Information and Economic Voting*

JONATHAN ROGERS AND MARCELO TYSZLER

*T*he connection between the economy and vote choice continues to garner interest both in the academic and popular press. To isolate the effects of economic considerations, we develop a laboratory experiment that allows us to vary these considerations at three levels: the individual, community, and national economy. Choices by policymakers directly affect outcomes at each of these levels, allowing us to test for egotropic, "communotropic," and sociotropic voting, as well as examine information search. We observe significant demand for information and that demand decreases with the complexity of the environment. Moreover, information demand is positively associated with other-regarding behavior.

In any particular election, especially at the national level, there are many salient political issues. Yet, whether there is a war or a domestic social movement, whether the electorate is polarized or unified, the state of the economy is always a pertinent campaign issue to at least one of the major parties. However, while the idea that the economy matters now borders on conventional wisdom, the definitions of "the economy" used both in popular and academic literature vary widely.

Following the "Responsibility Hypothesis" (Lewis-Beck and Paldam 2000), it is understood in the literature that voters hold the government responsible for "the economy." Two common interpretations tend to dominate the discussion: egotropic and sociotropic voting (Nannestad and Paldam 1994). Egotropic (also known as pocketbook) voting is the principle of rewarding or punishing leaders based on changes in the voter's personal financial circumstances. While the choices of politicians are rarely intended to result in direct personal gain or loss for an individual, that individual may credit or blame the politician. On the other end, sociotropic voting is where voters choose based on which politician they believe has been (or will be) better for the national economy. Again, leaders have only limited influence over macroeconomic conditions, but may still be judged based on economic performance.

However, economic conditions are not uniformly distributed across geographic areas. Variation in tax rates, relative concentrations of industries, and demographics, among many other factors, make some regions more prosperous than others. As an example, while much of the United States experienced reasonably strong growth during the 1990s and early 2000s, the economies of the traditional steel and manufacturing regions of the Midwest (including cities like Detroit and Cleveland) suffered, along with their industries. Thus, while voters in much of the United States may have been pleased with economic conditions during the 1996 presidential

campaign, those in regions directly harmed by expanded free trade policies may have been far less so. For these voters, local economic conditions may have outweighed national level interests.

The national economy is not a concept with which most voters have direct interaction. Some have blamed the decline of manufacturing areas in the Midwestern United States on the ratification of the North American Free Trade Agreement. While egotropic motives may have resulted in reduced approval rates among those who lost their jobs, contact with laid-off friends, family, and neighbors may have reduced approval, even among those not directly affected by job cuts (Glasgow 2005). It has also been shown that citizens have certain expectations as to a federal government response to natural disasters (Chamlee-Wright and Storr 2010) and blame for a lack of short- or long-term (local) economic recovery may be attributed to the president, rather than only to local officials. Thus, a degree of empathy, in-group solidarity, or preference for community strength may result in a level of economic voting that is neither egotropic nor sociotropic, but "communotropic." To define it formally, communotropic voting is the electoral rewarding or punishing of incumbents for general economic conditions within a particular community or region (Rogers 2014). These are pro-social preferences, but are geographically constrained and the incumbent has responsibilities to areas other than the relevant region.

In terms of cognitive difficulty, egotropic voting is easy, as individuals tend to know whether their own situation is improving or worsening. To be either communotropic or sociotropic, information is required. The goal of this study is to test what level of economic information voters seek and what is most useful in making a vote choice. To do this, we have created a stylized democracy, where politicians set tax rates and redistribution policies, while voters signal their (dis)approval to officials through elections and opinion polls. A key advantage of our design is that conditions at the national, community, and personal level are directly attributable to the leader and so we are able to disentangle preferences at each of the three levels.

ECONOMIC VOTING

From the perspective of egotropic voting, voters attribute improvements in personal finances (Fiorina 1978), loss of employment or inability to find a job (Grafstein 2005), or outstanding debt problems to the current administration. For each, improved conditions are associated with greater levels of support for leaders. Among the relatively few who find support for egotropic voting, Markus (1988) finds a link between personal conditions and individual vote choice. He argues that the lack of a connection found in aggregate level studies is due to the relative proportion of voters suffering economic hardships during any given campaign is relatively stable.

Sociotropic voters reward politicians who are attributed credit for higher rates of economic growth (Lewis-Beck and Rice 1984; Lewis-Beck and Tien 1996), lower rates of inflation (Norpoth 1996), lower consumer prices (Lepper 1974; Arcelus and Meltzer 1975), or an otherwise stronger economy according to leading economic indicators (Wlezien & Erikson 1996). Kinder and Kiewiet (1979) further argue that voters may have preconceptions as to which party is better suited to handle national economic problems. Whatever the problems in question may be, the argument is sociotropic in nature. However, it is not clear how voters perceive national economic conditions, with some studies suggesting bias introduced by local conditions, personal finances, political attitudes, demographics, and the media (Hetherington 1996; Duch, Palmer and Anderson 2000; Rogers 2014; Rogers 2016). Finally, Powell and Whitten (1993), among others, argue that the ability of voters to sanction government for its economic performance is contingent on the clarity of its political responsibility.

Any claim of economic voting at the various levels assumes that voters are aware of the state of the economy. Socioeconomic status, among many other demographic variables, is known to affect the accuracy of economic perceptions (Holbrook and Garand 1996). Duch, Palmer and Anderson (2000) find that perceptions of the national economy are conditioned by a number of factors, including political attitudes. It is also possible that voters shift their attributions of responsibility for changes in the economy, based on partisanship (Tilley and Hobolt 2011). In either case, perceptions of conditions and responsibility may vary from reality, but must be correlated. Moving to the local level, it has been found that objective state-level economic conditions increase self-interest in survey respondents (Lau and Heldman 2009). Berry and Howell (2007) use school board elections and find that voters hold officials accountable for performance. It may also be the case that political sophistication affects sociotropic or egotropic behavior. Gomez and Wilson (2001, 2007) assert a theory of heterogeneous attribution, wherein low sophisticates assume that the national economy is under the control of the president high sophisticates, in contrast, understand that the economy is complex and that there is little connection between the president's actions and the national economy. These high sophisticates do, however, recognize connections between policies set by the national government and personal economic circumstances. Thus, high sophisticates are more likely to vote egotropically.

One aspect of economic conditions that politicians can (together) control is tax and redistribution policy. Peterson (1981) argues that at the local level, politicians are sensitive to not setting tax rates too high, out of fear that employers and residents might relocate to a more favorable tax environment. By the same right, they avoid setting taxes too low, as without sufficient revenue, government would be unable to provide the basic services necessary for industry. In a federal system, multiple levels of government have the ability to tax citizens, so one would expect economic voting to be weaker, as citizens are less able to attribute blame or credit to specific levels of government. If only a central authority can set taxes, however, then citizens can determine who is responsible (Anderson 2006). Rich or poor, liberal or conservative, citizens want their country to be economically prosperous. That said, they do not all agree on what tax structure will best advance this end (Lewis-Beck and Nadeau 2011). Their preferences will depend both on their own circumstances and what information is available to them about how objectively well or poorly the economy is performing (Rogers 2016).

