Voting Decision as a Constrained Choice Problem

A generic random utility model with a varying probability of inclusion in the choice set

Choose i’s problem is

max \( V_i - \frac{1}{\alpha} \ln \left( \sum_{j \in J} e^{\gamma_j} \right) + \epsilon_{ij} \),

where \( J \) is the set of all alternatives, \( V_i \) is the systematic component of chooser i’s utility from choosing j, and C is the set of alternatives that i considers in his/her choice set.


Conditional logit with a varying probability of inclusion in the choice set: components

1. \( V_i = e^{\beta + \epsilon_{ij}} \)
2. \( \Pr(j \in C_i) = \left[ 1 + e^{-\gamma_j} \right]^{-1} \)
3. \( \epsilon_{ij} \sim i.i.d. \text{Gumbel}(0, \alpha) \)

Choice probability and log-likelihood

Setting \( \beta = \alpha \delta \),

\( \Pr(i \text{ chooses } j) = \frac{e^{\alpha \delta(i) - \ln(1 + e^{\gamma_j})}}{\sum_{k \in J} e^{\alpha \delta(k) - \ln(1 + e^{\gamma_k})}} \)

Then, the log-likelihood function is

\( \ln \Pr(Y, D, Z | \beta, \gamma) + c = c + \sum_{i} \sum_{j} \epsilon_{ij}(y_i, D, Z; \beta, \gamma), \)

where \( \epsilon_{ij}(y_i, D, Z; \beta, \gamma) = \left\{ \begin{array}{ll} \sum_{k \in J} e^{\alpha \delta(k) - \ln(1 + e^{\gamma_k}) \gamma_j} & \text{if } i \text{ chose } j, \\ 0 & \text{otherwise} \end{array} \right. \)

Conclusions

1. Electoral viability, extremity of parties’ policy offerings and strong partisan attachment affect voters’ choice sets.
2. Conditional logit with a varying probability of inclusion in the choice set provides a better fit than conditional logit, when assessing the proximity and directional theories of voting.
3. In contrast to the conditional logit, conditional logit with a varying probability of inclusion in the choice set provides a more realistic picture of issue voting.

Acknowledgements

We would like to thank Michael D. McDonald, Olga V. Shvetsova, Robin E. Best, David H. Clark and Ekrem Karakoc for helpful suggestions. Any remaining errors are our own.

Motivation

- In prevalent models of issue voting, each voter compares cardinal utility that he/she will derive if specific political parties are elected.
- Choice sets are implicitly assumed to be the same for all voters and include all parties.
- We assume that:
  - parties are not equally likely to be included in voters’ choice sets, and
  - voters have different choice sets.
- We derive and apply a conditional logistic regression with a varying probability of inclusion in the choice set to examine
  - the determinants of a voter’s choice set, and
  - the effect of party policy positions on voters’ choices under these assumptions.

Varying probability of inclusion in the choice set

The set of alternatives that voter i considers in his/her vote choice is influenced by:

- Party’s viability in voter’s district
  - The logic of electoral coordination suggests that voters tend to disregard parties that have little chance to win seats.
- Extremity of party policies
  - In the directional theory of voting, voters tend to disregard parties that are too extreme.
- Strong affinity to a political party
  - Voters who have a strong attachment to a specific party tend to disregard other parties.

Choice among the alternatives in the effective choice set

- ... following the proximity model of voting: Voter’s problem:
  \( \max \sum_{k \in K} (q_{jk} - s_k)^2 \)
- ... following the directional model of voting: Voter’s problem:
  \( \max \sum_{k \in K} q_{jk} s_k b_k \)

where \( q_{jk} \) is the position of party j on issue k, \( s_k \) is the position of voter i on issue k, \( C \) is the set of alternatives that voter i considers in his/her vote choice, and \( b_k \geq 0 \) is the weight of issue k in voting decisions.


Estimates: Parliamentary election in Norway, 1989

<table>
<thead>
<tr>
<th>Proximity model</th>
<th>Directional model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Left-right</td>
<td>-0.152** (0.008)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>-0.025** (0.004)</td>
</tr>
<tr>
<td>Environment</td>
<td>-0.016** (0.005)</td>
</tr>
<tr>
<td>Immigration</td>
<td>-0.097** (0.007)</td>
</tr>
<tr>
<td>Health care</td>
<td>-0.031** (0.004)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>-0.047** (0.004)</td>
</tr>
<tr>
<td>Crime</td>
<td>0.058** (0.010)</td>
</tr>
</tbody>
</table>

Penalty term

- Constant: 5.655** (0.331) 1.744** (0.334)
- Party’s viability in voter’s district: -0.740** (0.081) -0.569** (0.085)
- Extremity of party policies: 0.091* (0.041)
- Strong affinity to another party: 5.222** (0.346) 4.267** (0.239)

Log lik.: -2045.223 -1395.896 -2090.958 -1399.655

AIC: 4104.447 2813.792 4195.916 2821.310

BIC: 4155.100 2893.390 4246.569 2909.908

N: 1466 1466 1466 1466

Models 1 and 3 are conditional logit estimates; models 3 and 4 are estimates of the conditional logit with a varying probability of inclusion in the choice set. ↑ Policy utility is measured as Euclidean distance; ↓ Policy utility is measured as products. Standard errors in parentheses. Two-tailed tests. * p < 0.05; ** p < 0.01.

Predicted probability of inclusion in the choice set (Model 4)

The predicted effect of changes in policies on changes in parties’ vote shares