Predictors of AfD party success in the 2017 elections

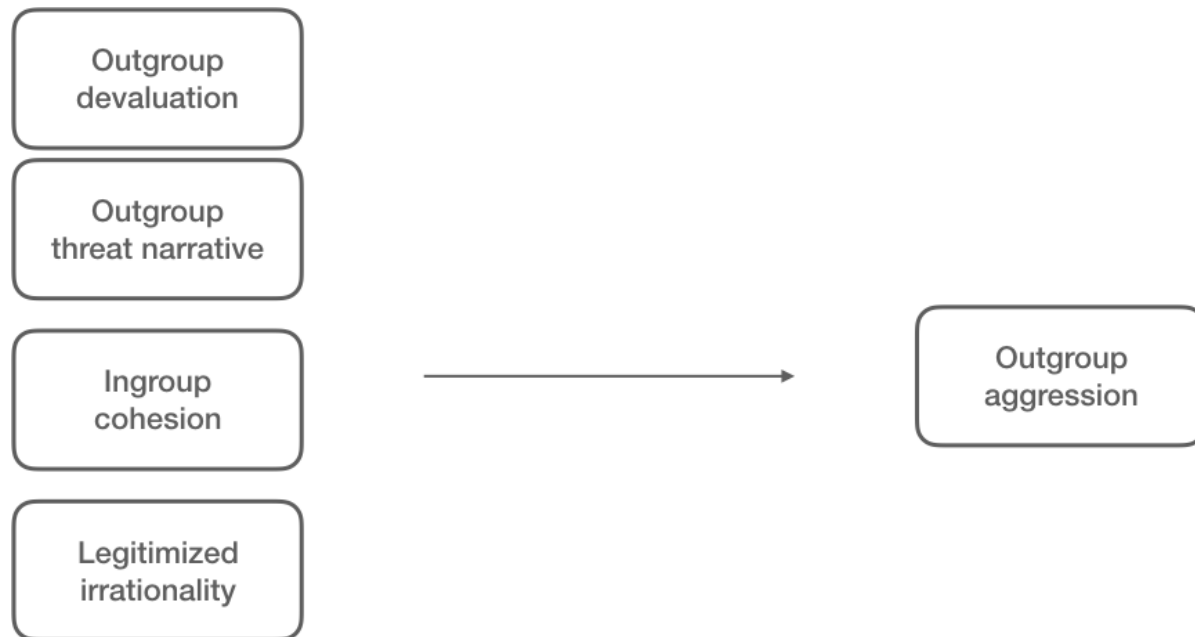## A Bayesian modeling approach

Sebastian Sauer, Oliver Gansser

FOM
ECDA 2019

Menace to society

Right-wing populism then and now
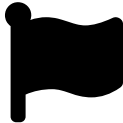
A model of *rough populism*

Cf. Kershaw, I. (2016). To hell and back: Europe 1914-1949. New York City, NW: Penguin.
Welzer, H. (2007). Täter. Wie aus ganz normalen Menschen Massenmörder werden.
Frankfurt: Fischer.

AfD as a nucleus of the German right-wing movement?

Popular theories on AfD success

- 🏭 weak economy ("rust belt hypothesis")

- 🚶 high immigration ("flooding hypothesis")
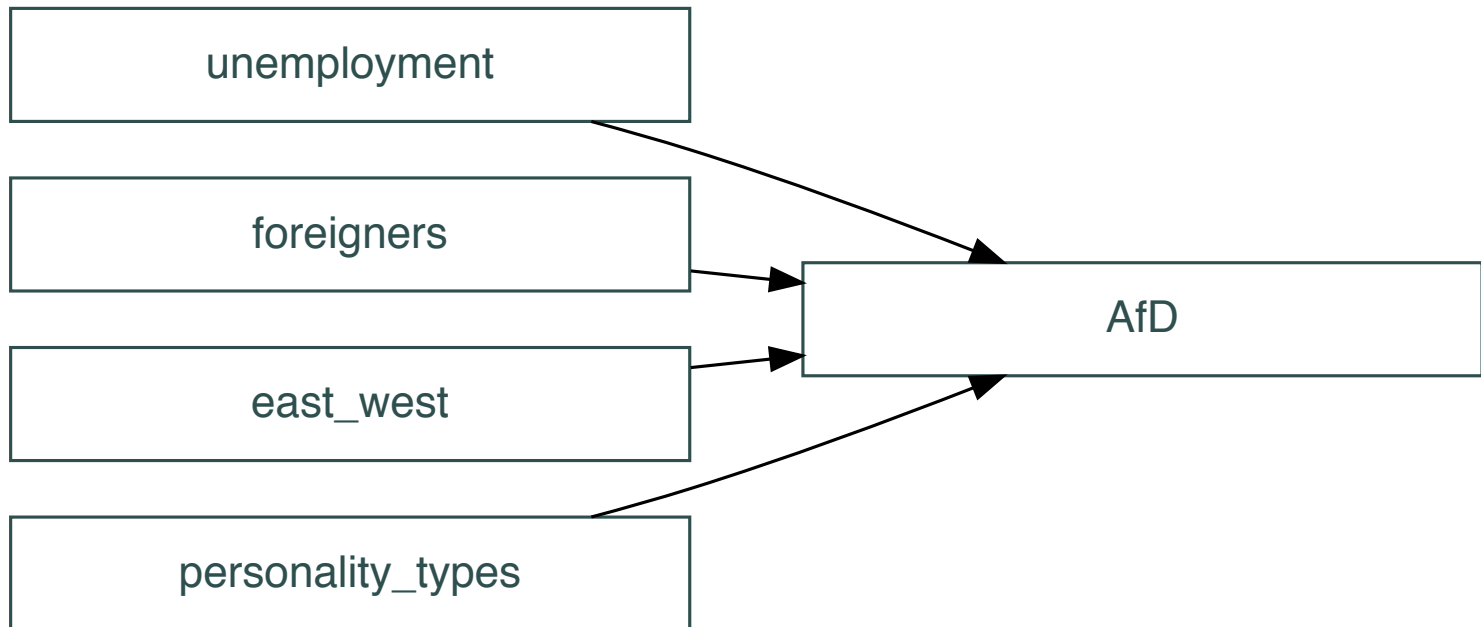
- 🚩 cultural patterns ("Saxonia hypothesis")

