Voting versus Lobbying

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The Setting

• political contest between two groups providing or promising effort
• lobbying groups, political parties
• consider different mechanisms for resolving the contest
  • winner pays – first or second price auction: example – a politician to be bribed – common in the lobbying literature
  • everyone pays: example – an election, warfare – common in the voting literature
    • all-pay auction where greater effort wins
    • linear Tullock contest success function where greater effort increases the chance of winning: true in warfare, in voting we have weather, intervention of courts, way votes are counted, proportional representation and so forth
Empirical Applications of this Class of Models

• Coate-Conlin: referendum voting in Texas
• Esteban-Ray-Mayoral: ethnic conflict
Are Large or Small Groups More Effective?

- Olson, Becker, Levine/Modica others argue that smaller groups are more effective at lobbying
- Levine/Mattozzi, others argue that larger groups are more effective at voting
- When groups of different sizes compete for the same prize when is the larger or smaller group more likely to be successful?
- Why should it be different for voting and lobbying?
- What factors determine the effectiveness of groups of different sizes?
Duties versus Chores

- effort provision a *duty*: we view voting as a civic duty so we receive a benefit for doing our duty that exceeds at least some of the cost of participating
duty in the broad sense: a political demonstration or protest might be an enjoyable event - to be outdoors in good weather, meet new people, chant, march and sing

- effort provision a *chore*: a fixed cost of participation
cannot simply write a check for 32 cents to “anti-farm subsidies” must find the appropriate organization, learn about them, join up - and they have to vet me, process my application and so forth
considerable cost incurred even as I contributed absolutely nothing to the lobbying effort

- tend to think of voting as a duty and lobbying as a chore, but the cost structure is the fundamental distinction
The Main Results

• difference between voting and lobbying
  • duty (voting) versus chore (lobbying)
  • all-pay (voting) versus winner-pays (lobbying)
• duty favors large groups while chores favor small groups
• all-pay versus winner-pays does not matter
• since it is the cost function that matters we examine the micro-foundations of the cost function
• there are several models of group behavior – do they give rise to different cost functions with different conclusions concerning duty and chores?
  • (no)
The Political Contest Between Groups

two groups $k = S, L$ of size $N_L > N_S$ compete for a common prize worth $V$ to the group and $v_k = V/N_k$ to each group member.

only difference between groups is their size

groups behave as single individuals

choose a social norm in the form of a per capita effort level $0 \leq \varphi_k \leq 1$

• marginal cost of per capita effort up to a threshold $\varphi \geq 0$ is $-f < 0$

• further effort requires a per capita fixed cost $F \geq 0$ plus a marginal cost of $c > 0$

group may “burn money” by choosing to pay the fixed cost without providing additional effort
Duties versus Chores

only allow two cases:

- effort a duty: \( \varphi > 0 \) and \( F = 0 \)

- effort is a chore: \( \varphi = 0 \) and \( F > 0 \)

we will examine the micro-foundations of the cost function later
Bids, Strategies and Payoffs

social norm $\varphi_k$ in per capita terms results in total effort or bid $b_k = N_k \varphi_k$

pure strategy for group $k$ is choice of accepting the fixed cost $q_k \in \{0, 1\}$ and a social norm $\varphi_k$ satisfying the feasibility condition that $q_k = 1$ if $\varphi_k > \varphi$

if group has probability $p_k$ of winning the prize and follows pure strategy $q_k, \varphi_k$ it receives per capita utility

$$p_k v_k - q_k F - c \max\{0, \varphi_k - \varphi\} + f \min\{\varphi_k, \varphi\}$$
Willingness to Pay

willingness-to-pay is the greatest amount of effort group would be willing to provide to get the prize for certain.

