On the Organization of International Cooperation

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THE DOMINANT APPROACH TO INTERNATIONAL COOPERATION

- Coordination dilemmas (e.g. Stag Hunt)
- **Collaboration dilemmas (e.g. Prisoners' Dilemma)**

COOPERATION AS A "WITHIN-GROUP" PROBLEM

Cooperation is socially optimal, but individuals have incentives to free-ride on efforts of others

- Defection is the dominant strategy in each single interaction
- Mechanisms for overcoming collaboration problems:
  - Long "shadow of the future" *(Axelrod 1984; Oye 1985)*
  - Conditional sanctions *(Rosendorff and Milner 2001)*
  - Effective monitoring *(Koremenos, Lipson, and Snidal 2001)*

In other words. . .

- cooperation is a "within-group" problem, and
- its success depends on *coercive strategies* such as reciprocal threats

PATTERNS OF INTERNATIONAL COOPERATION

International cooperation can create negative externalities for some states:

- Some examples:
  - Institutional reforms and enlargement of international organizations (e.g. WTO)
  - International peace-keeping and humanitarian interventions

$\Rightarrow$ Uneven distribution of externalities can lead to conflict between supporters and opponents

THE GMO CASE

- Diverging interests on trade of genetically modified organisms (GMOs)
  - US prefers ‘sound-science principle’
  - EU prefers ‘precautionary principle’
- Failure to find compromise led to conflict between US and EU
- The US. . .
  - vetoed the adoption of precautionary principle
  - initiated trade dispute within the WTO
  - refused to send non-GMO food aid
  - retaliated against EU supporters
- The EU. . .
  - refused imports of GMO food products
  - invested heavily in institution-building projects
  - retaliated against US supporters

COLLECTIVE ACTION AS BETWEEN-GROUPS PROBLEM

In other words. . .

- cooperation is a “between-groups” problem, and
- its success depends on the ability of supporters to overcome opposition

HOW CAN WE STUDY THIS?

Important features:

- "Supporters" and "opponents" to international collective action
- Groups can "invest" resources to facilitate/hinder collective action
- Uncertainty over preferences that may change over time

Model structure:

- Cooperation as a between-groups problem
- Different forms of IO to prevent conflict:
  - Coalitions of the willing
  - Universal organizations
  - Agent-implementing organizations

WHAT WE FIND

1. Coercive strategies work
2. Delegation can obviate the need for coercion
3. Voting makes preferences common knowledge
4. Relative advantages of organizational forms depend on:
   - Probability of support
   - Shadow of the future
   - Credibility of threats

$\Rightarrow$ Unified framework for analyzing different forms of international organization

THE MODEL: "STAGE" GAME

- $N \geq 2$ players, each has 1 unit of resource
- Each can spend $x \in [0, 1]$ toward/against action
- Collective action:
  - costs $\theta > 1$ to implement
  - produces $a \geq 2$ outcome
- Player i's value of outcome: $v_i \in \{-1, 1\}$
  (*supporter* if $v_i = 1$, *opponent* if $v_i = -1$)
- Payoff depends on:
  - how much player spends (instead of consuming)
  - whether the action takes place
  - how the player values the action

THE MODEL: "STAGE" GAME (CONFLICT)

Action implementation depends on resources contributed. Let $\mathcal{S}$ be set of players spending in support ($S = |\mathcal{S}|$), and $\mathcal{O}$ be set of players spending in opposition ($|\mathcal{O}| = N - S$), so that

- $X = \sum_{i \in \mathcal{S}} x_i$: total resources in support, and
- $Y = \sum_{j \in \mathcal{O}} x_j$: total resources in opposition,

then:

$$\pi = \begin{cases} 1 & \text{if } X - Y \geq \theta \\ 0 & \text{if } X - Y \leq \theta - 1 \\ 1/2 & \text{otherwise} \end{cases}$$

The payoff for player i is:

$$u_i = 1 - x_i + \pi v_i a$$

Timing: supporters move first, followed by opponents.
Assume (for now) complete information.

SINGLE INTERACTION: COSTLY IMPOSITION

Supporters can *impose* the action if $S - (N - S) \geq \theta$, or:

$$S \geq \left\lceil \frac{N + \theta}{2} \right\rceil \equiv S_c.$$

Otherwise, opponents can *impose* the status quo. "Brute force" solution is:

PROPOSITION

The stage game has a unique symmetric coalition-proof subgame perfect equilibrium. If $S < S_c$, then every player consumes privately and the status quo prevails. If $S \geq S_c$, then each supporter spends $x_c = (N + \theta)/S - 1$, opponents consume privately, and the action takes place.