Source: Franz, Christian; Fratzscher, Marcel; Kritikos, Alexander S. (2018) : German right-wing party AfD finds more support in rural areas with aging populations, DIW Weekly Report, ISSN 2568-7697, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin, Vol. 8, Iss. 7/8, pp. 69-79

Behavior types model *CHOUGHS*

- Seven behavior types according to CHOUGHS model

    - C onformism
    - H edonism
    - O ut of responsibility
    - U nderstand
    - G ourmets
    - H armony
    - S elf-determined

- based on approx. 100k face-to-face interviews (stratified by sex and age)

- Multidimensional scaling was used to devise types
- CHOUGHS builts on Schwartz' values model
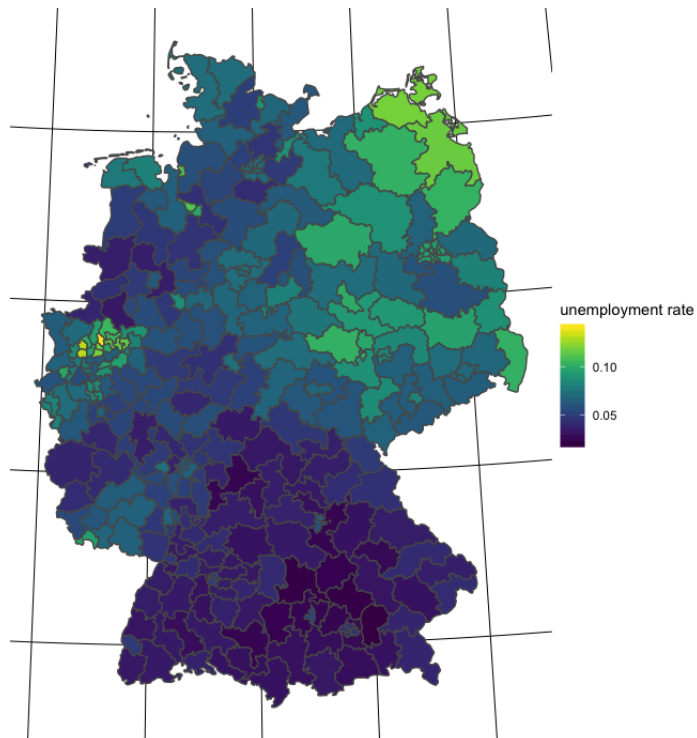
Source: Gansser, O., & Lübke, K. (2018). *The development of new typologies of behaviour based on universal human values and purchasing behavior*, in: Archives of Data Science, Series B, in submission. Gebauer, H., Haldimann, M., & Saul, C.J. (2017). Service innovations breaking institutionalized rules of health care. *Journal of Service Management*, 28(5), 972-935.
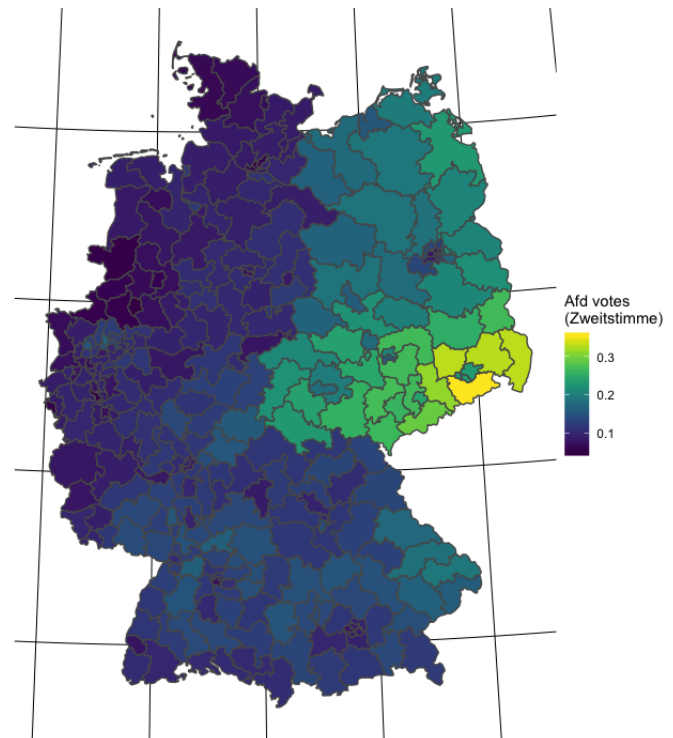
Our research model

