Voting versus Lobbying

David K. Levine, Andrea Mattozzi and Salvatore Modica

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 $\underline{\varphi} \geq 0 \text{ is } -f < 0$
- further effort requires a per capita fixed cost $F \geq 0$ plus a marginal cost of $c > 0$

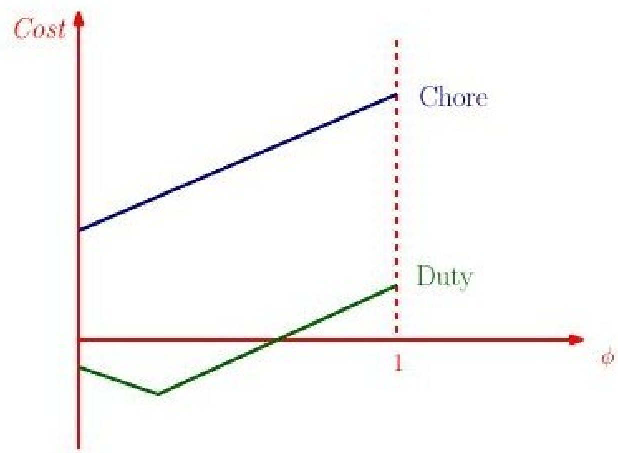
group may "burn money" by choosing to pay the fixed cost without providing additional effort

Duties versus Chores

only allow two cases:

- effort *a duty:* $\underline{\varphi} > 0$ and $F = 0$
- effort is a *chore*: $\underline{\varphi} = 0$ and $F > 0$

we will examine the micro-foundations of the cost function later



Bids, Strategies and Payoffs

social norm φ_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 φ_k satisfying the feasibility condition that $q_k = 1$ if $\varphi_k > \underline{\varphi}$

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

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

Willingness to Pay

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

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

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 $N_S F < V < FN_L + cN_S$
- 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 $W_d \geq N_{-d}\underline{\varphi}$ it costs the advantaged group $c(W_d - N_{-d}\underline{\varphi}) + N_{-d}F$ to match the bid of the disadvantaged group

if $W_d < N_{-d}\underline{\varphi}$ 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 $W_d > N_{-d}\underline{\varphi}$ 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 $\varphi^k > \underline{\varphi}$ and social norm is just φ^k with $q(\varphi^k)$ being 0 if $\varphi^k \le \underline{\varphi}$ and being 1 if $\varphi^k > \underline{\varphi}$

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 ϕ^i is negative of cost

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

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 ϕ^i and the other members use the social norm φ_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 φ_k the optimal choice of ϕ^i is $\underline{\varphi}$

Behavioral Theory 1 of 3: Rule Consequentialism

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

what pair φ^i, φ_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 π

Crime and Punishment

bad signal received group member receives a punishment of size P^i

optimal deviation is $\phi^i = \underline{\varphi}$

social norm incentive compatible

$$-\pi P^i \geq C(\varphi^i) + \underline{\varphi} f - P^i$$

a colluding group acts to minimize the punishment cost so chooses

$$P^i = [C(\varphi^i) + \underline{\varphi} f]/(1 - \pi)$$

cost (of punishing the innocent) is

$$[C(\varphi^i) + \underline{\varphi} f]\pi/(1 - \pi)$$

Accounting for Enforcement Costs

utility of the group taking account of enforcement costs

$$V_k(\varphi^i, \varphi_k) - \left((N_k - 1)C(\varphi_k) + C(\varphi^i) + N_k \underline{\varphi} f\right) \pi/(1-\pi)$$

equivalent to

$$W(\varphi^i, \varphi_k) = (1-\pi)V_k(\varphi^i, \varphi_k) - \pi\left((N_k - 1)C(\varphi_k) + C(\varphi^i)\right)$$

group colludes to maximize with respect to both arguments

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

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

is maximized with respect to φ^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 φ_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 π 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 ψP^i

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

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

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

$$M_k\underline{\varphi} + \frac{(M_k/N_k)V - M_kF}{c} = \frac{M_k}{N_k}\left(N_k\underline{\varphi} + \frac{V - N_kF}{c}\right) = \frac{M_k}{N_k}r_k$$

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