Going nuclear-free: The electoral consequences of the nuclear phase-out for the Green parties in Switzerland

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Puzzle

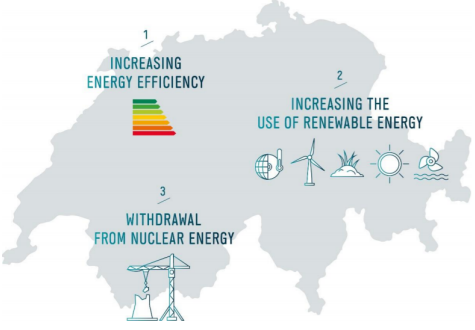
- Climate policies are widely debate and of considerable public interest
  - Brundtland Report (1987): Promotion of sustainable development
  - Swiss constitution (Art. 89): Secure, economical and environmentally compatible supply
  - However: Someone has to pay for it!

Theory: Retrospective Voting

- Energy policies are beneficial to the broad public
- Costs are usually imposed to a small number of communities
- In democracies, voters can hold political representatives accountable
  - retrospectively reward policy-makers
  - retrospectively punish policy-makers

Case: Nuclear Phase-Out in Switzerland

21 May 2017: Revision of the Swiss Federal Energy Act approved with 58.2%



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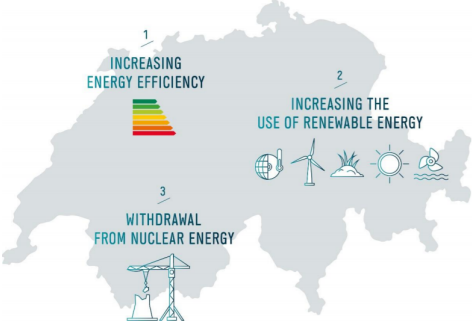

Expected Consequences

- Eventual shut down of all five Swiss nuclear plants
  - Canton Aargau: Leibstadt and Beznau I/II
  - Canton Solothurn: Gösgen
  - Canton Bern: Mühleberg (shutdown: 2019)
- Municipalities located near a nuclear power plant are likely to suffer most from an eventual shutdown
  - Fear of job loss, tax loss, psychological stress, etc.
- The party policy of the Green parties are fundamentally connoted with the nuclear phase-out
  $\rightarrow$ Are they now punished for this?

Research Question

Did the approval of the revised Federal Energy Act on 21 May 2017 cause a decrease in the vote share for the Green Party and the Green Liberal Party in municipalities with and close to a nuclear power plant?

Hypotheses

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Hypothesis 2: The approval of the revised Federal Energy Act in 2017 caused a decrease in the vote share for the Green Liberal Party in municipalities with and close to a nuclear power plant; however, this effect is less pronounced compared to the effect for the Green Party.

Hypothesis 3: The approval of the revised Federal Energy Act in 2017 caused a particularly severe decrease in the vote share for the Green and the Green Liberal Party in Mühleberg.

Identification Strategy

Difference-in-Difference Design

- Comparison of the vote share (Y) for the Green and the Green Liberal party in the election of the National Council before the revision of the Federal Energy Act in 2017 (D) in 2015 ($T = 0$) and afterwards in 2019 ($T = 1$).

- Estimand: Average Treatment Effect for the Treated (α_{ATET})
- Estimator:

$$Y = \mu + \gamma \cdot D + \delta \cdot T + \alpha \cdot (D \cdot T) + \epsilon$$

Unit of Analysis:

- Municipalities in the cantons Aargau, Bern and Solothurn

Identification Assumptions

Parallel Trends Assumption

$$E[Y_0(1) - Y_0(0)|D = 1] = E[Y_0(1) - Y_0(0)|D = 0].$$

Stable Unit Treatment Value Assumption (SUTVA)

$$Y_i = D_i \cdot Y_{1i} + (1 - D_i) \cdot Y_{0i}$$

Data and Measures

Data

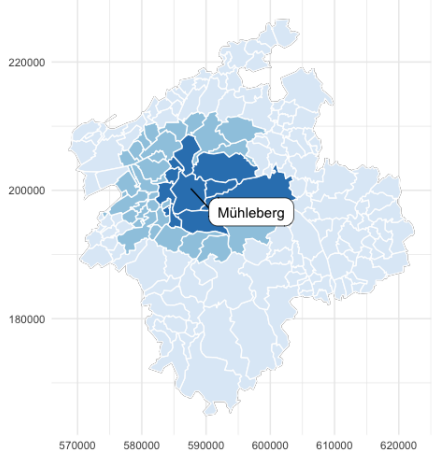
- Source: Federal Statistical Office
- Dataset: `Nationalratswahlen - Parteistimmen und Parteistärke seit 1975: Bezirke und Gemeinden` (BFS 2020)