AfD votes, and socioenomic factors at the Bundestagswahl 2017
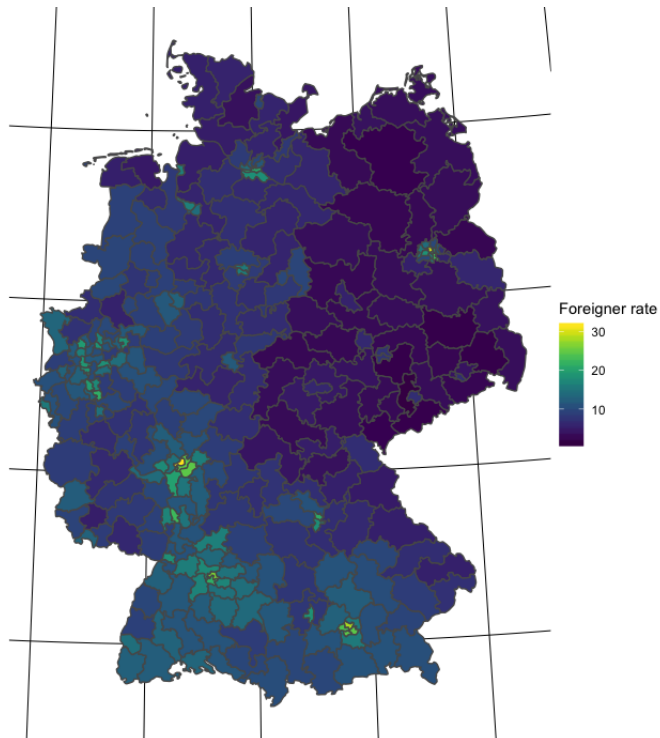
Unemployment and AfD votes

Data provided by the Bundeswahlleiter 2017

Foreigners and AfD votes

Data provided by the Bundeswahlleiter 2017

Data provided by the Bundeswahlleiter 2017

data analysis

Data preparation

- Election related data were obtained from Bundeswahlleiter 2017

- Behavior types data (n = 12444) were collected by the authors ´

- Data and analysis are accessible at Github:
  https://github.com/sebastiansauer/afd_values

- Outcome variable: proportion of votes for AfD was log-transformed for better approximation to normality

Skewness: 1.62; Kurtosis: 5.74   Skewness: 0.57; Kurtosis: 3.22

Bayes modeling

- Stan via the R package `rethinking`

- Hamiltonian Markov Chain Monte Carlo (MCMC)

- 2000 iterations, 2 chains, 1/2 warmup

- Multi level regression modeling (varying intercepts)

- The WAIC was used for to compare model performance:

  - is an estimate for *out-of-sample* model performance
  - based on information theory
  - WAIC is similar to the AIC but less restrictive

Cf. McElreath, R. (2016). Statistical rethinking. New York City, NY: Apple Academic Press Inc.

Model specification

$a \sim \mathcal{N}(\mu, \sigma)$

$\mu = \beta_0 e + \beta_1 f + \beta_2 u + \beta_3 t_1 + \beta_4 t_2 \cdots \beta_{10} t_8$