\[ W_k = \begin{cases} \frac{N_k \varphi}{N_k} & \text{if } V < N_k F \\ \frac{N_k \varphi + \frac{V-N_k F}{c}}{N_k} & \text{if } V \in [N_k F, N_k ((1 - \varphi)c + F)] \\ \frac{N_k \varphi}{N_k} & \text{if } V > N_k ((1 - \varphi)c + F) \end{cases} \]

benefit of duty \( f \) does not figure in because group can receive that benefit regardless of whether or not it wins the prize

if \( V \leq N_k F \) for both groups we say that both groups are disadvantaged

otherwise a group with the highest willingness to pay is called advantaged and the other group disadvantaged
Size of the Prize

• prize is small if $V < FN_S$
• prize is medium if $NSF < V < FN_L + cN_S$
• prize is large if $V > FN_L + cN_S$
Group Advantage

Theorem: For a chore with a small prize both groups are disadvantaged. For a chore with a medium prize the small group is advantaged. For a large prize or a duty the large group is advantaged.
Allocation Mechanisms

_allocation mechanism_ determines the award of the prize and the contributions of the two groups based on their bids

1. Second-price auction. The highest bidder wins and provides an effort contribution equal to the bid of the lower bidder.

2. First-price auction. The highest bidder wins and provides an effort contribution equal to their own bid.

3. All-pay auction. The highest bidder wins and both bidders provide an effort contribution equal to their own bid.

4. Linear Tullock contest. Group $k$ wins the prize with probability

$$p_k = \frac{b_k}{b_k + b_{-k}}$$

both bidders provide an effort contribution equal to their own bid.

- for chores if neither group chooses to incur fixed cost the prize is canceled and both groups receive zero

- for auctions if there is a tie the winner is determined endogenously.
Equilibrium

Nash equilibrium of the game between groups (two-player game) with the following refinements:

1. Second-price auction: weakly undominated strategies
2. First-price auction: the “honest bidding” refinement from menu auctions – a bid that loses with probability one must be equal to the willingness-to-pay.
3. All-pay auction: none
4. Linear Tullock contest: pure strategy equilibrium.
**Tripartite Auction Theorem**

$d$ the disadvantaged group

if $W_d \geq N_{-d}\varphi$ it costs the advantaged group $c(W_d - N_{-d}\varphi) + N_{-d}F$ to match the bid of the disadvantaged group

if $W_d < N_{-d}\varphi$ it costs nothing to overmatch the bid of the disadvantaged group

*surplus* is the difference between the value of the prize and cost of matching the bid of the disadvantaged group if this is positive, zero otherwise.

**Theorem:** *In the second-price, first-price and all-pay auction a disadvantaged group gets 0 and an advantaged group gets the surplus. The expected effort provided is the same for the second-price and first-price auction and no greater for the all-pay auction. If $W_d > N_{-d}\varphi$ then the expected effort provided is strictly less for the all-pay auction*
Observations

small group gets a positive surplus when there is a medium prize and a chore: fungibility (Levine/Modica) and resource constraints

rent dissipation: if the value of the prize is medium and groups are of similar size then value of prize dissipated

when effort has value to a recipient (for example to a politician who receives it as a bribe) then auction is preferred
Linear Tullock Contest

The disadvantaged group does not get zero but still gets less than the advantaged group
Costly Participation and Free-riding

- contests are not between individuals but between large groups
- farm lobby in the United States: two million farms
- enormous public goods problem: in voting theory called the paradox of voting
- chances of an individual vote changing the outcome of an election are so small that the incentive to vote is negligible – so indeed, why does anybody bother?
- why do farmers contribute to lobbying efforts when their individual effort makes little difference?
- everybody of course would like their group to win the contest – but of course would much prefer that everyone else contribute to the effort while they do not
A Public Good Game

a simple within group game for the Tullock case

with Tullock contest fixed cost is paid if and only if \( \varphi^k > \varphi \) and social norm is just \( \varphi^k \) with \( q(\varphi^k) \) being 0 if \( \varphi^k \leq \varphi \) and being 1 if \( \varphi^k > \varphi \)

fix pure strategy of the other group \(-k\) and let \( p_k(N_k \varphi_k) \) be the probability that group \( k \) wins.

