The Political Effects of the 1918 Influenza Pandemic in Weimar Germany †

Stefan Bauernschuster
University of Passau ‡

Matthias Blum
German Medical Association §

Erik Hornung
University of Cologne ¶

Christoph Koenig
University of Rome Tor Vergata ‖

October 2024 (forthcoming in Explorations in Economic History)

Abstract

How did the 1918 Influenza pandemic affect elections in Weimar Germany? We combine a panel of election results (1893–1933) with spatial heterogeneity in excess flu mortality to assess the pandemic's effect on voting behavior across constituencies. Applying a dynamic differences-in-differences approach, we find that areas with higher influenza mortality saw a lasting shift towards leftwing parties. We argue that pandemic intensity increased the salience of public health policy, prompting voters to reward parties signaling competence in health issues. Alternative explanations such as pandemic-induced economic hardship, punishment of incumbents, or political polarization are not supported by our findings.

Keywords: Pandemics, Spanish flu, Elections, Public Health, Voting behavior, Issue salience, Issue ownership, Weimar Republic

JEL Classification: D72, I18, N34, H51

† For helpful discussions and comments we would like to thank Guido Alfani, Michael Bechtel, Sebastian Braun, James Fenske (discussant), Richard Franke, Nils Wehrhöfer (discussant) and seminar participants at U Bayreuth, Queen's U Belfast, U Bocconi, U Bristol, U Cologne, ZEW Mannheim, ASREC Milan, U Cattolica Milan, HSE Moscow, U Passau, EHA Pittsburgh, U Rome Tor Vergata, U Salzburg, Wageningen U, and EHES Vienna as well as Sascha O. Becker and Hans-Joachim Voth for kindly sharing their data. Katrin Bank, Franziska Dammer, Edwin Mejía, Robin Moellerherm, Seraphin Schwarzbauer and Antonia Weddeling provided valuable research assistance. Hornung acknowledges that his research was funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany's Excellence Strategy - EXC 2126/1 - 390838866.

‡ University of Passau, Innstrasse 27, 94032 Passau, Germany; stefan.bauernschuster@uni-passau.de

§ German Medical Association, Herbert-Lewin-Platz 1, 10623 Berlin, Germany; matthias.blum@baek.de

¶ University of Cologne, Albertus-Magnus-Platz, 50923 Cologne, Germany; hornung@wiso.uni-koeln.de

‖ University of Rome Tor Vergata, Department of Economics and Finance, Via Columbia 2, 00133 Rome, Italy; Christoph.Koenig@uniroma2.it

1. Introduction

The unprecedented scope and severity of the 1918 Influenza pandemic gave a fundamental boost to the transformation of health from a private concern to a matter of public policy.[1] How did the pandemic and the associated increase in the state's perceived responsibility for public health influence the behavior of voters?

We investigate these questions by analyzing the political consequences of the 1918 Influenza in Weimar Germany. The so-called Spanish flu arrived amidst World War I (1914-1918) in Germany for a deadly second wave in October 1918, adding a health emergency to the list of issues the people were confronted with at the time. Contrary to other countries such as the U.S., however, the initial policy response was negligible: schools, theaters, and public transport largely remained open for the public and newspapers downplayed the topic to keep up morale in the trenches and at home.[2] Nevertheless, the pandemic killed around 0.5% of the population and its local intensity was arguably salient to voters whose neighborhoods came down with the flu, whose relatives and friends died, and whose engagement with public life was affected by widespread sick leaves. When elections were held in January 1919, just a month after the second wave flattened, personal experiences with the flu were most likely still fresh on voters' minds.

To assess the relationship between pandemic intensity and election results, we exploit a panel of voting results containing 14 elections from 1893 to 1933 across all 362 constituencies of the German Empire and the Weimar Republic in a difference-in-differences design. We combine this panel with a measure of Spanish flu mortality in 1918, derived from estimating excess mortality and accounting for military deaths from World War I. Causes-of-death data, available at the district- and city-level confirm that the remaining variation in excess mortality can indeed be ascribed to the influenza pandemic.

The key result of our analysis is that constituencies which suffered higher Spanish flu mortality shifted electoral support towards leftwing parties which had a strong ex-ante focus on public health provision. This finding is in line with the pandemic-induced change in voters' perception of health as a state responsibility argued in the literature. Quantitatively, our results imply that moving from the 25th to the 75th percentile of mortality distribution increased the leftwing vote share by 2.1 percentage points or 12.4% of a standard deviation (SD) of the left-wing vote share during the Weimar Republic. We show that these votes were diverted largely from rightwing parties.

Using event-study specifications, we investigate pre-treatment dynamics and track the impact of Spanish flu mortality over time. We find that high and low mortality constituencies followed similar trends in voting patterns until 1912, the last election prior to the pandemic, which corroborates the validity of the parallel trends assumption. Moreover, the post-treatment dynamics reveal a lasting shift in electoral support for leftwing parties which started immediately in January 1919 and continued until 1933. This permanency is consistent with the idea that the benefits of voting for certain parties remained higher after the pandemic boosted the perception of health as a government responsibility rather than a private affair. It is also con-

[1] This notion is shared by historians studying the global effects of the 1918 Influenza pandemic (Spinney, 2017) and German health policy in particular (Woelk and Vögele, 2002; Sachße and Tennstedt, 1988).

[2] Despite the lack of government intervention, there were substantial disturbances in public services and industrial production when countless workers needed to take sick leave (Michels, 2010, p. 21).

sistent with the idea that transitory shocks can have permanent effects on party affiliation as predicted by theories of habit formation (Gerber et al., 2003; Meredith, 2009; Madestam et al., 2013; Fujiwara et al., 2016).

Several pieces of evidence substantiate that our findings can indeed be ascribed to the influenza pandemic. First, we use novel city-level data on causes of deaths to show that our results are entirely driven by excess mortality due to respiratory diseases, the cause-of-death category which includes influenza. On the contrary, excess mortality resulting from non-respiratory diseases and external causes, the category which includes military deaths, does not exhibit any correlation with voting outcomes. Second, acknowledging that diseases may spread easier under poor living conditions, we demonstrate that our baseline results are robust to controlling for several pre-WWI measures of poverty and inequality.

We also address concerns about the comparability of elections results before and after WWI. While the fundamental changes in Germany's political, electoral, and party system before the elections of 1919 are captured econometrically by election fixed effects, threats to identification could arise if the impact of these changes was correlated with flu mortality.[3] We undertake several measures to alleviate such concerns: first, we hold constituency borders fixed at the beginning of the observational period to rule out any impact of changes in administrative borders. Second, to address changes in the party landscape, we aggregate votes into three broad party camps (left wing, centre, right wing) which are highly comparable over the entire study period. Finally, we directly account for the size of the newly enfranchised male population and corroborate our findings by controlling for the size of the female electorate as well as alternative proxies of female empowerment, such as gender ratios and female labor force participation, which all leave our results unaffected. We also show that Spanish flu mortality is not associated with differential crude mortality rates between genders.

Mechanism and theoretical considerations The most plausible explanation for the shift in electoral support toward leftwing parties is the increased importance of public health following the pandemic. According to the so-called 'issue ownership' theory, pioneered by Budge and Farlie (1983) and Petrocik (1996), voters reward competence in important issues, but only if the issue is salient to them (Bélanger and Meguid, 2008; Dennison, 2019). Hence, voters prioritize their most salient issues and support those parties aligning most closely with their views on those issues.

To evaluate this mechanism in our context, we break down our party camps into detailed party groups. Consistent with issue ownership theory, we find that higher flu mortality benefited only socialist and liberal parties, arguably because voters associated them with public health competence. Already prior to the pandemic, *Social Democrats* were highly involved in the local health insurances, whereas *National Liberals* supported the social hygiene movement. This notion is supported by econometric evidence showing higher pre-pandemic investments in public health infrastructure in constituencies with higher pre-pandemic vote shares for these parties.[4]

[3]See the discussion in Section 2 for further details.

[4]We acknowledge that our findings also align with a public choice perspective, where voters have fixed preferences for health policies but update their voting behavior considering the perceived utility gained from these policies.

We exclude that our results arise from changes in (socio-)economic conditions caused by the pandemic. Our analyses display no systematic relationship between Spanish flu mortality and poverty indicators such as welfare rates, infant mortality, or the adult height of children born in the wake of the pandemic. Additionally, we rule out other political-economy mechanisms. For one, voters may have chosen to hold incumbents accountable for the policy response during the pandemic as predicted by standard models of retrospective voting (Healy et al., 2010; Lewis-Beck and Stegmaier, 2018). However, we do not find that excess flu mortality is related to incumbents' vote shares.[5] Alternatively, the pandemic might have polarized the electorate, shifting votes toward populist or extremist parties as recently seen after episodes of financial crises, globalization, structural change, and automation (Mian et al., 2014; Algan et al., 2017; Colantone and Stanig, 2018; Dorn et al., 2020). Our analysis, however, does not show increased support for extreme parties in constituencies with higher flu mortality.

Contribution to the literature Our work is most closely related to literature on the political consequences of health crises and pandemics. This literature predominantly relies on retrospective voting mechanisms and finds countervailing effects of crisis intensity on attitudes towards incumbents. Crises either lead to disappointment with the government (Aksoy et al., 2020; Baccini et al., 2021; Campante et al., forthcoming; Gutiérrez et al., 2022) or a 'rally around the flag' effect uniting voters and governments confronted with a common threat (Daniele et al., 2020; Flückiger et al., 2019; Herrera et al., 2020; Giommoni and Loumeau, 2022). Which effect dominates is likely driven by the quality of the political response by the government. Different from these papers, we find no evidence for retrospective voting but for issue ownership which rewards overall perceived competence in a particular policy domain, also of non-incumbents, rather than punishing bad political performance of the past.

Within this field, few papers have so far analyzed the political consequences of the 1918 Influenza pandemic. Arroyo Abad and Maurer (2021) find evidence of retrospective voting in U.S. elections after 1918, when voters mildly punished incumbents for their inadequate response, despite local politicians successfully curbing the spread using non-pharmaceutical interventions (Bootsma and Ferguson, 2007; Correia et al., 2022). The U.S. setting differs from ours because the German government did not take actions to prevent the spread of the pandemic and withheld information about it from the general public to keep up morale during wartime, which made it difficult for voters to evaluate individual politicians' performance.[6] Furthermore, until the end of the pandemic, Germany was a constitutional monarchy with a chancellor appointed by the emperor. Instead of blaming the now resigned government, voters affected by the flu could have either decided to vote for extremist parties like in Italy (Galofré-Vilà et al., 2022) or to reward expertise. Focusing on Weimar Germany, Blickle (2020) finds that cities in regions with higher influenza mortality in 1918 exhibited higher vote shares for the Nazi party (NSDAP) in the 1932 and 1933 elections. This finding is explained by lower public spending, especially on schooling, in cities more affected by the flu. In comparison, our paper uses more granular

[5] This echoes Achen and Bartels (2004), who found little to no impact of influenza mortality for the incumbent party in the 1918 U.S. midterm elections.

[6] This setting allows us to sidestep issues arising from voters with different party affiliations having different perceptions regarding the risk of contracting the flu and therefore differentially complying with NPIs as, e.g. in recent U.S. elections (Allcott et al., 2020; Baccini et al., 2021).

measures of pandemic intensity and shows a sizable and lasting positive effect on voting for leftwing parties, induced by a shift in support towards parties with expertise in health issues. This shift occurs immediately after the pandemic and is well identified using panel data in an event-study design.

This paper also relates to a literature studying the Spanish flu's economic consequences, which may constitute competing mechanisms in our context. Beach et al. (2022) summarize the literature and argue that its findings are consistent with a negative labor supply shock because the pandemic largely affected working-age adults. The pandemic had negative consequences for GDP growth (Barro et al., 2020; Carillo and Jappelli, 2022) which were mostly short-lived (Velde, 2022; Dahl et al., 2022). Negative employment and income effects are typically found especially at the lower end of the income distribution, leading to increases in inequality (Karlsson et al., 2014; Basco et al., 2021; Galletta and Giommoni, 2022). However, high mortality rates also resulted in labor shortages which increased wages in the medium-run (Garrett, 2009) and female labor force participation in the short-run (Fenske et al., 2022). Hence, whether or not the Spanish flu affected inequality everywhere in the same way is unclear. When examining changes in poverty and inequality as potential drivers of political outcomes, we contribute to this literature by demonstrating that the pandemic did not have a comparable economic impact in Germany. The consequences of the flu in Germany are generally underresearched, partly due to the difficulty of distinguishing its effects from those of the war (see Michels, 2010, for a historical overview).[7]

Given our empirical setting, we also contribute to a growing body of work discussing explanations for the rise of fascism in Weimar Germany before WWII (see, e.g. King et al., 2008; Adena et al., 2015; Satyanath et al., 2017; Spenkuch and Tillmann, 2018; Galofré-Vilà et al., 2021; Koenig, 2023; Voth and Voigtländer, forthcoming). Our paper shows that the influenza pandemic 1918 triggered a shift in electoral support from right to left after WWI and thus provides rare evidence on the factors which stabilized the nascent, fragile democracy of Weimar Germany rather than those leading to its downfall.[8]

On a broader scale, our findings also complement the literature studying behavioral voting responses to natural disasters, such as floods and fires (Bechtel and Hainmueller, 2011; Baccini and Leemann, 2021; McAllister and bin Oslan, 2021; Hoffmann et al., 2022; Hilbig and Riaz, 2024). This literature largely observes increases in support for green parties advocating pro-climate policies, which emerges immediately after such events but vanishes within a relatively brief period. In contrast, our findings indicate a lasting shift in voting behavior which we attribute to voters either assigning more weight to health in elections following the pandemic or forming a new habit of voting for certain parties.

The remainder of this paper is organized as follows. In Section 2, we provide key information on the Spanish flu pandemic in Germany and give an overview of the historical and political context. Section 3 introduces the main data sets. Section 4 introduces our estimation strategy whereas Section 5 presents the main estimation results as well as robustness and validity checks.

[7] Recently, Franke (2022) identified poverty and air pollution as key factors influencing Influenza mortality in 1918 in the German state of Württemberg.

[8] Acemoglu et al. (2022) show that Spanish flu deaths in Italy also boosted Socialist party vote shares. However, the resulting perceived threat of Socialism ultimately contributed to the subsequent rise of Fascism in Italy.

In Section 6 we discuss and present evidence on the mechanisms behind our main findings. Section 7 concludes.

2. Historical background

1918 was the final year of WWI. Germany was heavily involved in fighting against the Allied powers and the German government was focused on military efforts and mobilization to sustain the war effort. The German spring offensive began in late March but largely failed to deliver a decisive victory. It was followed by the Hundred Days Offensive of the Allied powers which started in early August and ended with the Armistice of Compiègne in November 1918. The war had taken a toll on the German population and there was widespread war weariness, economic hardships, and food shortages, leading to growing discontent.

2.1. The 1918 influenza pandemic in Germany

The 1918 Influenza pandemic was one of the deadliest pandemics in human history. Case fatality ratio and reproductive numbers were higher than for other pandemics of the twentieth century.[9] The virus, originating in the United States, spread to Europe through military troops. In March 1918, over 100 US soldiers fell ill at Fort Riley, Kansas, marking the initial outbreak. The virus then gradually spread through the US and reached France in April 1918 via US soldiers, eventually reaching all other countries (Crosby, 2003; Barry, 2004). In Germany, it entered through soldiers on leave and prisoners of war in camps. The influenza spread from west to east starting in mid-June 1918 (Michels, 2010, p.10).

The Spanish flu in Germany occurred in multiple waves. The first wave hit in spring and peaked in early July, about three weeks later than among the Entente troops (Johnson, 2001, p.111). The second wave peaked between mid-October and mid-November. While those infected in the first wave only developed relatively mild symptoms, the virus had possibly undergone genetic mutation and caused more severe symptoms in the second wave. Mortality was several times higher and death often occurred soon after the first onset of symptoms (Michels, 2010, p.16). Unlike in other countries, the third wave which occurred between late January and March 1919 does not show a significant impact in the German mortality statistics (Buchholz et al., 2016, p. 530).

The sick experienced high fever, severe headaches, and limb pain. Those with a severe form of the disease often suffered from nose and ear bleeding as well as spitting up blood. Their faces turned blue due to oxygen deprivation. Autopsies revealed extensive lung damage, with lungs filled with blood and fluid (Michels, 2010, p.6). Unlike many other pandemics, the Spanish flu shows a unique W-shaped relationship between mortality and age with the highest death rates among young adults (Shanks and Brundage, 2012). This was attributed to a cytokine storm, an immune system response causing organ failure.

According to a survey by Buchholz et al. (2016, p. 527), estimates of excess mortality caused by the Spanish flu in Germany in 1918 vary between approximately 240,000 and 442,300 deaths

[9] Recent work suggests that the 'Spanish flu' caused around 50 million deaths globally, with some estimates ranging up to 100 million casualties (Johnson and Mueller, 2002). The influenza subtype H1N1 which emerged in 1918 was more infectious and deadly than other sub-types.

in a population of 62 million. This translates into an excess death rate ranging from 3.9 to 7.2 per 1,000 individuals, which aligns with the 6.5 estimate used in Barro et al. (2020). Johnson and Mueller (2002) calculates 225,330 flu deaths leading to a flu mortality of 3.8 in 1918–1920. Our own calculations suggest a total Spanish flu mortality rate of about 6.2 within the borders of Weimar Germany which is closer to the higher estimates.[10]

2.2. The policy and media response

German authorities did little to limit the spread of the influenza. The second wave of infections hit the German army during the Hundred Days Offensive, the crucial final phase of WWI, and authorities downplayed the threat to keep up morale (Michels, 2010). Restricting mobilization and supplies to limit the spread of an infectious disease was not an option. Non-pharmaceutical interventions (NPI) such as bans on meetings, cultural events and religious services were rejected because authorities did not want to raise concerns of the people.

The Imperial Health Council (*Reichsgesundheitsrat*), an advisory body to the health department, did not recommend school closures because they prevented mothers from going to work and deprived children from receiving a meal (Michels, 2010, p.21). The council rather recommended instructing the people with some basic codes of conduct to limit infections emphasizing personal hygiene and cleanliness, especially when preparing food (Michels, 2010, p.21). The national government delayed informing the federal states about these recommendations for two weeks until the end of October. Neither imperial nor state governments issued any binding instructions, but left decisions to local authorities. Similarly, the Prussian Ministry of Culture delegated the decision whether to close schools to local councils and public health officers. While only few cities indeed decided to close schools for a few days, even fewer also closed theaters and cinemas and suspended court hearings.

Press censorship remained effective during the first wave of the pandemic. General rules implied that the press should not report on the state of the military and news should not agitate the reader. German media aligned with the government's communication strategy during this period to maintain a positive image and not to undermine Germany's position on the Western front before the arrival of US troops (Michels, 2010, p.12). Despite rumors attributing the spread of influenza to food and supply shortages, the media refrained from discussing such matters.

During the second wave, mainstream newspapers in Germany began to report more openly about the disruptions caused by influenza and the impact of the disease on public life. However, the health department, concerned about the tone and content of the media coverage, requested the ministry of interior to instruct the press to avoid alarming the public. As a result, even at the peak of the second wave in October and November 1918, the coverage of the pandemic remained minimal in German newspapers. Articles were limited to brief reports and did not discuss the government or political parties as being responsible for the outbreak or its consequences. Moreover, the topic disappeared from the press by the end of October, long before the epidemic had subsided because peace negotiations with the Allies, rising food prices, and other war-related

[10] Another recent study by Franke (2022) indicates excess mortality between 5.4 and 7.0 per 1,000 for the period 1918–1920.

topics were predominant in October and early November (Michels, 2010, p.23).

In contrast to mainstream media, newspapers issued by social democratic parties or related institutions were more critical and discussed concerns of the working class. The flagship newspaper *Vorwärts* increasingly reported more openly as the flu progressed (Müller, 2020).[11]

2.3. Changes in the political system by 1919

The German Empire, existing from 1871 to November 1918, was a constitutional monarchy where power was held by the German emperor who appointed a chancellor with executive authority. Following the end of the German Empire, the Weimar Republic emerged as a parliamentary republic in 1919. In this new system, the government was appointed by an elected president and relied on parliamentary support from a majority.

The focus of our analysis are voting results for the Reichstag, the lower house of Germany's parliament. From 1871 to 1912, the last elections before the Spanish flu, members of parliament were elected according to a majoritarian representation system by men at least 25 years old.[12] There were 397 single-member constituencies, each consisting of 2–4 counties. From 1919 to 1933, members of parliament were elected according to a proportional representation system by men and women at least 20 years old.[13] As a results, the population entitled to vote increased from approximately 14 million in 1912 to 37 million in 1919. There were now only 38 large electoral constituencies each of which sent candidates according to a party's electoral lists. Since voting results for elections during the Weimar Republic are reported at the county-level, they can be aggregated up to the level of 362 constituencies existing already during the German Empire, making them directly comparable.[14]

From October 3 until November 9, 1918, the German Empire was effectively governed by a cabinet under the chancellor Max von Baden, who, like most of his cabinet members, had no party affiliation. After a change in the constitution, this was in fact the first government accountable to parliament. As a consequence, it was also the first cabinet to ever include Social Democrats.[15] The ministry of the interior, responsible for health issues, was held by a member of the Centre party.

In the aftermath of the November Revolution of 1918 in Germany, the country was governed by the Council of the People's Deputies which ruled by decree and bypassed parliament. Their rule lasted from November 10 to February 13 and thus had minor overlaps with the second wave of the Spanish flu. The council consisted exclusively of social democrats and was predominantly occupied with negotiating and signing the peace terms and preparing federal elections for the National Assembly (*Nationalversammlung*) on 19 January 1919.[16] The National Assembly, in

[11]Editors started using the term 'epidemic' on July 5. On October 11, the *Vorwärts* reported that influenza had "not only greatly increased in extent" but that "the number of severe and fatal cases increased compared with the first wave" (Vorwärts, 11 October. 1918, p. 3). On October 20, the *Vorwärts* reported that the disease extended "over the entire Reich" and was also "associated with more severe courses of disease".

[12]Excluding soldiers, convicts, and those on welfare.

[13]Excluding soldiers again from 1920.

[14]See Section 3 for more details.

[15]In the last federal elections of the German Empire in 1912, Social Democrats had received 34.8% of votes, resulting in 110 seats (199 were needed for a majority in the house). The elections of 1917 were postponed until after the end of the war.

[16]The council included three members from the Social Democratic Party (SPD) and three members from the

turn, was elected with the purpose of drafting the new constitution of the Weimar Republic and was replaced after the first Reichstag elections after WWI in June 1920.

