Inferring Strategic Voting
Kawai and Watanabe(2011)

Biancen Xie

Presented at Hanqing Advanced Institute of Economics and Finance
xiebiancen@hotmail.com
Outline

• Introduction
• Model
• Data
• Empirical Analysis
• Results and Counterfactual Experiment
• Conclusion
Main question solved in this paper:
• Can we identify the existence and fraction of strategic voters?

Empirical methodologies used in the past studies:
• Aggregate regression
• Self-reporting survey
• Direct measurement
• Laboratory Experiment
Introduction

Definition

• Sincere voting: voting according to preferences
• Strategic voting: voting conditioning on pivotality
• Misaligned voting: voting for a candidate other than the most-preferred
• Pivotality: the state of having the decisive vote

the set of misaligned voters is only a subset of the set of strategic voters.
Model

Environment:
- Plural-rule election
- $K$ candidates for one seat in one district
- $M$ municipalities in an electoral district

Voter’s utility function

$$u_{nk} = u(x_n, z_k) + \xi_{km} + \xi_{nk}$$

- $x_n$: Voter $n$’s characteristic
- $z_k$: Candidate $k$’s characteristics
- $\xi_{km}$: Candidate $k$’s shock on municipality $m$
- $\xi_{nk}$: Voter $n$’s preference shock
Model

Voter’s strategies:

• Sincere: vote for candidate $k$ IFF $u_{nk} \geq u_{nl} \forall l$
• Strategic: vote for candidate $k$ IFF $u_{nk}(T_n) \geq u_{nl}(T_n) \forall l$

Expected utility from voting for candidate $k$:

$$u_{nk}(T_n) = \frac{1}{2} \sum_{l \in \{1..K\}} T_{n,kl} (u_{nk} - u_{nl})$$

• $T_{n,kl}$: Voter $n$ ’s belief that his vote would be pivotal: belief that candidate $k$ and $l$ would be tied for the first place or that $k$ will be one vote behind.
Model

Further assumptions

- Beliefs are common across all voters in the same district (Beliefs over tie probabilities are common across the same district)
- Denote the type of voter $n$ in municipality $m$ by a random variable:

$$\alpha_{nm} = \begin{cases} 
0 & \text{if voter } n \text{ is sincere} \\
1 & \text{if voter } n \text{ is strategic}
\end{cases}$$

- The probability that voter $n$ in municipality $m$ is a strategic voter $(\alpha_m)$ is drawn iid from a conditional distribution $F_{\alpha} (\cdot | w)$ where $w$ reflects the closeness based on election forecasts.
Model

Aggregating vote share:

\[ V_{k,m}^{SIN} = \frac{\sum_{n=1}^{N_m} (1 - \alpha_{nm}) \cdot 1\{u_{nk} \geq u_{nl}, \forall l\}}{\sum_{n=1}^{N_m} (1 - \alpha_{nm})} \]

\[ V_{k,m}^{SIR}(T) = \frac{\sum_{n=1}^{N_m} \alpha_{nm} \cdot 1\{\underline{u}_{nk} \geq \underline{u}_{lk}, \forall l\}}{\sum_{n=1}^{N_m} \alpha_{nm}} \]

\[ V_{k,m}(T) = \frac{\sum_{n=1}^{N_m} \alpha_{nm} \cdot V_{k,m}^{SIR}(T)}{N_m} + \frac{\sum_{n=1}^{N_m} (1 - \alpha_{nm}) \cdot V_{k,m}^{SIN}(T)}{N_m} \]
Data

General information
• Source: Japanese House Representatives election
• Vote share and candidate characteristics (*from ATES*)
• Demographic information (*from Social and Demographic Statistics of Japan*)
• Data selection criteria:
  • 3 or 4 candidates
  • No recent mergers
  • Minimum of 2 municipalities
## Data

<table>
<thead>
<tr>
<th></th>
<th>mean</th>
<th>st. dev.</th>
<th>min</th>
<th>max</th>
<th># obs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of municipalities per district</strong></td>
<td>9.23</td>
<td>7.27</td>
<td>2</td>
<td>36</td>
<td>159</td>
</tr>
<tr>
<td>3-candidate district</td>
<td>8.72</td>
<td>7.03</td>
<td>2</td>
<td>36</td>
<td>144</td>
</tr>
<tr>
<td>4-candidate district</td>
<td>14.13</td>
<td>8.02</td>
<td>3</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td><strong>winner’s vote share (%)</strong></td>
<td>51.72</td>
<td>6.83</td>
<td>28.98</td>
<td>73.62</td>
<td>159</td>
</tr>
<tr>
<td>3-candidate district</td>
<td>52.90</td>
<td>5.70</td>
<td>36.03</td>
<td>73.62</td>
<td>144</td>
</tr>
<tr>
<td>4-candidate district</td>
<td>40.46</td>
<td>6.69</td>
<td>28.98</td>
<td>55.89</td>
<td>15</td>
</tr>
<tr>
<td><strong>winning margin (%)</strong></td>
<td>13.53</td>
<td>10.23</td>
<td>0.06</td>
<td>53.92</td>
<td>159</td>
</tr>
<tr>
<td>3-candidate district</td>
<td>14.05</td>
<td>10.17</td>
<td>0.17</td>
<td>53.92</td>
<td>144</td>
</tr>
<tr>
<td>4-candidate district</td>
<td>8.50</td>
<td>9.73</td>
<td>0.06</td>
<td>35.50</td>
<td>15</td>
</tr>
<tr>
<td><strong>margin between 2nd and 3rd (%)</strong></td>
<td>28.51</td>
<td>9.67</td>
<td>0.00</td>
<td>43.32</td>
<td>159</td>
</tr>
<tr>
<td>3-candidate district</td>
<td>30.39</td>
<td>7.65</td>
<td>0.00</td>
<td>43.32</td>
<td>144</td>
</tr>
<tr>
<td>4-candidate district</td>
<td>10.45</td>
<td>8.51</td>
<td>0.57</td>
<td>23.32</td>
<td>15</td>
</tr>
<tr>
<td><strong>pre-election forecast on closeness</strong></td>
<td>2.33</td>
<td>0.81</td>
<td>1</td>
<td>4</td>
<td>159</td>
</tr>
<tr>
<td>3-candidate district</td>
<td>2.36</td>
<td>0.82</td>
<td>1</td>
<td>4</td>
<td>144</td>
</tr>
<tr>
<td>4-candidate district</td>
<td>2.07</td>
<td>0.59</td>
<td>1.5</td>
<td>3.5</td>
<td>15</td>
</tr>
</tbody>
</table>
The situation might be very different in 4-candidate districts:

