalar  $H_{ij}$ .<sup>7</sup> Finally,  $\varepsilon_{ij}$  is a random error term. Alienation and indifference parameters are as given in Equations (2) and (3).

The simulations proceed in two steps. First, I simulate an election in which the economy has no influence and voters decide only based on positional considerations. Parties choose their positions to maximize their vote share.<sup>8</sup> Unsurprisingly, they converge to the position of the median voter. Using these positions as a baseline, in a second step I simulate electoral competition under different combinations of the state of the economy and the distribution of responsibility. Given the valence advantages or disadvantages produced by these combinations, parties again chose their positions to maximize their vote shares. When their valence disadvantage is sufficiently large, they will take positions away from the median voter (Adams, 1999).

I simulate an electorate with a population of 1000 voters. The sets of responsibility shares  $\{\theta_j\}$  that are simulated range from a situation in which all parties share power equally, to one in which one party governs alone, with a few interesting combinations in between. I fix the weight of the positional term  $\alpha_2$  and vary the weight of the economic evaluation term  $\alpha_1$  to get percentages of total economic voting ( $\Delta_{\text{Total}}$ ) between 3 percent and 18 percent, which is about the range observed in the ten elections analyzed in the previous section. The set of the remaining parameters is chosen such that the simulations produce outcomes that match what was observed for the elections analyzed in Section 5 closely, no matter whether they involve two, three, or four parties. The parameter choices are discussed in detail in the Appendix.

### 6.2. Simulations: two types of economic voting

How does the number of parties and the distribution of responsibility between them affect the relative prevalence of the two types of economic voting? Fig. 3 shows the results of the simulations in graphical form.<sup>9</sup> It plots the changes in probabilities of casting a ballot for a different party over total economic voting ( $\Delta_{\text{Parties}}/(\Delta_{\text{Parties}} + \Delta_{\text{Turnout}})$ ) when there are two, three, and four parties. Each row shows a different combination of the shares of governing responsibility. Within a row, results are given from a bad economic situation on the left to a good one on the right. Darker fields

indicate a higher percentage of economic voting through changing probabilities of choosing a different party.<sup>10</sup>

Two things stand out. First, vote-switching is more prevalent if the number of parties is high. When there are only two parties, between 50 and 70 percent of economic voting happens through changing probabilities of voting for a different party. If there are four parties, almost all economic voting happens through vote switching in most situations. This is in line with the empirical findings in the previous section. Second, vote switching is also more common when there is a high concentration of responsibility. If few parties are in government, voters can change their vote to another party in response to economic mismanagement. When many parties are responsible for the economy, voters have a hard time finding another party to vote for. The simulations thus suggest that two factors that have been prominent in the literature affect the relative prevalence of the two types of economic voting. Voters react to economic conditions mostly by voting for an opposition party if governing responsibility is concentrated and if the number of parties is high. Economic voting as traditionally defined is thus most prevalent when there is clarity of responsibility, so it is clear who to vote against; and when there are available alternatives for dissent, so there are parties to vote for. The novel insight is that few available alternatives and/or dispersed responsibility do not mean that economic voting does not take place. Instead, the second type of economic voting becomes more prevalent.

### 6.3. Simulations: turnout rates

Many of the studies that investigate the relationship between economic conditions and the decision to vote do so at the macro-level. In Section 5, I have shown that the same economic conditions have different effects on different people. Some are more motivated to turn out by a worse economy, while others are more likely to abstain. This can affect overall turnout positively or negatively. In this section, I explore the effect of the number of parties and the distribution of responsibility between them on aggregate abstention rates. Fig. 4 displays the turnout rates predicted by the model for select combinations of responsibility shares, given different levels of the importance of the economic voting term  $\alpha_1$ . Results from ten simulation runs for three different levels of  $\Delta_{\text{Total}}$  are given. In the first row, total economic voting is at most 4 percent, in the second row it is 12 percent and in the last row it is 18 percent. The light gray dots give the turnout rates when responsibility is shared equally among all parties, the black dots when one party governs alone, and the dark gray dots for a configuration in between.<sup>11</sup> Note that turnout is higher

