



Voting patterns in the Swiss National Council

Through a network analysis



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Agenda



Datasets



Spectral analysis
Over time



Modularity
Loyalty



Conclusion

Datasets

Publicly available: <http://www.votes.ch>

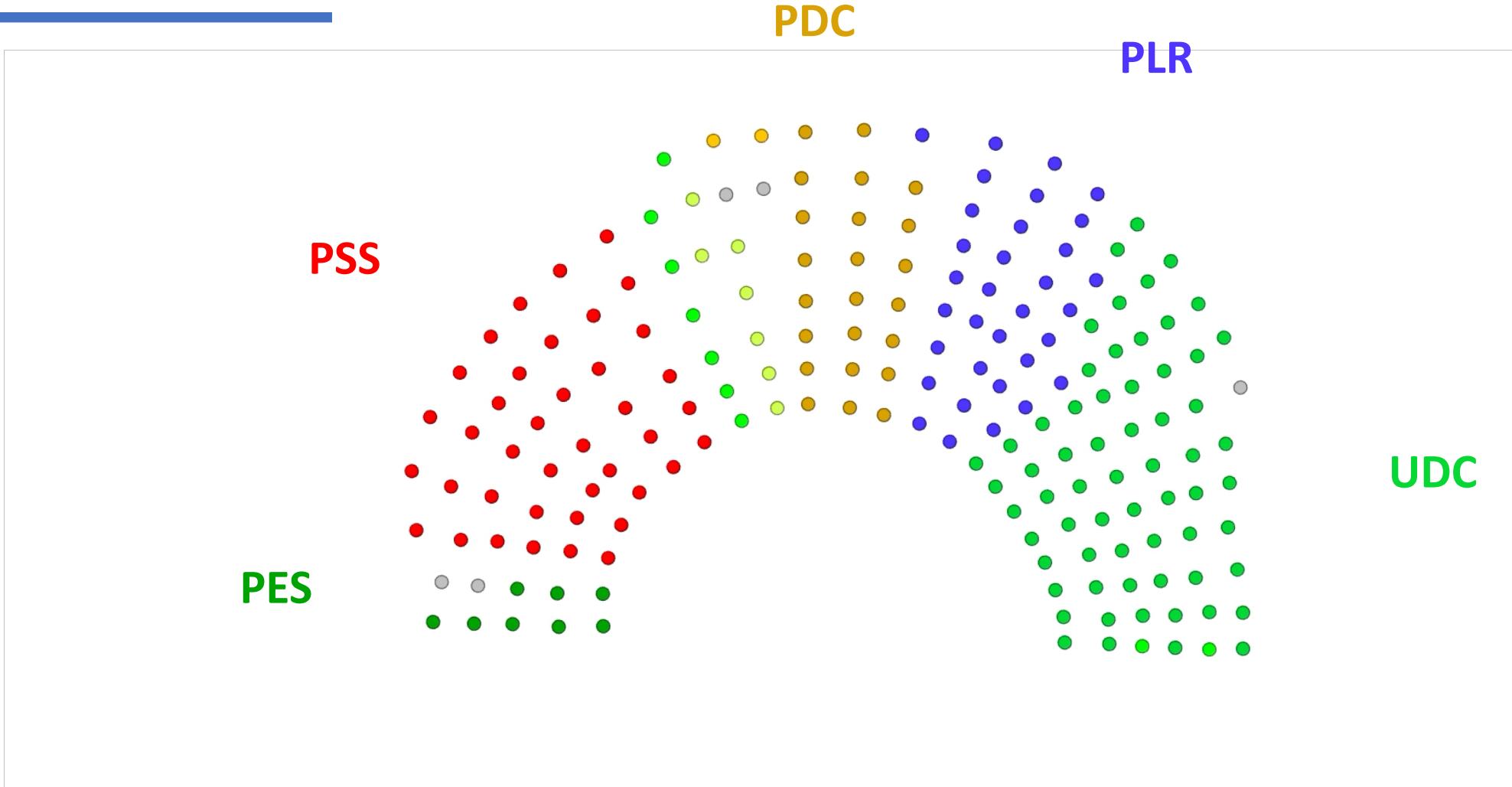
AffairTitle	CouncillorName	Yes	No	Abstain	Not participated	Excused	ge
Asylrecht für Eritreer!	Thorens Goumaz Adèle	1	1	0	0	0	0 0.5
Asylrecht für Eritreer!	Marra Ada	0.0	0.5	0	1	0	0 0
Asylrecht für Eritreer!	Glauser-Zufferey Alice	0	0	1	0	0	0 1