The elections of 1919 brought some further changes to Germany's party landscape. New parties emerged and established parties operated under new party names. We will not cover these transitions in detail here but deal with them empirically by combining parties into broader political camps to maintain comparability over time. This practice follows Koenig (2023) and allows us to condition on pre-existing political leanings before the Spanish flu.

2.4. Health and politics

Pre-war Germany With the exception of the SPD and its predecessors, parties did not address health policy in their programs prior to the pandemic. The main goal of socialist parties in Germany was improving the conditions of the working class and the social aspects of health were part of this. Since their earliest party platform, the Gotha Program of 1875, the Socialist Workers' Party (SAP) advocated policies explicitly protecting the health of workers in Germany (Kettler, 1978). Furthermore, they demanded self-administration of all workers' insurances. In their 1891 Erfurt Program, the SPD demanded free medical treatment for all and nationalization of health care. Subsequent party conventions discussed compulsory vaccination, combating widespread diseases such as Tuberculosis, and the expansion and improvement of health insurance benefits.

It was, however, through the insurance system that the SPD and its predecessors assumed a leading role in health. Many insurances were governed by an elected board of workers, oftentimes party officials, thus deepening the ties between the party and the local insurances (Tennstedt, 1983; Müller, 2020).[17] In fact, during the Anti-Socialist Laws, which banned meetings and assemblies spreading social-democratic principles from 1878 to 1890, health insurance meetings were used to disguise official party assemblies. After mandatory health insurance for blue collar workers was implemented under Bismarck in 1884, socialists rather than conservatives reaped the political benefits by successfully claiming the responsibility for this policy (Kersting, 2022). It was also through the insurances that social democracy was confronted with political reality (Labisch, 1976, p. 363).

While the SPD established their leadership in health topics through administration of workers' insurances, the National Liberals were the party for medical practitioners. Because they largely came from the wealthy and educated middle class in Germany, physicians were among the typical constituents of the party. As liberals they opposed the idea of nationalized health care and promoted the free choice of medical doctors. Liberals also supported the social hygiene movement which promoted health through prevention of illness, e.g. through building public health infrastructure (Fehlemann, 2002; Hüntelmann, 2021). This movement was initially leaning left-liberal but soon came to be dominated by national-liberal physicians (Labisch

Independent Social Democratic Party (USPD), a group which had split from the SPD due to their firm anti-war stance.

[17] Physician and Reichstag MP Otto Mugdan (Left Liberals) argued in 1904 that it had become impossible to gain employment in a health insurance fund for anyone who was not a Social Democrat (cited after Tennstedt, 1983, p. 436). Out of 1,277 local insurance funds contacted (*Ortskrankenkassen*), 166 funds responded to a survey stating that they had Social Democrats on their board, while 181 funds reported that they did not (Tennstedt, 1983, p. 430).

and Tennstedt, 1991, p. 14). Private and public health clinics and nursing homes became the primary policy tool for liberal physicians in the early 1900s (Kott, 2014, p. 181). In Section 6.2, we support this historical assessment with econometric evidence showing that areas where the SPD and the National Liberals were traditionally more successful also had a stronger provision of public health infrastructure prior to the Spanish flu.

Weimar Germany The period immediately following the war marked a politicization of health (Woelk and Vögele, 2002, p. 21). While until 1914, the state mainly assumed the policing of health-related issues and left the provision of sanitary infrastructure to local governments, it became increasingly involved in health care and the establishment of a public health system after 1918 (Woelk and Vögele, 2002, p. 22). As per the new constitution, public health became a responsibility of the government instead of the individual. This change was rooted in the perception that the poor state of popular health after the war resulted from political decisions rather than individual decisions or behaviors (Sachße and Tennstedt, 1988, p. 117).

Despite this development, the historical literature does not suggest that public health became an issue exploited in party propaganda or election campaigns. Lau (2008) provides a brief overview of the 1919 and 1920 campaigns, along with a detailed analysis of each major party's positions during the 1924 to 1930 campaigns. Neither the Spanish flu nor the provision of public health are mentioned as a campaign issues by any of the major parties. Similarly, Fischer (1989), who focuses primarily on the 1928 to 1930 electoral campaigns, provides no indication that health was systematically mentioned in party propaganda. However, the Social Democrats and National Liberals likely maintained their leading role in public health, as both parties played a key role in driving the shift toward greater state responsibility for public health issues and the continued expansion of health infrastructure (Eckart, 1991; Fehlemann, 2002).

3. Data and variables

3.1. Voting data

The voting data used in this paper is a panel of election results for German constituencies (*Wahlkreise*) from 1893 to 1933 constructed by Koenig (2023). The data harmonizes two existing datasets on elections before and after WWI by ICPSR (1991) and Falter and Hänisch (1990) and expands it with returns for the election of the National Assembly in January 1919. To assure comparability over time, all parties are classified into one of three political *camps*: leftwing, centre, and rightwing.[18] We compute their vote shares by dividing the number of votes for a political camp by the total number of valid votes. For analyses inspecting mechanisms, we further classify them into one of six party *groups* (Communist, Socialist, Liberal, Catholic-Minority, Conservative, Antisemitic).

Prior to 1920, parliamentary seats were allocated via single-member constituencies and election results were not published at a lower level of aggregation. Each constituency consisted of 2–4 counties (*Kreise*) and their borders remained constant until the end of WWI. Starting with the 1920 election, voting data were consistently published at the county-level, which allows cal-

[18] See Table D.1 in the Appendix for details.

culating election results at the constituency-level also for this period.[19] To assure comparability across space, we aggregate post-1920 election results and other county-level variables up to the level of the 362 constituencies in the German Empire contained within the borders of Weimar Germany.[20]

We augment the constituency-level data in Koenig (2023) with corresponding data for cities above 10,000 inhabitants from 1898 onwards. This data allows us to construct an unbalanced panel of 180 cities and exploit several sources of data which is only available at this level of observation.

3.2. Mortality data

Optimally, we would have liked to use administrative data on influenza deaths reported at the same level of observation as our voting data. Since such data do not exist, we rely on a variety of official vital statistics. A very important source are newly-digitized yearly all-cause numbers of deaths between 1904 and 1933 which we use to calculate excess mortality as explained in more detail in Section 3.3. The data was published by the statistical offices of Imperial and Weimar Germany at the county-level which we collapse to the constituency-level for most analyses to match the panel of election results. In order to rule out any effects due to the drop in birth rates during WWI, we subtract stillbirths and deaths of infants below the age of one. All death counts are scaled by the 1910 population, which was the last census unaffected by the influenza pandemic and WWI.[21]

We were able to obtain official data on influenza deaths from the Prussian statistical office at a higher level of aggregation, specifically for the state's 37 districts (*Regierungsbezirke*).[22] For our analyses at the city-level, we can construct all-cause excess mortality based on cause-specific numbers of deaths for localities with more than 15,000 inhabitants using publications on vital statistics by the Imperial Health Office between 1904 and 1913. Crucially, we are able to extend this series into the years 1914 to 1918 by digitizing hitherto unpublished city-level mortality reports submitted to the Imperial Health Office, which we resurrected from hand-written archival sources. Within the 13 cause-of-death categories listed in the city-level records, influenza deaths are recorded in the category 'respiratory diseases'. This category includes any death caused by diseases of the respiratory system apart from the separately listed 'diphtheria & croup' and 'tuberculosis' categories.[23] We aggregate the remaining categories into deaths from 'external' forces such as suicide, violence and accidents and those from 'non-respiratory' diseases.[24] This will allow us to run placebo checks to ensure that it was not just any type of mortality which influenced the voting results.

[19]For details on handling changes in administrative boundaries of counties, we follow Koenig (2023).

[20]Some areas of the German Empire were ceded after the Treaty of Versailles, including Alsace–Lorraine, parts of Silesia and Poznan.

[21]Note that we normalize by the 1910 population instead of using a time-varying measure of population size to avoid endogenous responses to the pandemic in the denominator.

[22]For a map, see Figure B.1 in the Appendix.

[23]Using a broad category like 'respiratory diseases' for our analysis avoids issues related to potential mis-classification of influenza deaths by the officials. We also added pertussis deaths which were not listed separately until 1905. The remaining categories are as follows: childbed fever, scarlet fever, measles & rubella, typhoid, intestinal diseases, suicide, violence, accidents and all other or unknown diseases.

[24]Since cause-of-death categories do not distinguish by age, we cannot deduct deaths of individuals below the age of one as we do when constructing all-cause mortality rates.

A crucial step in our estimation of flu mortality described in Section 3.3 requires purging excess mortality in 1918 from the direct impact of the war and, hence, information on military deaths. While administrative data on killed soldiers for each war year exists for the cities in our sample as well as for Prussian districts, they were never tabulated for all of Germany at the constituency- or county-level. We therefore made use of the German WWI Army's casualty lists digitized by the Verein für Computergenealogie (2024). The lists provide consistent information on every casualty regarding their casualty status and birth place. The date stamp on each casualty list furthermore provides a close proxy of the date a soldier was injured or killed. For our measure of military deaths, we keep only records for killed soldiers and collapse the data at the year-constituency-level.[25]

3.3. Estimation of Spanish flu mortality

Figure 1 shows mortality rates for the period 1904–1918. The box plots give a sense of excess mortality during the years 1914-1918. In the absence of WWI and the Spanish flu, one would expect mortality rates to remain relatively stable at around 11-12 deaths per 1,000 inhabitants, as observed from 1904 to 1913. However, the mortality rates for the years 1914–1918 are higher due to military deaths resulting from the war. The box plot for 1918 shows an even higher and more dispersed mortality rate resulting from the additional impact of the Spanish flu. It is estimated that the Spanish flu claimed between 240,000 and 442,300 lives, while around 380,000 people died as a result of WWI in 1918 (Buchholz et al., 2016; Roesle, 1925).[26]

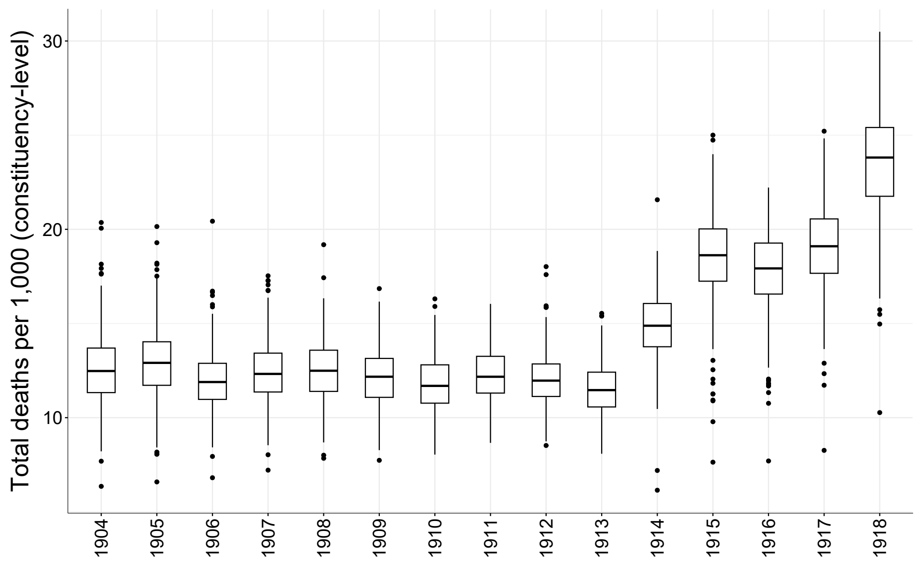


Figure 1 — Mortality rates 1904–1918

Notes: The graph shows box plots of constituency-level mortality (crude death rates per 1,000 inhabitants in 1910) from 1904 to 1918.

[25]In order to accurately match birth places to constituencies, we made use of an improved mapping of birth place strings to geographic coordinates which was kindly provided to us by Sascha O. Becker and Hans-Joachim Voth. See Section C for further details.

[26]These figures are comparable to the mortality rates during earlier war years. According to Roesle (1925), about 234,000 German WWI soldiers died in 1914, 424,000 in 1915, 335,000 in 1916 and 282,000 in 1917.

In the absence of fine-grained data on Spanish flu mortality in 1918, we construct an estimate thereof using only information on all-cause mortality and military deaths.[27] In a first step, we run the following regression to obtain estimates for constituency-specific mortality levels and trends:

$$Mort_{it} = \mu_i + \theta_i \times t + \epsilon_{it} \tag{1}$$

$Mort_{it}$ is the number of deaths in constituency i in year $t \in 1904-1913$ per 1,000 individuals in 1910, the last pre-war census year. μ_i are constituency fixed effects to capture time-invariant unobserved heterogeneity in mortality rates across units. To flexibly account for local mortality dynamics, we include constituency specific linear time trends. We do not include the years 1914–1917 to avoid that the estimated coefficients are affected by WWI. The estimated μ_i and θ_i coefficients are used to predict mortality in 1918. Predicted 1918 mortality is subtracted from actual 1918 mortality to obtain a measure of excess mortality as described in Equation 2. We compute excess mortality for the years 1914 to 1917 in an analogous way and use these variables in plausibility and validity checks.[28]

$$ExcMort_{1918} = Mort_{i1918} - \widehat{Mort_{i1918}} \tag{2}$$

We expect that the 1918 excess mortality calculated from Equation 2 includes both military deaths and influenza deaths. To confirm this, we make use of the fact that official data on military and influenza deaths are available at a higher level of aggregation, and regress a district-level equivalent of Equation 2 on military deaths per 1,000 capita in year 1918. The results of this analysis are depicted in column 1 of Table 1. We find a significant positive correlation between excess mortality and military deaths per 1,000 capita in 1918. In column 2, we regress 1918 excess mortality on influenza deaths per 1,000 capita. The correlation is highly significant and large. When regressing excess mortality on both military deaths and influenza deaths in column 3, the influenza deaths coefficient stays highly significant and large while the military deaths shrinks and turns insignificant. In columns 4 to 6, we perform a similar analysis at the city level but use excess respiratory deaths instead since influenza deaths are not available at the city level.[29] Both variables are strongly and significantly correlated with excess mortality. Finally, column 7 indicates that the strong correlation between excess mortality and military deaths in 1918 also holds at the constituency level.

The analysis above confirms that excess mortality in 1918 is not only driven by the Spanish flu but also military deaths and stresses the need to construct a more refined measure which isolates excess mortality due to the Spanish flu. In order to do this, we account for variation in military deaths from excess mortality in 1918 as done in specifications 1, 4, and 7 and formalized in Equation 3:

[27] See Appendix Section C for further details.

[28] Alternatively, we follow Clay et al. (2019) and compute excess mortality for the years 1914 to 1918 using data from both 1909 to 1913 and 1919 to 1923 to obtain estimates for μ_i and θ_i. We prefer our measure over this alternative measure since horse race estimations show that it is a better predictor of influenza deaths reported at the district-level (see Table A.2 in the Appendix).

[29] Note that the calculation of excess mortality requires data from 1904 onwards which, in turn, restricts the sample to cities with a population consistently above the reporting threshold of 15,000 between 1904 and 1918.

Table 1 — Creating Spanish flu excess mortality

	Excess mortality 1918							Flu mortality 1918	
Unit	Districts			Cities			Const's	Districts	Cities
Deaths 1918 per 1,000	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Military	0.516*		0.129	0.646***		0.617***	0.222***		
	(0.293)		(0.243)	(0.176)		(0.171)	(0.044)		
Influenza		1.430***	1.393***					1.283***	
		(0.212)	(0.245)					(0.237)	
Excess Respiratory					0.866***	0.857***			0.856***
					(0.170)	(0.171)			(0.171)
Observations	37	37	37	180	180	180	362	37	180
Mean DV	12.608	12.608	12.608	11.682	11.682	11.682	12.232	0.000	0.000
R^2	0.077	0.574	0.579	0.055	0.239	0.290	0.083	0.501	0.248

Notes: This table presents regressions between predicted measures of excess and flu mortality and reported deaths due to war and the Spanish flu at the district-level in columns 1-3 and 8, city-level in columns 4-6 and 9 and constituency-level in column 7. Robust standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01.

$$ExcMort_{i1918} = \beta_t MilitaryDeaths_{i1918} + \epsilon_{i1918} \quad (3)$$

We argue that the residual from this regression indeed captures Spanish flu mortality. To empirically validate this approach, we look at the district- and city-level data and regress excess mortality in 1918 purged of variation in military deaths on influenza deaths and excess respiratory deaths, respectively. As columns 8 and 9 of Table 1 prove, residualized excess mortality is strongly correlated with influenza deaths at the district-level and with excess respiratory deaths at the city-level. The highly significant coefficients hover around one, which suggests that residualized excess mortality in 1918 is indeed a sensible predictor of Spanish flu mortality while it is uncorrelated with military deaths by construction. Therefore, in the remainder of the paper, we will use excess mortality in 1918 purged of variation in military deaths as our main variable of interest and label it Spanish flu mortality ($FluMort_{i1918}$) for ease of interpretation. Figure 2 shows a map of the spatial distribution of Spanish flu mortality across the 362 constituencies in the German Empire.

3.4. Control variables

There is a number of factors which may confound our relationship of interest. In order to identify the most important confounders, we inspect their correlation with Spanish flu mortality in Table 2, where we progressively add more characteristics across the columns.

The first two variables address concerns related to the combination of election results from Imperial Germany and the Weimar Republic, specifically the expansion of the electorate in 1918. The new constitution of the Weimar Republic introduced women's suffrage and lowered the voting age to 20. Although these changes increased the electorate substantially, significant shifts in electoral patterns emerged only several years after WWI (Koenig, 2023). Moreover, women tended to vote either in accordance with their spouses or social class (Sneeringer, 2002).

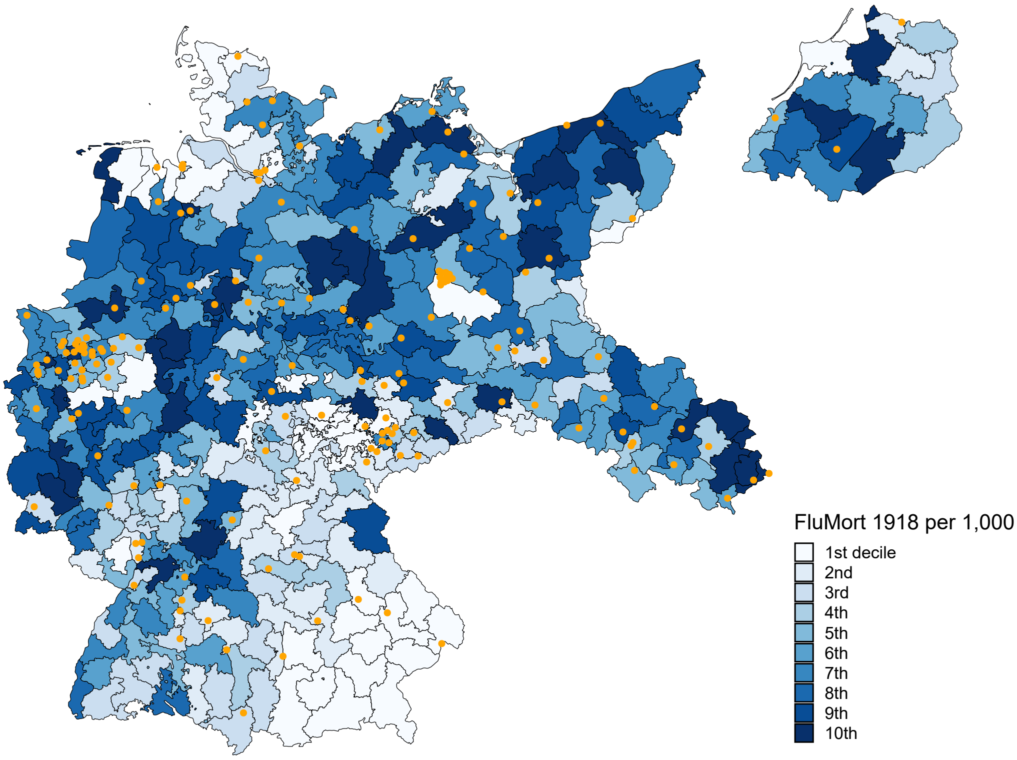


FIGURE 2 — Estimated Spanish flu mortality across constituencies

Notes: The map depicts Spanish flu mortality in 1918 across constituencies. Spanish flu mortality in 1918 is excess mortality in 1918 purged of military deaths in 1918 per 1,000 individuals in 1910. Yellow dots indicate the location of the cities included in the city-level analysis. For further details see Section 3.3.

Nevertheless, to address related concerns empirically, we include controls for the population share of newly enfranchised females (born before 1899) and males (born between 1893 and 1898), based on data from the 1910 census. Further demographic controls include population density in 1910 (in logs), population growth between 1910 and 1917, and the population shares of Catholics, agricultural employment, blue-collar employment and the middle class.

To account for pre-pandemic health infrastructure and poor living conditions, we add infant mortality in 1917 as well as doctors and health sector workers per capita in 1909. Furthermore, we control for non-military excess deaths during the war years 1914 to 1917, computed analogously to Equation 3, in order to account for an area's general proneness to disease outbreaks during the war and their potentially lasting impact on mortality. We additionally control for workers in coal mining and proximity to the closest coal deposit, calculated from digitized maps, as a proxy for air pollution, which has been shown to be an important predictor of Spanish flu deaths (Clay et al., 2018; Franke, 2022).

To account for war-related confounders, we include the population share of WWI veterans as estimated by Koenig (2023), the number of military personnel and prisoners of war per capita as of 1917. Moreover, we include the proximity of each constituency to the nearest garrison, the proximity to any front, to the Western front and to the Easter front. Further details on all variables and their sources are provided in Appendix Section C.