- Voters may have beliefs in **three way ties** rather than **two-way ties**.
- Since the prediction would be very **ambiguous** in a 4-candidate district, the common belief might be violated.
Empirical Analysis

Specification of the model

\[ u_{nk} = u(x_n, z_k, \theta^{PREF}) + \xi_{km} + \varepsilon_{nk} = -(\theta^{ID} x_n - \theta^{POS} z_k^{POS})^2 + \theta^{QLTY} z_k^{QLTY} + \xi_{km} + \varepsilon_{nk} \]

voters’ ideology is assumed to be a function of demographics

- \( x_n \): voter characteristics
- \( z_{km} = \{z_k^{POS}, z_{km}^{QLTY}\} \): Candidate characteristics
  - \( z_k^{POS} \): Ideological characteristics
  - \( z_{km}^{QLTY} \): Non-ideological characteristics
- \( \theta^{PREF} \): vector of preference parameters
Empirical analysis

Partial Identification of preference parameters

- Two kinds of restrictions:
  - Restriction (I): voters do not vote for their least-preferred candidate
  - Restriction (II): common belief within one district.

- With two restrictions, the parameters can only be partially identified.

Partial Identification of the fraction of the strategic voters

- Vary the identified set of $\theta^{PREF}$ to trace out the identified set of the parameters that determine the extent of strategic voting
- When there is a large number of strategic voters, the actual vote share can systematically diverge from the predicted outcome.
Empirical analysis

Parameters estimated

- $\theta^{PREF}$: Preference parameters
- $(\theta_{\alpha_1}, \theta_{\alpha_2})$: Parameters that determine the distribution of strategic voters

Estimation steps

- For some district, regress the vote share data of candidate $k$ in each municipality on the demographic data to obtain coefficients.
- Fix preference parameters, beliefs, fraction of strategic voters and municipality shocks; compute the simulated vote share.
- Regress the simulated vote share on demographic data to obtain regression coefficients.
- Vary beliefs to obtain minimum and maximum for the coefficients.
- Integrate out the fraction of strategic voters and municipality shocks.
- Find out the moment inequality and apply Pakes, Porter, Ho, and Ishii (2007)
Main Results

Parameter estimates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\theta_{\text{const}}$</td>
<td>$[-0.556, -0.543]$</td>
</tr>
<tr>
<td>$\theta_{1}$</td>
<td>$[-0.028, -0.025]$</td>
</tr>
<tr>
<td>$\theta_{2}$</td>
<td>$[-0.109, -0.104]$</td>
</tr>
<tr>
<td>$\theta_{\text{above65}}$</td>
<td>$[0.136, 0.141]$</td>
</tr>
<tr>
<td>$\theta_{\text{YUS}}$</td>
<td>$[-0.701, -0.695]$</td>
</tr>
<tr>
<td>$\theta_{\text{JCP}}$</td>
<td>$[-2.495, -2.482]$</td>
</tr>
<tr>
<td>$\theta_{\text{DPJ}}$</td>
<td>$[-1.975, -1.969]$</td>
</tr>
<tr>
<td>$\theta_{\text{const}}$</td>
<td>$[2.629, 2.635]$</td>
</tr>
<tr>
<td>$\theta_{2}$</td>
<td>$[-0.637, -0.625]$</td>
</tr>
<tr>
<td>$\theta_{2}$</td>
<td>$[0.339, 0.349]$</td>
</tr>
<tr>
<td>$\theta_{\text{above65}}$</td>
<td>$[-0.056, -0.052]$</td>
</tr>
</tbody>
</table>

Voters with lower income, fewer years of schooling prefer LDP, YUS.

Voters with lower income, longer years of schooling prefer pro-market candidates

| ideology – JCP | 1.97 | 0.36 | 1 | 2.75 | 154 |
| ideology – DPJ | 3.10 | 0.60 | 1 | 4.50 | 159 |
| ideology – LDP | 3.12 | 0.61 | 1.25 | 4.67 | 159 |
| ideology – YUS | 2.55 | 0.45 | 1.25 | 3.25 | 20 |
Main Results

The fraction of strategic voters and misaligned voters

- The authors estimate the fraction of strategic voters to be [63.4%, 84.9%]
- The authors determine the fraction of misaligned voters to be [1.4%, 4.2%]

Counterfactual Experiment: Sincere voting under plurality rule

- The change in vote share is small (due to a small fraction of misaligned voter)
- Change in the number of seats is considerable (due to small winning margin)
Conclusion

• The authors find a much larger fraction of strategic voters than in the past studies.
• The authors consider including abstention in the future method.
• My suggestions:
  • Drop the sample of 4-candidate districts and go through the estimation again to see if there is a big difference.
  • Find more accurate indicators for individual ideologies. (i.e data from local surveys)