SINGLE INTERACTION: WASTE AND INEFFICIENCY

Social welfare requires that action be implemented when

$$S \geq \left\lceil \frac{N + \theta/a}{2} \right\rceil \equiv \mathfrak{S}.$$

The problems with imposed solution:

1. action not implemented when it "should" be: $S_c > \mathfrak{S}$
2. when implemented, resources wasted on deterrence: $Sx_c = \theta + (N - S) > \theta$ for any $S < N$
3. requires complete information!

SINGLE INTERACTION: INCOMPLETE INFORMATION

Assume now:

- Each player privately observes v_i.
- Valuations randomly (and independently) drawn from common distribution with $\Pr(v = 1) = p$
- Player i believes that $\Pr(k \text{ supporters among } N-1)$ is binomially distributed:

$$f(k) = \binom{N-1}{k} p^k (1-p)^{N-1-k}.$$

SINGLE INTERACTION: NO ACTION W/ UNCERTAINTY

The action cannot take place anymore because no way for supporters to identify themselves and coordinate.

- Without communication, unique equilibrium is private consumption (Lemma 1).
- Suppose players could vote (yes/no) on action and then play stage game. They cannot commit to truthful voting (Lemma 2), so action never takes place.

Problem: *under anarchy voting outcome is not binding* (no cost to acting contrary to one's vote).

Possible solution: enforce voting outcomes. . . but how:

(I) endogenous coercive enforcement:
  (A) coalitions of the willing
  (B) universal organizations

(II) non-coercive delegation

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COERCIVE ENFORCEMENT
THE MODEL

- Players agree on quota $Q \in [1, N]$
- In each period,
  - each observes realization of v_i
  - all vote yes/no simultaneously
    (voting outcome common knowledge)
  - each spends for/against action
    (players voting in support move first)
  - voting not binding on spending
- Common discount factor, $\delta \in (0, 1)$
- Preference shocks independent between periods
- Payoffs: discounted sum of period payoffs

COERCIVE ENFORCEMENT
DISTRIBUTION OF COSTS

We look for equilibria with following features:

- if Q or more votes in support, the action implemented "at cost" (supporters do not have to impose the action)
- if fewer than Q votes, all players consume privately (opponents do not have to impose the status quo)

We consider two organizational forms:

1. Coalitions of the Willing (CoW): only players who vote in support contribute toward the action when the quota is met
2. Universal Organizations (UNO): all players contribute toward the action when the quota is met

Enforcement: grim-trigger (deviations punished by reversion to SPE where communication (voting) ignored)

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Coercive Enforcement

Coalitions of the Willing

Define "sincere voting" constraint as:

$$\underbrace{af(Q-1)}_{\text{benefit of sincerity}} \geq \underbrace{\sum_{k=Q-1}^{N-1} x(k+1)f(k).}_{\text{cost of sincerity}} \qquad \text{(SC)}$$

