Forecasting Elections in Multi-party elections: A backwards random-walk approach

Lukas Stoetzer | Universität Zürich
Simon Munzert | Humboldt-Universität zu Berlin
Thomas Gschwend | Universität Mannheim
Marcel Neunhoeffer | Universität Mannheim
Sebastian Sternberg | Universität Mannheim

Contribution

Contribution

1. **A dynamic Bayesian forecasting model** combining pre-election polls with a fundamentals-based forecasting model.

Contribution

1. **A dynamic Bayesian forecasting model** combining pre-election polls with a fundamentals-based forecasting model.

2. Extend a "backwards-random-walk" modelling strategy (Linzer 2013) to a **multi-party context**

Contribution

1. **A dynamic Bayesian forecasting model** combining pre-election polls with a fundamentals-based forecasting model.

2. Extend a "backwards-random-walk" modelling strategy (Linzer 2013) to a **multi-party context**

3. Model permits to **simulate interesting probabilities**: probability of coalition majorities, passing the electoral threshold, vote gains

Contribution

1. **A dynamic Bayesian forecasting model** combining pre-election polls with a fundamentals-based forecasting model.

2. Extend a "backwards-random-walk" modelling strategy (Linzer 2013) to a **multi-party context**

3. Model permits to **simulate interesting probabilities**: probability of coalition majorities, passing the electoral threshold, vote gains

4. Application to **German Federal Election of 2017**

Contribution

1. **A dynamic Bayesian forecasting model** combining pre-election polls with a fundamentals-based forecasting model.

2. Extend a "backwards-random-walk" modelling strategy (Linzer 2013) to a **multi-party context**

3. Model permits to **simulate interesting probabilities**: probability of coalition majorities, passing the electoral threshold, vote gains

4. Application to **German Federal Election of 2017**

5. Communicate results to **general public** using almost daily updated forecasts:

The Model

The Model

Fundamentals-based forecasting

Elections should not be considered in a vacuum.

- Relationship between electoral results and fundamentals in past elections. E.g. Germany:
    - Previous election result
    - Average support in pre-election polls 200-230 days before the election
    - Chancellor-party

- Effect of predictors allowed to vary over elections

- Accurate forecast months before the election

The Model

Fundamentals-based forecasting

Elections should not be considered in a vacuum.

- Relationship between electoral results and fundamentals in past elections. E.g. Germany:
    - Previous election result
    - Average support in pre-election polls 200-230 days before the election
    - Chancellor-party
- Effect of predictors allowed to vary over elections
- Accurate forecast months before the election

Dynamic component

Pre-election polls provide reliable information prior to the election.

- ↔ Survey-disaster in recent years
- Increasing popularity of "pooling the polls"models in the literature (Jackmann 2005, Walther 2015)
- Compromise between fundamentals-based forecast and information from a dynamic poll-model

A dynamic Bayesian forecasting model

– Multinomial Sampling Model with house-effects

$$y_{tc} \sim Multinomial(\alpha_t^* + \delta_c^*, N_{ct}).$$

– Log-ratio transformation

$$\alpha_t = \left(log(\frac{\alpha_{t1}^*}{\alpha_{tP}^*}), \ldots, log(\frac{\alpha_{t(P-1)}^*}{\alpha_{tP}^*}) \right)$$

– Backwards random walk

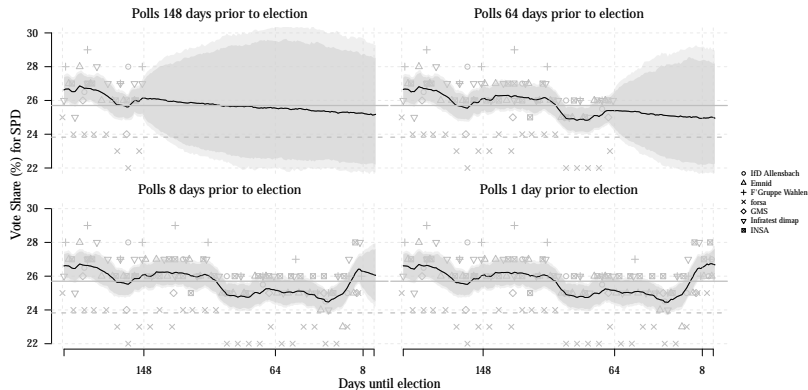$$\alpha_t = \alpha_{t+1} + \omega_t, \quad \omega_t \sim N(0, W)$$

