Do Citizens Vote for Parties or Policies? Evidence from Israel

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Abstract

This paper measures the relative importance of party platforms versus expected policy outcomes in the voting decisions of individuals in a proportional representation (PR) system. It uses survey pre-electoral data from the 2006 Israeli elections. It is assumed that there are two types of voters: voters who mainly care about party platforms and voters who mainly care about policy outcomes. I find that the proportion of policy voters is slightly below 10%. This is smaller than the proportion found in previous studies. The key to explaining this difference is the fact that this paper uses individual subjective perceptions about party platforms and likelihood of the different coalitions. Critically, it is shown that the inclusion of such subjective perceptions in the model improves the fit. Finally, there seems to be no correlation between policy voting and sociodemographics. Labour and Likud are the parties who gained most from policy voting.

Keywords: subjective expectations, voting behavior, electoral systems.
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1 Introduction

Proportional representation (PR) systems offer incentives to agents to manipulate the outcome of the elections, i.e. rational agents may prefer not to vote for their favorite party in the ballot booth (Austen-Smith and Banks 1988, Cox 1997, Baron and Diermeier 2001). Such a situation may arise when agents have in mind policy outcomes rather than party platforms when casting their vote. The question, is, however, do agents *actually* respond to such incentives? And if so, what are the consequences in terms of representation and policy outcomes? These are the questions I address in this paper.

Advocates of PR systems generally argue that the main goal of such systems is to have a distribution of seats in parliament that mirrors the distribution of preferences in society (Farrel 2011, Lijphart 1984). From this point of view, it seems critical to know whether parliament actually mirrors society, and, if it does not, whether the mismatch is a result of a rational choice by the electorate. Strategic voting may have unintended long term consequences on this distribution (and, therefore, the party system), the most important being potential underrepresentation (or overrepresentation) of some sectors of the population in parliament (Norris 2004, Ch. 8 and 9). Understanding voting behavior of the electorate may explain why a particular viewpoint or social group is permanently underrepresented (or overrepresented) in the institutions over and above traditional explanatory factors, such as gerrymandering, malapportionment, barriers to party formation or electoral thresholds.

Following the literature, I define party voters as those who cast their vote solely based on the evaluation of the different parties. Policy/coalition-oriented voters are those who bear in mind the potential effect on government formation and policy outcomes of their vote.[1] The main goal of this paper is to measure the proportion of each type of voters in a PR system, and analyze which parties win or lose because of policy oriented voting. To

[1] Voters who take into consideration the impact of their vote on policies can be thought of as strategic voters. However the most traditional definition of strategic voting takes into account pivotality considerations. Since pivotality in PR systems is quite a loose concept, in this paper I stick to denoting these voters indistinctly as policy- or coalition. Note that a policy voter may indeed vote for her favorite party if she thinks it may have the best impact on policies.

so do, I employ pre-electoral survey data from the Israeli legislative elections of 2006.

The main contributions of this paper are the follwing. First, it shows that including individual perceptions instead of imposing common beliefs also improves the fit of a model of voting behavior.[2] Moreover, it explains why a model of common beliefs may produce results that look like random. Third, it analyzes what type of citizens are more prone to casting a policy votes, and which parties majorly benefited from it in the 2006 Israeli elections. Finally, it confirms the findings of Duch, May and Armstrong (2010, DMA henceforth), i.e., that making the assumption that agents care *either* about party platforms *or* policy outcomes outperforms a model in which all agents care about both. Performance is assessed both in terms of correctly predicted votes and the Vuong test for non-nested models. Hence this paper measures policy-oriented voting using both heterogeneity and individual perceptions and, as a result, it gives a better measure than the previous literature of the importance and distribution of policy considerations among the electorate.

The proportion of coalition-directed voters is shown to be below 10%, depending on the exact specification of the model. All robustness checks yield a consistent picture. To the best of my knowledge, two other works have addressed a similar question. Kedar (2009) does not distinguish between two types. She estimates the different impact for the average voter of party and policy considerations. DMA assume there are two kind of voters (party- and coalition-oriented) and estimate the proportion of each type. In their model, they do not use individual expectations, but they assume all agents expect the same number of seats for each party, and also that the different probabilities of each potential government coalition being formed are common across agents.[3]

Albeit small, policy-oriented voting in Israel had consequences in the party system.

[2] The latter result is in line with the findings of Manski (2000) and Lee and Li (2006).

[3] Unfortunately, neither DMA nor Kedar (2009) report results on any Israeli legislative election, so I cannot directly compare my results to theirs. What DMA find, using data from 86 surveys and 23 countries is that in 75% of the cases the proportion of coalition-directed voters is above 50% (only in two cases such proportion is close to zero). Kedar (2009) finds that in PR systems, policy considerations in general are at least as important as party considerations.

I show that it mostly benefited Labour and Likud - the largest party to the left and to the right, respectively. Results suggest that a few supporters of centrist Kadima voted for these parties on either side in order to signal their preference for a particular coalition government. Also, I find that strategic behavior seems to be uncorrelated to any socioeconomic characteristic.

2 The Data and Context

2.1 The 2006 Israeli Legislative Election

The 2006 Israeli general election was held on March the 28th. The Israel parliament consists of 120 seats, allocated by the d'Hondt method in one single district. The threshold to achieve representation is 2%. In the previous elections of 2003, 13 parties had gained parliamentary seats, seven of which with less than 5% of the total votes. In 2006, around the same number of parties were expected to be effectively competing for seats. Amongst them, Labour, Kadima and Likud were generally deemed to be the largest. Kadima was a centrist party newly created by former members of Likud and Labour. The general belief before the elections was that Kadima would win enough seats to be nominated *formateur* and thus be able to bargain with other parties in order to form a government.

Amongst the other parties contesting, four were considered in the survey that I use: Beiteinu, Meretz, Shas and Ihud Leumi & Mafdal (henceforth ILM). Figure 1 shows how the respondents of the INES survey of 2006 placed them on the Left-Right political spectrum. After the elections the government coalition included Kadima, Labour, Shas and Gil.[4]

[Figure 1 about here]

[4]There are no questions in the survey regarding the Gil Party, so I cannot compare its actual share of vote with the hypothetical one had everybody voted sincerely. The Gil was otherwise known as the Pensioners party, and was created in the mid-nineties with the main goal of defending the rights and views of the retired population of Israel. It won 5.92% of the total votes in the 2006 elections.

2.2 The Data

The INES 2006 panel survey consisted of two waves of phone interviews.[5] The pre-election survey was carried out from exactly one month before until five days before the elections. The post-election survey took place in the month immediately after the elections. 1,919 individuals were interviewed in the pre-election wave, including both Jews (88%) and Muslims (9%).[6]

The survey included the usual battery of questions regarding political attitudes and socioeconomic background. The questions I use are the ones which give me information about respondents'

(i) Evaluations of the different parties and its leaders (1=hate/rejection, 10=love/ support).

(ii) Ideological location of the parties and interviewees (0=left, 10=right).

(iii) Chances of each of 7 possible coalitions being formed after the elections (0=no chances, 100=extremely good chances).

(iv) Degree of support for any of those 7 coalitions (1=reject, 10=support).

(v) Expected number of seats that the parties would win.

(vi) Intended vote.

Party-specific questions refer only to the following: Kadima, Labour, Likud, Shas, Beiteinu, ILM and Meretz. Coalition-specific questions refer to 7 potential coalitions listed in Appendix 10.1.

2.3 Some Descriptive Statistics

Since expectations play a key role in this paper, it is important to show that overall they were well formed and accurate. Given that there were multiple possible government combinations (even more than the seven mentioned in the INES survey), what seems more reasonable is to check whether Israelis were actually expecting a coalition leaning towards the left (i.e. including the Labour party) or towards the right (i.e. including Likud). I

[5]The INES (2006) data available online at `http://www.ines.tau.ac.il/elections.html`

[6]Out of them, 1,411 individuals were interviewed again shortly after the elections. However, I do not use any information from the 'post-election' survey.

construct 'Expected Coalition', a variable that captures the following: 'Likelihood of a Rightist Coalition - Likelihood of a Leftist Coalition'.[7] This variable takes value 100 if the respondent expected a rightist coalition with certainty, and -100 if she expected a leftist coalition for sure.

[Figure 2 about here]

Figure 2 shows the distribution of expectations over the population. Whereas uncertainty upon the direction of the future government was high, overall Israeli citizens were mostly expecting a coalition towards the left. Over 65% of respondents thought that a leftist coalition was more likely (i.e. 'Expected Coalition'< 0). Importantly, this result is by no means a consequence of wishful thinking. If one takes the subsample of respondents who place themselves on the right of the political spectrum, we can see that the pattern is nearly the same. The right histogram in Figure 2 shows it (57% of voters to the right expected a leftist coalition).

A usual concern when dealing with survey data is that respondents may not be truthful in their answers. In Table 1, I compare the actual results in the elections with the results derived from the 'vote intention' as expressed in the survey (columns 1 and 3). The discrepancies between both columns seem to be due to measurement error, rather than to any systematic bias. There is no evidence suggesting that voters of a particular party are hiding their intentions, nor that voters in general overstate their likelihood of voting for a particular party. Results on voters intentions are directly comparable to the results that were being published by newspapers polls during the days of the survey (these can be checked at `http://www.imra.org.il/l`).

[Table 1 about here]

[7] I am indebted to Bargsted and Kedar (2009) for the idea of defining this variable. I construct it in a different way, though. In my case, 'Expected Coalition' = (2)+(3)+(5) - (1)-(4)-(6), where (1)-(6) refer to the coalitions mentioned in Appendix 10.1

3 Theoretical Framework

The hypothesis is that there are two types of voters, according to how they respond to the strategic incentives posed by the system. Party-oriented agents vote according to how much they like the different parties disregarding the strategic incentives. Coalition directed voters take into account the potential effects their votes may have upon coalition formation, and, therefore, actual policies. Note that coalition voters may vote for their preferred party once they have made their calculations.

3.1 Why Vote for Policies?

There are various reasons why a voter may cast a coalition directed vote.[8] Since in PR systems governments tend more often than not to be coalitions, agents may cast their vote in order to tilt government policy towards their favorite policy. For instance, that would be the case when a voter slightly to the left of the center of the political spectrum voted for a party much to her left, even if there was a centrist party much closer to her. She could be signaling to the centrist party that her preferred coalition was a center/left one. Or, even if agents are sure a particular coalition will be formed, they may have an incentive to vote strategically. This is the case when they use their vote in order to increase the bargaining power of a party within that coalition.

I denote with PT_{ij} the evaluation of party j by agent i. CL_{ij} captures the evaluation of the impact of j in government policy, conditional on j being in government. Party agents vote for the party with the largest PT_{ij}, whilst coalition directed voters vote for the party with the largest CL_{ij}.

Measuring PT_{ij} is straightforward. It is the sum of answers to the following: "Here is a scale from 1 to 10 to express support or rejection of a group or a person. '1' describes strong rejection/ hate, and '10' describes strong support/love."

[8]See Baron and Diermeier (2001) for a formal analysis on the motives and their impact on strategies.

Measuring CL_{ij} is a more complex task. CL_{ij} captures the value for i of the impact of party j in government policy. In the baseline case, I construct it in a way similar to that of DMA: *conditional on j being in government*, CL_{ij} is the weighted average evaluation of all the possible coalitions including j (weighted by the likelihood of each coalition being formed). See Appendix 10.2 for details on the construction of CL_{ij}.

It is important to underline that potential bias of expectations is not a matter of concern here. Some scholars are concerned about subjective expectations because of wishful thinking (DMA, Rabinowitz and Macdonald (1989), Laver and Benoit (2005)), whereas others argue they can indeed be used as explanatory variables (Kedar (2009), Lee and Li (2006), Manski (2000)).[9] In this case, the potential concern is that voters may overestimate the chances of all coalitions including their favorite party. Even if this were to happen, this would not affect the measurement of CL because this variable is constructed using *conditional* probabilities. [10]

3.2 Statistical Model

In order to estimate the proportion of coalition directed and party types, I assume a random utility model. Let $\mathscr{J}$ denote the set of parties contesting in the elections. $y_i = (y_1, y_2, ..., y_J)$, $y_{ij} = 1$ if i votes for j and 0 otherwise. We observe each agent's characteristics up to a random component. Let x_i be a vector of political attitudes and sociodemographic individual variables and ε_{ij} be the unobservables that influence i's vote.

[9]For a nice summary on this debate, see Kedar (2009), pages 70-71.

[10]Voters may inflate the chances of their favorite coalition too. This increases the value of CL_{ij} for all j in such coalition, and so does not ultimately affect the probability that the model defines her as coalition directed. This is because these parties are likely to be seen as close substitutes. Therefore, the value of CL_{ij} is inflated for them all. Furthermore, the controls on political attitudes and sociodemographic background take care (at least, partially) of this issue too.

i's utility of voting for j is

$$
(1) \qquad
\begin{aligned}
&U_{ij}^{*,col} = \alpha_c CL_{ij} + x_i\beta + \varepsilon_{ij}^{col} && \text{if } i \text{ is coalition directed}\\
&U_{ij}^{*,pty} = \alpha_p PT_{ij} + x_i\beta + \varepsilon_{ij}^{pty} && \text{if } i \text{ is party oriented}\\
&\text{where } \varepsilon_{ij}^{col}, \varepsilon_{ij}^{pty} \sim iid \text{ type I extreme value}
\end{aligned}
$$

Each type decides her vote in order to maximize her utility, so that

$$
(2) \qquad
\begin{aligned}
&y_{ij} = 1 \quad \text{iff} \quad U_{ij}^{*,col} \geq U_{ik}^{*,str}\ \forall k \in \mathscr{J} && \text{and } i \text{ is coalition directed}\\
&y_{ij} = 1 \quad \text{iff} \quad U_{ij}^{*,pty} \geq U_{ik}^{*,pty}\ \forall k \in \mathscr{J} && \text{and } i \text{ is party oriented}
\end{aligned}
$$

in case of a tie, the agent decides randomly.

Next, I derive the complete data likelihood function of the votes that I observe.[11] Probabilities are modeled as a multinomial logit, conditional on the type of voter. I build the likelihood function of the observed votes in the following way. Let $PT_i = (PT_{i1}, PT_{i2}, ..., PT_{iJ})$, $CL_i = (CL_{i1}, CL_{i2}, ..., CL_{iJ})$ and $\mathbf{X}_i = (PT_i, CL_i, x_i)$, $i = 1, 2, ..., N$. Let z_i be the unobserved variable indicating the type (z_i=1 if coalition directed, 0 if sincere). The probability P_{ij} that i votes for party j is given by

$$
(3) \qquad
\begin{aligned}
&P_{ij}(\mathbf{X}_i; z_i) = \frac{e^{\alpha CL_{ij} + x_i\beta_j}}{\sum_{j=1}^{J} e^{\alpha CL_{ij} + x_i\beta_j}} && \text{if } i \text{ is coalition directed}\\
&P_{ij}(\mathbf{X}_i; z_i) = \frac{e^{\alpha PT_{ij} + x_i\beta_j}}{\sum_{j=1}^{J} e^{\alpha PT_{ij} + x_i\beta_j}} && \text{if } i \text{ is party oriented}
\end{aligned}
$$

where all β_js are zero for the party of reference (in my case, Kadima). Denote the p.d.f.

[11] By complete data, I mean the likelihood of the observations if we were to observe the type. Therefore I have to make assumptions on the distribution of the z_is

of observation i by $p(y_i|\mathbf{X}_i, z_i, \beta, \alpha)$. Then

$$
\begin{aligned}
f_i^{col} &\equiv p(y_i; \mathbf{X}_i, \beta, \alpha | z_i = 1) = \prod_{j=1}^{J} (P_{ij}|z_i = 1)^{y_{ij}} \\
f_i^{pty} &\equiv p(y_i; \mathbf{X}_i, \beta, \alpha | z_i = 0) = \prod_{j=1}^{J} (P_{ij}|z_i = 0)^{y_{ij}} \\
&\text{where } y_{ij} = 1 \text{ if } i \text{ votes for } j \text{ and 0 otherwise}
\end{aligned} \tag{4}
$$

Note that the only difference between the two types is the variable linked to the salience parameter α. This is a finite mixture problem in the sense that

$$p(y_i|\beta, \alpha) = \pi f_i^{col} + (1 - \pi) f_i^{pty} \tag{5}$$

where $p(z_i = 1|\beta, \alpha) = \pi$, i.e. π is the unconditional probability that an agent is coalition directed. This is the main parameter of interest throughout this paper. In order to write down the complete data likelihood, I need to make some assumptions on the distribution of the z_is. I assume they are *iid*, and that they follow a Bernoulli distribution:

$$p(z_i; \pi) = \pi^{z_i} (1 - \pi)^{1 - z_i} \tag{6}$$

Then the complete data distribution takes the following form (that is, if we could observe each individual's type):

$$
\begin{aligned}
&p(y, z|\beta, \alpha, \pi) = p(y|z, \beta, \alpha, \pi) p(z|\beta, \alpha) = \prod_{i=1}^{N} p(y_i|z_i, \beta, \alpha, \pi) p(z_i|\beta, \alpha) \\
&= \prod_{i=1}^{N} \left((1 - \pi) f_i^{pty} \right)^{(1 - z_i)} \left(\pi f_i^{col} \right)^{z_i}
\end{aligned} \tag{7}
$$

In Appendix **??** I show that the complete data likelihood function can be written as follows:

$$\mathscr{L}(y, \mathbf{X}, z; \alpha, \beta, \pi) = \prod_{i=1}^{N} \left\{ \left(\pi f_i^{col} \right)^{z_i} \left((1 - \pi) f_i^{pty} \right)^{(1 - z_i)} \right\} \tag{8}$$

and so the log-likelihood of the complete data is

$$
(9) \quad \begin{aligned} log\mathscr{L}(y, \mathbf{X}, z; \alpha, \beta, \pi) &= \sum_{i=1}^{N} \left\{ z_i log\left(\pi f_i^{col}\right) + (1 - z_i) log\left((1 - \pi) f_i^{pty}\right) \right\} \\ &= \sum_{i=1}^{N} \left\{ z_i log\left(\pi\right) + z_i log\left(f_i^{col}\right) + (1 - z_i) log\left((1 - \pi)\right) + (1 - z_i) log\left(f_i^{pty}\right) \right\} \end{aligned}
$$

Notice that the function is additively separable.

3.3 Estimation Procedure

In order to estimate all parameters, I implement the Expectation-Maximization [EM] algorithm as outlined in Dempster et al. (1977).[12] This iterative process works as follows:[13]

1. E-STEP. Take a guess on $\{\pi, \alpha, \beta\}$. Then, assuming a functional form for the distribution of z, take the expected value of z conditional on the guess $\{\pi, \alpha, \beta\}$. I assume

$$
(10) \quad \begin{aligned} & z | \pi, \alpha, \beta, \{\mathbf{X}, y\} \sim \text{ Bernouilli. The expectation is} \\ & \hat{z}_i = \frac{\pi f_i^{col}(\mathbf{X}_i, y_i, \beta, \alpha)}{f(\mathbf{X}_i, y_i, \beta, \alpha, \pi)} = \frac{\pi f_i^{col}(\cdot)}{\pi f_i^{col}(\cdot) + (1 - \pi) f_i^{pty}(\cdot)} \qquad \forall i \end{aligned}
$$

I.e. $\hat{z}_i$ is the expectation conditional on the data and the parameters of the model. In other words, $\hat{z}_i$ is the posterior probability that i belongs to the set of coalition directed types. Once all $\hat{z}_i$s are computed, we replace the unobserved z_is in with $\hat{z}_i$ in (9).

