

Appendix

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Heterogeneity in Treatment Effects and levels instead of logs

In principle, any regional variance could be a source of heterogeneity in the treatment effects. To test for this, we interacted the treatment variable (wind turbines) with several covariates. We include a dummy for municipalities in eastern Germany; for municipalities that already constructed wind turbines before 2013; a dummy for those municipalities in regions with the Greens in regional government; and a dummy indicating an urban (50,000 or more inhabitants, which corresponds to a large medium-sized town in Germany) or rural municipality. For most covariates, we find no or only a weak mediating effect on the treatment variable.

The positive and statistically significant interaction term between the construction of wind turbines and the dummy variable for eastern German municipalities indicates that the effect of wind turbines on the electoral success of the AfD is stronger there. No such moderation can be found for the vote shares of the Greens (**Table A7**). Similarly, the effect of new turbines on AfD outcomes is stronger in municipalities in which there already were wind turbines prior to 2013. For the Green vote share, there is no such effect (**Table A8**). When Greens are in regional government, there is no impact on the effect of the construction of wind turbines on their electoral success, but interestingly, the effect becomes stronger for AfD (**Table A9**). For both parties, the effect is weaker in urban municipalities (**Table A10**).

Finally, we use the vote share of parties as levels (not as logs) as dependent variable. This gives more weight to outlier municipalities, i.e. municipalities with particularly high vote shares for Greens or AfD. Again, the general interpretation of the results remains untouched but the results for Greens are not significant anymore. Yet, when running the same analysis only for municipalities with fewer than 10,000 inhabitants (which is about 85 percent of the whole sample), excluding the strongholds of the Greens as outliers, the result is statistically significant (**Table A11**). Summing up, even though not all results can be replicated with all specifications, the general patterns are confirmed by the wide range of robustness checks.

Table A1 - Descriptive statistics analysis 1

		n	mean	sd	min	max
<i>Party</i>						
	CDU/CSU	6098	0.23	0.42	0	1
	SPD	6098	0.17	0.37	0	1
	AFD	6098	0.07	0.25	0	1
	FDP	6098	0.05	0.22	0	1
	The Left	6098	0.08	0.27	0	1
	Greens	6098	0.18	0.38	0	1
	Other	6098	0.03	0.18	0	1
	No party	6098	0.14	0.35	0	1
<i>Main IVs</i>						
	Support for renewable energy	6399	4.36	0.89	1	5
	Support for wind energy	6096	3.54	0.96	1	5
<i>Controls</i>						
	Sex	6096	0.42	0.49	0	1
<i>Age categories</i>						
	18-29	6525	0.05	0.22	0	1
	30-39	6525	0.10	0.31	0	1
	40-49	6525	0.13	0.34	0	1
	50-59	6525	0.20	0.41	0	1
	60+	6525	0.49	0.50	0	1
	Population (log)	6518	10.64	2.09	3.26	15.11
	Eastern Germany	6525	0.24	0.42	0	1
<i>Secondary education</i>						
	No degree	6052	0.002	0.04	0	1
	Degree after < 7 years	6052	0.001	0.03	0	1
	Secondary modern school degree	6052	0.21	0.41	0	1
	High school diploma	6052	0.38	0.49	0	1
	University of applied sciences entrance qualification	6052	0.11	0.31	0	1
	A-levels	6052	0.30	0.46	0	1
<i>Vocational training</i>						
	No degree	5902	0.03	0.18	0	1
	Internship	5902	0.009	0.09	0	1
	Vocational preparation year	5902	0.002	0.05	0	1
	Apprenticeship	5902	0.41	0.49	0	1
	Preparation for mid-level public service	5902	0.03	0.16	0	1
	Professional qualification from vocational schools	5902	0.02	0.15	0	1
	2- or 3-year health care schooling	5902	0.04	0.20	0	1
	Technical college degree (master craftsman/-woman, technician or equivalent)	5902	0.13	0.34	0	1
	University of cooperative education, Professional academy	5902	0.04	0.19	0	1
	Degree from a college of administration	5902	0.02	0.14	0	1
	University of applied sciences degree	5902	0.08	0.28	0	1
	Degree from a university, scientific college, art college	6100	0.16	0.36	0	1
	PhD	6100	0.02	0.15	0	1
<i>Occupational status</i>						
	Employed	6100	0.51	0.50	0	1
	Pupil	6100	0.001	0.03	0	1
	Student	6100	0.02	0.14	0	1
	Pensioner	6100	0.39	0.49	0	1
	Income from capital assets	6100	0.01	0.08	0	1
	Alimony/Grants from third parties	6100	0.001	0.04	0	1
	Housewife/husband	6100	0.02	0.13	0	1
	ALG I	6100	0.01	0.07	0	1
	ALG II	6100	0.01	0.11	0	1
	Social welfare/basic security	6100	0.01	0.07	0	1
	Other	6100	0.02	0.14	0	1

