Delegation in Veto Bargaining

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Motivation

In many contexts

- Proposer needs approval for a project
  - e.g., from boss, other branch of gov't, majority of a committee

- Proposer is uncertain what veto player will accept

Significant literature emanating from Romer & Rosenthal 1978, 1979

This paper

- Establish that screening via a menu is valuable
  - positive, normative, and prescriptive interpretations

  → **New rationale for discretion/flexibility**

- Conceptual and methodological connection to optimal delegation

Applications

- In U.S., prosecutor decides whether to include lesser charges
  - e.g., "Murder" or "Murder or Manslaughter"
  - Acquit is always an option
- Congress makes proposal to President
  - Bill can give much or little discretion of how to implement
  - President can always veto
- Salesperson (e.g., real estate agent) decides which products to show
  - Not buying is always an option
- Committee chooses pool of candidates to put forward
  - Leadership must select one, or none

Preview of Results

We study a one-dimensional model with single-peaked prefs

- Typically not optimal to offer a singleton
  - Menus can Pareto improve over singleton proposals

- But Veto player may get large information rents
  - Even her first best, despite limited bargaining power

- Identify conditions for optimal menu to be 'nice', e.g., interval

- Comp stats: e.g., more discretion when more (ex-ante) **mis**alignment or Proposer more risk averse
  - Contrast with expertise-based delegation à la Holmstrom

- Methodology: allow for stochastic mechanisms, and invoke them to establish certain necessity

Related Literature

- Proposal power and agenda setting

  Romer & Rosenthal, 1978, 1979; Matthews, 1989; Cameron & McCarty, 2004

- Optimal expertise-based delegation

  Holmstrom, 1984; Melumad & Shibano, 1991; Alonso & Matouschek, 2008; Amador & Bagwell, 2013; Kovac & Mylovanov, 2009

- Optimal delegation with outside options

  Amador & Bagwell, 2019; Kolotilin & Zapechelnyuk, 2019, Zapechelnyuk 2019

Model

Model

- Proposer (P) and Veto player (V) determine action $a \in \mathbb{R}$
- P's utility $u(a)$ concave, maximized at $a = 1$
  - Twice continuously differentiable at all $a \neq 1$
  - Leading examples: $u(a) = -|1 - a|$ and $u(a) = -(1 - a)^2$
- V's utility $u_V(a, v) = -(v - a)^2$
  - Type v is **private info**
  - Distribution F with differentiable density f; $f(v) > 0$ on $[0, 1]$
  - Leading examples: f log-concave
  - For many results, only ordinal prefs matter, so any symmetric loss function around v could be used

Timing

1. P proposes a menu $A \subseteq \mathbb{R}$. A must be a closed set.
2. V's learns type v and chooses $a \in A \cup \{0\}$. So 0 is the status quo.

Nb: equivalent to any (deterministic) direct mechanism. Accommodates various game forms/protocols. No transfers.

Benchmarks

Complete Information

- Suppose V's ideal point v known to P (Romer & Rosenthal 1978)
- Then P could offer a single action
  - $v < 0 \implies$ offer 0
  - if $v \in [0, 1/2] \implies$ offer $2v$
  - if $v > 1/2 \implies$ offer 1
- Pareto efficiency, no vetos, P extracts all surplus

Incomplete Information, but Singleton Proposal

- Not optimal to offer 0
- Vetos will occur
- Pareto inefficiency
- Surplus is shared

Full Delegation,
No Compromise,
& Interval Delegation

Full Delegation

- P could offer full delegation menu $A = [0, 1]$
  - offering any $a \notin [0, 1]$ is dominated
  - although V may find some $a \notin [0, 1]$ preferable
- V then chooses ideal point if $v \in [0, 1]$; 0 if $v < 0$; and 1 if $v > 1$
- Pareto efficiency obtains, no vetos
- V gets his "first best" (almost), despite P having substantial bargaining power and commitment
  - first best for all $v \in [0, 1]$
  - support of v could be $[0, 1]$, then really first best

Full Delegation

$$\kappa := \inf_{a\in[0,1)} -u''(a) \geq 0.$$

Proposition

Full delegation is optimal if

$$\kappa F(v) - u'(v) f(v) \text{ is } \uparrow \text{ on } [0,1].$$

Nb: $\uparrow$ means non-decreasing

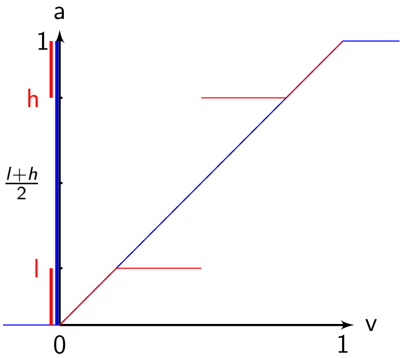
- Full delegation optimal if $f(v)$ does not $\uparrow$ too fast

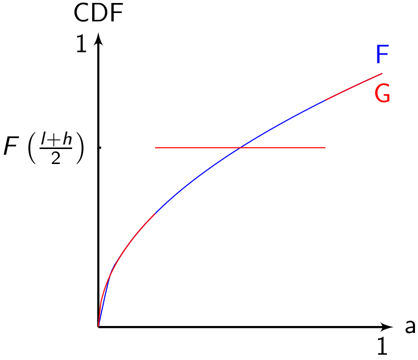
Corollary

Full delegation is optimal if $f(v)$ is $\downarrow$ on $[0,1]$.

- So for a unimodal f, full delegation optimal when ex-ante disagreement is *large*: v's mode ≤ 0
- Reverses logic of expertise-based delegation

Full Delegation: Intuition





- $F \geq_{SOSD} G$ if f is $\downarrow$; hence Proposer prefers F to G
- If f is $\uparrow$ on (l, h), removing that interval increases expected action, but adds variance; desirable if f'/f large relative to $-u''/u'$
- With linear utility, $f \downarrow$ **necessary** for optimality of full delegation
- For any f, full delegation optimal if P is sufficiently risk averse

No Compromise

- The degenerate menu $\{0, 1\}$ is no compromise
  - can be viewed as a singleton proposal 1
- If u is differentiable at 1, then no compromise **not** optimal
  - because then $u'(1) = 0$
- If u is linear and $f \uparrow$, then no compromise **is** optimal
  - removing any interval $(a, b) \subseteq 1$ raises average action
- But these conditions much stronger than needed
  - e.g., with linear u, sufficient that $f(\frac{1}{2})$ is a *subgradient* of F at $\frac{1}{2}$

Interval Delegation

Interval delegation: $A = [c, 1] \cup \{0\}$ for $c \in [0, 1]$

- subsumes full delegation and no compromise
- Nb: $c > 0 \implies$ vetos and Pareto inefficiency

Interval delegation is simple: practically and analytically

Questions:

- Under what conditions is interval delegation optimal?
- What is the best interval?

Interval Delegation

$$u(a) = -(1-\gamma)|1-a| - \gamma(1-a)^2 \text{ for some } \gamma \in [0,1] \qquad \text{(LQ)}$$

Proposition

If f is log-concave and u satisfies (LQ), then interval delegation is optimal.

Comparative Statics

Let $C^* \subseteq [0,1]$ be the set of optimal interval thresholds

multiple maximizers possible $\because$ P's exp utility may not be quasiconcave

Proposition

1. Optimal singleton proposal $p^* \geq \sup C^*$, strictly when $\sup C^* < 1$.
2. If f str. $\uparrow$ in LR on $[0,1]$, then C^* $\uparrow$ in SSO.
3. If u becomes str. more risk averse on $[0,1]$, then C^* $\downarrow$ in SSO.

Among interval menus:

1) Menus yield a Pareto improvement
2) $\uparrow$ ex-ante alignment $\downarrow$ discretion. Opposite to expert-based deleg
3) More risk-averse Proposer (à la Rothschild-Stiglitz) compromises more; eventually, full delegation

$\implies$ prosecutor/salesperson should include "lower" options when jury/consumer more difficult to convince

Intervals are important. (2) and (3) proved using MCS with uncertainty.

Delegation vs Cheap Talk

- Matthews (1989)
  - Cheap talk by V before P makes a singleton offer
  - Babbling equilibrium exists: $A = \{0, p^*\}$
  - Under mild conditions, also size-two equilibria:

    V makes a veto threat, against which P proposes $\hat{p} \in (0, p^*)$

    or V doesn't, against which P proposes 1
  - Informative eqm equivalent to $A = \{0, \hat{p}, 1\}$
  - P prefers informative eqa to uninformative

- How does P's lack of commitment affect her?
  - P's welfare from $A = \{0, p, 1\} \downarrow$ in p at $p = \hat{p}$
  - P would like to commit to lower proposal to reduce vetos
  - But even optimal "singleton compromise" need not be global optimum; it is not, in particular, whenever (non-trivial) interval delegation is

Methodology

Formulating Proposer's Problem

Any A induces choice function $\alpha : \mathbb{R} \to A$. Wlog, consider $A \subseteq [0,1]$.

Let $\mathcal{A} := \{\alpha : [0,1] \to [0,1] \text{ s.t. } \alpha(0) = 0 \text{ and } \alpha \text{ is } \uparrow\}$.

Optimization problem:

$$\max_{\alpha \in \mathcal{A}} \int u(\alpha(v)) \mathrm{d}F(v) \tag{D}$$

$$\text{s.t. } v\alpha(v) - (\alpha(v))^2/2 = \int_0^v \alpha(t)\mathrm{d}t. \tag{IC}$$

We tackle using inft-diml Langrangian methods (cf. Amador & Bagwell 2013)

Stochastic Mechanisms

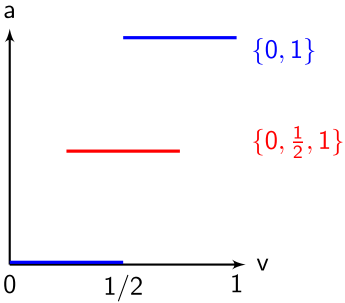
Wlog, stochastic allocations $\mathcal{L} := \{\text{CDFs supported in } [0,1]\}$.