$\sigma \sim \mathcal{Cauchy}(0, 1)$

$f, u, t_1, t_2 \cdots t_8 \sim \mathcal{N}(1, 0)$

$e \sim \mathcal{N}(0, \sigma_2)$

$\sigma_2 \sim \mathcal{Cauchy}(0, 1)$

Model specification in R

```
# Likelihood:
afd_prop_log ~ dnorm(mu, sigma),

d$

# regression:
mu <- beta0[state_id] + beta1*for_prop_z     + beta2*unemp_prop_z +
  beta3*enjoyer        + beta4*harmony_seeker + beta5*self_determined
  beta6*appreciater    + beta7*conformist     + beta8*type_unknown +
  beta9*responsibility_denier + beta10*hedonist,

# priors:
sigma  ~ dcauchy(0, 1),
beta1  ~ dnorm(0, 1), beta2 ~ dnorm(0, 1), beta3 ~ dnorm(0, 1),
beta4  ~ dnorm(0, 1), beta5 ~ dnorm(0, 1), beta6 ~ dnorm(0, 1),
beta7  ~ dnorm(0, 1), beta8 ~ dnorm(0, 1), beta9 ~ dnorm(0, 1),
beta10 ~ dnorm(0, 1),
beta0[state_id] ~ dnorm(0, sigma2),  # multi level
sigma2 ~ dcauchy(0, 1)
```
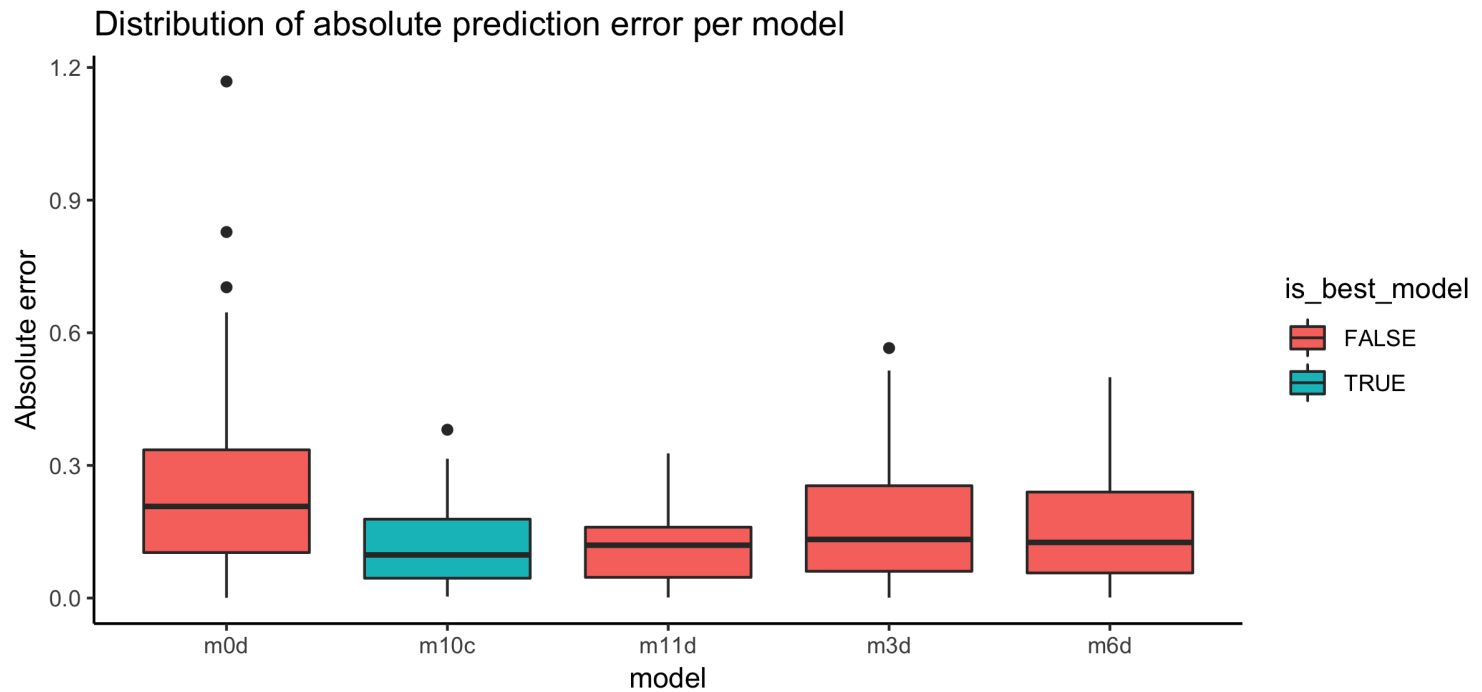
Results: Model comparison

State is the strongest predictor

name	predictors	type	WAIC	SE	weight
m10c	**unemp, foreign, state**	**Gaussian**	**-50.97**	**10.74**	**1**
m11d	unemp, foreign, state, 8 consumer types	Gaussian	-39.02	10.31	0
m06d	unemp, foreign, east, 8 consumer types	Gaussian	-6.96	12.50	0
m03d	unemp, foreign, east	Gaussian	-1.24	12.44	0
m00d	none	Gaussian	54.39	16.13	0
m12d	unemp, foreign, state, 8 consumer types	Poisson	64311.15	10241.34	0
m09b	unemp, foreign, state	Poisson	64453.60	9016.30	0
m00e	none	Poisson	211670.94	51582.24	0

