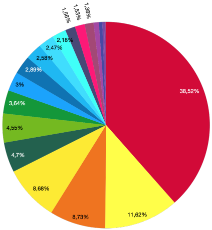
Legislative Decision Making

- Distributive bargaining
- Logrolling

Sollwerte des Haushaltsjahres 2024

2024 | Ausgaben | Einzelplan | Soll
Haushaltstelle: ____ ___ __ - ___
Betrag (in Tausend Euro): 445.687.863
Anteil an Gesamthaushalt: 100%



Betrag in tausend Euro	**Anteil** an Summe pos. Posten	**Posten** unterhalb von: Sollwerte des Haushaltsjahres 2024
171.673.496	38,52%	Bundesministerium für Arbeit und Soziales
51.800.000	11,62%	Bundesministerium der Verteidigung
38.930.773	8,73%	Bundesschuld
38.701.275	8,68%	Bundesministerium für Digitales und Verkehr
20.933.291	4,7%	Allgemeine Finanzverwaltung
20.300.142	4,55%	Bundesministerium für Bildung und Forschung
16.220.500	3,64%	Bundesministerium für Gesundheit
13.351.439	3%	Bundesministerium für Familie, Senioren, Frauen und Jugend
12.902.605	2,89%	Bundesministerium des Innern und für Heimat
11.515.500	2,58%	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung

Distributive politics

- A significant part of legislative activity concerns the (re)distribution of resources.
  - Allocation of ministries to members of different parties
  - Allocation of budget shares to ministries and projects
  - Public projects conducted in different geographical regions
  - Subsidies to different consituent groups
- Many of these decisions are made within legislatures or other relatively small decision making bodies.
- Legislators usually have different priorities / conflicting interests.
- Budgets are crafted and agreed upon according to certain (formal / informal) *rules and procedures*.

Legislative bargaining theories

- The literature on *legislative bargaining* seeks to model this process.
- Want to investigate how behavior and outcomes depend on rules.

Example

- Anna, Bonnie, and Cindy must decide on how to distribute a cake.
- A feasible allocation is (x_A, x_B, x_C) such that $x_A + x_B + x_C \leq 1$
- Suppose they use *majority rule*. What do you expect?

Exercise: Show that *any* feasible allocation can be defeated by another feasible allocation in a pairwise vote!

$\Rightarrow$ **Instability and 'chaos'?**

- Majority rule *by itself* may not produce a stable outcome.
- Raises questions:
  - Why don't we see 'chaos' in democratic institutions such as legislatures?
  - Why are some outcomes stable? What kinds of outcomes are these?

Structure induced equilibrium

- Shepsle and Weingast (1981) suggest that democratic institutions involve *more* than the application of pure majority rule (PMR).
  " In our view, real-world legislative practices constrain the instability of PMR by *restricting the domain and the content* of legislative exchange."
- Even if all options can be defeated, an option can be stable if no option that would defeat it can be proposed!
- All real-world legislatures have *procedural rules* restricting the proposals that may be offered.
  - Google: Robert's Rules of Order

Prototypical Amendment Rules

- Closed rule: the legislature votes on a single proposal (usually proposed by a committee)
  - In case of failure, ‘status quo’ remains
- Open rule: before a vote is taken, (some) members may offer ‘amendments’
  - Legislature votes on amendment vs. standing proposal (‘motion on the floor’)
  - Winner becomes the new motion on the floor
  - When no further amendment is offered, the legislature votes on the motion on the floor vs. status quo.
- In reality, there are many other, and much more complicated (‘special’) rules and procedures!
  - In US Congress, the ‘rules committee’ decides which rules will be used for which upcoming questions.
  - In German Bundestag, the ‘Ältestenrat’ has similar responsibilities.

Baron and Ferejohn (1989) ‘Bargaining in legislatures’

- Baron and Ferejohn (BF) proposed a formal model of legislative bargaining which has become a standard tool in Public Choice Theory.
- In their model,
  - members must decide on how to divide a *dollar* (*exogenous* size of the overall budget)
  - process occurs in a sequence of *‘sessions’* (e.g. days on which the legislature meets)
  - members are *impatient*: They prefer to get a dollar today rather than tomorrow.
  - the legislature is assumed to operate using majority rule.
- BF compare *open* and *closed* amendment rules
- The model demonstrates how rules may influence the *distribution* of resources as well as the *time required to reach agreement*.

