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Turnout in the Municipal Elections of March 2020 and Excess Mortality during the COVID-19 Epidemic in France

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ABSTRACT

Turnout in the Municipal Elections of March 2020 and Excess Mortality during the COVID-19 Epidemic in France*

We analyze the consequences of the decision of French government to maintain the first round of the municipal elections on March 15, 2020 on local excess mortality in the following weeks. We exploit heterogeneity across municipalities in voter turnout, which we instrument using a measure of the intensity of local competition. The results reveal that a higher turnout was associated with a significantly higher death counts for the elderly population in the five weeks after the elections. If the historically low turnout in 2020 had been at its 2014 level, the number of deaths would have been 21.8 percent higher than the one that was recorded. More than three quarters of these additional deaths would have occurred among the individuals aged 80 and above.

JEL Classification: J11, D72

Keywords: COVID-19, excess mortality, voter turnout, intensity of electoral competition, municipal-level data

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"[I] have asked the advice of scientists about our local elections, whose first round will be held in a few days. They believe that nothing goes against the fact that the French citizens, even the most vulnerable among them, go to the polling stations."
(Speech of the French President Emmanuel Macron, March 12, 2020).[1]

1 Introduction

European countries have been confronted, in the early phases of the COVID-19 epidemics, with challenging decisions concerning the timing and the extent of the introduction of the social distancing measures that were recommended to slow down the diffusion of the virus. The French government faced a particularly difficult situation, as all municipalities had to renew their councils and mayors in a two-round election that was scheduled on March 15 and 22, 2020. The lack of support from the opposition, which even referred the scenario of postponing the elections as a *coup d'État*,[2] eventually induced the decision to maintain the first round.[3] The President Emmanuel Macron made a speech on March 12, describing the epidemics as the "biggest health crisis in a century" for the country, but also announcing that elections were maintained. This choice was further confirmed by the Prime Minister Édouard Philippe on March 14, when he asked the population to stay home except for "buying food, do a bit of physical exercise or vote."[4] These admittedly contradictory statements blurred the effectiveness of the message delivered by the authorities about social distancing (Moatti, 2020), and resulted in an historically unprecedented level of abstention (55.4 percent, up from 36.5 percent in the first round of the 2014 elections).[5]

The large number of crowded electoral meetings and the difficulty in respecting newly

[1]Our translation: "[J]'ai interrogé les scientifiques sur nos élections municipales, dont le premier tour se tiendra dans quelques jours. Ils considèrent que rien ne s'oppose à ce que les Français, même les plus vulnérables, se rendent aux urnes." (Source: https://www.elysee.fr/emmanuel-macron/2020/03/12/adresse-aux-francais).

[2]See *Libération*, March 15, 2020, "Maintenir ou ne pas maintenir : telle est l'élection", (source: https://www.liberation.fr/france/2020/03/15/maintenir-ou-ne-pas-maintenir-telle-est-l-election_1781802, last accessed on June 2, 2020).

[3]The exponential growth in the number of new cases and in the number of hospitalizations eventually induced the government to suspend the second round of the elections, and to declare the lockdown of the country on March 16.

[4]Our translation: "[N]e sortir de chez soi que pour faire ses courses essentielles, faire un peu d'exercice ou voter" (Source: https://www.gouvernement.fr/partage/11444-declaration-de-m-edouard-philippe-premier-ministre-sur-le-covid-19).

[5]See https://www.interieur.gouv.fr/avotreservice/elections/telechargements/ (last accessed on May 26, 2020).

introduced social distancing measures for the voters and for the polling station staff suggest that the controversial political decision not to postpone the elections could have significantly contributed to accelerate the spread of the epidemics. Medias reported cases of municipal councilors who contracted the virus and died after having been engaged in the local electoral campaign and having been present at the polling stations.[6]

Even though municipal elections were held throughout the country, their effects on the diffusion of the virus are likely to have been heterogeneous given major disparities in voter turnout across and within departments. We thus analyze whether the municipal-level voter turnout in the first round of the local elections has influenced the excess mortality in the following weeks,[7] exploiting an exogenous source of variation in turnout across municipalities. Providing a convincing answer to our research question is valuable for all countries that will have to decide whether to maintain, adjust (notably relying on postal voting) or postpone national and local elections in the coming months, when the COVID-19 epidemics might regain momentum.

We draw on the *fichier des décès* published on a monthly basis by the INSEE, the French National Statistical Institute, which gathers information from death certificates. Our econometric analysis tackles concerns related to reverse causality, which pose a serious threat to identification, as turnout is likely to have been lower in areas of the country that were already severely affected by the epidemics in early March. A survey conducted by the CEVIFOP from *Science Po* revealed that the single most important reason behind abstention was a concern related to the epidemics (mentioned by 57 percent of the non-voters), and 25 percent of the non-voters mention this as the unique reason behind their choice.[8] We rely on differences across municipalities in the intensity of electoral competition, measured by the ratio between the number of candidates and the number of councilors to be elected, to instrument the municipal-level turnout. A more intense local competition can increase the turnout,[9] while a number of candidates equal to the number of seats to be filled can clearly

[6]See, for instance, *France Inter*, April 16, 2020, "Comment le Covid-19 a décimé certains conseils municipaux", (Source: https://www.franceinter.fr/les-conseils-municipaux-decimes-par-le-covid-19, last accessed on June 3, 2020).

[7]Deschênes and Moretti (2009) also analyze data on excess mortality that are similarly fine-grained with respect to the temporal and spatial dimension.