Source: Social sustainability Barometer (Wolf et al. 2020), own calculation

Table A2 – Logistic regressions of party identification on support for renewable energy/wind energy

		AfD	Greens	CDU	SPD	FDP	Left
Support for renewable energy		-0.64*** (0.06)	0.76*** (0.08)	-0.06 (0.04)	0.28*** (0.05)	-0.14** (0.07)	0.32*** (0.08)
Support for wind energy		-0.46*** (0.07)	0.37*** (0.05)	-0.12*** (0.04)	0.22*** (0.04)	-0.22*** (0.07)	0.13** (0.06)
Female		-1.12*** (0.14)	0.66*** (0.08)	-0.15** (0.07)	-0.11 (0.08)	-0.43*** (0.13)	-0.10 (0.11)
<i>Age categories (ref. 18-29 years)</i>							
	30-39	1.28** (0.54)	-0.14 (0.18)	0.09 (0.21)	0.27 (0.30)	-0.55** (0.27)	-0.41 (0.29)
	40-49	1.16** (0.53)	-0.13 (0.18)	0.45*** (0.20)	0.46 (0.29)	-0.87*** (0.27)	-0.42 (0.29)
	50-59	0.93* (0.53)	0.10 (0.17)	0.36* (0.20)	0.85*** (0.28)	-1.00*** (0.27)	-0.09 (0.28)
	60+	0.65 (0.55)	0.01 (0.20)	0.58*** (0.21)	0.99*** (0.29)	-0.81*** (0.28)	0.17 (0.30)
<i>Secondary education (ref. A-level)</i>							
	No degree	1.58 (1.68)	0.39 (0.79)	-0.26 (1.06)	-0.40 (1.07)		-0.09 (1.13)
	Degree after <7 years		0.50 (1.09)			0.92 (1.77)	1.41 (2.62)
	Secondary modern school degree	0.42* (0.23)	-0.62*** (0.15)	-0.22 (0.13)	0.39** (0.15)	-0.77*** (0.26)	0.11 (0.22)
	High school diploma	-0.02 (0.21)	-0.55*** (0.13)	-0.01 (0.12)	0.30*** (0.14)	-0.39* (0.21)	0.08 (0.19)
	University of applied sciences entrance qualification	0.25 (0.24)	-0.01 (0.14)	-0.21 (0.13)	-0.09 (0.16)	-0.18 (0.22)	0.18 (0.19)
<i>Highest vocational training or university degree (ref. no training)</i>							
	Internship	0.57 (0.71)	-0.30 (0.44)	0.75* (0.39)	0.52 (0.40)		0.02 (0.61)
	Vocational preparation year	1.74** (0.71)	-0.13 (0.73)	0.98 (0.62)	-0.30 (0.90)		-0.50 (0.95)
	Apprenticeship	0.39 (0.45)	-0.02 (0.21)	0.47* (0.25)	0.04 (0.24)	-0.00 (0.38)	-0.40 (0.29)
	Preparatory service for the middle service in public service	0.51 (0.54)	-0.16 (0.32)	0.77** (0.31)	0.13 (0.31)	-1.32 (0.81)	-0.99* (0.54)
	Professional qualification from vocational schools	0.72 (0.56)	0.27 (0.32)	0.13 (0.34)	-0.82** (0.38)	-0.22 (0.60)	-0.69 (0.48)
	2- or 3-year health care schooling	0.03 (0.56)	0.11 (0.27)	0.77*** (0.28)	-0.43 (0.31)	-0.86 (0.59)	0.11 (0.38)
	Technical college degree (master craftsman/-woman, technician or equivalent)	0.03 (0.47)	-0.02 (0.24)	0.44* (0.26)	0.19 (0.25)	-0.12 (0.41)	-0.35 (0.31)
	University of cooperative education, Professional academy	0.14 (0.53)	-0.04 (0.27)	0.77*** (0.28)	-0.18 (0.31)	0.02 (0.46)	-0.29 (0.39)
	Degree from a college of administration	-0.71 (0.74)	-1.04** (0.42)	0.87*** (0.32)	0.01 (0.34)	-0.37 (0.58)	-0.36 (0.46)
	University of applied sciences degree	-0.49 (0.51)	-0.16 (0.25)	0.68** (0.27)	0.07 (0.28)	-0.09 (0.40)	-0.10 (0.34)
	Degree from a university, scientific college, art college	-0.46 (0.51)	0.09 (0.23)	0.49* (0.26)	-0.01 (0.27)	-0.16 (0.38)	-0.03 (0.32)
	PhD	-0.05 (0.64)	0.12 (0.30)	0.29 (0.33)	-0.14 (0.37)	0.34 (0.45)	-0.30 (0.45)
<i>Occupational status (ref. unemployed)</i>							
	Pupil	2.40* (1.29)	0.39 (0.78)				1.72* (0.91)
	Student	-0.66 (1.16)	0.19 (0.24)	-0.21 (0.32)	-0.23 (0.44)	-0.77* (0.45)	-0.28 (0.44)
	Pensioner	0.16 (0.20)	-0.29** (0.14)	0.09 (0.11)	0.37*** (0.12)	-0.10 (0.20)	-0.16 (0.17)
	Income from capital assets	-1.06 (0.89)	-0.03 (0.49)	0.44 (0.36)	0.04 (0.48)	0.96* (0.54)	-1.17 (0.95)

