Paths of Ideological Conflict: Closing the Gap Between Gamson's Law and Theory

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Portfolio Allocation and Gamson's Law

- Literature on government formation typically concentrates on governments in "minority legislatures"
- Central issue: assignment of ministerial portfolios to parties

  cf. [Laver(1998)] and [Laver and Schofield(1998)] for literature review
- Most prominent landmark: Gamson's Law
  $\rightarrow$ portfolio payoffs are proportional to relative seat share *within the coalition* cf. [Gamson(1961)]
- Strong empirical evidence, but poor theoretical foundation and conflict with bargaining theory $\rightarrow$ outside options

  cf. [Browne and Franklin(1973)], [Warwick and Druckman(2006)], [Snyder et al.(2005)Snyder, Ting, and Ansolabehere], [Carroll and Cox(2007)] among others

Political Science, Power Indices and Factual Content

- Economic theory suggests the use of power-indices as the Banzhaf-Power-Index or the Coalitional Bargaining Solution

  cf. [Banzhaf(1952)]/[Coleman(1971)]/[Penrose(1946)] and [Compte and Jehiel(2010)]
- Approaches based on power indices and bargining theory stay behind Gamson's Law w.r.t. explanatory power

  cf. [Linhart et al.(2008)Linhart, Pappi, and Schmitt]
- "[The Power-index approach] should not (even) be considered as part of political science. Viewed as a scientific theory, it is a branch of probability theory and can safely be ignored by political scientists. [...] It has no factual content and can therefore not be used for purposes of prediction or explanation."

  cf. [Albert(2003)]

Example: 2016 State Parliament Election Rhineland-Palatinate

Table : 2016 State Parliament Election Rhineland-Palatinate

party	CDU	SPD	FDP	Grüne	AfD
seats	35%	39%	7%	6%	14%

Table : Ministerial Positions Cabinett Dreyer II

party	SPD	FDP	Grüne
# ministers	5 (56%)	2 (22%)	2 (22%)

Gamson's Law: 75% , 13% , 12% → 7 , 1 , 1

Banzhaf Index: 71% , 14% , 14% → 6-7 , 1 , 1

both ignore ideological closeness/conflict potential

Our Approach: 51-54% , 23-25% , 23-24% → 5 , 2 , 2

Towards Factual Content

- We suggest portfolio allocation due to relative weakness proportionality (cf. interpretation of Coalitional Bargaining Solution)
- In contrast to CBS, we do not derive weakness by unblocked coalitions, but by election specific ideological closeness $\rightarrow$ factual content
- More precisely, we interpret ideological closeness of a coalition as proportional to its materialization probability
- This yields a measure of weakness for non-member parties
- Finally, we suggest portfolio allocation to be proportional to relative weakness

Relative Weakness Proportionality

- Let $N = \{1, \ldots, n\}$ denote the parties in a parliament
- Let $\{\mu_S\}_{S \subseteq N}$ be a measure of coalitional strength which satisfies $\mu_S \in [0, 1]$ for all coalitions $S \subseteq N$ and $\mu_S = 0$ for all non-winning coalitions
- Then, $m_i^\mu = \sum_{S \subseteq N \setminus \{i\}} \mu_S$ denotes a party i's weakness
- We define bargaining power x_i to be proportional to i's relative weakness: for all parties i, j we have

$$x_i = \frac{m_j^\mu}{m_i^\mu} x_j \quad \text{where } \tilde{m}_i^\mu = \begin{cases} 1 + m_i^\mu & \exists \text{ pivotal party} \\ m_i^\mu & \nexists \text{ pivotal party} \end{cases}$$

$\rightarrow$ if i is weaker than j (i.e. $m_i^\mu > m_j^\mu$), we have $x_i < x_j$ the weaker i compared to j, the lower x_i compared to x_j

Relative Weakness Index

- Normalizing bargaining power by $\sum_{i \in N} x_i = 1$ (index on the unit interval) yields

$$x_i = \frac{1}{\tilde{m}_i^{\mu}} \cdot \left(\sum_{l=1}^{|N|} \frac{1}{\tilde{m}_l^{\mu}} \right)^{-1}$$

  by solving the corresponding system of equations
- Portfolio allocation can be calculated by relative bargaining power within the government coalition

How to measure coalitional strength, i.e. $\{\mu_S\}_{S \subseteq N}$?
$\rightarrow$ ideological closeness via VAA data

Factual Content and VAAs

- Voting Advice Applications (VAA) are a commonly used tool in Europe and " slowly but surely are gaining ground in other parts of the world"

  [Garzia and Marschall(2012)], [Marschall and Garzia(2014)],

  [Van Camp et al.(2014)Van Camp, Lefevere, and Walgrave]
- VAAs provides yes/no/neutral positions for the "most important" election statements of potential parliament parties
- We use data from the German "Wahl-o-Mat"
- Equivalent use with "StemWijzer" (Netherlands), "Smartvote" (Switzerland), "Vote Compass" (Canada, USA, Australia, New Zealand), ...