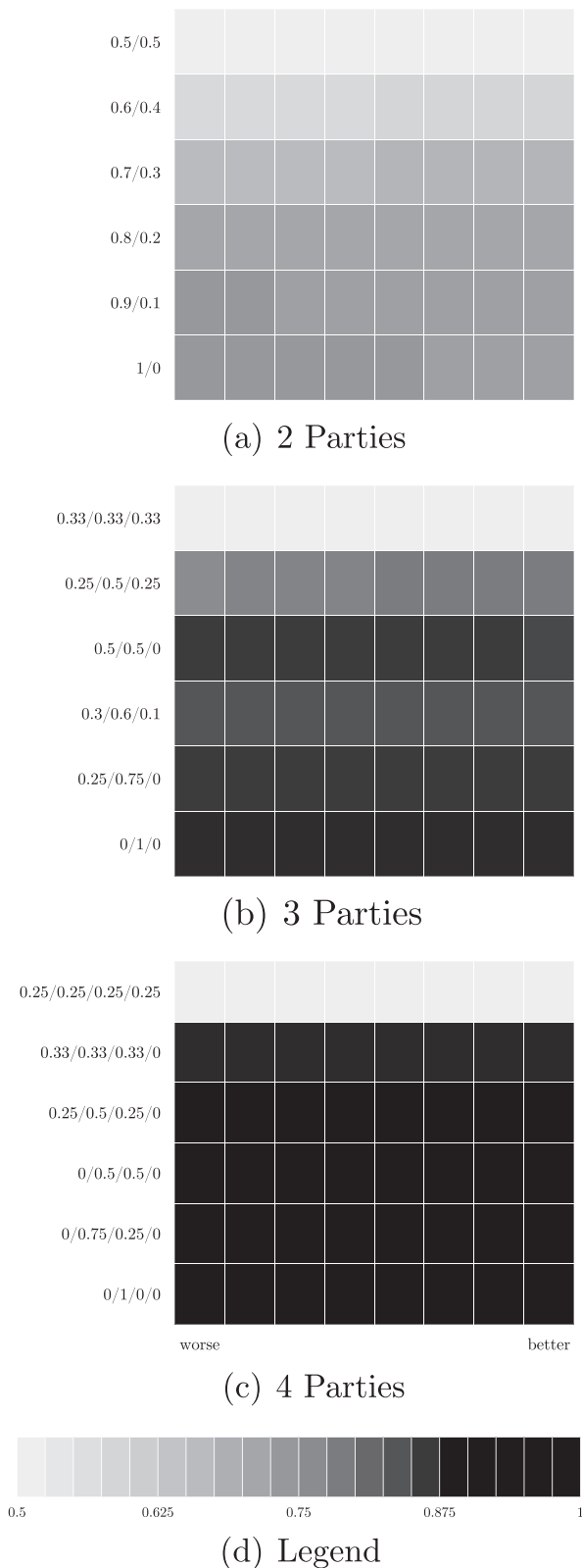
<sup>7</sup> The absolute magnitude of  $H_{ij}$  quantifies how important this term is relative to the economic evaluation and the positional component.

<sup>8</sup> The maximization process proceeds as follows: In each iteration, parties evaluate their vote share for all positions between 0 and 10 (in increments of 0.1), holding the positions of the other parties constant. They chose the position that gives them the highest vote share. In each iteration every party maximizes once and there are 20 iterations. The positions converge to their equilibrium value after a few iterations.

<sup>9</sup> Ten electorates with parameters drawn from the same distributions were simulated. The graphs show the mean levels for each combination.

<sup>10</sup> I only present results of the simulations in which the maximum  $\Delta_{\text{Total}}$  is about 12 percent. The pattern is the same when the impact term of the economic evaluation  $\alpha_1$  is higher or lower, only more or less pronounced. It is worth noting that the model predicts vote shares for the incumbent parties that are in line with the empirical findings in the literature. The more governing responsibility a party has and the worse the economy is, the larger the vote share losses are.

<sup>11</sup> The responsibility shares for the configuration in between are: 0.8/0.2 for two parties, 0.3/0.6/0.1 for three parties, and 0/0.5/0.5/0 for four parties.

