# 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 government, majority of a committee

- Proposer is uncertain what veto player will accept

Large literature emanating from Romer & Rosenthal 1978

This paper

- Screening via a menu is typically valuable
- 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

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  - 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
  - Because not ‘dividing a dollar’
  - Menus Pareto improve over singleton proposals

- But Veto player ‘often’ gets large information rents
  - Even her first best

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

# Preview of Results

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

- Typically not optimal to offer a singleton
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- But Veto player 'often' gets large information rents
  - Even her first best
- Identify conditions for optimal menu to be 'nice', e.g., interval
- Comp stats: e.g., more discretion when more (ex ante) *mis*alignment
  - Contrasts with expertise-based delegation à la Holmstrom
- Methodology

# Related Literature

- Proposal power and agenda setting
  Romer & Rosenthal, 1978; 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, 2014; Kolotilin & Zapechelnyuk, 2019
- Monotone Bayesian persuasion
  Dworczak & Martini, 2019; Kolotilin, 2018

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  - Twice continuously differentiable at all $a \neq 1$
  - Leading examples: $u(a) = -|1 - a|$ and $u(a) = -(1 - a)^2$

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- 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
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## 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. No transfers.

# 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 $v$ if $v \in [0, 1]$; 0 if $v < 0$; and 1 if $v > 1$
- Pareto efficiency obtains
- $V$ gets his "first best", despite $P$ having substantial bargaining power and commitment
  - first best for all $v \in [0, 1]$
  - support of $v$ could be $[0, 1]$ (or a subset), 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

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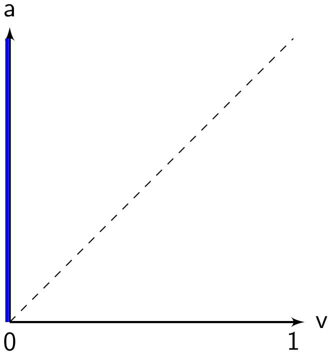
## Corollary

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

- So for a unimodal (in particular, log-concave) $f$, full delegation optimal when ex-ante disagreement is *large*: $v$'s mode $\leq 0$
- Reverses logic of expertise-based delegation

# Full Delegation: Intuition



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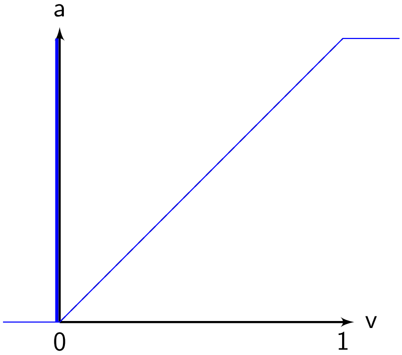

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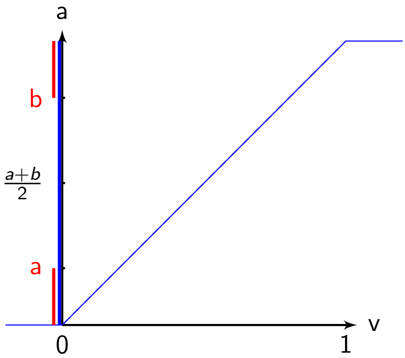

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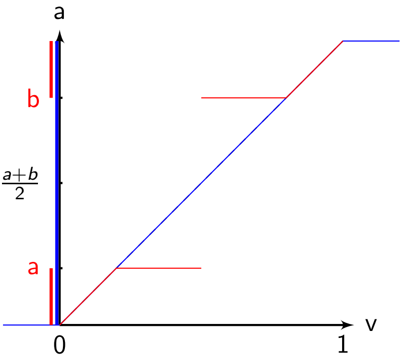

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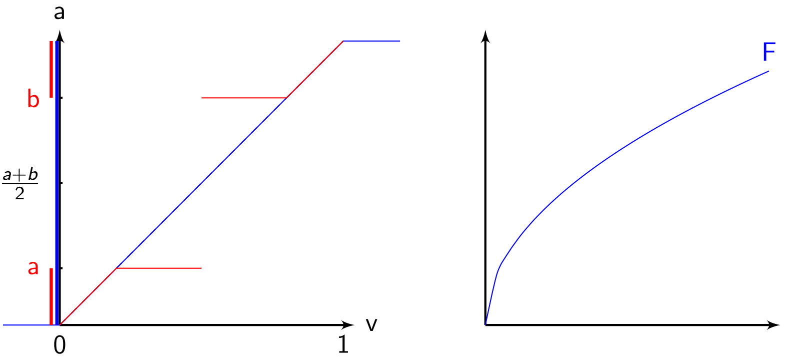