Table A2 continues on page 3

Table A2 continued from page 2

Alimony/Grants from third parties	0.93 (1.17)	0.38 (0.79)	0.15 (0.86)		0.84 (1.00)	
Housewife/husband	0.42 (0.47)	-0.37 (0.29)	-0.04 (0.28)	-0.12 (0.35)	-1.37 (1.01)	0.06 (0.44)
ALG I	0.90* (0.53)	-0.18 (0.58)	-0.18 (0.50)	-0.93 (0.73)	-0.31 (1.04)	0.13 (0.57)
ALG II	0.73* (0.42)	0.13 (0.38)	-1.47** (0.61)	-0.41 (0.43)	-0.06 (0.59)	1.48*** (0.32)
Social welfare/basic security	0.45 (0.55)	0.45 (0.45)	-1.32* (0.75)	-0.55 (0.61)	-0.66 (1.03)	1.46*** (0.40)
Other	-0.41 (0.51)	-0.12 (0.26)	-0.30 (0.25)	0.26 (0.26)	-0.38 (0.52)	0.11 (0.37)
Population of municipality (natural logarithm)	0.03 (0.03)	0.06** (0.02)	-0.11*** (0.02)	0.05** (0.02)	0.08** (0.04)	0.04 (0.03)
Living in eastern Germany	1.25** (0.51)	-1.31*** (0.32)	-0.83*** (0.28)	-0.18 (0.30)	0.22 (0.43)	1.87*** (0.33)
Constant	-0.58 (0.94)	-6.28*** (0.52)	-0.30 (0.41)	-5.32*** (0.50)	-1.00 (0.67)	-4.80** (0.69)
Pseudo R ²	0.20	0.13	0.03	0.07	0.05	0.09
Observations	5,502	5,641	5,630	5,622	5,561	5,617
State Fixed Effects	YES	YES	YES	YES	YES	YES

Notes: Results of several logistic regression models.

Dependent variables: party identification with parties in Germany; robust standard errors (in parentheses) clustered at individual level;

Reference categories: Age group: 18-29; Male; western Germany; secondary education: A-levels; vocational training: no degree; occupational status: unemployed.