Yes => 1

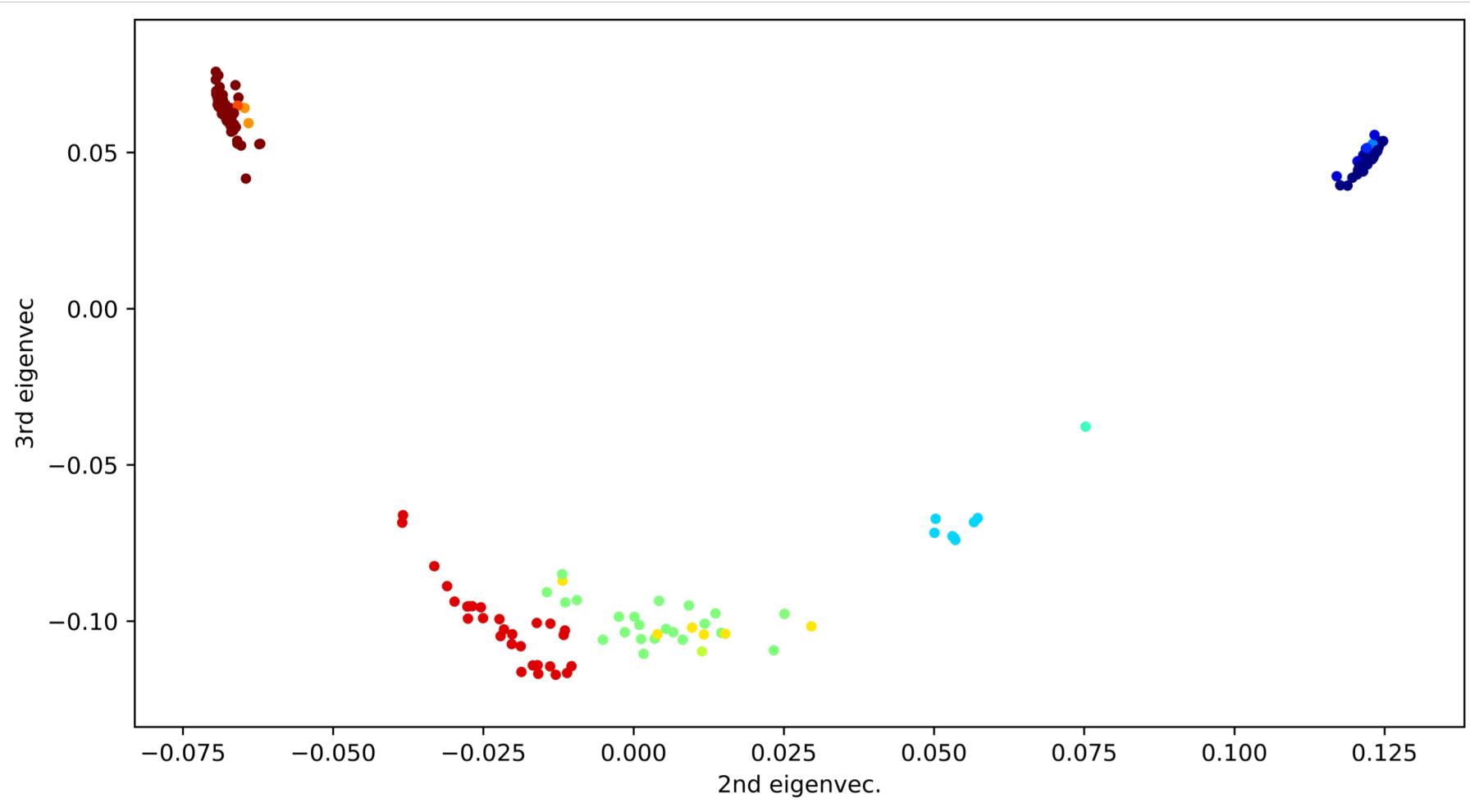
No => 0

Abstain, Excused and Not participated => 0.5

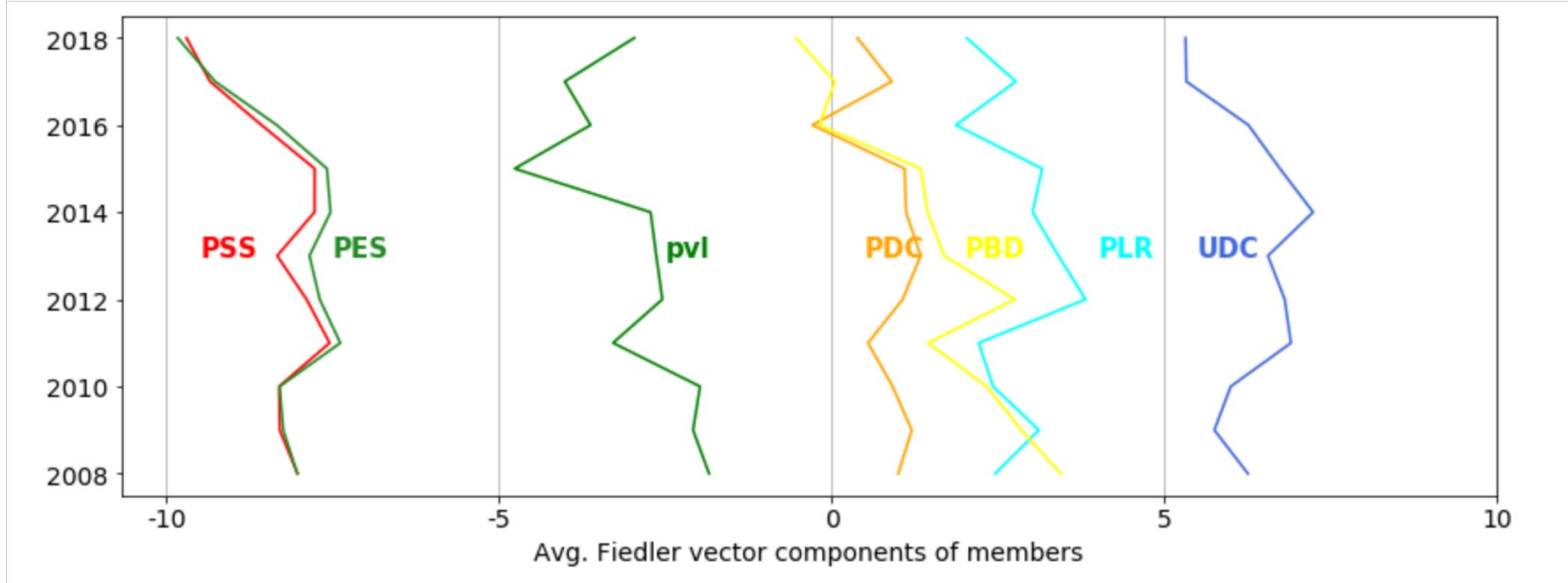
Network construction



Spectral analysis (Laplacian eigenmap)



Spectral analysis



The **smaller and younger parties** pvl and PBD have undergone substantial changes in their positioning

Referendum campaigns seem very polarized – but what about the parliament?