The comprehensive set of 24 covariates presented in column 5 is reduced to a set of 15

Table 2 — Determinants of Spanish flu mortality

	FluMort 1918 p.c.					
	(1)	(2)	(3)	(4)	(5)	(6)
Male 1893-1898 p.c.	148.949***	125.389***	76.821***	72.540***	85.534***	55.573***
	(27.271)	(27.488)	(20.113)	(20.268)	(22.265)	(18.172)
Female before 1899 p.c.	17.202**	19.598**	16.238***	15.328***	18.768***	
	(6.704)	(8.219)	(5.739)	(5.636)	(6.653)	
Log pop. density	0.227***	0.465***	0.416***	0.420***	0.414***	0.426***
	(0.084)	(0.133)	(0.083)	(0.085)	(0.088)	(0.084)
Pop. growth 1910-17	12.070***	13.696***	5.014***	5.666***	5.832***	4.267***
	(2.507)	(2.826)	(1.307)	(1.589)	(1.580)	(1.319)
Catholics p.c.		−0.540	0.599**	0.597**	0.509*	0.437
		(0.358)	(0.275)	(0.298)	(0.306)	(0.290)
Agric empl. p.c.		9.774	2.971	−0.217	−1.287	4.541***
		(7.067)	(4.784)	(5.239)	(5.361)	(1.310)
Blue-collar empl. p.c.		8.481	−2.618	−5.666	−6.645	
		(8.661)	(5.674)	(6.183)	(6.374)	
Middle cl p.c.		0.833	−13.645**	−15.752**	−14.553*	−6.156*
		(10.330)	(6.601)	(7.366)	(7.711)	(3.303)
Infant mortality 1917			−5.897**	−5.479**	−4.242*	−3.049
			(2.322)	(2.316)	(2.471)	(2.008)
Doctors p.c.			0.797	0.933	0.813	
			(0.614)	(0.607)	(0.627)	
Health empl. p.c.			−0.151	−0.159	−0.204	
			(0.132)	(0.132)	(0.134)	
Coal mining empl. p.c.			6.317**	3.167	4.620	
			(2.643)	(2.985)	(3.110)	
Proximity coal deposit			0.335**	0.329**	0.248	0.408***
			(0.143)	(0.143)	(0.156)	(0.144)
Non-military Excess deaths 1917			0.725***	0.716***	0.749***	0.705***
			(0.056)	(0.058)	(0.059)	(0.055)
Non-military Excess deaths 1916			0.050	0.056	0.050	0.036
			(0.063)	(0.062)	(0.064)	(0.064)
Non-military Excess deaths 1915			0.246***	0.244***	0.243***	0.260***
			(0.053)	(0.054)	(0.056)	(0.052)
Non-military Excess deaths 1914			0.037	0.055	0.047	0.064
			(0.058)	(0.058)	(0.057)	(0.059)
Veterans p.c.				−4.313	−4.273	−2.568
				(5.247)	(5.180)	(5.028)
Military 1917 p.c.				−4.767	−5.683	−2.936
				(3.782)	(3.825)	(3.463)
POW 1917 p.c.				4.311	4.062	6.602
				(5.189)	(5.215)	(4.990)
Proximity garrison					0.278	
					(1.006)	
Proximity any front					0.116	
					(0.081)	
Proximity Western front					0.074	
					(0.152)	
Proximity Eastern front					0.085	
					(0.144)	
Lasso selection	N	N	N	N	N	Y
Observations	362	362	362	362	362	362
Mean DV	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.155	0.175	0.718	0.723	0.725	0.710

Notes: This table presents results from OLS regressions of predicted Spanish flu mortality in 1918 as described in Section 3.3 on a number of potential control variables in a cross section of constituencies. Columns 1–2 include two sets of demographic covariates, column 3 adds several proxies for pre-pandemic health circumstances and columns 4–5 add two sets of war-related controls. Column 6 uses the set of control variables from column 5 selected by the Lasso technique described in Section 3.4. Robust standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01.

covariates using standard Lasso techniques in column 6.[30] These factors collectively account for 71% of the variation in flu mortality. In line with existing findings for Germany by Franke (2022), the estimates suggest that Spanish flu mortality increases with population density and with air pollution, as indicated by proximity to coal deposits. We include these 15 demographic, health and war-related variables as controls in all regressions.

3.5. Other outcomes

To inspect potential channels of transmission, we use four additional panel variables to capture potential changes in local economic conditions emerging after the pandemic. In particular, we use population size, taken from the census of the years 1895, 1900, 1905, 1910, 1916, 1917, 1919, 1925 and 1933. Changes in population size may reflect natural changes due to births and deaths, but also net migration, all responding to local economic and health conditions. Second, we use infant mortality for the years 1904 to 1933, calculated from the same vital statistics discussed above as the ratio of stillbirths and deaths below the age of one over the total number of births in a given year. Changes in infant mortality are arguably a very good proxy for the local nutritional status and general health environment. Third, we also use general mortality from the same vital statistics for similar reasons. Fourth, we collected data from statistical yearbooks on the share of individuals and households receiving welfare benefits in approximately 60 cities. The data covers the years 1910 to 1912 and 1926 to 1929, enabling us to approximate the changes in the population eligible for financial support during this period. From the same sources we also gathered data on the ordinary spending of cities per capita as used by Blickle (2020) for the years 1908, 1911, 1912, 1925, 1927-1931, and 1933. Last, we obtained detailed administrative data on a sample of about 7,000 (male) WWII draftees from Blum and Bromhead (2019). For the purpose of our study, we focus on 2,871 individuals born between 1904 and 1926 with sufficient information on height, socio-economic background as well as date and place of birth. Table A.1 in the Appendix provides descriptive statistics for all variables used.

4. Estimation strategy

To identify the impact of Spanish flu mortality on election results, we estimate the following difference-in-differences model:

$$Vote_{it} = \gamma_i + \tau_t + \delta(FluMort_{i1918} \times PostFlu_t) + \lambda_t(X_i' \times Year_t) + \epsilon_{it}. \tag{4}$$

$Vote_{it}$ is the vote share for a particular political camp or party group in constituency i in election year t. γ_i are constituency fixed effects accounting for time-constant heterogeneity across constituencies. τ_t are election fixed effects which flexibly capture common trends in the election system as well as general time trends in voting patterns. $FluMort_{i1918}$ is residualized excess mortality in constituency i in year 1918 per 1,000 individuals in 1910 and measures mortality from the Spanish flu. $PostFlu_t$ is an indicator variable taking the value of one for all elections in years t after 1918 and zero otherwise. X' is the vector of time-invariant constituency specific covariates determined prior to the Spanish flu and identified as relevant by the Lasso

[30] We select the Lasso tuning parameter λ as the maximum value within one SD of the cross-validation error.

selection in Table 2. We interact this vector with election dummies $Year_t$ to allow for differential effects of covariates over time. Standard errors ϵ_{it} are clustered at the constituency-level to account for serial correlation within constituencies.

The coefficient δ preceding the interaction of Spanish flu mortality $FluMort_{i1918}$ and the post-pandemic indicator $PostFlu_t$ yields the causal effect of Spanish flu mortality on vote shares under the assumption that, conditional on the set of controls, constituencies with higher Spanish flu mortality in 1918 would have followed the same voting trend as constituencies with lower Spanish flu mortality in the absence of the Spanish flu. We assess the validity of this assumption by testing the robustness of our baseline results to the addition of linear constituency-specific pre-trends following Bhuller et al. (2013).

To provide an even more rigorous check for the validity of the key identifying assumption, we also estimate a dynamic difference-in-differences specification with multiple pre- and post-periods. In particular, we modify Equation 4 by interacting Spanish flu mortality in 1918 with a full set of election fixed effects instead of a single post-pandemic indicator. This results in an event-study specification with four leads and nine lags, with the last pre-pandemic election in 1912 serving as the reference year:

$$Vote_{it} = \gamma_i + \tau_t + \sum_{t=1893}^{1933} \delta_t (FluMort_{i1918} \times Year_t) + \lambda_t (X_i' \times Year_t) + \epsilon_{it} \quad (5)$$

This dynamic specification allows us to investigate the voting trends across areas prior to the Spanish flu. In particular, if $\delta_t = 0$ for all pre-pandemic elections, this would provide evidence for the validity of the common trends assumption. Moreover, we can inspect how the Spanish flu effects change over time; in particular, we would like to understand whether they are transitory or permanent.

5. Results

5.1. Main results

Static difference-in-differences analysis We start by estimating a basic version of the static difference-in-differences model from Equation 4, without adjusting for any covariates. Column 1 of Table 3 shows that Spanish flu mortality significantly increases the leftwing vote share. In column 2, we add our set of control variables in addition to constituency and election fixed effects. This reduces the point estimates for leftwing votes but does not affect significance.[31] Adding linear constituency-specific pre-trends in the outcome leaves our estimates virtually unaffected. The positive effect of Spanish flu mortality on the leftwing vote share remains statistically highly significant and economically meaningful.

The coefficient of 0.007 suggests that moving from a constituency at the 25th percentile of Spanish flu mortality to a constituency at the 75th percentile of Spanish flu mortality increases the left-wing vote share by 2.1 percentage points. In other words, a one SD increase in flu mortality is associated with an increase in 12.4% of an SD of the left-wing vote share during the Weimar Republic. Columns 4–6 repeat the exercise using the centre's vote share as

[31] Table A.4 in the Appendix shows that the key factors driving the impact of the control variables on the baseline estimates are the population shares of male cohort 1893-1898 and prisoners of war in 1917.

Table 3 — The impact of Spanish flu mortality on vote-shares

	Leftwing			Centre			Rightwing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FluMort1918×PostFlu	0.012***	0.007***	0.008***	0.001	0.008	0.007	−0.012***	−0.015***	−0.015***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	N	Y	Y	N	Y	Y	N	Y	Y
Constituency pre-trends	N	N	Y	N	N	Y	N	N	Y
Constituencies	362	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.299	0.412	0.412	0.412	0.288	0.288	0.288
R^2	0.889	0.939	0.946	0.862	0.888	0.898	0.788	0.843	0.855

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of the party camp indicated in the column head at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

the outcome variable. The results point to positive but mostly insignificant increases in vote shares. Columns 7–9 use the right-wing vote share as the outcome variable. The estimates are consistently negative and significant suggesting that the increase in vote shares for left-wing parties came at the expense of right-wing parties. The effect size of -0.015 implies that a one SD increase in flu mortality translates into a reduction of 18.4% of a SD in rightwing vote shares after WW1.

In terms of magnitudes, the effects are similar to several other factors which have been associated with the success of rightwing parties during the Weimar period. Satyanath et al. (2017) report increases of the Nazi party vote share from 15 to 19% of an SD in response to a one SD increase in association density. The study by Koenig (2023) estimates that a one SD higher share of veterans per capita increased rightwing votes by 13% of an SD and reduced those for the left by 20%. Adena et al. (2015) show that a one SD higher radio subscription rate reduced Nazi votes by 15% during the 1930s. The impact of the flu, however, is lower than major economic shocks and religion. Galofré-Vilà et al. (2021) find that a one SD increase in austerity during the Great Depression led to an increase of about 40% of an SD in the vote share of the Nazi party during the 1930s whereas Spenkuch and Tillmann (2018) demonstrate that a one SD increase in the share of catholics reduced support for the Nazis by 27% of an SD.

Since the evidence on mechanisms discussed below points towards the idea of voters rewarding the left for their perceived competence in health issues, our analyses will focus on leftwing vote shares as outcome from here on. We will return to comparing vote shares of other party groups in the mechanism section.

Dynamic difference-in-differences analysis To provide prima facie evidence for the key identifying assumption that constituencies with different levels of Spanish flu mortality would have followed similar trends in the absence of the pandemic, we present descriptive graphs in Figures B.2–B.4 in the Appendix. The figures plot the average vote shares of leftwing, center, and rightwing party camps for constituencies categorized as either above or below the median of Spanish flu mortality from 1893 to 1933. Focusing on Figure B.2, we observe that the trends in the leftwing vote shares before the Spanish flu were nearly identical in both groups, which visually supports the notion of common pre-treatment trends. After the Spanish flu, the leftwing vote share increased much more in constituencies with higher mortality rates than in those with lower mortality rates, starting immediately with the 1919 election. As a result, the initial gap between the two groups was reduced by half, and this reduced difference persisted in subsequent elections until the end of the observation period.[32]

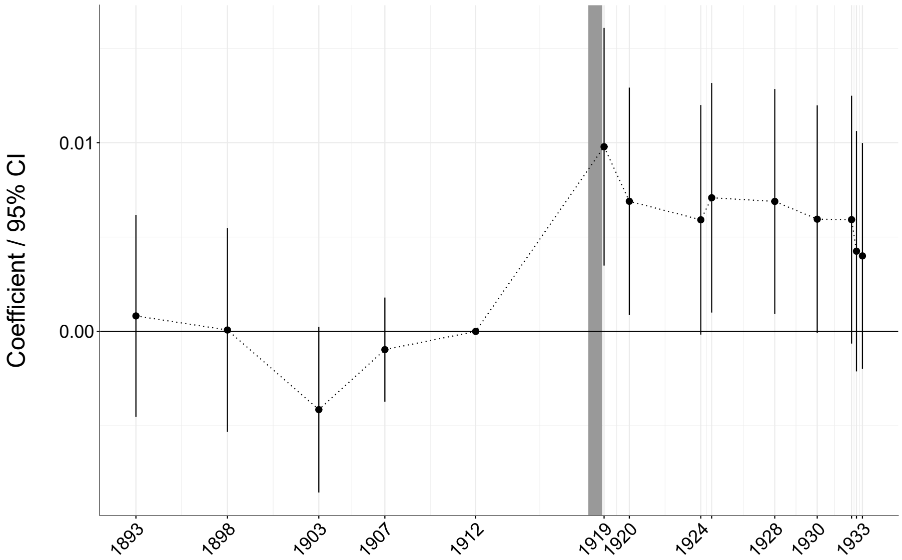


FIGURE 3 — Event study graph for leftwing vote share

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures leftwing vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

We proceed to present results from the dynamic difference-in-differences specification of Equation 5 which allows us to include covariates and more thoroughly inspect pre-treatment trends and post-treatment dynamics. The results depicted in Figure 3 confirm that there is no differential trend in leftwing vote shares across constituencies with varying levels of flu mortality in elections from 1893 to 1912. This finding supports the validity of the difference-in-differences approach. Immediately after the Spanish flu, we observe a significant increase in the leftwing vote share which remains of similar size in subsequent elections. Our analysis also

[32]To ensure the validity of these findings, we also compare constituencies below and above the 25th and 75th percentiles of the Spanish flu mortality distribution in a robustness check. The results are qualitatively similar (see Figure B.5 of the Appendix).

allows the conclusion that the nearly constant treatment effect permits the use of a parametric version of the difference-in-differences specification. This approach can be applied without loss of generality throughout the rest of the empirical analysis.[33] Potential mechanisms which could explain the persistence of the pandemic's impact are discussed in Section 6.

5.2. Robustness checks

To rule out that outliers drive our results, we regress both changes in the leftwing vote share from 1912 to 1919 and Spanish flu mortality in 1918 on our full set of covariates. Figure 4 plots the two residuals against each other which essentially illustrates the difference-in-differences approach of Equation 4 with only two time periods. The scatter plot, however, allows us to inspect whether the positive relation between Spanish flu mortality and the leftwing vote share is observable over the entire distribution of Spanish flu mortality, or whether the positive relation is driven by specific data points at the lower or upper end of the distribution. Figure 4 shows that the positive relation between Spanish flu mortality and the leftwing vote share is indeed linear and not driven by any particular outliers. In related exercises, we show that our results are not driven by particular areas of Weimar Germany by adding state-election fixed effects and leaving out Prussian provinces and states one-by-one (see Table A.5 and Figures B.11, B.12, and B.13 in the Appendix).

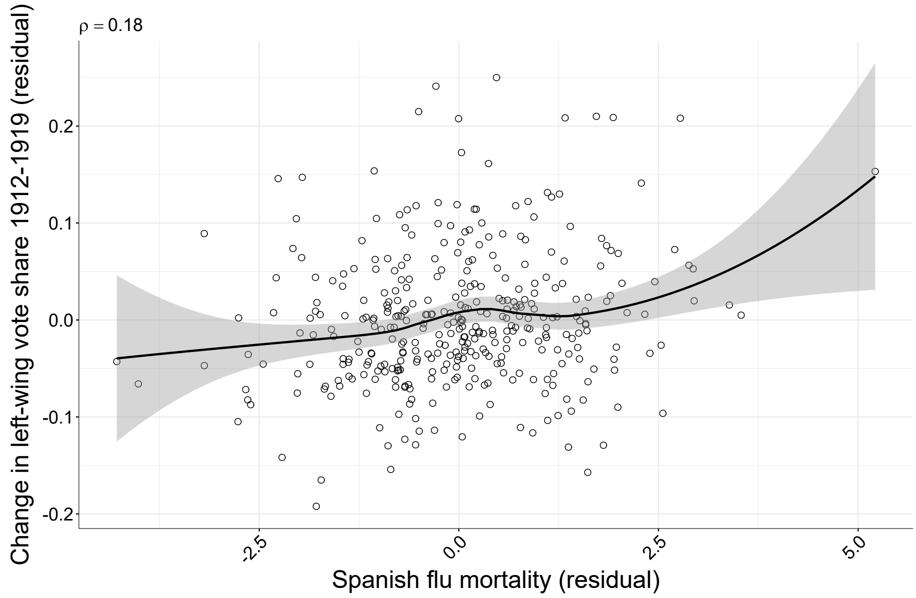


FIGURE 4 — Spanish flu mortality and change in leftwing vote share 1912-1919

Notes: Figure shows a scatter plot of the change in leftwing votes shares between 1912 and 1919 against Spanish flu mortality across constituencies after having accounted for control variables. The black line is the corresponding LOESS estimate. The gray area shows 95% confidence bands.

To corroborate that the introduction of female suffrage in the Weimar Republic does not bias our estimates, we add five proxies for female empowerment and allow these measures to have

[33] In the Appendix, we provide analogous event-study graphs for the vote shares of the centre (Figure B.6 and the rightwing (Figure B.7). The results suggest that over the entire post-pandemic period, leftwing parties gain at the expense of rightwing parties while vote shares of centre parties are barely affected. Figures B.8, B.9 and B.10 show the continuous treatment effect without adjusting for covariates.

different effects on voting outcomes before and after the introduction of female suffrage. The five proxies include the size of the newly enfranchised female electorate from Table 2, the gender ratio in 1910, the female-to-male employment ratio in 1907, female labor force participation rate in 1907, and the share of women eligible for WWI benefits, which in particular includes widows of soldiers perished in WWI. Table A.6 in the Appendix shows that none of these variables is significantly correlated with the leftwing vote share and, most importantly, that our flu mortality estimates are left unchanged when including these covariates.

Relatedly, we test whether the Spanish flu resulted in differential mortality by gender.[34] If indeed men were more likely to die from the Spanish flu than women as shown by Murray et al. (2006), this may have strengthened the relative position of females in a constituency by increasing female labor force participation like in India (see Fenske et al., 2022) and, in turn, may have affected the voting results after the introduction of female suffrage. The event-study Figure B.14 in the Appendix shows there is no relationship between Spanish flu intensity and the (crude) gender mortality ratio.

Finally, we test whether the results are robust to weighting constituencies according to their 1910 or 1919 population size (see Table A.7 in the Appendix), applying wild cluster bootstrap methods for inference, clustering at the district-level and using the Conley correction for spatial correlations in standard errors (see Table A.8 in the Appendix). These robustness tests yield findings consistent with our baseline results.

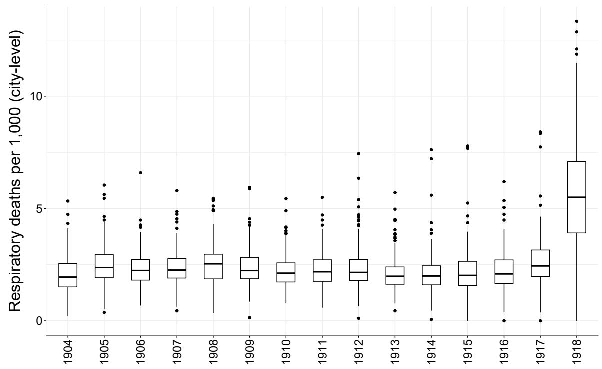
5.3. Validity checks

Below we present evidence for the validity of our Spanish flu measure using cause of death data available at the city-level and consider the possibility of confounding factors related to poverty and inequality which may be picked up by Spanish flu mortality and potentially explain the observed changes in voting patterns.

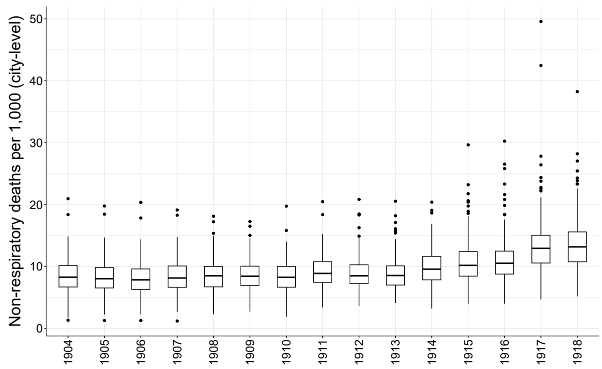
5.3.1. Controlling for excess mortality due to WWI

We investigate the robustness of the Spanish flu effect to the inclusion of excess mortality from earlier war years. To this end, we sequentially add as controls to our estimation equation interaction terms of the *PostFlu* indicator with military deaths for every year from 1914 to 1917. To facilitate comparison between different types of excess mortality, we remove the respective non-military excess mortality from the set of controls in each specification and add it, instead, also as an interaction with the *PostFlu* indicator. Table A.9 in the Appendix shows the results. We start with our main specification using flu mortality, i.e. residualized excess mortality of 1918, as the treatment variable. In column 2, we alternatively use excess mortality of 1918 as the treatment variable while controlling for military deaths 1918 rather than purging it from the treatment variable. This alternative specification confirms our results and additionally shows that military deaths during the pandemic year have no impact on leftwing votes. In columns 3 to 6, we sequentially add non-military excess mortality and military deaths from 1914 to 1917, all interacted with *PostFlu* indicators, as controls. The coefficient of the Spanish flu mortality

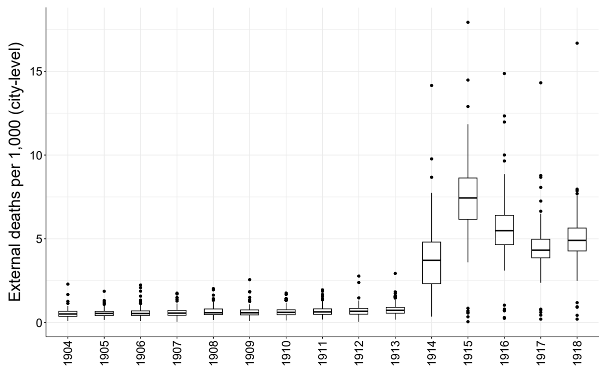
[34] Note that, due to data limitations, we can only subtract gender-specific stillbirths when calculating female and male mortality rates but not deaths below the age of one.