Level at which treatment ($D = 1$) and control ($D = 0$) group are defined

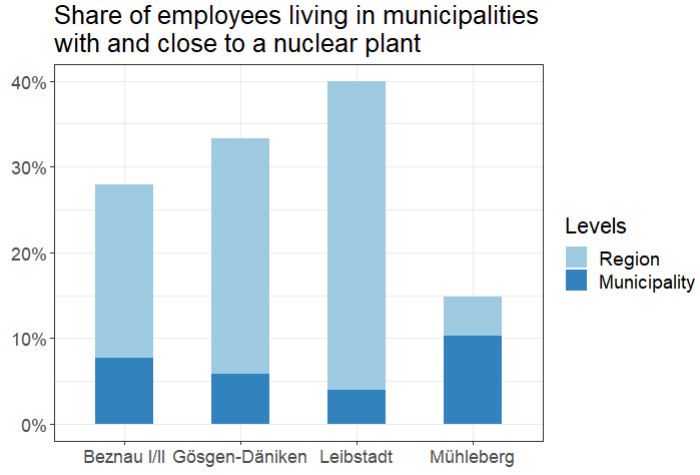
- Main analysis: Municipalities within 3km around the nuclear plant
- Robustness check 1: Municipalities within 10km
- Robustness check 2: All municipalities in the same district as the nuclear plant
- Control units: All remaining municipalities in the corresponding canton

Catchment Area Nuclear Power Plant Mühleberg (Bern)

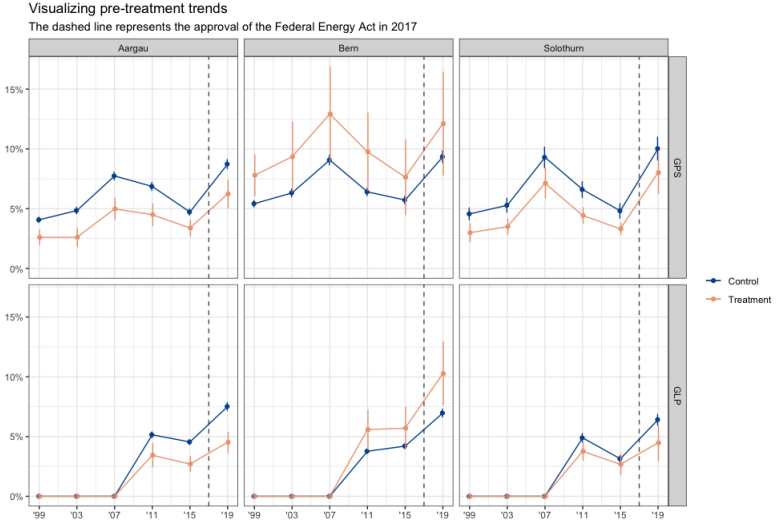
Approach to select treated units ($D = 1$)