2. M-STEP Given $\hat{z}$, maximize (9) with respect to α, β and π . This yields a set of estimates $\hat{\alpha}, \hat{\beta}$ and $\hat{\pi}$.

3. E-STEP Given the current set of estimates $\hat{\alpha}, \hat{\beta}$ and $\hat{\pi}$, estimate the updated expected value of the vector z: $\hat{z}' = \hat{z}'(\mathbf{X}, y; \hat{\alpha}, \hat{\beta}, \hat{\pi})$.

4. M-STEP Given $\hat{z}'$, maximize (9) with respect to α, β and π and get $\hat{\alpha}', \hat{\beta}', \hat{\pi}'$.

5. Repeat 3 and 4 until convergence.

To obtain standard errors, I evaluate the Information Matrix at the maximum of the likelihood function.

[12]Other excellent detailed sources for the EM algorithm and its implementation are Frühwirth-Schnatter (2006), McLachlan and Basford (1988), McLachlan and Peel (2000) and McLachlan and Krishnan (2008).

[13]More details can be provided upon request in a supplementary Appendix

4 Results

Let us first set a benchmark model to which one can compare a two-types model. This benchmark model is the standard conditional logit model, which means that we are assuming that all agents care about both party and policty considerations. The goal is twofold: first, confirm that, as in DMA, an heterogeneous agents model is superior to an homogeneous agents model the benchmark one. Second, and most importantly, to check whether using subjective expectations (SE) model improves a model in which common beliefs are imposed (CB model). In the benchmark model,

$$
\begin{aligned}
&i \text{ votes for } j \text{ if } U^*_{ij} \geq (U^*_{i1}, U^*_{i2}, ..., U^*_{iJ}) \forall j \in \mathscr{J} \\
&\text{where } U^*_{ij} = \alpha_p PT_{ij} + \alpha_c CL_{ij} + X_i \beta_j + \varepsilon_{ij}, \quad \varepsilon_{ij} \sim iid \text{ type one extreme value}
\end{aligned}
\tag{11}
$$

and X_i is a vector of sociodemographic controls and political attitudes (including placement in the LR spectrum, education, gender, age and religious observance). Using this model, one can correctly predict up to 82.41% of the votes.

Given that I run the model both with common beliefs and subjective expectations, I can assess how adequate it is to assume that all voters have the same expectations (CB model) as opposed to assuming they may have different expectations (SE model). We can see in Panel A of Table 4 that there is virtually no difference in predicting power in this case. This is not surprising, since the benchmark model is a homogeneous agents model. One would expect subjective expectations to play a role in an heterogeneous types model, which is what I turn into next.

[Table 4 about here]

So suppose instead that agents are indeed heterogeneous: there are two types. Some agents only care about party platforms PT, while some others only about policy outcomes, CL. Agents follow the voting rules as defined above in (1). Recall I can construct CL in two different ways. The specification in which I use subjective expectations is what

I denote the baseline model of this paper. Results are shown in Table 3.

[Table 3 about here]

We can see that the socioeconomic variables have the effect that one would expect: for instance, rightist voters tend to vote more for Likud, ILM or Israel Beiteinu. Religious observance increases the likelihood of voting for Shas, an ultra-orthodox religious party. Also, more intransigent attitudes with respect to the peace process increase propensity to voting for parties to the right.

Let us turn to π, the main parameter of interest in this paper. Strictly speaking, it is the probability of selecting a coalition-oriented voter at random. Hence, it may be interpreted as the proportion of coalition-oriented voters in the electorate. We can see in Table 2 that in both cases the picture is the same: the vast majority of voters seem to be concerned about party platforms. 5% of the voters are policy-oriented if assuming common beliefs, 7% if using subjective expectations.

[Table 2 about here]

A possible argument against the above specification is that stating that the individuals are either coalition-directed or sincere may be somewhat extreme, since many voters may be taking into account both how they feel about the coalitions and the individual parties. These type of agents may be regarded as 'mixed' voters.

Therefore, I next assume that there are three types of voters. The exercise is otherwise the same: find the unconditional probability that an agent is coalition-directed (π^{col}), mixed (π^{mix}) or party-oriented ($\pi^{pty} = 1 - \pi^{col} - \pi^{mix}$). The utility that mixed agents derive from voting for party j is given by

where $U_{ij}^{*,mix} = \alpha_p^{mix} PT_{ij} + \alpha_c^{mix} CL_{ij} + X_i \beta_j + \varepsilon_{ij}^{mix}$

and $\varepsilon_{ij}^{mix} \sim iid$ type one extreme value

We can check in Panel B of Table 2 that for both models the proportion of mixed voters is quite large: nearly 50%. On average, the weight that mixed voters place upon party platforms is at least three times as large than on policy considerations.[14] Given that the proportion of coalition-oriented voters is around 6%, the picture remains the same. For the vast majority of the electors, it was party platforms what mattered more.

Just as two types could be restrictive, so can three. We can model heterogeneity with many different types, possibly as many as individuals. This is the case when all agents care about PT and CL, but the weights they give to them differ. Here, I analyze this case. Probabilities can be modeled as a mixed logit (MXL). The utility of agents is therefore:

$$U_{ij}^{*} = \alpha_p^i PT_{ij} + \alpha_c^i CL_{ij} + X_i\beta_j + \varepsilon_{ij}, \quad \varepsilon_{ij} \sim iid \text{ type one extreme value}$$

Since only one decision per individual is observed, it is not possible to estimated the actual value of the parameters α_p^i and α_c^i. What can be done, though, is compute the distribution of such parameters across the population. The assumption is that α_c and α_p follow a multivariate Normal distribution: I use the EM algorithm as described in Train (2009) for estimation. For the SE model, the estimation suggests that the parameters follow this distribution:

$$\begin{pmatrix} \alpha_p \\ \alpha_c \end{pmatrix} \sim N \begin{pmatrix} 1.71, & 0.39 & 0 \\ 0.35, & 0 & 0.44 \end{pmatrix}$$

This results imply that for 99.5% of the individuals the parameter on PT has a positive value, and for 65.2% of them so does the parameter for CL. Moreover, it implies that for 6.21% of the individuals, the parameter for CL has a larger value than that for PT. This is consistent with saying that the unconditional probability of being a coalition-directed type is around 0.05. The percentage of votes correctly predicted speaks in favor of a finite types model: they both do a better job of predicting the votes than the mixed logit model. My intuition for this is that given that we only observe on decision per voter, the

[14] In the CB model, $\hat{\alpha}_p^{mix} = 2.09, \hat{\alpha}_p^{mix} = 0.00$, whereas in the SE model, $\hat{\alpha}_p^{mix} = 1.76, \hat{\alpha}_p^{mix} = 0.68$

distributions estimated from the mixed logit model are not precise enough for prediction.

The most important lesson to extract from using the mixed logit model is that it gives support to the fact that there is heterogeneity in voting strategies across agents. This is critical because a multinomial logit model like the one I use for the baseline specification has the IIA condition, which is especially suspicious in a voting model with multiple choices. Since the MXL model does not possess IIA, this consistency of results supports the fact that the finite types models estimated above are valid.

4.1 Subjective Expectations vs. Common Beliefs

We can check in Table 5 that a model with subjective expectations clearly improves the fit: PRE with respect to the two types model is 1.64% in the two types model, but is a remarkable remarkable 22% when we assume a three types model. In terms of the Vuong test the pattern is the same. Below I show that very similar results hold when using a proximity model.

[Table 5 about here]

5 Alternative specification: a proximity model

It is standard in the literature to model voting in terms of proximity. That is, voters assess parties and coalitions according to how close they feel to them in a variety of topics. In particular, DMA and Kedar (2009) use a proximity model, where distance in the LR spectrum is their proxy for party and coalition evaluations. The goal of this section is therefore to assess what are the predictions of my model when assuming voters evaluate parties and policies in this uni-dimensional space.

Hence, the only aspect that I change in this section is the construction of variables PT and CL. Since respondents are not asked about the expected position in the LR spectrum of the different coalitions, I have to construct this measure. I do so taking into account two pieces of information: LR placement of each party within the coalition and expected seats of each party member. I assume that the position of the government is a weighted average of the position of its members -weighted by seat shares. This assumption finds empirical support in Laver and Shepsle (1994). In Table 6, I also provide anecdotal evidence on Israeli cabinets, where one can check that the portfolio allocation was proportional to the seat shares within government in 2003 and 2006. Once I have the expected placement of each coalition, I just need the likelihood of each coalition to construct CL as in the previous section (details below).

[Table 6 about here]

The second goal of this section is to assess how much does the fit improve when using subjective expectations. A proximity model may be more sensible to subjective expectations because now I am using three subjective pieces of information (perceived position of the parties in the LR spectrum, likelihood of the coalitions, expected seats). As above, I will construct a model of common beliefs (CB) and a model of subjective expectations (SE) and compare their fit.

5.1 Construction of PT and CL

PT_{ij} and CL_{ij} become functions of distances in the LR spectrum:

$$PT_{ij} = PT_{ij}\left(dist(i, LR_{ij})\right), \qquad CL_{ij} = CL_{ij}\left(dist(i, LR^c_{ij})\right)$$

where $dist(i, LR_j)$ is the euclidean distance between the self-reported position of agent i and the position of party j in P_{ij} - or the expected position of a government coalition including party j for the case of $dist(i, LR^c_j)$.