A. Respiratory diseases (city-level)



B. Non-Respiratory diseases (city-level)



C. External causes (city-level)

Figure 5 — Box plots of cause-specific mortality from 1904 to 1918

Notes: The graph shows box plots of cause-specific mortality at the city-level between 1904 and 1918. See Section 3.2 for details.

variable remains virtually unaltered. In column 7, we add the interactions of all these mortality measures at the same time with the same result. Finally, in column 8, we show that our findings are unaffected in this extensive specification if we use excess mortality in 1918 as an alternative treatment variable while controlling for military deaths in 1918. Taken together, this analysis provides further evidence that we indeed identify an effect of the Spanish flu and that this effect is not confounded by direct or indirect consequences of the war for mortality.[35]

5.3.2. Placebo checks on city-level causes of death

Although we have adjusted for excess mortality caused by war deaths and control for a rich set of covariates, one might still be concerned that the remaining variation in excess mortality in 1918 is driven by other local mortality phenomena besides the Spanish flu.

To alleviate this concern, we use data on causes of death across 180 German cities with more than 15,000 inhabitants for placebo checks. For this purpose, we classify deaths into three categories: deaths caused by respiratory diseases, deaths caused by non-respiratory diseases,

[35]Non-military deaths 1916 seem to have a negative impact on leftwing votes in column 5 but do not invalidate our findings. There seems to also be a significant impact of military deaths 1915 and 1916 in specifications 7 and 8 which, however, is most likely a result of multicollinearity given the high correlation of 0.93 between these two variables.

and deaths resulting from external causes. We compute annual mortality rates by calculating the number of deaths in each category per 1,000 city inhabitants in 1910. Figure 5 shows that mortality caused by respiratory diseases, the category in which Spanish flu deaths should be recorded if they are correctly identified by physicians, is remarkably higher in 1918 than in all other years. We do not find such conspicuous changes in mortality caused by non-respiratory diseases over the years. Looking at mortality resulting from external causes, the category including casualties of war, we observe higher numbers during the war years from 1914 to 1918 than in previous years.

TABLE 4 — Cause-specific mortality rates and vote shares

	Leftwing					
						Z-score
	(1)	(2)	(3)	(4)	(5)	(6)
FluMort1918	0.005*					
	(0.003)					
ExcMort - Respiratory×PostFlu		0.005**			0.007**	0.118**
		(0.003)			(0.003)	(0.053)
ExcMort - Non-Respiratory×PostFlu			−0.002		0.002	0.050
			(0.003)		(0.003)	(0.077)
ExcMort - External×PostFlu				0.005	0.006	0.066
				(0.004)	(0.004)	(0.041)
City FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Cities	180	180	180	180	180	180
Observations	1,894	1,894	1,894	1,894	1,894	1,894
Mean DV	0.397	0.397	0.397	0.397	0.397	0.000
R^2	0.904	0.904	0.903	0.903	0.905	0.905

The table reports results from estimating equation 4. The dependent variable measures leftwing vote shares at the city-level for 12 elections between 1898 and 1933. The main explanatory variable is: in column 1 predicted Spanish flu in 1918 mortality as described in Section 3.3; in column 2 deaths from respiratory diseases per 1,000 capita, in column 3 deaths from non-respiratory diseases per 1,000 capita, in column 4 deaths from external causes per 1,000 capita, each interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the city-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

In Table 4 we show results from estimating a static difference-in-differences model similar to Equation 4 using the city-level data. In column 1, we replicate our baseline specification from Table 3 using a Spanish flu mortality rate constructed in the same way as in Section 3.3 for the city-level. We find that a one SD increase in flu mortality is associated with an increase 16.9% of an SD in the leftwing vote share during the Weimar Republic which is similar to the constituency-level equivalent of 12.4%. In column 2, we find a strong and statistically highly significant positive effect of mortality from respiratory diseases in 1918 on the leftwing vote share, which is in line with a Spanish flu effect. The effect of mortality from non-respiratory diseases in 1918 (column 3) and mortality resulting from external causes in 1918 (column 4) are both small and insignificant. This pattern is reinforced if we simultaneously include all three cause-specific mortality variables as covariates in column 5: mortality from respiratory diseases drives our main effect. Normalizing the three cause-specific mortality measures to a mean of zero and an SD of one to make them comparable, we confirm our findings (column 6). Thus, this exercise provides further evidence that it is indeed Spanish flu mortality which caused the increase in the leftwing share.

5.3.3. Poverty, inequality, and malnutrition

A related concern is that the impact of the Spanish flu on the leftwing vote share may be confounded by pre-existing differences in poverty and inequality across localities. To address this concern, we show in Appendix Table A.10 that our results are robust to adding interaction terms of the *PostFlu* indicator and four indicators of pre-existing poverty and inequality: the poverty rate in 1907, the infant mortality in 1914, and the household-level Gini coefficients for income and wealth in 1914 for Prussia.

Furthermore, one may be concerned that poor living conditions and malnutrition emerging during WWI drive our estimates. The civilian population increasingly struggled with shortages of food and coal since the early stages of WWI. These conditions may lead to high Spanish flu mortality and affect people's voting decisions at the same time. As shown in the literature, in-utero exposure to malnutrition increases infant mortality (see, e.g. Hernández-Julián et al., 2014). Infants are particularly vulnerable and quickly react to changes in living conditions. We consider infant mortality a suitable proxy for poor living conditions and have thus included its 1917 value as one of our war-related controls in all regressions. However, this may not be sufficient to exclude confounding effects for two reasons. Firstly, we may not capture possible non-linearity and heterogeneity in other years. Secondly, if infant mortality is just a poorly measured proxy of what we really want to capture, we should include this variable as dependent variable instead of control variable in the regression (see Pei et al., 2019).

Figure B.15 in the Appendix shows results from the dynamic difference-in-differences specification of equation 5 using infant mortality as an outcome variable instead.[36] We do not find any economically meaningful or statistically significant correlations between Spanish flu mortality and infant mortality during pre-pandemic years. This suggests that, conditional on constituency fixed effects, areas that were strongly affected by the Spanish flu are not the same areas experiencing high infant mortality due to dismal living conditions during WWI.

Besides increasing mortality rates, poor nutritional and health conditions significantly impact the physical growth of surviving children, leading to reduced adult height. This stunting effect is particularly pronounced during the first 1,000 days of a child's life. Research by Cox (2015) shows that Germany at the end of WWI was no exception. We use local variation in the height of WWII conscripts born between 1904 and 1926 across 91 cities (see Blum and Bromhead, 2019) to study whether Spanish flu mortality is related to stunting. Figure B.22 in the Appendix shows the results of regressing height on Spanish flu mortality interacted with year of birth indicators, where 1913 is the reference year. We do not find any evidence that Spanish flu intensity is correlated with the adult height of children born during WWI. Together, these

[36] To compute infant mortality, we divide the number of deaths of infants under one year old by the number of births in the corresponding year.

findings indicate that the impact of dismal living conditions during the war does not distort the effects of the Spanish flu on the leftwing vote share in our model.

6. Studying the Mechanisms

The results of the dynamic difference-in-differences analysis in Section 5.1 have revealed that the effect of the pandemic on election outcomes was both immediate and persistent. In principle, these findings could be explained by very different mechanisms. One possible explanation could be lasting economic consequences of the pandemic which, as discussed in the introduction, have been documented for other countries. Another possibility could be changes in political supply which, however, is at odds with the qualitative evidence from historical accounts presented in Section 2.2. Our main hypothesis, instead, posits that the persistence results from a shift in political demand and, more precisely, that the local intensity and salience of the pandemic induced voters to transfer their votes to leftwing parties based on their perceived competence handling public health issues. In this section, we provide evidence to further support this hypothesis and exclude other competing mechanisms.

6.1. Economic mechanisms

Existing research suggests that the Spanish flu pandemic had economic consequences in other countries which may work as mechanisms also in our context. The Spanish flu is especially associated with changes in labor income. Given that the pandemic particularly affected the working-age population, it is conceivable that entire families became vulnerable to falling into poverty. These families, in turn, might have become inclined to support leftwing parties which promoted social policy.

We inspect this and related mechanisms using several (standardized) correlates of poverty as outcome variables in our difference-in-differences approach established in equation 4.[37] Column 1 in Table 5 show null results for changes in population size. Accordingly, we interpret this finding to imply that areas more affected by the pandemic did not suffer from a significant population decline. Column 2 shows results for infant mortality. While we already documented the absence of differential trends in infant mortality before the war in Section 5.3.3, we confirm here that there is little evidence for systematic changes in infant mortality after the war which could reflect an increase in poverty due to the pandemic. Column 3 shows similar results for overall mortality.

Columns 1–3 in Table 5 present outcomes only indirectly connected to poverty. Unfortunately, these are the only available data in the panel of constituencies used in our baseline results. However, we were able to collect measures specifically measuring poverty in several cross sections from the 61 largest cities in Germany before and after the war which can be used for our DiD approach. In columns 4 and 5, we observe no significant effect of the Spanish flu on the share of individuals and households receiving welfare payments in cities. Likewise, there is no impact on ordinary city-level spending per capita in column 6. Moreover, column 7 shows

[37] We also present results from event-study specifications based on equation 5 in Figures B.16–B.21 of the Appendix. In many cases, we have to rely on a lower number of waves than for elections outcomes, i.e., population counts were undertaken only every five years, or antisemitic votes and turnout are unavailable for 1919.

TABLE 5 — The impact of Spanish flu mortality on demography and poverty

Unit	Constituencies			Cities			
	Log (population)	Infant mortality	Deaths p.c.	Share of Ind.s on welfare	Share of HHs on welfare	City spending p.c.	Individual soldier height
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FluMort1918×PostFlu	−0.006	0.025	0.041	0.102	0.244	−0.153	0.009
	(0.014)	(0.029)	(0.030)	(0.338)	(0.204)	(0.406)	(0.071)
Unit FE	Y	Y	Y	Y	Y	Y	Y
Year/Cohort FE	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y
Individual controls	N	N	N	N	N	N	Y
Units	362	362	362	58	58	64	91
Observations	3,258	10,860	10,860	192	310	460	2,871
Mean DV	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	0.988	0.933	0.931	0.781	0.746	0.727	0.315

Notes: The table reports results from estimating equation 4 at the constituency-level in columns 1–3 and the city-level in columns 4–6 and individual-level in column 7. Dependent and explanatory variables are standardized with mean zero and unit standard deviation. The dependent variables are population size in logs, observed in 1895, 1900, 1905, 1910, 1916, 1917, 1919, 1925, and 1933 (column 1), the annual ratio of stillbirths and deaths below the age of one over 1,000 births from 1904 to 1933 (column 2), annual deaths per 1,000 individuals from 1904 to 1933 (column 3), the number of individuals receiving welfare payments divided by the total population in 1910, observed in the years 1910, 1911, 1912, 1926, 1927 (column 4), the number of households receiving welfare payments divided by total households in 1910, observed in the years 1910, 1911, 1912, 1926, 1927, 1928, and 1929 (column 5), ordinary city spending per capita in 1910 Reichsmark values, observed in the years 1908, 1911, 1912, 1925, 1927, 1928, 1929, 1930, 1931, and 1933 (column 6) and individual height of WWII draftees born between 1904 and 1926 (column 7). The treatment variable in all columns is predicted unit-level Spanish flu mortality as described in Section 3.3, interacted with an indicator variable taking value one for time periods after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. The individual-level controls included in column 7 are dummies of father's level of occupation and number of siblings. Controls are time-invariant and interacted with year fixed effects in columns 1–6 and cohort fixed effects in column 7. Individual-level controls are also interacted with cohort fixed effects. Standard errors, clustered at the constituency- or city-level, in parentheses: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

that Spanish flu mortality is uncorrelated with adult height of children born in the wake of the pandemic measured when drafted for WWII; we interpret this as a proxy for dismal living conditions during childhood in the years following the pandemic. In sum, we find no evidence that constituencies or cities subject to higher Spanish flu mortality experienced worsening economic conditions which could explain changes in voting behavior.

6.2. Politico-economic mechanisms

After excluding that purely economic changes are the main driving force behind our results, we focus on politico-economic channels in this subsection. For the purpose of this analysis, we move from inspecting outcomes for three broad party camps to six more narrow party groups which better reflect political competition but still provide sufficient consistency in comparing vote shares from before and after the inception of the Weimar Republic. The six groups consist of communist, socialist, liberal, catholic-minority, conservative, and antisemitic parties. For further details on the party classification, see Appendix D.

6.2.1. Retrospective voting

As discussed in the introduction, existing research predominantly explains voter's responses to changes in (socio-)economic conditions with a retrospective voting mechanism. In our case, voters could be punishing incumbent parties for their failed response to improve health conditions during the pandemic. To empirically test this mechanism, we run a difference-in-differences model along the lines of equation 4, but use the vote share of the local incumbent party group as outcome variable. We define the incumbent as belonging to the party group obtaining the largest share of votes in the election(s) preceding the pandemic in the respective constituency.[38] The underlying idea is that voters hold their local representative in the national parliament accountable for national policies.

TABLE 6 — The impact of Spanish flu mortality on incumbent vote shares

	Incumbent vote share					
Classification	Party groups (5)			Party groups w/o Left (4)		
Incumbent = Winner in?	1907	1912	1907–1912	1907	1912	1907–1912
	(1)	(2)	(3)	(4)	(5)	(6)
FluMort1918×PostFlu	0.001	0.001	0.001	−0.004	−0.001	−0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Constituency FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Constituencies	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.388	0.408	0.409	0.347	0.339	0.349
R^2	0.824	0.816	0.821	0.837	0.851	0.845

Notes: The table reports results from estimating equation 4 at the constituency-level for 14 elections between 1893 and 1933. The dependent variables measure vote shares of the incumbent, i.e. the party group with the highest vote share in the pre-pandemic election year(s) indicated in the column head. The treatment variable is predicted Spanish flu mortality as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table 6 shows no evidence that heterogeneity in Spanish flu intensity is associated with the punishment of incumbents. In column 1, we define the party group with the highest vote share in the 1907 elections as the incumbent. In column 2, it is the party group with the highest vote share in the 1912 elections. In column 3, it is the party group with the highest average vote share across both the 1907 and 1912 elections. For none of the three alternatives we find evidence that Spanish flu mortality decreased the vote share of the last winner. Indeed, the estimated coefficients are far from conventional significance levels. In columns 4 to 6, we account

[38]Since the Communist party did not exist before WWI, we only have five instead of six party groups which can be classified as incumbents.

for the fact that leftwing parties may not have been considered incumbents due to their lack of involvement with the governments prior to WWI. We thus exclude them from the potential pool of incumbents and re-run the estimations from columns 1 to 3. Again, we do not find any evidence for voters punishing incumbents.

A potential explanation for the lack of evidence for a retrospective voting channel is that voters did not associate local representatives in parliament with the incumbent government. In the German Empire, the chancellor and members of his government were typically not affiliated with any of the parties and not elected by parliament.[39] Hence, voters may not have tried to punish local incumbents because they did not associate them with the government they would have actually liked to hold accountable.

6.2.2. Issue ownership

As discussed at the beginning of this section, the most plausible explanation for our main results is voters shifting their preferences in favor of parties with a reputation for addressing public health issues. Assuming that higher Spanish flu mortality implied a larger increase in the salience of public health concerns across constituencies, we argue that this also translated into a larger shift of votes towards parties with established expertise in this domain. The persistence of this effect may reflect that voters permanently assigned a higher weight to health issues after the pandemic, as health became increasingly viewed as a government responsibility (as discussed in Section 2.4). Alternatively, it may indicate that the pandemic induced some voters to form a new habit of voting for leftwing parties. Making a conscious decision to switch party affiliation may be followed by forming a new identity in the spirit of Akerlof and Kranton (2010).[40] Our data do not allow us to discern whether persistence derives from pure habit formation or from a lasting re-prioritization of health.

Section 2.4 provides qualitative evidence that the SPD was strongly associated with public health due to their involvement in the health insurance, while the National Liberals were also perceived as a party concerned with health issues, supported by their affiliation with the medical profession and their endorsement of the social hygiene movement. In order to further support our argument, we now also present correlational evidence in line with the historical narrative that socialist and liberal parties advocated for the expansion of public health before the Influenza pandemic in Table 7. For this analysis, we return to the three party camps but separate the center camp into liberals and Catholics, with the latter serving as the reference category. The results in columns 1–6 indicate that constituencies with higher vote shares for socialist and liberal parties during the period 1893–1907 had more developed public health infrastructure by 1909, as measured by the per capita number of doctors and medical personnel. Columns 7–9 suggest that this also translated into lower flu mortality in 1918. While these regressions should not be interpreted as causal, they provide suggestive evidence that, unlike rightwing and Catholic-minority parties, socialists and liberals were more supportive of local public health provision. This finding aligns with the notion that these parties regarded public health as a

[39]The chancellors would typically build issue-by-issue coalitions, predominantly relying on votes from the Conservative and Liberal parties but also the Catholic centre party for their policies (Davis, 2000, p. 6).

[40]Subsequently, individuals may develop cognitive biases and tend to process information confirming their choice (see Rabin and Schrag, 1999; Kaplan and Mukand, 2014).

Table 7 — Correlation between health employment with political preferences

	Doctors p.c. 1909			All medical p.c. 1909			Flu Mortality 1918		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Vote share Leftwing 1893-1907	0.570***	0.974***	0.396**	1.276***	3.258***	1.437***	−2.439***	−5.024***	−7.639***
	(0.079)	(0.144)	(0.155)	(0.303)	(0.427)	(0.525)	(0.632)	(1.012)	(1.159)
Vote share Liberal 1893-1907	0.045	0.471***	0.394***	−0.706**	1.384***	1.142***	−0.277	−3.003***	−3.352***
	(0.064)	(0.120)	(0.104)	(0.278)	(0.423)	(0.402)	(0.751)	(1.031)	(1.024)
Vote share Rightwing 1893-1907	−0.283***	0.155	0.124	−1.582***	0.571	0.474	1.916***	−0.892	−1.032
	(0.038)	(0.106)	(0.093)	(0.197)	(0.359)	(0.338)	(0.528)	(1.021)	(1.014)
Catholics p.c.		0.414***	0.242**		2.034***	1.491***		−2.653***	−3.433***
		(0.109)	(0.100)		(0.318)	(0.313)		(0.870)	(0.856)
Log pop. density			0.084***			0.264***			0.378***
			(0.011)			(0.034)			(0.085)
Observations	362	362	362	362	362	362	362	362	362
Mean DV	0.440	0.440	0.440	1.805	1.805	1.805	0.000	0.000	0.000
R^2	0.285	0.332	0.472	0.188	0.260	0.347	0.083	0.105	0.136

Notes: This table presents results from OLS regressions of per-capita health personnel in 1909 and flu mortality 1918 on political preferences (1893–1907) and basic demographics in a cross section of constituencies. Robust standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01.

pertinent issue and were likely perceived by voters as owners of this issue.

Table 8 presents results regarding the relationship between Spanish flu mortality and changes in votes shares by decomposing the three party camps (left wing, centre, right wing) into the six party groups (communist, socialist, catholic-minority, liberal, conservative, antisemitic). The estimated coefficients show a significant increase in vote shares of the Socialist SPD and the right-oriented part of the liberal parties which contains the National Liberals, i.e. precisely those parties which are associated with public health policies. Conversely, there is a significant decline in vote shares for communists and an insignificant decline for conservatives and anti-semites. Given the absence of evidence for retrospective voting, we argue that issue ownership is the most plausible explanation for these findings. It is reasonable to assume that voters rewarded parties with expertise in health matters and punished those without it in the aftermath of the Spanish flu.

An alternative interpretation of the results for the socialist parties group is that health issues became more salient specifically to their potential voters, possibly due to the more open reporting on the Spanish flu by newspapers affiliated with the SPD and related institutions. We empirically test this alternative hypothesis by examining the relationship between Spanish flu mortality and voter turnout. If the pandemic activated potential voters for the SPD but did not change mobilization for other parties, we would expect an aggregate increase in turnout in localities with higher Spanish flu mortality. However, column 8 of Table 8 shows that there is no significant relationship between Spanish flu mortality and turnout.[41] Hence, we conclude that the salience of the health issues did not significantly impact voter mobilization or attract previously abstaining SPD voters to the polls.

[41] Figure B.23 in the Appendix confirms that there is no significant change in turnout immediately after the Spanish flu.

Table 8 — The impact of Spanish flu mortality on party-group vote shares

	Leftwing		Centre			Rightwing		
	Com-munist	Socia-list	Catholic-Minority	Liberal (all)	Liberal (right)	Conser-vative	Anti-semitic	Turn-out
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FluMort1918×PostFlu	−0.005**	0.012***	−0.002	0.011*	0.014***	−0.007	−0.009	−0.001
	(0.002)	(0.003)	(0.004)	(0.006)	(0.005)	(0.005)	(0.006)	(0.002)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Constituencies	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	4,706	4,706
Mean DV	0.065	0.234	0.254	0.158	0.082	0.158	0.140	0.789
R^2	0.824	0.878	0.938	0.741	0.540	0.764	0.859	0.794

Notes: The table reports results from estimating equation 4 at the constituency-level for 14 elections between 1893 and 1933. The dependent variables measure vote shares of the party group indicated in the column head. The treatment variable is predicted Spanish flu mortality as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

6.2.3. Identity politics and polarization

The results presented in Table 8 also provide insights into the potential role of identity politics and polarization as alternative mechanisms. The findings in columns 1 and 7 show that neither communist nor antisemitic parties experienced an increase in votes in constituencies with higher Spanish flu mortality. This suggests that the results do not reflect a surge in support for extremist parties.[42]

7. Conclusions

The Spanish flu pandemic in Germany has received little attention in history textbooks, most likely because it coincided and was overshadowed by other major events like Germany's November Revolution 1918, the final weeks of WWI and the end of the German Empire. With a death toll of about 0.5% of the population in 1918, it was certainly still a major event for the families and individuals affected. We analyze the consequences of this experience on political outcomes. Using a measure of excess mortality purged from military deaths, we estimate the effects on vote shares in 14 elections before and after the pandemic in a difference-in-differences design. Starting with the very first elections immediately after the flu in 1919, leftwing parties saw an increase in vote shares by 2.1 percentage points when moving from a region in the 25th percentile to a region in the 75th percentile of the mortality distribution. This effect remained

[42] It is worth noting that communist parties did not run for elections prior to WWI. The estimated coefficient thus implies that constituencies with higher Spanish flu mortality did not become more radical once the party became an option.

relatively stable until the end of the Weimar Republic and the last free elections in 1933.

Our evidence precludes the idea that changes in economic conditions related to the pandemic are responsible for the observed voting patterns. Furthermore, voters do not seem to have punished incumbents for misguided policy responses to the pandemic. Rather, voters appear to have rewarded parties they perceived as commanding sufficient competence in public health policy. Because of their historical association with the health insurances and the social hygiene movement, SPD and National Liberals were clearly on the minds of voters when public health became a national issue during the Spanish flu pandemic. In areas ravaged by the pandemic, the perception of health as a public issue was consolidated and voters remained loyal to their new political leanings.

