Codebook to the paper “Electoral Consequences of a Renewable Energy Project”

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Date: 9th November, 2025

1. Overview

The codebook describes the underlying 4 datasets:

1. Data_NationalElection
2. Data_StateElection
3. Data_RegionalElection
4. Data_Petition

The first three datasets contain voting data for the different municipalities in the Gotha county. The structure of these datasets is as follows. It includes the voting shares (second vote for National and State election, all votes for Regional Election) for the main parties involved in this election (Green, CDU, SPD, Left, FDP, and AfD (if not available its closest alternative NPD). The combined voting share of the minority government parties (Green, Left, and SPD) is also included as well as the combined voting share of the opposition parties (CDU, AfD, FDP). The datasets also include the voter turnout in percent of the electorate.

Regarding the regional election (voting on Kreistag) that unlike state and national elections, voters in the county assembly elections have three votes, which can be freely allocated among candidates from different parties or non-partisan candidates.

The regional election data also include the voting share of Rico Heinemann – the speaker of the local civic initiative. Because Heinemann did not participate in the 2014 regional elections, data for this year are missing. While votes for parties and successful candidates are published for each community, results for unsuccessful candidates (like Heinemann) are only available at the county level. However, the regional election official provided data on the regional distribution of votes for Heinemann in 2024. For 2019, this voting data is available in some instances at a somewhat coarse-grained level. In these few cases, I allocate the coarse-grained vote total for Heinemann by equally splitting the votes between the community closest to the Apfelstädt river and the one furthest away.

Table 1: The voting data are available for the following years:

Regional	May 2014	May 2019	May 2024
State	September 2014	October 2019	September 2024
National	September 2013	September 2017	September 2021

Voting data at the municipality level stem from the Thuringian Statistical Office (https://wahlen.thueringen.de/#). The communities are of varying sizes. They are quite often small villages but the city of Gotha also counts as a single community. Basically, every inhabited place in the county with an own name counts as community in this paper. Communities differ from municipalities as municipalities are administrative units, usually consisting of several communities. Each community has at least one precinct while some have more than one. Postal ballots remain a problem at the community level albeit at a much smaller scale. While each community has a precinct for in-person voting, several communities are sometimes, but not always, pooled together for an additional precinct exclusively used for mail-in votes. In these cases, I allocate the mail-in votes to a community based on the in-person community voting share for a party as illustrated below.

Table 2 illustrates one example with three communities A, B, and C having separate in-person precincts but are pooled together for mail-in votes. Among the in-person votes for party 1, 5% were casted in community A, 20% in B, and 75% in C. This distribution of the in-person votes for one specific party is used to allocate the 1,000 mail-in votes to those communities. Accordingly, 50 mail-in votes for party 1 are allocated to community A, 200 to B, and 750 to C. Summed up with the in-person votes the total votes for the specific party 1 is computed, from which voting shares can be subsequently be derived. The use of the in-person community voting share for allocation has the advantage that party differences in the mode of voting (mail-in vs. in-person) do not dilute the vote totals. In other words, if 75% of the in-person vote for a specific party come from one community, it is reasonable to assume that also 75% of the mail-in votes for a specific party come from one community.

Table 2: Example of the allocation process of mail-in votes to communities.

Community	In-person votes all parties	In-person votes party 1	In-person voting share party 1	Mail-in votes party 1	Allocated mail-in votes party 1	Total votes party 1
A	1,000	100	5%		50	150
B	2,000	400	20%		200	600
C	7,000	1,500	75%		750	2,250
Total	10,000	2,000		1,000	1,000	3,000

The national election dataset also contains variables that can be used to test the orthogonality of treatment assignment, which asserts that treatment assignment is uncorrelated with factors that may affect the outcome. A typical test for this assumption involves regressing the treatment indicator on observable characteristics. Unfortunately, detailed data on community characteristics are limited, as the statistical office does not report much data at such a fine-grained level. However, a basic test using time-invariant geographic variables, such as distance to wind turbines, cities, railways, and elevation, is possible (Geoportal, 2024). I also include pre-treatment socio-economic controls, such as the population share of various social groups and economic indicators such as income per capita (Regionaldatenbank, 2025), unemployment rate (Bundesarbeitsagentur, 2025), and the population growth since 1989 (Roesel, 2022). Note that these variables predate the municipal reforms. Some data points for smaller communities are unavailable and have been substituted with values from larger municipalities. Some data points regarding the population from 1989 were interpolated with data from the local resident's registration offices.