In order to compute the expected position of a government including j, I take the weighted average of the positions of all coalitions including j (weighted by the probability of each coalition being formed, conditional on j being in government). For each coalition C_j, its position in the LR spectrum is computed as the weighted average of the positions of its members (weighted by actual number of seats won in the elections). Formally, this is done as follows:

Let $\overline{LR}_j \in [0,10]$ be the average position of party j in the LR spectrum according to respondents, $\overline{LR}_j = \frac{1}{N}\sum_i LR_{ij}$. Denote by s_j the actual number of seats of party j after the elections and suppose that a given coalition C_j which includes j is formed by j, h and k. Then the expected position of this coalition is

$$CB: \quad LR^i_{C_j} \equiv \frac{s_j}{s_j+s_h+s_k}\overline{LR}_j + \frac{s_h}{s_j+s_h+s_k}\overline{LR}_h + \frac{s_k}{s_j+s_h+s_k}\overline{LR}_k = LR_{C_j} \forall\, i$$

$$SE: \quad LR^i_{C_j} \equiv \frac{s_j}{s_j+s_h+s_k}LR_j + \frac{s_h}{s_j+s_h+s_k}LR_h + \frac{s_k}{s_j+s_h+s_k}LR_k$$

Note the subtle difference between the two models. In the CB model, $LR^i_{C_j}$ is actually $\overline{LR}_j$, the average placement of j across respondents, whereas s_j is the actual number of seats that the party won in the elections.[15] Hence, $LR^i_{C_j} = LR_{C_j}\ \forall\ i$ in that model, i.e. the expected position of the coalition is common across agents.

Recall that $\omega^i_{C_j}$ is the conditional probability that coalition C_j will be formed. Thus, the expected position of a coalition including j is given by

$$CB: \quad LR^c_{ij} \equiv \sum_{C_j \in \mathscr{C}_j} \omega^i_{C_j} \times LR^i_{C_j} = \sum_{C_j \in \mathscr{C}_j} \omega_{C_j} \times LR_{C_j} = LR^c_j \,\forall\, i$$

$$SE: \quad LR^c_{ij} \equiv \sum_{C_j \in \mathscr{C}_j} \omega^i_{C_j} \times LR^i_{C_j}$$

where the second equality is given by the fact that the probabilities of the different coalitions are the same for all agents. LR^c_{ij} can be interpreted as the expected location of the government policy *if j is in government*. Again, it is the same for all individuals. Hence,

[15] DMA use actual number of seats for expected seats too. Nonetheless, they use data from the 'Comparative Manifesto Project' to assess party positions. Likewise, they use Martin and Stevenson (2001) in order to construct the likelihood of the different coalitions.

$$CB: \quad dist(i, LR_j^c), \qquad PT_{ij} = dist(i, \overline{LR}_j)$$

$$SE: \quad dist(i, LR_{ij}^c), \qquad PT_{ij} = dist(i, LR_j)$$

The values of $\overline{LR}_j$ and LR_j^c for all seven parties are presented in Figure 3. As one would expect, the correlation is quite high, and LR_j^c is always more towards the center. This is consistent with the idea that coalition government policies tend to be more centrist than those proposed by the parties that form them.

[Figure 3 about here]

5.1.1 Imputing Expected Seats

The major inconvenience for building CL and PT for the SE model is the fact that interviewees are only asked about the expected number of seats for Kadima, Likud and Labour. They are only asked for the expected number of seats of another party if, beforehand, they claim they are going to vote for that party. Thus, for Meretz, ILM, Shas and Beiteinu, I only have between 9-13% of respondents stating the expected number of seats, depending on the party. I have to impute expected number of seats for the rest of the sample. In order to do so, I employ the IP method described in Schafer (1997).

In Table 7 we can see that the mean and median of imputed expected seats are very close to the actual number of seats that the parties won. The larger difference is for Meretz (average of imputed expected seats is 8.78 while the actual number of seats won was 5) and the smallest is Shas (10.59 and 12 respectively). In Figure 4 we can see the mean and variance of Seats for all 20 imputations. I include this figure to show that none of the 20 imputed data sets is an outlier, and that there is no autocorrelation between seats in imputation m and in imputation m + 1.[16]

[16]The point most to the left refers to the mean and variance of the observed data, which explains why the variance is larger (recall that we observe expected seats only for around 10of these four parties).

[Table 7 about here]

[Figure 4 about here]

Figure 5 shows that there is no systematic distortion or projection bias regarding imputed expected seats. I split the sample into supporters of each party, and then I compute the average expected seats shares for each group of supporters (expected shares assuming that only these seven parties would be members of parliament, so the shares add up to 100%). We can see that in some cases there is a small bias in favor of one's favorite party (for instance Kadima supporters on average thought that Likud would get 16% of the seats, whereas Likud supporters raised this number to 21%). Yet this bias is by no means systematic across parties: for instance, Meretz supporters were the most pessimistic regarding seat shares for Meretz. This lack of systematic bias enhances validity to the results.

[Figure 5 about here]

5.2 Results

I find that the proportion of policy-oriented voters radically differs between both models. The SE model estimates it to be around 12%, whereas the CB model estimates it to be nearly one half (46%). What accounts for this difference? In the SE model, the correlation is -0.01 between PT and CL, whereas for the CB model it is quite high (0.85). Therefore the algorithm finds it hard to disentangle whether the agent is of one type or the other. We can check in Figure 6 that the estimated probabilities of being policy-oriented are normally distributed in the CB model, while in the SE case they tend to diverge to 0 or 1. The SE model seems more precise.

[Figure 6 about here]

5.3 Subjective Expectations vs. Common Beliefs

When it comes to model fit, we can see in Table 8 that, overall, when using a proximity model, including heuristic expectations also improves the fit. If we assume agents to be all of the same type, SE improves the fit only slightly. Nonetheless, when we assume two types, the improvement is more remarkable.

[Table 8 about here]

6 Discussion

6.1 Why subjective expectations?

Expectations on coalitions are shown to have an impact on voting strategies over and above party and coalition preferences for Israeli citizens (Bargsted and Kedar 2009). Here I go one step further, and I show that they matter over and above preferences and expected electoral results. That is, even if two agents have the same preferences and expect the same distribution of seats, they will use different voting strategies if they expect different coalitions to be formed.

Figure 7 shows that indeed, ideologically similar agents who expected Labour and Likud to win the same number of seats had different expectations upon the coalition that would be formed. The question is, did it have an impact on their votes? Table 9 shows that it did. We can check that, controlling for preferences on parties and coalitions, socioeconomic status and expected electoral results, perceptions on the likelihood of the different coalitions still matter. The effect is quite small, but significant.[17] I.e. in highly contested elections, perceptions could decide the winner.

[Figure 7 about here]

6.2 Who cast a policy vote?

The following two questions naturally arise. First, what were the consequences of coalition directed voting in the Israeli 2006 elections? and second, what accounts for coalition directed voting? These are the issues I address here. To answer the first question, I take

[17]For the average voter, the probability of voting for a party never varies by more than 3%.

advantage of the fact that the EM algorithm provides me with the probability $\hat{z}_i$ that each agent is a policy-oriented type. Table 9 shows the percentage of votes of policy-oriented voters. Likud and Labour seem to have been the most attractive to coalition-oriented voters. In order to check whether this correlation is significant, I run a multinomial logit, controlling for preferences and socioeconomic background.

[Table 9 about here]

We can see in Panel A of Table 10 that the correlation remains positive and significant: a higher probability of being labeled as a policy-oriented type is correlated to a higher probability of voting for Likud as opposed to all other parties, especially ILM and Kadima (If I use Labour as the reference party, I find that only the likelihood of voting for Kadima increases with $\hat{z}_i$). Although I have no evidence of causality, this seems to hint at the fact that Kadima lost a few votes to Labour and Likud (who also, but in smaller numbers, may have gained votes from smaller parties from both ends of the LR spectrum).

[Table 10 about here]

Finally, I try to ascertain whether strategic behavior is correlated to any particular social characteristics. On top of the controls used above, I am particularly interested in assessing whether better informed agents have a tendency to be more strategic. Hence I add variables on 'political knowledge' and 'frequency of reading newspapers' in the analysis. Moreover, given the political behavior of coalition-oriented voters just described, I construct '$\mathbf{LR}_{4/6}$', a variable that takes value 1 if the agent places herself at either 4 or 6 in the political spectrum, and 0 otherwise. Note that $\mathbf{LR}_{4/6}$ does not include agents that locate themselves in the exact center ('5'). If the intuition above is correct, we should find that this variable is positively correlated with coalition-oriented voting. Hence, I regress $\hat{z}_i$ on all these variables.

Table 11 shows the results, which have to be taken with care since $R^2 < 0.05$ in all cases. Coalition-directed behavior seems to be unexplained by any socioeconomic variable (results not shown). However, as we can see in column (1), there is indeed a positive correlation between coalition-oriented voting and $\mathbf{LR}_{4/6}$. When I modify $\mathbf{LR}_{4/6}$ to also include agents who place themselves at either '3' or '7' of the LR axis (i.e. $\mathbf{LR}_{34/67}$), the effect vanishes. It remains marginally significant though when I include agents placed at '5', i.e. $\mathbf{LR}_{456}$. Figure 8 shows the percentage of coalition-oriented voters at each point of the LR axis. We can see that, in effect, the highest frequencies are at 4 and 6.

[Table 11 about here]

[figure 8 about here]

My interpretation is the following: (I base it on an agents located '6'. It is the same but with Labour and leftist parties for an agent located at '4'). Some agents who feel ideologically very close to both Kadima and Likud used their vote in order to increase the chances that the policies of the future coalition leaned towards their blisspoint '6'. Amongst their closest parties, voting for one or the other could make a huge difference in terms of policies: voting for Likud increased the likelihood of a rightist coalition, voting for Kadima increased uncertainty about the color of the coalition. For agents more to the right, the incentive was not there: their choice between closest parties (say between Likud and ILM) would not have such radical consequences, since they both expressed a preference for a coalition leaning towards the (far) right (none of them entailed uncertainty).