Simplified model (closed rule)

- Suppose the legislature meets for only two sessions ($t = 0, 1$).
- At the beginning of *each* session, one member is 'recognized' at random. (Each member is recognized with probability $\frac{1}{n}$.)
- The recognized member makes a *proposal* $x \in \mathbb{R}^n_+$ satisfying

$$\sum_{i=1}^{n} x_i \leq 1$$

- The proposal is immediately voted on using *majority rule*
  - If it passes, benefits are distributed and the legislature is dissolved.
  - If not, the legislature adjourns until the *second* session.
- If no agreement is reached in the second session, the legislature is dissolved and no benefits are distributed.
- If distribution y is reached in session t, legislator i's utility is

$$u_i(y) = \delta^t \cdot y_i$$

- $\delta \in [0, 1]$ is a *discount factor*
  - $\delta \approx 0$ means legislators are very impatient
  - $\delta \approx 1$ means they are very patient

Exercise: Let $n = 3$ and $\delta = 1/2$. Draw a *game tree* representing this game!

A *strategy* in this game specifies

- How a player votes on any given proposal in session 2.
- What proposal he makes if recognized in session 2.
- How he votes on any proposal made in session 1.
- What proposal he makes if recognized in session 1.

Subgame perfect equilibrium

- Proposals and voting decisions prescribed by the strategy must constitute best responses in *every subgame*.
- I.e. for any proposal made in session 2, a player's vote must be a best response. Likewise, the proposal made in session 2 must be optimal given that voters will best respond, etc.

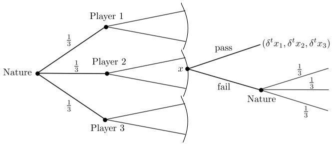
'Sincere' voting

- In addition, assume that voters vote yes if they (weakly) prefer that a proposal passes, and 'no' otherwise.

Exercise: Derive the unique Subgame Perfect Equilibrium with sincere voting!

Full Model: Infinite horizon, closed rule

- Potentially infinite number of rounds (sessions).
- Agreement requires $q \leq n$ 'yes' votes
- Game continues until agreement is reached.



Equilibrium concept

- There are *many* subgame perfect equilibria!
- **Symmetric, stationary** Subgame Perfect Equilibrium (SSPE):
  - Strategies (proposals and votes) are **stationary**: The proposals a player makes as well as the way he votes on other proposals is the same in every session, irrespective of the date or the game's prior history.
  - All players use the **same** strategy (make the same (types of) proposals and vote the same as all other players)
- **In addition:** Assume that players vote yes if they (weakly) prefer that a proposal passes, and 'no' otherwise.

Analysis: voting decisions

- Suppose a proposal $(x_1, ..., x_n)$ has been made.
- For which values of x_i will player i vote 'yes'?
    - Let V_i be his *expected utility* (EU) in equilibrium.
    - If the proposal fails, the game continues to the next round. *Stationarity* implies that his EU *from that point on* is still V_i. Thus, his 'continuation value' is δV_i.
    - Thus, Mr. i votes 'yes' if and only if

$$x_i \geq \delta V_i$$

- By *symmetry*, $V_i = V$ (i.e. the same) for all i

Analysis: proposals

- What is the best proposal that a player can make?

Minimum winning coalitions

- The proposer needs q votes. So, the best he can do is to 'buy' $(q-1)$ of the remaining players. He must offer each coalition member exactly δV.

    (Note that the proposer is indifferent about whom to include, so he *can* choose randomly.)

Equilibrium payoffs

- If chosen to propose (probability $\frac{1}{n}$), a player gets $1-(q-1)\delta V$.
- Otherwise (probability $\frac{n-1}{n}$), he gets δV *if he is included in the winning coalition*. (Probability μ_i, as yet unknown.)
- It follows that the *expected utility* for any player is given by

$$V_i = \frac{1}{n}\big(1-(q-1)\delta V\big) + \frac{n-1}{n}\mu_i \delta V$$

- Since $V_i = V$ for all i, it follows that μ_i must be the same for all i.

  (By symmetry, this means that each proposer includes all other players with *equal* probability.)

- Then we must have $\mu_i = \frac{q-1}{n-1}$, and the expected payoff simplifies to

$$V = \frac{1}{n}$$

This makes sense: given that the first proposal will pass, the entire pie will be distributed *somehow*, and then symmetry implies that each player expects exactly $1/n$ of that pie.

Symmetric Stationary Subgame Perfect Equilibrium

- Each player's vote has a 'price' equal to his *continuation value*

$$\delta V = \frac{\delta}{n}$$

- Proposers buy as many votes as are necessary $(q-1)$ and keeps

$$1-(q-1)\frac{\delta}{n} = \frac{\delta}{n} + \left(1 - q\frac{\delta}{n}\right)$$

- The proposer receives a larger payoff than others
    - This 'proposer advantage' is decreasing in δ and q (intuition?)