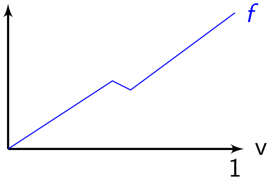
Let $\mathcal{S} := \{\sigma : [0,1] \to \mathcal{L} \text{ s.t. } \alpha(0) = \delta_0 \text{ and } \mathbb{E}[\sigma(v)] \text{ is } \uparrow\}$.

$$\max_{\sigma \in \mathcal{S}} \int \mathbb{E}_{\sigma(v)}[u(a)] \mathrm{d}F(v) \tag{S}$$

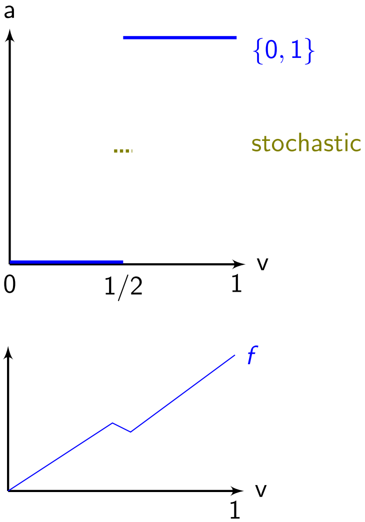
$$\text{s.t. } \mathbb{E}_{\sigma(v)}\left[va - a^2/2\right] = \int_0^v \mathbb{E}[\sigma(t)]\mathrm{d}t. \tag{IC-S}$$

Stochastic mechanisms can be optimal





Stochastic mechanisms can be optimal



Relaxing the Proposer's Problem

Recall deterministic mechanisms problem:

$$\max_{\alpha \in \mathcal{A}} \mathbb{E}[u(\alpha(v))] \tag{D}$$

$$\text{s.t. } v\alpha(v) - \frac{\alpha(v)^2}{2} = \int_0^v \alpha(t)\mathrm{d}t. \tag{IC}$$

Relaxed Problem

Let $\kappa := \inf_{a \in [0,1)} -u''(a) \geq 0$ and define relaxed problem

$$\max_{\alpha \in \mathcal{A}} \mathbb{E}\left[u(\alpha(v)) - \kappa\left[v\alpha(v) - \frac{\alpha(v)^2}{2} - \int_0^v \alpha(t)\mathrm{d}t\right]\right] \tag{R}$$

$$\text{s.t. } v\alpha(v) - \frac{\alpha(v)^2}{2} \geq \int_0^v \alpha(t)\mathrm{d}t.$$

- Deterministic mechs with modified objective and weakened IC. If IC holds at solution, then clearly also solves (D).

Stochastic Mechanisms

Proposition

If $\alpha^* \in \mathcal{A}$ solves problem (R) and is incentive compatible, then α^* also solves problem (S).

Under our sufficient conditions, our solutions to (D) also solve (R) and hence are optimal even among stochastic mechs.

Proof idea.

Suppose not and let σ achieve strictly higher value in (S).

Define $\alpha(v) := \mathbb{E}[\sigma(v)]$.

α is feasible for (R) $\because$ V risk averse and **relaxed IC**,
and achieves str. higher value than α^* in (R) $\because$ P risk averse. □

Necessary Conditions

$$u(a) = -(1-\gamma)|1-a| - \gamma(1-a)^2 \text{ for some } \gamma \in [0,1] \qquad \text{(LQ)}$$

Lemma

Assume (LQ) A deterministic mech that solves problem (S) also solves problem (R).

It is thus enough to show necessity in problem (R),
which has a concave objective and a convex feasible set.

Proposition

Assume (LQ). Our sufficient conditions are necessary for the given menu to be optimal among stochastic mechanisms.

Additional results

- Other kinds of optimal deleg sets (e.g., singleton compromise)
- Could allow for interdependent prefs: $u(a, v)$
  - Holmstrom-like delegation model with outside option
    cf. Kolotilin & Zapechelnyuk, 2019

Conclusion

Recap

Studied role for screening/delegation in veto bargaining

- New rationale for delegation and discretion
  - Here: uncertainty about what is acceptable to Veto player
  - Contrast with agent has expertise
- Non-singleton menu typically optimal
- Veto player can obtain large info rents ("full delegation"), even though Proposer has substantial bargaining and commitment power
- Sufficient and necessary conditions for 'nice' delegation sets
- Among interval menus, discretion $\downarrow$ when ex-ante more aligned
  - Highlights different economics from expertise-based delegation

Ongoing and Future Research

- Endogenous default action (chosen by V ex ante)

  cf. Coate & Milton, 2019

- Multiple proposers and competition

- No/limited commitment
  - If full delegation optimal with commitment, it survives
  - Coasian dynamics suggest that even if it is not, it will emerge
  - We conjecture non-Coasian result is possible