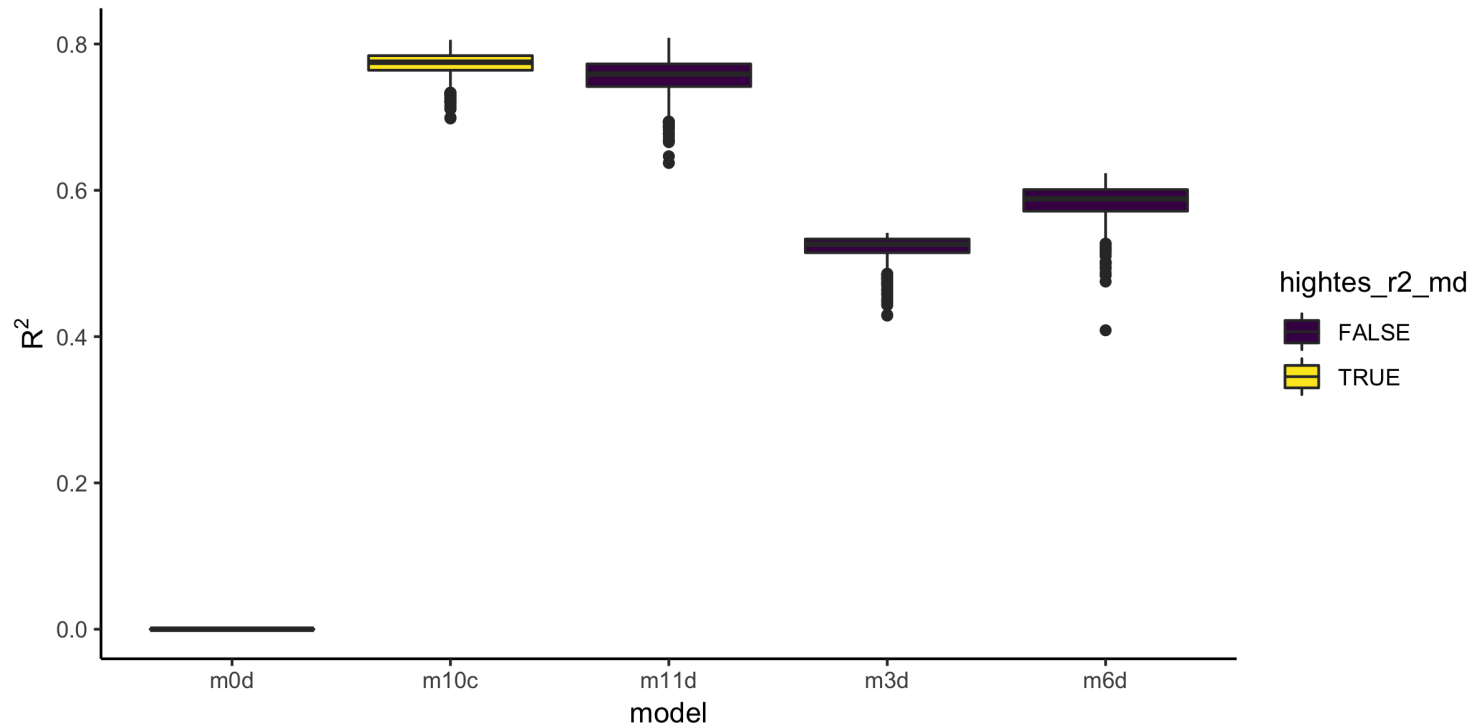# Comparing model errors

Distribution of absolute prediction error per model

Note. Target variable is log. of AfD proportion

R squared estimates for each model

Beware: Unadjusted R^2 estimates, prone to overfitting

Results: Most favorable model

Model specification of most favorable model

Model predictors: state (as multi level) + foreign + unemp