**** $p < 0.01$, ** $p < 0.05$.*

Table A3 – Multinomial logit regression of party identification on support for renewable energy/wind energy

		Base outcome = no party identification					
		AfD	Greens	CDU	SPD	FDP	The Left
Support for renewable energy		-0.48*** (0.07)	0.88*** (0.08)	0.05 (0.06)	0.40*** (0.07)	-0.05 (0.08)	0.41*** (0.08)
Support for wind energy		-0.32*** (0.07)	0.51*** (0.06)	0.08 (0.05)	0.37*** (0.06)	-0.04 (0.08)	0.33*** (0.07)
Female		-1.18*** (0.15)	0.40*** (0.10)	-0.22** (0.09)	-0.24** (0.10)	-0.65*** (0.15)	-0.20* (0.12)
<i>Age categories (ref. 18-29)</i>							
	30-39	1.30** (0.51)	0.03 (0.22)	0.28 (0.24)	0.44 (0.30)	-0.23 (0.29)	-0.12 (0.29)
	40-49	1.37*** (0.51)	0.14 (0.22)	0.76*** (0.23)	0.81*** (0.29)	-0.29 (0.29)	-0.07 (0.29)
	50-59	1.36*** (0.50)	0.65*** (0.21)	0.95*** (0.23)	1.48*** (0.28)	-0.16 (0.28)	0.63*** (0.28)
	60+	1.57*** (0.50)	0.86*** (0.20)	1.63*** (0.22)	2.23*** (0.27)	0.37 (0.26)	1.11*** (0.26)
<i>Secondary Education (ref. A-levels)</i>							
	No degree	18.07 (3,079.64)	15.70 (3,079.64)	15.07 (3,079.64)	15.17 (3,079.64)	-0.40 (5,715.67)	15.81 (3,079.64)
	Degree after <7 years	0.88 (11,596.16)	17.63 (6,494.83)	0.19 (8,336.90)	18.18 (6,494.83)	18.03 (6,494.83)	18.46 (6,494.83)
	Secondary school degree	0.56*** (0.21)	-1.02*** (0.16)	-0.65*** (0.15)	-0.15 (0.16)	-1.21*** (0.23)	-0.53*** (0.20)
	High school diploma	0.21 (0.18)	-0.80*** (0.13)	-0.34*** (0.12)	-0.05 (0.13)	-0.68*** (0.17)	-0.40*** (0.15)
	University of applied sciences entrance qualification	0.13 (0.24)	-0.34* (0.17)	-0.37** (0.17)	-0.25 (0.19)	-0.42* (0.23)	-0.13 (0.20)
Population of municipality (nat. logarithm)		0.06 (0.04)	0.08** (0.03)	-0.05* (0.03)	0.08*** (0.03)	0.11*** (0.04)	0.08** (0.04)
Living in eastern Germany		1.47*** (0.55)	-0.85** (0.42)	-0.46 (0.39)	0.03 (0.41)	0.51 (0.51)	1.79*** (0.42)
Constant		-0.59 (0.80)	-6.03*** (0.57)	-0.14 (0.47)	-4.96*** (0.56)	-1.03 (0.68)	-4.69*** (0.67)
State Fixed Effects					YES		
Observations					5,383		
Pseudo R ²					0.10		

Notes: Results of a multinomial logit regression; standard errors in parentheses.

Category 'other party' and 'don't know' excluded for better readability.

Reference categories: Age group: 18-29; Male; western Germany; secondary education: A-levels;

** $p < 0.01$; * $p < 0.05$

Table A4 – Election years

2013	General Election (Hesse)
2014	Saxony, Brandenburg, Thuringia
2015	Bremen, Hamburg
2016	Rheinland-Palatinate, Baden-Württemberg, Berlin, Mecklenburg-Western Pomerania, Saxony Anhalt
2017	General Election (Saarland, North Rhine- Westphalia, Lower Saxony, Schleswig- Holstein)
2018	Hesse, Bavaria
2019	Bremen, Brandenburg, Saxony, Thuringia

Note: States in parentheses held regional elections in the same year as the general election. In these years, we only included general election results.