[8]See http://www.sciencespo.fr/cevipof/sites/sciencespo.fr.cevipof/files/Enquete%20Coronavirus_16%2617Mars2020-3.pdf (last accessed on June 3, 2020).

[9]Cassette et al. (2013) provide evidence that the turnout in French municipal elections increases with the number of candidates.

discourage the voters, who perceive that they have little to no role to play. The survey by the CEVIFOP from *Science Po* mentioned above reveals that the second most important reason behind the non-vote is the fact that there was no uncertainty about the local results (27 percent of the non-voters).

Municipalities with a higher voter turnout on March 15, 2020 experienced a significantly higher normalized excess mortality for the population aged 60 and above in the following weeks. Our estimates entail that the total number of deaths among this age group would have been 21.8 percent higher between March 18 and April 21 if the turnout had been the one recorded in the previous elections in 2014. Individuals aged 80 and above would have accounted for around 78 percent of the additional deaths in this counterfactual scenario. Our estimates bundle together the influence on the diffusion of the virus due to the participation in electoral meetings before the first round of the election, and social contacts on the day of the vote itself, two mechanisms that our empirical approach does not allow disentangling.[10] Dealing with the threat to identification due to reverse causality is crucial, as OLS estimates reveal a negative association between turnout and the normalized excess mortality.[11] We do not find any significant association between the (instrumented) turnout and the dependent variable in the weeks before the elections, and we do not find any significant impact of the voter turnout on the mortality of younger cohorts of the French population.

The rest of the paper is structured as follows: Section 2 introduces the two main data sources, and provides basic descriptive statistics. Section 3 presents the empirical approach and our identification strategy, and it discusses the econometric results. Section 4 draws the main conclusions.

[10] This explains why we do not simulate the number of deaths if the elections had been postponed, i.e., setting the turnout to zero; the effect of such a decision crucially hinged on its timing, as the effects that we uncover appear also to be related to the electoral meetings held in the weeks before the vote.

[11] This result is in line with Zeitoun et al. (2020), who do not find any relationship between the average participation rate, which is assumed to be exogenous, and the evolution of the number of COVID-19 admissions in hospitals, both measured at the level of the departments; see also *Le Monde*, May 15, 2020, "Municipales : le premier tour de scrutin n'aurait pas contribué statistiquement la propagation du Covid-19" (Source: https://www.lemonde.fr/politique/article/2020/05/15/les-municipales-n-auraient-pas-contribue-statistiquement-a-la-propagation-du-covid-19_6039720_823448.html, last accessed on June 3, 2020).

2 Data sources

We draw on two main data sources to obtain (*i*) municipal-level weekly data on mortality in the first part of 2020 and in previous years, and (*ii*) detailed information about the candidates and voter turnout in the first round of the 2020 local elections.

With respect to (*i*), we employ in the empirical analysis the *fichier des décès* that is published on a monthly basis by the INSEE.[12] This dataset released in a given month includes data derived from the death certificates that have been transmitted by each French municipality to the INSEE. Death certificates, which are established by the municipality where the death occurred, can be sent to the INSEE either in electronic or in a paper version. As paper certificates can arrive to the INSEE with some delay, the data release in a given month do not relate exclusively to the previous month: for instance, the data released on May 19, 2020 include 70,761 deaths, out of which 56,246 refer to the previous month (April 2020), and 14,515 to deaths occurring between January and (mostly) March. This, in turn, entails that the coverage of the deaths for the last part of April 2020 is still incomplete, and it will become (almost) complete only with the June 2020 release of the *fichier des décès* (see also Table A.1 in the Appendix). We thus exclude from the econometric analysis the data between April 22 and April 30. The dataset includes information on the date of birth, and on the municipality and date of death of each deceased individual.

As far as (*ii*) is concerned, we rely on the French Ministry of Interior Affairs, which provides detailed data on the electoral process for the municipal elections in 2020 and 2014.[13] In particular, we draw on information about the voter turnout for each municipality in the first round of both elections, and we also gather municipal-level information on the number of councilors to be elected,[14] and on the number of candidates for the 2020 election.[15] The electoral system is different for municipalities below and above the threshold of 1,000 inhabitants. Above this threshold, voters must select a list, and cannot express individual preferences, while below this threshold, voters can express individual preferences, and they

[12] See https://www.insee.fr/fr/information/4190491.

[13] See https://www.interieur.gouv.fr/avotreservice/elections/telechargements/ (last accessed on May 27, 2020).

[14] The number of councilors is a increasing function of the population of the municipality, going from 7 (for municipalities with less than 100 inhabitants) to 69 (for municipalities above 300,000 inhabitants, except Paris, Lyon and Marseille where the number is higher).

[15] The candidates had to express their intention to run for the elections before February 27, 2020.

are also allowed to chose candidates belonging to competing lists.[16]

We also draw on the 2016 Population Census to obtain information on the age-specific population in each municipality.[17] We obtain data on the area of each municipality from Open Street Map to measure population density.[18] Finally, we draw on the *Fichier des établissements de santé* (FINESS) to obtain information on the municipalities that have at least one hospital.[19]

3 Descriptives

Our analysis focuses on a sample of 33,694 out of 34,747 municipalities that do not have a hospital, which account for 62 percent of the total population in metropolitan France.[20],[21] This sample selection criterion has a double justification: first, the events from portion of the *fichier des décès* that we use relate to deaths occurring mostly either at home,[22] or in retirement houses,[23] and thus relate to individuals who resided in the municipality that established the death certificate. Second, our instrumentation strategy works better for smaller

[16]For smaller municipalities, candidates get elected in the first round if they are voted by at least 50 percent of the voters and at least 25 percent of the electorate; a second round, where additional candidates can run for the office, is held if the some of the seats remain vacant, so that voting is necessary to form the new municipal council even if the number of candidates is equal to the number of councilors to be elected.