CoW can be SPE provided δ high enough (Prop. 2), and

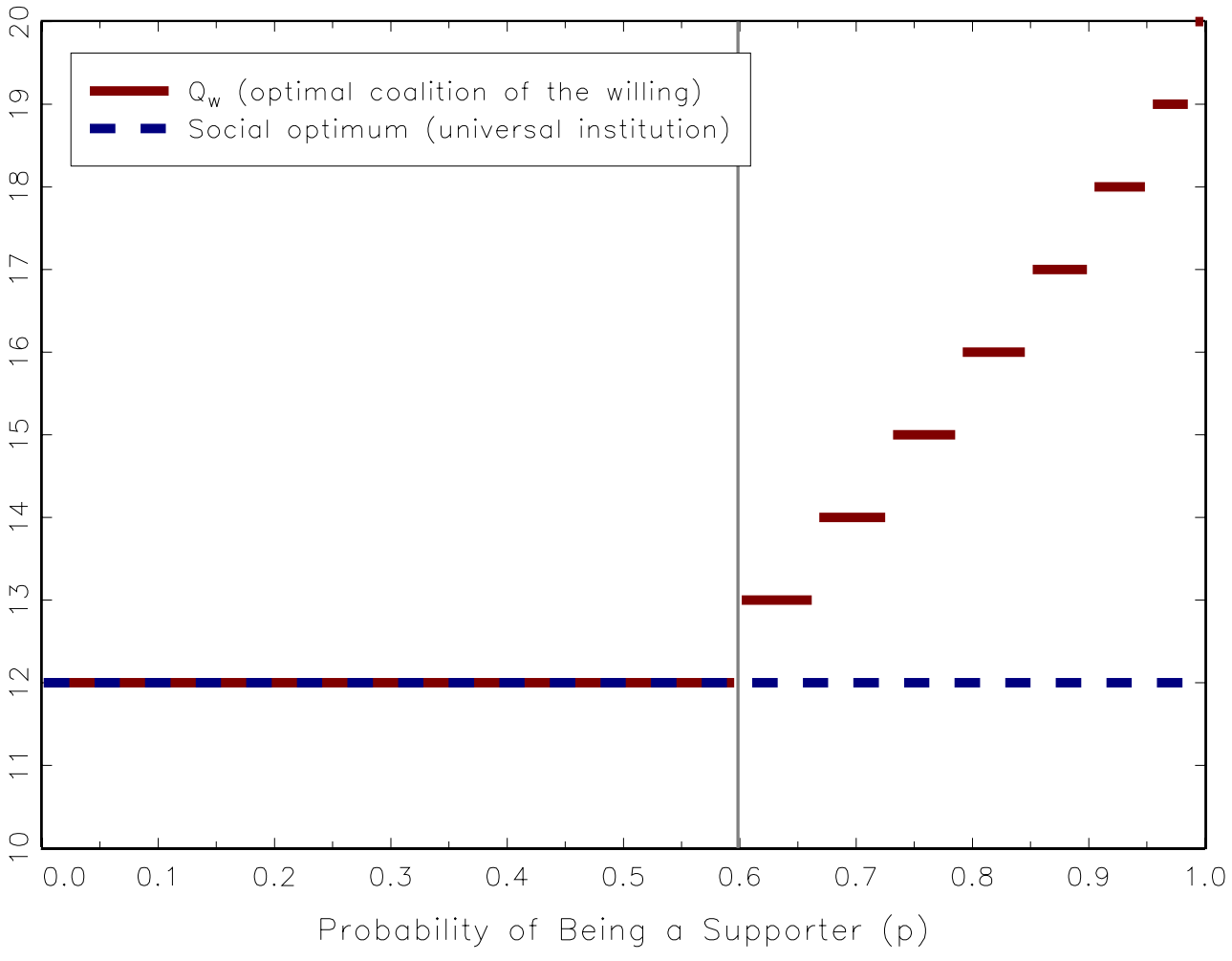
Lemma

The optimal quota for CoW is $Q_w = \max\{\theta, \mathfrak{S} + n(p)\}$, *where* $n(p) \geq 0$ *is the smallest integer such that* $\mathfrak{S} + n(p)$ *satisfies the sincere voting constraint in* (SC). *The stepping function* $n(p)$ *is non-decreasing.*

COERCIVE ENFORCEMENT

COALITIONS OF THE WILLING, ILLUSTRATION

What does the solution look like? $N = 20$, $a = 3$, $\theta = 11$:



COERCIVE ENFORCEMENT

COALITIONS OF THE WILLING, INTUITION

Spending contrary to one's vote:

- can be *observed*, so
- can be deterred with threats
- provided δ is high enough
- $\Rightarrow$ not the source of inefficiency

Voting contrary to one's preference (against action if supporter):

Coercive Enforcement

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- can **not** be observed, so
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- only deterred through higher quota: (SC)
  (risk of action failure is worse than gain from free-riding)
- $\Rightarrow$ as p increases Q_w moves further away from social optimum

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COERCIVE ENFORCEMENT

FIXING THE SHORTCOMINGS

Main CoW problems caused by supporters-only contributing:

- upper bound on how costly action can be
- supporter incentives to free-ride require institutional fix

Therefore, potential fix is for *everyone* to contribute when quota met.

Coercive Enforcement

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Coercive Enforcement
Universal Organizations

UNO can be SPE provided δ is high enough (Prop. 3), and

Lemma

The optimal quota for the UNO is $Q_u = \mathfrak{S}$ regardless of p, and is always socially optimal even ex post.

Good news: UNOs can solve the problems of CoWs.

Bad news: UNOs require higher discount factors to implement.