References

Acemoglu, Daron, Giuseppe De Feo, Giacomo De Luca and Gianluca Russo (2022), 'War, socialism, and the rise of fascism: an empirical exploration', *Quarterly Journal of Economics* **137**(2), 1233–1296.

Achen, Christopher H and Larry M Bartels (2004), Blind retrospection: Electoral responses to drought, flu, and shark attacks, Working Paper 2004/199, Instituto Juan March de estudios e investigaciones Madrid.

Adena, Maja, Ruben Enikolopov, Maria Petrova, Veronica Santarosa and Ekaterina Zhuravskaya (2015), 'Radio and the rise of the nazis in prewar germany', *Quarterly Journal of Economics* **130**(4), 1885–1939.

Akerlof, George A. and Rachel E. Kranton (2010), *Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being*, Princeton University Press.

Aksoy, Cevat Giray, Barry Eichengreen and Orkun Saka (2020), The political scar of epidemics, Working Paper 27401, NBER.

Algan, Yann, Sergei Guriev, Elias Papaioannou and Evgenia Passari (2017), 'The european trust crisis and the rise of populism', *Brookings Papers on Economic Activity* **2017**(2), 309–400.

Allcott, Hunt, Levi Boxell, Jacob Conway, Matthew Gentzkow, Michael Thaler and David Yang (2020), 'Polarization and public health: Partisan differences in social distancing during the coronavirus pandemic', *Journal of Public Economics* **191**, 104254.

Arroyo Abad, Leticia and Noel Maurer (2021), Do pandemics shape elections? retrospective voting in the 1918 spanish flu pandemic in the united states, Discussion Paper 15678, CEPR.

Baccini, Leonardo, Abel Brodeur and Stephen Weymouth (2021), 'The COVID-19 pandemic and the 2020 US presidential election', *Journal of Population Economics* **34**(2), 739–767.

Baccini, Leonardo and Lucas Leemann (2021), 'Do natural disasters help the environment? how voters respond and what that means', *Political Science Research and Methods* **9**(3), 468–484.

Barro, Robert J., José F. Ursúa and Joanna Weng (2020), The Coronavirus and the Great Influenza Pandemic: Lessons from the "Spanish Flu" for the Coronavirus's Potential Effects on Mortality and Economic Activity, Working Paper 26866, NBER.

Barry, John M. (2004), *The Great Influenza: The Epic Story of the Deadliest Plague in History*, Viking, New York.

Basco, Sergi, Jordi Domènech and Joan R Rosés (2021), 'The redistributive effects of pandemics: Evidence on the spanish flu', *World Development* **141**, 105389.

Beach, Brian, Karen Clay and Martin Saavedra (2022), 'The 1918 influenza pandemic and its lessons for covid-19', *Journal of Economic Literature* **60**(1), 41–84.

Bechtel, Michael M and Jens Hainmueller (2011), 'How lasting is voter gratitude? an analysis of the short-and long-term electoral returns to beneficial policy', *American Journal of Political Science* **55**(4), 852–868.

Bélanger, Éric and Bonnie M Meguid (2008), 'Issue salience, issue ownership, and issue-based vote choice', *Electoral Studies* **27**(3), 477–491.

Bhuller, Manudeep, Tarjei Havnes, Edwin Leuven and Magne Mogstad (2013), 'Broadband internet: An information superhighway to sex crime?', *The Review of Economic Studies* **80**(4), 1237–1266.

Blickle, Kristian (2020), Pandemics Change Cities: Municipal Spending and Voter Extremism in Germany, 1918-1933, Staff Report 921, FRB of New York.

Blum, Matthias and Alan de Bromhead (2019), 'Rise and fall in the Third Reich: Social advancement and Nazi membership', *European Economic Review* **120**(2), 103312.

Bootsma, Martin CJ and Neil M Ferguson (2007), 'The effect of public health measures on the 1918 influenza pandemic in US cities', *Proceedings of the National Academy of Sciences* **104**(18), 7588–7593.

Buchholz, Udo, Silke Buda, Annicka Reuß, Walter Haas and Helmut Uphoff (2016), 'Todesfälle durch Influenzapandemien in Deutschland 1918 bis 2009', *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz* **59**(4), 523–536.

Budge, Ian and Dennis Farlie (1983), *Explaining and Predicting Elections: Issue Effects and Party Strategies in Twenty-three Democracies*, Taylor & Francis.

Campante, Filipe R., Emilio Depetris-Chauvin and Ruben Durante (forthcoming), 'The Virus of Fear: The Political Impact of Ebola in the U.S.', *American Economic Journal: Applied Economics* .

Carillo, Mario F. and Tullio Jappelli (2022), 'Pandemics and Regional Economic Growth: Evidence from the Great Influenza in Italy', *European Review of Economic History* **26**(1), 78–106.

Clay, Karen, Joshua Lewis and Edson Severnini (2018), 'Pollution, Infectious Disease, and Mortality: Evidence from the 1918 Spanish Influenza Pandemic', *Journal of Economic History* **78**(4), 1179–1209.

Clay, Karen, Joshua Lewis and Edson Severnini (2019), 'What explains cross-city variation in mortality during the 1918 influenza pandemic? Evidence from 438 U.S. cities', *Economics & Human Biology* **35**, 42–50.

Colantone, Italo and Piero Stanig (2018), 'The trade origins of economic nationalism: Import competition and voting behavior in western europe', *American Journal of Political Science* **62**(4), 936–953.

Correia, Sergio, Stephan Luck and Emil Verner (2022), 'Pandemics depress the economy, public health interventions do not: Evidence from the 1918 flu', *Journal of Economic History* **82**(4), 917–957.

Cox, Mary Elisabeth (2015), 'Hunger games: or how the allied blockade in the first world war deprived german children of nutrition, and allied food aid subsequently saved them', *The Economic History Review* **68**(2), 600–631.

Crosby, Alfred W. (2003), *America's Forgotten Pandemic: The Influenza of 1918*, Cambridge University Press.

Dahl, Christian Møller, Casper Worm Hansen and PS Jensen (2022), 'The 1918 epidemic and a v-shaped recession: Evidence from municipal income data', *Scandinavian Journal of Economics* **124**, 139–163.

Daniele, Gianmarco, Andrea F.M Martinangeli, Francesco Passarelli, Willem Sas and Lisa Windsteiger (2020), Wind of change? experimental survey evidence on the covid19 shock and socio-political attitudes in europe, Working Paper 8804, CESifo.

Davis, Belinda J. (2000), *Home Fires Burning: Food, Politics, and Everyday Life in World War I Berlin*, The University of North Carolina Press, Chapel Hill and London.

Dennison, James (2019), 'A review of public issue salience: Concepts, determinants and effects on voting', *Political Studies Review* **17**(4), 436–446.

Dorn, David, Gordon Hanson, Kaveh Majlesi et al. (2020), 'Importing political polarization? the electoral consequences of rising trade exposure', *American Economic Review* **110**(10), 3139–83.

Eckart, Wolfgang (1991), Öffentliche gesundheitspflege in der weimarer republik und in der frühgeschichte der bundesrepublik deutschland, *in* F. W.Schwartz, B.Badura, J. G.Brecht, W.Hofmann, K.-H.Jöckel and A.Trojan, eds, 'Public health: Texte zu Stand und Perspektiven der Forschung', Springer, pp. 221–237.

Falter, Jürgen W. and Dirk Hänisch (1990), Election and Social Data of the Districts and Municipalities of the German Empire from 1920 to 1933, Data file Version 1.0.0, Study No. ZA8013, GESIS Data Archive, Cologne.

Fehlemann, Silke (2002), Die entwicklung der öffentlichen gesundheitsfürsorge in der weimarer republik: Das beispiel der kinder und jugendlichen, *in* W.Woelk and J.Vögele, eds, 'Geschichte der Gesundheitspolitik in Deutschland. Von der Weimarer Republik bis in die Frühgeschichte der "doppelten Staatsgründung"', Berlin: Duncker & Humblot, pp. 67–82.

Fenske, James, Bishnupriya Gupta and Song Yuan (2022), 'Demographic Shocks and Women's Labor Market Participation: Evidence from the 1918 Influenza Pandemic in India', *The Journal of Economic History* **82**(3), 875–912.

Fischer, Günther (1989), *"Wir stehen schon wieder mitten im Wahlkampf": eine Analyse der Wahlpropaganda in der Weimarer Republik unter besonderer Betrachtung der NSDAP*, Verlag Tangente.

Flückiger, Matthias, Markus Ludwig and Ali Sina Önder (2019), 'Ebola and state legitimacy', *Economic Journal* **129**(621), 2064–2089.

Franke, Richard (2022), 'Poverty, pollution, and mortality: The 1918 influenza pandemic in a developing german economy', *Economic History Review* **75**(4), 1026–1053.

Fujiwara, Thomas, Kyle Meng and Tom Vogl (2016), 'Habit formation in voting: Evidence from rainy elections', *American Economic Journal: Applied Economics* **8**(4), 160–188.

Galletta, Sergio and Tommaso Giommoni (2022), 'The effect of the 1918 influenza pandemic on income inequality: Evidence from italy', *Review of Economics and Statistics* **104**(1), 187–203.

Galofré-Vilà, Gregori, Christopher M Meissner, Martin McKee and David Stuckler (2021), 'Austerity and the rise of the nazi party', *Journal of Economic History* **81**(1), 81–113.

Galofré-Vilà, Gregori, Martin McKee, María Gómez-León and David Stuckler (2022), 'The 1918 influenza pandemic and the rise of italian fascism: A cross-city quantitative and historical text qualitative analysis', *American Journal of Public Health* **112**(2), 242–247.

Garrett, Thomas A (2009), 'War and pestilence as labor market shocks: Us manufacturing wage growth 1914–1919', *Economic Inquiry* **47**(4), 711–725.

Gerber, Alan S., Donald P. Green and Ron Shachar (2003), 'Voting may be habit-forming: Evidence from a randomized field experiment', *American Journal of Political Science* **47**(3), 540–550.

Giommoni, Tommaso and Gabriel Loumeau (2022), 'Lockdown and Voting Behaviour: A Natural Experiment on Postponed Elections during the COVID-19 Pandemic', *Economic Policy* **37**(111), 547–599.

Gutiérrez, Emilio, Jaakko Meriläinen and Adrian Rubli (2022), 'Electoral repercussions of a pandemic: Evidence from the 2009 h1n1 outbreak', *The Journal of Politics* **84**(4), 1899–1912.

Healy, Andrew, Neil Malhotra et al. (2010), 'Random events, economic losses, and retrospective voting: Implications for democratic competence', *Quarterly Journal of Political Science* **5**(2), 193–208.

Hernández-Julián, Rey, Hani Mansour and Christina Peters (2014), 'The effects of intrauterine malnutrition on birth and fertility outcomes: Evidence from the 1974 bangladesh famine', *Demography* **51**(5), 1775–1796.

Herrera, Helios, Guillermo Ordoñez, Maximilian Konradt and Christoph Trebesch (2020), Corona politics: The cost of mismanaging pandemics, Research Paper 20-033, Penn Institute for Economic Research.

Hilbig, Hanno and Sascha Riaz (2024), 'Natural disasters and green party support', *The Journal of Politics* **86**(1), 000–000.

Hoffmann, Roman, Raya Muttarak, Jonas Peisker and Piero Stanig (2022), 'Climate change experiences raise environmental concerns and promote green voting', *Nature Climate Change* **12**(2), 148–155.

Hüntelmann, Axel C. (2021), 'The shifting politics of public health in Germany between the 1890s and 1920s', *European Review of History: Revue européenne d'histoire* **28**(5-6), 636–662.

ICPSR (1991), German Reichstag Election Data, 1871-1912, ICPSR Study 43, Inter-university Consortium for Political and Social Research, Ann Arbor, MI.

Johnson, Niall (2001), Aspects of the Historical Geography of the 1918-19 Influenza Pandemic in Britain, PhD thesis, University of Cambridge.

Johnson, Niall P. A. S. and Juergen Mueller (2002), 'Updating the Accounts: Global Mortality of the 1918-1920 "Spanish" Influenza Pandemic', *Bulletin of the History of Medicine* **76**(1), 105–115.

Kaplan, Ethan and Sharun Mukand (2014), The persistence of political partisanship: Evidence from 9/11, Technical report, mimeo.

Karlsson, Martin, Therese Nilsson and Stefan Pichler (2014), 'The impact of the 1918 spanish flu epidemic on economic performance in sweden: An investigation into the consequences of an extraordinary mortality shock', *Journal of Health Economics* **36**, 1–19.

Kersting, Felix (2022), Welfare reform and repression in an autocracy: Bismarck and the socialists, Working Paper 227, EHES.

Kettler, Helmut (1978), Die Entwicklung der gesundheitspolitischen Vorstellungen der deutschen Sozialdemokratie, phdthesis, University of Kiel.

King, Gary, Ori Rosen, Martin Tanner and Alexander F Wagner (2008), 'Ordinary economic voting behavior in the extraordinary election of adolf hitler', *Journal of Economic History* **68**(4), 951–996.

Koenig, Christoph (2023), 'Loose Cannons: War Veterans and the Erosion of Democracy in Weimar Germany', *Journal of Economic History* **83**(1), 167–202.

Kott, Sandrine (2014), *Sozialstaat und Gesellschaft: das deutsche Kaiserreich in Europa*, Göttingen: Vandenhoeck & Ruprecht.

Labisch, Alfons (1976), 'Die gesundheitspolitischen vorstellungen der deutschen sozialdemokratie von ihrer gründung bis zur parteispaltung (1863–1917)', *Archiv für Sozialgeschichte* **16**, 325–370.

Labisch, Alfons and Florian Tennstedt (1991), Prävention und prophylaxe als handlungsfelder der gesundheitspolitik in der frühgeschichte der bundesrepublik deutschland (1949-ca. 1965), *in* T.Elkeles, J.-U.Niehoff, R.Rosenbrock and F.Schneider, eds, 'Prävention und Prophylaxe: Theorie und Praxis eines gesundheitspolitischen Grundmotivs in zwei deutschen Staaten', Berlin: Ed. Sigma, pp. 13–28.

Lau, Dirk (2008), *Wahlkämpfe der Weimarer Republik: Propaganda und Programme der politischen Parteien bei den Wahlen zum Deutschen Reichstag von 1924 bis 1930*, Tectum-Verlag, Marburg.

Lewis-Beck, Michael S and Mary Stegmaier (2018), Economic voting, *in* R. D.Congleton, B. N.Grofman and S.Voigt, eds, 'The Oxford Handbook of Public Choice', Vol. 1, Oxford University Press, pp. 247–165.

Madestam, Andreas, Daniel Shoag, Stan Veuger and David Yanagizawa-Drott (2013), 'Do political protests matter? evidence from the tea party movement', *The Quarterly Journal of Economics* **128**(4), 1633–1685.

McAllister, Jordan H. and Afiq bin Oslan (2021), 'Issue ownership and salience shocks: The electoral impact of australian bushfires', *Electoral Studies* **74**, 102389.

Meredith, Marc (2009), 'Persistence in political participation', *Quarterly Journal of Political Science* **4**(3), 187–209.

Mian, Atif, Amir Sufi and Francesco Trebbi (2014), 'Resolving debt overhang: Political constraints in the aftermath of financial crises', *American Economic Journal: Macroeconomics* **6**(2), 1–28.

Michels, Eckard (2010), 'Die Spanische Grippe 1918/19. Verlauf, Folgen und Deutungen in Deutschland im Kontext des Ersten Weltkriegs', *Vierteljahrshefte für Zeitgeschichte* **58**(1), 1–33.

Müller, Stefan (2020), *Die Spanische Grippe: Wahrnehmung und Deutung einer Jahrhundertpandemie im Spiegel der sozialdemokratischen Presse*, Friedrich-Ebert-Stiftung Archiv der sozialen Demokratie, Bonn.

Murray, Christopher J. L., Alan D. Lopez, Brian Chin, Dennis Feehan and Kenneth H. Hill (2006), 'Estimation of Potential Global Pandemic Influenza Mortality on the Basis of Vital Registry Data From the 1918–20 Pandemic: A Quantitative Analysis', *The Lancet* **368**(9554), 2211–2218.

Pei, Zhuan, Jörn-Steffen Pischke and Hannes Schwandt (2019), 'Poorly Measured Confounders are More Useful on the Left than on the Right', *Journal of Business & Economic Statistics* **37**(2), 205–216.

Petrocik, John R. (1996), 'Issue Ownership in Presidential Elections, with a 1980 Case Study', *American Journal of Political Science* **40**(3), 825–850.

Rabin, Matthew and Joel L. Schrag (1999), ‘First Impressions Matter: A Model of Confirmatory Bias’, *The Quarterly Journal of Economics* **114**(1), 37–82.

Roesle, E. (1925), *Ergebnisse der Todesursachenstatistik im Deutschen Reiche für das Jahr 1914 bis 1919: Fortsetzung von Bd. XIX, S. 1-157 und S. 1*-498*, die Ergebnisse der Todesursachenstatistik für das Jahr 1913 betreffend*, Vol. 23 of *Medizinalstatistische Mitteilungen aus dem Reichsgesundheitsamte (Beihefte zu den Veröffentlichungen des Reichsgesundheitsamts)*.

Roodman, David, Morten Ørregaard Nielsen, James G. MacKinnon and Matthew D. Webb (2019), ‘Fast and wild: Bootstrap inference in stata using boottest’, *The Stata Journal* **19**(1), 4–60.

Sachße, Christoph and Florian Tennstedt (1988), *Geschichte der Armenfürsorge in Deutschland. Band 2: Fürsorge und Wohlfahrtspflege 1871–1929*, Kohlhammer.

Satyanath, Shanker, Nico Voigtländer and Hans-Joachim Voth (2017), ‘Bowling for fascism: Social capital and the rise of the nazi party’, *Journal of Political Economy* **125**(2), 478–526.

Shanks, G. Dennis and John F. Brundage (2012), ‘Pathogenic responses among young adults during the 1918 influenza pandemic’, *Emerging Infectious Diseases* **18**(2), 201–207.

Sneeringer, Julia (2002), *Winning women’s votes: Propaganda and politics in Weimar Germany*, University of North Carolina, Chapel Hill.

Spenkuch, Jörg L. and Philipp Tillmann (2018), ‘Elite Influence? Religion and the Electoral Success of the Nazis’, *American Journal of Political Science* **62**(1), 19–36.

Spinney, Laura (2017), *Pale Rider: The Spanish Flu of 1918 and How It Changed the World*, New York: PublicAffairs.

Tennstedt, Florian (1983), *Vom Proleten zum Industriearbeiter: Arbeiterbewegung und Sozialpolitik in Deutschland 1800 bis 1914*, Bund-Verlag.

Velde, Francois R (2022), ‘What happened to the us economy during the 1918 influenza pandemic? a view through high-frequency data’, *Journal of Economic History* **82**(1), 284–326.

Verein für Computergenealogie (2024), ‘Verlustlisten Erster Weltkrieg’. Available at: http://wiki-de.genealogy.net/Verlustlisten_Erster_Weltkrieg.

Voth, Hans-Joachim and Nico Voigtländer (forthcoming), ‘Highway to hitler’, *American Economic Journal: Applied Economics* .

Woelk, Wolfgang and Jörg Vögele (2002), Einleitung, *in* W.Woelk and J.Vögele, eds, ‘Geschichte der Gesundheitspolitik in Deutschland. Von der Weimarer Republik bis in die Frühgeschichte der “doppelten Staatsgründung”’, Berlin: Duncker & Humblot, pp. 11–50.

Appendix

This Web Appendix (not for publication) provides additional material discussed in the unpublished manuscript *The Political Effects of the 1918 influenza pandemic in Germany*

Table of Contents

A. Tables

Table A.1 — Summary statistics

	Obs	Mean	Std.Dev.	Min	Max
Voting (constituency)					
% Vote Leftwing	5,068	0.30	0.16	0.00	0.82
% Vote Socialist	5,068	0.23	0.15	0.00	0.82
% Vote Communist	5,068	0.07	0.08	0.00	0.63
% Vote Centre	5,068	0.41	0.26	0.00	1.00
% Vote Catholic-Minority	5,068	0.25	0.27	0.00	1.00
% Vote Liberal	5,068	0.16	0.16	0.00	0.93
% Vote Liberal (right)	5,068	0.08	0.12	0.00	0.81
% Vote Rightwing	5,068	0.29	0.22	0.00	0.98
% Vote Conservative	5,068	0.16	0.17	0.00	0.95
% Vote Antisemite	4,706	0.14	0.18	0.00	0.79
% Turnout	4,706	0.79	0.09	0.33	0.95
% Vote Winner 1907	5,068	0.39	0.24	0.00	1.00
% Vote Winner 1912	5,068	0.41	0.22	0.00	1.00
% Vote Winner 1907-1912	5,068	0.41	0.22	0.00	1.00
% Vote Winner 1907 (w/o Left)	5,068	0.35	0.26	0.00	1.00
% Vote Winner 1912 (w/o Left)	5,068	0.34	0.26	0.00	1.00
% Vote Winner 1907-1912 (w/o Left)	5,068	0.35	0.25	0.00	1.00
Other outcomes (constituency)					
Log(population)	3,258	11.79	0.62	6.42	14.22
Infant mortality	10,860	0.16	0.05	0.03	0.40
Deaths per 1,000	10,860	12.91	3.50	2.14	30.49
Treatment (constituency)					
FluMort 1918 per 1,000	362	0.00	2.36	−12.05	7.60
ExcMort 1918 per 1,000	362	12.23	2.47	−0.29	19.24
ExcMort 1917 per 1,000	362	7.72	2.08	−2.30	15.90
ExcMort 1916 per 1,000	362	6.29	1.64	−2.87	13.17
ExcMort 1915 per 1,000	362	7.01	2.02	−2.94	13.33
ExcMort 1914 per 1,000	362	3.24	1.41	−4.43	7.92
Military deaths 1918 per 1,000	362	6.42	3.20	0.00	28.99
Military deaths 1917 per 1,000	362	5.70	2.70	0.00	22.99
Military deaths 1916 per 1,000	362	6.12	2.81	0.00	24.24
Military deaths 1915 per 1,000	362	8.13	4.45	0.00	40.55
Military deaths 1914 per 1,000	362	2.19	1.07	0.00	8.06
Controls (constituency)					
Males born 1893-1898 p.c.	362	0.06	0.01	0.04	0.08
Females born before 1899 p.c.	362	0.37	0.02	0.28	0.43
Log (pop. density)	362	−1.89	1.49	−3.54	5.16
Pop. growth 1910-1917	362	−0.04	0.07	−0.29	0.21
Catholics p.c. 1910	362	0.34	0.35	0.01	1.00
Agricultural p.c. 1907	362	0.20	0.11	0.00	0.45
Blue-collar p.c. 1907	362	0.22	0.08	0.07	0.40
Middle-class p.c. 1907	362	0.10	0.04	0.05	0.28
Infant mortality 1917	362	0.18	0.04	0.10	0.30
Doctors p.c. 1909	362	0.44	0.25	0.13	1.73
Health empl. p.c. 1909	362	1.81	0.99	0.38	5.60
Coal empl. p.c. 1907	362	0.01	0.03	0.00	0.25
Proximity coal deposit	362	−0.72	0.76	−3.09	0.00
Non-mil. ExcMort 1917 per 1,000	362	0.00	2.06	−9.82	8.41
Non-mil. ExcMort 1916 per 1,000	362	0.00	1.63	−9.01	7.02
Non-mil. ExcMort 1915 per 1,000	362	0.00	1.90	−9.50	6.19
Non-mil. ExcMort 1914 per 1,000	362	0.00	1.36	−7.28	5.02
Veterans p.c.	362	0.14	0.02	0.06	0.20
Military p.c. 1917	362	0.04	0.03	0.01	0.19
POW p.c. 1917	362	0.03	0.02	0.00	0.14
Proximity garrison	362	−0.13	0.09	−0.43	0.00
Proximity any front	362	−4.00	2.02	−8.08	−0.27
Proximity Western front	362	−4.57	2.72	−12.44	−0.27
Proximity Eastern front	362	−11.76	2.81	−16.02	−3.83

Notes: The table presents summary statistics of all variables used in the analysis at the constituency-, (Prussian) district- and city-level. Panel and cross-sectional variables are reported according to their time-dimension. Note that % Turnout and % Vote Antisemitic are not available for the 1919 election and Gini 1914 only for Prussia. ExcMort 1918 per 1,000 (pre-post) is only available for (Prussian) districts without area losses after WWI. Outcomes at the city-level are imbalanced since reporting depends on surpassing specific population thresholds.