Right-wing referendum campaign



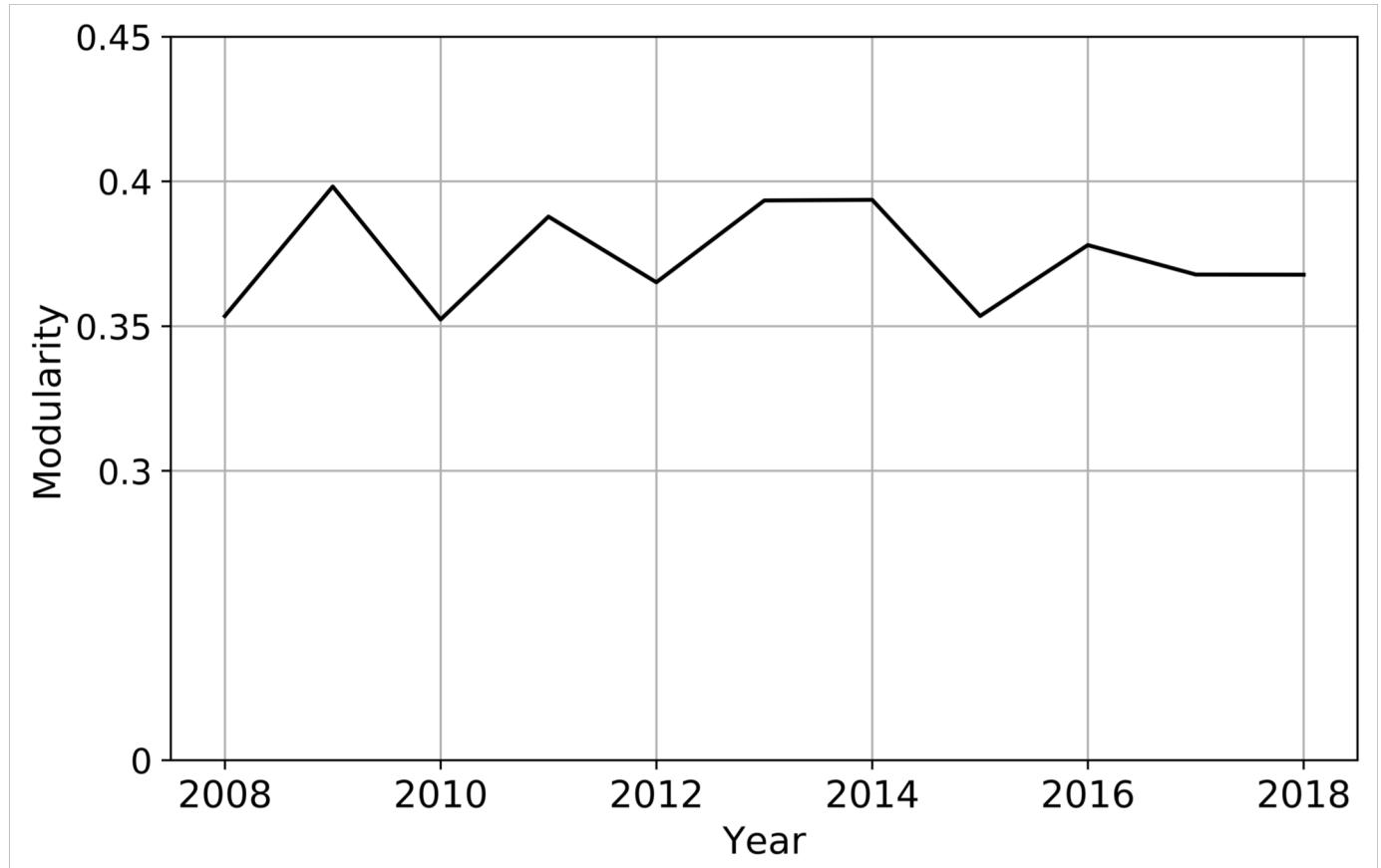
Left-wing referendum campaign

How polarized is the Swiss National Council?

