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Discussion Papers

The Partisan Effects of Voter Turnout
How Conservatives Profit from Rainy Election Days

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How Conservatives Profit from Rainy Election Days

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Abstract

In this short note, we use data from different elections in the German state of North-Rhine Westphalia between 1975 and 2010 to show that the social democrats generally profit from higher voter turnout at the expense of the conservatives. We deal with the endogeneity of voter turnout by using election day rain as an instrumental variable. Our particular contribution is the comparison of municipal and state elections.

Keywords:	Turnout, Partisan Effects, Rain
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1   Introduction

The quality of a democracy is often judged by how many people go to vote. High turnout is interpreted as a signal for satisfaction with the democratic system and many non-governmental organizations explicitly state the promotion of electoral participation as one of their goals. But what are the consequences of higher turnout regarding election outcomes? How is the distribution of vote shares affected? Which parties (if any) profit from higher turnout?

We shed new light on this issue by examining the partisan effects of voter turnout in all municipal and state elections in the German state of North-Rhine Westphalia between 1975 and 2010. Importantly, we address the endogeneity of voter turnout by using election day rain as an instrumental variable (IV).[1] Our findings suggest that a one percentage point increase in voter turnout significantly increases social democratic vote shares by 0.76 (0.69) percentage points in municipal elections (state elections). The IV estimates are much larger than conventional OLS estimates, suggesting that failing to address the endogeneity of voter turnout can lead to substantial bias. Our particular contribution is to compare the effects at the different local tiers of government (municipal and state elections) within the same institutional framework. In the first stage, the effect of rain is significantly more pronounced in local elections compared to state elections, something that is consistent with the calculus of voting. The second stage effect of turnout on party vote shares, however, is comparable in size for the two tiers.

Our work relates to the literature on partisan effects of voter turnout (Hansford and Gomez, 2010; Knack, 1994; Martinez and Gill, 2005; Nagel and McNulty, 1996) and to the literature on election day weather and voter turnout (Fraga and Hersh, 2010; Gomez, Hansford, and Krause, 2007; Shachar and Nalebuff, 1999). These studies focus on the US, where it seems to be an empirical regularity that democrats profit from higher turnout rates while conservatives suffer. For Europe, evidence is more scarce, although partisan effects studies have been conducted for Spain (Artés, 2014), Italy (Lo Prete and Revelli, 2014) as well as Norway (Lind, 2014) and the effect of inclement weather on voter turnout has been investigated for the Netherlands (Eisinga, Te Grotenhuis, and Pelzer, 2012) as well as Sweden (Persson, Sundell, and Öhrvall, 2014). Table 1 in the appendix summarizes the literature on election day rain and turnout. For Germany, an analysis is still missing.[2] Furthermore, we extend and generalize the literature on partisan effects of voter turnout by offering a first comparison of different election types (municipal vs. state elections) within the same institutional framework.[3]

2   Data and Empirical Strategy

We collected panel data on all municipal and state elections in North-Rhine Westphalia, Germany's most populous state, between 1975 and 2010. For each of the 396 municipalities, we observe 16 election outcomes: eight municipal council and eight state parliament elections. On both levels, one electoral term lasts 5 years.

The political landscape in North-Rhine Westphalia is dominated by two major parties: The conservative *Christlich-Demokratische Union* (CDU) and the social-democratic *Sozialdemokratis-*

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[1]Turnout may be endogenous due simultaneity considerations: If parties carry out mobilization efforts, causality also runs in the opposite direction.

[2]In a companion paper, Arnold (2015) investigates the effects of electoral closeness on turnout. This paper also uses rainfall to investigate interaction effects of electoral closeness and other driving forces on turnout.

[3]Our paper also provides crucial evidence for the literature on close election RDDs (work for Germany included, see Ade and Freier (2013); Freier (2011); Freier and Odendahl (2012)), in which weather conditions are argued to provide one source of election outcome randomness, something that we can confirm with this study.

che Partei Deutschlands (SPD). In our sample, these two parties together get more than 80 percent of the total vote. Smaller parties like the Greens (*Bündnis 90 / Die Grünen*), the Liberals (*FDP*) or the Left Party (*Die Linke*) account for the rest of the vote.[4]

The precipitation data were obtained from the German Weather Service (*Deutscher Wetterdienst, DWD*). The state-run DWD maintains a grid of several thousand weather stations across Germany. We employ data from all 121 weather stations in North-Rhine Westphalia that consistently reported data between 1975 and 2010. Each municipality is assigned to the closest weather station. We thus employ variation in rain showers across time and space. Average municipality-station distance is 7.83 kilometers. Figure 1 shows a map of North-Rhine Westphalia with the location of all weather stations used in the analysis.

Descriptive statistics of all variables can be found in Table 2, separate by election type. The CDU is somewhat stronger than the SPD in terms of vote share, with a smaller difference for state elections. Turnout is at 71 percent on average. The smallest municipality has 2,353 eligible voters, while Cologne has more than 750,000 eligible voters. The share of elderly people (those above the legal retirement age of 65) is approximately 15 percent. Average rain on election day is similar for both election types and at about 1.6 – 1.7 millimeters.[5] The variation in this measure is quite high, however. In 53 percent of all municipal elections, it did not rain at all. Conditional on some rain at all, average rain on election day then increases to $\frac{1.6}{0.53} = 3.02$ millimeters.

To estimate a causal effect of turnout on party vote shares, we employ an instrumental variable approach. Turnout is instrumented by election day rain. For this to be a valid design, two conditions need to be fulfilled: First, rain has to have a significant impact on turnout. This condition of instrument relevance is testable. Second, rain must not affect party vote shares through any other channel except turnout. That is, rain is exogenous in the outcome equation. This condition of instrument exogeneity is not testable. However, given that rainfall is essentially random, we can think of no reason why this assumption should not hold.

To be more precise, in the first stage we estimate the following relationship

$$T_{itj} = \alpha_{1j} + \beta_{1j}R_{itj} + X'_{itj}\gamma_{1j} + \theta_{ij} + \tau_{tj} + u_{itj}, \tag{1}$$

where T is turnout, R is rain on election day[6] (measured in millimeters), X is a vector of covariates, θ and τ are municipal and year fixed effects and u is an error term. The indices i and t stand for municipalities and (election) years, respectively. We run separate regressions for each election level, such that $j = \{$Municipal Election, State Election$\}$.

In the second stage, we estimate

$$VS^p_{itj} = \alpha_{2j} + \beta_{2j}\hat{T}_{itj} + X'_{itj}\gamma_{2j} + \theta_{ij} + \tau_{tj} + \epsilon_{itj}, \tag{2}$$

where VS^p is the vote share of party p ($p = \{$SPD,CDU$\}$), $\hat{T}$ are the fitted values from the first stage and ϵ is an error term.

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[4]The main reason for our focus on North-Rhine Westphalia is that the two major parties, SPD and CDU, stand for election in nearly all municipalities. We thus do not have to deal with missing values. This is not necessarily the case in other German states, where local voter initiatives are quite strong on the municipal level.

[5]This remarkable similarity is unexpected because of seasonal differences: Municipal elections take place in late September / early October whereas state elections happen in May.

[6]In addition, we include a dummy that takes the value 1 if it did not rain at all on election day. We also experimented with a quadratic rain term, but the results turned out to be insignificant.

The coefficients of interest are β_1 (Does rain affect turnout?) and β_2 (What are the partisan effects of voter turnout?). The vector of controls X includes a third order population polynomial, the share of elderly people and average rain on election day.

3   Results

Table 3 holds the main results. We estimate separate models for SPD and CDU vote shares. Furthermore, we compare the baseline OLS estimate with the IV approach for each case. Panel (1) includes the results for municipal elections whereas Panel (2) focuses on state elections.

The following interpretation refers to municipal elections, i.e. Panel (1). Column (1) shows a positive and significant correlation between SPD vote shares and voter turnout. To evaluate whether this effect is causal, we resort to our IV estimates. Column (2) holds the first stage results. One can see that election day rain significantly reduces voter turnout. The point estimate suggests that 10 millimeters of rain reduce turnout by 1.2 percentage points.[7] The first stage F-statistic of more than 26 suggests that the instrument is highly relevant. Column (3) holds the results from the second stage, where voter turnout is replaced with the fitted values from the first stage. The IV coefficient is twice as large as the OLS coefficient and highly significant. It is estimated that a one percentage point increase in voter turnout increases SPD vote shares by 0.76 percentage points.

Analogous results for CDU vote shares can be found in columns (4) - (6). While the social democrats seem to profit from higher turnout rates, the conservatives fare worse when electoral participation is higher. The IV estimate in column (6) suggests that a one percentage point increase in voter turnout translates into a 0.85 percentage point decrease in CDU vote shares.

A validation of these findings is provided in Panel (2), where we estimate exactly the same relationships for a different set of elections within the same municipalities. We find that also in state elections, the SPD gains and the CDU loses in terms of vote shares when turnout is higher. The effects are a bit smaller but consistent with prior results in terms of sign and significance. The fact that we find similar effects for turnout in two different sets of elections and on two levels of government makes it more plausible that the results are generalizable. A note is also warranted on the comparison of the first stage effects in the two different tiers of government. Rain exerts a significantly more pronounced effect in municipal elections compared to state elections, something that we believe is consistent with the calculus of voting (Downs, 1957; Riker and Ordeshook, 1968).[8]

Our findings are mostly in line with research from the United States, where Democrats profit from higher turnout rates (Gomez, Hansford, and Krause, 2007; Hansford and Gomez, 2010). Also in Germany, the social democrats gain in terms of vote shares, whereas the conservatives suffer.

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[7]In terms of elasticities, this effect seems rather small: A one standard deviation increase in rain ($+4.32$ mm) reduces turnout by $4.32 \cdot 0.0012 \approx 0.5$ percentage points, which corresponds to $\frac{0.005}{0.12} \approx 4$ percent of a standard deviation in this variable. However, in comparison to effects found in the previous literature, this effect is quite large: Hansford and Gomez (2010) estimate that in US presidential elections, an inch of rain (≈ 25 mm) reduces turnout by a bit more than one percentage point. The effects we estimate are thus more than twice as large.

[8]We presume that the probability of being pivotal is quite similar (average election district size is about the same). As more is at stake at state elections this should make the benefits of voting larger at the state level. Now, we view rain as a cost shifter in the calculus of voting. The induced costs of rain should be similar in municipal and state elections, however, for municipal elections it is more often that the shift in costs (rainfall) induces people to forfeit the benefits of voting. Note that the fact that the first stage is smaller in the state elections does not have consequences on the interpretation of the second stage effects. The similarities in the second stage effects, despite the differences in the first stage, speak further to the general nature of the turnout - partisan vote share relationship.

The control variables also merit a short discussion. We include municipal fixed effects in all models we estimate, using only the within variation in the data. Electorate-specific unobserved heterogeneity (like political culture, historical strength of a certain party, etc.) is thus implicitly controlled for. Furthermore, we control for location-specific precipitation patterns by including average rain on election day as a control variable. Amounts of rain above (or below) this average cannot be anticipated by the public and therefore act as an exogenous cost (benefit) on the act of voting. Controlling for population size accounts for the fact that turnout is generally lower in larger electorates (Geys, 2006). The year dummies capture the downward trend in turnout rates that is common to Western democracies (Gentzkow, 2006).

A possible concern against our results is that higher turnout does not hurt a specific party, but the incumbent party.[9] We therefore rerun our models with the incumbent vote share or the opposition vote share as left hand side variable (results not reported). We find no significant effects.

4   Conclusion

In this research note, we show that – in a setting of elections on different levels in Germany – social democrats profit from higher turnout rates whereas conservative vote shares decline if electoral participation increases. The endogeneity of voter turnout is addressed by using election day rain as an instrumental variable. Reassuringly, the general nature of this effect is confirmed in two independent sets of elections at different levels of government.

Our results are informative insofar as they confirm conventional wisdom and help understanding observed politician behavior in recent elections. For example, German chancellor Angela Merkel (a member of the conservative CDU) has become well-known for her election campaign strategy of "asymmetric demobilization" (Denkler, 2012). By avoiding statements on controversial issues and holding still, the CDU prevents social democratic voters from getting engaged. Furthermore, the CDU puts core social democratic issues like minimum wages on its own agenda, weakening potential SPD voters' reasons to go vote. These actions also imply weak mobilization of the own clientele, but demobilization of the opposing political camp – potentially due to known differences in the clientele's characteristics[10] – is larger. It is hence "asymmetric". The result is an overall lower turnout rate that helps the conservatives win elections.

Tables and Figures

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[9]See Bechtel and Hainmueller (2011) for an account of how extreme weather events and subsequent policy action can benefit the incumbent party.

[10]This also links our work to the known turnout effects of increased social inequality, see Schäfer (2012).

Table 1: Related Literature: Rain on Election Day

Paper	Country	Election	Time Frame	Rain on Turnout	Main Finding	Method
Panel 1: Rain as an explanatory variable						
Eisinga, Te Grotenhuis, and Pelzer (2012)	Holland	Federal	1971 - 2010	$-$***	Rainfall depresses turnout by a rate of one half percent per centimeter	RE
Fraga and Hersh (2010)	United States	Presidential	1948 - 2000	$-$***	Rain depresses turnout on average, but not in close elections	RE, FE
Gomez, Hansford, and Krause (2007)	United States	Presidential	1948 - 2000	$-$***	Election day rainfall reduces turnout in a county at roughly 0.8% per inch	RE
Knack (1994)	United States	House	1984 - 1988	$-^0/+^0$	No effect of rain on turnout or on partisan outcomes	Logit
Arnold (2015)	Germany (Bavaria)	Mayoral	1946 - 2009	$-$***	Rainfall reduces turnout on average, but not if the race is close	FE
Persson, Sundell, and Öhrvall (2014)	Sweden	Federal	1976 - 2010	$-^0/+^0$	No significant effect of rain on turnout is found in three Swedish datasets	OLS
Shachar and Nalebuff (1999)	United States	Presidential	1948 - 1988	$-$**	Electoral closeness stimulates party leaders' effort and thereby increases turnout; rain negatively impacts turnout	Structural Model
Panel 2: Rain as an instrumental variable						
Artés (2014)	Spain	Federal	1986 - 2011	$-$***	Conservatives are hurt by higher turnout whereas other smaller parties gain in terms of vote share	IV
Hansford and Gomez (2010)	United States	Presidential	1948 - 2000	$-$***	Higher turnout helps the Democrats, harms the incumbent, and makes vote shares less predictable	IV
Lind (2014)	Norway	Municipal	1972 - 2010	$+$***	Higher turnout hurts the left wing parties	IV
Lo Prete and Revelli (2014)	Italy	Mayoral	2001 - 2010	$-^0$	Higher voter turnout has a negative effect on city performance and the valence of mayors	IV

Notes: - stands for a negative effect, + for a positive effect. Stars denote the usual level of significance. A zero marks an insignificant effect. *Source:* Own Research.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
	Panel 1: Municipal Elections				
Election Data:					
SPD Vote Share	0.34	0.11	0.04	0.67	3162
CDU Vote Share	0.47	0.11	0.14	0.85	3165
Turnout	0.71	0.12	0.42	0.94	3165
Eligible Voters	32992.9	65953.14	2353	764876	3165
Share Elderly	0.15	0.03	0.08	0.3	3168
Weather Data:					
Rain (mm)	1.6	4.23	0	25.8	3087
No Rain	0.53	0.5	0	1	3168
Average Rain (mm)	2.75	1.27	0.22	7.26	3089
Distance to Next Weather Station (km)	7.83	4.18	0.63	21.17	3168
	Panel 2: State Elections				
Election Data:					
SPD Vote Share	0.39	0.11	0.09	0.72	3168
CDU Vote Share	0.46	0.12	0.2	0.88	3168
Turnout	0.71	0.09	0.48	0.89	3168
Eligible Voters	32424.24	64355.06	2463	705339	3168
Share Elderly	0.15	0.03	0.08	0.3	3168
Weather Data:					
Rain (mm)	1.69	3.75	0	36.3	3113
No Rain	0.61	0.49	0	1	3168
Average Rain (mm)	1.88	0.57	0.61	4.25	3113
Distance to Next Weather Station (km)	7.83	4.18	0.63	21.17	3168

Notes: The tables highlights the descriptive statistics for the two independent samples of municipal elections (Panel 1) and state elections (Panel 2).
Source: Own calculations.