Example

- $n = 3$ players
- discount factor $\delta = 0.9$

	$q = 2$	$q = 3$
Proposer offers	30% to one	30% to both
Proposer keeps	70%	40%

Model: Open rule, infinite horizon

- Round 1: One legislator is chosen at random to make a proposal.
  - This proposal becomes the ‘motion on the floor’
- Immediately thereafter, *another* member is randomly chosen to EITHER

  (a) call for a vote on the proposal (‘move the previous question’), OR
  (b) make an alternative proposal (‘offer an amendment’).
- If (a), the proposal is immediately voted on as under a closed rule.
  - Pass $\Rightarrow$ game ends, gains are distributed
  - Fail $\Rightarrow$ move to next round, start as above
- If (b), a vote is taken between the proposal and the amendment.
  - The winner becomes ‘motion on the floor’ *in the next round*. (And the first step above is skipped.)
  - Another member can either ‘move the previous question’ or offer another amendment
  - etc.
- Discounting occurs whenever the ‘motion on the floor’ fails OR an amendment is proposed.

Analysis (Intuition)

- Any member not offered a positive share would propose an amendment if recognized.
- Proposers may therefore buy more than a bare majority of votes in order to increase the chance that their proposal will not be amended.

Equilibrium (Open rule, infinite horizon)

- Equilibrium properties depend on parameters δ and n.
- Equilibrium coalitions may be larger than minimum winning.
- The size of the proposed coalitions is
  - weakly decreasing in δ (intuition?)
  - closer to minimum winning for larger n (intuition?)
- The proposer always gets less than under the closed rule.
- Overall, benefits are distributed more equally
- Unless all members are included, delay may occur in equilibrium.

Note: Primo (2006) shows that the open rule equlibria characterized by Baron and Ferejohn are not unique. However none of the predictions highlighted here are affected by his criticism. See additional readings if interested in the details.

Experiments on BF bargaining

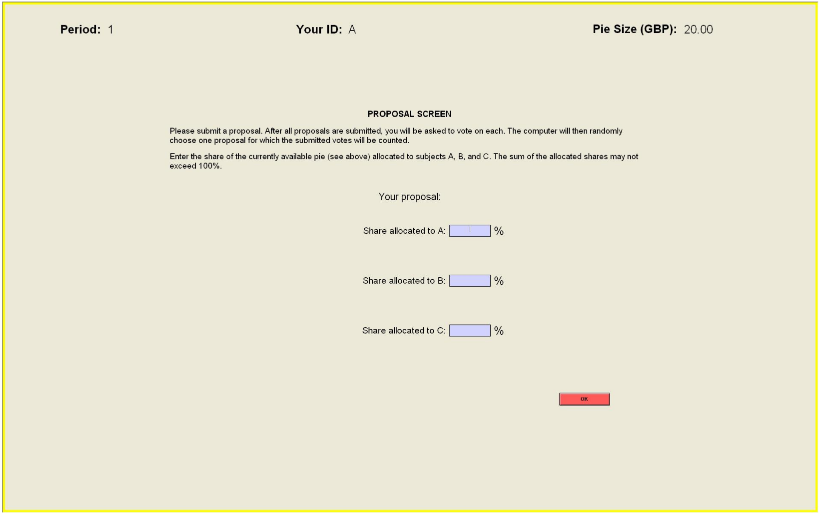
- McKelvey (1991), Frechette et al. (2003, 2005a, 2005b, 2005c), Diermeier and Morton (2005), and many others
- Focus is on **closed rule** and **majority rule** version of the game.
- Authors want to test whether behavior corresponds to predicted equilibrium properties.

Main findings

- (Most) proposers do build minimum winning coalitions.
- Responders are offered larger shares than predicted by theory.
- Equal splits *within coalition* are most common.
- Only a small number of proposals fail.