Results suggest that agents around the center felt that the choice amongst the two favorites could have a major impact, whether more radical agents could have thought that there was no such trade-off in the choice between the two best options, as it would not have such a great impact upon policies. Hence, they voted simply in terms of party-proximity.

Table 12 reinforces this view. I interact the probability of being strategic with a dummy for being a supporter of party j. Hence, I can estimate which party the supporters of party j tend to vote for when they happen to be strategic. In other words, I can estimate which parties are deemed as close substitutes. Labour supporters tend to vote *less* for Labour when they are strategic. The same goes for Likud supporters. On the other hand, Kadima supporters seem to be really prone to voting for other parties when they fall into the strategic category. Labour, Meretz, Yisrael Beiteinu and Likud seem to be the parties gaining from voters defecting away from Kadima.

[Table 12 about here]

7 Concluding Remarks

In this paper I refine the means to measure the proportion of policy-oriented voters. This is a relevant question, since it may help us understand why party systems in a PR system may not fully mirror the preferences of the electorate. I find that in Israel, policy voters seem to be a small minority within the electorate. Nonetheless, their voting strategies may still be decisive in very closed elections, in terms of determining the government coalition, or the entrance in parliament of small parties. For the election I deal with, policy-voting seems to have slightly increased voting for the two big parties at either side of the Left-Right spectrum.

I also show that modeling agents as heterogeneous and including their subjective expectations in the model is an important step towards a better understanding of voting behavior. The most natural following step is to confirm these findings with data from other countries with PR systems. Also, it seems a natural step to include other kinds of behavior. For instance, voters who rather than voting for parties or policies jump onto the bandwagon, which defines an exciting new avenue for research.

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8 Figures

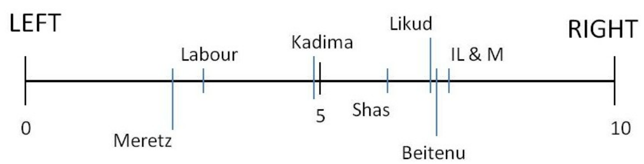


Figure 1: Distribution of parties on a Left-right scale, where 0 is left, 5 is center and 10 is right. Source: Averages of respondents' answers in the INES survey (2006)

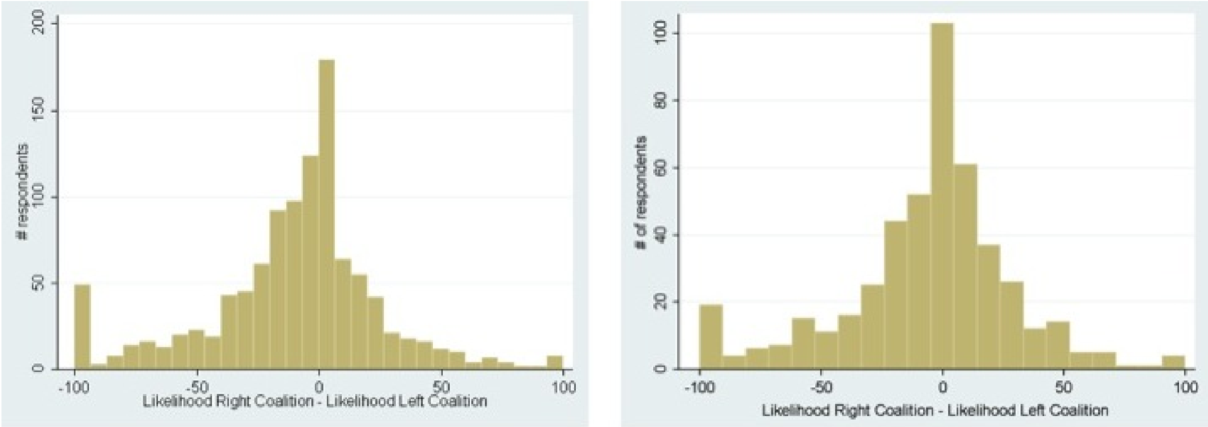


Figure 2: Expectations on government formation of Israeli voters. 100=Right coalition certain, -100=Left coalition certain. Left: all voters. Right: voters who placed themselves to the right of the political spectrum (i.e. between 6 and 10). Source: INES survey (2006).

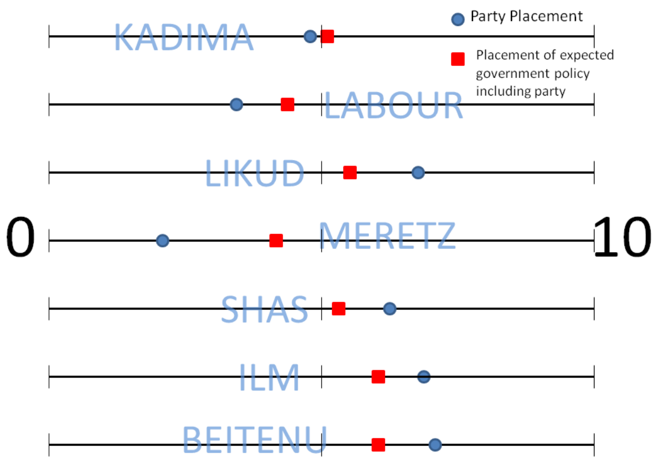


Figure 3: Average placement of parties (circles) and expected average placement of coalitions including each party (squares) in the LR spectrum.

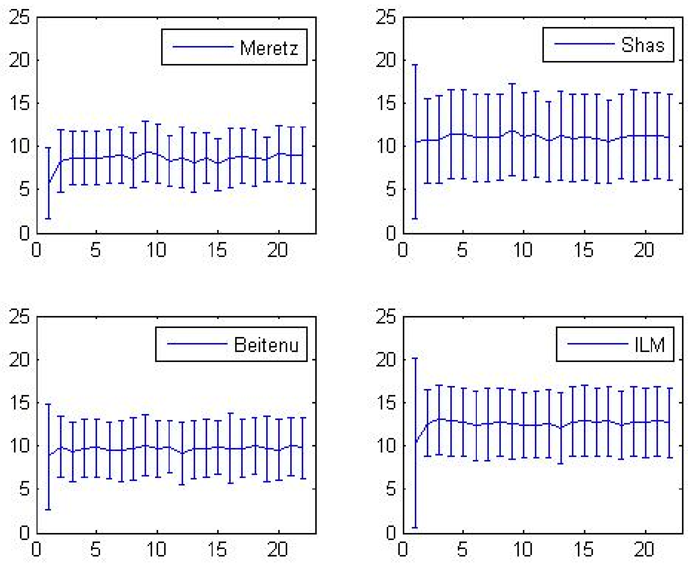


Figure 4: Mean and standard deviation of imputed seats for all 20 imputations. The first one (the one most to the left) is the mean and standard deviation for the observed data for each party

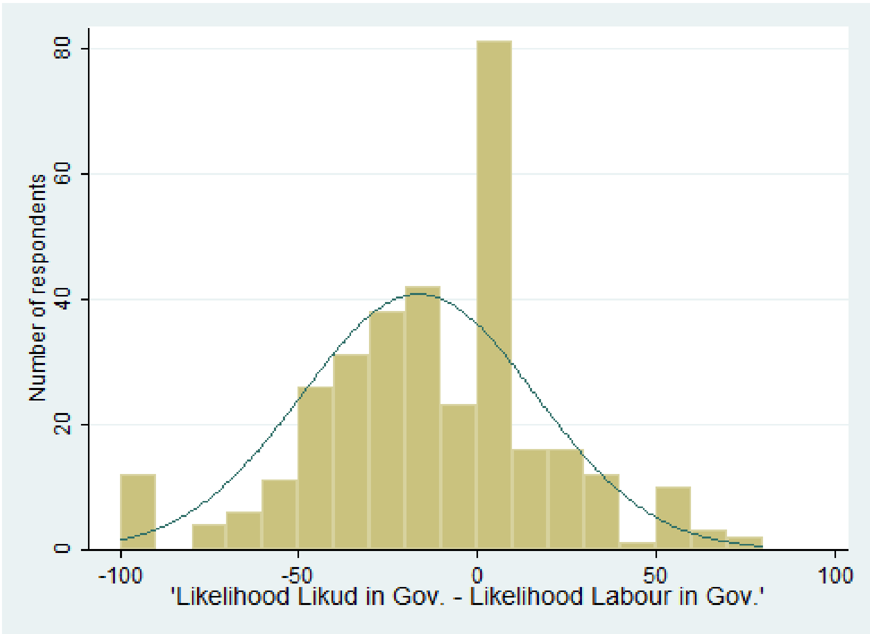


Figure 7: Expected coalition for ideologically similar agents. Horizontal axis: 'Likelihood of Likud being in government' - 'Likelihood of Labour being in government', where 100=Likud surely in, Labour surely not, and -100 means the opposite. Subset of respondents who placed themselves at 4, 5 or 6 in the LR axis and agreed on returning territories for peace.