While a degree of economic information is obviously known to a voter (e.g., their employment status), other information is likely to require active search. For example, people are generally aware that they pay taxes, but systematically overestimate how much (Gemmell, Morrissey and Pinar 2004). Lau and Redlawsk (2006) and Redlawsk (2004) find various correlates with content and depth of search, including the abilities of the voter and the complexity of the environment. Indeed, more complex political choices may induce voters to employ simpler strategies, to limit the cognitive difficulty of the decision (Lodge and McGraw 1995). One way in which complexity can be introduced is through inter- and intra-community heterogeneity in income. This makes it harder for voters to easily and accurately associate policy with performance and may affect demand for information. Thus, while egotropic voting involves a very low (or trivial) information requirement, communotropic or sociotropic preferences are much more demanding.

All of these studies have contributed to our understanding of economic voting and of information search, but to disentangle the three levels of economic voting and their relationship to information search, something more is needed. In particular, it would be useful to isolate voters from all but economic considerations. This would allow us to avoid the effects of partisanship, social issues, campaigns, and candidate personalities on vote choice. Because of this, we have designed an experiment that captures the key components necessary to the theories.

Among the required elements are politicians, voters, various economic policies, and the establishment of reference groups for the voters. To do this, voters will be split into minimally linked communities. People have long been found to form in-group connections based on even the most simple of bonds (Tajfel and Billig 1974; Tajfel and Turner 1979). The actions of the politicians (tax and redistribution policies) will be directly responsible for the welfare of each individual, each community, and the society (the group as a whole). By examining what information voters then seek about the actions of politicians, and observing how this affects approval and vote choice, we will be able to measure egotropic, communotropic, and/or sociotropic voting.

EXPERIMENTAL DESIGN

The experimental design creates a stylized democratic society, capturing the essential elements introduced in the previous sections. It consists of three communities of five voters each and two politicians. Voters are randomly assigned to a community and endowment, with both remaining fixed throughout the experiment. Endowments can be low (100 ECUs) or high (500 ECUs). This composition allows for enough variation within and between communities allowing us to verify the impact of income distribution on the search patterns for information. Initially, one of the politicians is randomly selected to be in office and the other is assigned to be a candidate seeking to replace the incumbent. The incumbent receives a fixed salary of 500 ECUs while the candidate receives a salary of 100 ECUs. This was done to ensure that the politicians' only direct incentive would be to win votes and receive the higher salary of the incumbent. Experimental points are converted at the rate of 500 ECUs/US$.

The incumbent's initial task is to select a tax rate. This rate, multiplied by the tax base (the sum of all endowments) yields the tax burden, the total amount of taxes paid by all voters. However, as governments can provide some goods and services more efficiently than individuals could on their own, there is an efficiency gain g for initial levels of taxation. For example, a government might be able to build a bridge more cheaply than an individual could on their own, because the government already employs engineers and owns relevant equipment. But as the tax rate increases, there is also an efficiency loss l. This reflects deadweight losses, administrative bloat, and also potential capital flight that might occur, when taxes are too high. To account for the interplay of efficiency gains and losses, the tax burden is transformed into tax revenue via the following function: Tax Revenue = $(w \times t) \times [(1 + g) - t \times l]$, where w is the nation's aggregate endowment (i.e., tax base) and t the tax rate. Thus, the tax burden is $w \times t$, while the tax revenues are thus generated following a format similar to a Laffer Curve.

In the experimental design g is set to 0.40, implying a 40 percent efficiency gain over the collected taxes, and l is set to 1, implying an inefficiency effect that increases in proportion to the increase in the tax rate. This means that the tax burden (the taxes extracted from the population) is different from the tax revenue (the funds available for politicians to spend). The reason for this use of the Laffer Curve is that there is a theoretical, non-linear relationship between the tax rate and revenues collected by government. If taxes are set too high, then this is argued to decrease the incentive to work or increase the incentive to dodge taxes.

Now while this would seem complicated, subjects are not required to do any math. Instead, subjects are provided with a table describing every possible combination of tax rate, burden, and revenue. Table 1 illustrates the tax revenue functions for the various treatments, to be described in the following subsection. Note that at 20 percent the net welfare is maximized and at 40 percent it breaks even. At 70 percent the politician maximizes the tax revenue under her control. Subjects are

TABLE 1   *Impact of Tax Rates Across Treatments*

Tax Rate (%)	Tax Burden	Tax Revenue	Difference
(a) Treatments: baseline, clustered, and heterogeneous			
0	0	0	0
10	390	507	117
20	780	936	**156**
30	1170	1287	117
40	1560	1560	**0**
50	1950	1755	− 195
60	2340	1872	− 468
70	2730	**1911**	− 819
80	3120	1872	− 1248
90	3510	1755	− 1755
100	3900	1560	− 2340
(b) Treatment: poor			
0	0	0	0
10	270	351	81
20	540	648	**108**
30	810	891	81
40	1080	1080	**0**
50	1350	1215	− 135
60	1620	1296	− 324
70	1890	**1323**	− 567
80	2160	1296	− 864
90	2430	1215	− 1215
100	2700	1080	− 1620

Note: Tables show the tax rates and how they relate to values of Tax Burden and Revenue in the different treatments (cf. Treatments section). The fourth column shows the difference between burden and revenue, where positive values reflect a net benefit to society. Bold highlights the optimal level (20 percent), the break-even level (40 percent), and the maximum revenue level (70 percent).

given one of the two tables (depending on the treatment). The highlighting and the "Difference" column are provided for the reader's convenience and were not shown to subjects.

The incumbent must then divide the tax revenue among the three communities. Within each community, the amount provided is shared equally among its members. This is all that the incumbent can do. The tax rate is naturally not the only way in which politicians can affect the economy, but this simplification does allow for a direct connection between policy outputs and outcomes. It also makes it possible for performance to differ at the community and national levels. The candidate's task is to simultaneously present a hypothetical alternative plan: a tax rate and a division proposal. All information about the candidate's hypothetical plan is presented to voters in the same manner as information about the incumbent's enforced plan.

Every third period, there is an election decided by majority vote. The newly elected politician comes into office and the losing one becomes the candidate. In the periods without election there is an approval survey on the job performance of the incumbent. Results are always publicly announced. Survey and election results are the only signals that politicians get in terms of what the voters do and do not like, though they also know how many rich and poor voters are in each community. This is meant to capture the inability of politicians to perfectly respond to public preferences. Politicians do know the average welfare change caused by their policy for the low and high endowed voters in each community separately and for the average voter in a given community and nation. They can also see the past policy decisions of the other politician. There are 16 periods, with the exact number of periods not announced, in order to avoid end-game effects.