– Prior on Election-Day = fundamentals-forecast

$$\alpha_{Tp}^* \sim Beta(a_p, b_p)$$

Application: German Federal Elections

Application: German Federal Elections
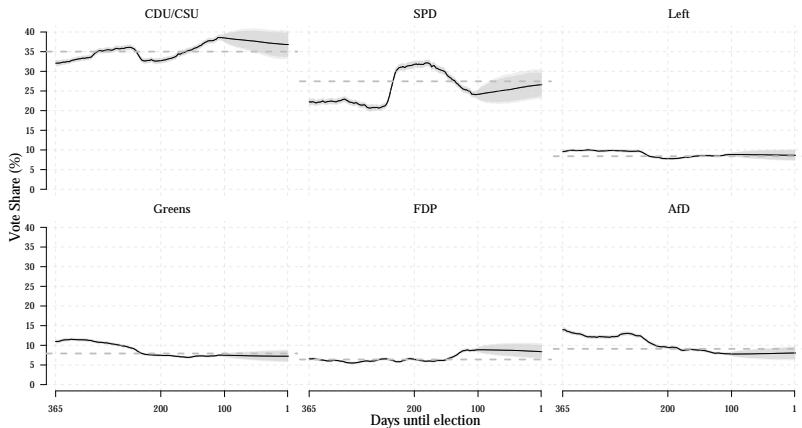
Example: Dynamic Forecast for SPD-Vote Share, 2013

Application: German Federal Elections

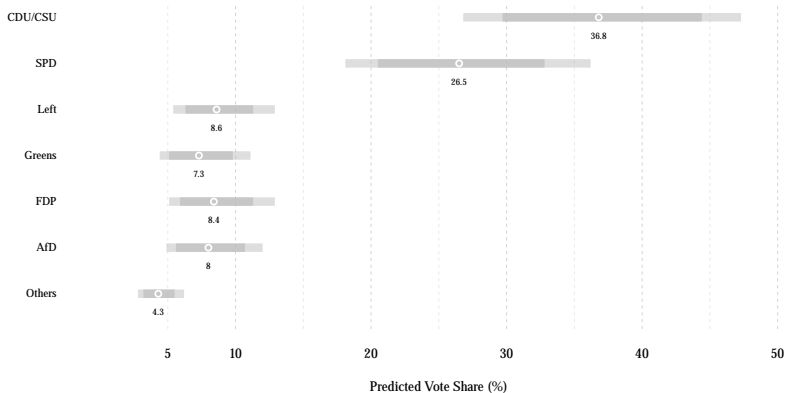| Model	RMSE				
	2002-13	2002	2005	2009	2013
Pure Fundamentals-Based	2.54	1.87	2.32	1.91	3.47
Dynamic. 1 day prior to election	1.98	1.23	3.24	1.38	1.33
Dynamic. 8 days prior to election	1.83	1.08	2.86	1.06	1.69
Dynamic. 36 days prior to election	2.27	1.96	2.80	1.64	2.65
Dynamic. 64 days prior to election	2.22	1.56	2.81	1.48	2.67
Dynamic. 92 days prior to election	2.54	2.06	2.92	1.78	3.14
Dynamic. 120 days prior to election	2.80	2.60	3.27	2.18	3.02
Dynamic. 148 days prior to election	2.59	2.18	3.03	1.88	3.05

Forecast German Federal Elections of 2017

Forecast 101 days prior to the election

Forecast German Federal Elections of 2017

Forecast 101 days prior to the election

Forecast German Federal Elections of 2017

Event	Prob. (in %)	
Coalition CDU/CSU + SPD	100	●
Biggest Party CDU/CSU	88	◗
Six factions in the Bundestag	87	◗
Coalition CDU/CSU + A'90/The Greens + FDP	77	◗
Gain in Vote Share SPD (>25.7%)	56	◗
Coalition CDU/CSU + FDP	30	◗
Coalition SPD + A'90/The Greens + Left	13	◗
A'90/The Greens *below 5% threshold*	7	◗
FDP *below 5% threshold*	2	

Updated forecasts and further information: