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Crisis Management and Local Political Accountability

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Abstract

This paper analyzes whether local councilors in Germany were held accountable by voters for the local severity of the Covid-19 pandemic. We base our analysis on hand-collected election data on 173,339 candidates who competed in the 1997-2021 open-list municipal council elections in Hesse. The timing of the 2021 election one year into the pandemic and substantial variation in Covid-19 mortality rates allow us to evaluate the impact on incumbents' electoral performance. We implement difference-in-differences regressions with variation in treatment intensity exploiting exclusive data on Covid-19 mortality at the municipal level. Our results suggest that higher mortality rates substantially reduce incumbency advantages of local councilors.

Keywords: retrospective voting, crises, pandemics, council elections, accountability

JEL codes: D72, H12, H70, I18

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1 Introduction

The Covid-19 pandemic has left its mark on all countries around the globe. And yet, the extent of how hard countries were hit varies considerably – as indicated for instance by mortality rates. While Greece, the US, Chile, Brazil, the UK and Italy are at the top of the distribution (with more than 300 Covid-19-related deaths per 100.000 inhabitants), various Asian countries (Taiwan, South Korea, Indonesia, Japan, China) have performed quite well in this regard with about six times lower mortality rates (WHO, 2022).

Within countries, i.e. at the subnational (state, county, municipal) level, there is also large variation in pandemic exposure and severity. Some of the variation may be due to inherent characteristics of subnational regions and localities, such as the population density or the age structure of the population. However, federal and subnational governments had at their disposal and made use of a battery of drastic measures to contain the pandemic (school/daycare closures, work-from-home mandates, mask mandates, curfews, mandatory testing, etc.). During the first 12 months when a vaccine (or suitable medication) was not available for large parts of the population, policymakers carried a large responsibility in selecting and implementing appropriate and effective measures.

Given that most decisions on pandemic crisis management took place at the federal or state level, it is not clear whether there was any effect on local election results. Were voters aware that federal and state institutions were responsible for crisis management and therefore local elections were not affected at all by the pandemic? Or did voters fall prey to ‘blind retrospection’ where citizens (wrongfully) punished/rewarded local politicians for decisions that were beyond their control? If local incumbents were scapegoated for high Covid mortality rates, does the extent of this vary with the personal characteristics (gender, age, education level, etc.) of individual incumbents?

This paper addresses these questions in the context of the German state of Hesse where local council elections took place one year into the pandemic. In March 2021, Germany experienced the third Covid-19 wave, having just witnessed a devastating second wave from October

2020 to January 2021. In this environment, voters in the 422 municipalities in Hesse were called to the polls on March 14th, 2021 to elect local councils. We use hand-collected individual data on 173,339 candidates for six local council elections in Hessian municipalities in the 1997-2021 period. This allows us to track candidates across several elections and to use their re-election as a dummy outcome variable in our estimations.

Adopting a difference-in-differences (DiD) strategy with continuous treatment intensity (municipal variation in Covid mortality rates), we find that incumbents were less likely to get reelected in municipalities where the consequences of the pandemic were more severe. Our results suggest that voters actively evaluate local Covid-19 crisis management and punish/reward incumbents accordingly.

This paper primarily contributes to the literature on the political consequences of natural disasters (Malhotra and Kuo (2008), Healy and Malhotra (2009), Bechtel and Hainmueller (2011), Bodet *et al.* (2016)) which increasingly addresses pandemics. Campante *et al.* (2020) find that a panic caused by Ebola spread just before the US mid-term elections in 2014 reduced turnout and hurt the Democrats' chances of winning likely because the Republican campaign linked Ebola to immigration. Leromain and Vannoorenberghe (2022) show that Covid-19 was responsible for a lower voter turnout in French local elections in March 2020. Giommoni and Loumeau (2022) associate stricter Covid-19 restrictions with a higher vote share of incumbents in French local council elections. Baccini *et al.* (2021) show that Donald Trump could have been reelected as president in 2020 if it had not been for the Covid-19 pandemic.

We also contribute to a more traditional strand of the political economy literature that tries to understand voters' decision-making. Do voters engage in retrospective voting and form an opinion of in-office politicians based on their past performance (Ashworth *et al.*, 2018)? If yes, voters would hold incumbents accountable (Ferejohn, 1986) or remove ineffective incumbents where necessary (Rogoff, 1990). McDermott and Jones (2003) find indeed that voters hold the congressional majority party, rather than just their particular congressman, accountable for poor performance of the US Congress. de Benedictis-Kessner and Warshaw (2020) show that congressional and gubernatorial incumbents were punished by voters for the state of their

respective local economies based on county-level data on economic conditions between 1969 and 2018 in US. In a diffuse setting such as a global pandemic, it is not clear, however, whether voters are aware of local mortality rates and who is responsible for containing the pandemic.

In previous literature on pandemic retrospective voting, Gutiérrez *et al.* (2022) document a relatively small, yet non-trivial negative impact of a local H1N1 outbreak on the incumbent party's performance in elections to the lower house of the Mexican Congress in 2009. Experiencing a thousand more excess acute respiratory infection cases reduced the incumbent vote share by 0.17 ppts and this negative effect persisted in the 2012 congressional and presidential elections. Abad and Maurer (2021) show that incumbents lost votes due to the Spanish flu in 1918: in gubernatorial elections and congressional elections, areas that experienced a disproportionate number of deaths voted against the incumbent party.

One major contribution of our paper is that we conduct our analysis at the smallest local level possible using fine-grained data at the candidate level. This allows us to analyze to what extent our main estimates vary with personal characteristics of candidates such as gender, age and education levels. Moreover, our extensive dataset allows us to investigate various mechanisms.

2 Background

2.1 Covid-19 in Hesse

Hesse is a medium-sized state with more than 6 million inhabitants corresponding to 7.5 percent of Germany's total population. With regard to Covid-19 infection and mortality rates, Hesse has fared similarly to the rest of Germany. The first case of a Covid-19 infection in Hesse was confirmed on February 27, 2020, while the first death was reported on March 18, 2020.

Hessian municipal council elections in 2021 took place as scheduled on March 14, which coincides almost with the beginning of the third wave of the Covid-19 pandemic. On election day almost 3.2 percent of the state population (198,742 people) had officially been tested pos-

itive with Covid-19 (RKI, 2022). Until election day, Covid-19 had been responsible for the untimely death of 6,035 people which amounts to about one death per 1,000 inhabitants.

[Figure 1 goes here]

On December 27th, 2020 the state-wide vaccination campaign against the SARS-CoV-2 virus began in Hesse with the Pfizer-BionTech vaccine. Until election day only 7.8 percent of the state population had received their first vaccination due to severe shortages in the production of the vaccine (See Figure A.1 for a more detailed picture). The Covid-19 pandemic was thus still a salient issue for most of the population and the containment of the spread of the virus was an important task for (local) policymakers.

2.2 Pandemic crisis management in Germany/Hesse

With regard to electoral accountability, it is important to determine who is responsible for which disease control measures. This is, however, not straightforward in a federal country such as Germany. According to the Infection Protection Act (*Infektionsschutzgesetz*, i.e. *Gesetz zur Verhütung und Bekämpfung von Infektionskrankheiten beim Menschen*), the legal foundation for each measure is established by the federal government.

However, which concrete actions are actually taken is decided by the sixteen state governments. In addition, the states are in charge of acting in accordance with the IfSG, in particular on measures of quarantine (§30), occupational bans (§31) and curfews (§28), and they decide about the responsible authority at lower tiers of government (counties and/or municipalities).

In order to visualize how the Covid-19 containment measures varied over time across German states as well as across Hessian counties we use the strictness index of these measures which is reported by the German Federal Statistical Office (Figure 2). This index quantifies the severity of the restriction measures related to Covid-19¹ and ranges from 0 to 100, where 100 means the harshest restriction policies. Figure 2 shows that anti-covid measures had reached the

¹It is calculated using severity levels of several restriction measures, such as surgical mask duty, type and number of closed institutions due to the disease, restricting the number of people to meet together etc.

highest level of strictness all across Germany and Hesse during the election in March 2021. In addition, as the institutional description above already predicts, the variation between German states is higher than the variation between Hessian counties.

[Figure 2 goes here]

Consequently, the State Presidents and State Ministers of Health were mainly responsible for the containment of the pandemic. At the time of the Hessian municipal elections in 2021, Volker Bouffier from the conservative CDU was the State President of Hesse, while the Minister for Social Affairs and Integration (also responsible for health issues) was Kai Klose from the Green Party. During the pandemic, the Hessian state government consisted of a CDU-Green coalition (see Figure A.2 in the online appendix for the seat distribution in the state parliament).

In sum, municipal bodies had only limited discretion to undertake disease-related health-care measures. However, a closer look at the Hessian Municipal Legislation (*Hessische Gemeindeordnung*) reveals that municipal councils are independent in planning and executing their own budget. Also, the use of financial instruments to rescue local businesses was one of the widely discussed topics in council meetings.

2.3 Hessian council elections

Since 2001, council elections in Hesse take place in March every five years.² We focus on the council elections that took place on March 14, 2021. On this day, local councils were elected in all 422 municipalities.

Local council members are elected via an open-list procedure (also called preferential voting). Prior to the election, parties compile a list of candidates and assign an initial rank to each candidate. The number of votes each voter has is equal to the number of council seats. Voters may freely allocate their votes to candidates across different lists (*Panaschieren*) and may cast up to three votes for a single candidate (*Kumulieren*).

²Before 2001, elections were held every four years.

Lists receive seats according to the total number of votes received. For example, a list that receives 20% of the votes overall in a council election with 30 seats receives 5 seats. Candidates are ranked according to their preferential votes and are elected to the council when their post-election (final) rank is lower than or equal to the number of seats to which their list is entitled (Baskaran and Hessami, 2019).³

3 Data and empirical strategy

3.1 Data

3.1.1 Covid-19 mortality data

For our DiD identification strategy, we rely on differences in the severeness of the pandemic across municipalities in Hesse as the treatment. We proxy the severeness via the number of lives the disease had taken away per 1,000 inhabitants (mortality rate) from the beginning of the pandemic until the day of the 2021 local elections.

Since publicly available Covid-19 mortality data is limited to the county level, we hand-collected this data for the municipal level. We contacted all 21 counties in Hesse and requested them to provide the cumulative number of infections and deaths since the beginning of the pandemic and for the last two weeks until the election day, March 14, 2021.⁴ 11 of the 21 counties delivered the data (see Section A.3 for details).

Hence, our estimation sample consists of 220 municipalities in total: 215 regular municipalities and 5 county-free cities (for the latter Covid-19 mortality rates are publicly available). Figure 4 shows that the municipalities in our sample are spread evenly across the state.⁵

³Thus, a candidate's pre-election rank does not directly determine the outcome of the election. On the other hand, candidates at the top of a list are more noticeable, and the initial list rank may indicate a candidate's quality.

⁴As the data is updated every evening, the last day statistics are from March 13.

⁵Table A.1 compares municipalities that delivered the Covid-19 data with the ones that did not. We see that except for some significant differences in transfers and council formation which are negligible in magnitude, the in-sample municipalities are similar to others.

[Figure 4 goes here]

Figure 5 plots the distribution of Covid-19 mortality rates. We see that it varied from 0 to 5 deaths per 1,000 inhabitants across Hessian municipalities where the range up to 3 deaths lies within 95th percentile. The distribution is right-skewed with the mean at 1 and the median at 0.78.

[Figure 5 goes here]

3.1.2 Council election data

We build on the hand-collected council election data from Baskaran and Hessami (2018) and extend it with newly collected data for the 2021 election. The combined dataset includes information on 173,339 candidates who competed for municipal council seats in Bavaria in 1997, 2001, 2006, 2011, 2016 and 2021. Figure 3a shows the evolution of our data coverage which is incomplete due to the hand-collection of the data, although it improves over time. For the last two elections, our data covers all municipalities in Hesse.⁶ In Section A.1 of the online appendix, we explain how we collected and cleaned the data.

[Figure 3 goes here]

Our data comprises candidates' names, gender, party, initial list ranks, final ranks, number of preferential votes received, and incumbency. We also have details on candidates' educational background, occupation, and birth year.⁷ Since many candidates competed for office in multiple elections, we match individuals within municipalities across elections.⁸ This matching helps us to fill in missing information on candidates' occupation, age and education.

Matching the candidates across elections also enables us to identify incumbents. We code candidates who were elected into the council in period $t - 1$ and rerun in period t as incumbents in period t . Incumbency is coded as missing when the data for the $t - 1$ election is not

⁶The total number of municipalities in the state decreased from 426 to 422 due to mergers in 2020.

⁷Age is calculated as election year minus birth year.

⁸See Section A.2 of the online appendix for details on the matching process.

available for a given municipality. Figure 3 depicts how many candidates we could classify as incumbents or non-incumbents.

In recent elections, we can identify more (non-)incumbents. We could classify on average 70% of the candidates as either incumbents or non-incumbents for the entire 2001-2021 period. 2021 represents the ideal case where we could classify almost all candidates.⁹

3.1.3 Further variables

We additionally collect municipality-level data on demographics (population, gender and age statistics), fiscal characteristics (revenues, transfers and debt) and political formation (gender and party decomposition of municipal and county councils) from the Hessian State Statistical Office. Note that the political variables are available only for the period 1997-2021, while the time series for the other variables start from 1991.

3.2 Empirical strategy

3.2.1 OLS: Incumbency advantages (over time)

In this paper, we investigate whether voters retrospectively rewarded or punished incumbents. As a first step, we measure the general incumbency advantage of local councilors in Hesse. We specify the following regression equation:

$$\text{Elected}_{itm} = \beta * \text{Incumbent}_{itm} + \theta_t + \gamma_m + W'_{tm} + \varepsilon_{itm}, \quad (1)$$

where the dependent variable is a dummy variable that indicates whether a candidate i is elected into the council in municipality m in election t .¹⁰ Incumbent_{itm} is a dummy variable which is 1 for incumbent candidates. Our coefficient of interest β quantifies the effect of incumbency

⁹We could not classify six 2021 candidates with the same first and last names within the same list. We cannot tell the incumbency status of candidates in 1997 since we do not have data for the previous election.

¹⁰According to Baskaran and Hessami (2018), the amount of votes or vote shares received by candidates is a subpar proxy for voter preferences in open-list elections since there is a positive association between initial

on the likelihood of being elected (compared to non-incumbents). θ_t and γ_m are time and municipality fixed effects. W'_{tm} is a vector of municipal control variables including population size, the share of women, the share of population over 65 and under 14, and council size.

Next, we estimate an interaction model to examine how the incumbency advantage changes over time. We regress the outcome variable on interactions between the incumbent dummy and a dummy for each election:¹¹

$$\begin{aligned} \text{Elected}_{itm} = & \beta_1 * \text{Incumbent}_{itm} \times 2001_{itm} + \beta_2 * \text{Incumbent}_{itm} \times 2006_{itm} \\ & + \beta_3 * \text{Incumbent}_{itm} \times 2011_{itm} + \beta_4 * \text{Incumbent}_{itm} \times 2016 + \beta_5 * \text{Incumbent}_{itm} \times 2021 + \gamma_m + W'_{tm} + \varepsilon_{itm}. \end{aligned} \quad (2)$$

3.2.2 Continuous DiD

Our main strategy to test whether voters voted retrospectively, i.e. whether they knowingly punished or rewarded incumbents for their crisis management, relies on within-state variation of covid mortality rates at the time of election. We use a generalized difference-in-differences (DiD) design with continuous treatment intensity:¹²

$$\text{Reelected}_{imt} = \beta \text{Mortality Rate}_{m,t} + \alpha_m + \gamma_t + Z1_{mt}\xi_1 + Z2_{m,t-1}\xi_2 + \varepsilon_{imt} \quad (3)$$

where Reelected_{imt} is a dummy variable with 1 if the incumbent is reelected and translates into a reelection probability of incumbent i in municipality m in election t ; mortality rate represents the number of Covid-related deaths per 1,000 inhabitants and takes non-zero values only for 2021. α_m are municipality fixed effects which control for time-invariant municipality characteristics. γ_t are year fixed effects which take care of time trends in incumbency advantages.

rankings and final ranks of candidates. Therefore, in order to properly represent voter preferences, we include the candidates' ultimate election status as dependent variable in our regressions.

¹¹Due to lack of data on candidates' incumbency status the 1997 election is excluded from the regressions.

¹²See, e.g., Lindo *et al.* (2020) for a similar approach.

We add two types of controls to account for time-varying characteristics of municipalities: $Z1_{mt}$ (female share, elderly ($65 <$) and children (<14) share, population density, per capita tax revenue, transfers, debt) and $Z2_{m,t-1}$ as the council-specific covariates (share of women, CDU, SPD, Gruene and FDP in the council). To rule out potential correlation in error terms within municipalities across election years, standard errors are clustered at the municipality level.

According to recent DiD literature, e.g. Callaway *et al.* (2021), such a TWFE approach yields a β which equals not only to the causal effect of the treatment (the average effect of moving from dose d_i to d_j among units that experienced dose d_i) but also a bias term that average effect of treatment among groups who received doses of d_j and d_i may have varied even though they had both received the same treatment dose. This selection bias term can only be eliminated in the case of a fulfillment of the “strong” parallel trends assumption. In our case, the identifying assumption is that the changes in the reelection probability of incumbents in municipalities with a low mortality rate provide a good counterfactual for the changes in the reelection probability of incumbents that would have been observed in municipalities where a higher share of the population was lost due to the infection if they had experienced similar mortality rate.

A second caveat of the TWFE approach stressed in Callaway *et al.* (2021) is that it typically puts more weight on doses around the average of the treatment variable and less on the tails. Therefore, the final average causal response to treatment can be misleading. This may also apply to our case given an uneven distribution of the treatment variable as shown in Figure 5. We address this issue by grouping our treatment intensity variable into four equally-sized dose groups (quartiles) and define the lowest (treatment=1), middle-low (treatment=2), middle-high (treatment=3) and the highest (treatment=4) doses.

3.2.3 Common trend assumption

Replacing the continuous treatment variable in Equation (3) with indicators for treatment dose groups allows us to compare the treatment effects in the higher treatment groups to the lowest group. This grouping technique also enables us to compare observable characteristics of mu-

nicipalities which received different treatment doses and to provide evidence for the “strong” parallel trends assumption.

To analyze the validity of this assumption, Figure 6 plots how the average reelection probability of incumbents across the treatment groups developed over time. Before the treatment, the four lines follow a quite similar pattern with a peak in 2006 and a subsequent decline that evolves in a parallel fashion for all four treatment groups.

[Figure 6 goes here]

Figure A.3 visualizes how these groups of municipalities are distributed across Hesse. The treatment groups are not clustered geographically. Figure A.4 presents balance tests across treatment groups in demographic, fiscal and political dimensions. The fact that there are no systematic differences between the four treatment groups (especially in Covid-relevant population statistics such as the elderly share) assures us that the lower-dose groups would have the same outcome if they had received the high dose and vice versa.

4 Results

4.1 Incumbency advantages (over time)

Table 1 estimates incumbency advantages of local councilors in Hesse based on Equation (1). While Model (1) is a simple bivariate regression, we add fixed effects and time-varying control variables in subsequent models. The estimates hardly change in Models (2)-(4). Model (4), which is the most complete model, shows that incumbent candidates are 57 percent more likely to get elected into the council than their non-incumbent counterparts (in line with the descriptive statistics in Figure A.5 in the online appendix).¹³

¹³Figure A.5 provides descriptive statistics on reelection probabilities. Subfigure (a) illustrates that incumbent candidates are almost three times more likely to enter the council than non-incumbents. Subfigure (b) illustrates how incumbency advantages have varied over time. The largest incumbency advantages occurred in 2006 and they have been declining thereafter.

[Table 1 goes here]

Table 2 collects the regression results based on Equation (2) using the same structure as the previous table. The only difference is that the incumbent dummy is interacted with election year dummies. In Model (4), the incumbency premium reaches its peak at 61% in 2006, after which it gradually declines by around 3 percentage points per election year.

[Table 2 goes here]

Based on the results above, there is no clear evidence that overall voter preferences towards incumbents were particularly different in 2021, but it rather followed the existing trend from previous elections. On the one hand, provided that all municipalities were already in a crisis regime by the time of elections in 2021, these results indicate that there was no rally-around-the-flag effect. On the other hand, this method does not allow us to test voted retrospectively in 2021 as the crisis effect on reelection probability of good and bad performing incumbents might have canceled each other out.

4.2 Covid-19 mortality and incumbents' re-election

4.2.1 Linear specification

Table 3 collects the results for our DiD estimations based on Equation (3). Column (4) shows that compared to the incumbents in municipalities in the first treatment dose group, incumbents in the second treatment dose group were almost 4.9ppt less likely to get reelected, incumbents in the third dose group were 6.4ppt less likely to get reelected, and incumbents in the fourth dose group were 4.6ppt less likely to get reelected. Thus, medium to high mortality rates consistently led to lower reelection rates compared to low mortality rates.

[Table 3 goes here]

Another finding in Table 3 is that the treatment effect is largest for the medium-high dose group (6.4ppt) while the treatment effects for the medium-low (4.9ppt) and the high (4.6ppt)

dose group have a quite similar, slightly smaller magnitude. This may imply a quadratic relationship between mortality rates and incumbents' reelection probabilities.

4.2.2 Quadratic specification

To formally investigate nonlinear effects, we replace the treatment dose groups with a continuous mortality rate variable and its square. Table 4 collects the results for the quadratic specification. Column (4) shows that each additional Covid-related death per 1,000 inhabitants indeed is associated with a reduction in the reelection probability of incumbents at a decreasing rate. Thus, up to a point, additional mortality leads to harsher punishment of incumbents by voters. Thereafter, the marginal effect declines.

[Table 4 goes here]

Figure 7 visualizes the quadratic relationship while indicating the relevant percentiles of the mortality rate within our sample with dotted lines. Note that the sign of the effect only changes after the 95th percentile of the mortality rate, i.e. it is hardly relevant for our sample. The main conclusion that can be derived is that the marginal effect of Covid-19 mortality declines but the overall effect is significantly negative for almost the entire sample.

[Figure 7 goes here]

5 Robustness

5.1 Alternative number of treatment groups

Since the Covid-19 mortality rate is a continuous variable, there are many alternative ways of dividing municipalities into groups according to their Covid-19 mortality rate. In Table A.2, we divide the treatment variable into two, three, five and six equal-sized dosage groups and also reprint our previous main specification with quartiles for comparison. As before, all estimates are reported in comparison to the lowest possible treatment dose group.

With two groups there is no significant treatment effect, even though the coefficient is negative and has a t-statistic larger than 1.5. With three treatment groups, there is a significantly negative sign for the comparison between the lowest and the medium treatment group. With five and six treatment groups, there is also a pattern that indicates that as of a certain threshold of mortality, incumbents are punished by voters.

Overall, the results confirm a quadratic relationship between the mortality rate and incumbents' reelection probabilities. We will use the quadratic model as the main specification in the following sections.

5.2 Balanced sample and outliers

Since our election data does not cover all municipalities in all years (see Figure 3), we test the robustness of our baseline results using a balanced municipality-election panel for the 2006-2021 period. There are 132 municipalities in our dataset for which data is available for all four elections. Column (2) of Table A.3 shows that although the magnitude of the estimates change slightly with the balanced sample, they results are qualitatively the same as in the baseline.

As a second robustness test on the sample composition, we exclude the five largest cities from the sample from the estimations. The five county-free cities are clear outliers given their size and special status and as described in Section A.3, they are the only local units which did not participate in our Covid data-collection survey. The results in column (3) of Table A.3 confirm that our estimates are robust to the exclusion of the five large cities.

5.3 Incumbents' vote share

As a final robustness test, we use incumbents' individual vote shares instead of a re-election dummy as the outcome variable in the estimations. Vote shares are calculated as the share of votes an individual candidate receives relative to the total votes cast in a given municipality. The advantage of this outcome variable is that it is a more sensitive measure than the re-election dummy and that it has more variation. On the other hand, we prefer the re-election dummy

for the main specification because only getting re-elected bears direct consequences for the candidate and is the most important electoral outcome.

Table A.4 collects the estimation results using this alternative outcome variable. The estimated coefficients have the same sign and statistical significance as in the baseline.¹⁴ More precisely, each additional covid death per 1,000 population led to around 8.5% loss in incumbent candidate's vote share on average in municipalities with a mortality rate less than 3.

6 Mechanisms

In this section, we address three alternative mechanisms for the baseline results. Instead of (blind) retrospection for a comparably weak performance in containing the pandemic locally, it could be that (a) turnout differed considerably due to the fear of getting infected, (b) voters reacted not to the cumulative mortality but only to the mortality and infections two weeks prior to the election, and (c) that the results are concentrated among incumbents from a certain party that took an extreme position in addressing the pandemic at a national level.

6.1 Voter turnout

One alternative explanation for our finding that higher mortality led to a lower likelihood for incumbents to get re-elected is that high Covid-19 mortality kept citizens from casting their votes, i.e. from turning out. Thus, our baseline results may simply be driven by a change in the composition of the electorate that turned out.¹⁵

¹⁴See Figure A.6 for visualization of this relationship between mortality rate and incumbent vote share.

¹⁵Existing literature is inconclusive about the effect of turnout on the electoral performance of incumbents. Theory suggests that increased turnout may be related to incumbency advantage losses (Grofman *et al.*, 1999). While Godbout (2013); Hansford and Gomez (2010); Martins and Veiga (2014); Trounstone (2013) report a negative effect of a higher voter turnout on incumbents' electoral success, Frank *et al.* (2022) discover that in Bavarian mayoral elections, a rise in turnout brought benefits to incumbents. On the other hand, Baskaran *et al.* (2022) find that slightly increased turnout due to Covid-19 outbreaks had hardly any effect on incumbents' reelection probabilities in Bavarian council elections.

To investigate the relevance of this channel, we first test whether the local Covid-19 mortality rate affected voters’ turnout decision. In Table 5, we first reestimate our baseline model using the turnout rate (model (1)) as well as the vote-by-mail rate (model (2)) as outcome variables. Note that the sample size is smaller for model (2) since the Hessian State Statistical Office provides mail turnout statistics only for the last two elections. The results indicate that one additional Covid-19 related death per 1,000 inhabitants reduces the turnout rate by 1.5ppt (statistically significant at the 10% level). Using the mail-by-vote turnout rate – which is likely to matter in this context as voters may have preferred not to leave the house –, we do not find any effect of Covid-19 mortality.

[Table 5 goes here]

In a second step, we test if the decrease in electoral turnout drives our main results by re-estimating our quadratic specification including the turnout rate and the vote-by-mail rate as additional control variables. Both for model (3) and (4), we find that our main coefficient of interest for the squared mortality rate is significant and positive (with a similar magnitude as in our baseline regressions), indicating that turnout changes do not explain our main finding.

6.2 Emotional voting

Next, we examine if the losses in incumbency advantage due to Covid-19 mortality are due to emotional voting, i.e. “blind” emotional reactions to recent events. Achen and Bartels (2012) illustrate that voters base their decisions on feelings of (dis)satisfaction in general, which can be affected by circumstances, even if those circumstances are outside the government’s control. They find that shark attacks on the east coast of the US were the reason why the incumbent president Woodrow Wilson lost the presidential election in 1916. Alternatively, Healy *et al.* (2010) find that the results of the football or basketball matches by local teams which took place right before elections were mirrored in the election outcome; i.e. the wins led to an 1-2ppt increase in incumbents’ vote share.

One could, therefore, hypothesize that in places where the consequences of the disease were particularly severe immediately preceding the election in 2021 incumbents were less likely to get reelected. As described in Section 3.1.1, we collected Covid-19 data also for the 14 days preceding the election. We add both short-term mortality and infection statistics as controls in our main specification.

[Table 6 goes here]

Table 6 collects the results. Neither absolute nor relative measures of mortality and infections have a significant effect on the outcome and do not affect the baseline treatment coefficients. Table A.5 in Online Appendix where we replace the treatment variable with short-term mortality rate provides additional support to the view that the voters were not voting emotionally with regard to events immediately preceding the election.

6.3 Party bias

A third mechanism that may explain our main result are party-specific effects. As mentioned in the institutional description, mostly the federal and the state government were responsible for making decisions to contain the spread of the Covid-19 pandemic. The different parties favored different degrees of strictness in containing the virus. In particular, the FDP took relatively extreme position in this debate and favored a more freedom-oriented approach.

To investigate to what extent nation-wide party effects drive our results, we have estimated our baseline model for subsamples of candidates that belonged to the four major parties (SPD, Greens, CDU, and FDP). The results for these estimations are collected in Table 7.

[Table 7 goes here]

The results indicate that mainly the incumbents from SPD and FDP faced difficulties in getting re-elected due to pandemic. The fact that they are the minority in the Hessian State Parliament as described in Section 2.2 in comparison to the CDU-Greens coalition, shows that voters were overall satisfied with the measures taken. Besides, we see that the effects are particularly large for incumbent local FDP candidates. Thus, the liberal approach taken to contain the

spread of the virus, which was in particular voiced by the federal-level opposition parliament members, appears to have hurt re-election probabilities of FDP local council candidates.

The coefficients for the squared mortality rate for the SPD and the CDU (which are the two largest parties with the most councilors overall in Hesse) correspond to the coefficient in the baseline. The FDP coefficient is about three times larger. For the Greens, the coefficient is indistinguishable from zero. To conclude, party spillovers from the federal to the local level played a role but are not the main explanation for the baseline findings.

7 Effect heterogeneity

7.1 Incumbents' personal characteristics

Our unique dataset at the candidate level allows us also to investigate whether effects vary with the individual characteristics of candidates. Were certain candidates punished more harshly by voters for a weak Covid-19 crisis management performance?

To investigate this, we run additional estimations for subsamples of candidates across gender, age, and education levels. The results are collected in Table 8 and indicate that relatively young and relatively old incumbents as well as incumbents without a university degree were particularly punished for high mortality rates.

[Table 8 goes here]

Moreover, female office-holders were punished twice as harshly as their male counterparts. Descriptively speaking, in our sample incumbents from both genders on average have almost the same re-election probability (at around 56 percent¹⁶) prior to the 2021 elections.

This offers an interesting contribution to the existing literature on the performance of women leaders in managing crisis, such as pandemic. Aldrich and Lotito (2020) disproves that female leaders around the world are handling the COVID-19 situation better compared to their male counterparts. Their cross-country analysis yields empirical evidence to support

¹⁶Calculated by reestimating the Model (4) in Table 1 for the subsamples with female and male candidates

this observation to be a mere correlation. On the contrary, Bruce *et al.* (2022) suggest that Brazilian municipalities headed by female leaders fared relatively well in the recent pandemic. They find that female mayors increased the enforcement of non-pharmaceutical measures while decreasing fatalities and hospitalizations per 100,000 people.¹⁷

Hence, our results are unsupportive of the findings in the literature as they could be may come down to the fact that in Germany, the municipal councils in general are not free make decisions about such non-pharmaceutical measures individually in their municipalities, as described in Section 2.2. That, in turn, leads to an assumption that female councils had not lived up to voters' expectations about keeping the fatality rate as low as possible in their localities.

7.2 Access to hospitals

In Germany, hospitals are the only healthcare institutions that offer medical assistance on a 24/7 basis. Also, considering that patients with severe Covid cases needed to be treated in intensive care units at hospitals, we assume that access to hospitals could drive our treatment estimates.

We identify 198 hospitals in Hesse using the Geofabrik OSM dataset¹⁸ (Figure A.7) and calculate the driving distance as well as driving time to the nearest hospital from the municipality centroids.¹⁹ Figure A.8 visualizes the variation in these two hospital access measures across municipalities. This variation allows us to test whether the proximity to hospitals mattered for the punishing behavior of voters.

Figure 8a compares coefficient estimates of treatment effects from our baseline model across increasing ranges of driving distance to the nearest hospital. It reveals that the treatment

¹⁷Further, women are in general thought of as being less risk-taking than men when under pressure (Mather and Lighthall, 2012) or while making political decisions (Verge *et al.*, 2015), which may make them more impulsive and less prone to accept health risks.

¹⁸Updated on 29.04.2022, available at <https://download.geofabrik.de/europe/germany/hessen.html>

¹⁹Driving time and distance are calculated using the time stamp of 13.03.2021 12:00 (a day before the elections at noon to obtain average traffic) as the departure time from municipality centroids. The results are similar when using the time stamp of running the algorithm (09.02.2023 11:00) as departure time instead.

magnitude enlarges as the proximity increases, i.e. voters tend to punish incumbents for a high level of mortality more the farther they live from any health centers where they could be treated in case of emergency. Subfigure (b) shows that the results are consistent when we define the proximity with travel time instead of distance.

[Figure 8 goes here]

One possible explanation for these results is that voters with a hospital in their close neighborhood felt safer during the pandemic. The harsher punishment from voters with bad access to hospitals can be seen as a sign of blind retrospection if we consider the fact that where hospitals are built is decided only at a state-level in Germany and had been decided a while ago in the past.²⁰

8 Conclusion

This paper analyzes whether voters change their voting behavior during a severe crisis, exploiting local elections in Hesse that took place in the midst of the Covid-19 pandemic in mid-March 2021. At this point in time, local mortality rate increases due to Covid-19 had been observed by voters for a full year, less than 10% of voters had received their first vaccination shot, infection rates continued to be high, and it was clear that the pandemic would cause more damage in the coming months or even years.

Our results show that incumbent councilors typically enjoy a large incumbency advantage in Hesse. Using difference-in-differences estimations that exploit varying treatment intensity (i.e. mortality rate increases), we find that while the incumbency advantage remained high throughout Hesse in the 2021 election, it declined more in those municipalities where local Covid-19-related mortality rates were particularly high. Compared to the quartile of municipalities with the lowest mortality rate increases, municipalities with moderately low to very

²⁰Punishing politicians for negative occurrences beyond their control is known as "blind retrospective voting", which is widely discussed in the literature (e.g. Achen and Bartels (2017); Arceneaux and Stein (2006)).

high mortality rate increases faced a decline in incumbency advantages of local councilors of 5 to 6ppts which amounts to about 10% of usual incumbency advantages.

tbc

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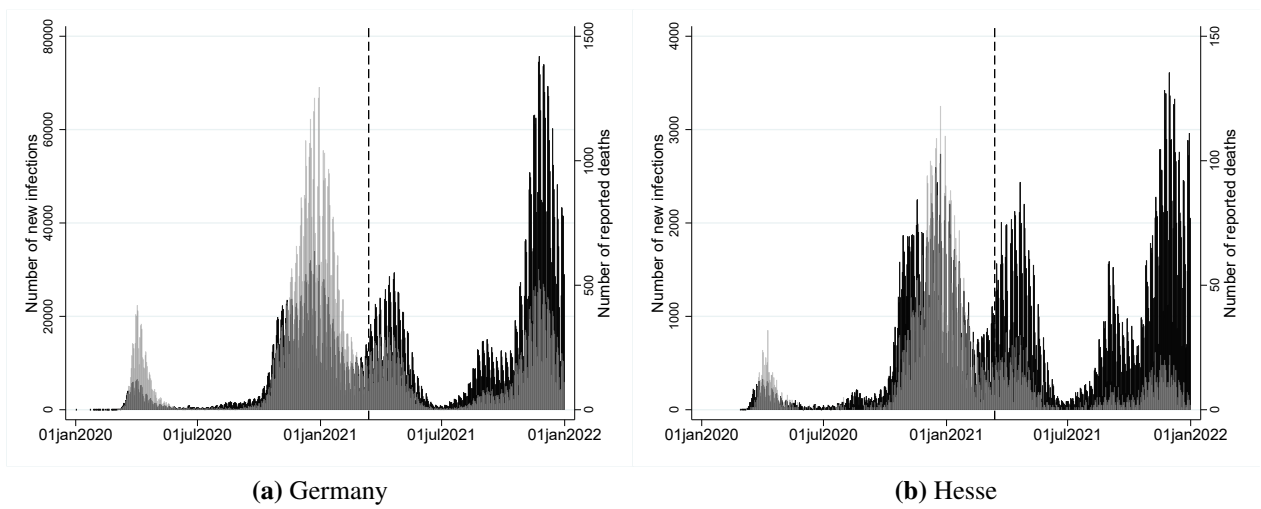
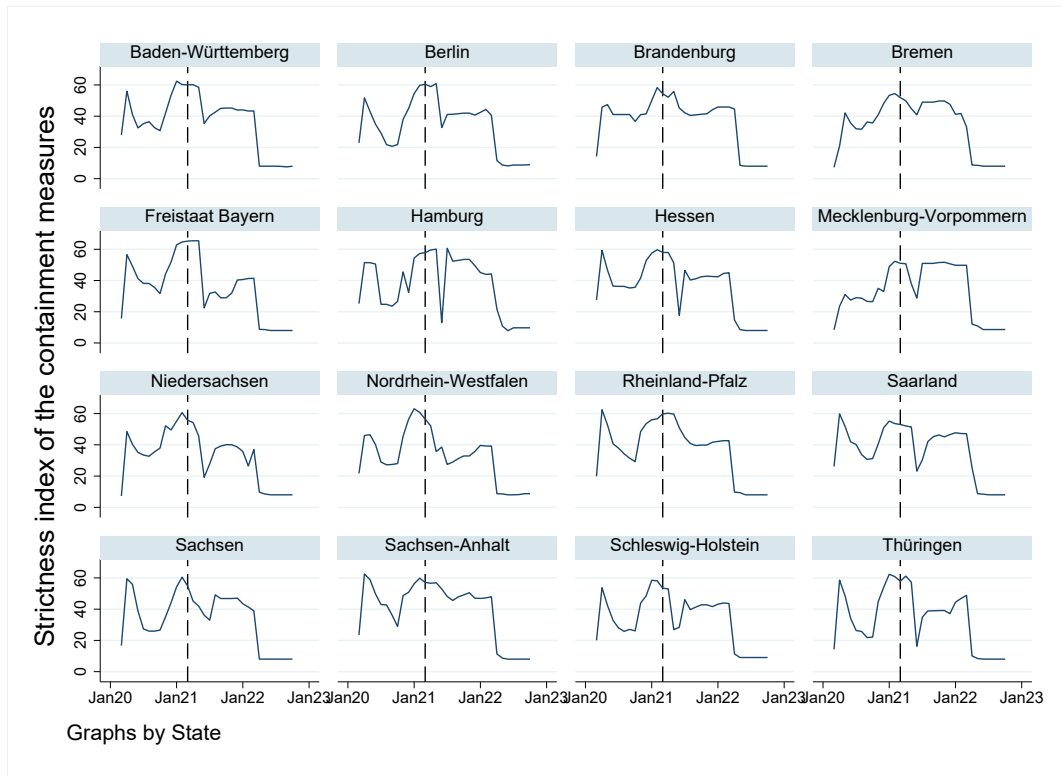
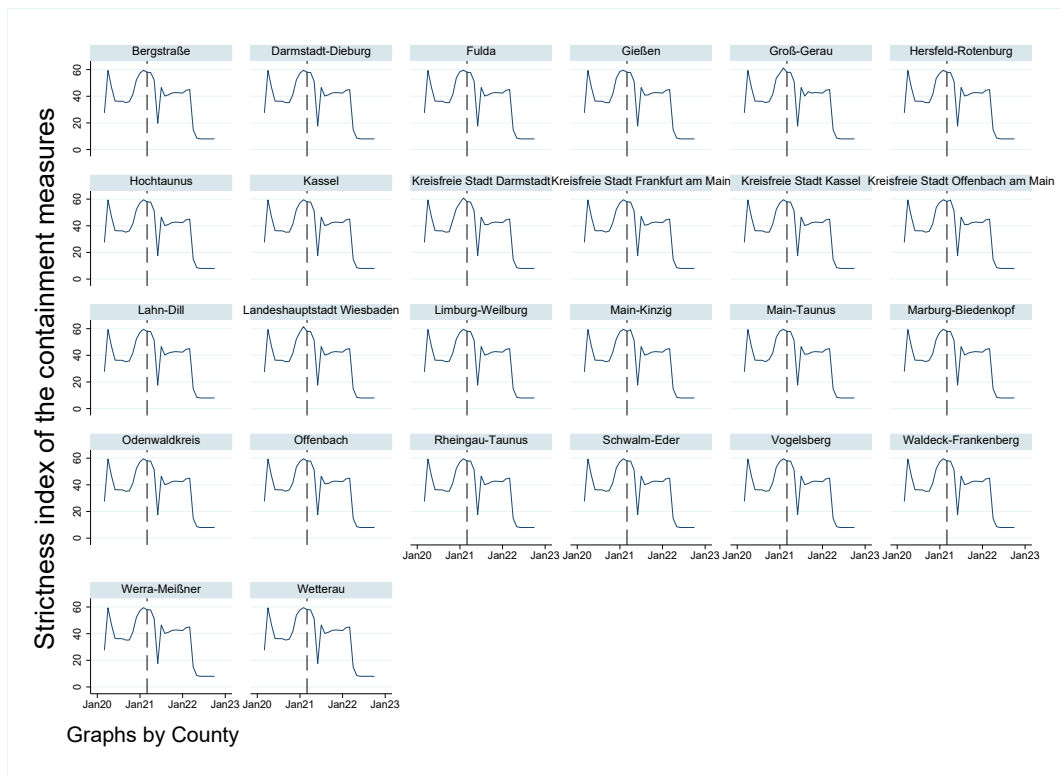


Figure 1: Covid-19 infections and mortality: Germany vs. Hesse. This figure plots the development of Covid-19 infections (left y-axis) and mortality (right y-axis) over time from January 2020 to December 2021. Subfigure (a) illustrates the daily number of infections and reported deaths in Germany, while in subfigure (b) the corresponding numbers for the state of Hesse are presented. In both graphs, black-shaded bars represent the number of infections, grey-shaded bars represent the number of deaths. The vertical dashed line in each figure indicates the election day (March 14, 2021).



(a) Germany



(b) Hesse

Figure 2: Strictness of Covid-19 containment measures across Germany and Hesse. This figure illustrates the strictness of Covid-19 containment measures enacted per month since the beginning of the pandemic using an index scaled from 0 to 100. The data is provided by The Federal Statistical Office. Subfigure (a) illustrates the variation of the index across German states, while in subfigure (b) the corresponding numbers for Hessian counties are presented. The vertical dashed line in each figure indicates the election month (March 2021).

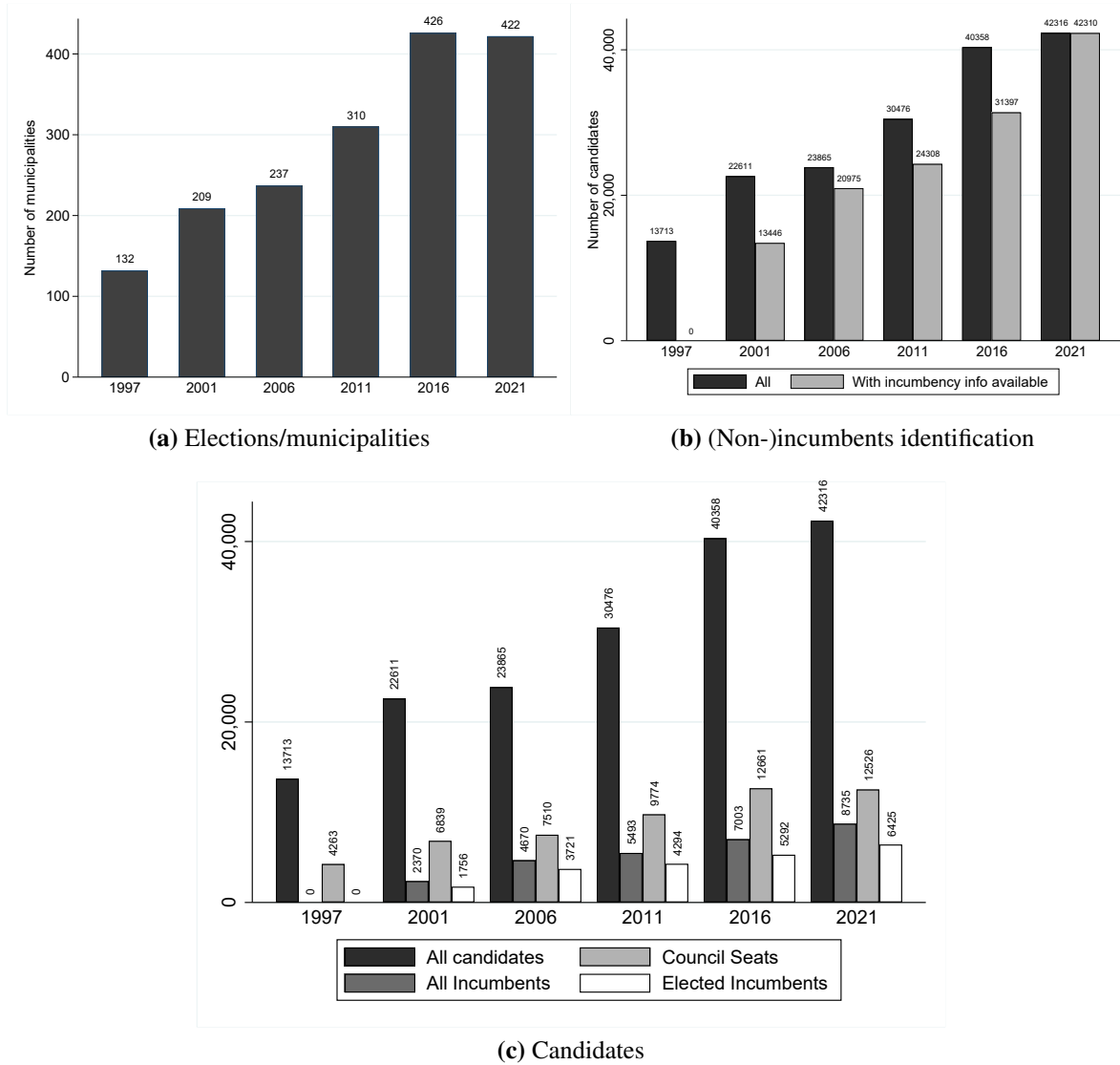


Figure 3: Summary statistics: election coverage and council candidates. These bar charts summarize the election outcomes and the incumbency status of the candidates covered in the data. Subfigure (a) shows the number of municipalities included in our sample in each legislative period (which corresponds with the number of elections for which we have data). For the last two elections we have the full sample. The official number of municipalities in Hesse has decreased from 426 to 422 due to municipal mergers that took place after 2016. Subfigure (b) illustrates how many candidates we could clearly identify as incumbents or nonincumbents based on the election outcomes from the previous election. As Figure ?? shows, the data is not available for all municipalities in all years. Hence, not all the candidates can be categorized as incumbents/non-incumbents. Subfigure (c) shows the number of candidates from our sample per legislative term and the total number of council seats they ran for along with the number of reelected incumbents.

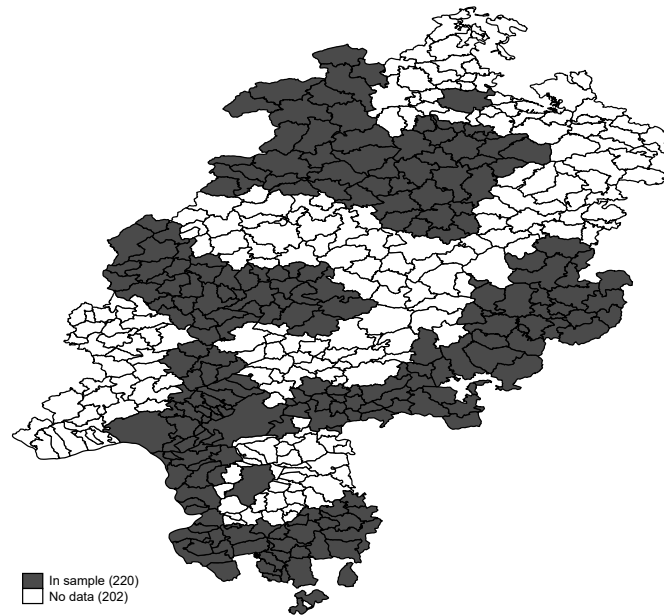


Figure 4: Geographic distribution of municipalities included in the sample. This map shows how the municipalities for which we have Covid-19 mortality rate data are spread all over Hesse. The municipalities for which we have obtained the data are indicated by the dark shade.

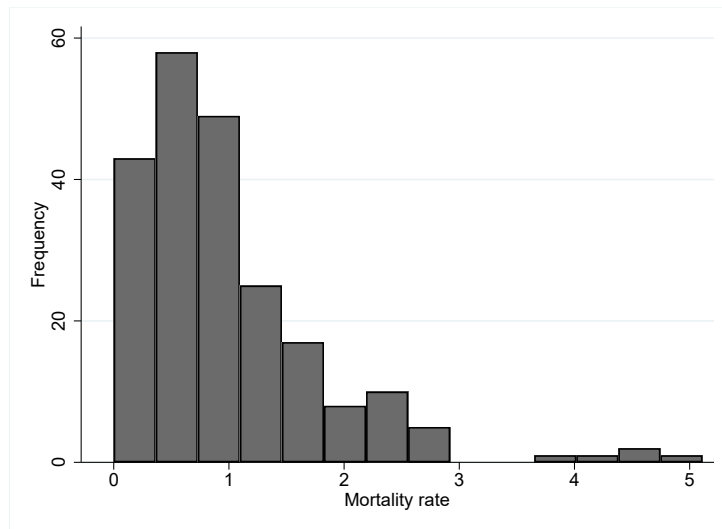


Figure 5: Distribution of municipal Covid-19 mortality rates. This histogram shows how the Covid-19 mortality rate is distributed across the municipalities in our sample. The x-axis indicates the cumulative number of deaths per 1000 inhabitants in a municipality from the beginning of the pandemic until election day.

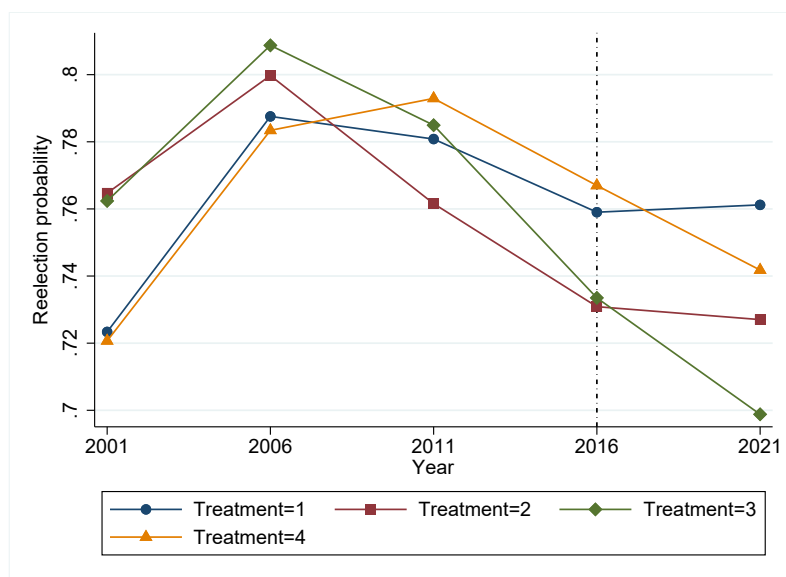


Figure 6: Incumbents' re-election over time and across treatment dose groups. This graph illustrates the rate at which incumbent local councilors were re-elected in Hesse over time and across the four treatment dose groups. Municipalities are grouped via the quartile of mortality rates they belong to. The dotted vertical line highlights the last election prior to the treatment.

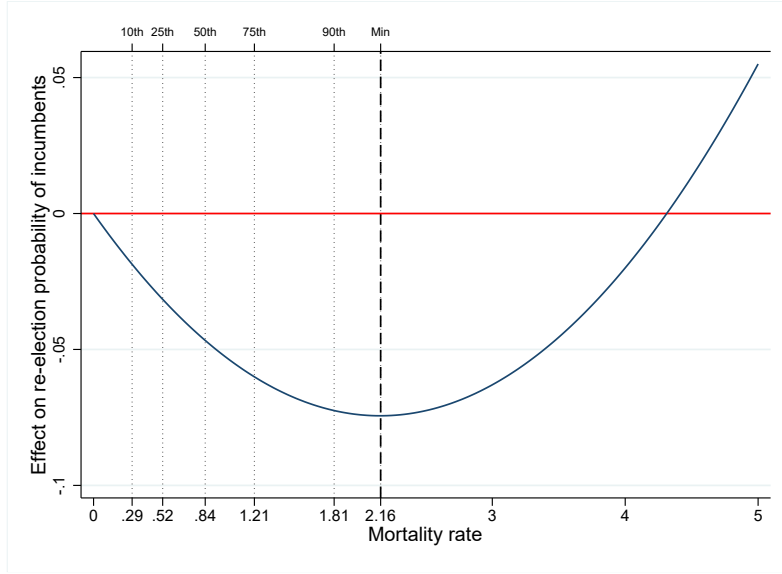


Figure 7: Treatment effect across the distribution of mortality rates. This curve is a quadratic function of mortality rate with coefficients from Model (4) in Table 4. This function reaches its minimum at mortality=2.16 (dashed line). The dotted vertical lines refer to the respective percentiles of the mortality rate labelled on the upper x-axis.

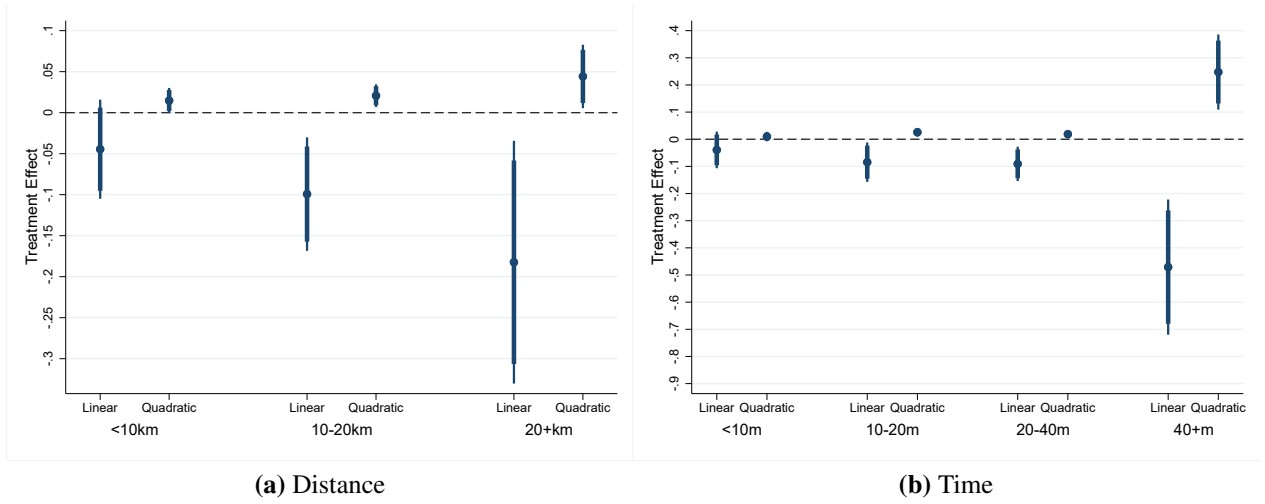


Figure 8: Effect heterogeneity II: proximity of nearest hospital. The coefficients indicate the linear and quadratic effect of covid mortality on reelection probabilities of incumbents by (a) travel distance (km) and (b) travel time (minutes) to the nearest hospital from a given municipality.

Table 1: Incumbency advantages

<i>Election Probability</i>	(1)	(2)	(3)	(4)
Incumbent	0.580*** (0.006)	0.580*** (0.006)	0.567*** (0.004)	0.567*** (0.004)
Time FE	No	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes
Municipal level controls	No	No	No	Yes
Observations	132436	132436	132436	132436
Municipalities	428	428	428	428
R-squared	0.27	0.27	0.28	0.28

Notes: This table collects regression results for Equation 1. The results are reported with municipality and time fixed effects. Municipal controls consists of population covariates and council size. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 2: Incumbency advantages over time, 2001-2021

	(1)	(2)	(3)	(4)
Incumbent \times Election2001	0.561*** (0.011)	0.532*** (0.015)	0.530*** (0.013)	0.531*** (0.013)
Incumbent \times Election2006	0.617*** (0.008)	0.626*** (0.009)	0.612*** (0.008)	0.613*** (0.008)
Incumbent \times Election2011	0.602*** (0.008)	0.609*** (0.008)	0.595*** (0.007)	0.595*** (0.007)
Incumbent \times Election2016	0.576*** (0.008)	0.579*** (0.008)	0.564*** (0.007)	0.564*** (0.007)
Incumbent \times Election2021	0.555*** (0.007)	0.554*** (0.007)	0.537*** (0.006)	0.533*** (0.007)
Time FE	No	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes
Municipal level controls	No	No	No	Yes
Observations	132436	132436	132436	129476
Municipalities	428	428	428	422
R-squared	0.27	0.27	0.28	0.28

Notes: This table reports regression results for Equation 2. The results are reported with municipality and time fixed effects. Municipal controls consists of population covariates and council size. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 3: Diff-in-Diff: Covid-19 and incumbency advantages

Dep. var.: Reelected	(1)	(2)	(3)	(4)	Linear effect of treatment (5)
Treatment=2	-0.039*** (0.014)	-0.034** (0.017)	-0.031 (0.023)	-0.049** (0.025)	
Treatment=3	-0.068*** (0.018)	-0.062*** (0.022)	-0.058** (0.026)	-0.064** (0.028)	
Treatment=4	-0.025* (0.014)	-0.019 (0.018)	-0.033 (0.024)	-0.046* (0.026)	
Treatment					-0.015* (0.008)
Year FE	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes	Yes
Municipal level controls	No	No	No	Yes	Yes
Observations	15733	15733	15733	15098	15098
R-squared	0.00	0.00	0.02	0.02	0.02

Notes: Table evaluates effect of covid mortality on the reelection probability of incumbents. Treatment coefficients reported in Columns 1-4 compare the reelection probability in these groups to the lowest treatment group (treatment=1), which is assumed to remain untreated as all municipalities in other years. Column 5 reports the linear effect of the treatment assignment considering the treatment variable (with values of 1, 2, 3 and 4) as continuous. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 4: Covid-19 mortality rates and incumbency advantages

Dep. var.: Reelected	(1)	(2)	(3)	(4)
Mortality rate	-0.057*** (0.011)	-0.054*** (0.019)	-0.057** (0.026)	-0.069** (0.028)
Mortality rate ²	0.015*** (0.003)	0.015*** (0.004)	0.014*** (0.005)	0.016*** (0.005)
Year FE	No	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes
Municipal level controls	No	No	No	Yes
Observations	15733	15733	15733	15098
R-squared	0.00	0.00	0.02	0.02

Notes: Estimates are based on quadratic regression of reelection probability on the continuous treatment variable of covid mortality rate. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 5: Mechanism I: Voter turnout

Outcome:	Turnout (1)	Mail voting (2)	Reelected (3)	Reelected (4)
Mortality rate	-1.521* (0.825)	-1.027 (0.838)	-0.072** (0.028)	-0.051 (0.032)
Mortality rate ²	0.278 (0.173)	0.161 (0.189)	0.016*** (0.005)	0.011* (0.006)
Turnout			-0.006*** (0.002)	
Mail voting				-0.003 (0.003)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes	Yes
Observations	828	396	15098	8120
R-squared	0.88	0.97	0.02	0.04

Notes: Estimates are based on quadratic regression of turnout rate on the continuous treatment variable of covid mortality rate. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 6: Mechanism II: Emotional voting

Dep. var.: Reelected	(1)	(2)	(3)	(4)
Mortality rate	-0.068** (0.029)	-0.066** (0.029)	-0.069** (0.028)	-0.070** (0.028)
Mortality rate ²	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.017*** (0.006)
Covid deaths (last two weeks)	-0.001 (0.003)			
Covid mortality (last two weeks)		-0.050 (0.078)		
Covid infections (last two weeks)			-0.000 (0.000)	
Infected population (% last two weeks)				0.051 (0.076)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes	Yes
Observations	15098	15098	15098	15098
R-squared	0.02	0.02	0.02	0.02

Notes: This table estimates the model controlling for the covid deaths and mortality within the last 14 days before the election and tests if the voters punishing behavior was driven by their emotions. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 7: Mechanism III: Party bias

<i>Reelection Probability</i>	Left-wing parties		Right-wing parties	
	SPD (1)	Gruene (2)	CDU (3)	FDP (4)
Mortality rate	-0.078* (0.043)	0.055 (0.082)	-0.071 (0.048)	-0.219** (0.092)
Mortality rate ²	0.018** (0.008)	-0.006 (0.015)	0.020** (0.010)	0.056*** (0.019)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes	Yes
Observations	5012	1284	5157	759
R-squared	0.07	0.13	0.06	0.19

Notes: Table reestimates the results in Table 4 on subsample of incumbents according to their party affiliation. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table 8: Effect heterogeneity I: Incumbents' personal characteristics

Dep. var.: Reelected	Gender		Age			University	
	Female (1)	Male (2)	Young (3)	Middle (4)	Old (5)	Yes (6)	No (7)
Mortality rate	-0.105* (0.056)	-0.058* (0.030)	-0.157** (0.079)	-0.013 (0.045)	-0.116*** (0.039)	0.018 (0.052)	-0.138*** (0.041)
Mortality rate ²	0.026** (0.011)	0.014** (0.006)	0.026 (0.016)	0.001 (0.010)	0.028*** (0.007)	0.006 (0.010)	0.027*** (0.010)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3430	11661	1254	4329	6907	4311	6475
R-squared	0.08	0.03	0.18	0.05	0.04	0.07	0.05

Notes: Table reestimates the results in Table 4 on subsample of incumbents according to their gender, age and education level. As for age groups, the candidates under 40 are categorized as young, above 55 as old and the remainder as middle-aged. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Online appendix

A.1 Details on the collection of the council election data

We use the municipal election data from Baskaran and Hessami (2018) and extend it with the latest election results in 2021 in the same way as other elections had been. Our student assistants retrieved the election results, which were often in pdf format, from municipal websites. After that, this data were manually converted into conventional Excel tables. In certain instances, we used the flyers provided by the lists to obtain data. For information regarding previous elections that was not accessible online, the mayor's office was also contacted. The Excel spreadsheets were then combined into one dataset using the municipal code and year. As manual data collecting is prone to inaccuracies numerous plausibility tests were carried out to ensure data quality. Found errors were either corrected or indicated as missing.

A.2 Details on the fuzzy matching of council candidates

The availability of our hand-collected election data improves over time with the last two elections being complete. In order to identify incumbents and to gather additional information on the birth year and occupation of candidates in previous elections, we match candidates using a fuzzy match strategy.²¹ Finding the same people who took part in multiple elections is our aim. We match candidates according to their first and last names as well as their list, which are merged into a single string with all special characters removed.

Candidates are matched only within municipalities. The tolerance of the fuzzy match ensures that spelling mistakes and minor deviations are not an obstacle. However, there are certain drawbacks to this strategy. It is unable to identify individuals who have migrated to other towns or who have changed lists between years. Changes in names as a result of marriages are also unnoticeable. Also, it is impossible to rule out the possibility of two people with the

²¹using Stata function strgroup by Julian Reif (University of Chicago).

same name living in the same municipality and on the same list. However, we believe that these inaccuracies are unrelated to outcomes, and hence are not a cause for concern.

With this approach, candidates are matched only within lists in the same municipalities. The fuzzy match's tolerance makes sure that minor inaccuracies and spelling typos are irrelevant. However, it is unable to recognize people who have moved to different towns or who changed from one list to another. Marriage-related name changes are also imperceptible. In very rare cases when two individuals with the same name who reside in the same municipality and are list, it is impossible to find their matches in other years. However, these errors are likely unrelated to our results.

A.3 Details on the collection of the municipal Covid-19 mortality data

Our data collection lasted overall four months (June-September 2022). We sent out our requests to all 21 counties in Hesse in four waves, i.e we sent them three emails and a phone call with one month-intervals. For the municipalities who did not respond to our first two emails, we tried to contact the mayor's office directly. Overall, we heard back from fourteen counties, eleven of which delivered the data.

The remaining counties either refused to share the data or had not collected the Covid-19-related death statistics at the municipality level.²² Overall, there are 215 municipalities and five county-free cities in our main sample. However, in order to show that the municipalities included in the sample are similar to those that did not respond to our request across observable characteristics, we exclude these five county-free municipalities from our sample in Table A.1, as the data for these cities was already available from the official RKI database.

Note that some municipalities merged in 2020, which means that these merger municipalities only exist in 2021. In order to overcome this inconsistency, we identify such municipalities

²²One county had delivered the death statistics with missing values for municipalities where the number of covid-19-related deaths was smaller than 5. For our main sample, we replaced these missings with their potential median value of 3 (our results are consistent with missing values as well).

and to which municipalities they were merged to and assign to them the same mortality rate calculated for their mergers where necessary.²³

A.4 Further figures

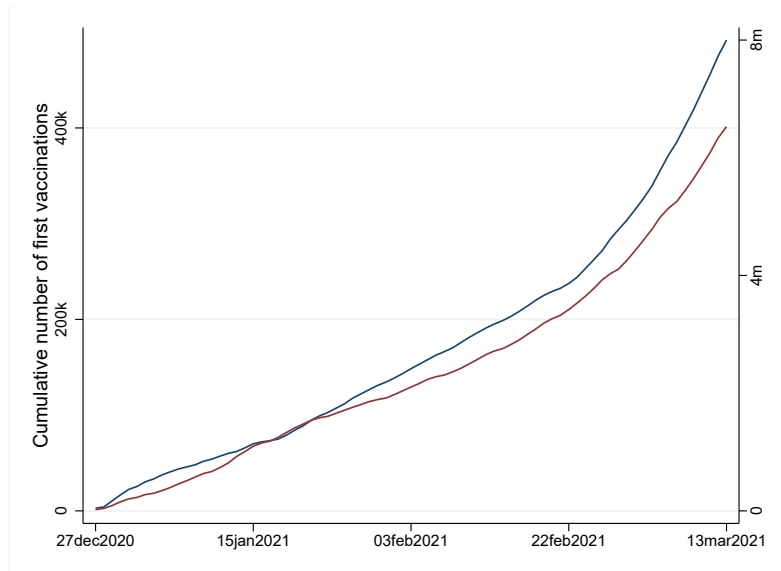


Figure A.1: Roll-out of Covid-19 vaccines in Hesse and Germany. This figure plots how many people had received their first vaccination by election day. The blue line represents the state Hesse (left y-axis) and the red line is for Germany (right y-axis).

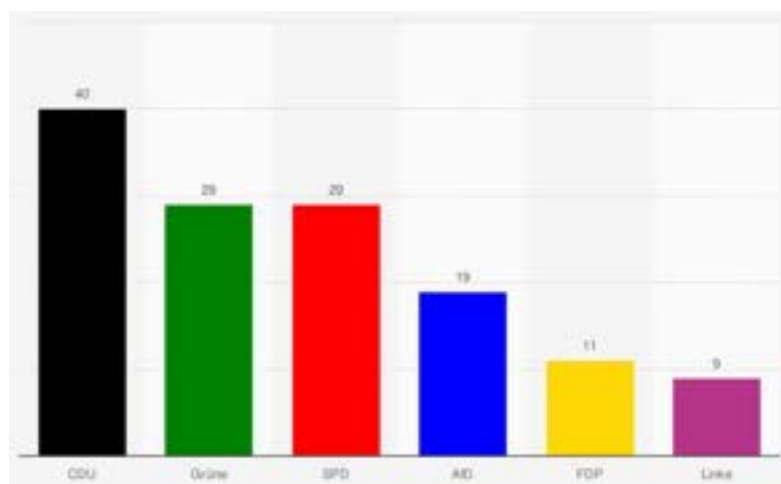


Figure A.2: Seat distribution in the Hessian State Parliament since 2018. This figure plots the distribution of seats in the Hessian Parliament since 2018 across parties.

²³There was only one such merger in our sample, which affected four municipalities.

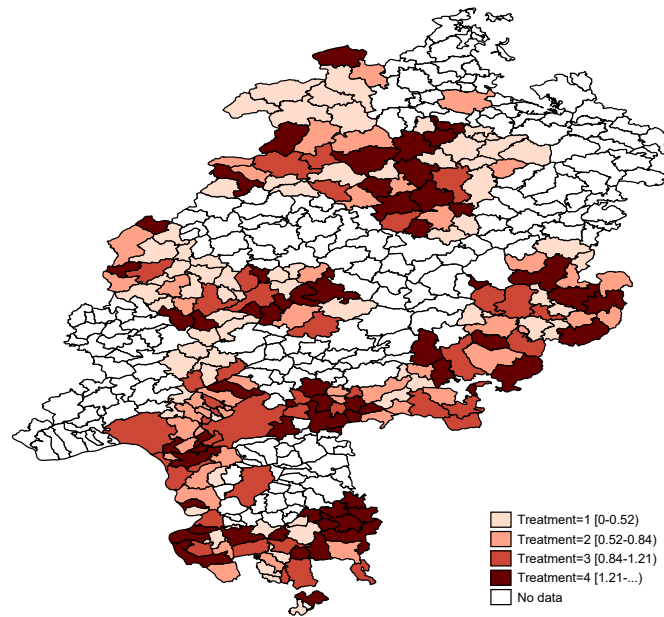
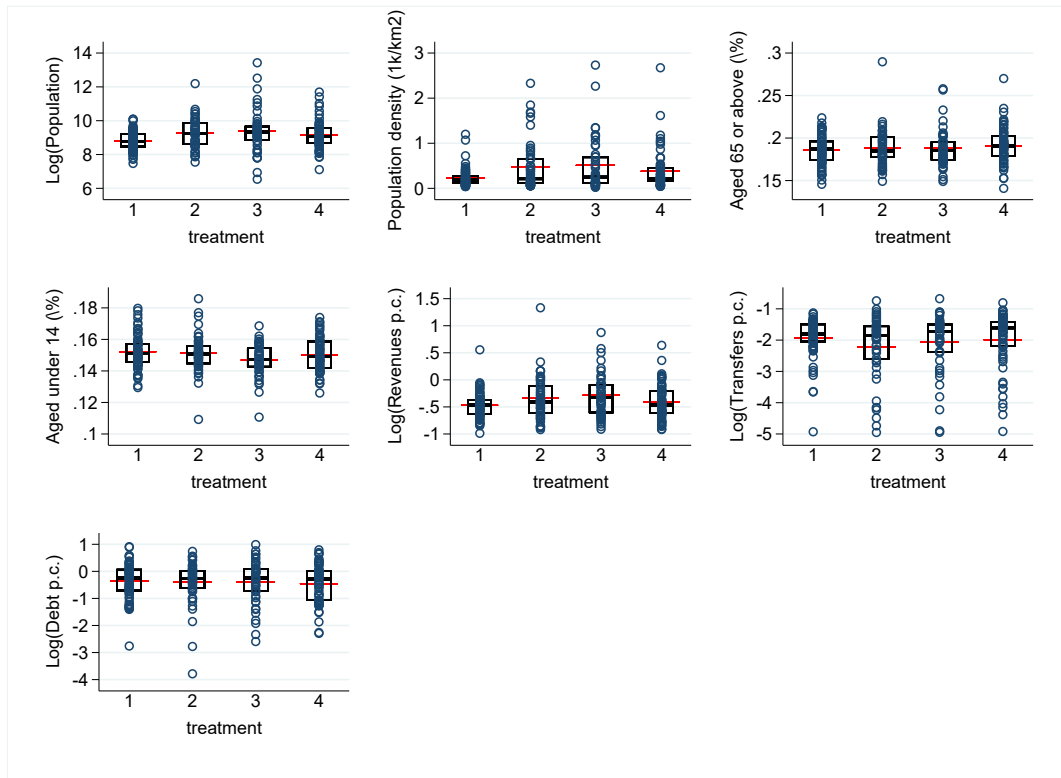
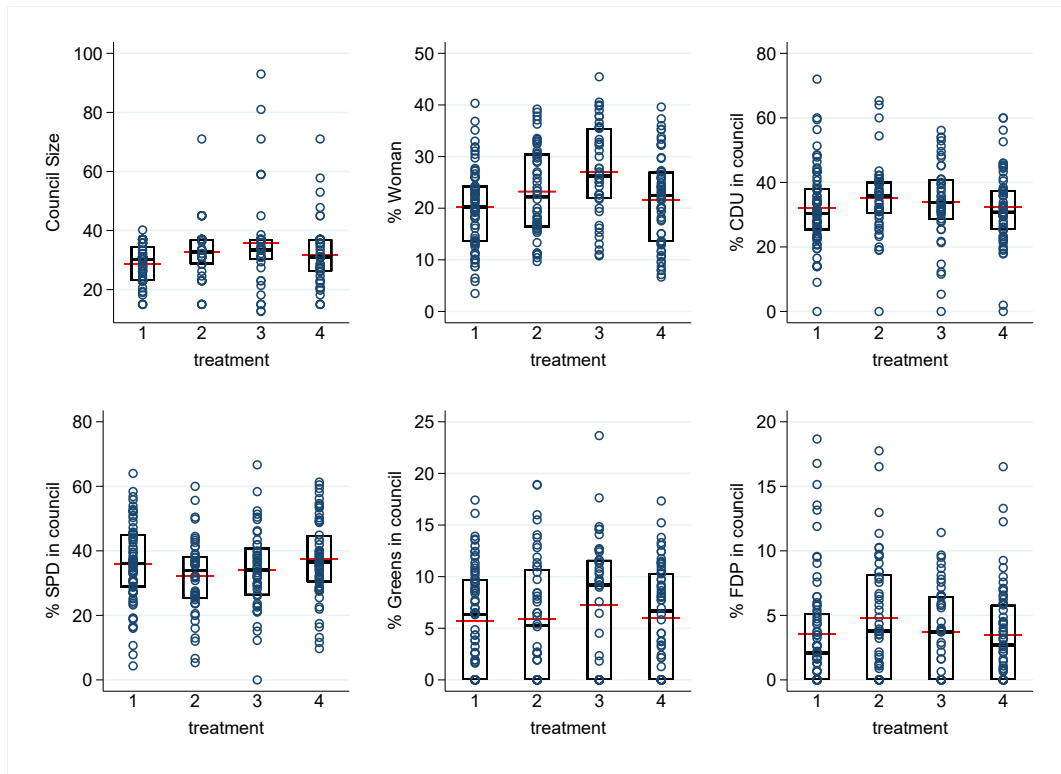


Figure A.3: Treatment dose groups based on Covid-19 mortality. Municipalities are grouped via the quartile of mortality rates they belong to (cutoffs are at the 25th, 50th and 75th percentiles of municipal level data). The darker the shade, the higher was the treatment dose, i.e. the higher were the cumulative mortality rates per municipality.

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(a) Demographic and fiscal characteristics



(b) Political characteristics

Figure A.4: Municipality characteristics: four treatment dose groups. This figure presents balance tests across treatment groups. Subfigure (a) compares demographic and fiscal characteristics among the four treatment groups (averaged for 1991-2020). Subfigure (b) compares political characteristics of treatment groups (averaged for 1997-2016). The x-axis in each plot indicates the respective treatment group.

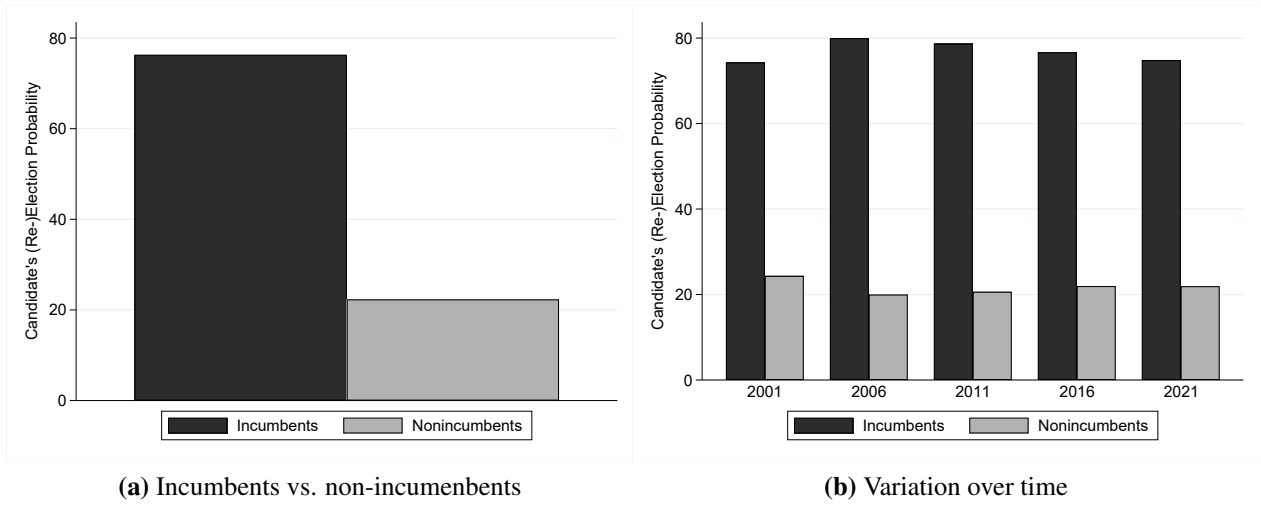


Figure A.5: Incumbency advantages (over time). Subfigure (a) contrasts the election probability of incumbents and non-incumbents which is as a mean percentage of elected (non-)incumbents. Subfigure (b) plots this difference across different election years.

