Participatory Democracy with Imperfect Information

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Plan

Introduction

The Setting

- The Aam Aadmi Party government on Saturday conducted public meetings in six constituencies of Delhi in the second phase of its participatory budgeting exercise. ...
- Going to the public for budget has helped the government understand local needs, which cannot be addressed from the Secretariat... said Dwarka MLA Adarsh Shastri.

The Hindu, NEW DELHI, April 26, 2015

Introduction

- Participatory democracy is a process of collective decision making
- Real life experiences: Brazilian municipalities, state level in Rio Grande del Sul (Brazil), in West Bengal and Kerala (India) (For details see **Fung and Wright (2001)**)
- Formal model of participatory democracy inspired by **Aragone‘s and Sanchez-Pages (2008)**:

  citizens decide whether to attend a meeting relevant for the final policy choice

  decide whether or not to reelect the incumbent politician
- Issues: uncertainty due to delegated participatory discussions
  inefficiency (lack of experience) in understanding and / or transmitting the policy choice of the electorate to the government

The Benchmark Model

- Electorate of unit mass. k local groups mass n_i, $i = 1, 2, ..., k$ such that $\sum_{i=1}^{k} n_i = 1$.
- Ideal policy choice for each group and governing party $\theta_1, \theta_2, ..., \theta_k$ and θ_0
- Delegates: Government officials or local level party workers
- Output: Unbiased but noisy signal, a_i, of θ_i.
- Messengers operate independently

$$a_i \sim F(\theta_i, \sigma^2)$$

The Benchmark Model

Support function

$$S(\theta_i, \hat{\theta}) = S((\theta_i - \hat{\theta})^2) = 1 - s(\theta_i - \hat{\theta})^2$$

Government's satisfaction function

$$D(\theta_0, \hat{\theta}) = D((\theta_0 - \hat{\theta})^2) = 1 - d(\theta_0 - \hat{\theta})^2$$

Government's objective

$$\Pi(S_1, S_2, ...S_k, D) = \Pi(\sum_{i=1}^{k} n_i S(\theta_i, \hat{\theta}), D(\theta_0, \hat{\theta}))$$

$$= \alpha \sum_{i=1}^{k} n_i S(\theta_i, \hat{\theta}) + (1 - \alpha) D(\theta_0, \hat{\theta})$$

The Benchmark Model

Final choice of policy

$$\hat{\theta} : \sum_{i=1}^{k} w_i a_i + w_0\theta_0, \; where \; w_i \geq 0 \; and \; \sum_{i=0}^{k} w_i = 1.$$

$$(\theta_i - \hat{\theta}) \sim F((\theta_i - \sum w_j\theta_j), \sigma^2 \sum w_j^2).$$

Similarly

$$(\theta_0 - \hat{\theta}) \sim F((\theta_0 - \sum w_j\theta_j), \sigma^2 \sum w_j^2).$$

Denote $E(\hat{\theta}) = \sum w_j\theta_j$ by θ.

$$E(\Pi) = 1 - [\alpha s \sum_{i=1}^{k} n_i(\theta_i, \theta)^2 + (1-\alpha)d(\theta_0, \theta)^2] - [\alpha s + (1-\alpha)d]\sigma^2 \sum w_j^2 \quad (1)$$

Optimisation

Optimisation with no uncertainty: $\sigma^2 = 0$

Maximisation with respect to $\hat{\theta}$ yields

$$\hat{\theta} = \frac{\alpha s \sum_{i=1}^{k} n_i \theta_i + (1-\alpha) d \theta_0}{\alpha s + (1-\alpha) d} = \theta^C, \ say.$$

Optimisation with uncertainty:

$$\hat{\theta} = \frac{\alpha s \sum_{i=1}^{k} n_i \theta_i + (1-\alpha) d \theta_0}{\alpha s + (1-\alpha) d} \times \frac{\sum \theta_j^2}{(\sigma^2 + \sum \theta_j^2)} = \theta^C \frac{\sum \theta_j^2}{(\sigma^2 + \sum \theta_j^2)} = \theta^U, \ say.$$