Miller and Vanberg (2013): Decision Rules in Legislative Bargaining

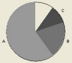
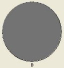
- Computerized laboratory experiments (conducted at Oxford)
- Group size: 3
- Each group divided 20 GBP
- 2 ‘treatments’: Majority vs. Unanimity rule
- 15 periods, one period is paid


Period: 1
Your ID: A
Pie Size (GBP): 20.00
PROPOSAL SCREEN
Please submit a proposal. After all proposals are submitted, you will be asked to vote on each. The computer will then randomly choose one proposal for which the submitted votes will be counted.
Enter the share of the currently available pie (see above) allocated to subjects A, B, and C. The sum of the allocated shares may not exceed 100%.
Your proposal:
Share allocated to A: %
Share allocated to B: %
Share allocated to C: %
OK

Period: 1 **Your ID:** A **Pie Size (GBP):** 20.00

VOTING SCREEN

All subjects have submitted a proposal. Please vote "YES" or "NO" on each proposal. The computer will then randomly choose one for which votes will be counted.

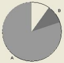
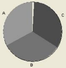
	Share A	Share B	Share C		VOTE
Subject A proposes:	60 %	20 %	10 %		○ NO ○ YES
Subject B proposes:	0 %	100 %	0 %		○ NO ○ YES
Subject C proposes:	30 %	30 %	30 %		○ NO ○ YES

submit

Period: 1 **Your ID:** A **Pie Size (GBP):** 20.00

VOTING HAS ENDED.

The vote count for all proposals is displayed in the table. Information on the proposal chosen to be counted is presented beneath the table. Please click confirm after reviewing this information.

	Share A	Share B	Share C		Vote A	Vote B	Vote C	Result
Subject A proposed	80 %	10 %	0 %		yes	no	no	FAIL
Subject B proposed	33 %	33 %	33 %		yes	yes	yes	PASS
Subject C proposed	30 %	30 %	40 %		no	yes	yes	PASS

The computer has randomly chosen the following proposal to be voted on: **Proposal A**

PROPOSAL FAILED

The pie will now shrink and a new round of bargaining will begin.

Confirm

Benchmark predictions (SSPE with $n = 3$ and $\delta = .9$)

- Minimum winning coalitions
- Proposals

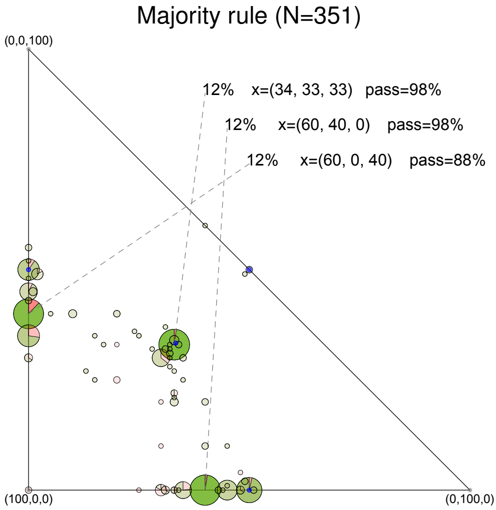
	Demand	Offer
majority rule	$69 - 70\%$	$30 - 31\%$
unanimity rule	$38 - 40\%$	$30 - 31\%$

- Offers above (below) equilibrium offers accepted (rejected)
- First proposal should pass immediately

Our research hypotheses:

- Proposals more often fail under unanimity rule
- Individuals more often vote no under unanimity rule
- These hypotheses were inspired by Buchanan and Tullock (1962)

Results - First round proposals and passage rates



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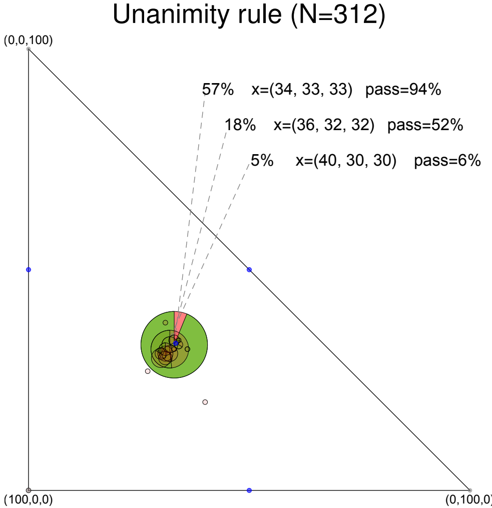
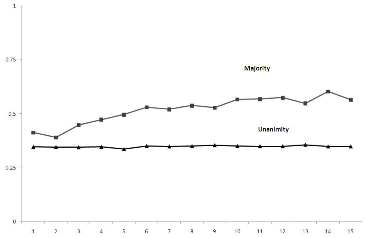
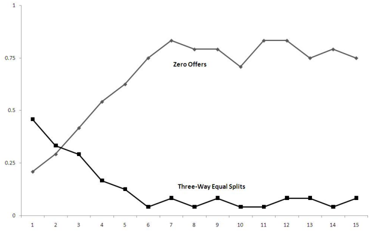