[17]Source: https://www.insee.fr/fr/statistiques/4171341?sommaire=4171351#consulter, data extracted on April 4, 2020.

[18]Source: https://www.data.gouv.fr/fr/datasets/decoupage-administratif-communal-francais-issu-d-openstreetmap/, data extracted on April 4, 2020.

[19]See https://www.data.gouv.fr/fr/datasets/finess-extraction-du-fichier-des-etablissements/, data extracted on April 4, 2020.

[20]For this reason, the municipalities in our sample account for a significantly lower share of the deaths recorded by the INSEE in the *fichier des décès*; for the five weeks after the municipal elections, 26,191 deaths out of 79,685 recorded for the entire metropolitan France (see Table A.1 in the Appendix), so that our sample account for 32.8 percent of all deaths.

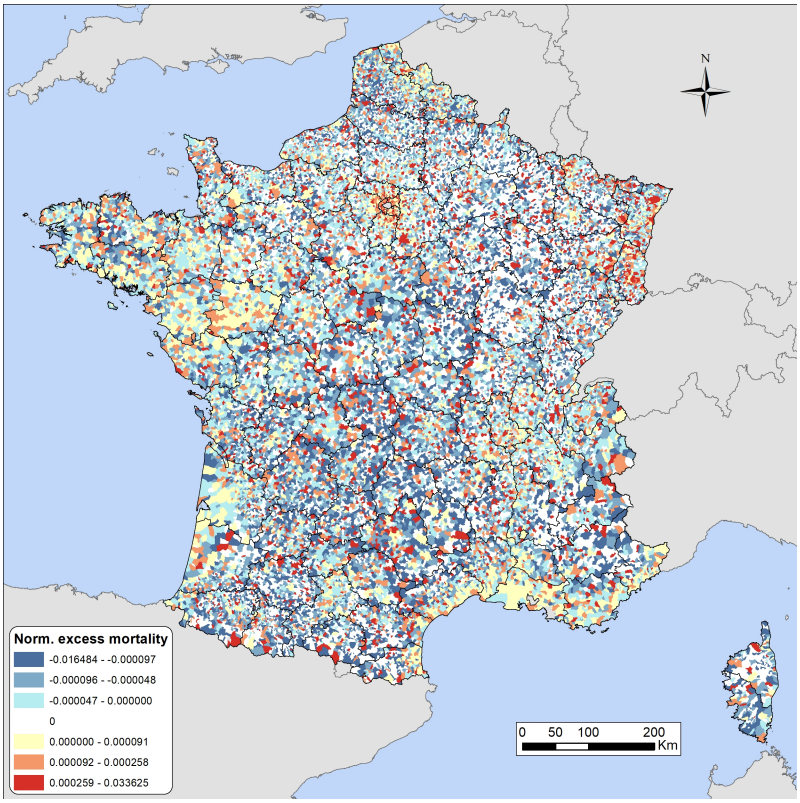
[21]48 municipalities, which result from the merging two or more municipalities between 2014 and 2020, are excluded from the analysis, as we do not have information on the turnout in 2014, and five more because, according to the 2016 Population Census, they did not have any resident aged above 60.

[22]The association of French general practitioners suggested that around 9,000 COVID-19 related deaths had occurred at home by the end of April 2020, see *Le Figaro*, April 27, 2020, "Coronavirus : au moins 9000 personnes seraient mortes à domicile" (Source: https://www.lefigaro.fr/actualite-france/coronavirus-au-moins-9000-personnes-sont-mortes-a-domicile-20200427, last accessed on May 30, 2020).

[23]Deaths in retirement houses represent around half of the total deaths that have been recorded in France, see *Le Monde*, May 8, 2020, "Coronavirus : les résidents d'Ehpad représentent la moitié des décès comptabilisés en France" (Source: https://www.lemonde.fr/les-decodeurs/article/2020/05/08/coronavirus-les-residents-d-ehpad-representent-la-moitie-des-deces-comptabilises_6039103_4355770.html, last accessed on May 30, 2020).

municipalities, where moving from one to two competing lists can have a major impact on voter turnout. 3,700 out of 8,800 municipalities with more than 1,000 inhabitants had only a single list of candidates, and the number of candidates was equal to the number of councilors to be elected for 14,837 out of 24,894 municipalities with less than 1,000 inhabitants. The mean (median) value of the ratio between the number of candidates and the number of seats to be filled stands at 1.40 (1.00), with a standard deviation of 0.69. For the municipalities in our sample, the average turnout in 2020 was 59.5 percent (standard deviation 14.5 percent), down from 74.8 percent recorded in 2014 (standard deviation 9.7 percent). The raw bivariate correlation between the logarithm of turnout in 2020 and our instrument stands at 0.10.

Figure 1: Normalized excess mortality in March 2020 in metropolitan France



Source: Authors' elaboration on data from INSEE, *fichier des décès*, various releases, and INSEE, French Population Census of 2016.