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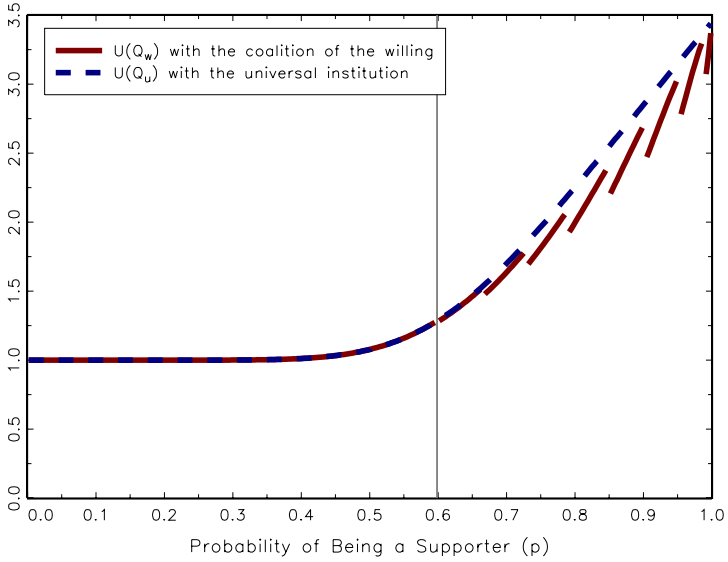
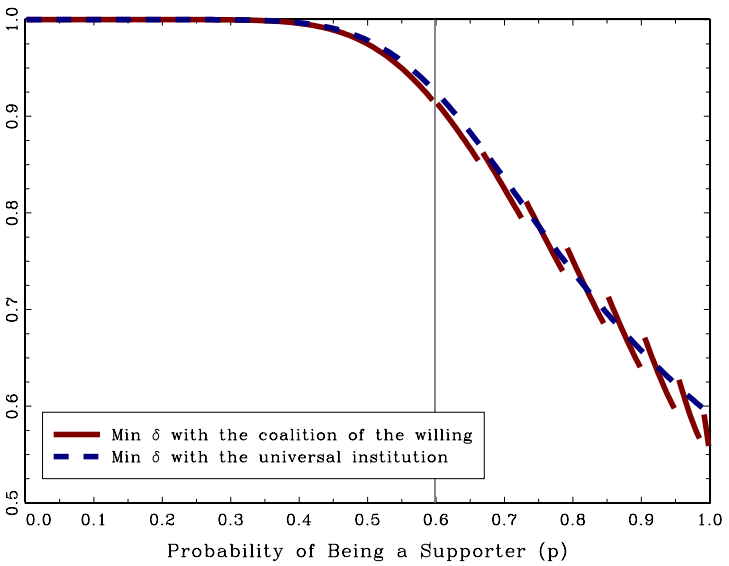


Equilibrium Payoffs



Shadow of the Future

COERCIVE ENFORCEMENT
SUMMARY OF FINDINGS

Coalitions of the Willing (CoWs) vs. Universal Organizations (UNOs):

- both CoWs and UNOs can be implemented provided players care enough about the future (so sincere voting can be enforced)
- both implement the action at cost (no resource waste)
- both are socially efficient, even *ex post*, provided p is not too high
- UNOs generally better:
  - if p is too high, CoWs lose efficiency (the required quota is higher than the socially optimal one) but UNOs do not
  - UNOs can implement costlier actions than CoWs (because they distribute the costs among all players rather than just supporters)
- however, CoWs require lower discount factors to implement, so might be only alternative when UNO is not feasible

$\Rightarrow$ Both viable solutions, depending on circumstances!

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COERCIVE ENFORCEMENT
THE PROBLEMS

Since CoWs and UNOs enforce voting outcomes using conditional threats, they are vulnerable to usual problems that reduce that ability:

- transaction costs: lower expected benefits of institution, making deviation more tempting
- perfect monitoring: if noise, deviations harder to detect, must relax trigger of punishment somewhat
- punishment too severe: grim trigger is *most conducive* to cooperation but not renegotiation-proof
- shadow of future too long: required minimum patience might be extremely high, so impossible to reach

Can we get cooperation without coercion? **YES!**

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Non-coercive Enforcement
The Model

Consider **single-stage** game again:

- Players agree on quota, Q, hire an agent at wage $W > 0$ (wage is exogenous)
- Players simultaneously give the agent $x_0 \in (W/N, 1]$ each (if anyone fails to contribute, agent returns the contributions)
- Each player privately observes v_i (so initial contributions under "veil of ignorance")
- Players simultaneously vote for/against the action
- The agent acts with the resources he has, net his fee (contributes toward action if quota is met, returns investments otherwise)
- Players act with the resources they have (they are not bound by the outcome of the vote)

Non-coercive Enforcement
The Model

Assumptions:

- everyone pays the agent
- agent's fee is sunk regardless of outcome of vote
- returning contributions stacks model *against* sincere voting
- agent has no expertise or informational advantage over players
- players not bound by vote outcome

Focus on equilibria where:

- players make symmetric contributions
- players do not spend from remaining resources toward action ("agent-implementing" institution)

Non-coercive Enforcement

Existence

Define the "no-blocking" contribution as:

$$x_0(Q) = \frac{(1+w)N - Q + \theta}{2N - Q}. \qquad \text{(NBC)}$$

Define the "no-imposition" constraint on quota as:

$$Q \leq \left\lceil 1 + \left(\frac{1}{2}\right)\left(N + \frac{\theta - 1}{1 - w}\right)\right\rceil \equiv \overline{Q}_a. \qquad \text{(NIC)}$$

Proposition

For any $Q \leq \overline{Q}_a$, there exists an agent-implementing SPE where players contribute $x_0(Q)$, vote sincerely, and consume remaining resources. The agent invests toward action if there are at least Q supporting votes, and returns contributions (net his fee) otherwise.

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Non-coercive Enforcement

Optimal Quota

The solution is unique:

Lemma

There exists a unique $Q_a(w, p)$, which maximizes the delegation payoff. Moreover, this optimal quota is non-decreasing in p.

Delegation can be preferable, *even in the single-shot game*:

Lemma

If the probability of being a supporter is sufficiently high, then players strictly prefer to delegate for any feasible agent fee.

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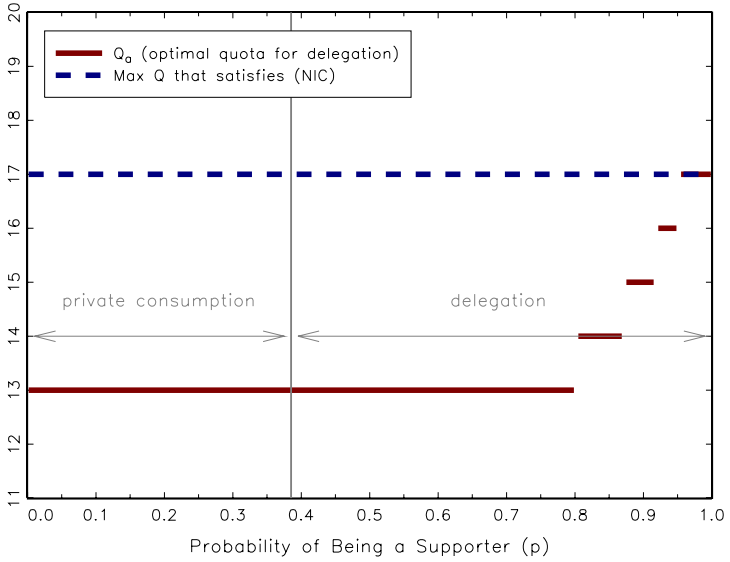
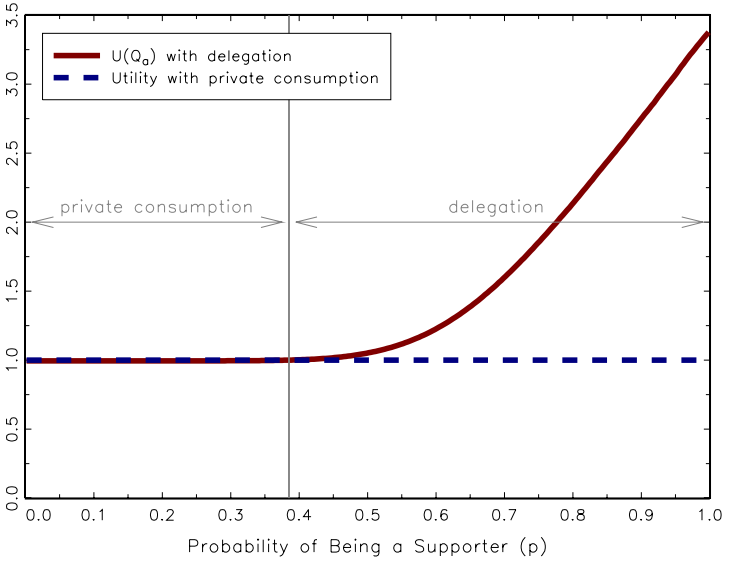
NON-COERCIVE ENFORCEMENT