Table A5 - Descriptive statistics analysis 2

<i>Dependent variable</i>	Total		With wind turbine		Without wind turbine	
	Mean	SD	Mean	SD	Mean	SD
Green party	7.35	5.81	7.11	4.82	7.37	5.89
AfD	11.06	7.73	12.96	7.54	10.88	7.72
<i>Independent variable</i>						
Wind turbines	0.45	2.21	4.87	5.60	-	-
<i>Control variables</i>						
Share of foreigners	3.85	5.42	3.59	3.52	3.87	5.56
Share of unemployment	2.49	1.78	2.79	2.38	2.45	1.71
Population size	6889.76	47119.4	17719.56	139833.8	5888.95	24641.25
Share of asylum-seekers	1.04	0.63	1.33	0.65	1.02	0.62
Share of women	50.5	0.49	50.45	0.48	50.51	0.49
Average age	45.11	1.81	45.29	1.87	45.09	1.80
Share of university graduates	10.06	3.43	9.82	3.1	10.08	3.45
Average household inc.	20626.51	2422.15	20663.19	2215.02	20623.13	2440.38
N	32472		2740		29732	

Table A6 – Two-way fixed effects regressions of election results of other Germany parties on wind turbines

	CDU/CSU	SPD	FDP	The Left
Wind turbines	0.001 (0.001)	0.003 (0.002)	0.005 (0.001)	-0.002 (0.003)
Constant	3.821 (0.006)***	2.996 (0.011)***	1.340 (0.008)***	1.866 (0.010)***
Adjusted R-squared	0.68	0.46	0.71	0.50

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: natural logarithm of vote shares of other parties (CDU/CSU, SPD, FDP, Left).

Standard errors (in parentheses).

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A7 – Testing for heterogeneous effects: East vs. west

	Greens	AfD
Wind turbines	0.003 (0.00)	-0.014 (0.04)***
Eastern Germany#wind turbines	0.003 (0.00)	0.050 (0.00)***
Constant	1.645 (0.00)***	1.540 (0.00)***
Adjusted R-squared	0.280	0.727

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: natural logarithm of vote shares of AfD and Green party, respectively.

Standard errors (in parentheses) clustered at municipality level.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A8 – Testing for heterogeneous effects: Pre-2013 wind turbines

	Greens	AfD
Wind turbines	0.007 (0.00)**	-0.002 (0.46)
Pre2013#wind turbines	-0.004 (0.00)	0.013 (0.00)*
Constant	1.645 (0.00)***	1.541 (0.00)***
Adjusted R-squared	0.280	0.725

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: natural logarithm of vote shares of AfD and Green party, respectively.

Standard errors (in parentheses) clustered at municipality level.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A9 – Testing for heterogeneous effects: Greens in government

	Greens	AfD
Wind turbines	0.004 (0.00)***	0.000 (0.00)
Green gov	0.297 (0.01)***	-0.062 (0.02)***
Green gov#wind turbines	0.001 (0.46)	0.015 (0.00)***
Constant	1.458 (0.01)***	1.580 (0.00)***
Adjusted R-squared	0.305	0.725

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: natural logarithm of vote shares of AfD and Green party, respectively. Standard errors (in parentheses) clustered at municipality level.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A10 – Testing for heterogeneous effects: urban vs. rural

	Greens	AfD
Wind turbines	0.004 (0.00)***	0.008 (0.00)***
Urban#wind turbines	-0.010 (0.00)*	-0.019 (0.01)***
Constant	1.646 (0.00)***	1.541 (0.00)***
Adjusted R-squared	0.280	0.724

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: natural logarithm of vote shares of AfD and Green party, respectively. Standard errors (in parentheses) clustered at municipality level.

Municipalities with a population greater than 50,000 are considered to be urban.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A11 – Levels instead of logs

	Greens		AfD	
	Full sample	>10k inhabitants	Full sample	>10k inhabitants
Wind turbines	-0.004 (0.45)	0.024 (0.012)*	0.070 (2.32)*	0.134 (0.039)***
Constant	5.916 (0.024)***	5.678 (0.025)***	5.403 (0.039)***	5.371 (0.044)***
Adjusted R-squared	0.301	0.260	0.543	0.541

Notes: Two-way fixed effects regressions (OLS) (year dummies not shown).

Dependent variables: vote shares of AfD and Green party, respectively.

Standard errors (in parentheses) clustered at municipality level.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$