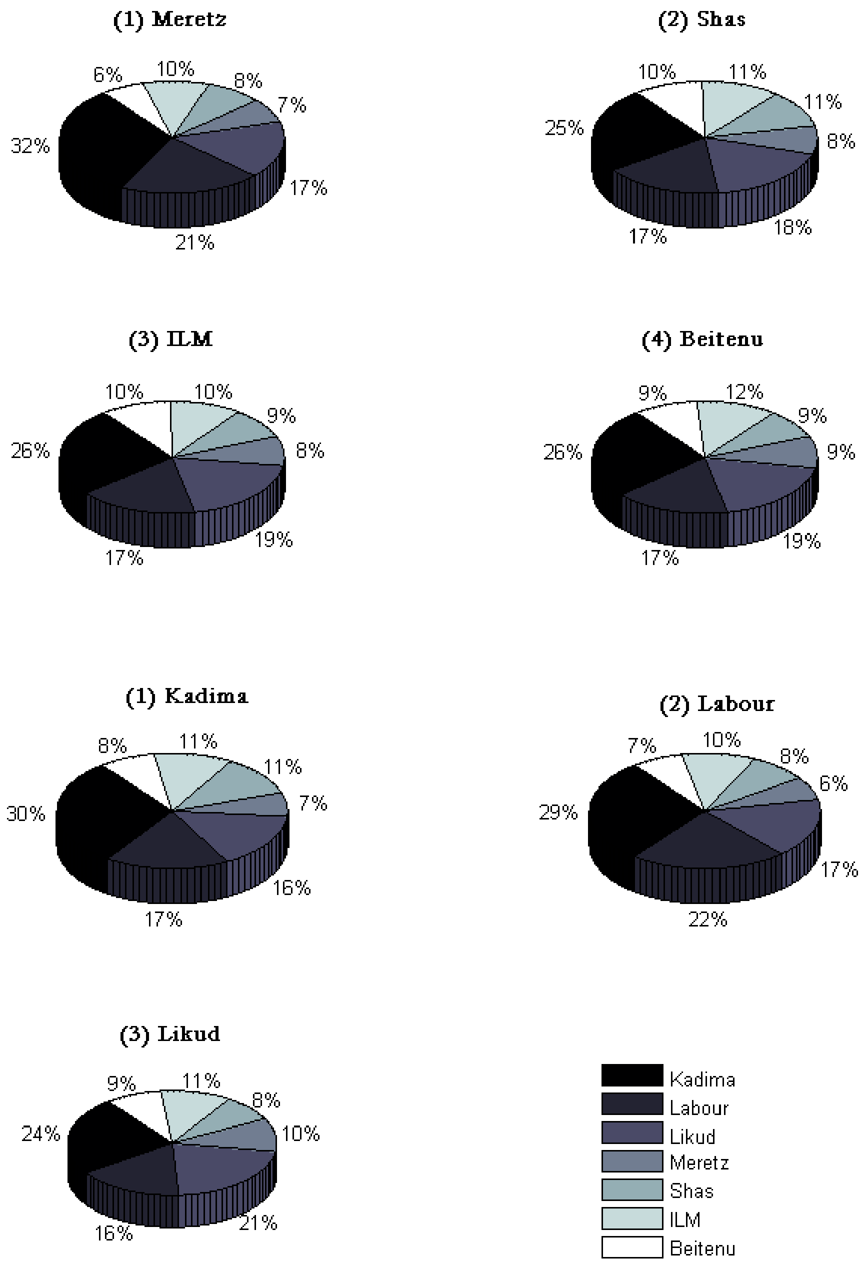
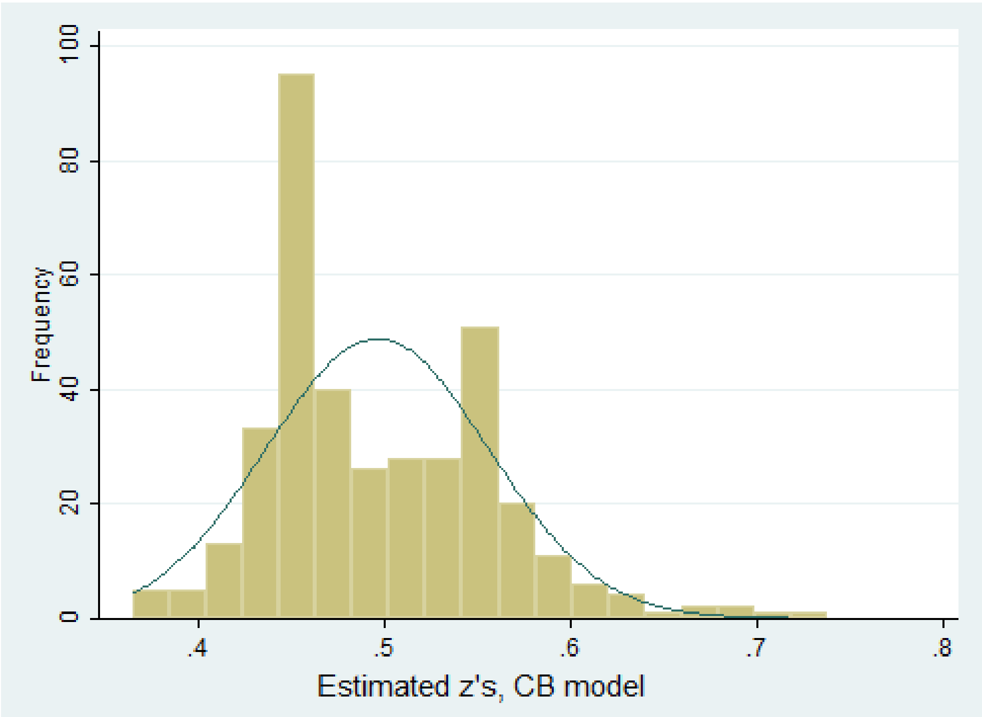
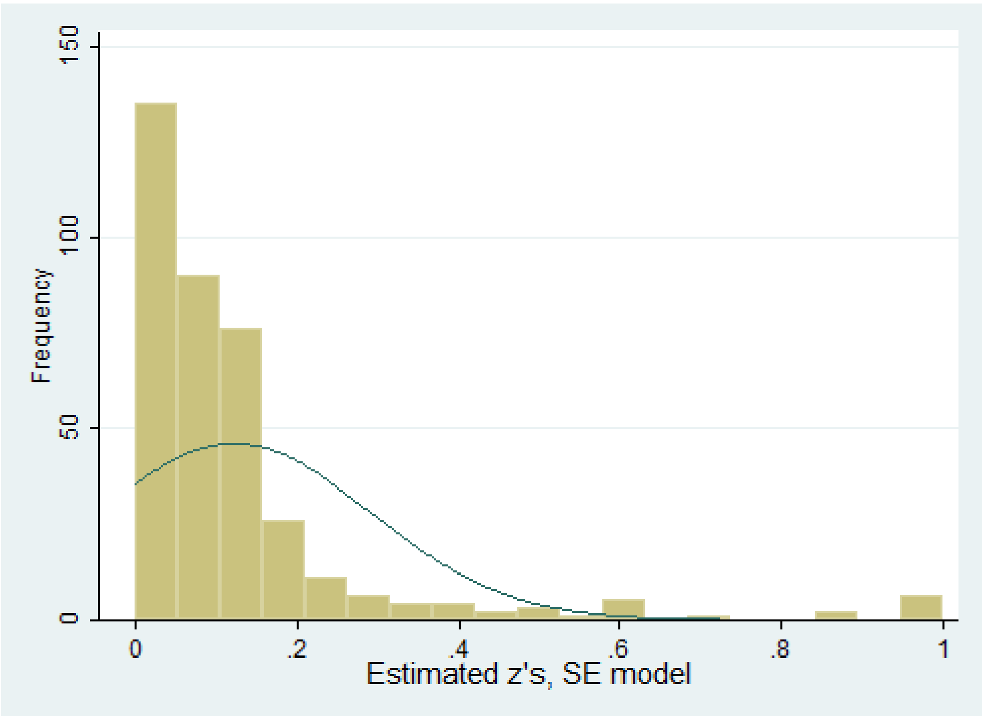


Figure 5: Expected shares of seats after multiple imputation, by supporters of the different parties.



(a) Common Beliefs model



(b) Subjective Expectations model

Figure 6: Distribution of the $\hat{z}_i$s, i.e. estimated probabilities that the agents are policy oriented.

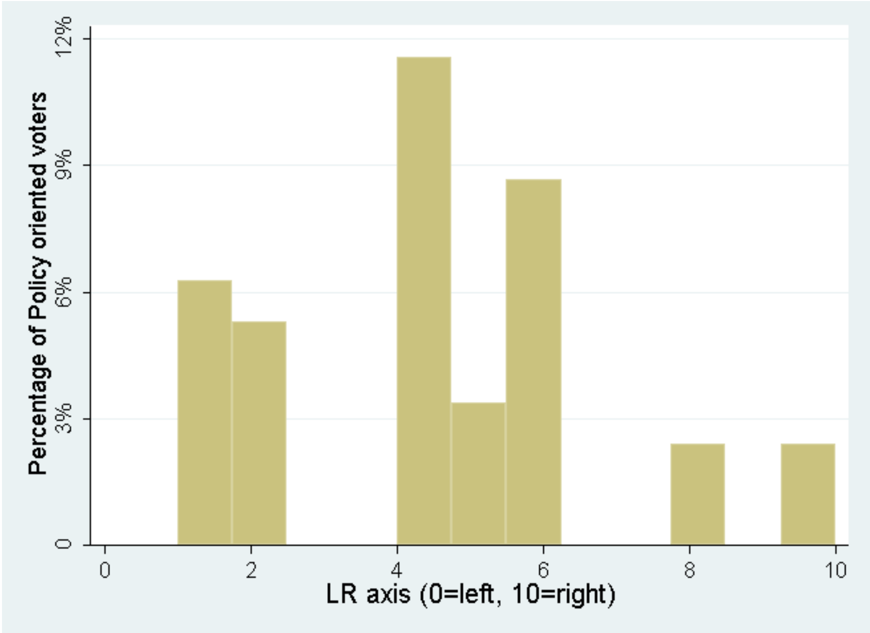


Figure 8: Percentage of policy-voters at each point of the LR axis.

9 Tables

Table 1: Comparison of results according to vote intention with the hypothetical results if all voters had voted for their favorite party. The set of 420 respondents includes only respondents who claimed they were going to vote for one of the seven mentioned parties.