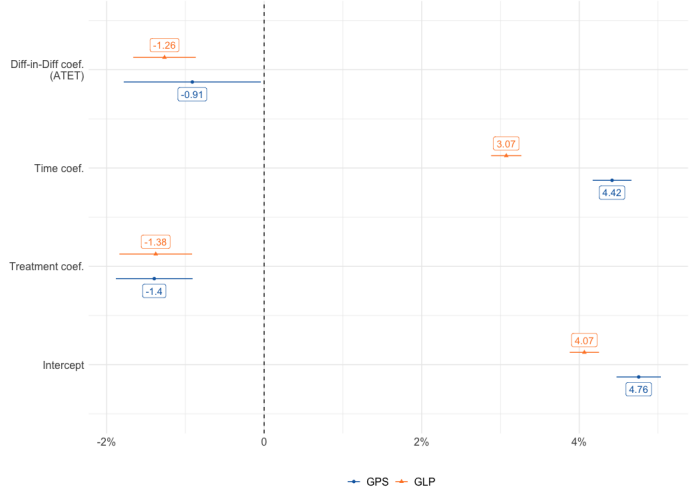
Identification Checks: SUTVA



Identification Checks: Parallel Trends

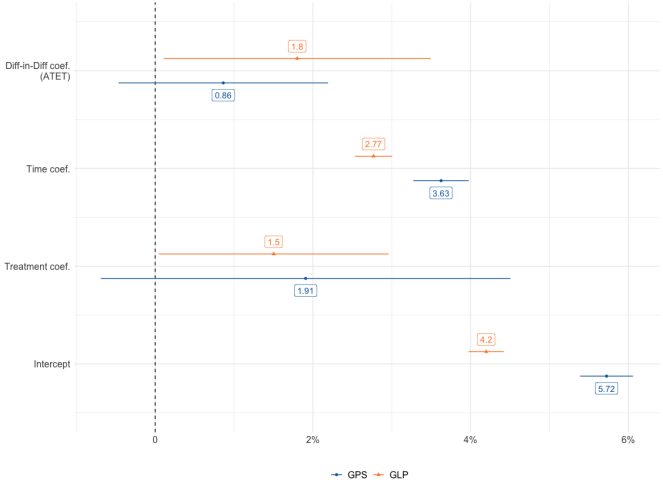


Main Results: Hypotheses 1 & 2



→ H1: confirmed; H2: partly confirmed

Main Results: Hypothesis 3



→ H3: rejected

Conclusion

Hypotheses

- H1: confirmed
- H2: partly confirmed
- H3: rejected

Credibility of the Results

- Graphical representation showed that parallel trends assumption seems plausible
  - But: Sample is very imbalanced and thus, large confidence intervals
- Robustness checks indicate that the spillover effect is limited for the Greens, but not so for the Green Liberals

References

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Appendix

Table1: Main Analysis with Radius 3km

	Dependent variable:			
	Vote share for municipalities within 3km of the nuclear plant			
	AG/SO Green	AG/SO GLP	BE Green	BE GLP
	(1)	(2)	(3)	(4)
Time coef.	4.417***	3.074***	3.625***	2.769***
	(0.123)	(0.096)	(0.175)	(0.118)
Treatment coef.	−1.395***	−1.376***	1.908	1.502**
	(0.244)	(0.231)	(1.299)	(0.728)
Diff-in-diff coef. (Time:Treatment)	−0.912**	−1.265***	0.864	1.801**
	(0.435)	(0.199)	(0.665)	(0.847)
Constant	4.755***	4.065***	5.724***	4.198***
	(0.141)	(0.093)	(0.168)	(0.112)
Observations	640	640	692	692
R^2	0.345	0.377	0.182	0.226
Adjusted R^2	0.342	0.374	0.178	0.222
Residual Std. Error	3.078 (df = 636)	2.030 (df = 636)	3.963 (df = 688)	2.723 (df = 688)
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix

Table2: Robustness Check with Radius 10km

	Dependent variable:			
	Vote share for municipalities within 10km of the nuclear plant			
	AG/SO Green	AG/SO GLP	BE Green	BE GLP
	(1)	(2)	(3)	(4)
Time Coef.	4.228***	3.158***	3.602***	2.749***
	(0.129)	(0.108)	(0.181)	(0.122)
Treatment Coef.	0.030	−0.427**	0.843	0.731
	(0.317)	(0.201)	(0.706)	(0.459)
Diff-in-diff coef. (Time:Treatment)	0.535*	−0.577***	0.727	1.055**
	(0.299)	(0.202)	(0.451)	(0.451)
Constant	4.673***	4.105***	5.720***	4.190***
	(0.154)	(0.105)	(0.173)	(0.115)
Observations	640	640	692	692
R^2	0.334	0.361	0.179	0.220
Adjusted R^2	0.331	0.358	0.176	0.216
Residual Std. Error	3.103 (df = 636)	2.057 (df = 636)	3.969 (df = 688)	2.734 (df = 688)
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix

Table3: Robustness Check with District (Bezirk)

	Dependent variable:			
	Vote share for municipalities within the same district as the nuclear plant			
	AG/SO Green	AG/SO GLP	BE Green	BE GLP
	(1)	(2)	(3)	(4)
Time coef.	4.290***	3.087***	3.559***	2.625***
	(0.117)	(0.097)	(0.212)	(0.123)
Treatment coef.	0.035	−0.886***	0.629	1.122***
	(0.406)	(0.259)	(0.390)	(0.278)
Diff-in-diff coef. (Time:Treatment)	0.763	−0.780***	0.389	0.836***
	(0.540)	(0.296)	(0.309)	(0.320)
Constant	4.677***	4.084***	5.630***	3.981***
	(0.144)	(0.095)	(0.192)	(0.119)
Observations	640	640	692	692
R^2	0.334	0.368	0.181	0.255
Adjusted R^2	0.331	0.366	0.177	0.252
Residual Std. Error	3.103 (df = 636)	2.045 (df = 636)	3.965 (df = 688)	2.671 (df = 688)
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix

Autor Plots