The optimal payoffs are:

Certain

$$\Pi^C = 1 - \alpha s \left\{ \sum n_i \theta_i^2 - 2\theta^C \sum n_i \theta_i + (\theta^C)^2 \right\} - (1-\alpha) d (\theta_0 - \theta^C)^2 \qquad (2)$$

Uncertain

$$\begin{aligned} E(\Pi)^U &= 1 - \alpha s \left\{ \sum n_i \theta_i^2 - 2\theta^U \sum n_i \theta_i + (\theta^U)^2 \right\} - (1-\alpha) d (\theta_0 - \theta^U)^2 \\ &\quad -(\alpha s + (1-\alpha) d)\sigma^2 \sum w_j^2 \qquad (3) \end{aligned}$$

Figure 1

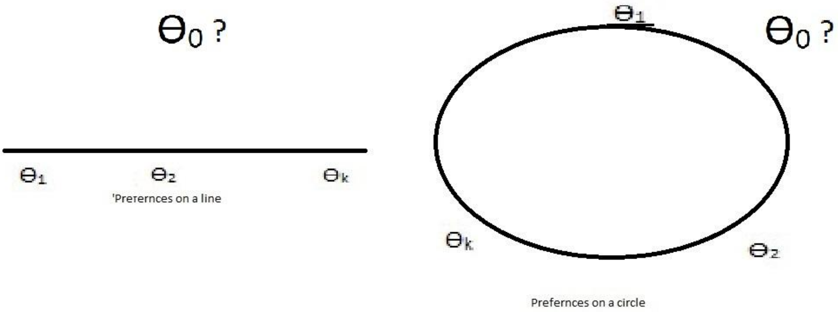

Figure: Preference geometry

Result

Remark 1:

(a) Payoff is decreasing in volatility.
(b) Both $E(\Pi)^U$ and Π^C are decreasing in $\sum n_i \theta_i^2$, inter-group heterogeneity in the electorate.
Both are also decreasing in $(\theta_0 - \theta^C)^2$.
(c) Figure 1: The impact of distortion different for linear preference (with explicit presence of extreme groups). It will certainly hurt some groups (and/or the government).
For a circular preference pattern, this may be mitigated automatically.

Uncertainty $\Rightarrow$ distortion

So interest of the incumbent: noise is reduced. Better delegation or more interaction.

Extensions

Meeting cost $c > 0$ per capita.

Notation $\theta^{A-i} = \frac{1}{1-n_i}\sum_{j\neq i} n_j\theta_j$. So, $(\theta^A - \theta^{A-i}) = n_i(\theta_i - \theta^{A-i})$ = the aggregate signal from all other groups (except i^{th}).

$$\theta^C = \frac{\alpha s n_i(\theta_i - \theta^{A-i}) + \alpha s \theta^{A-i} + (1-\alpha)d\theta_0}{\alpha s + (1-\alpha)d} = \frac{\alpha s n_i(\theta_i - \theta^{A-i})}{\alpha s + (1-\alpha)d} + \theta^{C-i}.$$

Therefore

$$(\theta^C - \theta_i)^2 = \left(\frac{\alpha s n_i(\theta_i - \theta^{A-i})}{\alpha s + (1-\alpha)d} + (\theta^{C-i} - \theta_i)\right)^2$$

Participation will be optimal if $|\theta_i - \theta^{A-i}|$ greater than η_i

Remark 2:

(a) bigger groups participate more.
(b) extreme groups always participate

Extensions

Intra-group heterogeneity

Assumption: $a_i \sim F(\theta_i, \sigma_i^2)$

- For moderate groups incentive for participation will be actually smaller.
- Extreme groups will all participate and with more vigour.

Strategic behaviour

Electorate indicating their choice as different from the true θ_i.

For preferences on a line, reporting will be upward biased for groups with above average θ_i. A strategic filtering of the signals needed by the government.

For preferences on a circle,

- If diametrically opposite: truth will become a dominant strategy.
- When closer: incentives for misrepresentation reappears!

Thank you

Comments are welcome

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