Summary statistics (continued)

	Obs	Mean	Std.Dev.	Min	Max
Further controls (constituency)					
Population 1910 in 1,000	362	159.73	112.88	1.33	1,319.43
Population 1919 in 1,000	362	163.55	122.84	0.61	1,492.05
Gender ratio 1910	362	1.03	0.05	0.85	1.24
Employment ratio 1907	362	0.49	0.16	0.10	1.00
Women employed p.c. 1907	362	0.26	0.09	0.06	0.46
Female WW1 benefit eligibles p.c. 1924 per 1,000	362	0.02	0.01	0.00	0.09
Poor p.c. 1907	362	0.00	0.00	0.00	0.02
Infant mortality 1914	362	0.19	0.05	0.09	0.35
Gini 1914 income (Prussia only)	216	0.64	0.11	0.35	0.86
Gini 1914 wealth (Prussia only)	216	0.86	0.05	0.68	0.96
% Vote Leftwing 1893-1907	362	0.23	0.18	0.00	0.74
% Vote Liberal 1893-1907	362	0.25	0.18	0.00	0.80
% Vote Rightwing 1893-1907	362	0.24	0.23	0.00	0.90
Other outcomes (district)					
Deaths per 1,000	37	19.32	1.14	16.93	21.92
Death gender ratio	640	0.87	0.16	0.43	1.16
Treatment (district)					
Influenza deaths 1918 per 1,000	37	3.24	0.70	1.54	4.98
FluMort 1918 per 1,000	37	0.00	1.26	−2.88	2.93
ExcMort 1918 per 1,000	37	12.61	1.31	9.94	15.19
ExcMort 1918 per 1,000 (pre-post)	32	11.92	1.71	5.15	15.19
ExcMort 1917 per 1,000	37	8.17	0.86	6.41	9.72
ExcMort 1916 per 1,000	37	6.28	1.02	3.74	8.32
ExcMort 1915 per 1,000	37	8.29	1.22	6.18	11.49
ExcMort 1914 per 1,000	37	3.98	0.84	2.71	6.46
Military deaths 1918 per 1,000	37	6.36	0.71	4.74	8.06
Military deaths 1917 per 1,000	37	4.60	0.62	3.74	5.95
Military deaths 1916 per 1,000	37	4.98	0.99	3.03	7.07
Military deaths 1915 per 1,000	37	7.22	0.85	5.46	8.82
Military deaths 1914 per 1,000	37	3.69	0.54	2.38	4.66
Controls (district)					
Males born 1893-1898 p.c.	37	0.06	0.01	0.05	0.07
Log (pop. density)	37	−2.16	1.14	−3.17	3.55
Pop. growth 1910-1917	37	−0.02	0.05	−0.16	0.13
Catholics p.c. 1910	37	0.33	0.31	0.02	0.95
Agricultural p.c. 1907	37	0.21	0.10	0.00	0.38
Middle-class p.c. 1907	37	0.10	0.03	0.06	0.21
Infant mortality 1917	37	0.18	0.03	0.14	0.23
Proximity coal deposit	37	−0.96	0.89	−2.86	−0.03
Non-mil. ExcMort 1917 per 1,000	37	0.00	0.71	−1.34	1.24
Non-mil. ExcMort 1916 per 1,000	37	0.00	0.60	−1.38	1.41
Non-mil. ExcMort 1915 per 1,000	37	0.00	0.76	−1.01	2.37
Non-mil. ExcMort 1914 per 1,000	37	0.00	0.50	−0.79	1.90
Veterans p.c.	37	0.14	0.01	0.11	0.17
Military p.c. 1917	37	0.04	0.02	0.01	0.13
POW p.c. 1917	37	0.03	0.02	0.00	0.09
Voting (city)					
% Vote Leftwing	1,894	0.40	0.14	0.00	0.84
% Vote Centre	1,894	0.38	0.21	0.00	0.99
% Vote Rightwing	1,894	0.23	0.18	0.00	0.73
Other outcomes (city)					
Share of ind.'s on welfare	192	0.06	0.09	0.00	0.63
Share of HHs on welfare	310	0.21	0.23	0.01	1.80
Ordinary city spending per capita	460	213.17	122.74	4.53	1,222.61

Notes: The table presents summary statistics of all variables used in the analysis at the constituency-, (Prussian) district- and city-level. Panel and cross-sectional variables are reported according to their time-dimension. Note that % Turnout and % Vote Antisemitic are not available for the 1919 election and Gini 1914 only for Prussia. ExcMort 1918 per 1,000 (pre-post) is only available for (Prussian) districts without area losses after WWI. Outcomes at the city-level are imbalanced since reporting depends on surpassing specific population thresholds.

Summary statistics (continued)

	Obs	Mean	Std.Dev.	Min	Max
Treatment (city)					
FluMort 1918 per 1,000	180	0.00	4.23	−10.72	23.44
ExcMort Respiratory 1918 per 1,000	180	3.30	2.46	−4.38	10.17
ExcMort Non-Respiratory 1918 per 1,000	180	4.24	3.60	−3.48	22.43
ExcMort External 1918 per 1,000	180	4.14	1.54	−0.65	15.72
ExcMort 1918 per 1,000	180	11.68	4.36	−0.93	34.80
ExcMort 1917 per 1,000	180	8.25	4.07	−1.49	37.55
ExcMort 1916 per 1,000	180	6.66	2.75	−1.49	19.42
ExcMort 1915 per 1,000	180	8.15	2.80	0.18	18.75
ExcMort 1914 per 1,000	180	3.60	2.34	−2.24	15.66
Military deaths 1918 per 1,000	180	5.41	1.59	2.37	16.98
Military deaths 1917 per 1,000	180	4.46	1.26	1.86	14.27
Military deaths 1916 per 1,000	180	5.51	1.58	2.38	16.47
Military deaths 1915 per 1,000	180	7.47	1.85	3.14	15.60
Military deaths 1914 per 1,000	180	3.25	1.91	0.23	13.58
Controls (city)					
Males born 1893-1898 p.c.	180	0.06	0.01	0.04	0.07
Log (pop. density)	180	−1.30	1.38	−3.25	4.60
Pop. growth 1910-1917	180	−0.09	0.13	−0.37	0.54
Catholics p.c. 1910	180	0.29	0.31	0.02	0.99
Agricultural p.c. 1907	180	0.13	0.09	0.00	0.36
Middle-class p.c. 1907	180	0.11	0.04	0.06	0.28
Infant mortality 1917	180	0.17	0.05	0.08	0.40
Proximity coal deposit	180	−0.61	0.67	−2.79	0.00
Non-mil. ExcMort 1917 per 1,000	180	0.00	4.06	−9.09	29.67
Non-mil. ExcMort 1916 per 1,000	180	0.00	2.52	−6.00	13.13
Non-mil. ExcMort 1915 per 1,000	180	0.00	2.15	−4.22	12.77
Non-mil. ExcMort 1914 per 1,000	180	0.00	1.46	−4.18	8.89
Veterans p.c.	180	0.14	0.03	0.06	0.19
Military p.c. 1917	180	0.04	0.03	0.01	0.18
POW p.c. 1917	180	0.02	0.02	0.00	0.12
Other outcomes (soldiers)					
Height (in meters)	2,871	1.71	0.06	1.50	1.92
Treatment (soldiers)					
FluMort 1918 per 1,000	2,871	0.70	2.78	−6.79	16.21
Controls (soldiers)					
Males born 1893-1898 p.c.	2,871	0.06	0.00	0.04	0.07
Log (pop. density)	2,871	0.01	1.38	−3.13	4.60
Pop. growth 1910-1917	2,871	−0.01	0.16	−0.37	0.54
Catholics p.c. 1910	2,871	0.50	0.25	0.02	0.98
Agricultural p.c. 1907	2,871	0.05	0.06	0.00	0.36
Middle-class p.c. 1907	2,871	0.11	0.03	0.06	0.28
Infant mortality 1917	2,871	0.15	0.02	0.08	0.40
Proximity coal deposit	2,871	−0.16	0.26	−2.79	0.00
Non-mil. ExcMort 1917 per 1,000	2,871	−0.78	2.28	−6.46	8.39
Non-mil. ExcMort 1916 per 1,000	2,871	−0.08	1.42	−5.54	12.13
Non-mil. ExcMort 1915 per 1,000	2,871	−0.30	1.27	−4.02	9.03
Non-mil. ExcMort 1914 per 1,000	2,871	−0.15	0.84	−2.88	8.89
Veterans p.c.	2,871	0.12	0.02	0.06	0.19
Military p.c. 1917	2,871	0.02	0.02	0.01	0.16
POW p.c. 1917	2,871	0.02	0.01	0.00	0.12

Notes: The table presents summary statistics of all variables used in the analysis at the constituency-, (Prussian) district- and city-level. Panel and cross-sectional variables are reported according to their time-dimension. Note that % Turnout and % Vote Antisemitic are not available for the 1919 election and Gini 1914 only for Prussia. ExcMort 1918 per 1,000 (pre-post) is only available for (Prussian) districts without area losses after WWI. Outcomes at the city-level are imbalanced since reporting depends on surpassing specific population thresholds.

Table A.2 — Creating Spanish flu mortality

	Deaths p.c.				Influenza deaths 1918 p.c.		
Sample	1904-1913		1909-1913 + 1919-1923				
	Dist. FE	+Dist. Trend	Dist. FE	+Dist. Trend			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ExcMort1918 (pre only)					0.402^{***}		0.395^{***}
					(0.054)		(0.062)
ExcMort1918 (pre-post)						0.274^{***}	0.050
						(0.048)	(0.032)
Dist. FE	Y	Y	Y	Y	N	N	N
Districts	37	37	32	32	37	32	32
Observations	370	370	320	320	37	32	32
Mean DV	11.799	11.799	11.812	11.812	3.241	3.176	3.176
R^2	0.823	0.855	0.373	0.377	0.574	0.427	0.696

Notes: This table presents results from regressions of crude mortality rates and reported Spanish flu deaths p.c. on predicted excess mortality in a panel of districts. ExcMort1918 (pre only) is excess mortality in 1918 computed using mortality rates from 1904-1913; ExcMort1918 (pre-post) is excess mortality in 1918 computed using mortality rates from 1909-1913 and 1919-1923. Robust standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01.

TABLE A.3 — Excess mortality and WWI military deaths

	Excess mortality														
	Districts					Constituencies					Cities				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Deaths per 1,000	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Military 1914	1.266***					0.312***					0.960***				
	(0.163)					(0.074)					(0.074)				
Military 1915		1.123***					0.157***					0.972***			
		(0.125)					(0.021)					(0.092)			
Military 1916			0.835***					0.073**					0.686***		
			(0.107)					(0.031)					(0.133)		
Military 1917				0.784***					0.103***					0.294	
				(0.186)					(0.033)					(0.229)	
Military 1918					0.516*					0.222***					0.646***
					(0.293)					(0.044)					(0.176)
Observations	37	37	37	37	37	362	362	362	362	362	180	180	180	180	180
Mean DV	3.977	8.294	6.278	8.171	12.608	3.239	7.013	6.292	7.719	12.232	3.603	8.152	6.663	8.251	11.682
R^2	0.649	0.610	0.650	0.319	0.077	0.056	0.119	0.016	0.018	0.083	0.611	0.413	0.155	0.008	0.055

Notes: This table presents regressions between yearly predicted measures of excess mortality and reported deaths due to war at the district-, constituency- and city-level in columns 1-3, 4-6 and 7-9, respectively. Robust standard errors in parentheses: *p<0.1; **p<0.05; ***p<0.01.

Table A.4 — Impact of controls on baseline results for leftwing votes

	Leftwing																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
FluMort1918×PostFlu	0.012***	0.007***	0.010***	0.009***	0.012***	0.009***	0.010***	0.012***	0.011***	0.021***	0.016***	0.014***	0.012***	0.010***	0.011***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Male 1893-1898 p.c.×Elec FE	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Log pop. density×...	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
Pop. growth 1910-17×...	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
Catholics p.c.×...	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	Y
Agric empl. p.c.×...	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y
Middle cl p.c.×...	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	Y
Infant mort. 1917×...	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	Y
Prox. coal deposit×...	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	Y
Non-mil exc. deaths 1914×...	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y
Non-mil exc. deaths 1915×...	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	Y
Non-mil exc. deaths 1916×...	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	Y
Non-mil exc. deaths 1917×...	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y
Veterans p.c.×...	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y
Military 1917 p.c.×...	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y
POW 1917 p.c.×...	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y
Constituencies	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299
R^2	0.889	0.909	0.909	0.892	0.898	0.913	0.910	0.890	0.893	0.893	0.893	0.890	0.890	0.898	0.892	0.900	0.939

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of leftwing parties for 14 elections between 1893 and 1933 The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Reported controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A.5 — Controlling for state-specific election fixed effects

	Leftwing		Centre		Rightwing	
	(1)	(2)	(3)	(4)	(5)	(6)
FluMort1918×PostFlu	0.007***	0.005*	0.008	0.011**	−0.015***	−0.016***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Constituency FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
State×Election FE	N	Y	N	Y	N	Y
Constituencies	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.412	0.412	0.288	0.288
R^2	0.939	0.947	0.888	0.909	0.843	0.872

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of leftwing parties at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Even-numbered columns show results when controlling additionally for interactions of state dummies and election fixed effects. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Table A.6 — Conditioning on measures of female empowerment

	Leftwing									
Factor =	New female voters p.c.		Gender ratio 1910		Female-to-male employment ratio 1907		Female labor force participation 1907		Female WWI benefit eligibles p.c. 1924	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FluMort1918×PostFlu	0.008***	0.008***	0.007***	0.007***	0.007**	0.007**	0.007***	0.007***	0.007**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Factor×PostFlu	−0.339		−0.024		0.051		0.044		0.476	
	(0.236)		(0.079)		(0.042)		(0.090)		(0.379)	
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Factor×Election FE	N	Y	N	Y	N	Y	N	Y	N	Y
Constituencies	362	362	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299
R^2	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of the party camp indicated in the column head at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls for measures of female empowerment as indicated in column heads are either interacted with a *PostFlu* dummy (odd-numbered columns) or with election dummies (even-numbered columns). Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

Table A.7 — Population weighted regressions

	Leftwing			Centre			Rightwing		
Pop. weights	None	1910	1919	None	1910	1919	None	1910	1919
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FluMort1918×PostFlu	0.007***	0.007**	0.007**	0.008	0.007	0.007	−0.015***	−0.014**	−0.014**
	(0.003)	(0.003)	(0.003)	(0.005)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Constituencies	362	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.344	0.343	0.412	0.395	0.397	0.288	0.262	0.261
R^2	0.939	0.938	0.939	0.888	0.887	0.889	0.843	0.844	0.845

Notes: The table reports population weighted regression results from estimating equation 4. Population weights as indicated in column heads. The dependent variables measure vote shares of the party camp indicated in the column head at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 in the own and all adjacent constituencies as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

Table A.8 — Different approaches to inference

	Leftwing					Centre					Rightwing				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
FluMort1918×PostFlu	0.007***	0.007***	0.007**	0.007**	0.007***	0.008	0.008	0.008	0.008	0.008	−0.015***	−0.015***	−0.015**	−0.015**	−0.015***
	(0.003)		(0.003)	(0.003)	(0.003)	(0.005)		(0.006)	(0.007)	(0.006)	(0.005)		(0.007)	(0.008)	(0.006)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SE type	Base-line	Boot-strap	Cluster District	Conley spatial	Conley spatial	Base-line	Boot-strap	Cluster District	Conley spatial	Conley spatial	Base-line	Boot-strap	Cluster District	Conley spatial	Conley spatial
Reps/Cutoff (in km)		10000		100	25		10000		100	25		10000		100	25
Constituencies	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.299	0.299	0.299	0.412	0.412	0.412	0.412	0.412	0.288	0.288	0.288	0.288	0.288
R^2	0.939	0.939	0.939	0.939	0.939	0.888	0.888	0.888	0.888	0.888	0.843	0.843	0.843	0.843	0.843

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of the party camp indicated in the column head at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Inference is performed as indicated in rows *SE type* and *Reps/Cutoff (in km)*. *p<0.1; **p<0.05; ***p<0.01. Following Roodman et al. (2019), wild-cluster bootstrap standard errors are not reported.

Table A.9 — World War I mortality and vote shares

	Leftwing							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FluMort 1918×PostFlu	0.007***		0.007***	0.008***	0.007***	0.008***	0.006**	
	(0.003)		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
ExcMort 1918×PostFlu		0.008***						0.006**
		(0.003)						(0.003)
Mil. deaths 1918×PostFlu		0.000						0.003
		(0.001)						(0.007)
Non-mil. ExcMort 1914×PostFlu			0.003				0.003	0.003
			(0.003)				(0.003)	(0.003)
Mil. deaths 1914×PostFlu			0.002				−0.012	−0.011
			(0.004)				(0.010)	(0.010)
Non-mil. ExcMort 1915×PostFlu				0.004			0.000	0.000
				(0.002)			(0.003)	(0.003)
Mil. deaths 1915×PostFlu				0.002			0.009***	0.008**
				(0.001)			(0.003)	(0.004)
Non-mil. ExcMort 1916×PostFlu					−0.013***		−0.006*	−0.005*
					(0.003)		(0.003)	(0.003)
Mil. deaths 1916×PostFlu					0.001		−0.015***	−0.015***
					(0.002)		(0.005)	(0.005)
Non-mil. ExcMort 1917×PostFlu						−0.002	−0.002	−0.002
						(0.003)	(0.003)	(0.003)
Mil. deaths 1917×PostFlu						0.002	0.007	0.004
						(0.002)	(0.007)	(0.008)
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	N	N	N	N	N	N
Constituencies	362	362	362	362	362	362	362	362
Observations	5,068	5,068	5,068	5,068	5,068	5,068	5,068	5,068
Mean DV	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299
R^2	0.939	0.939	0.939	0.939	0.938	0.938	0.938	0.939

The table reports results from estimating equation 4. The dependent variables measure vote shares of leftwing parties at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variables are predicted Spanish flu mortality and excess mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls for deaths due to war and non-military excess mortality are interacted with *PostFlu* dummies. Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

Table A.10 — Conditioning on measures of poverty

	Leftwing							
Factor =	% Poor 1907		Infant mortality 1914		Gini 1914 income (Prussia)		Gini 1914 wealth (Prussia)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FluMort1918×PostFlu	0.007***	0.007***	0.007***	0.007***	0.005	0.005	0.008**	0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Factor×PostFlu	0.352		0.072		0.169*		0.436***	
	(1.511)		(0.179)		(0.089)		(0.143)	
Constituency FE	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Factor×Election FE	N	Y	N	Y	N	Y	N	Y
Constituencies	362	362	362	362	216	216	216	216
Observations	5,068	5,068	5,068	5,068	3,024	3,024	3,024	3,024
Mean DV	0.299	0.299	0.299	0.299	0.287	0.287	0.287	0.287
R^2	0.939	0.939	0.939	0.939	0.938	0.939	0.939	0.939

Notes: The table reports results from estimating equation 4. The dependent variables measure vote shares of leftwing parties at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls for measures of poverty as indicated in column heads are either interacted with a *PostFlu* dummy (odd-numbered columns) or with election dummies (even-numbered columns). Controls: Males born 1893-1898 p.c., Log(pop. density), Pop. growth 1910-1917, Catholics p.c., Agricultural p.c., Middle class p.c., Infant mortality 1917, Proximity to nearest coal deposit, Non-military Excess deaths p.c. 1914 to 1917, Veterans p.c., Military personnel 1917 p.c., and Prisoners of war 1917 p.c. All controls are time-invariant and interacted with election fixed effects. Standard errors, clustered at the constituency-level, in parentheses: *p<0.1; **p<0.05; ***p<0.01.