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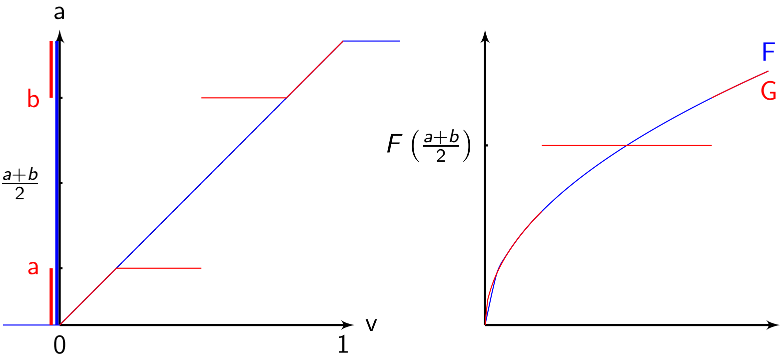

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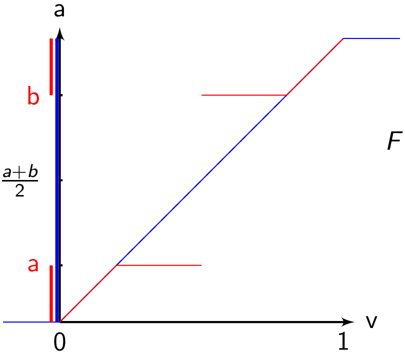


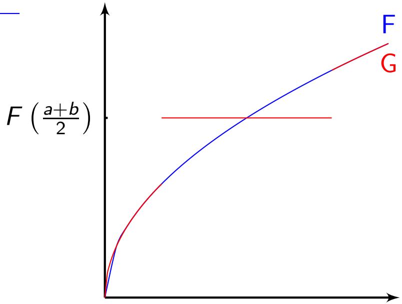


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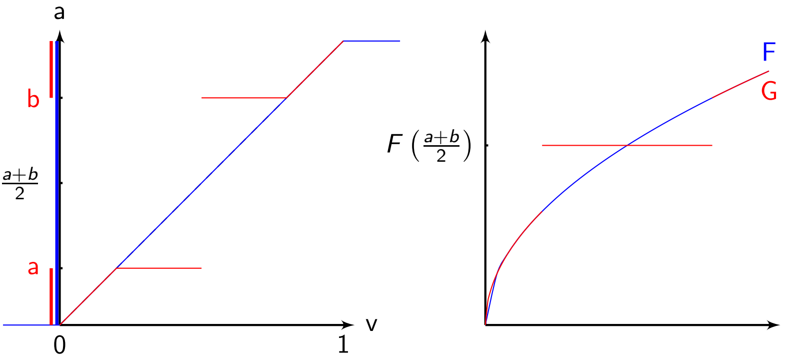


- $F \geq_{SOSD} G$ if $f$ is $\downarrow$; hence Proposer prefers $F$ to $G$
- If $f$ is $\uparrow$ on $(a, b)$, removing that interval increases expected action, but adds variance; desirable if $f'/f$ large relative to $-u''/u'$
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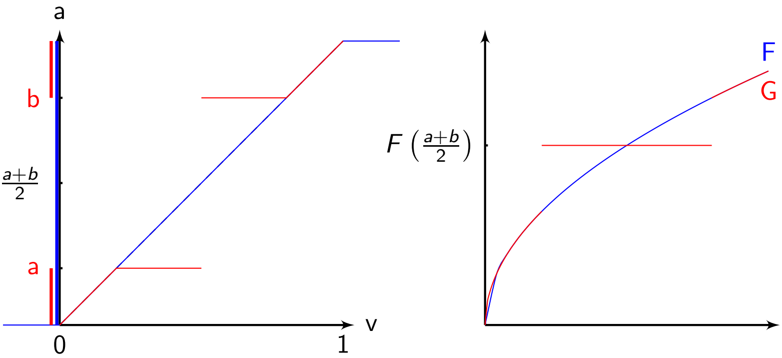


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- With linear utility, $f \downarrow$ *necessary* for optimality of full delegation
- For any $f$, full delegation optimal if P is sufficiently risk averse

# 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
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  - 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

## Proposition

No compromise is optimal if for all $s \in [0, 1/2)$ and $t \in (1/2, 1]$

$$u'(0)\frac{F(1/2) - F(s)}{1/2 - s} \leq u'(1_-)\frac{F(t) - F(1/2)}{t - 1/2}.$$

- For linear $u$, this says that $f(\frac{1}{2})$ is *subgradient* of $F$ at $\frac{1}{2}$

# Interval Delegation

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

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

- subsumes full delegation and no compromise

Two Questions:

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

# Interval Delegation

**Proposition**

Suppose $f$ is log-concave and for some $\gamma \in [0, 1]$,

$$u(a) = -(1-\gamma)|1-a| - \gamma(1-a)^2.$$

Then there is $c \in [0, 1]$ such that $A = \{0\} \cup [c, 1]$ is optimal.