We need to introduce some simple notation to present the data on mortality: let m^c_{ity} be the number of deaths for individuals in the age group c, e.g., individuals aged 60 and above,

in municipality i in the week $t = 1, ..., 16$ of the year y, with $y = 2010, ..., 2020$. We define the weekly normalized excess mortality in 2020 as:

$$n_{it}^c \equiv \frac{1}{s_i^c}\left[m_{it2020}^c - \frac{1}{10}\sum_{y=2010}^{2019} m_{ity}^c\right]$$

where s_i^c is the population in the age group c in municipality i according to the 2016 Population Census. Thus, n_{it}^c gives us the excess mortality recorded in a given week of 2020 as a share of the population at risk. Figure 1 reports the average normalized excess mortality for each municipality in March 2020 for metropolitan France. The most severely affected areas, notably the two regions of Grand-Est and Île de France, can be easily spotted in Figure 1, but this map also reveals that there has been a substantial spatial heterogeneity in the initial diffusion of the epidemics even across neighboring municipalities.

4 Econometric analysis

The dependent variable y_{it}^c of our econometric analysis is the inverse hyperbolic sine of the group-specific normalized excess mortality n_{it}^c, with $t = 1, ..., 16$:

$$y_{it}^c = \text{arcsinh}\left(n_{it}^c\right) = \ln\left(n_{it}^c + \sqrt{1 + (n_{it}^c)^2}\right) \tag{1}$$

Two key properties of the inverse hyperbolic sine justify our choice concerning the transformation of the dependent variable: first, $\text{arcsinh}(x)$ is defined for any $x \in \mathbb{R}$, and this is a necessary feature as many French municipalities recorded a negative excess mortality during the COVID-19 epidemics;[24] second, $\text{arcsinh}(x)$ is a contraction mapping on the whole real line,[25] and this feature contributes to reduce the weight of outlying observations in the econometric analysis (Burbidge et al., 1988).

We bring to the data the following specification for a given age group c:

$$y_{it}^c = \alpha_t^c \ln\left(\text{turnout}_{i2020}\right) + \beta_t^c \ln\left(\text{turnout}_{i2014}\right) + \boldsymbol{\gamma}^{c\prime}\boldsymbol{x}_i + d_{\text{dept}(i)} \times d_t + \epsilon_{it}^c, \text{ with } t = 1, ..., 16, \tag{2}$$

where turnout_{i2020} is the turnout in the first round of the municipal elections on March 15,

[24] Bhalotra et al. (2017) also rely on the inverse hyperbolic sine transformation of local mortality figures.
[25] Notice that, $\forall x \in \mathbb{R}$: $\partial\text{arcsinh}(x)/\partial x = 1/\sqrt{1+x^2} \leq 1$.

2020, which we assume to capture the extent of social interactions both on the day of the vote, and in the electoral meetings in the previous weeks. The coefficient of this variable is week-specific, in order to leave the time profile of the strength of the association between y_{it}^c and turnout_{i2020} unrestricted. We also control for the (logarithm of) turnout_{i2014}, i.e., the turnout rate in the first round of the previous municipal elections. In the baseline specification, the vector of controls $\boldsymbol{x}_i$ includes the logarithm of population density, but additional controls are added in robustness checks that are described below. We also include interactive fixed effects between the dummies for the department of each municipality and weekly dummies, i.e., $d_{\text{dept}(i)} \times d_t$, to allow for a flexible temporal evolution of excess mortality during the epidemics in each French department.

A key concern relates to the endogeneity of $\ln(\text{turnout}_{i2020})$, as the turnout was probably lower in municipalities that had been more severely affected already in the early stages of the COVID-19 epidemics in France. We deal with the threat to identification due to reverse causality by instrumenting $\ln(\text{turnout}_{i2020})$ with a measure of the intensity of electoral competition in municipality i. In particular, we define z_{i2020} as the logarithm of the ratio between the number of candidates, and the number of local councilors that had to be elected. A higher value of z_{i2020} should have increased voter turnout, as it increased the stakes related to the vote. A possible threat to the validity of our instrument is related to the fact that the intensity of electoral competition within a department could be correlated with some time-invariant characteristics of a municipality,[26] such as the frequency of social interactions or economic conditions, that could have exerted a direct effect on the level of mortality registered over our period of analysis. We deal with this concern by including in Eq. (2) the voter turnout in 2014, whose coefficient β_t^c is also allowed to vary with the week $t = 1, ..., 16$ of 2020, to capture the time-varying dependency between unobservables and excess mortality as the epidemics unfolded.

[26]The inclusion of interactive fixed effects between the dummies for the department of each municipality and weekly dummies in Eq. (2) fully absorbs the variability across departments.

Table 1: Econometric results (January 1st to April 21, 2020)

	Dependent variable: inverse hyperbolic sine of weekly normalized excess mortality					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Age group c	60+	60+	70+	70+	80+	80+
ln(turnout) × Mar. 18-24	-0.0000	0.0003***	-0.0001	0.0004**	-0.0001	0.0006
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Mar. 25-31	-0.0001**	0.0004***	-0.0002**	0.0007***	-0.0003*	0.0010*
	(0.0000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 1-7	-0.0001*	0.0003**	-0.0001	0.0005**	-0.0003	0.0014***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 8-14	-0.0001**	0.0002	-0.0002**	0.0003	-0.0004**	0.0007*
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Apr. 15-21	-0.0000	0.0003***	-0.0000	0.0006***	0.0001	0.0012***
	(0.0000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
Observations	538,256	538,256	537,984	537,984	535,200	535,200
Under-ident. (p-value)		0.00		0.00		0.00
Kleinbergen-Paap F-test		39.22		39.60		39.86
First stage						
Intensity of competition		0.2851***		0.2852***		0.2855***
		(0.0077)		(0.0077)		(0.0077)
Observations		538,256		537,984		535,200
R^2		0.68		0.68		0.68

Notes: ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively; clustered standard errors at the department level are reported in parentheses; all specifications also include interactions between the turnout in 2020 and in 2014 and weekly dummies (coefficients not shown) for the 16 weeks included in the analysis, the logarithm of population density, and department-week dummies; OLS and 2SLS regressions have been estimated using the Stata commands `reghdfe` and `ivreghdfe`.