B. Figures

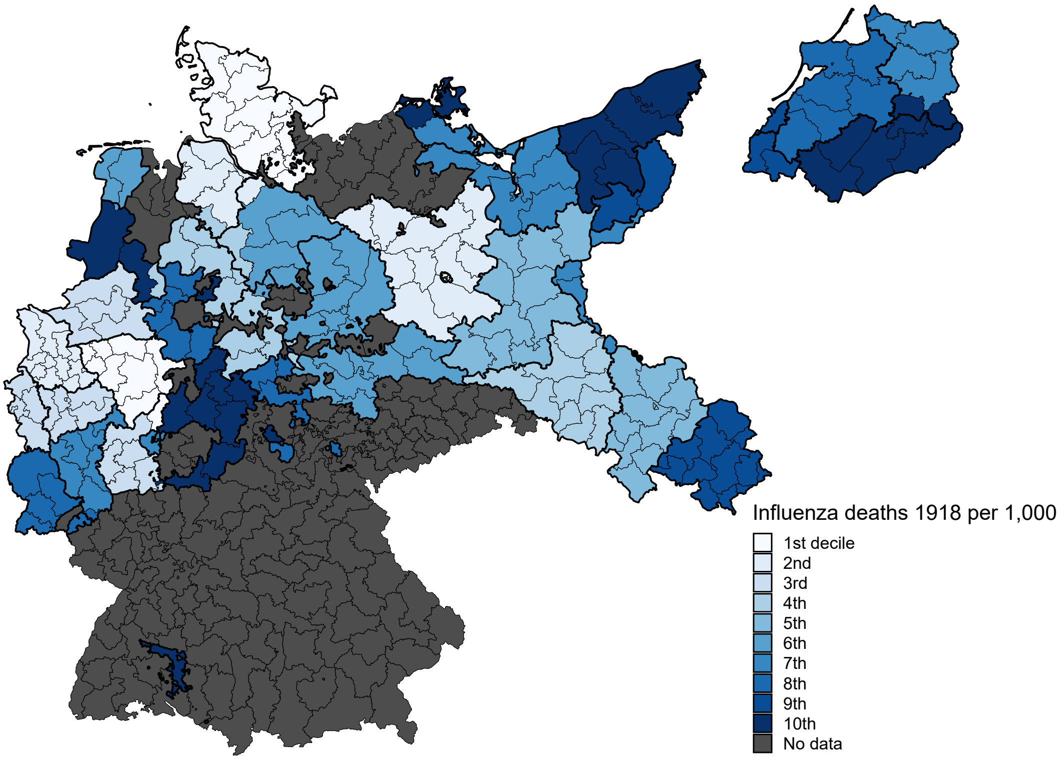


Figure B.1 — Reported Spanish flu mortality across districts

Notes: The map depicts Spanish flu mortality in 1918 as reported in administrative data by the Prussian statistical office. The map plots district-level (37 units, thick lines) data on a constituency-level (216 units, thin lines) map for Prussia. Some constituencies span several districts and are allocated the value of the district where the majority of the population lives.

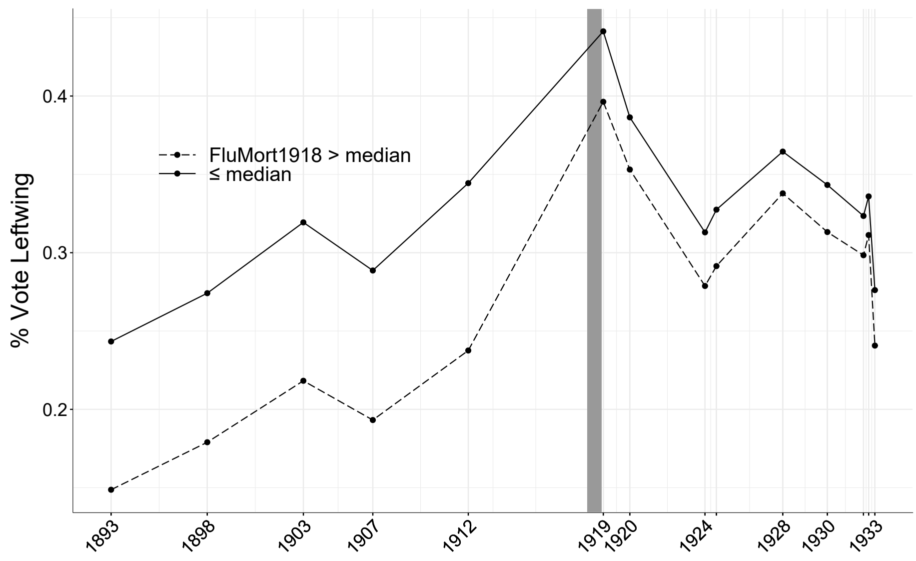


FIGURE B.2 — Leftwing vote share Pre/Post-Flu and flu mortality 1918

Notes: Plot of the mean leftwing vote share for constituencies below (solid line) and above (dashed line) the median of Spanish flu mortality in 1918 over time. The gray-shaded area marks the pandemic.

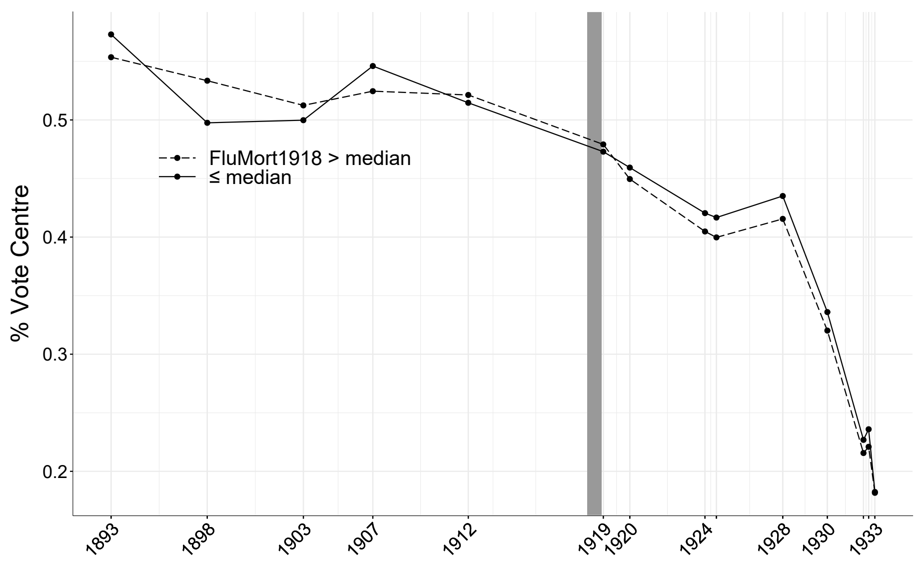


FIGURE B.3 — Centre vote share Pre/Post-Flu and flu mortality 1918

Notes: Plot of the mean centre vote share for constituencies below (solid line) and above (dashed line) the median of Spanish flu mortality in 1918 over time. The gray-shaded area marks the pandemic.

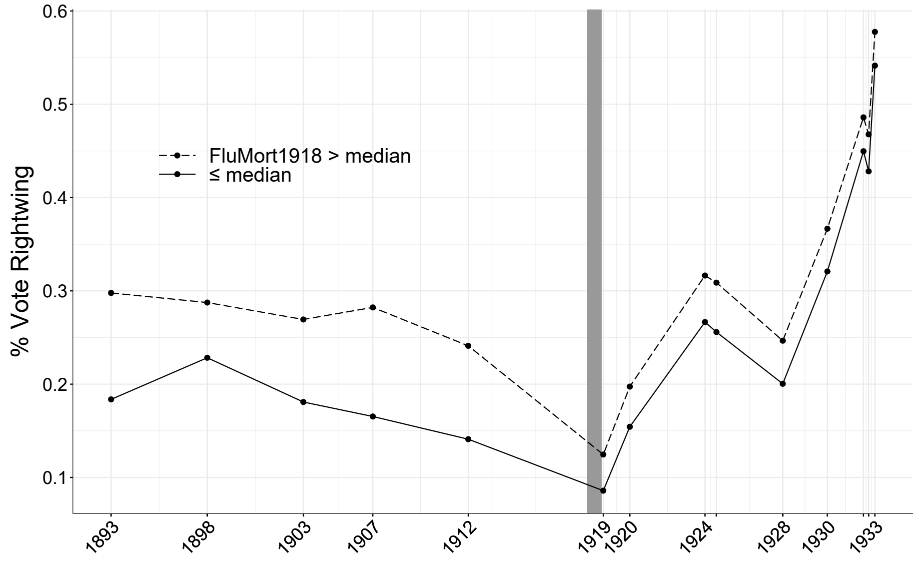


Figure B.4 — Rightwing vote share Pre/Post-Flu and flu mortality 1918

Notes: Plot of the mean rightwing vote share for constituencies below (solid line) and above (dashed line) the median of Spanish flu mortality in 1918 over time. The gray-shaded area marks the pandemic.

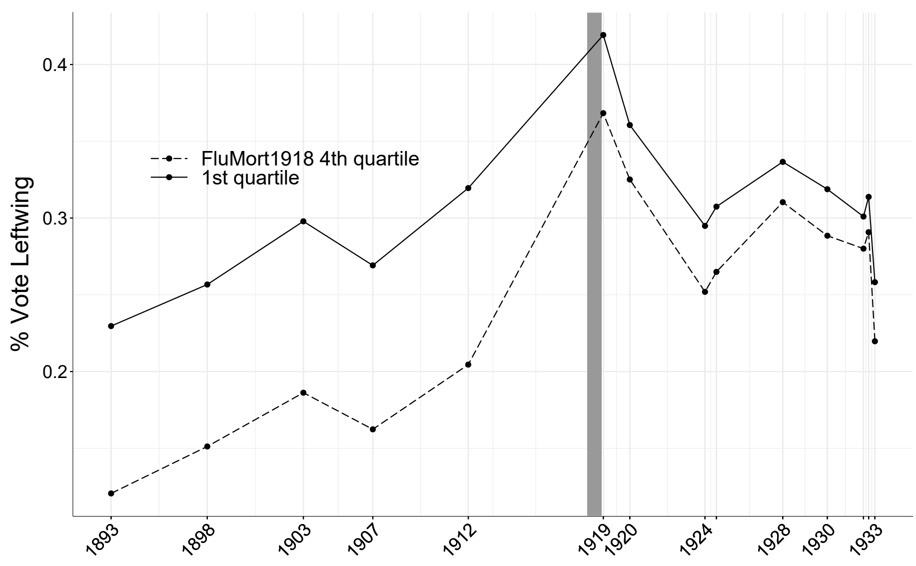


Figure B.5 — Leftwing vote share Pre/Post-Flu and flu mortality 1918

Notes: Plot of the mean leftwing vote share for constituencies below the 25th percentile (solid line) and above the 75th percentile (dashed line) of Spanish flu mortality in 1918 over time. The gray-shaded area marks the pandemic.

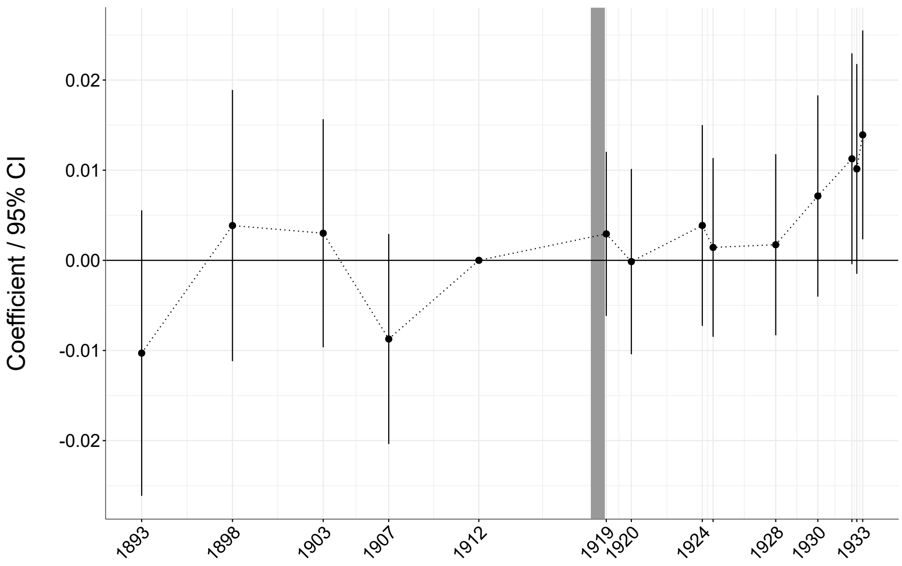


FIGURE B.6 — Event study graph for centre vote share

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures centre vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

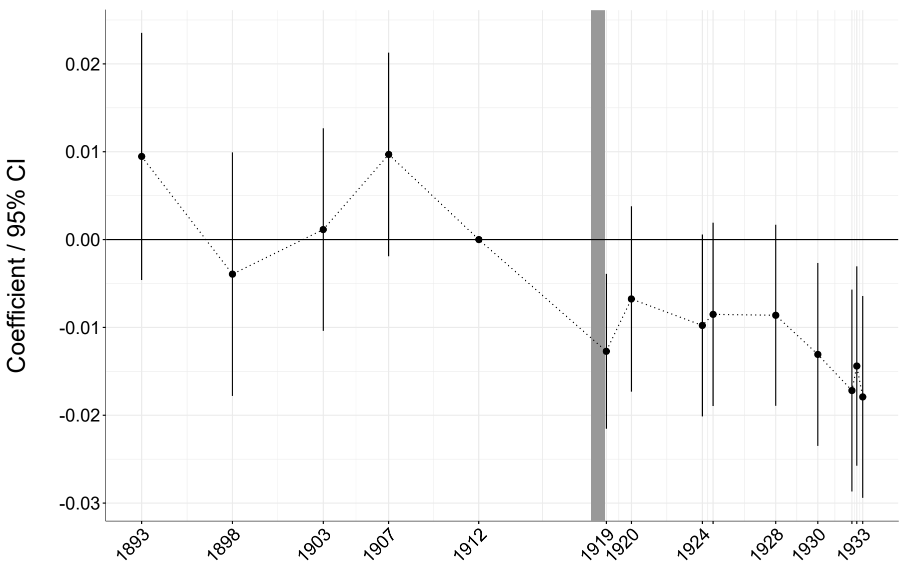


FIGURE B.7 — Event study graph for rightwing vote share

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures rightwing vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

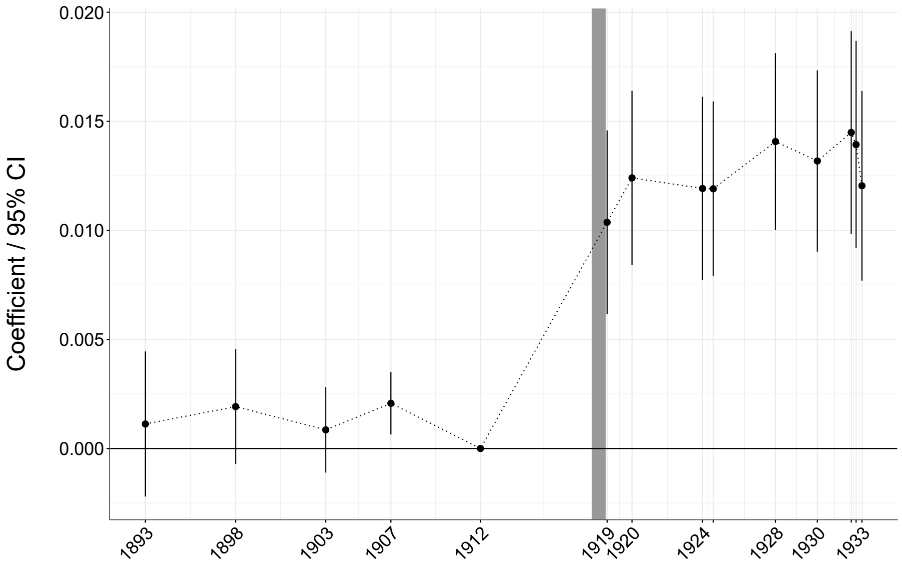


Figure B.8 — Event study graph for leftwing vote share (without controls)

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures leftwing vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are not included in this specification. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

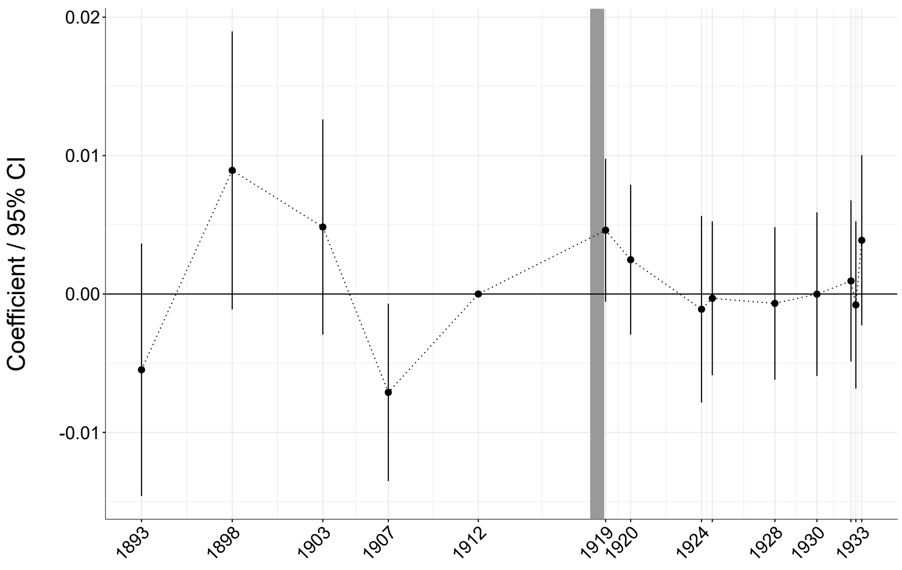


Figure B.9 — Event study graph for centre vote share (without controls)

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures centre vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are not included in this specification. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

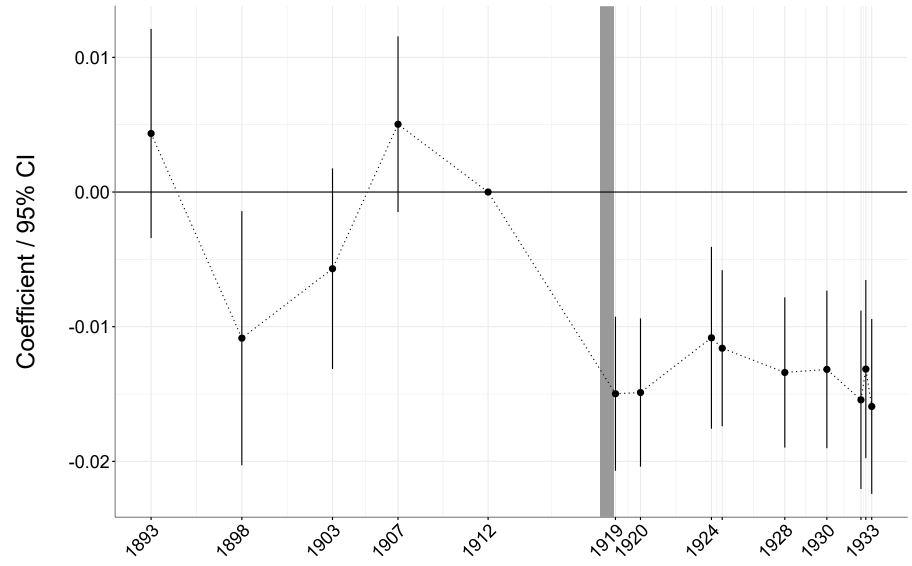


Figure B.10 — Event study graph for rightwing vote share (without controls)

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures rightwing vote shares at the constituency-level for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with election fixed effects. The omitted reference year is 1912. Controls are not included in this specification. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

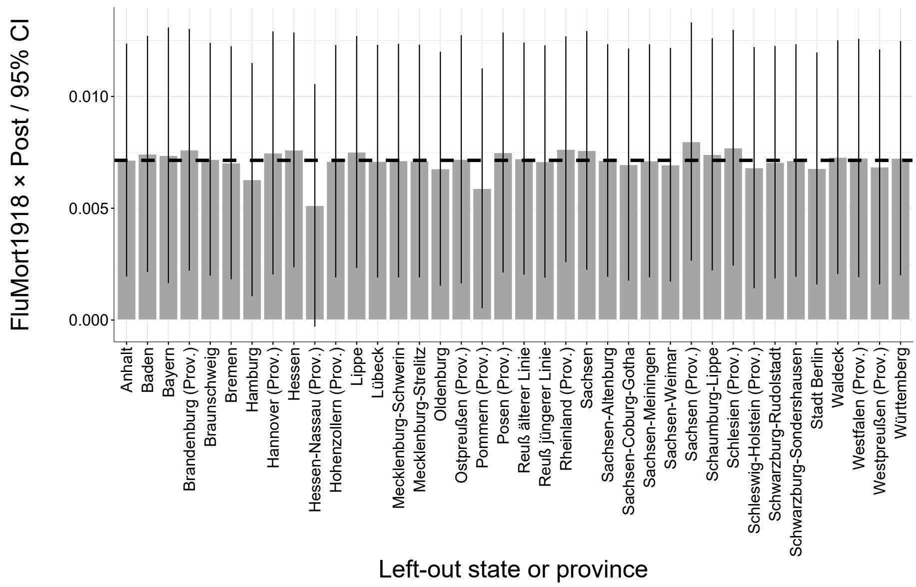


Figure B.11 — Leaving out provinces one-by-one (leftwing)

Notes: The figure reports δ coefficients from estimating equation 4 with 95% confidence intervals, dropping one province at the time from the sample. The dependent variables measure vote shares of leftwing parties for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level.

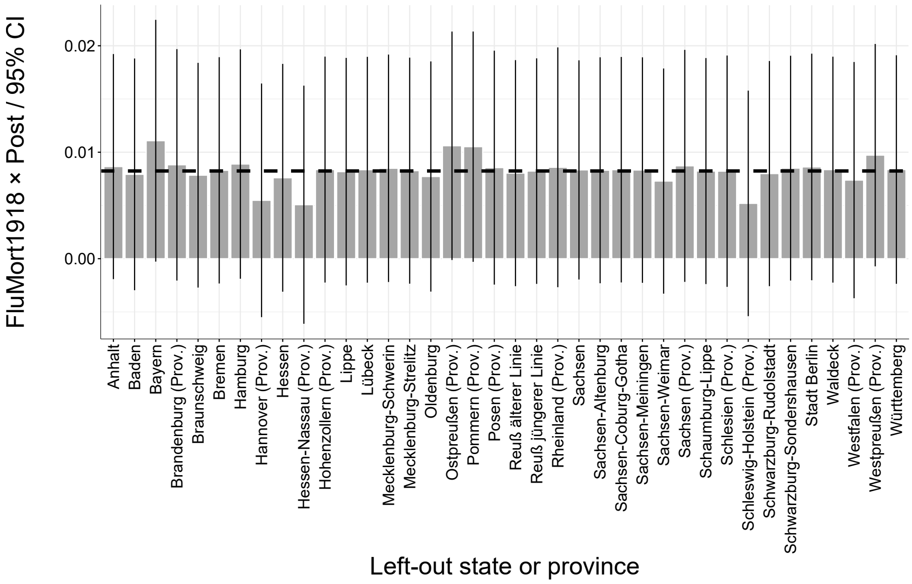


Figure B.12 — Leaving out provinces one-by-one (centre)

Notes: The figure reports δ coefficients from estimating equation 4 with 95% confidence intervals, dropping one province at the time from the sample. The dependent variables measure vote shares of centre parties for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level.