The different levels of economic information that could influence voting behavior are the individual, the community, and the national levels. Understanding which information voters look for in order to support their voting and approval decision is a primary goal of this study. To directly observe which levels are relevant for a given subject, information is provided in a costly way. As demand for information has been shown to have a discontinuity at 0, subjects face a small but positive cost, set to 2 ECUs/item. We believe this induces a more careful consideration of the pieces of information, allowing us to better understand their search patterns (Schram and Sonnemans 2011). This provides a direct mechanism to observe the information requested by subjects, while incentivizing subjects to seek only the information that they want to use in making their decisions.

Voters are always informed about their endowment and final payoff. They also know the number of rich and poor voters in their own community and each of the other communities. They can then purchase additional information about the tax rate and on the welfare change of their own community, other communities, and the whole nation. Voters can see the same information (including any purchased information) for both politicians. That means, if a voter purchases a piece of information, she will have access to that piece of information about both politicians. Note that while the experimental design may seem complicated, it has been made as simple as possible, but no simpler. If the subjects were provided with any further information or the game made any more simple, then subjects would be able to easily calculate all of the information. We would then not know whether subjects did not purchase information, because they did not want it, or because they could calculate it for free (and possibly incorrectly), in their minds. As it stands, it is generally not possible to exactly calculate one piece of information, given that a voter has purchased another.[1]

A full copy of the instructions can be found in the Appendix. After reading the instructions, subjects took a quiz to ensure that they understood the experimental environment. Subjects were required to get every question correct to proceed.[2] After the experiment was over and before receiving their payment, subjects were asked to answer an open-ended question as to how they used the information provided in the experiment.[3]

Treatments

As the income distribution is expected to affect the demand for information, the treatment variable is the income compositions of the three communities. Our baseline composition is the homogeneous income distribution in which each community contains three low endowed and two high endowed voters. We refer to this distribution as *baseline*: (3,2); (3,2); (3,2). This presents a total of nine low endowed and six high endowed voters, and thus a total national endowment of 3900 ECUs.

In order to test the effect of the *intra*-community heterogeneity in the information decision while keeping the national distribution constant, we introduce the income distribution

---

[1] In those instances where it is technically possible, it remains so cognitively difficult that a subject is more likely to pay the trivial cost than work out the calculations themselves.

[2] If a subject got a question incorrect on their first attempt, the computer would notify them of the error and point them to the relevant part of the instructions to try again.

[3] All experimental sessions were run in a dedicated laboratory at a large research university. For the 16 sessions, a total of 272 subjects were recruited (17/session) via ORSEE, the Online Recruitment System for Economic Experiments (Greiner 2004). All subjects who arrived on time, regardless of whether or not they were used, were paid a $10 show up fee. Total per subject payments averaged $18.07 and sessions typically lasted between 75 and 90 minutes. The experiment was programmed and conducted with the software z-Tree (Fischbacher 2007).

TABLE 2   *Experimental Treatments*

Distribution		National Distribution	Intra-Community Heterogeneity	Inter-Community Heterogeneity
	C1 C2 C3			
Baseline:	{(3,2), (3,2), (3,2)}	9,6	Low	Low
Clustered:	{(1,4), (4,1), (4,1)}	9,6	Moderate	Moderate
Poor:	{(4,1), (4,1), (4,1)}	12,3	Moderate	Low
Heterogeneous:	{(2,3), (3,2), (4,1)}	9,6	(3,2): low; (4,1): moderate	High

Note: C1, C2, and C3 are Communities 1, 2, and 3, respectively. Each ordered pair in the chart shows the number of (low, high) endowment voters present.

clustered: (1,4); (4,1); (4,1). This distribution differs from the baseline, however, also on the degree of *inter*-community heterogeneity. To disentangle these effects, we look additionally at the distribution *poor*: (4,1); (4,1); (4,1), which has the same degree of inter-community heterogeneity as the *baseline* (i.e., homogeneous) and the same degree of intra-community heterogeneity as *clustered*. This comes at the cost of changing the national endowment and national income distribution (now 12 low endowed and three high endowed voters, and thus a national endowment of 2700 ECUs).

In order to complete the picture a final income distribution is needed: *heterogeneous*: (2,3); (3,2); (4,1). This distribution has the same national endowment as *baseline*, with a higher degree of inter-community heterogeneity.

Table 2 summarizes the design highlighting how the different distributions can be compared.

PREDICTIONS

Based on the theories discussed earlier and the experimental design outlined in the previous section, it is possible to derive a set of hypotheses. What we predict depends, however, on both the preferences of voters and on the beliefs of politicians regarding those preferences. For the sake of convenience, and because we are interested in examining information and other-regarding behavior, we will use egotropic behavior by voters as the null.

To explain, first assume that voters are purely self-interested. That is, voters care only about which politician would provide the largest net gain, or smallest net loss, in after policy welfare. As this information is provided for free and is sufficient to let voters distinguish between candidates, there would be 0 information purchase. Further, changes in income distribution within and between communities would not be expected to have any effect on information demand, so there would be no treatment effects. If politicians believe voters to be egotropic, then they will set the tax rate at the revenue maximizing 70 percent rate, and attempt to win the minimum needed number of votes. That is, they will compete by redistributing tax dollars in an attempt to win any two random communities. Under certain circumstances, low endowment voters would prefer this, assuming risk neutrality. A tax rate of 70 percent gives the government 1911 ECU in revenue, which, if evenly split between two randomly chosen communities, would give each poor voter an expected after policy payoff of $\left(\frac{2}{3}\right)[(1911/10)+30]+\left(\frac{1}{3}\right)30 = 167.33$ ECU, as opposed to $(936/15)+80 = 142.4$ ECU under the "optimal" 20 percent tax rate, with even redistribution across all three communities. Given that both rich and poor voters pay the same tax rate in this experiment, rich voters are generally net losers from taxes and thus if they are egotropic, they would strictly prefer lower taxes, regardless of redistribution.

To derive alternative predictions, assume some degree of other-regarding preferences among voters. That is, voters care not only about their own personal welfare, but also about the welfare of neighbors and citizens at large. In this case, information purchase must be higher than under pure egoism, because other-regarding voters would need information about the consequences of policies for other voters. Therefore, we would predict significantly positive levels of information purchase among sociotropic and communotropic voters. The nature of this information, however, depends on whether voters care about the whole nation and/or about the community level.

If voters have mainly national concerns, we should expect positive information demand, as voters would need to know the tax rate and national average welfare change in order to reward or punish incumbents. For sociotropic voters, this would not change across treatments as a given policy would have identical effects at the national level in each condition. If voters have specific community level concerns, more information is needed, as income heterogeneity increases. This follows, because as heterogeneity increases, so does the complexity, making it more difficult to determine the exact connection between a policy and its effect on each of the three communities. Finally, information demand at the community and/or national levels must be connected to voting and approval behavior. If participants are spending money and cognitive effort on this information, it should be connected to vote choices.