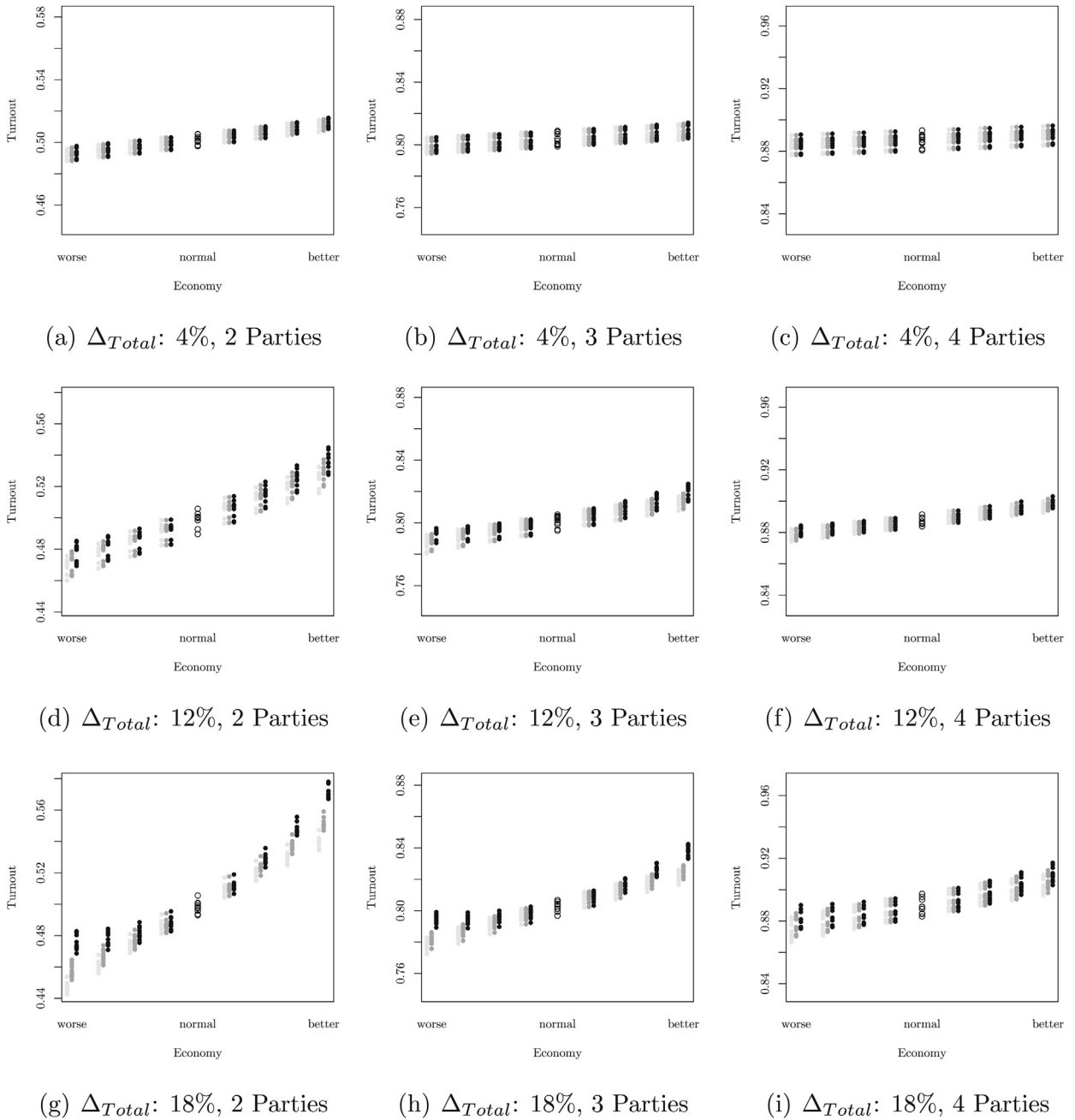


**Fig. 3.** Results of the simulations. Percentage of economic voting through changing probabilities of voting for a different party out of total economic voting ( $\Delta_{Parties}/(\Delta_{Parties} + \Delta_{Turnout})$ ). Each row shows a different combination

when there are more parties, as both alienation and indifference are lower. To ease comparison, the range of the vertical axes is the same in all graphs.

