Legislative Bargaining with Heterogeneously Productive/Destructive Legislators

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November 2025

Motivation

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- **Legislative sabotage**: legislators who loose from a law can engage in destructive activities:
  - Delay its enactment via legislative obstructionism (Binder 2004, 2015)
  - Delay/block its implementation in their district:
    - E.U.: late implementation of E.U. directives
    - U.S.: states can use funding decisions and litigation to delay and hinder effective implementation of federal programs (anti-commandeering doctrine, Obamacare, SNAP)
  - Promote protests in their district (Frynas 2001, Ukiwo 2007)

Motivation

- **Starting point:** Legislators can affect the content, implementation, and consequences of a law not only with their vote.
- **Legislative cooperation**: legislators who benefit from the law can engage in productive activities:
  - Co-sponsoring and improving the drafting of the bill (Volden and Wiseman 2014)
  - Proposing amendments that increase its efficiency
  - Swift and smooth implementation in their district (Mettler and Soss 2004)
  - Communication and advertisement by legislators (Weaver and Jacobs 2000)

Motivation

- This paper takes these tactics as given, and investigates their strategic impact on lawmaking
- **Key novelty**: all legislator have one vote, but they differ in their ability to engage in legislative sabotage/cooperation.
- **Main research questions**:
  - How does the possibility of legislative cooperation/sabotage affect coalition building?
  - Under what condition are the equilibrium coalitions of optimal size and composition?

Main take-away

- We build a model of distributive politics that combines key ingredients of:
  - legislative bargaining:
    - A pie (federal tax revenue) must be divided among the districts
    - A majority of legislators must approve the proposal
  - coalitional bargaining: the size of the pie depends on the coalition supports it (the numbers of active legislators)

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- We build a model of distributive politics that combines key ingredients of:
  - legislative bargaining:
    - A pie (federal tax revenue) must be divided among the districts
    - A majority of legislators must approve the proposal
  - coalitional bargaining: the size of the pie depends on the coalition supports it (the numbers of active legislators)
- The combination of these ingredients lead to various inefficiencies:
  - Size-inefficiency: the equilibrium coalitions is inefficiently small
  - **Composition-inefficiency**: the equilibrium coalitions have an inefficient composition

Existing literature: legislative bargaining

- Typical setup:
  - A pie must be shared via a decentralized procedure of offers and counter offers (Rubinstein 1982)
  - **An offer is accepted if a majority of legislators vote yes** (Baron Ferejohn 1989)
  - The size of the pie does not depend who votes yes or no

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  - The size of the pie does not depend who votes yes or no
- Bargaining outcome is usually efficient (the whole pie is distributed)
  - Unless the pie varies over time (Eraslan and Merlo 2002, 2017)
- Focus on distributive properties:
  - Agenda power (Knight 2005, Bernheim et. al. 2006, Diermeier and Fong 2011...)
  - Minimal-winning or larger coalition (Knight 2005 @@@others@@@)

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- Most related paper: Battaglini 2021

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- Inefficiencies can occur: Chatterjee et. al. 1993, Okada 2011
  - If the pie does not increase fast enough with coalition size, the grand coalition might not form
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- Most related paper: Evdokimov 2022
  - Coalitional bargaining with **heterogeneously productive members**

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- **Players**
  - A set N of legislators
  - They can be active (N_1) or passive (N_0)
- **The bargaining procedure**
  - Legislators bargain over an infinite horizon
  - In each period $t \in \mathbb{N}$, a proposer p is drawn uniformly from N
  - The proposer p chooses:
    - A coalition $C \subseteq N$
    - A division $x \in \mathbb{R}_+^C$ of the pie $\widetilde{Y}(C)$ within C:

$$\sum_{j \in C} x_j \leq \widetilde{Y}(C).$$

  - Members of C vote sequentially on x:
    - If all vote yes, x is implemented, the game ends
    - Otherwise the game moves to $t+1$

The model

- **The size of the pie**
  - The pie $\widetilde{Y}(C)$ depends on the coalition C that supports it:

$$\widetilde{Y}(C) = \begin{cases} 0 \text{ if } |C| < q, \\ Y + \sum_{j \in C \cap N_1} \eta \text{ if } |C| \geq q. \end{cases}$$

  - q is the quota of the voting rule, $2 \leq q \leq n-1$
  - Y : fixed part of the pie (federal tax revenue)
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- **Payoffs**
  - Each coalition member j gets period payoff x_j, non members get 0
  - Common discount factor $\delta \in [0, 1)$
- **Equilibrium**
  - SPNE in stationary strategies

Equilibrium Analysis

Equilibrium behavior of the coalition members

- Consider a period t in which:
  - a proposal (C, x) has been made,
  - players expect some continuation play σ from $t + 1$ onwards.
- The tradeoff of each coalition member $j \in C$:
  - If the proposal is accepted, j gets x_j,
  - If the proposal is rejected, j gets δv_j^σ.
- Sequential voting $\Rightarrow$ legislators vote as if they are pivotal.

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Lemma (equilibrium condition for coalition members)

In any equilibrium σ, for any coalition C proposed with positive probability, each coalition member $j \in C$ votes yes iff $x_j \geq \delta v_j^{\sigma}$.

Equilibrium behavior of the proposer

- Consider a period t in which:
  - a proposer p has been drawn,
  - players expect some continuation play σ from $t+1$ onwards.
- The proposer is the residual claimant:
  - p gives each $j \in C$ just enough to get its approval: $x_j = \delta v_j^{\sigma}$.

▷ The surplus that p gets from forming a coalition C is then

$$S_p\left(C, v^{\sigma}\right) = Y + \sum_{j \in C \cap N_1} \eta - \sum_{j \in C \setminus \{p\}} \delta v_j^{\sigma}.$$

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Lemma (equilibrium condition for proposers)

In any equilibrium σ,

1. *p proposes only coalitions that are accepted w.p. 1 (no delay)*
2. *p proposes only coalitions that maximizes $S_p\left(C, v^\sigma\right)$ and contain p and at least q legislators.*

How do we determine the equilibria?

- **We can work in the space of coalitions and values:**
  - An equilibrium is uniquely pinned down by:
    - the (mixed) choice of C by each proposer $p \in N$,
    - and the profile of continuation values v^{σ}.
  - Surplus distribution x within C and voting behavior of each $j \in C$ are uniquely pinned down by continuation values v^{σ}.

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  - Surplus distribution x within C and voting behavior of each $j \in C$ are uniquely pinned down by continuation values v^{σ}.
- **How do we determine the equilibrium coalitions and values?**
  - Start with a putative profile of values $v \in \mathbb{R}^{N}$.
  - For each proposer $p \in N$, pick a lottery σ_p over coalitions C that maximize $S_p\left(C, v\right)$.
  - Compute the profile of values v^{σ} induced by σ.
  - Check that $v^{\sigma} = v$.

Notations

- The strategy of each proposer p can be represented as a vector of inclusion probabilities:
$$\sigma_p \equiv (\sigma_p(j))_{j \in N} \in [0,1]^N,$$
- $\sigma_p(j)$: probability that p includes j in her coalition conditional on p being the proposer
- $\sigma_p(p) = 1.$

Equilibrium fixed-point condition

Lemma

A strategy profile σ is an equilibrium if and only if:

1. *The choice of coalitions σ_p of each proposer $p \in N$ maximizes the expected net value of the pie:*

$$\Pi_p\left(v^{\sigma}\right) \equiv \max_{\substack{\sigma_p \in [0,1]^N, \\ \sum_{j \in N} \sigma_p(j) \geq q, \\ \sigma_p(p)=1}} \left(Y + \sum_{j \in N_1} \sigma_p\left(j\right) \eta - \sum_{j \in N \setminus \{p\}} \sigma_p\left(j\right) \delta v_j^{\sigma} \right).$$

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2. *The continuation value of each legislator $j \in N$ is given by:*

$$v_j^{\sigma} = \frac{1}{n} \Pi_j\left(v^{\sigma}\right) + \left(\frac{1}{n} \sum_{p \in N \setminus \{j\}} \sigma_p\left(j\right) \right) \delta v_j^{\sigma}.$$

Uniqueness and symmetry of the equilibria

Lemma (Equilibrium uniqueness)

For each legislator $j \in N$, all equilibria induce the same continuation value v_j^{σ} and the same probability $\frac{1}{n}\sum_{p\in N\setminus\{j\}}\sigma_p\left(j\right)$ of being included in the coalition of another proposer.

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In any equilibrium, all legislators of the same type have the same value and the same probability of being included in the coalition of another proposer.

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Corollary

The only equilibrium object to be determined are the continuation values v_o^σ and v_1^σ of passive and active legislators.
The net contributions of active and passive districts are $\eta - \delta v_1^\sigma$ and $-\delta v_0^\sigma$.

Efficiency

Size and composition efficiency

Definition

An equilibrium is:

1. **Efficient** if all coalitions that are proposed with positive probability are of maximal value,
2. **Size-inefficient** if there exists a coalition that is proposed with positive probability whose value could be increased by including more legislators,
3. **Minimal-winning** if all coalitions that are proposed with positive probability are of size q
4. **Composition-inefficient** if there exists a coalition that is proposed with positive probability whose value could be increased by changing its composition, fixing its size and the identity of the proposer.