Politicians must act accordingly if they anticipate communo- and/or sociotropic behavior, rather than if they expect voters to be egotropic. In the first two cases, they will set the tax rate at or near the optimal rate of 20 percent, as this is where national welfare is maximized and the burden placed on a given community is efficient. Beyond this, if they expect sociotropic behavior, the tax revenue will be distributed in a relatively even manner across communities, with any particular community rarely bearing more than its fair share of the burden. That is, where communities begin as equal to one another, they will remain more or less equal after taxation and redistribution.

Following this reasoning, we present the following set of predictions, where in each case the null is egoism (selfish/low information):

P1 : Politicians will choose the "optimal" tax rate (20 percent).

At the 20 percent tax rate, politicians are providing the greatest net benefits to society (see Table 1). They are placing relatively little burden on voters and, based on the revenue function, have a relatively large amount of money to redistribute. The manner in which they do this redistribution depends on what they believe voters will prefer.

P2 : Politicians will redistribute revenue proportionally in all treatments.

Recall that politicians cannot direct tax revenue to their own pockets and only receive personal benefits in the form of their flat salaries of 500 ECU (incumbent) or 100 ECU (candidate). Because every voter faces the same tax rate, more of a burden is placed on communities that have a larger tax base. Therefore, if politicians believe that voters care about fairness in outcomes, they will distribute revenues, relative to how much is extracted from each community.

P3 : Information purchase will be significantly higher than 0.

If voters are purely self-interested, then they will only care how much better or worse off they are made by each politician's policies. This information is provided for free. If they care about

community or society level conditions, then they will purchase this information. Even though the information is trivially cheap, they will only purchase the information, if they plan to use it.

P4 : Information purchase will increase as inequalities within and between communities increase. Specifically, information purchase will increase in the following order: *baseline, poor, clustered, heterogeneous*.

As complexity of the information environment increases (see Table 2), it becomes increasingly difficult for voters to determine how a set of policies affects each community and each voter within those communities. Because of this, more information is needed, in order for voters to choose based on other-regarding preferences.

P5 : Approval and vote choices will be influenced by changes in community and national level conditions, as well as how fairly the incumbent has chosen to reallocate tax revenue.

Finally, if voters have other-regarding preferences, then this must be reflected in approval and vote choice. Those who purchase information are expected to do so for a reason, so information purchase will be taken as a measure of other-regarding preferences.

RESULTS

As the focus of this study is the behavior of voters, this will be the main component of the analysis. We start this section, however, by providing a description of how politicians set taxes and how they redistributed revenue.

Politicians' Behavior

Table 3 shows the average tax rates chosen by politicians, aggregated, as well as by treatment. As it illustrates, both incumbents and candidates select, on average, a tax rate close to the optimal (20 percent). As for redistributive policies, Figure 1 shows triplots of the percentage of the after tax national endowment given to each community. For example, a point at the very top of a triplot would indicate that the politician has allocated 100 percent of the tax revenue to community 1. A point exactly on the midpoint of the line between C1 and C2 would mean that the politician has given 50 percent to C1, 50 percent to C2, and 0 percent to C3. This figure then shows that politicians structure tax returns such that they do not heavily modify the initial distributions. This is demonstrated in the clustering of points near the center of the triangle. A point exactly at the center of the plot would mean a perfectly even split of the tax revenue among the three communities.

Combined, this suggests that differences between the incumbent and candidate are more about specific values than about the structure of the policies. If politicians are electorally motivated, then this behavior would be consistent with expecting voters to behave in line with other-regarding preferences, as outlined in predictions P1 and P2.[4] An alternative explanation is

---

[4] Using average behavior per electorate, *t*-tests reject the null hypothesis that the tax rate is 70 percent both for the incumbent and candidate ($p \leq 0.01$, $N = 16$). Likewise, they can only marginally reject if the hypothesized value is 20 percent ($p = 0.0534$, $N = 16$ for the incumbent and $p = 0.0150$, $N = 16$ for the candidate). Regarding redistributive policies, the average SD of the fractions for each community is 0.0645 (with a 95 percent CI of (0.0318; 0.0971)) for the incumbent and 0.0638 (with a 95 percent CI of (0.0309; 0.0967)) for the candidate. This is much lower than the SD of 0.2886 one would expect under targeting.

TABLE 3   *Politicians' Average Choice*

Treatment	Tax Rate
Baseline	
Incumbent	23.75
Candidate	21.72
Clustered	
Incumbent	27.19
Candidate	30.31
Poor	
Incumbent	24.38
Candidate	27.81
Heterogeneous	
Incumbent	22.97
Candidate	23.59
Total	
Incumbent	24.57
Candidate	25.86

Note: The second column shows the average tax rate chosen by the incumbent and candidate. The average is across all rounds and groups within each treatment.
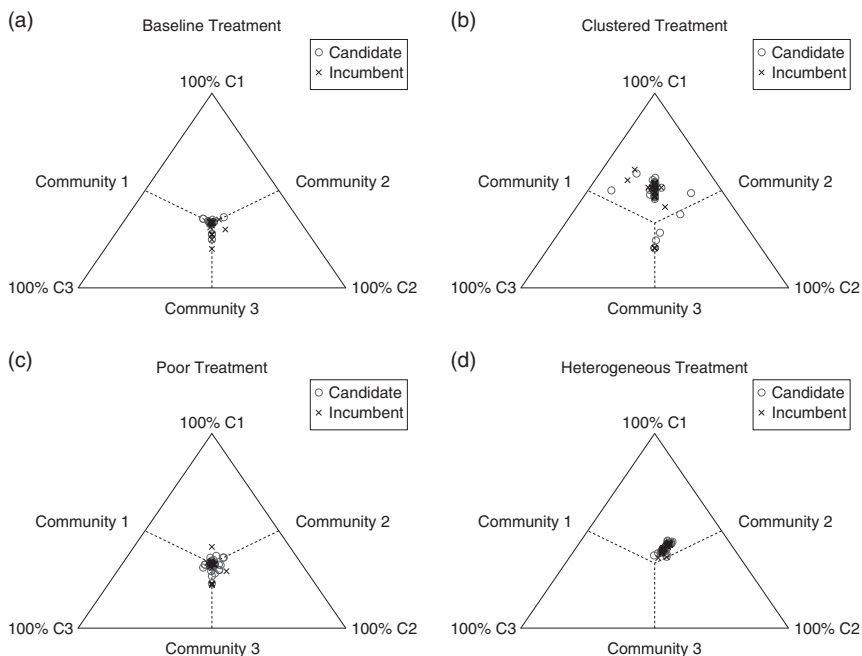

Fig. 1. *Politicians' after policy dispersion*
Note: Triplots show the percentage of the after tax national endowment allocated by politicians (either incumbent or candidate) to each community. Each panel shows data from all rounds in a given treatment (cf. Treatments section). The triplot is an equilateral triangle in which the top, bottom right, and bottom left corners indicate an allocation of 100 percent to communities 1, 2, and 3, respectively (endowment distributions for each community are defined in Table 2). The "Y" in the center divides the triangle into regions in which two communities receive the same percentage, with the crossing of the three lines indicating an equal split (i.e., one-third to each community).

that politicians were following a norm of even redistribution and this is possible (Fehr and Fischbacher 2003). However, in the *clustered* treatment, considerably more was allocated to community one, the wealthy community.[5]

Voters' Behavior

In order to understand voters' behavior we consider two aspects of the experimental data. We start by looking at information demand and then move into voting and approval behavior.