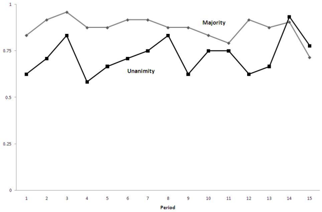
Average proposer share over time



Equal splits vs MWC (majority rule)



Fraction of proposals *passed* (round 1)



Probability of acceptance (individual level, RE Logit)

	$ownshare \leq 31\%$	$ownshare > 31\%$
Unanimity	-1.136	0.177
	(0.492)**	(0.298)
Proposer's share	-4.750	-1.456
	(1.389)***	(0.973)
Own share	8.047	5.587
	(1.312)***	(1.956)***
Period	0.058	0.021
	(0.028)**	(0.016)
Constant	-0.632	-.0171
	(1.782)	(0.739)
Observations	438	948
Number of subjects	48	48

*** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Miller and Vanberg (2014): Group size and decision costs in legislative bargaining

- 2x2 ‘treatments’ varying the decision rule and the group size:

	Small groups (N=3)	Large Groups (N=7)
majority rule		
unanimity rule		

- Per capita stakes constant (≈ 7 GBP per person)
  - 20 GPB for n=3
  - 50 GBP for n=7
- Discount factor: $\delta = .5$
- Otherwise exactly like Experiment 1

Benchmark predictions - proposals

	Small group ($n = 3$)	Large group ($n = 7$)
majority rule	give: 17% to 1 keep: 83%	give: 8% to 3 keep: 76%
unanimity rule	give: 17% to 2 keep: 66%	give: 8% to 6 keep: 52%

Our main hypotheses:

- Larger groups $\Rightarrow$ more proposals fail
- Larger groups $\Rightarrow$ individuals more likely to reject
- Same for unanimity rule vs. majority rule

Rates of passage

	Small group ($n = 3$)	Large group ($n = 7$)
majority rule	88% $[.84, .91]$	75% $[.71, .79]$
unanimity rule	74% $[.69, .79]$	67% $[.62, .71]$

95% confidence intervals in brackets.

- Proposals more often fail in large groups.
- Proposals more often fail under unanimity rule.

What is the underlying mechanism?

- We do *not* see differences in the willingness to vote yes on a given share (normalized by equal split).
- Under all conditions, responders often vote no when the proposer demands more than an equal share for himself.
- *Relative to an equal share*, proposers demand larger shares for themselves in large groups.

Summary (Miller and Vanberg 2013, 2014)

Results at the group level (outcomes)

- Most majority rule games end quickly with formation of a minimum winning coalition.
- Outcomes are more equal under unanimity rule, especially in small groups.
- More delay (proposals fail) under unanimity rule.
- More delay in larger groups.

Results at the individual level (voting decisions)

- More rejection under unanimity rule? (Exp 1: yes, Exp 2: unclear)
- More rejection in large groups? Yes
  - But: not driven by increased rejection *per se*
  - *Proposals* are less egalitarian in larger groups

Implications

- In small groups, unanimity rule may be used to achieve more egalitarian outcomes, at the cost of some delay.
- In larger groups, additional delay may be too costly and majority rule may be preferable.
- Of course, *qualified* (e.g. 2/3) majority rule may offer a good compromise.

Recent research that I am involved in

- *Asymmetric* version of the BF game (Miller et al 2018)
  - Individuals attach (different) values to *disagreement*.
  - Individuals who like disagreement must be paid for their vote.
  - Under unanimity rule, these individuals receive large shares.
  - Under majority rule, they are excluded and receive nothing.
- *Production and Claims* (Merkel and Vanberg 2023)
  - Experimental participants have different *claims* because they have 'produced' the pie.
  - Under unanimity rule, most groups agree on something 'in between' *proportional* and *equal* splits.
  - Under majority rule, results are (surprisingly) similar.
- *Precommitment* (Miettinen and Vanberg 2025)
  - Theoretical model involving attempts to precommit to a bargaining position.
  - Under unanimity rule, players adopt aggressive bargaining positions, leading to delay.
  - Any less-than-unanimity rule eliminates incentives to adopt a tough stance, implying immediate agreement.
- *Private information* (Piazolo and Vanberg, ongoing)
  - Model with heterogeneous disagreement values (like Miller et al)
  - Disagreement values are privately known.
  - Under unanimity rule, players are more "expensive" because voting no *signals* that they are opposed.

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