The main result when active districts are not scarce

Proposition (Equilibrium efficiency when $n_1 \geq q$.)

There exists cutoffs $\underline{y}, \hat{y}, \bar{y} \in \mathbb{R}$ *such that* $0 < \underline{y} < \hat{y} < \bar{y}$ *and:*

1. *If* $\frac{Y}{\eta} \in \left[0, \underline{y}\right]$, *then* $\eta - \delta v_1^{\sigma} > 0 > -\delta v_0^{\sigma}$, *so the unique equilibrium is efficient and larger than minimal-winning.*

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2. *If* $\frac{Y}{\eta} \in \left(\underline{y}, \hat{y}\right)$, *then* $\eta - \delta v_1^\sigma = 0 > -\delta v_0^\sigma$, *so all equilibria are size-inefficient, composition-efficient, and larger than minimal-winning.*

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3. *If $\frac{Y}{\eta} \in [\hat{y}, \bar{y}]$, then $0 > \eta - \delta v_1^\sigma > -\delta v_0^\sigma$, so all equilibria are size-inefficient, composition-efficient and minimal-winning.*
4. *If $\frac{Y}{\eta} \in (\bar{y}, +\infty) >$, then $0 > \eta - \delta v_1^\sigma = -\delta v_0^\sigma$, so all equilibria are size-inefficient, composition-inefficient and minimal-winning.*

Implication 1: drivers of size-inefficiency

Corollary (NSC for size-inefficiency)

All equilibria are efficient when $\frac{Y}{\eta} \leq \underline{y}$, *and all equilibria are size-inefficient when* $\frac{Y}{\eta} > \underline{y}$, *where* $\underline{y} \equiv \frac{1-\delta}{\delta} n$.

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- Y : captures the proposer's incentives to (inefficiently) exclude legislators to get a greater share the fixed part of the pie.
- η : captures the proposer's incentives to (efficiently) include legislators to increase the variable part of the pie.

▷ As the ratio $\frac{Y}{\eta}$ grows sufficiently large, the proposer starts excluding active legislators to get a greater share of a smaller pie.

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▷ As the ratio $\frac{Y}{\eta}$ grows sufficiently large, the proposer starts excluding active legislators to get a greater share of a smaller pie.

- $\underline{y}$ decreases in δ: more patient legislators are more likely to get excluded.
- $\underline{y}$ is independent of q: occurrence of size-inefficiency is independent of institutional factors.

Implication 2: drivers of the magnitude of size-inefficiency

Corollary (NSC for maximal size-inefficiency)

All equilibria are larger than minimal-winning when $\frac{Y}{\eta} \leq \hat{y}$, *and all equilibria are minimal-winning when* $\frac{Y}{\eta} > \hat{y}$, *where*

$$\hat{y} \equiv \frac{nn_1 - nq\delta + n\delta - n_1\delta}{n_1\delta}.$$

- As the ratio $\frac{Y}{\eta}$ grows even larger, the proposer excludes as many active legislators as possible given the voting quota constraint.

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- As the ratio $\frac{Y}{\eta}$ grows even larger, the proposer excludes as many active legislators as possible given the voting quota constraint.
  - $\hat{y}$ decreases in δ
  - $\hat{y}$ decreases in q: a greater voting quota can force proposers to include more active legislators

Implication 3: drivers of composition-inefficiency

Corollary (NSC for composition-inefficiency)

All equilibria are composition-efficient when $\frac{Y}{\eta} \leq \bar{y}$, *and all equilibria are composition-inefficient when* $\frac{Y}{\eta} > \bar{y}$ *where*

$$\bar{y} \equiv \frac{(n - \delta + q\delta)(nn_1 - nq\delta + n\delta - n_1\delta)}{n\delta^2 (q-1)}.$$

- *As the ratio* $\frac{Y}{\eta}$ *grows even larger, since voting constraint binds, the proposer starts replacing some active legislators by passive ones.*

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- *As the ratio* $\frac{Y}{\eta}$ *grows even larger, since voting constraint binds, the proposer starts replacing some active legislators by passive ones.*
  - $\bar{y}$ *decreases in* δ.
  - $\bar{y}$ *decreases in* q*: a greater voting quota can induce proposers to replace active legislators by passive ones*
  - $\bar{y}$ *increases in* n_1.

Conclusion

- We build a model of legislative bargaining in which the winners (losers) can increase (decrease) the size of the pie
- All legislators have one vote, but differ in their ability to increase (decrease) the size of the pie
- We show that the combination of a fixed part of the pie (federal tax revenues) and a variable part (legislative cooperation) can lead to two qualitatively different kinds of inefficiency
  - Size-inefficiency: equilibrium coalitions are too small
  - Composition-inefficiency: equilibrium coalitions include the wrong legislators