```
# Likelihood:
afd_prop_log_z ~ dnorm(mu, sigma),

# regression:
mu <- beta0[state_id] +  beta1*for_prop_z + beta2*unemp_prop_z,

#priors:
beta0[state_id] ~ dnorm(0, sigma2),

sigma  ~ dcauchy(0, 1),
sigma2 ~ dcauchy(0, 1),
beta1  ~ dnorm(0, 1),
beta2  ~ dnorm(0, 1)
```
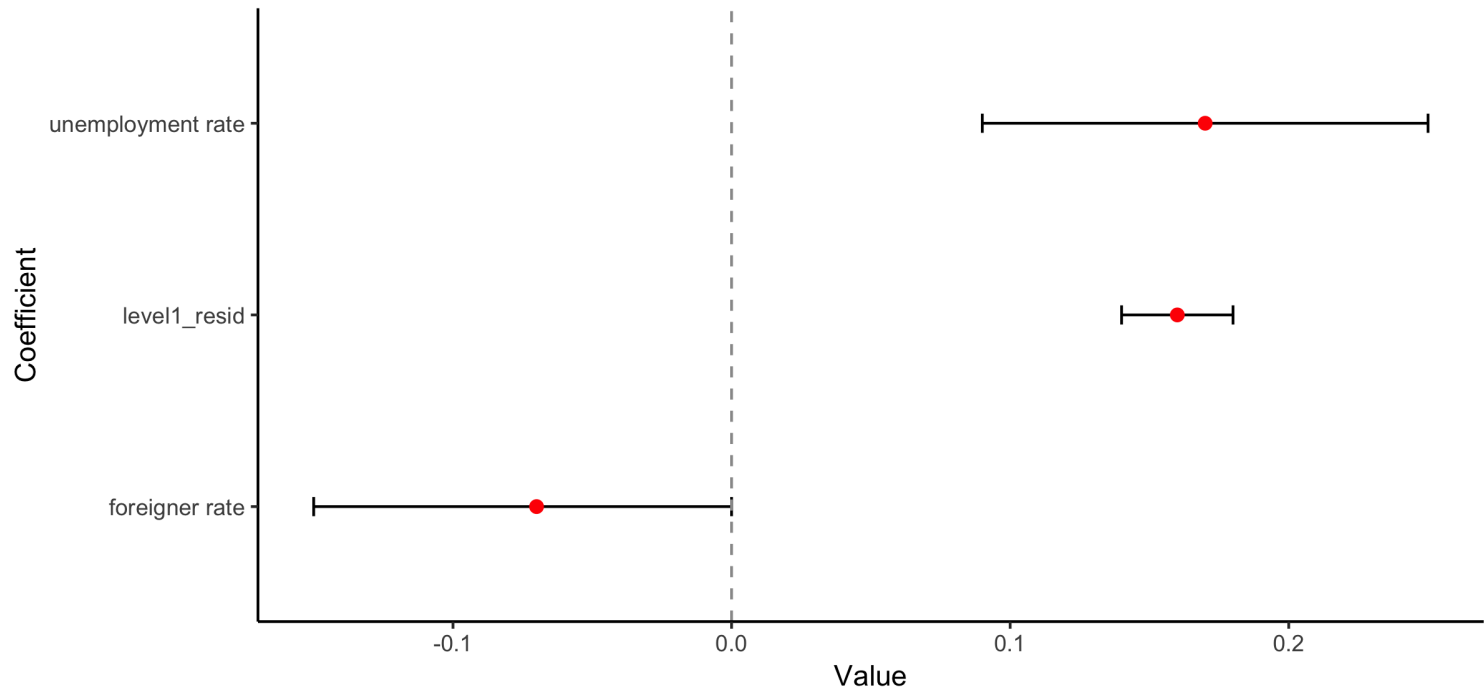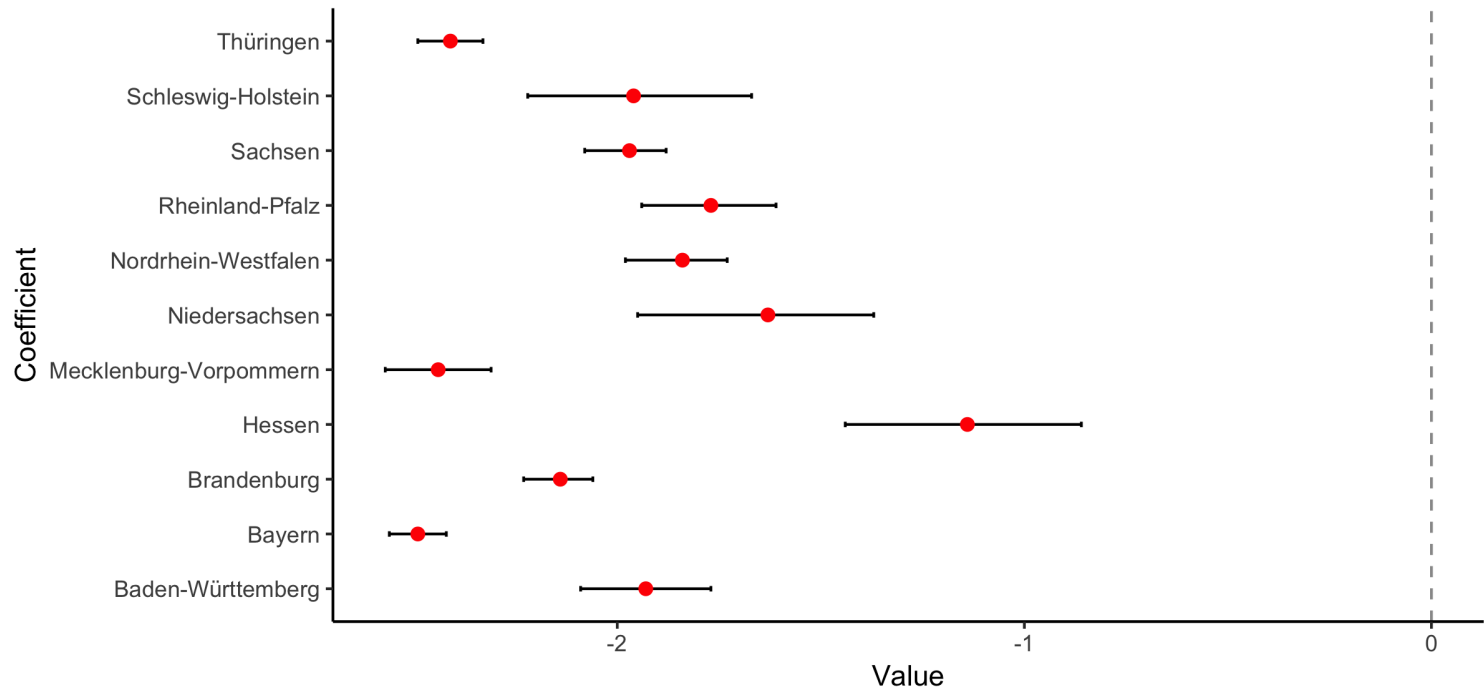
Coefficients level 1