Measuring Consensus via VAA data

- For each statement $s = 1, \ldots, S$, the parties $i = 1, \ldots, N$ self-position by choosing "agree"/"not agree"/"neutral"
- For each two parties i, j and each statement s, we define the consensus value c_{ij}^s according to

	agree	neutral	not agree
agree	2	1	0
neutral	1	2	1
not agree	0	1	2

$$\Rightarrow c_{ij}^s \in \{0, 1, 2\}$$

Bilateral Closeness and Example Revisited

Definition (Bilateral Closeness between parties i and j)

$$bilclos_{ij} := \left(\sum_{s=1}^{S} c_{ij}^{s} \right) \frac{1}{2 \cdot S} \in [0, 1]$$

Table : Closeness Matrix RP 2016

	CDU	SPD	FDP	Grüne
CDU	1	0.645	0.697	0.395
SPD	0.645	1	0.579	0.750
FDP	0.697	0.579	1	0.408
Grüne	0.395	0.750	0.408	1

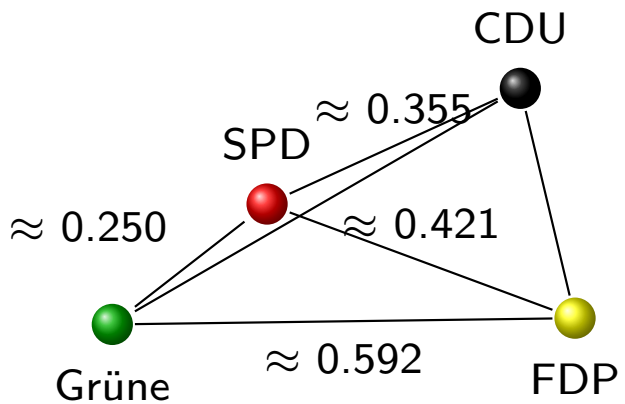
Closeness of SPD and FDP: 57.9%
Closeness of SPD and Green: 75%
Closeness of FDP and Green: 40.8%
$\Rightarrow$ Closeness of Traffic-Light **Coalition?**

Distance Network

Instead of consensus, the statement specific conflict value can be measured by $2 - c_{ij}^s$. This yields distance between each two parties:

$$d_{ij} := \left(\sum_{s=1}^{S} 2 - c_{ij}^s \right) \frac{1}{2 \cdot S} = 1 - bilclos_{ij}$$

Figure : Distance Network RP 2016



Coalitional Closeness: Possible vs Actual Conflict

- Centrality approach: Closeness by inverting the length of paths of least distance (cf. [Freeman(1978)])
- Problems regarding scales, relative differences and since distance $= 1-$ bilclos is cumulated across statements
- We use differences to possible conflict on negotiation paths w.r.t. statement-specific consensus/conflict

Possible vs. Actual Conflict

We interpret closeness as the difference between possible and actual conflict on a conflict path.

Coalitional Closeness: Sequential Negotiation on Paths

- Let $K \subseteq N$ be a coalition of parties
- Let $p^K := \{ij | i, j \in K, i \neq j\}$ be the link set of the complete graph with node-set K
  $\rightarrow$ set of all (bilateral) negotiation possibilities within K

1. Average conflict across complete negotiation graph
   $\rightarrow$ concides with average closeness of coalition
2. Overall conflict across complete negotiation graph
   $\rightarrow$ conflict potential of coalition
3. Least possible conflict across connecting negotiation path
   $\rightarrow$ path of least conflict in coalition

Possible vs. Actual Conflict: Average Conflict

Definition (Average Conflict)

Average conflict closeness of K is given by

$$\text{AVCclos}_K := \sum_{s=1}^{S} \left(2 - \sum_{\substack{i,j \in K: \\ i \neq j}} (2 - c_{ij}^s) \binom{|K|}{2}^{-1} \right) (2S)^{-1}$$

where we normalize by maximal average conflict across statements (index on unit interval).