\( k \) has members \( i = 1, 2, \ldots, N_k \) each chooses effort level \( \phi^i \in [0, 1] \)

effect of individual effort on the outcome is sufficiently small that individuals care only about their costs (no pivotality)

utility of an individual \( i \) who chooses \( \phi^i \) is negative of cost

\[
C(\phi^i) = q(\phi^i)F + c \max \{0, \phi^i - \varphi\} - f \min \{\phi^i, \varphi\}
\]

so everyone contributes the minimum

huge empirical literature saying “this is not true”
Group Utility

group utility $V_k(\varphi^i, \varphi_k)$ when member $i$ provides effort $\phi^i$ and the other members use the social norm $\varphi_k$

$$V_k(\phi^i, \varphi_k) = p_k(\phi^i + (N_k - 1)\varphi_k)V - (N_k - 1)C(\varphi^k) - C(\phi^i).$$

we can reiterate that given $\varphi_k$ the optimal choice of $\phi^i$ is $\varphi$
Behavioral Theory 1 of 3: Rule Consequentialism

each group member asks what would be in the best interest of the group

what pair $\varphi^i, \varphi_k$ would maximize $V_k(\varphi^i, \varphi_k)$?

assume a unique symmetric solution with $\varphi^i = \varphi_k$

each member “does their part” by implementing $\varphi^i = \varphi_k$

- conceptually supposed to capture the idea that it is unethical to free ride
- widely used in voting and implicitly used in lobbying literature
Behavioral Theory 2 of 3: Partial Altruism

individual objective function a weighted average of the group utility and own utility with weight $0 \leq \lambda \leq 1$ a measure of selfishness

$$U_k(\phi^i, \varphi_k) = (1 - \lambda)V_k(\phi^i, \varphi_k) - \lambda C(\phi^i).$$

look for Nash equilibrium

$\lambda = 0$ complete altruism, not the same as rule-consequentialism due to possibility of coordination failure

$\lambda = 1$ complete selfishness

members are willing to bear some cost of contributing if they are altruistic enough

some quantitative problems with this approach including that it requires a level of altruism incompatible with evidence from other spheres of behavior
Behavioral Theory 3 of 3: Peer Pressure

• usually public good problems are overcome by coercion – mandatory voting laws, a military draft

• formal legal channels not so relevant for lobbying, nor indeed for voting

• coercion in the form of peer pressure is common
Peer Pressure with an Endogenous Social Norm

group colludes to maximize $V_k(\varphi^i, \varphi_k)$ but group members must be coerced through punishment if they do not contribute their share

for a given individual social norm $\varphi^i \in [0, 1]$ the group has a monitoring technology which generates a noisy signal of whether or not a member complies with the norm, that is, chooses $\phi^i = \varphi^i$

signal is $z^i \in \{0, 1\}$

0 means “good, followed the social norm”

1 means “bad, did not follow the social norm”

if member $i$ does violate the social norm so $\phi^i \neq \varphi^i$ then the signal is 1 (bad) for sure

if the member does follow the social norm $\phi^i = \varphi^i$ the signal is 1 (good) with probability $\pi$
Crime and Punishment

bad signal received group member receives a punishment of size $P^i$
optimal deviation is $\phi^i = \varphi$
social norm incentive compatible
\[-\pi P^i \geq C(\varphi^i) + \varphi f - P^i\]
a colluding group acts to minimize the punishment cost so chooses
$P^i = [C(\varphi^i) + \varphi f]/(1 - \pi)$
cost (of punishing the innocent) is
$[C(\varphi^i) + \varphi f] \pi/(1 - \pi)$
Accounting for Enforcement Costs

utility of the group taking account of enforcement costs

\[ V_k(\varphi^i, \varphi_k) - ((N_k - 1)C(\varphi_k) + C(\varphi^i) + N_k \varphi f) \pi / (1 - \pi) \]