If total economic voting is low, only a slight positive trend (a better economy means more turnout) is discernible. As  $\Delta_{Total}$  increases, turnout changes to a greater degree, and more so when there are fewer parties. This is in line with the finding of the previous sections that economic voting happens almost exclusively through party switching when there are many parties. If responsibility is dispersed, turnout decreases linearly as conditions get worse and increases as they get better. This is because alienation increases if the parties mismanage the economy. Indifference does not change since all parties are held responsible equally. If responsibility is concentrated, turnout is non-linear and resembles a J-shape. Turnout decreases under moderately bad conditions, and then stays constant or even increases again as conditions get worse. This reflects the different effects of alienation and indifference. Again, alienation is higher when the economy is bad. The effect of indifference works in both ways. Voters who support opposition parties on positional grounds will be even less indifferent if the economy is bad and are thus more likely to turn out. Voters who support the government's policy still prefer the party on positional grounds, but they discount this because of the perceived lack of competency. In other words, they are more likely to be indifferent and not cast a vote. Finally, voters who are indifferent between the parties on positional grounds can now see differences between the parties on performance grounds. This makes them less likely to be indifferent and more likely to cast a vote for an opposition party. If responsibility is concentrated and the economy is sufficiently bad, the decrease in indifference among "independents" will cancel out or even surpass the negative effects of increased alienation and increased indifference among "partisans." The indifference effect is less important the more parties there are. Indifference is lower to begin with, as it is more likely that voters find a party to vote for if there are more options. The additional information about the parties' competency provided by the economy then does not add much, and indifference remains unchanged. The effect of the economy on alienation is also attenuated due to alienation being low in the first place. This means that when there are many parties and/or responsibility is dispersed, the model predicts that the economy has a linear positive effect on turnout. But when the number of parties is low and responsibility is concentrated, turnout follows a non-linear form. The results of the simulations suggest a reason for the contradictory findings of the effect of the economy on turnout in the literature. The effect is potentially non-linear, particularly if the distribution of responsibility or the number of parties change from one election to the next. Existing studies usually test only for linear effects. Depending on the sample used, it is thus not surprising that they find evidence for positive, negative, or no effects.

of the shares of governing responsibility. Within a row, results are given from a bad economic situation on the left to a good one on the right.



**Fig. 4.** Results of the simulations. Turnout rates given economic conditions and different configurations of governing responsibility at different levels of total economic voting and for different numbers of parties. The light gray dots give the turnout rates when responsibility is shared equally among all parties, the black dots when one party governs alone, and the dark gray for a configuration in between.

### 7. Discussion and future research

This paper started out with the observation that the large majority of studies on economic voting analyze vote choice and ignore a potential effect on turnout. The studies that do analyze turnout often ignore vote choice. What is more, they come to contradictory findings at the micro and macro-level. I have argued that vote choice and the decision to turn out are not independent of each other, but need

to be analyzed jointly. The paper makes two novel contributions. First, it shows that there are two types of economic voting, and that macro-level conditions systematically influence their relative prevalence. Using a statistical analysis of ten elections from four countries, I present evidence that economic voting through vote switching is dominant when there are many parties. If the number of parties is low, however, a substantial part of economic voting happens through changes in the probability of turning out. The



exploratory computer simulations suggest in addition that “traditional” economic voting is dominant when there is high clarity of responsibility. When responsibility is dispersed, however, voters are more likely to react through their turnout decision. Studies that ignore abstention run the risk of significantly underestimating the effect of the economy on elections. Second, the paper provides an explanation for the contradictory findings on the relation between the economy and turnout at the micro and macro-level. The empirical analysis shows that in each given election, some voters are more likely to abstain in reaction to changing economic conditions, while others are less likely. In the aggregate, this can lead to higher or lower turnout rates. The simulations suggest that the effect can be non-linear. Extant studies test for simple linear effects and, depending on the sample they use, come to contradictory conclusions.

I see two main avenues for future research. First, there are various ways to further explore the link between vote choice, turnout, and the economy. Most importantly, additional empirical work is warranted. The statistical analysis in this paper focuses on aggregate effects – the relative prevalence of the two types of economic voting and the effect on turnout. Doing so has also implicitly generated predictions about which individuals are more likely to react in what way. Future research could test these implications at the micro-level with the validated turnout data used in this paper. Another priority is to extend the analysis to elections in other countries to gain more variance, especially on the distribution of responsibility, potentially through a multilevel model. Such an analysis, however, needs to address potential bias when using unvalidated turnout self-reports.

Second, the paper also has implications for other debates that are worth exploring in more detail. Most importantly, there is an extensive literature on the connection between turnout and election outcomes (Lijphart, 1997; Grofman et al., 1999), including a special issue of *Electoral Studies* (see Lutz and Marsh, 2007). Starting from the observation that not all citizens are equally likely to turn out, a large number of studies ask what consequences this has for the vote shares of the competing parties. For example, citizens with lower socioeconomic status are more likely to support left parties but are also less prone to turn out. Left parties are thus thought to have an electoral disadvantage and stand to benefit from higher turnout. The general finding, however, is that “turnout does not matter a great deal, no matter what method, dataset or period of time the authors apply” (Lutz and Marsh, 2007, p. 544). Most of this literature focuses on individual resources as an explanation for abstention and thus implicitly assumes that people’s turnout decision is independent of their evaluation of the parties that stand for election. This paper, however, has suggested that the two are tightly linked. Given the inconsistent findings, it is worth attempting to incorporate the features of the party system and valence issues, such as the economy, more explicitly. It may be that in some elections many leftist voters do not turn out because their party has mismanaged the economy (or because of some other negative valence event), while in others the same is true for

voters right of center. If this mechanism is sufficiently important compared to the impact of individual-level variables, such as socioeconomic status, but not accounted for in the empirical specification, one is again bound to find inconsistent results at the micro and macro-level. The probabilistic model of economic voting with abstention due to alienation and indifference proposed in this paper might serve as a starting point for such an analysis.

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### Appendix. Parameter choice for simulations

The voters’ positions on the unidimensional policy scale are  $x_i \sim N(5, 2.5)$ , so there is a large number of voters that are centrist, and more than 95 percent are between 0 and 10. It is a common feature of electorates around the world that their left-right positions are normally distributed (Laver and Sergenti, 2012, Ch. 3). The sets of responsibility shares  $\{\theta_j\}$  that are simulated range from a situation in which all parties share power equally to one in which one party governs alone, with a number of combinations in between (see Fig. 3). For simplicity I assume that the evaluation of the economy is the same for all voters (denoted by  $\lambda$ , which ranges from  $-0.8$  to  $0.8$  in steps of  $0.2$ ). I fix the weight of the positional term  $\alpha_2 = 1$  and vary the weight of the economic evaluation term  $\alpha_1$  to get percentages of total economic voting ( $\Delta_{\text{Total}}$ ) between 3 percent and 18 percent, which is about the range observed in the ten elections analyzed in the previous section (corresponding to  $\alpha_1 = 0.25$  when  $\Delta_{\text{Total}}$  is 4,  $\alpha_1 = 0.75$  when  $\Delta_{\text{Total}}$  is 12 percent, and  $\alpha_1 = 1.25$  when  $\Delta_{\text{Total}}$  is 18 percent.)

To account for other attributes that influence the voter’s utility for the party, I draw  $H_{ij} \sim N(\mu_H, \sigma_H)$ . In the electorate as a whole, no party has an advantage through this term. Different values for  $\mu_H$  and/or  $\sigma_H$  impact the level of  $\Delta_{\text{Parties}}/\Delta_{\text{Total}}$ , the percentage of economic voting that happens through changes in the probabilities of voting for the different parties as opposed to changes in the probability of abstaining. I chose the parameters such that  $\Delta_{\text{Parties}}/\Delta_{\text{Total}}$  is at most about 70 percent for two parties, which is what was found empirically in Section 5 ( $\mu_H = 3.5$  and  $\sigma_H = 1$ ). This leads to a  $\Delta_{\text{Parties}}/\Delta_{\text{Total}}$  of around 85 percent for three parties and 90 percent for four parties, which is again in line with what was observed empirically. Finally, the statistical models produce estimates of the percentage of people that were alienated, indifferent, and alienated and indifferent. They are for two parties: 9–15 percent alienated but not indifferent, 20–28 percent indifferent but not alienated, and 10–13 percent indifferent and alienated. For three parties the percentages are 11–15 percent, 8 percent, 2–5 percent. For four parties they are 12–14 percent, 0–3 percent, 0–1 percent. The alienation and indifferent thresholds are chosen such that the simulations produce roughly the same rates ( $T(I) = 1$  and  $T(A) = 1.8$ ).

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