Source: Authors' elaboration on data from INSEE (*fichier des décès*, 2016 Population Census), the Ministry of Interior Affairs (electoral results for the first round of the municipal elections in 2014 and 2020), and Open Street Map.

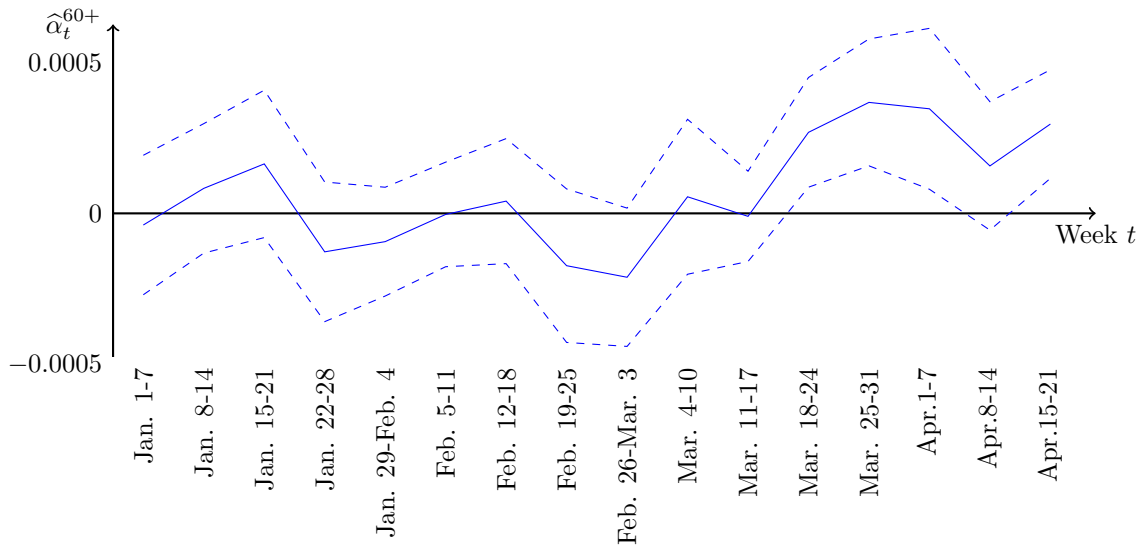
Table 1 reports the weekly coefficients for the municipal-level voter turnout in 2020 for the five weeks after the election on March 15 obtained from the estimation of Eq. (2) with OLS and 2SLS estimators for three nested age groups.[27,28] Columns (1) and (2) focus on the

[27]The sample sizes display minor differences when moving to older age groups as a few small-sized French municipalities do not have, according to the 2016 Population Census, any resident aged above 70 or 80.

[28]The five weeks between March 18 and April 21, 2020 broadly coincide with the period

population aged 60 and above: when we instrument the endogenous turnout, we obtain a positive and significant coefficient for four out of the five weeks after the municipal election, showing that a higher turnout has resulted in a larger normalized excess mortality, while OLS estimates are severely downward biased. The significance of the coefficient for March 18 to 24, i.e., just a few days after the election, strongly suggest that a part of the influence on excess mortality is due to the electoral meetings that were held in the weeks right before the first round. The Kleinbergen-Paap F-test is reassuring with respect to the strength of our instrument. Coefficients are larger in magnitude, albeit less precisely estimated due to the smaller size of the population at risk, when we focus on older age groups in the remaining four data columns of Table 1.

Figure 2: Estimated weekly coefficients with 2SLS for the age group 60+



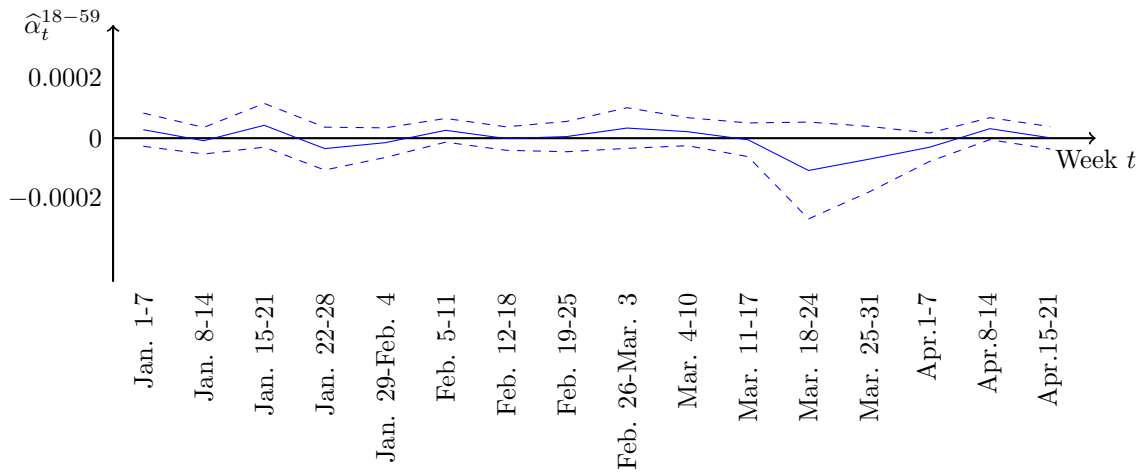
Notes: estimated coefficients and 95 percent confidence intervals for the logarithm of the participation rate in 2020 from the 2SLS estimation in Table 1 for the age group 60+.

Figure 2 reports the estimated coefficients $\widehat{\alpha}_t^c$ for the first 16 weeks of 2020 from the 2SLS specification in Table 1 for the population aged 60 and above. While the effect is positive

in which France experienced a positive excess mortality compared to previous years; by the end of April, the daily country-level number of deaths had returned in line with the values of previous years (see Table A.1 in the Appendix and also https://www.lemonde.fr/les-decodeurs/article/2020/05/22/coronavirus-age-sexe-departement-la-hausse-de-la-mortalite-francaise-en-sept-graphiques_6040465_4355770.html, last accessed on June 5, 2020).

and significant at the 5 percent confidence level in four out of the five weeks since March 15, 2020, the coefficient is never positive and significant at conventional confidence levels in earlier weeks, and these placebos are reassuring with respect to the validity of our instrument. Similarly, Figure 3 plots the estimated coefficients $\widehat{\alpha}_t^c$ for the first 16 weeks of 2020 from the same 2SLS specification as in Table 1, when this is estimated on the population aged 18 to 59. None of these weekly coefficients are significant, suggesting that the decision to maintain the first round of the municipal elections increased mortality only for the elderly population.

Figure 3: Estimated weekly coefficients with 2SLS for the age group 18 to 59



Notes: estimated coefficients and 95 percent confidence intervals for the logarithm of the turnout in 2020 from a 2SLS for the age group 18 to 59 using the same specification as in Table 1.

We use the results from Table 1 from March 18 to April 21 to quantify the effects of turnout on mortality for the municipalities in our sample. More precisely, we predict the value of the dependent variable $\widehat{y}_{it}^c$ when (i) we replace $\ln(\text{turnout}_{i2020})$ with $\ln(\text{turnout}_{i2014})$, or when (ii) we add one standard deviation (equal to 14.5 percentage points) to the actual turnout in 2020. We then invert $\widehat{y}_{it}^c$ for each of the five weeks,[29] multiply it by the population at risk s_i^c and then sum over the five weeks and across all municipalities in our sample for the population aged 60+, 70+ and 80+ to get the predicted increase in the total number of deaths. Table 2 shows that the two counterfactual scenarios with a higher turnout correspond to a death toll that is 4,135 and 5,335 higher than it is actually observed in the data for the

[29] If $y = \text{arcsinh}(x)$, then $x = \sinh(y) = [e^y - e^{-y}]/2$.

population aged 60 and above. These two figures represent respectively 16.9 and 21.8 percent of the observed total number of deaths over this five-week period. Table 2 also reveals that the increase in the number of deaths is largely concentrated in the most vulnerable parts of the population, as around 78 percent, i.e., $4,152/5,335 = 0.778$, of the additional deaths in the second counterfactual scenario relate to the individuals aged 80 and above. As our sample selection criteria imply that we do not include in the analysis deaths occurring in hospitals, these figures represent a lower-bound of the total absolute effect. This entails that the historically unprecedented high level abstention has contributed to a significant and sizable reduction in the number of deaths that would have been otherwise recorded in France, thus lowering the cost in terms of human lives of the decision to maintain the first round of the municipal elections.

Table 2: Additional deaths from March 18 to April 21, 2020 in two counterfactual scenarios

		Age group c		
	All	60+	70+	80+
Average total deaths 2010-2019	17,125	15,199	13,461	11,021
Total deaths 2020	26,191	24,445	22,336	18,624
Difference 2020 vs. 2010-2019	9,066	9,246	8,875	7,603
Additional deaths				
First scenario		4,135	3,715	3,224
Second scenario		5,335	4,795	4,152
Number of municipalities	33,694	33,641	33,624	33,450

Notes: in the first counterfactual scenario we increase the turnout in 2020 by one standard deviation (14.5 percentage points), while in the second scenario we replace the turnout in 2020 with its municipal-specific 2014 value.

Source: Authors' elaboration on data from INSEE, *fichier des décès*, electoral data for the first-round of the municipal elections in 2014 and 2020 from the the Ministry of Interior Affairs, and from the 2SLS estimates in the even data columns in Table 1.

The empirical evidence that we have presented is robust to the adoption of several alternative specifications or sample selection criteria, as shown in the Appendix Tables A.2-A.5: (*i*) estimating the model on the entire set of municipalities in metropolitan France; (*ii*) dropping the departments with an early exposure to the COVID-19 epidemics, for which the number of candidates might have been affected by the deteriorating health situation; controlling (*iii*) for the average turnout in 2020 in neighboring municipalities (within a 10

km radius), and (*iv*) for the shares of the population in each municipality in different age cohorts,as individuals in different age groups might have adhered to a varying degree to the recommended social-distancing measures. For (*iii*) and (*iv*), we also allow the coefficients of these additional controls to vary at the weekly level, as we do for the voter turnout in 2014 and 2020.