Figure 2 presents lowess curves of the proportion of information purchased over time for each treatment, in total and by endowment. Information purchase began at relatively high levels, but as voters focused in on what information was most relevant to them, they purchased less of the other information. Indeed for low endowment voters in the *heterogeneous* treatment and high endowment voters in the *poor* treatment, information purchase in late rounds becomes virtually 0.

A cursory glance at Figure 2 suggests that information demand is significantly positive, in support of P3 (which claimed that exactly this would happen). This suggestion is indeed confirmed by a one-sided truncated *t*-test ($p \leq 0.001$, $N = 16$). Note that this test uses average information purchase per electorate as independent observations. Across all periods, voters purchased 17.18 percent of available information (with roughly 2 percent more purchased by poor voters). This is in line with other-regarding preferences, and reveals some degree of sociotropic behavior.

P4 predicted that information demand would increase from treatment to treatment in the order *baseline*, *poor*, *clustered*, *heterogeneous*.[6] We find little support for this claim. To show this using Figure 2, notice that among high endowment voters, average information purchase was lowest in the *poor* and *heterogeneous* treatments, which are on the opposite ends of the spectrum, in terms of complexity for these voters. In the *poor*, there is only one rich voter in each community, so the information environment is quite simple. The *heterogeneous* treatment is much more complex, as there are different distributions in each community. Taken together, high endowed voters' demand for information in these two treatments is statistically lower than in *baseline* and *clustered* treatments ($p = 0.0457$, Rank-Sum Mann–Whitney test, $N = 16$). Moreover, information purchase was at the lowest for all voters in the *heterogeneous* treatment ($p = 0.0391$, Rank-Sum Mann–Whitney test, $N = 16$)[7] and especially for low endowment voters ($p = 0.0522$, Rank-Sum Mann–Whitney test, $N = 16$). Therefore, there is no support for P4 and perhaps some evidence to suggest a curvilinear relationship between complexity and information demand. That is, in very simple situations, not much information is needed and thus little is demanded, while in complex environments, it becomes too difficult to meaningfully process and is again not demanded. Information is only useful and therefore demanded, in situations of moderate complexity.

Disaggregated by information type, Table 4 shows information demand across all periods, broken down by high and low endowment types. This shows that most of the information purchased is about the national level,[8] followed by the voter's own community. Overall, Table 4 reinforces the patterns observed in Figure 2, with particular attention to be paid to the *poor* and

---

[5] There is some evidence of this in the *heterogeneous* treatment, as well, but it is very slight.

[6] Treatments are described in Table 2.

[7] In these tests we use each electorate as an independent observation and test whether a sub-group of sessions/treatments were different from the remaining ones.

[8] The piece of information purchased most often is "Tax Rate." If combined with information about the average voter on the nation (column 4 of Table 4), it reaches an average of 0.31.
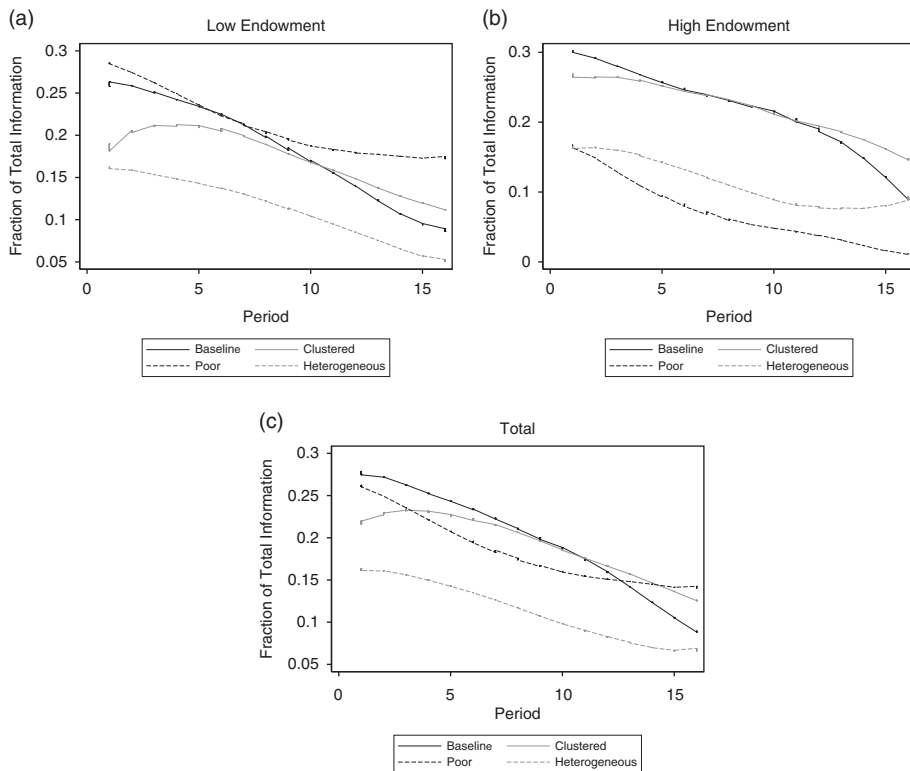
Fig. 2. *Total information demand*
Note: The figures show lowess curves of the proportion of information purchased over time. Panel (a) presents information purchase for low endowment voters, panel (b) presents the same for high endowment voters, and panel (c) shows information demand for all voters together.

heterogeneous treatments. In the *poor* treatment, high endowment voters almost never purchased information about other communities. The average demand for this piece of information is not only lower than for any other type of information, but it is also not statistically significantly greater than 0 (one-sided truncated *t*-test, $N = 4$, p $= 0.2125$). The *heterogeneous* treatment again follows the previously described pattern, however, with the average purchase of information about other communities significantly greater than 0 (one-sided truncated *t*-test, $N = 4$, p $= 0.002$). With all voters combined, purchase of each type of information is lowest in the *heterogeneous* treatment.

Moving next to voting and approval behavior, we can examine the effects of economic conditions at the various levels on vote choice. First, consider conflicting situations, those where personal conditions are bad but national conditions are good (Figure 3(a)), or where personal conditions are good but national conditions are bad (Figure 3(b)).