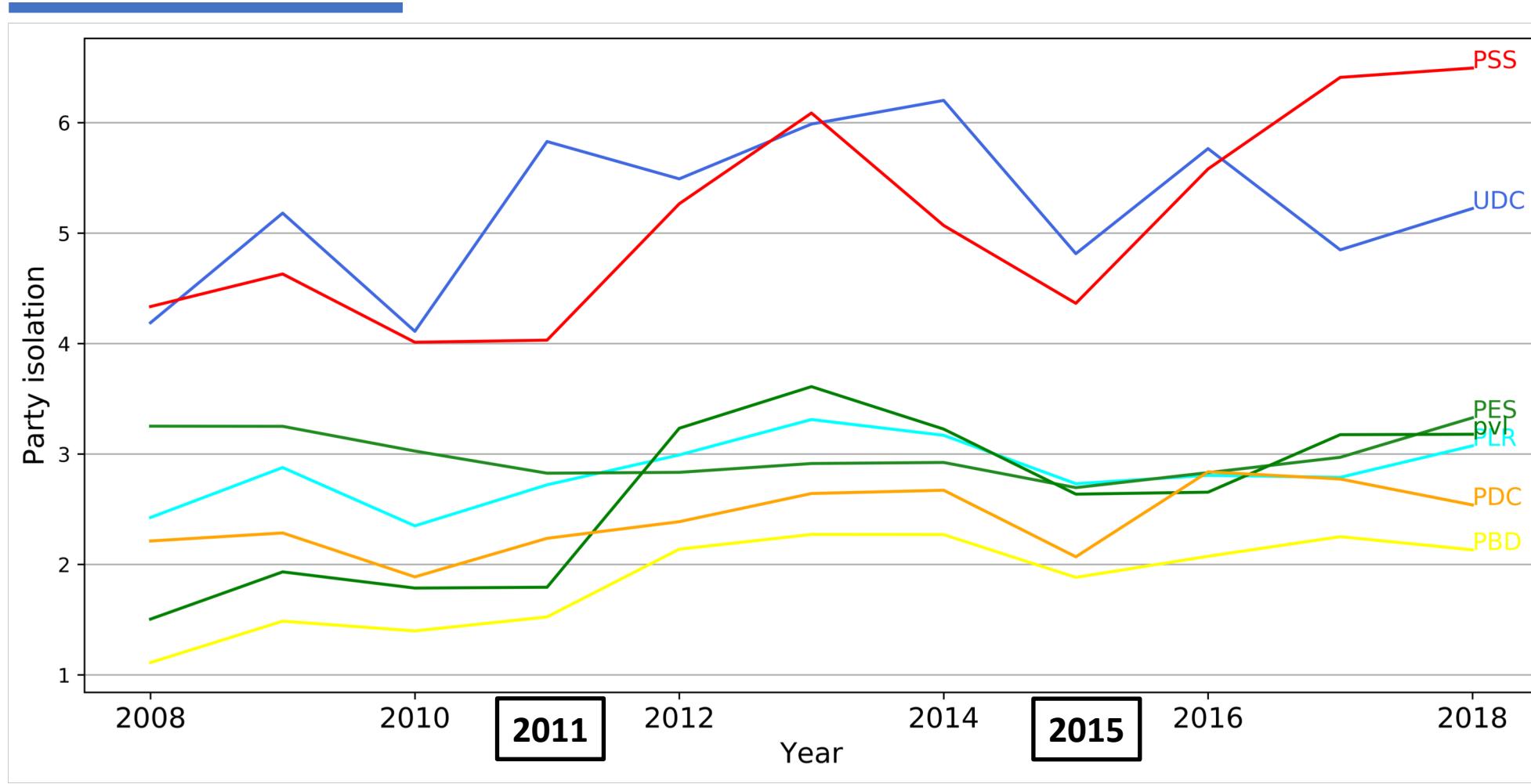
Modularity:

A measure of the density of links inside a community compared to links between communities [1][2].
Python implementation: [3]

A **highly polarized** national council would result in a **high overall modularity**