Model predictors: state (as multi level) + foreign + unemp

Note. Error bars indicate 89% percentile intervals. Red dots refer to the mean.
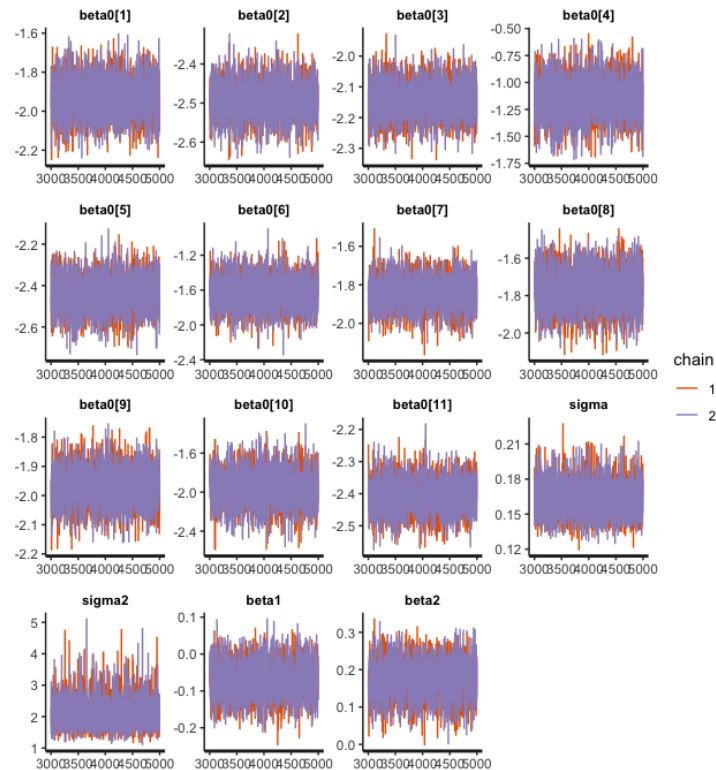
Coefficients level 2

Model predictors: state (as multi level) + foreign + unemp

Note. Error bars indicate 89% percentile intervals. Red dots refer to the mean.