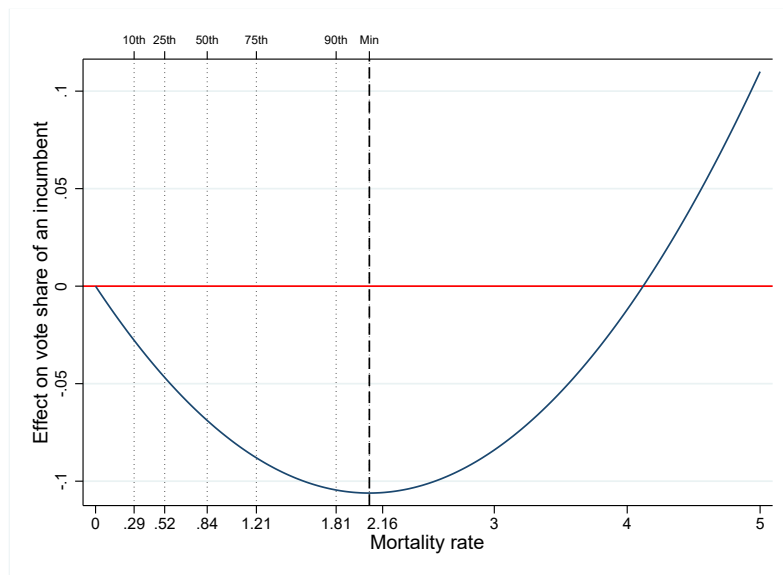


Figure A.6: Robustness III: Treatment effect on vote share. This curve is a quadratic function of mortality rate with coefficients from Model (4) in Table A.4. This function reaches its minimum at mortality=2.06 (dashed line). The dotted vertical lines refer to the respective percentiles of the mortality rate labelled on the upper x-axis.

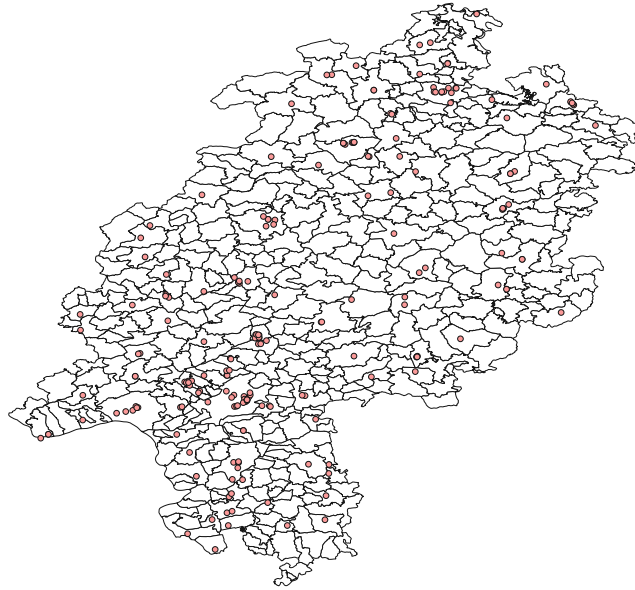


Figure A.7: Locations of hospitals in Hesse. This map indicates with a dot the location of each hospital in the state of Hesse. The geo-locations of hospitals are provided by Geofabrik OSM. Shapefiles were last updated on 29.04.2022.

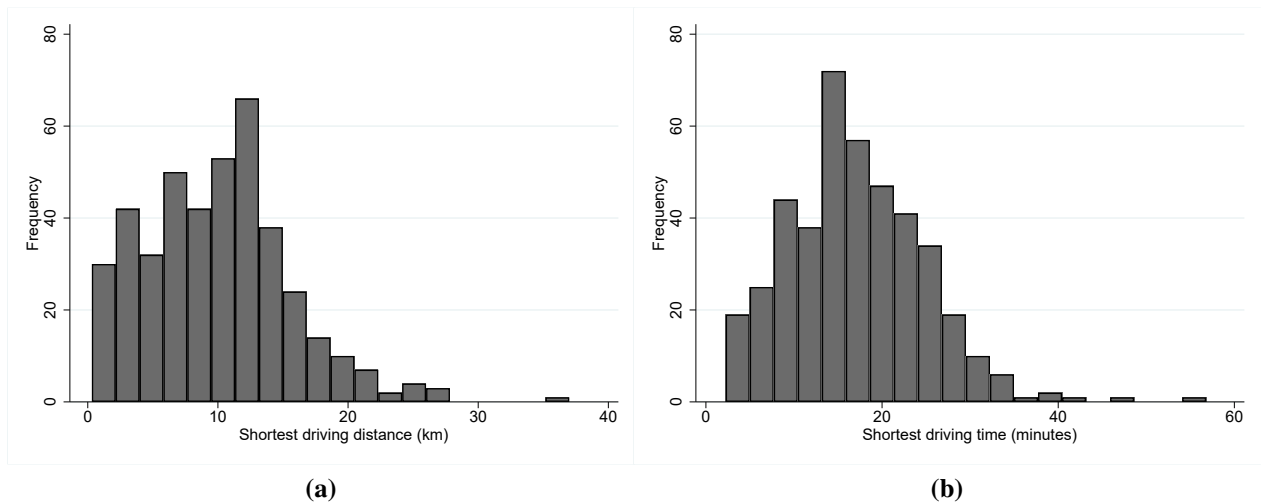


Figure A.8: Distribution of hospital access in Hesse. These histograms plot how (a) the driving distance and (b) driving time to closest hospitals vary across municipalities. The geo-locations of hospitals are provided by Geofabrik OSM. Shapefiles were last updated on 29.04.2022. Driving time and distance were calculated using the time stamp of 13.03.2021 12:00 (a day before the elections) as the departure time from municipality centroids.

A.5 Further tables

Table A.1: Summary statistics: in-sample vs. not in-sample municipalities

Variable	In sample	Not in sample	Difference	Std. Error	Obs.
Log(population)	9.06	9.03	-0.031	0.082	422
Population density	0.35	0.34	-0.013	0.039	422
Aged 65 or above (%)	0.19	0.19	0.005**	0.002	422
Aged under 14 (%)	0.15	0.15	-0.004***	0.001	422
Log(revenues p.c.)	-0.40	-0.45	-0.049	0.031	422
Log(transfers p.c.)	-2.06	-1.89	0.175**	0.081	422
Log(debt p.c.)	-0.42	-0.40	0.023	0.069	422
Council size	30.77	30.86	0.095	0.945	422
% Women in council	22.14	22.06	-0.074	0.841	422
% CDU in council	33.52	32.44	-1.080	1.093	422
% SPD in council	35.19	41.10	5.914***	1.154	422
% Greens in council	5.89	5.53	-0.352	0.545	422
% FDP in council	3.82	2.47	-1.352***	0.356	422

Notes: This table compares the characteristics of the 215 regular municipalities in our sample and the other 207 municipalities. The goal behind this comparison is to see whether the municipalities that delivered the Covid-19 data differ significantly from the ones that did not. The five county-free cities are not considered here as their data was already available in the RKI database. The data on demographic variables and council size are averaged for the period 1991-2020 while the political variables 1997-2016 averages.

Table A.2: Robustness I: Alternative number of treatment groups

Dep. var.: Reelected	2 Groups Median (1)	3 Groups p25-75 (2)	4 Groups Quartiles (3)	5 Groups Quintiles (4)	6 Groups (5)
Treatment=2	-0.031 (0.020)	-0.054** (0.023)	-0.049** (0.025)	-0.028 (0.026)	-0.036 (0.031)
Treatment=3		-0.034 (0.024)	-0.064** (0.028)	-0.079*** (0.029)	-0.059** (0.026)
Treatment=4			-0.046* (0.026)	-0.050* (0.030)	-0.088** (0.036)
Treatment=5				-0.039 (0.030)	-0.063** (0.031)
Treatment=6					-0.042 (0.032)
Year FE	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes	Yes	Yes
Observations	15098	15098	15098	15098	15098
R-squared	0.02	0.02	0.02	0.02	0.02

Notes: This table reestimates the treatment effect using different treatment groups. Column (3) reprints the baseline result (Model (4) from Table 3) for comparison. All models include municipality and year fixed effects, as well as the time-varying municipality control variables. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Coefficients are compared to the lowest treatment group (treatment=1). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table A.3: Robustness II: Alternative samples

Dep. var.: Reelected	Baseline sample (1)	Balanced sample (2)	Without large cities (3)
Mortality rate	-0.069** (0.028)	-0.081** (0.031)	-0.070** (0.029)
Mortality rate ²	0.016*** (0.005)	0.017*** (0.006)	0.016*** (0.005)
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Municipal level controls	Yes	Yes	Yes
Observations	15098	11206	14065
R-squared	0.02	0.02	0.02

Notes: This table reestimates the treatment effect using different samples and compares the results to the base line. As our hand-collected election data is incomplete across election years, Column 2 reestimates the model using balanced sample with 132 municipalities that exist in all years. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

Table A.4: Robustness III: Alternative election outcome

Dep. var.: Vote Share	(1)	(2)	(3)	(4)
Mortality rate	-0.093 (0.066)	-0.458*** (0.161)	-0.145** (0.059)	-0.103* (0.057)
Mortality rate ²	0.037* (0.019)	0.112*** (0.040)	0.029** (0.012)	0.025** (0.012)
Year FE	No	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes
Municipal level controls	No	No	No	Yes
Observations	14396	14396	14396	13794
R-squared	0.00	0.01	0.57	0.57

Notes: This table reestimates the treatment effect using vote share of incumbents as outcome. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.

**Table A.5: Mechanism II: emotional voting
(quadratic specification)**

Dep. var.: Reelected	(1)	(2)	(3)	(4)
Mortality rate	-0.407*** (0.098)	-0.319*** (0.102)	-0.184 (0.149)	-0.072 (0.166)
Mortality rate ²	0.401*** (0.118)	0.322*** (0.112)	0.088 (0.157)	-0.009 (0.191)
Year FE	No	Yes	Yes	Yes
Municipality FE	No	No	Yes	Yes
Municipal level controls	No	No	No	Yes
Observations	15733	15733	15733	15098
R-squared	0.00	0.00	0.02	0.02

Notes: This table estimates the model with continuous mortality within the last 14 days before the election and tests if the voters punishing behavior was driven by their emotions. Stars indicate significance levels at 10%(*), 5%(**) and 1%(***). Cluster-robust standard errors are in parentheses. The unit of clustering is the municipality of the candidate.