Delegation in Veto Bargaining

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December 2019
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) misalignment 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
  - $v < 0 \implies \text{offer 0}$
  - if $v \in [0, 1/2] \implies \text{offer } 2v$
  - if $v > 1/2 \implies \text{offer 1}$
- 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 \( \downarrow \text{ on } [0,1]. \)*

- So for a unimodal \( f \), full delegation optimal when ex-ante disagreement is *large*: \( v \)'s mode \( \leq 0 \)
- 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, \( f \downarrow \mathbf{necessary} \) 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 \( f\left(\frac{1}{2}\right) \) 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

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

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 \( \therefore \) 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 \( A = \{0, p, 1\} \) ↓ 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 $\alpha : \mathbb{R} \rightarrow A$. Wlog, consider $A \subseteq [0, 1]$. Let $\mathcal{A} := \{\alpha : [0, 1] \rightarrow [0, 1] \text{ s.t. } \alpha(0) = 0 \text{ and } \alpha \text{ is } \uparrow\}$. Optimization problem:

$$\max_{\alpha \in \mathcal{A}} \int u(\alpha(v))dF(v) \quad \text{(D)}$$

$$\text{s.t. } v\alpha(v) - (\alpha(v))^2/2 = \int_0^v \alpha(t)dt. \quad \text{(IC)}$$

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

$$\max_{\sigma \in \mathcal{S}} \int \mathbb{E}_{\sigma(v)}[u(a)]dF(v) \quad \text{(S)}$$

$$\text{s.t. } \mathbb{E}_{\sigma(v)}[va - a^2/2] = \int_0^v \mathbb{E}[\sigma(t)]dt. \quad \text{(IC-S)}$$
Stochastic mechanisms can be optimal

\[ \{0, 1\} \]

\[ \{0, \frac{1}{2}, 1\} \]
Stochastic mechanisms can be optimal

\[
\begin{align*}
\text{a} & \quad \{0, 1\} \\
0 & \quad \frac{1}{2} \quad 1 \\
1 & \quad \text{stochastic}
\end{align*}
\]
Relaxing the Proposer’s Problem

Recall deterministic mechanisms problem:

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

\[
\text{s.t. } v\alpha(v) - \frac{\alpha(v)^2}{2} = \int_0^v \alpha(t) \, dt. \quad (IC)
\]

Relaxed Problem

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

\[
\max_{\alpha \in A} \mathbb{E} \left[ u(\alpha(v)) - \kappa \left( v\alpha(v) - \frac{\alpha(v)^2}{2} - \int_0^v \alpha(t) \, dt \right) \right] \quad (R)
\]

\[
\text{s.t. } v\alpha(v) - \frac{\alpha(v)^2}{2} \geq \int_0^v \alpha(t) \, dt.
\]

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

**Proposition**

If $\alpha^* \in A$ solves problem (R) and is incentive compatible, then $\alpha^*$ 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 $\sigma$ achieve strictly higher value in (S).

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

$\alpha$ is feasible for (R) $\therefore$ V risk averse and relaxed IC, and achieves str. higher value than $\alpha^*$ in (R) $\therefore$ P risk averse.
Necessary Conditions

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

(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 ↓ 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