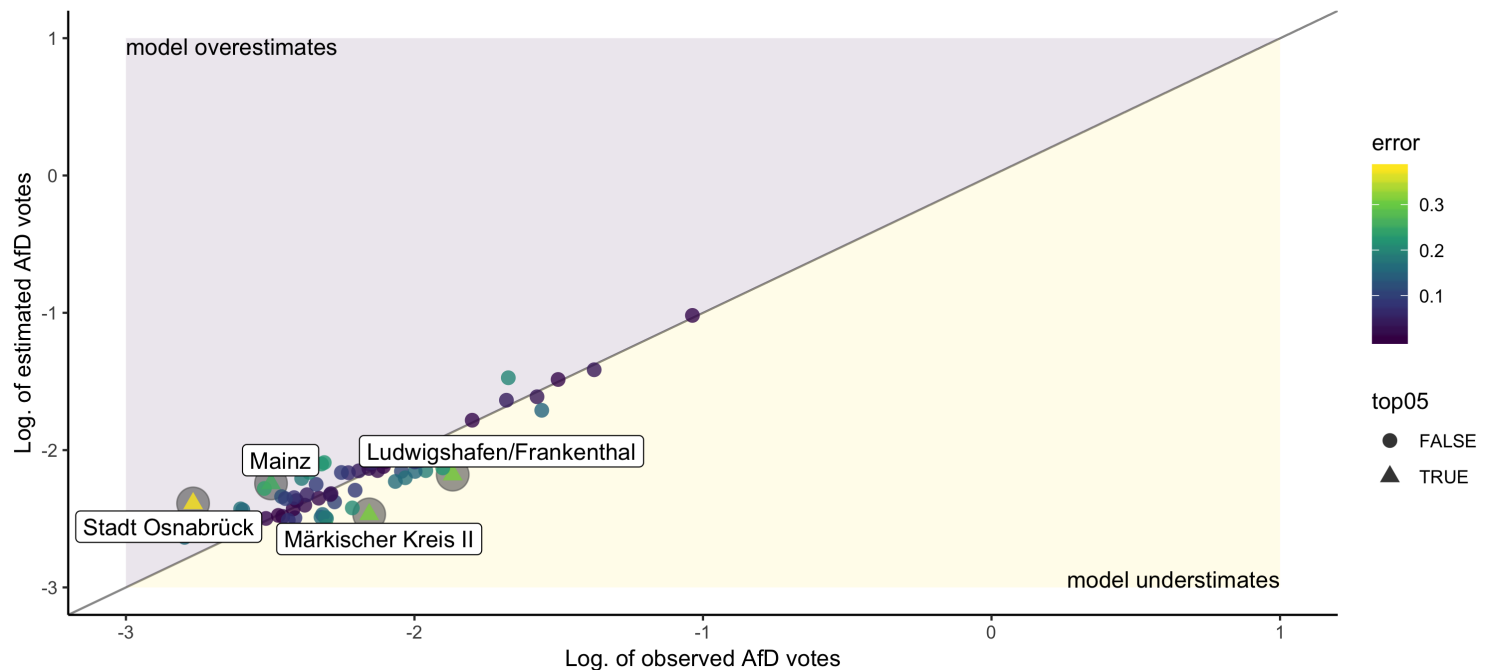# Big fat hairy catterpillars, as it should be

Model predictors: state (as multi level) + foreign + unemp
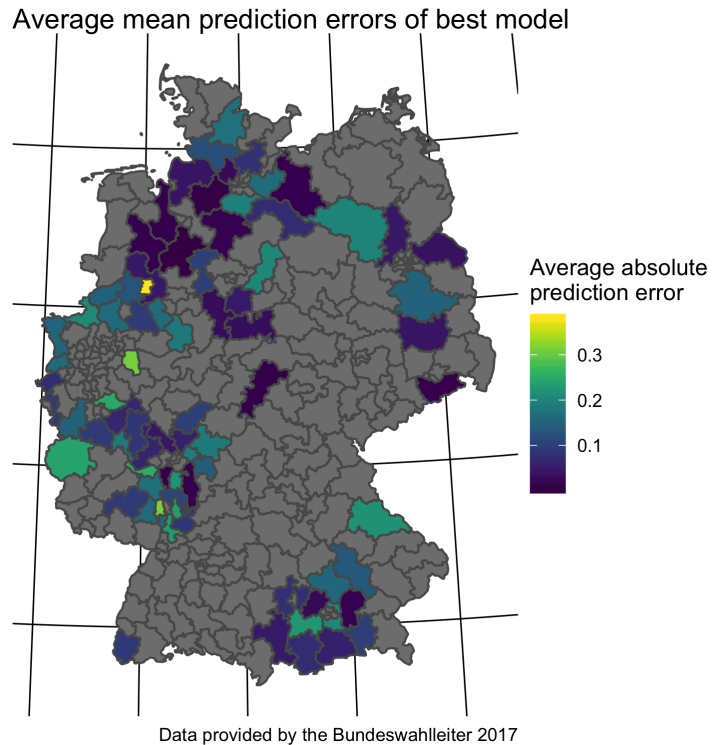
Observed vs. estimated AfD votes

Model predictors: state (as multi level) + foreign + unemp

Modelled vs. observed AFD votes. Top 5 percent predicted errors are labelled

Regional patterns of prediction errors

Average mean prediction errors of best model

Average absolute prediction error

Data provided by the Bundeswahlleiter 2017

Conclusions

Theoretical implications

- *Region related patterns* appear to play an important role

  - more than unemployment rate and foreigner rate
  - not yet well understood
  - rural? aged society?

- The present model is *simplistic*

- (The proposed) personality pattern didn't show strong impact

- Personality data *representative*?

- Let's model *future elections*

- Pathways of voter behavior remains opaque

Nicole Berbuir, Marcel Lewandowsky & Jasmin Siri (2015) The AfD and its Sympathisers: Finally a Right-Wing Populist Movement in Germany?, German Politics, 24:2, 154-178, DOI: 10.1080/09644008.2014.982546

Statistical implications

- *Observational research* is a very *limited* guide for *causal* interpretations

- *Overfitting* (and underfitting) is to be expected

- *Reduced* sample size of electoral disctricts warrants further investigation

- *Explorative* study, no strong conclusions warranted

- *More models* are possible (but inject researchers' degree of freedom)

Thank you

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 Get slides here: https://data-se.netlify.com/slides/afd_ecda2019/afd-modeling-ECDA-2019.pdf