Here voters are split into two groups: those who purchased national level information (tax rate and/or average voter in the nation) and those who did not (see Figure 3). First, in both the voting and approval rounds, we see the same patterns. The informed are more likely to vote against their personal interests. For instance, Figure 3(a) depicts voters in the situation where, compared with the candidate, the incumbent had made the voter worse off but had improved the economy as a whole. Those who were aware of a positive change in national economic conditions were more supportive of the incumbent than those who were only aware of the

TABLE 4   *Proportion of Information Purchased*

	Own Community	Other Communities	Aggregate	Tax Rate
Baseline	0.24	0.15	0.18	0.27
Low endowment	0.22	0.14	0.17	0.25
High endowment	0.26	0.17	0.19	0.32
Clustered	0.21	0.15	0.17	0.30
Low endowment	0.18	0.14	0.15	0.27
High endowment	0.25	0.16	0.19	0.35
Poor	0.25	0.12	0.13	0.30
Low endowment	0.29	0.14	0.15	0.32
High endowment	0.05	0.02	0.04	0.21
Heterogeneous	0.13	0.06	0.11	0.20
Low endowment	0.13	0.06	0.10	0.21
High endowment	0.13	0.06	0.12	0.20
Total	0.21	0.12	0.14	0.27
Low endowment	0.21	0.12	0.14	0.27
High endowment	0.19	0.11	0.15	0.28

Note: Cells show, for each type of information, the proportion of the available information purchased. For "Other Communities" we aggregate the two communities to which the voter does not belong. "Aggregate" refers to information about the average voter in the nation.
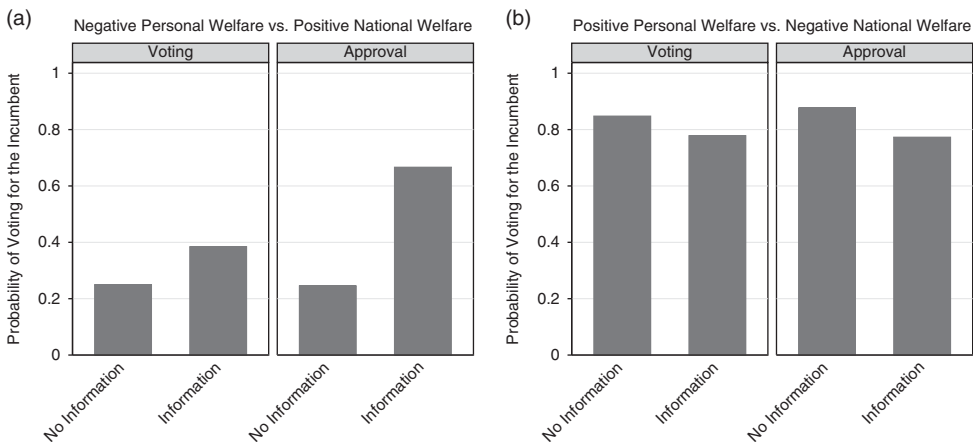

Fig. 3. Voting and approval behavior conditional on conflicting situation
Note: Shown are the probabilities of voting for or approving of the incumbent under conflicting situations. Panel (a) shows situations in which the incumbent offers less personal net after policy welfare but more national net after policy welfare than the candidate, while panel (b) shows the opposite case, that is, situations in which the incumbent offers more personal net after policy welfare but less national net after policy welfare than the candidate. "No information" refer to voters that, in that particular round, did not purchase national information. "Information" indicates that the voter purchased tax rate information and/or information about the average voter in the nation.

personal negative conditions. While it is tempting to say that the informed are more sociotropic (which they are), there is perhaps a selection effect. There may simply be types of voters that a simple informed versus uninformed comparison cannot reveal, as uninformed voters can obviously not behave more sociotropically than informed voters. What can be said is that this supports the assumption in our design that sociotropic behavior is correlated with higher information demand, with the caveat that the differences between the informed and uninformed

in the chart are endogenous. An attempt to measure how much more sociotropic these voters are is presented further below.

Next, we compare voting rounds to approval rounds. While the graph suggests little difference between voting and approval rounds for uninformed voters, it does suggest differences for informed voters. Specifically, informed voters appear more likely to approve sociotropically (i.e., report approving of an incumbent who is good for the nation at the expense of individuals and disapprove of an incumbent who is good for individuals at the expense of the nation) than they are to vote sociotropically. In this sense, informed voters may be using cheap talk, voicing a preference for improved national conditions, when they really prefer better personal conditions. This is also in line with previous work by Feddersen, Gailmard and Sandroni (2009), who argue that voters are more likely to make their choices based on ethical considerations, when the chance of being pivotal is low.

To generalize the previous analysis, Tables 5 and 6 show marginal effects after random effects probit estimations. The dependent variable is the probability of voting for (Table 5) or approving of (Table 6) the incumbent. These tests are needed to attempt to observe preferences over the different levels of economic conditions. While egotropic voting is free, it is costly to seek information that would make communo- or sociotropic voting possible. An effect of information purchase can be taken as evidence of other-regarding preferences. The models present results of aggregate behavior, further decomposed into low and high endowment voters.

In the regressions in Tables 5 and 6, the first variable (*Self Indicator*) is an indicator with value 1 if the incumbent offers the highest net after policy welfare to that particular voter, −1 if the candidate does and 0 in case of a tie. The next three variables present interaction effects of this indicator with whether or not the voter purchased information concerning her own

TABLE 5   *Voting Behavior, Marginal Effects*

	Total (*b* (SE))	Low Endowment (*b* (SE))	High Endowment (*b* (SE))
Prediction at 0	0.550	0.663	0.410
Self indicator	0.407*	0.443*	0.318*
	(0.025)	(0.055)	(0.042)
Self × own community information	−0.148*	−0.152*	−0.193
	(0.061)	(0.077)	(0.099)
Self × other communities information	−0.018	−0.007	−0.089
	(0.064)	(0.077)	(0.110)
Self × national information	−0.060	−0.096	0.033
	(0.046)	(0.057)	(0.077)
(known) Own community indicator	0.167*	0.184*	0.146
	(0.043)	(0.055)	(0.075)
(known) Other communities indicator	−0.203*	−0.224*	−0.131
	(0.048)	(0.062)	(0.083)
(known) National indicator	0.028	−0.024	0.148*
	(0.042)	(0.053)	(0.071)
N	1200	780	420

Note: Cells show marginal effects and standard errors of a probit panel regression with random effects at the individual level and session fixed effects (not reported). The dependent variable is a dummy indicating whether or not a voter voted for the incumbent. *Self Indicator* is an indicator variable if value 1 if the incumbent provides a voter with more net after policy income than the candidate, −1 on the opposite case and 0 on an tie. The next three variables are interaction effects with a dummy variable indicating whether or not a voter purchased information about her own community, any of the other communities or national indicators (tax rate or average voter in the nation). The final three variables are indicator variables defined similarly to *Self Indicator* interacting with the dummies presented before, respectively. They, thus, compare the known differences in net after policy income for a voter's own community (negative of the), dispersion across communities, and national welfare. *Statistical significance at the 5 percent level or better.

TABLE 6   *Approval Behavior, Marginal Effects*

	Total (*b* (SE))	Low Endowment (*b* (SE))	High Endowment (*b* (SE))
Prediction at 0	0.621	0.596	0.684
Self indicator	0.429*	0.451*	0.385*
	(0.028)	(0.031)	(0.060)
Self × own community information	− 0.122*	− 0.105	− 0.171*
	(0.043)	(0.054)	(0.073)
Self × other communities information	− 0.056	− 0.114*	0.078
	(0.044)	(0.053)	(0.079)
Self × national information	− 0.128*	− 0.150*	− 0.094
	(0.031)	(0.040)	(0.050)
(known) Own community indicator	0.122*	0.108*	0.171*
	(0.030)	(0.039)	(0.053)
(known) Other communities indicator	− 0.059	− 0.055	− 0.109
	(0.031)	(0.038)	(0.060)
(known) National indicator	0.080*	0.014	0.168*
	(0.027)	(0.034)	(0.049)
N	2640	1716	924

Note: Cells show the marginal effects and standard errors of a probit panel regression with random effects at the individual level and session fixed effects (not reported). The dependent variable is a dummy indicating whether or not a voter approved of the incumbent. *Self Indicator* is an indicator variable if value 1 if the incumbent provides a voter with more net after policy income than the candidate, −1 on the opposite case and 0 on an tie. The next three variables are interaction effects with a dummy variable indicating whether or not a voter purchased information about her own community, any of the other communities, or national indicators (tax rate or average voter in the nation). The final three variables are indicator variables defined similarly to *Self Indicator* interacting with the dummies presented before, respectively.
*Statistical significance at the 5 percent level or better.

community, at least one of the other communities, or any national level indicators, respectively. All voters are expected to react positively to gains in own income, but sociotropic preferences, signaled by the purchase of information, should reduce this effect. The next three variables are indicators comparing incumbent and candidate policies, with respect to their effects on the three levels of welfare. These variables enter the regression only when the voter purchased information on the level concerned. The coefficients for these three variables are expected to be positive, if voters have other-regarding preferences.

Several interesting observations can be made. We start at the aggregate level ("Total"). First, as expected, improvement in a voter's own conditions positively increases the voting and approval probabilities. Other things equal, receiving a higher income from one of the politicians increases the probability of voting for (by 40.7 percentage points) and approving of (by 42.9 percentage points) this politician, compared with the case where both offer the same. However, in support of P5, informed voters are less sensitive to personal gains. This can be seen in the negative interaction coefficients for *Self Indicator*, which are significant in at least one of the three cases in both regressions. The last three indicators show that knowledge of positive (negative) community, distributional and national conditions also favor the incumbent (candidate). This also sheds light on the meaningful difference between uninformed voting and informed egotropic voting. Informed egotropic voting would be revealed if the interaction terms on *Self Indicator* were 0, which would indicate that acquisition of information leads to no change in behavior. If voters are using information to make social comparisons with their own welfare, then negative estimates for the last three variables would indicate voting/approval behavior against others' best interest. Neither are observed, which supports the argument that the purchase of information reveals other-regarding behavior.

All analysis presented here has considered average behavior, but some further observations can be made. For example, we do observe that 58 voters (24.2 percent of the sample) never buy a single piece of information, while three voters (1.25 percent) buy all information available. Likewise, while 66 voters (27.5 percent) never purchase national level indicators, 16 (6.67 percent) do so in every single round. Reading the post-experiment questionnaire, we can classify 177 (74 percent) voters as basing their decision-making process on selfish motives[9] and 55 (23 percent) on sociotropic motives.[10]

When comparing endowment types, the general patterns are in line with the aggregate analysis. For example, both react positively to higher own income and are more "extreme" in approval rounds than in voting rounds. Important differences emerge, however. In particular, while low endowed voters react mostly to community level information, high endowed voters are primarily concerned with national conditions. Moreover, low endowed voters seem to react quite strongly to distributional concerns in voting rounds while neither type are affected by this indicator about conditions in other communities in approval rounds. Fundamentally, however, we are interested in the behavior of voters and how their vote choice is influenced by their own welfare and that of others. More on this can be found in the Appendix.

DISCUSSION

In all, the data supports most of the research hypotheses, indicating the presence of other-regarding preferences. Strong support is found for hypotheses P1 and P2, specifically that politicians choose tax levels close to the "optimal" tax rate of 20 percent and do not heavily alter the initial income distributions. Next, we find that information purchase is significantly positive, thus supporting P3. P4 was not supported, as this predicted the highest information purchase at the *heterogeneous* treatment. Instead, the evidence suggests something of a curvilinear relationship between complexity and information demand. Initially, as complexity increased, demand increased. However, after a point, increasing complexity may have lead to a decrease in demand for information. Further research is needed to examine this relationship.

Finally, the fifth hypothesis (P5) is supported, as the evidence suggests that informed voters are less sensitive to changes in their own income and that once aware of improved community or national conditions, they tend to favor incumbents, even if it comes at their own expense.

The data also suggests that voters are more "extreme" in approval rounds, specially regarding national indicators. Differences are also shown across endowment types. More specifically, high endowed voters react mostly to national conditions while low endowed voters seem more concerned with the community level and distributional indicators.

To highlight some of our main findings, first, there is evidence of sociotropic and commu-notropic voting, even though there was no direct financial incentive to do so. While there is no monetary incentive to engage in anything much more sophisticated than uninformed egotropic voting, information purchase remains non-trivial and other-regarding behavior occurs at significant levels.

Second, voters are responsive to economic conditions at the various levels, when they are aware of incumbent performance. That is, voters respond to changes in both tax and redistribution policies in a systematic manner. Specifically, high endowment voters demonstrate more sensitivity to national conditions while low endowment voter react more to community level indicators.

---

[9] Statements such as "I voted for the candidate that best helped me."
[10] Statements such as "I chose whichever candidate was offering the fairest tax rates and incomes."

Third, politicians rarely engage in targeting specific communities. While it would always have been feasible for politicians to set taxes and redistribution in a manner that would have maximized profit to two communities, at the expense of the third, this is not observed. This structure of redistribution, combined with the choice of the "optimal" tax rate, possibly reflects a belief among politicians that voters prefer more egalitarian and socially maximizing outcomes. Finally, there is evidence that some informed voters are engaging in cheap talk, signaling that they 1will vote sociotropically but then voting (more) egotropically. This may suggest that the considerations involved in the approval choice are not necessarily the same as those that induce vote choice.

In sum, we have presented an experimental investigation of information search and economic voting. While there is significant potential for further innovation with modification of this design, this study has contributed insight into the mechanisms underlying egotropic, communotropic, and sociotropic behavior. Still, more work is needed to better understand communotropic preferences. Rogers (2014) and Rogers (2016) provide observational evidence that these preferences exist, but it remains to be seen just how aware of local conditions and how well (or poorly) objective measures can convey sentiment to politicians. So, what information is relevant in economic voting? The answer depends not only on who the individual is, but also on where she lives and on her endowment.

REFERENCES

Anderson, Cameron D. 2006. 'Economic Voting and Multilevel Governance: A Comparative Individual-Level Analysis'. *American Journal of Political Science* 50(2):449–63.

Arcelus, Francisco, and Allen Meltzer. 1975. 'The Effect of Aggregate Economic Variables on Congressional Elections'. *American Political Science Review* 69(4):1232–39.

Berry, Christopher, and William Howell. 2007. 'Accountability and Local Elections: Rethinking Retrospective Voting'. *The Journal of Politics* 69(3):844–58.

Chamlee-Wright, Emily, and Virginia Storr. 2010. 'Expectations of Government's Response to Disaster'. *Public Choice* 144(1):253–74.

Duch, Raymond, Harvey Palmer, and Christopher Anderson. 2000. 'Heterogeneity in Perceptions of National Economic Conditions'. *American Journal of Political Science* 44(4):635–52.

Feddersen, Timothy, Sean Gailmard, and Alvara Sandroni. 2009. 'Moral Bias in Large Elections: Theory and Experimental Evidence'. *American Political Science Review* 203(2):175–92.

Fehr, Ernst, and Urs Fischbacher. 2003. 'The Nature of Human Altruism'. *Nature* 425:785–91.

Fiorina, Morris. 1978. 'Economic Retrospective Voting in American National Elections: A Micro-Analysis'. *American Journal of Political Science* 22(2):426–43.

Fischbacher, Urs. 2007. 'z-Tree: Zurich Toolbox for Ready-Made Economic Experiments'. *Experimental Economics* 10(2):171–78.

Gemmell, Norman, Oliver Morrissey, and Abuzer Pinar. 2004. 'Tax Perceptions and Preferences Over Tax Structure in the United Kingdom'. *The Economic Journal* 114:F117–38.

Glasgow, Garrett. 2005. 'Evidence of Group-Based Economic Voting: NAFTA and Union Households in the 1992 U.S. Presidential Election'. *Political Research Quarterly* 58(3):427–34.

Gomez, Brad T., and J. Matthew Wilson. 2001. 'Political Sophistication and Economic Voting in the American Electorate: A Theory of Heterogeneous Attribution'. *American Journal of Political Science* 45(4):899–914.

Gomez, Brad T., and J. Matthew Wilson. 2007. 'Economic Voting and Political Sophistication: Defending Heterogeneous Attribution'. *Political Research Quarterly* 60(3):555–58.

Grafstein, Robert. 2005. 'The Impact of Employment Status on Voting Behavior'. *Journal of Politics* 67(3):804–24.

Greiner, Ben. 2004. 'An Online Recruitment System for Economic Experiments'. In Kurt Kremer and Volker Macho (eds), *Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63*, 79–93. Gottingen: Ges. fr Wiss. Datenvararbeitung.

Hetherington, Marc. 1996. 'The Media's Role in Forming Voters' National Economic Evaluations in 1992'. *American Journal of Political Science* 40(2):372–95.

Holbrook, Thomas, and James C. Garand. 1996. 'Homo Economus? Economic Information and Economic Voting'. *Political Research Quarterly* 49:351–75.

Kinder, Donald, and Roderick Kiewiet. 1979. 'Economic Discontent and Political Behavior: The Role of Personal Grievances and Collective Economic Judgements in Congressional Voting'. *American Journal of Political Science* 23:495–527.

Lau, Richard R., and Caroline Heldman. 2009. 'Self-Interest, Symbolic Attitudes, and Support for Public Policy: A Multilevel Analysis'. *Political Psychology* 30:513–37.

Lau, Richard R., and David Redlawsk. 2006. *How Voters Decide*. New York: Cambridge University Press.

Lepper, Susan. 1974. 'Voting Behavior and Aggregate Policy Targets'. *Public Choice* 25(2):67–82.

Lewis-Beck, Michael S., and Charles Tien. 1996. 'The Future in Forecasting: Prospective Presidential Models'. *American Politics Quarterly* 24:468–91.

Lewis-Beck, Michael S., and Martin Paldam. 2000. 'Economic Voting: An Introduction'. *Electoral Studies* 19:113–21.

Lewis-Beck, Michael S., and Richard Nadeau. 2011. 'Economic Voting Theory: Testing New Dimensions'. *Electoral Studies* 30:288–94.

Lewis-Beck, Michael S., and Tom W. Rice. 1984. 'Forecasting U.S. House Elections'. *Legislative Studies Quarterly* 9:475–86.

Lodge, Milton, and Kathleen M. McGraw. 1995. *Political Judgement: Structure and Process*. Ann Arbor, MI: University of Michigan Press.

Markus, Gregory. 1988. 'The Impact of Personal and National Economic Conditions on the Presidential Vote'. *American Journal of Political Science* 29:137–54.

Nannestad, Peter, and Martin Paldam. 1994. 'The VP-Function: A Survey of the Literature on Vote and Popularity Functions After 25 Years'. *Public Choice* 79:213–45.

Norpoth, Helmut. 1996. 'Of Time and Candidates: A Forecast for 1996'. *American Politics Quarterly* 24:443–67.

Peterson, Paul. 1981. *City Limits*. Chicago: Chicago University Press.

Powell, G. Bingham, and Guy Whitten. 1993. 'A Cross-National Analysis of Economic Voting: Taking Account of the Political Context'. *American Journal of Political Science* 37(2):391–414.

Redlawsk, David. 2004. 'What Voters Do: Information Search During Election Campaigns'. *Political Psychology* 25(4):595–610.

Rogers, Jonathan. 2014. 'A Communotropic Theory of Economic Voting'. *Electoral Studies* 36:107–16.

Rogers, Jonathan. 2016. 'Tea Party Support and Perceptions of Local Economic Conditions'. *Electoral Studies* 42:91–98.

Schram, Arthur, and Joep Sonnemans. 2011. 'How Individuals Choose Health Insurance: An Experimental Analysis'. *European Economic Review* 55:799–819.

Tajfel, Henri, and John C. Turner. 1979. 'An Integrative Theory of Intergroup Conflict'. In W.G. Austin and S. Worchel (eds), *The Social Psychology of Intergroup Relations*, 33–47. Monterey, CA: Brooks/Cole.

Tajfel, Henri, and Michael Billig. 1974. 'Familiarity and Categorization in Intergroup Behavior'. *Journal of Experimental Social Psychology* 10:159–70.

Tilley, James, and Sara Hobolt. 2011. 'Is the Government to Blame? An Experimental Test of How Partisanship Shapes Perceptions of Performance and Responsibility'. *Journal of Politics* 73(2): 316–30.

Wlezien, Christopher, and Robert S. Erikson. 1996. 'Temporal Horizons and Presidential Election Forecasts'. *American Politics Quarterly* 24:492–505.