Beside voting data, the petition dataset contains data on the petition “Austrocknung der Apfelstädt verhindern”. This petition was brought forward the local civic initiative and could be signed in two ways. The first option was physical lists publicly displayed in communities near the river Apfelstädt n=4,200. Signees provided their name and address on these lists. Unfortunately, I did not gain access to these lists. Furthermore, this option provides distorted information because the signing lists were only available in communities near the river, not in those farther away. The second option was online via the petition committee's webpage on the state parliament's website n=1,600. Anyone could access this list to sign, although the process was somewhat complicated, as signees had to register, which took about a day's waiting time. Thus, it is likely that only individuals particularly concerned with the Apfelstädt river signed the online petition. The online petition data is available, but the state parliament's webpage only publishes the number of signees by 5-digit postal code (Thuringian Parliament 2024). There are only 11 distinct 5-digit postal codes in the Gotha county, as a single postcode often covers multiple communities. For this reason, I broaden the geographic coverage of the analysis to include the entire state of Thuringia to increase the number of observations for analysis. In this analysis, I compute the petition signing rate, which measures the number of signees per 1,000 inhabitants for each Thuringian postal code. Note that the aforementioned separation of in-person signing in only some communities close to the river and online signing for everyone distorts the available data, as the online data strongly underestimates signing rates in communities near the river, where in-person signing was possible and widely used.

For mapping the petition data, the shape files “data_plz” and “coord_plz” are available. Also available is a shape file regarding the Apfelstaedt River system “data_Riversystem” and “coord_Riversystem” in a Stata format.

2. Replication

In order to facilitate replication, the Stata syntax used for the regressions are posted. The syntax file is named “Dataanalysis_Repfile.do”. The syntax probably used some user-written commands that need to be downloaded individually by the user. For some figures, I used graph editing which are recorded and will be automatically re-applied when running the Stata syntax.

3. Datasets and variables

National-level dataset

Variable	Label	Source
ID_Community	Identification number municipality	
Community	Name of municipality	
Year	Election year	
Pop_size	Population size of municipality in 2017	Resident's registration offices in the Gotha county
Kids_0_17_share	Pop. Share children in 2017	National statistical office dataset 12411-02-03-5
Retired_share	Pop. Share retired in 2017	National statistical office dataset 12411-02-03-5
Female_share	Pop. Share female in 2017	National statistical office dataset 12411-02-03-5
Share_foreigners	Pop. Share foreigners in 2019	Special tabulation from Thuringian Statistical Office
Income_per_capita	Per capita income in Thousand Euros in 2010	National statistical office dataset 73111-01-01-5
Distance_Apfelstaedt	Distance to river Apfelstaedt in km	Own computations based on Geoportal data
Distance_windturbines	Distance to nearest wind turbine in km	Own computations based on Geoportal data
Distance_highways	Distance to nearest highway in km	Own computations based on Geoportal data
Distance_railways	Distance to nearest railway in km	Own computations based on Geoportal data
Elevation	Elevation in m	Wikipedia search
Unemployment_rate	Unemployment rate in 2017	Special tabulation from the Institute for Employment Research (IAB)
Distance_cities	Minimum distance to the cities Erfurt, Gotha, and Arnstadt in km	Own computations based on Geoportal data
Pop_growth	Population growth in % since 1989	Contemporary data from Resident's registration offices in the Gotha county, historic data stem from either the Resident's registration offices or were taken from Roesel (2022). In the latter case some interpolations were necessary if for instance

		population data for 1985 were available but not for 1989.
Share_Green	Vote share Green party (second vote) in %	Thuringian Statistical Office (2024)
Share_CDU	Vote share CDU party (second vote) in %	Thuringian Statistical Office (2024)
Share_SPD	Vote share SPD party (second vote) in %	Thuringian Statistical Office (2024)
Share_Left	Vote share Left party (second vote) in %	Thuringian Statistical Office (2024)
Share_FDP	Vote share FDP party (second vote) in %	Thuringian Statistical Office (2024)
Share_AfD	Vote share AfD party (second vote) in %	Thuringian Statistical Office (2024)
Share_coalition	Vote share parties of the coalition government (Green, Left, SPD) (second vote) in %	Thuringian Statistical Office (2024)
Share_opposition	Vote share parties of the opposition (CDU, FDP, AfD) (second vote) in %	Thuringian Statistical Office (2024)
Voter_turnout	Votes in % of the electorate	Thuringian Statistical Office (2024)