Party	Results according to vote intention (1)	Results if people had voted for their favorite party (2)	Actual results (3)
Kadima	33.82%	31.81 %	29.19%
Labour	18.83%	14.99%	19.94 %
Likud	13.16%	12.98%	11.90%
Meretz	6.76%	8.78%	4.99%
Shas	10.42%	9.87%	12.62%
Ihud Leumi - Mafdal	7.68%	9.14%	9.45%
Beiteinu	9.32%	8.23%	11.90%
Other/none	0%	4.20%	0%
TOTAL	100%	95.80%	100%
Observations	420	420	-

Actual results in column 3 are weighted in the following way: (total votes for party p / total votes for the 7 mentioned parties)$\times$75.41. The total vote share for these parties was 75.41%.
Source: INES survey (2006)

Table 2: Results for the different model specifications. Dependent Variable: Vote Intention for Party j. (SE): Model with Subjective Expectations. (CB): Model Imposing Common Beliefs.

	$\hat{\pi}_c$	$\hat{\pi}_m$	$\hat{\pi}_p$
Panel A: Heterogeneous Agents (two types)			
Common Beliefs	0.05		0.95
Subjective Expectations	0.07		0.93
Panel B: Heterogeneous Agents (three types)			
Common Beliefs	0.07	0.44	0.49
Subjective Expectations	0.06	0.45	0.49
Panel C: Heterogeneous Agents (multiple types)			
Common Beliefs	0.03$^{(1)}$		0.97
Subjective Expectations	0.06$^{(1)}$		0.94
Observations		420	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(SE): model including subjective expectations when constructing CL. (CB) Model that imposes common beliefs when constructing CL. CL: weighted average of evaluation of coalitions including party j. PT: party evaluation.
$\hat{\pi}_c$: Estimated proportion of coalition types. $\hat{\pi}_p$: Estimated proportion of party types. $\hat{\pi}_m$: Estimated proportion of mixed types.

Panel A: $U^*_{ij} = z_i\left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + (1 - z_i)\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right), z_i = \{0, 1\}$

Panel B: $U^*_{ij} = z^{col}_i\left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + z^{pty}_i\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right) + z^{mix}_i\left(\alpha^{mix}_p PT_{ij} + \alpha^{mix}_c CL_{ij} + x_i\beta_j + \varepsilon^{mix}_{ij}\right),$

Panel C: $U^*_{ij} = \alpha^i_p PT_{ij} + \alpha^i_c CL_{ij} + x_i\beta_j + \varepsilon_{ij}$

(1) $\hat{\pi}_c$ in Panel C is the estimated proportion of agents for whom $\alpha_c > \alpha_p$ (and so $\hat{\pi}_p$= 1-$\hat{\pi}_c$)

Table 3: Baseline Regression (two types model). Dependent Variable: vote intention for party j.

	Labour	Likud	Meretz	Shas	ILM	Y. Beiteinu
$\boldsymbol{\pi}$ (unconditional prob. that a voter is coalition directed)			0.07			
PT_{ij} (Party Evaluation)			1.96*** (0.08)			
CL_{ij} (Evaluation of Party impact on policies			1.08*** (0.12)			
Left (0) - Right (10)	0.014	0.293**	-0.241	0.153*	1.177***	0.408**
	(0.12)	(0.16)	(0.21)	(0.22)	(0.23)	0.184)
Territories for Peace	-0.155	-0.075	-0.150	0.485	1.351***	0.182
	(0.31)	(0.30)	(0.51)	(0.34)	(0.46)	(0.27)
Religious Observance	0.493	0.542	-0.072	2.114***	0.698	0.449
	(0.36)	(0.30)	(0.12)	(0.57)	(0.46)	(0.49)
% vote correctly predicted			85.71%			
Log Likelihood			-167.06			
Observations			420			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Reference Party: Kadima.
CL_{ij}: Weighted average of evaluation of coalitions including party j.
Territories for peace: "Territories should be exchanged for peace: (1) Def. Agree - (4) Def. Disagree"
Religious observance: (1) None of it - (4) All of it.
Other controls: years of schooling, gender, age.

Table 4: Results for the different model specifications. Dependent Variable: Vote Intention for Party j. (SE): Model with Subjective Expectations. (CB): Model Imposing Common Beliefs.

	% correct	Log$\mathscr{L}$
Panel A: Homogeneous Agents (Conditional Logit)		
Common Beliefs	82.86%	-207.79
Subjective Expectations	83.57%	-198.68
Panel B: Heterogeneous Agents (two types)		
Common Beliefs	85.48%	-180.31
Subjective Expectations	85.71%	-167.60
Panel C: Heterogeneous Agents (three types)		
Common Beliefs	85.95%	-146.33
Subjective Expectations	89.05%	-122.90
Observations	420	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(SE): model including subjective expectations when constructing CL. (CB) Model that imposes common beliefs when constructing CL. CL: weighted average of evaluation of coalitions including party j. PT: party evaluation. α_p: Coeffcient linked to PT. α_c: Coeffcient linked to CL. Controls: Self placement in the LR spectrum, years of schooling, territories for peace, religious observance, age and a constant.
Regression specifications

Panel A: $U^*_{ij} = \alpha_p PT_{ij} + \alpha_c CL_{ij} + x_i\beta_j + \varepsilon_{ij},$

Panel B: $U^*_{ij} = z_i\left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + (1 - z_i)\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right), z_i = \{0, 1\}$

Panel C: $U^*_{ij} = z^{col}_i\left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + z^{pty}_i\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right) + z^{mix}_i\left(\alpha^{mix}_p PT_{ij} + \alpha^{mix}_c CL_{ij} + x_i\beta_j + \varepsilon^{mix}_{ij}\right),$
$z^t_i = \{0, 1\}, \text{for } t = \{mix, col, pty\}$

Table 5: Comparison of Common Beliefs vs. Subjective Expectations Models

	% correct	PRE	Log$\mathscr{L}$	Vuong Test
Panel A: Two types				
Common Beliefs	85.48%		-180.30	
Subjective Expectations	85.71%	1.64%	-167.60	1.38
Panel B: Three types				
Common Beliefs	85.95%		-146.33	
Subjective Expectations	89.05%	22.03%	-122.90	2.48***

'% correct' : % of votes correctly predicted by the model. PRE is defined as in DMA:

$$PRE = \frac{N* - N_{alt}}{N - N_{alt}},$$ where $N*$ is the number of votes correctly predicted by the model,

N_{alt} is the number correctly predicted by the alternative model and N is the total number of observations.
Vuong test: as defined in Vuong (1989). The Vuong statistic follows a N(0,1).
Models:

Panel A: $U^*_{ij} = z_i \left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + (1 - z_i)\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right), z_i = \{0, 1\}$

Panel B: $U^*_{ij} = z^{col}_i \left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + z^{pty}_i \left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right) + z^{mix}_i \left(\alpha^{mix}_p PT_{ij} + \alpha^{mix}_c CL_{ij} + x_i\beta_j + \varepsilon^{mix}_{ij}\right),$

$z^t_i = \{0, 1\}, \text{for } t = \{mix, col, pty\}$

Table 6: Portfolio Allocation in the Israeli 2003 and 2006 Cabinets

2003 Legislature	# Seats	% Seats in gov.	# Ministers	% Ministers
Likud	38	57.57%	17	62.96%
Shinui	15	22.72%	6	22.22%
National Union	7	10.60%	2	7.40%
National Rel. Party	6	9.09%	2	7.40%
	66	100%	27	100%
2006 Legislature				
Kadima	29	43.28%	13	44.80%
Labour	19	28.35%	9	31.03%
Shas	12	17.91%	5	17.24%
Gil	7	10.44%	2	6.89%
	67	100%	29	100%

Table 7: Imputation of Expected Seats. Average mean and average median for each party for the 20 imputations

	Kadima	Labour	Likud	Meretz	Shas	ILM	Beiteinu
			Actual number of seats won in the elections				
	29	19	12	5	12	9	11
			Observed data (expected seats)				
Mean	32.7	21.04	20.39	5.78	10.51	10.392	8.73
Median	35	20	18	6	8	10	10
Std. dev.	10.17	8.90	10.09	4.13	8.96	9.73	6.05
N	377	377	377	33	49	43	38
			Augmented data				
Mean	32.7	21.04	20.39	8.78	10.89	12.65	9.51
Median	35	20	18	8.41	10.96	12.70	9.32
Std. dev.	10.17	8.90	10.09	3.16	4.96	4.02	3.44
N	377	377	377	377	377	377	377

Observed data: Includes only individuals for which we have an explicit answer on the expected number of seats that party j will win in the elections.
Augmented data: The values provided are the mean values of the 20 imputations.

Table 8: Comparison of Common Beliefs vs. Subjective Expectations Proximity Model.

