KOALA: Estimating coalition probabilities in multi-party electoral systems

Alexander Bauer[1], Andreas Bender[1], André Klima[1], Helmut Küchenhoff[1]

[1] *Statistical Consulting Unit StaBLab, Department of Statistics, LMU Munich, Germany*

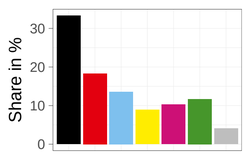
Alexander.Bauer@stat.uni-muenchen.de

Motivation

Election poll-based reporting

What's the status quo?

Typical election poll reporting:



- ...is based on observed mean voter shares
- ...sets the focus on individual party achievements
- ...imparts sample uncertainty only insufficiently

Example

Reporting on Union and FDP to jointly obtain a majority before the German federal election 2013

Last pre-election opinion poll: Source: Forsa, 20.09.2013

Union	SPD	Greens	FDP	The Left	AfD	Others
40%	26%	10%	5%	9%	4%	6%

After redistribution of party votes <5%
(i.e. the minimum hurdle to pass into German parliament)
Union-FDP jointly obtain exactly 50%.

Media headline:

"Union-FDP loses its majority"

Source: FAZ.net (2017). Umfrage zur Bundestagswahl: Schwarz-Gelb verliert die Mehrheit.http://archive.is/SuXVt. Accessed 26 April 2018.

What do we propose?

Good reporting should:

- ...impart findings in an easily graspable way
- ...prevent potential misunderstandings
- ...focus on the most relevant topics

We aim at **shifting the focus** from

Incomprehensive observed party shares to Uncertainty-based event probabilities

Flaws of this type of reporting:

- Misleading conclusions are drawn
  A mean share of 50% only means that it's slightly more probable that a majority is missed
- Sample uncertainty is ignored
  E.g., with a mean voter share of 5%, FDP will only enter the parliament with ∼50%
- Redistribution of votes is ignored
  FAZ.net bases the conclusion on the observed voter share and not on the redistributed 50% share

Foundations of KOALA-based reporting:

- Use event **probabilities** instead of voter shares
  Probabilities comprise sample uncertainty in a natural way and are less at risk to be misinterpreted
- Use **event** probabilities instead of voter shares
  Focusing on the main events allows the reader to easily grasp the big picture

KOALA headline:

"Union-FDP gains seat majority with 26%, FDP passes into parliament with 51%"*

* If the election was held today

① Probability estimation

text

② Visualization

text

③ Implementation

KOALA

Results for selected elections are presented on koala.stat.uni-muenchen.de

The implementation is based on several points:

- Our approach is implemented in the R package coalitions
- The website is shiny-based
- The website update approach is automated
- Automatic tweets are sent in the case of new results
- For sharing our results we automatically export them to Google Sheets

④ Results communication

text

References

Bender, A. and Bauer, A. (2018). coalitions: Coalition probabilities in multi-party democracies. *Journal of Open Source Software*, **3(23)**, 606, https://doi.org/10.21105/joss.00606.

Gelman, A. et al. (2013). *Bayesian Data Analysis, 3rd edition*. Boca Raton, FL: CRC press.