State-level dataset

Variable	Label	Source
Distance_Apfelstaedt	Distance to river Apfelstaedt in km	Own computations based on Geoportal data
Share_Green	Vote share Green party (second vote) in %	Thuringian Statistical Office (2024)
Share_CDU	Vote share CDU party (second vote) in %	Thuringian Statistical Office (2024)
Share_SPD	Vote share SPD party (second vote) in %	Thuringian Statistical Office (2024)
Share_Left	Vote share Left party (second vote) in %	Thuringian Statistical Office (2024)
Share_FDP	Vote share FDP party (second vote) in %	Thuringian Statistical Office (2024)
Share_AfD	Vote share AfD party (second vote) in %	Thuringian Statistical Office (2024)
Share_coalition	Vote share parties of the coalition government (Green, Left, SPD) (second vote) in %	Thuringian Statistical Office (2024)
Share_opposition	Vote share parties of the opposition (CDU, FDP, AfD) (second vote) in %	Thuringian Statistical Office (2024)
Voter_turnout	Votes in % of the electorate	Thuringian Statistical Office (2024)

Regional-level dataset

Variable	Label	Source
Distance_Apfelstaedt	Distance to river Apfelstaedt in km	Own computations based on Geoportal data
Share_Green	Vote share Green party (second vote) in %	Thuringian Statistical Office (2024)
Share_CDU	Vote share CDU party (second vote) in %	Thuringian Statistical Office (2024)
Share_SPD	Vote share SPD party (second vote) in %	Thuringian Statistical Office (2024)
Share_Left	Vote share Left party (second vote) in %	Thuringian Statistical Office (2024)
Share_FDP	Vote share FDP party (second vote) in %	Thuringian Statistical Office (2024)
Share_AfD	Vote share AfD party (second vote) in %	Thuringian Statistical Office (2024)
Share_FarRight	Voting share AfD party + NPD party) (second vote) in %	Thuringian Statistical Office (2024)
Share_coalition	Vote share parties of the coalition government (Green, Left, SPD) (second vote) in %	Thuringian Statistical Office (2024)
Share_opposition1	Vote share parties of the opposition (CDU, FDP, NPD) (second vote) in %	Thuringian Statistical Office (2024)
Share_opposition2	Vote share parties of the opposition (CDU, FDP, AfD) (second vote) in %	Thuringian Statistical Office (2024)
Share_Heinemann	Voting share Heinemann	Special tabulations from Regional Election Office
Voter_turnout	Votes in % of the electorate	Thuringian Statistical Office (2024)

Note: In 2014 the AfD party did not participate in the regional elections. As a substitute, I use the voting share of the most important right-wing party (NPD). Therefore, I need to compute to voting share for the opposition (Share_opposition1 for the pre-treatment analysis including the NPD votes and Share_opposition2 for the post-treatment analysis including the AfD votes). For the 2019 election, I use the combined AfD and NPD voting share labelled as Share_FarRight.

Petition dataset

Variable	Label	Source
_ID	Identifier for shapefile dataset	
postcode_string	Postcode, String	
postcode_name	Postcode, Name	
postcode_number	Postcode	
area_postcode	Area of Postcode, in m2	https://www.suche-postleitzahl.org
distance_Apfelstaedt	Distance to Apfelstaedt, in km	Own computations based on Geoportal data
sq_distance_Apfelstaedt	Squared distance to Apfestaedt in km2	Own computations based on Geoportal data
sw_watershed	Dummy: 1=Southwest of Thuringian Forest Watershed	Own computation
Petition_signees	Number of petition signees	Thuringinan Parlament (2024)
pop	Number residents	https://www.suche-postleitzahl.org
petition_rate	Signees per 1000 residents	Own computation
petition_deciles	Petition rate deciles	Own computation

4. References

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