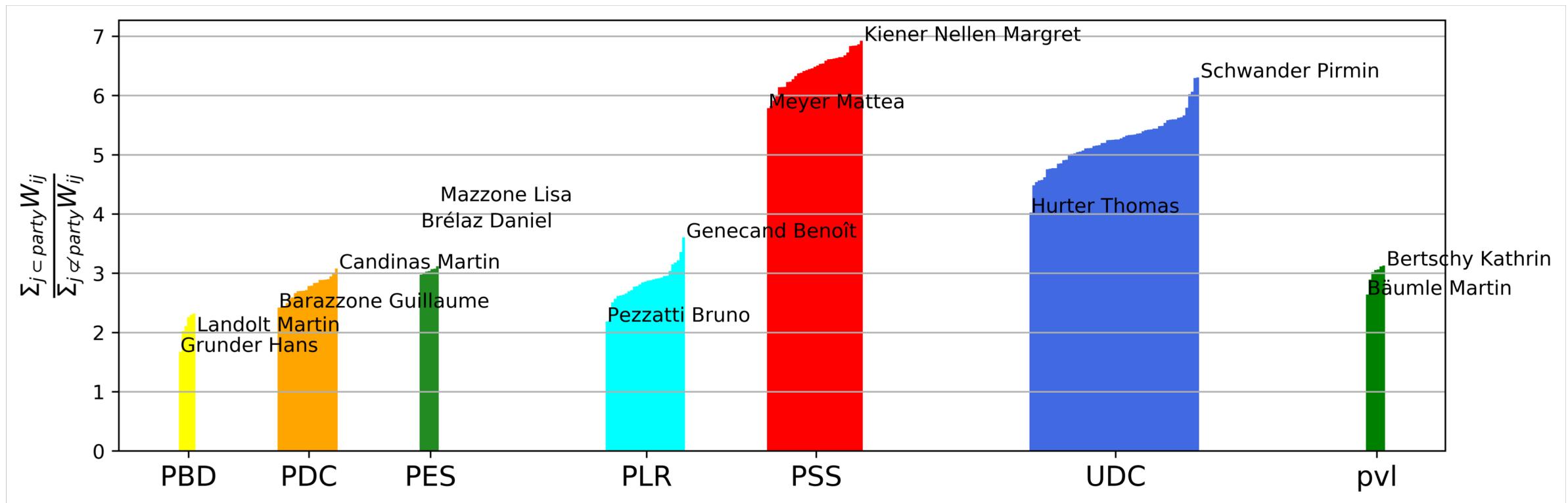


When do the parties isolate themselves?



Who is the most loyal to his party?

Ratio of the average edge weight to party colleagues
compared to the average edge weight to others



Who are the dealmakers?

Closeness centrality: Average length of shortest path to all other nodes [4]

Betweenness centrality: Fraction of all shortest paths between two other nodes passing through that particular node [5]

Name	Political Party	Closeness centrality
Pezzatti Bruno	PLR	0.644444
Müller Walter	PLR	0.639706
Burkart Thierry	PDC	0.625899
Bourgeois Jacques	PLR	0.617021
Regazzi Fabio	PDC	0.617021
Béglé Claude	PDC	0.614841
Landolt Martin	PBD	0.614841
Hess Lorenz	PBD	0.614841
Vogler Karl	csp-ow	0.614841
Riklin Kathy	PDC	0.614841

Name	Political Party	Betweenness centrality
Bäumle Martin	pvl	0.111102
Pezzatti Bruno	PLR	0.088842
Müller Walter	PLR	0.082346
Streiff-Feller Marianne	PEV	0.077262
Burkart Thierry	PLR	0.067171
Gössi Petra	PLR	0.060484
Vitali Albert	PLR	0.045592
Grossen Jürg	pvl	0.037017
Moser Tiana Angelina	pvl	0.034174
Flach Beat	pvl	0.029482



PLR
Les Libéraux-Radicaux



PLR
Les Libéraux-Radicaux

Conclusion

- **Smaller and younger** parties have undergone **substantial changes** in their positioning
- **Relative difference** between the left- and right-wing poles **has not increased** significantly
- Stable values of modularity indicate **stable inter-party collaboration** and low political polarization
- Liberal Party as well as the Green-liberal Party are the **main dealmaker parties**
- The highest values of **party isolation** were observed in the year following the general elections

References

Data: <https://www.parlament.ch/de/ratsbetrieb/abstimmungen/abstimmungs-datenbank-nr>

Modularity as a measure of polarization:

- [1] J. MOODY and P. J. MUCHA, “Portrait of political party polarization,” *Network Science*, vol. 1, no. 01, pp. 119–121, apr 2013

Louvain method for modularity calculation:

- [2] V. D. Blondel, J.-L. Guillaume, R. Lambiotte, and E. Lefebvre, “Fast unfolding of communities in large networks,” *Journal of Statistical Mechanics: Theory and Experiment*, vol. 2008, no. 10, p. P10008, oct 2008.
- [3] “A python implementation of the Louvain method to find communities in large networks.” <https://github.com/patapizza/pylouvain>

Closeness and betweenness centrality:

- [4] L. C. Freeman, “Centrality in social networks conceptual clarification,” *Social Networks*, vol. 1, no. 3, pp. 215–239, jan 1978
- [5] U. Brandes, “A faster algorithm for betweenness centrality,” *The Journal of Mathematical Sociology*, vol. 25, no. 2, pp. 163–177, jun 2001.

Questions?