ILLUSTRATION: LOW AGENT COSTS

What does the solution look like? $N = 20$, $a = 3$, $\theta = 11$, $w = 0.005$



Voting Rule

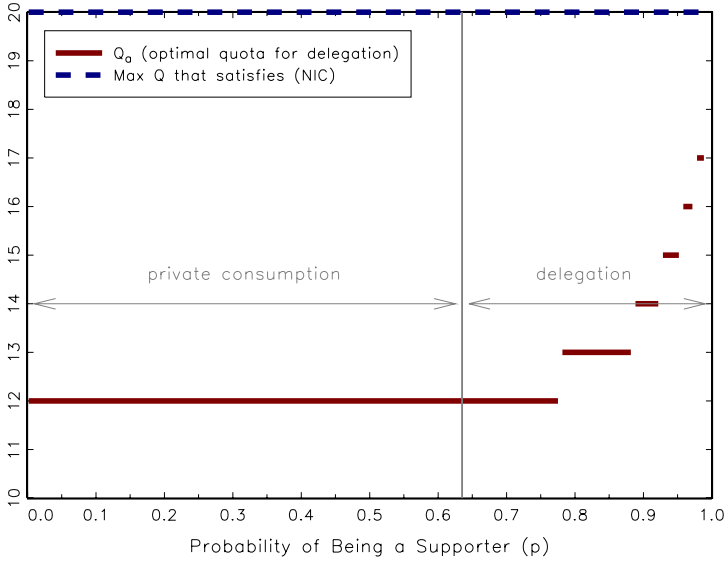


Equilibrium Payoff

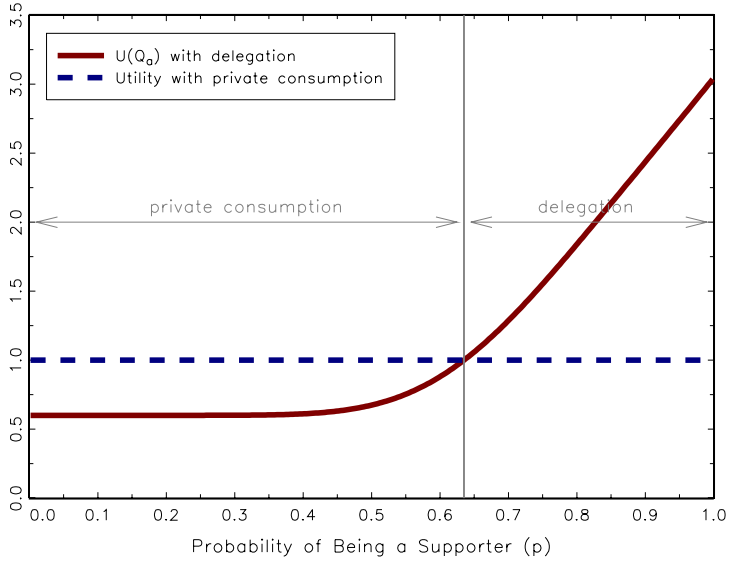
NON-COERCIVE ENFORCEMENT

ILLUSTRATION: EXTREME AGENT COSTS

What does the solution look like? $N = 20$, $a = 3$, $\theta = 11$, $w = 0.4$



Voting Rule



Equilibrium Payoff

NON-COERCIVE ENFORCEMENT
COMPARISONS WITH COW/UNO

Delegation does waste resources:

- agent's fee is sunk
  (although this could be "transaction costs" in coercive models)
- agent spends more than action's cost
  (difference large when there are many supporters)

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- delegation can function *regardless* of shadow of the future
- could be the only solution, especially when p is low (reputation to support CoWs and UNOs)

Non-coercive Enforcement

Comparisons with CoW/UNO

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   - negative externalities
2. Focus on latter offers new insights. . .
   - Rationale for diverse organizational forms
   - Novel rationale for delegation
   - Explanation of why states vote
   - Non-coercive compliance possible
3. Interesting extensions. . .
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   - Agency slippage

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