# Comparative Statics

Let $W(c)$ denote P's expected utility from offering $[c, 1]$,
and $C^* := \arg\max W(c)$.

## Proposition

1. Let $p^*$ denote optimal singleton proposal.
   $\sup C^* \leq p^*$, strictly when $\sup C^* < 1$.

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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) Allowing for menus induces a Pareto improvement
2) Contrast to expert-based delegation, where greater alignment implies more discretion
3) More risk-averse Proposer (à la Rothschild-Stiglitz) compromises more; eventually, full delegation

# 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
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- How does P's lack of commitment affect him here?
  - 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: in particular, when 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 $\mathcal{A} := \{\alpha : [0,1] \to [0,1] \text{ s.t. } \alpha(0) = 0 \text{ and } \alpha \text{ is } \uparrow\}$.

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Optimization problem:

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

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## Stochastic Mechanisms

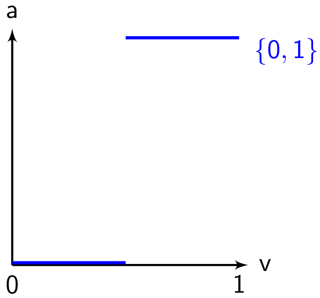
Stochastic allocation is a lottery over $[0,1]$, wlog

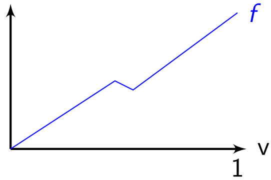
Let $\mathcal{S} := \{\alpha : [0,1] \to \Delta[0,1]$ s.t. $\alpha(0) = \delta_0$ and $\mathbb{E}[\alpha(v)]$ is $\uparrow\}$.

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

$$\text{s.t. } \mathbb{E}\left[v\alpha(v) - \alpha(v)^2/2 - \int_0^v \alpha(t)\mathrm{d}t\right] = 0. \tag{IC-S}$$

# Stochastic mechanisms can be optimal



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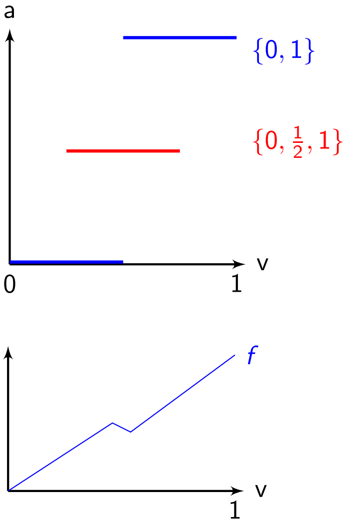

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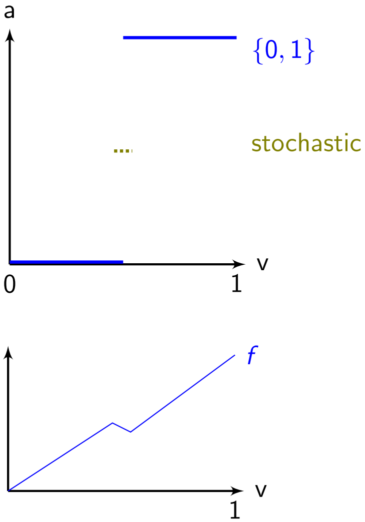

# Relaxing the Proposer's Problem

Recall deterministic mechanisms problem:

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

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

## Relaxed Problem

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

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

$$\text{s.t. } v\alpha(v) - \frac{\alpha(v)^2}{2} - \int_0^v \alpha(t)\mathrm{d}t \geq 0.$$

# Stochastic Mechanisms

**Proposition**

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

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## Proof idea.

Suppose not and let $\alpha^S$ achieve strictly higher value in (S).

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

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

# Necessary Conditions

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

**Lemma**

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

It is thus enough to show necessity in problem (R),
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**Proof idea.**

Suppose $\alpha$ achieves higher objective in (R). Use noise to simulate transfers and make $\alpha$ IC. □

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### Lemma

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It is thus enough to show necessity in problem (R),
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### 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

- At least two rationales for delegation
  - Literature: agent has expertise
  - Here: uncertainty about what is acceptable to Veto player
- Non-singleton menu typically optimal
- Veto player can have large info rents ("full delegation"), even though Proposer has substantial bargaining and commitment power
- Sufficient and necessary conditions for "nice" delegation sets
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# Ongoing and Future Research

- Endogenous default action (chosen by $V$ ex ante)

  cf. Coate & Milton, 2019

- Multiple proposers and competition

- No/limited commitment: cf. Coasian dynamics