5 Concluding remarks

We exploit the substantial spatial variation in voter turnout across municipalities, instrumenting it with exogenous shifts in the local intensity of the electoral competition, to identify its effect on the municipal-level excess mortality in the weeks after the election on March 15, 2020. The historically unprecedented level of abstention has contributed to mitigate the effect produced by the controversial political decision to maintain the elections, which were mostly felt by the population aged 80 and above. European governments should be cautious about maintaining local or national elections in the coming months in case the COVID-19 epidemics were to regain momentum.

References

Bhalotra, S. R., A. Diaz-Cayeros, G. Miller, A. Miranda, and A. S. Venkataramani (2017): "Urban Water Disinfection and Mortality Decline in Developing Countries," NBER Working Paper No. 23239, National Bureau of Economic Research.

Burbidge, J. B., L. Magee, and A. L. Robb (1988): "Alternative Transformations to Handle Extreme Values of the Dependent Variable," *Journal of the American Statistical Association*, 83, 123–127.

Cassette, A., E. Farvaque, and J. Hericourt (2013): "Two-round elections, one-round determinants? Evidence from the French municipal elections," *Public Choice*, 156, 563–591.

Deschênes, O. and E. Moretti (2009): "Extreme Weather Events, Mortality, and Migration," *The Review of Economics and Statistics*, 91, 659–681.

Moatti, J.-P. (2020): "The French response to COVID-19: intrinsic difficulties at the interface of science, public health, and policy," *The Lancet Public Health*, 5, article e255.

Zeitoun, J.-D., M. Faron, S. Manternach, J. Fourquet, M. Lavielle, and J. Lefevre (2020): "Reciprocal association between participation to a national election and the epidemic spread of COVID-19 in France: nationwide observational and dynamic modeling study." MedRxiv, https://www.medrxiv.org/content/early/2020/05/19/2020.05.14.20090100.

A Appendix

A.1 Structure of the data from INSEE, *fichier des décès*

Table A.1: Weekly number of deaths in 2020 by month of release

	Month of release of the data				
	May	April	March	February	Total
Jan. 1-7	19	48	240	13,039	13,346
Jan. 8-14	22	51	335	12,889	13,307
Jan. 15-21	30	86	1,358	11,306	12,780
Jan. 22-28	34	90	3,313	9,319	12,765
Jan. 29-Feb. 4	57	157	11,896	781	12,891
Feb. 5-11	61	204	12,305	0	12,570
Feb. 12-18	95	569	11,913	0	12,577
Feb. 19-25	112	2,390	9,420	0	11,922
Feb. 26-Mar. 3	164	10,423	1,808	0	12,395
Mar. 4-10	325	12,138	0	0	12,463
Mar. 11-17	820	12,167	0	0	12,987
Mar. 18-24	1,843	12,377	0	0	14,220
Mar. 25-31	10,924	6,222	0	0	17,146
Apr. 1-7	18,592	0	0	0	18,592
Apr. 8-14	16,415	0	0	0	16,415
Apr. 15-21	13,492	0	0	0	13,492
Apr. 22-28	7,697	0	0	0	7,697
Apr. 29-May 5	59	0	0	0	59
Total	70,761	56,922	52,588	47,344	227,615

Notes: the data refer to all 33,694 municipalities in metropolitan France.
Source: Authors' elaboration on INSEE, *fichier des décès*, February to May 2020 releases of the data.

A.2 Additional results

Table A.2: Results on the full sample

	Dependent variable: inverse hyperbolic sine of weekly normalized excess mortality					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Age group c	60+	60+	70+	70+	80+	80+
ln(turnout) × Mar. 18-24	-0.0000	0.0004***	-0.0001	0.0006**	-0.0001	0.0007
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0005)
ln(turnout) × Mar. 25-31	-0.0001	0.0007***	-0.0002	0.0013***	-0.0003	0.0017**
	(0.0001)	(0.0002)	(0.0001)	(0.0003)	(0.0003)	(0.0007)
ln(turnout) × Apr. 1-7	-0.0001	0.0007***	-0.0001	0.0011***	-0.0003	0.0024***
	(0.0001)	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0006)
ln(turnout) × Apr. 8-14	-0.0001**	0.0005***	-0.0002**	0.0008***	-0.0005*	0.0016***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 15-21	0.0000	0.0006***	0.0001	0.0010***	0.0003	0.0021***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
Observations	555,104	555,104	554,832	554,832	552,048	552,048
Under-ident. (p-value)		0.00		0.00		0.00
Kleinbergen-Paap F-test		34.46		34.76		35.19
Department-week FE	Yes	Yes	Yes	Yes	Yes	Yes
First stage						
Intensity of competition		0.2619***		0.2620***		0.2624***
		(0.0072)		(0.0072)		(0.0072)
Observations		555,104		554,832		552,048
R^2		0.68		0.68		0.68

Notes: ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively; clustered standard errors at the department level are reported in parentheses; all specifications also include interactions between the turnout in 2020 and in 2014 and weekly dummies (coefficients not shown) for the 16 weeks included in the analysis, and the logarithm of population density; OLS and 2SLS regressions have been estimated using the Stata commands `reghdfe` and `ivreghdfe`.

Source: Authors' elaboration on data from INSEE (*fichier des décès*, 2016 Population Census), the Ministry of Interior Affairs, and Open Street Map.