equivalent to

\[ W(\varphi^i, \varphi_k) = (1 - \pi)V_k(\varphi^i, \varphi_k) - \pi ((N_k - 1)C(\varphi_k) + C(\varphi^i)) \]

group colludes to maximize with respect to both arguments

\[ W(\varphi^i, \varphi_k) \] is maximized with respect to \( \varphi^i \) only if

\[ (1 - \pi)V_k(\varphi^i, \varphi_k) - \pi C(\varphi^i) \]

is maximized with respect to \( \varphi^i \)

which is a solution to the partial altruism model with \( \lambda = \pi \)

so often the details of the behavioral model is not that significant
Indivisibility and Monitoring

- examine the case where the effort is indivisible
- in voting a natural assumption: either a member votes or does not vote but does not cast half a vote
- lobbying often the group asks for a fixed levy of time, effort, or money, and treating the level of contribution of exogenous the issue for members is then whether or not to participate
- allow for *ex post* differences at the time the participation decision is made
- on election day a group member is in the hospital, a member of a lobbying group is suffering financial distress
- look at extensive margin (how many participate) rather than intensive margin (how much each contributes)
Types and Costs

group members draw types $y^i$ uniformly distributed on $[0, 1]$

may contribute 0 effort at 0 cost or they may contribute a single unit of effort at a cost of $d(y^i)$ where we assume the types are ordered so that this is a non-decreasing function

specifically a linear function

$$d(y^i) = d_0 + \gamma y^i$$

$d_0$ negative a duty, positive a chore

where $\gamma > \max\{0, -d_0\}$

common in the voting literature (in the duty case)
**Norms and Signals**

social norm for the group $\varphi_k$ a threshold

types with $y^i < \varphi_k$ expected to contribute

types with $y^i > \varphi_k$ not expected to contribute

contributions are observable but types are private information

peers receive a noisy signal of the type

signal $z^i$ continues to be 0 for “good, followed the social norm” and 1 for “bad violated the social norm”

supposed to contribute, so $y^i < \varphi_k$ but did not do so then this is perfectly observed so that $z^i$ takes the value 1 for sure.

did not contribute but was not supposed to contribute so $y^i > \varphi_k$ then we assume that the signal is noisy so probability $\pi$ that bad signal is received
Structure of Costs

if the cost of the punishment to the individual is $P^i$ then the cost to the group is $\psi P^i$

$$\theta = \psi (1 - \pi); \quad \varphi = \max\{0, -d_0 / \gamma\};$$
$$F = \max\{0, \gamma \theta d_0\} \text{ and } c = (\gamma/2)(1 - \varphi) + F.$$

**Theorem:** If $\theta = 1/2$ then for $\varphi^i < \varphi$ we have the expected cost $C(\varphi^i)$ strictly decreasing in $\varphi^i$ and for $\varphi^i > \varphi$ we have $C(\varphi^i) = F + c(\varphi^i - \varphi)$.

if $\theta > 1/2$ (monitoring costly) then $C$ is concave

if $\theta < 1/2$ (monitoring cheap) then $C$ is convex

Theorem 1 for the small group advantaged holds for $C$ concave and for the large group advantaged holds for $C$ convex

in general costly monitoring favors the small group and cheap monitoring the large group.
Why not Split a Large Group?

with a positive fixed cost why doesn't the larger group “act like a smaller group” by appointing a smaller subgroup to act on its behalf?

a subgroup of size $M_k < N_k$ will only receive a share of the prize: $(M_k/N_k)V$

so raw willingness of the subgroup to pay is

$$M_k \varphi + \left( \frac{M_k}{N_k} \frac{V-\phi}{c} \right) = \frac{M_k}{N_k} \left( N_k \varphi + \frac{V-N_k \phi}{c} \right) = \frac{M_k}{N_k} r_k$$

a fraction $M_k/N_k$ of the raw willingness of the entire group to pay.

problem involves “renegotiation” subgroup will collude not to do it