Lemma: we have $\text{AVCclos}_K = \sum_{\substack{i,j \in K: \\ i \neq j}} \text{bilclos}_{ij} \binom{|K|}{2}^{-1}$.

Possible vs. Actual Conflict: Conflict Potential

Theorem: For each statement $s = 1, \ldots, S$, the maximal overall conflict within $K \subseteq N$ is $\left\lfloor \frac{|K|^2}{2} \right\rfloor$.

Definition (Conflict Potential Closeness)

Conflict Potential closeness of K is given by

$$\text{CPclos}_K := \sum_{s=1}^{S} \left(\left\lfloor \frac{|K|^2}{2} \right\rfloor - \sum_{\substack{i,j \in K \\ i \neq j}} \left(2 - c_{ij}^s\right) \right) \left(\left\lfloor \frac{|K|^2}{2} \right\rfloor \cdot S \right)^{-1}$$

where we normalize by the maximal conflict value across statements to obtain an index on a normalized scale.

Possible vs. Actual Conflict: Path of Least Conflict

Interpret coalitional negotiation as a *minimal* sequential process of bilateral negotiations. The conflict value on a path of least conflict (PLC) w.r.t. statement s is given by

$$plc_K^s := \min \left\{ \sum_{ij \in p} (2 - c_{ij}^s) | p \text{ connects } K \right\}$$

Definition (Path of Least Conflict Closeness)

Path of Least Conflict closeness of K is given by

$$\text{PLCclos}_K := \sum_{s=1}^{S} \left(2\left(|K| - 1\right) - \text{plc}_K^s\right)\left(2\left(|K| - 1\right) \cdot S\right)^{-1}$$

where we normalize by the maximal **bilateral** conflict on a minimal connecting path across statements.

Comparison of Closeness Measures

Table : Coalitional Closeness RP 2016 (normalized to 100 %)

Coalition	CDU & SPD	SPD, FDP & Grüne
AVC-Closeness	64.47	57.89
CP-Closeness	64.47	36.84
PLC-Closeness	64.47	68.42

Party 1	Party 2	Party 3	CP	AVC	PLC	SMC
agree	agree	agree	2	2	2	2
agree	agree	neutral	1	1.33	1.5	1
agree	agree	not agree	0	0.67	1	0
agree	neutral	not agree	0	0.67	1	0.5

CP rules out certain consensus in a group of 3 parties: at least 2 parties have equal or not strongly opposite positions!

Application: Parliament Elections Germany

- Always adjust for incompatibilities!
- Analysis on ministerial positions (w/o prime minister)
- 31 Parliament Elections, comparison to Gamson's Law
  - Baden-Wuerttemberg 06 ✓, 11 ✓, 16 ✓
  - Bavaria 18 ✓
  - Berlin 06 ✓, 11 ✓, 16 ✓
  - Bremen 07 ✓, 11 ✓, 15 ✓
  - Federal Parliament 05 ✓, 09 ✓, 13 ✓, 17 ✓
  - Hamburg 08 ✓, 15 ✓
  - Lower Saxony 08 ✓, 13 ✓
  - North-Rhine-Westphalia 05 ✓, 10 ✓, 12 ✓, 17 ✓
  - Rhineland-Palatinate 12 ✓, 16 ✓
  - Saarland 12 ↯, 17 ✓
  - Schleswig-Holstein 12 ✓, 17 ✓
  - Saxony 14 ✓
  - Saxony-Anhalt 16 ↯
  - Thuringia ✓
- ✓: confirm (20), ✓: not confirm but better (9)
- confirmation rate for Gamson's Law:
  91% (20 out of 31-9=22) / 93.5% (20+9=29/31)

Application: Parliament Elections Germany

Table : Proxy-Performance for Portfolio Allocation

	Correct Proxy	Best Proxy	Gamson's Law
Gamson	18	20	
Banzhaf	4	7	8
NoWeight	4	8	9
AVCclos	15	18	14 (22)
CPclos	19	21	15 (23)
PLCclos	16	20	12 (22)
Merged	25	29	20 (29)

Conclusion

- We suggest portfolio allocation due to relative weakness proportionality: Closeness interpreted as materialization probability $\rightarrow$ weakness for non-member parties
- Ideological closeness is derived by conflict path analysis / consensus and conflict from VAA data
- Analysis of 31 elections in Germany $\rightarrow$ 91% / 93.5% confirmation rate
- Further research
  - More data (“StemWijzer”/“Smartvote”/“Vote Compass”)
  - Hybrid between CP and PLC $\rightarrow$ SMC
  - Centrality/Distance analysis

Thank you for your attention

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