Figure 1: Weather Stations in North-Rhine Westphalia
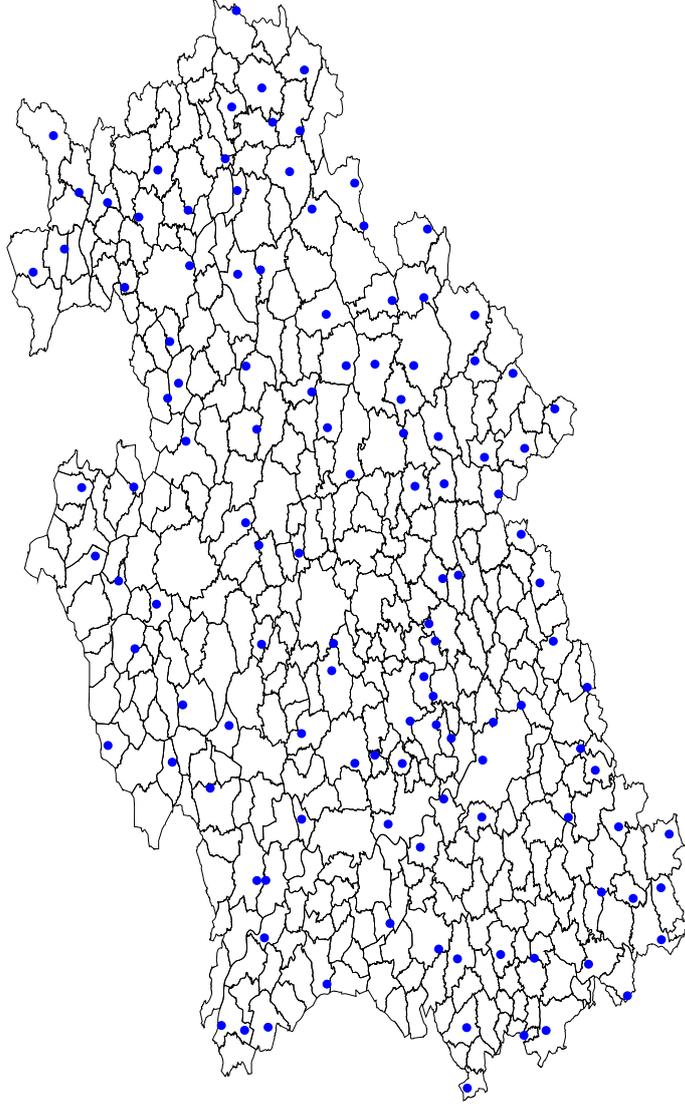
Notes: This map presents the spatial distribution of the 121 weather stations in North-Rhine Westphalia used in this analysis. The black lines depict the borders of all 396 municipalities. Each blue dot stands for a weather station.

Table 3: Main Results

Dependent Variable	(OLS) SPD Vote Share	(IV) Turnout	(IV) SPD Vote Share	(OLS) CDU Vote Share	(IV) Turnout	(IV) CDU Vote Share
	Panel (1): Municipal Elections					
Turnout	0.325***	-	0.755***	-0.380***	-	-0.851***
	(0.042)		(0.253)	(0.049)		(0.254)
Rain in cm	-0.004	-0.012***	-	0.006*	-0.012***	-
	(0.003)	(0.002)		(0.003)	(0.002)	
First Stage F-Statistic	-	26.25	-	-	26.21	-
(p-Value)	-	0.00	-	-	0.00	-
N	3081	3084	3081	3084	3084	3084
R^2	0.57	0.95	0.54	0.50	0.95	0.46
	Panel (2): State Elections					
Turnout	0.063	-	0.694***	-0.099**	-	-0.548**
	(0.038)		(0.258)	(0.041)		(0.262)
Rain in cm	-0.006***	-0.005***	-	0.003*	-0.005***	-
	(0.002)	(0.001)		(0.002)	(0.001)	
First Stage F-Statistic	-	16.67	-	-	16.67	-
(p-Value)	-	0.00	-	-	0.00	-
N	3113	3113	3113	3113	3113	3113
R^2	0.80	0.96	0.75	0.83	0.96	0.81

Notes: Standard errors are robust to heteroscedasticity. Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The data cover all local and state elections in the 396 municipalities of North-Rhine Westphalia between 1975 and 2010. Municipal and year fixed effects, a third order population polynomial and the share of elderly people are included as controls in each specification. Additionally, all models include a control for average rain on election day. The coefficient of the original variable *Rain in mm* has been multiplied by 10 to ease readability. We therefore denote the variable to relate to rain in cm.
Source: Own calculations.

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