Table A.3: Results when dropping early exposed departments

	Dependent variable: inverse hyperbolic sine of weekly normalized excess mortality					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Age group c	60+	60+	70+	70+	80+	80+
ln(turnout) × Mar. 18-24	-0.0000	0.0003***	-0.0000	0.0005**	-0.0000	0.0005
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Mar. 25-31	-0.0001*	0.0003**	-0.0002	0.0005**	-0.0002	0.0008
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 1-7	-0.0001	0.0004***	-0.0000	0.0005**	-0.0002	0.0017***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 8-14	-0.0001***	0.0001	-0.0003***	0.0001	-0.0005**	0.0003
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 15-21	-0.0001	0.0003**	-0.0001	0.0005***	-0.0001	0.0008**
	(0.0000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
Observations	478,752	478,752	478,496	478,496	476,000	476,000
Under-ident. (p-value)		0.00		0.00		0.00
Kleinbergen-Paap F-test		41.12		41.65		41.55
Department-week FE	Yes	Yes	Yes	Yes	Yes	Yes
First stage						
Intensity of competition		0.2759***		0.2759***		0.2763***
		(0.0071)		(0.0071)		(0.0071)
Observations		478,752		478,496		476,000
R^2		0.67		0.67		0.67

Notes: ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively; clustered standard errors at the department level are reported in parentheses; all specifications also include interactions between the turnout in 2020 and in 2014 and weekly dummies (coefficients not shown) for the 16 weeks included in the analysis, and the logarithm of population density; the sample excludes municipalities in all departments with more than 50 COVID-19 deaths by the end of March according to *Santé publique France* (Bas-Rhin, Haut-Rhin, Hauts-de-Seine, Moselle, Oise, Paris, Rhône, Seine-Saint-Denis, Val-de-Marne, Val-d'Oise, Vosges, Yvelines), and Haute-Savoie, which registered one of the first major clusters of cases; OLS and 2SLS regressions have been estimated using the Stata commands `reghdfe` and `ivreghdfe`.

Source: Authors' elaboration on data from INSEE (*fichier des décès*, 2016 Population Census), the Ministry of Interior Affairs, and Open Street Map.

Table A.4: Results with the average 2020 turnout in neighboring municipalities

	Dependent variable: inverse hyperbolic sine of weekly normalized excess mortality					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Age group c	60+	60+	70+	70+	80+	80+
ln(turnout) × Mar. 18-24	-0.0000	0.0002***	-0.0001	0.0004**	-0.0001	0.0006*
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0003)
ln(turnout) × Mar. 25-31	-0.0001**	0.0003***	-0.0002*	0.0005***	-0.0002	0.0008*
	(0.0000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Apr. 1-7	-0.0001*	0.0003**	-0.0001	0.0004**	-0.0003	0.0012**
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 8-14	-0.0001***	0.0001	-0.0003**	0.0003*	-0.0005**	0.0007*
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Apr. 15-21	0.0000	0.0002***	0.0000	0.0005***	0.0002	0.0010***
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)
Observations	538,256	538,256	537,984	537,984	535,200	535,200
Under-ident. (p-value)		0.00		0.00		0.00
Kleinbergen-Paap F-test		84.00		84.28		84.60
Department-week FE	Yes	Yes	Yes	Yes	Yes	Yes
First stage						
Intensity of competition		0.2846***		0.2846***		0.2850***
		(0.0073)		(0.0073)		(0.0073)
Observations		538,256		537,984		535,200
R^2		0.69		0.69		0.69

Notes: ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively; clustered standard errors at the department level are reported in parentheses; all specifications also include the turnout in 2020, in 2014, and the average turnout in 2020 in the municipalities within a 10 km radius (week-specific coefficients not shown), and the logarithm of population density; OLS and 2SLS regressions have been estimated using the Stata commands `reghdfe` and `ivreghdfe`.

Source: Authors' elaboration on data from INSEE (*fichier des décès*, 2016 Population Census), the Ministry of Interior Affairs, and Open Street Map.

Table A.5: Results with shares of population in different age groups

	Dependent variable: inverse hyperbolic sine of weekly normalized excess mortality					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Age group c	60+	60+	70+	70+	80+	80+
ln(turnout) × Mar. 18-24	-0.0000	0.0002**	-0.0001	0.0003*	-0.0001	0.0004
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Mar. 25-31	-0.0001**	0.0003***	-0.0002**	0.0006***	-0.0003**	0.0009
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0006)
ln(turnout) × Apr. 1-7	-0.0001**	0.0002	-0.0001	0.0003	-0.0004	0.0011**
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)
ln(turnout) × Apr. 8-14	-0.0001***	0.0001	-0.0002**	0.0002	-0.0005**	0.0006
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
ln(turnout) × Apr. 15-21	-0.0000	0.0002***	-0.0000	0.0004***	0.0001	0.0010**
	(0.0000)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0004)
Observations	538,256	538,256	537,984	537,984	535,200	535,200
Under-ident. (p-value)		0.00		0.00		0.00
Kleinbergen-Paap F-test		42.43		42.76		42.92
Department-week FE	Yes	Yes	Yes	Yes	Yes	Yes
First stage						
Intensity of competition		0.2859***		0.2860***		0.2863***
		(0.0078)		(0.0078)		(0.0078)
Observations		538,256		537,984		535,200
R^2		0.68		0.68		0.68

Notes: ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively; clustered standard errors at the department level are reported in parentheses; all specifications also include the turnout in 2020, in 2014, and share of the population in the 18-39, 40-59, 60-69, 70-79 and 80 and above (0-17 is the omitted category), age groups (week-specific coefficients not shown), and the logarithm of population density; OLS and 2SLS regressions have been estimated using the Stata commands `reghdfe` and `ivreghdfe`.

Source: Authors' elaboration on data from INSEE (*fichier des décès*, 2016 Population Census), the Ministry of Interior Affairs, and Open Street Map.