	% correct	PRE	Log$\mathscr{L}$	Vuong Test
Panel A: Homogeneous types (Conditional Logit)				
Common Beliefs	45.62%	-	-519.35	-
Subjective Expectations	49.60%	7.31%	-522.15	-0.45
Panel B: Two types				
(3) Two types (CB)	48.80% -	-509.90	-	
(4) Two types (SE)	57.29%	22.03%	-430.96	3.93***

'% correct' : % of votes correctly predicted by the model. PRE is defined as in DMA:

$$PRE = \frac{N * - N_{alt}}{N - N_{alt}}, \text{ where } N* \text{ is the number of votes correctly predicted by the model,}$$

N_{alt} is the number correctly predicted by the alternative model and N is the total number of observations.
Vuong test: as defined in Vuong (1989). The Vuong statistic follows a N(0,1).
Models:

$$\text{Panel A:} \quad U^*_{ij} = \alpha_c CL_{ij} + \alpha_p PT_{ij} + x_i\beta_j + \varepsilon_{ij}$$

$$\text{Panel B:} \quad U^*_{ij} = z_i\left(\alpha CL_{ij} + x_i\beta_j + \varepsilon^{col}_{ij}\right) + (1 - z_i)\left(\alpha PT_{ij} + x_i\beta_j + \varepsilon^{pty}_{ij}\right), z_i = \{0, 1\}$$

Table 9: Vote Shares, Subset of Policy Oriented Types

Kadima	Labour	Likud	Meretz	Shas	ILM	Y. Beiteinu
6.25%	31.25%	25%	12.50%	6.25%	0%	18.75%

Table 10: Multinomial Logit. Dependent Variable: Vote for Party j

	Kadima	Labour	Meretz	Shas	ILM	Beiteinu
Panel A						
$\hat{z}_i$	-5.073***	-1.452	-2.832**	-1.162**	-6.411**	-2.842**
	(1.17)	(0.95)	(1.27)	(1.14)	(3.28)	(1.14)
Left (0) -	-0.242	-0.232	-0.508**	-0.218	0.176	-0.174
Right (10)	(0.15)	(0.15)	(0.20)	(0.18)	0.18)	0.16)
Evaluation of Parties			YES			
Log Likelihood			-178.80			
Panel B						
$\hat{z}_i$	-4.18***	-0.945	-0.996	-0.524	-1.043	-1.173
	(1.14)	(0.70)	(0.94)	(0.92)	1.75)	(0.94)
Left (0) -	-0.310***	-0.545***	-0.696*	-0.23***	0.185*	-0.042
Right (10)	(0.07)	(0.08)	(0.20)	0.10)	0.08)	0.11)
Socioeconomic controls$^{(1)}$			YES			
Log Likelihood			-488.18			
Observations			420			

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Reference Party: Likud.
$\hat{z}_i$: Estimated probability that i is policy oriented, taken from the baseline model (SE with two types).
Left (0) - Right (10): self placement of the respondent in the LR axis (0=left, 10=right).
Socioeconomic controls include: age, territories for peace, years of schooling, density in the household, gender, support or member of any party.
Knowledge: takes values from 0 to 3, depending on whether the respondent accurately answered three political questions in the survey.
(1) Also includes knowledge and frequency reading papers

Table 11: Dependent variable: Estimated probability of being policy-oriented[1] ($\hat{z}_i$)

Pr. (Policy Voter)	(1)	(2)	(3)	(4)	(5)	(6)
LR$_{4/6}$	0.045**	0.049**				
	(0.22)	(0.22)				
LR$_{456}$			0.019	0.030*		
			(0.016)	(0.016)		
LR$_{34/67}$					0.006	0.010
					(0.017)	(0.017)
Socioeconomic controls	yes	yes	yes	yes	yes	yes
Party evaluations	yes	no	yes	no	yes	no
R^2	0.023	0.048	0.014	0.044	0.011	0.036
Observations			420			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(1) Taken from the SE model with two types.
LR$_{4/6}$: Indicator variable for respondent self-locating at 4 or 6 in the Left(0) - Right (10) axis
LR$_{456}$: Indicator variable for respondent self-locating at 4,5 or 6 in the Left(0) - Right (10) axis
LR$_{34/67}$: Indicator variable for respondent self-locating at 3,4,6 or 7 in the Left(0) - Right (10) axis
Socioeconomic controls include: age, territories for peace, years of schooling, density in the household, gender, support or member of any party, knowledge and frequency of reading papers.

Table 12: Voting Strategies of Coalition-Directed Voters. Multinomial logit. Dependent Variable: Vote for Party j

	Labour	Likud	Meretz	Shas	ILM	Yisrael Beiteinu
$\hat{z}_i$ (Estimated prob. that voter i is coalition-directed)[1]	0.304	0.328	-0.255	0.260	0.262	-0.327
	(0.228)	(0.231)	(0.363)	(0.486)	(0.234)	(0.342)
$\hat{z}_i \times$ Favorite Party is Kadima	0.657**	0.538*	1.269***	-	-	1.241***
	(0.281)	(0.287)	(0.431)	(-)	(-)	(0.385)
$\hat{z}_i \times$ Favorite Party is Labour	-0.540**	-	0.864	-	-	-
	(0.257)	(-)	(0.944)	(-)	(-)	(-)
$\hat{z}_i \times$ Favorite Party is Likud	-0.473	-0.894**	-	-	-	-0.409
	(0.419)	(0.356)	(-)	(-)	(-)	(0.609)
$\hat{z}_i \times$ Favorite Party is Meretz	-0.345	-0.348	-0.125	-	-	-
	(0.229)	(0.241)	(0.322)	(-)	(-)	(-)
$\hat{z}_i \times$ Favorite Party is Shas	0.155	0.481	-	-0.915	0.094	-9.412
	(0.344)	(0.241)	(-)	(1.223)	(0.542)	(-10.19)
$\hat{z}_i \times$ Favorite Party is ILM or Yisrael Beiteinu	0.427	0.254	-	-0.686	-2.432	0.939**
	(0.306)	(0.289)	(-)	(1.164)	(1.654)	(0.442)
Self Placement in the Left (0) - Right (10) spectrum	0.031	0.329	-0.302	-0.041	4.162**	0.491*
	(0.188)	(0.267)	(0.308)	(1.119)	(1.856)	(0.271)
Dummies for favorite party	YES					
Evaluation of parties	YES					
Log Likelihood	-100.59					
Observations	398					

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Base category: Kadima

The cells with no coefficient are due to the fact that no voters (or at most one) in that category takes a strictly positive number voter for the party in question (i.e. for the column party).

Favorite Party is j: dummy variable that takes value 1 if that i's evaluation of j is at least as large as for any other party, 0 otherwise.

(1) The estimated probability of an individual voting for coalitions ($\hat{z}_i$) is in this table multiplied by 100, which has no effect but to change the magnitude of the coefficients. $\hat{z}_i$ is taken from the baseline model with subjective expectations and two types.

10 Appendix

10.1 Coalitions mentioned in the surveys

1. Kadima - Labour
2. Kadima - Likud
3. Kadima - Likud - Haredim Parties (which include Shas)
4. Kadima - Labour - Haredim Parties (which include Shas)
5. Kadima - Likud - Right Parties (which include ILM and Beiteinu)
6. Kadima - Labour - Meretz
7. Grand coalition: Kadima - Labour - Likud - Haredim Parties - Right Parties

10.2 Construction of CL_{ij}

The construction is based on DMA. Let C_j be any coalition including j. $C_j \in \mathscr{C}_j$, the set of all possible coalitions including j. Define $\omega^i_{C_j}$ as the conditional probability of a coalition being formed (conditional on j being a member of government). That is, if $pr^i(C_j)$ is the subjective probability that C_j will be formed after the elections, then

$$\omega^i_{C_j} = \frac{pr^i(C_j)}{\sum_{\tilde{C}_j \in \mathscr{C}_j} pr^i(\tilde{C}_j)}, \qquad \tilde{C}_j \in \mathscr{C}_j$$

Let $EV^i_{C_j}$ denote i's evaluation of coalition C_j. Then,

$$CL_{ij} \equiv \sum_{C_j} \omega^i_{C_j} \times EV^i_{C_j}$$

so CL_{ij} can be interpreted as the evaluation of party impact upon government policies.

Note that in the Common Beliefs model,

$$\omega^i_{C_j} = \bar{\omega}_{C_j} = \frac{1}{N} \sum_i \frac{pr^i(C_j)}{\sum_{\tilde{C}_j \in \mathscr{C}_j} pr^i(\tilde{C}_j)}, \qquad \tilde{C}_j \in \mathscr{C}_j$$

10.3 Multiple Imputation of expected seats

In order to impute the expected number of seats for Meretz, Shas, Beiteinu and ILM I use the IP method detailed in Schafer (1997). I assume a linear model:

$$Seats_{ij} = X_{ij}\beta_j + \varepsilon_{ij}, \qquad \varepsilon_{ij} \sim iidN(0, \sigma_j^2)$$

where $Seats_{ij}$ is the expected number of seats j will win according to i, X_j is the set of k regressors that predict the expected seats for party j. These regressors include evaluation of the party and the leader, evaluation of the coalitions in which the party may be, and chances of the coalitions which include the party of being formed.

In order to estimate the posterior distribution of the parameters β, I follow Congdon (2006), chapter 4.2 and Kunz (2009). For simplicity of notation in what follows I will omit subscript j. Since the variance $\sigma^2 = \kappa^{-1}$ is unknown, the prior distribution follows that of a Normal Gamma:

$$\beta, \kappa \sim \mathscr{N}\mathscr{G}(\beta_0, \Sigma_0, \tau_0, \nu_0)$$

Therefore, conditional on the data, the posterior of the vector of parameters β follows a multivariate t-distribution:

$$\begin{aligned}
&\beta|y \sim t_k(\beta^*, \Sigma^*, \nu^*), \qquad \text{where} \\
&\Sigma^* = (\Sigma_0^{-1} + X'X)^{-1} \\
&\beta^* = \Sigma^*(\Sigma_0^{-1}\beta_0 + X'y) \\
&\nu^* = N + k
\end{aligned}$$

Given a draw β_m from t_k, then the complete (augmented) dataset of imputation m is given by

$$\begin{aligned}
&Seats_{i,m} = X_i\beta_m + \varepsilon^*_{i,m} \\
&\varepsilon^*_i = \kappa^*_m N(0,1), \qquad \kappa^*_m \sim \mathscr{G}(\tau_u, \nu_u) \\
&\tau_u = \tau_0 + n/2 \\
&\nu_u = \nu_0 + \frac{1}{2}\left(\beta_0'\Sigma_0^{-1}\beta_0 + y'y - \beta^{*\prime}(\Sigma^*)^{-1}\beta^*\right)
\end{aligned}$$

Since the portion of missing data is large, I create 20 independent imputed data sets using 10,000 iterations. The first 5,000 iterations are *burn-in*, and for the remaining 5,000, I take an imputed vector of $Seats^m$ every 250 iterations to avoid autocorrelation amongst them, $m = 1, 2, ..., 20$.