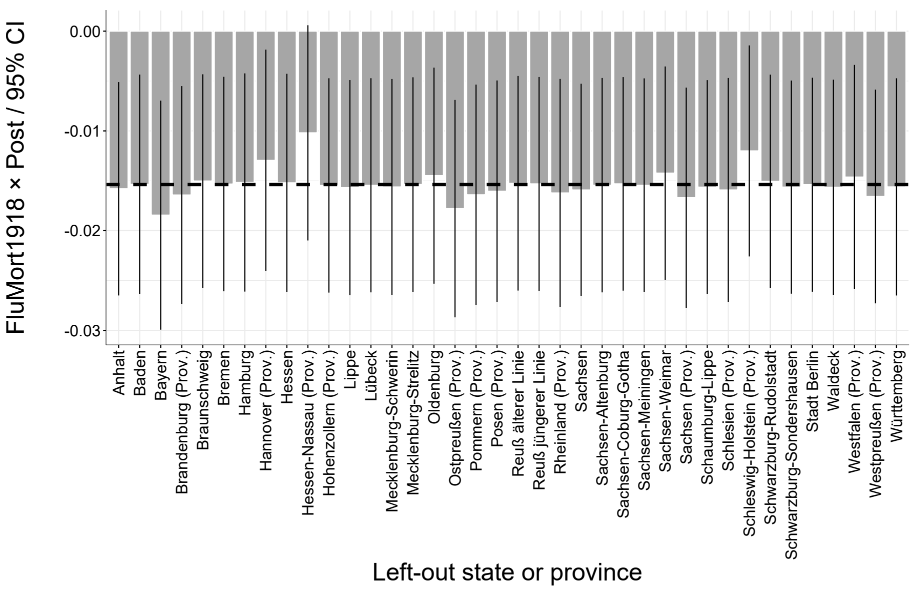


Figure B.13 — Leaving out provinces one-by-one (rightwing)

Notes: The figure reports δ coefficients from estimating equation 4 with 95% confidence intervals, dropping one province at the time from the sample. The dependent variables measure vote shares of rightwing parties for 14 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with an indicator variable taking value one for each election after 1918. Controls are time-invariant and interacted with election fixed effects. Standard errors are clustered at the constituency-level.

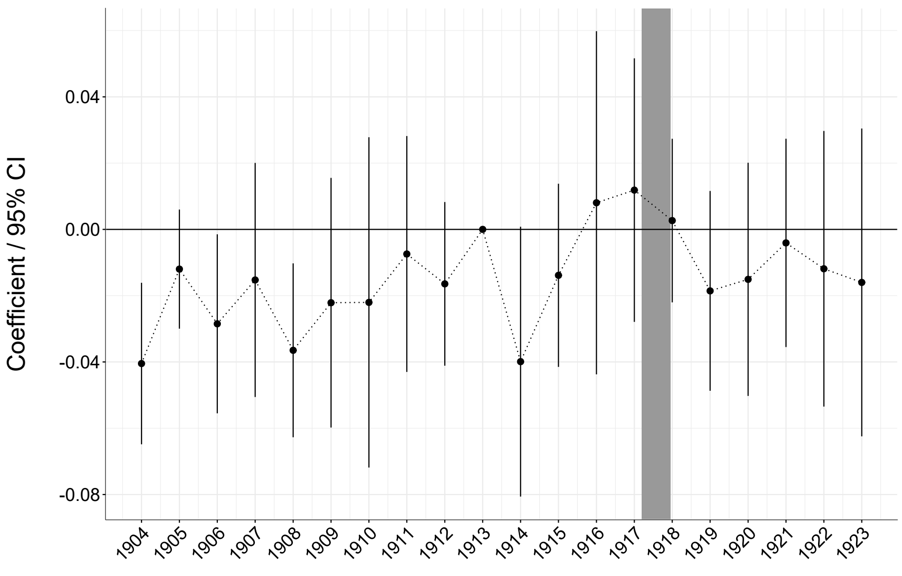


FIGURE B.14 — Event study graph for gender mortality ratio

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable is the ratio of female to male mortality per 1,000 individuals at the district-level between 1904 and 1923. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1913. Standard errors are clustered at the district-level. The gray-shaded area marks the pandemic.

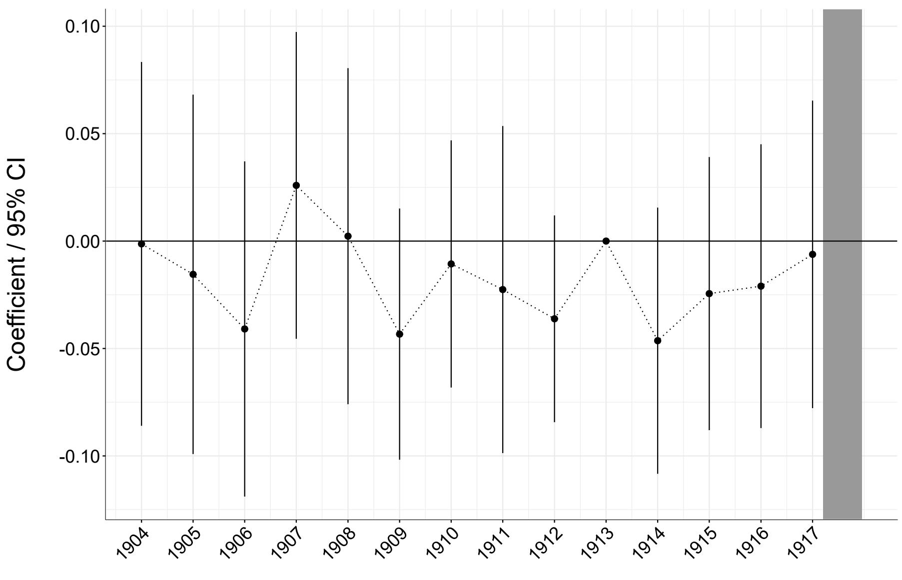


FIGURE B.15 — Spanish flu mortality and infant mortality

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is infant mortality per 1,000 births at the constituency-level between 1904 and 1917. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1913. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

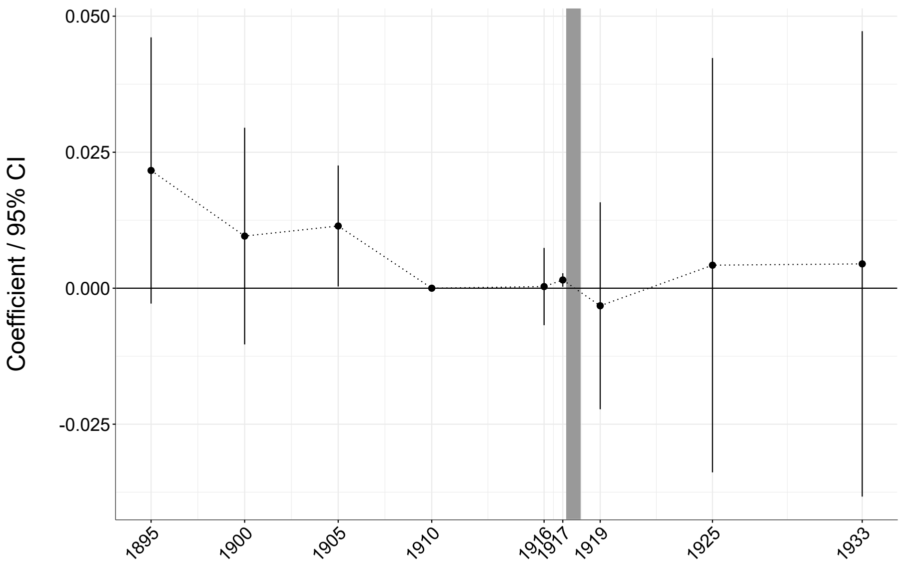


Figure B.16 — Event study graph for total population

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is log total population at the constituency-level from 9 censuses between 1895 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1910. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

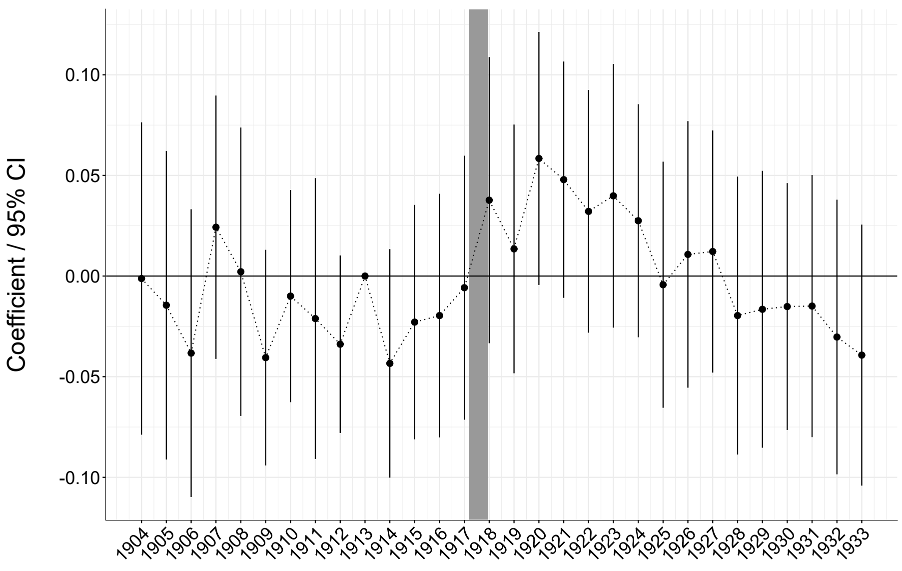


Figure B.17 — Event study graph for infant mortality

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is infant mortality per 1,000 births at the constituency-level between 1904 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1913. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

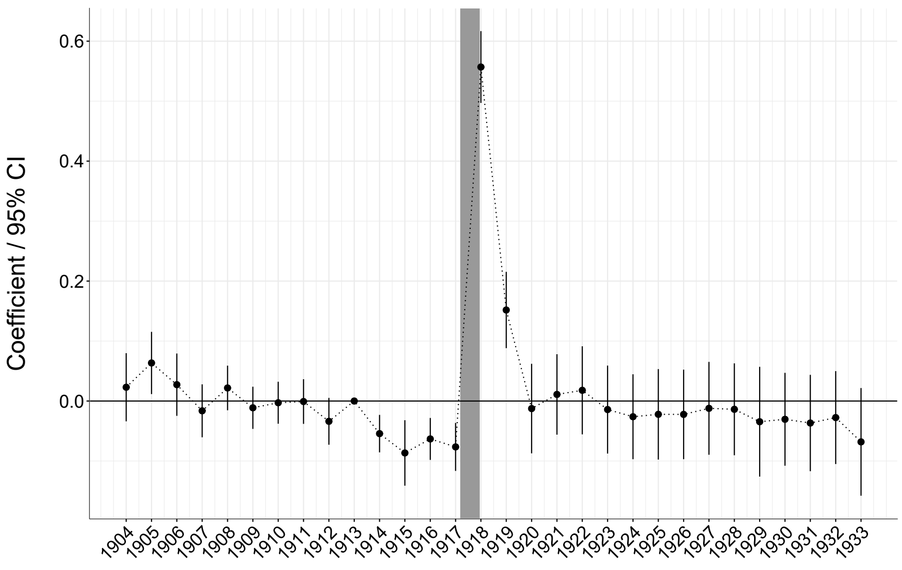


FIGURE B.18 — Event study graph for general mortality

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is all-cause mortality per 1,000 individuals at the constituency-level between 1904 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 as described in Section 3.3, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1913. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

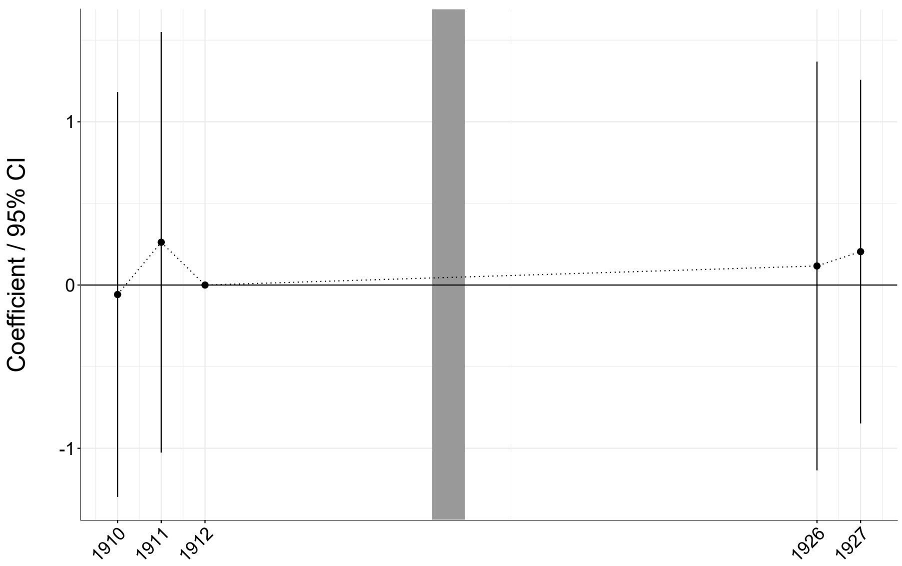


FIGURE B.19 — Event study graph for welfare recipients (individuals)

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is welfare recipients (individuals) per capita at the city-level. The main explanatory variable is predicted Spanish flu mortality in 1918 at the city-level as described in Section 5.3.2, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1912. Standard errors are clustered at the city-level. The gray-shaded area marks the pandemic.

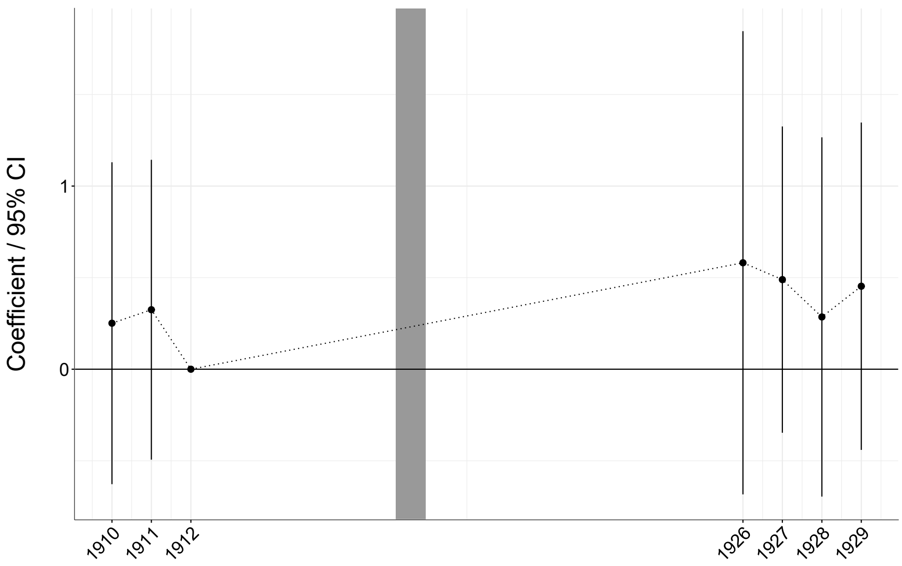


Figure B.20 — Event study graph for welfare recipients (households)

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is welfare recipients (households) per capita at the city-level. The main explanatory variable is predicted Spanish flu mortality in 1918 at the city-level as described in Section 5.3.2, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1912. Standard errors are clustered at the city-level. The gray-shaded area marks the pandemic.

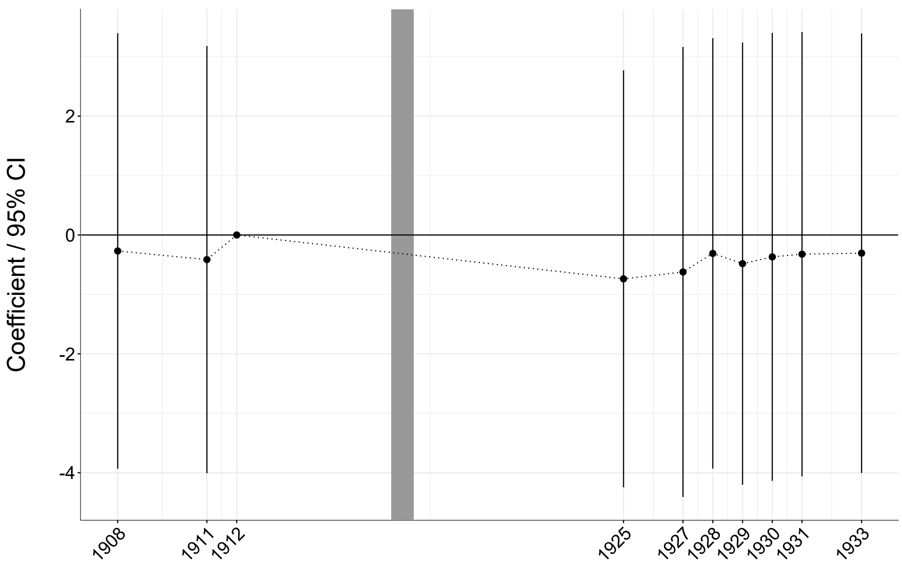


Figure B.21 — Event study graph for ordinary city spending per capita

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is ordinary city spending per capita at the city-level. The main explanatory variable is predicted Spanish flu mortality in 1918 at the city-level as described in Section 5.3.2, interacted with year fixed effects. Controls are time-invariant and interacted with year fixed effects. The omitted reference year is 1912. Standard errors are clustered at the city-level. The gray-shaded area marks the pandemic.

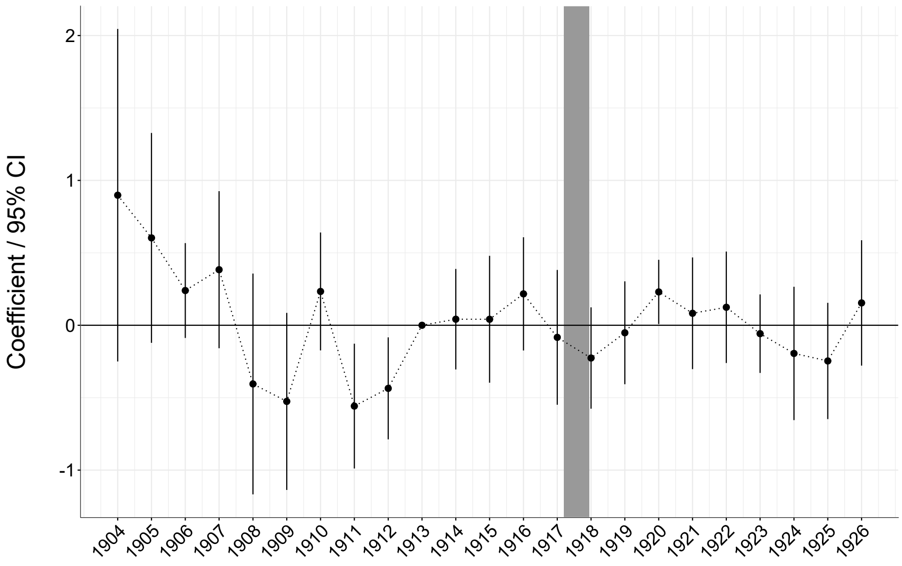


FIGURE B.22 — Event study graph for soldier height

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. Dependent and main explanatory variables are standardized with mean zero and unit standard deviation. The dependent variable is height (in meters) at the individual-level. The main explanatory variable is predicted Spanish flu mortality in 1918 at the city-level as described in Section 5.3.2, interacted with cohort fixed effects. Categories for fathers' occupation and number of siblings interacted with cohort fixed effects are included. The omitted reference cohort is 1913. Standard errors are clustered at the city-level. The gray-shaded area marks the pandemic.

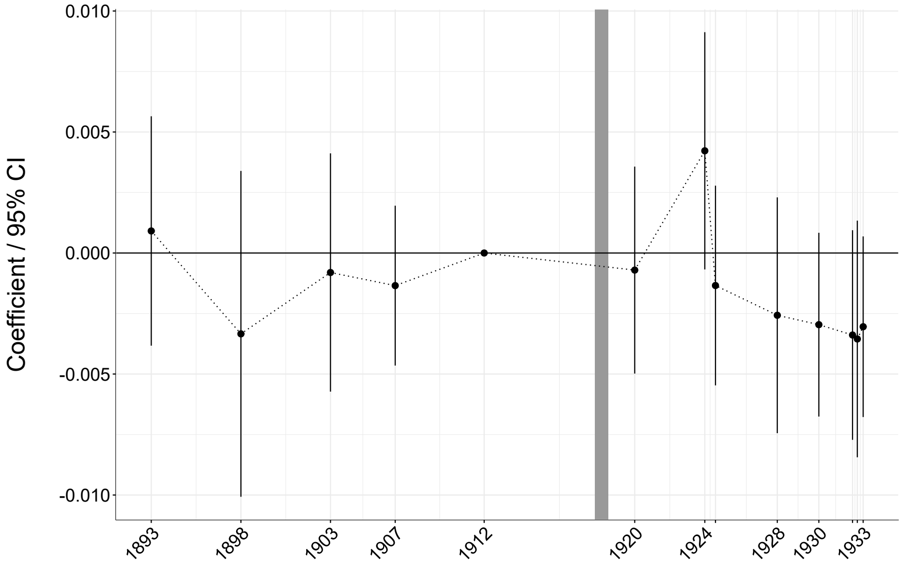


FIGURE B.23 — Event study graph for turnout

Notes: The figure plots δ_t coefficients estimated from equation 5 with 95% confidence intervals. The dependent variable measures turnout at the constituency-level for 13 elections between 1893 and 1933. The main explanatory variable is predicted Spanish flu mortality in 1918 at the city-level as described in Section 5.3.2, interacted with year fixed effects. Controls are time-invariant and interacted with election fixed effects. The omitted reference year is 1912. Standard errors are clustered at the constituency-level. The gray-shaded area marks the pandemic.

C. Data sources

Election data

Parliamentary elections Information on election results comes from three sources. For the period of the German Empire 1871 to 1912, we rely on ICPSR (1991) which reports election results already at the constituency-level. Data on the 1919 election is reported at the same level and taken from Statistisches Reichsamt (1919). For elections 1920 until 1933, we used county-level results in the dataset compiled by Falter and Hänisch (1990).

Parliamentary elections (city-level) Election results for cities above 10,000 inhabitants was released for the last four parliamentary elections 1898 (Kaiserliches Statistisches Amt, 1899), 1903 (Kaiserliches Statistisches Amt, 1904), 1907 (Kaiserliches Statistisches Amt, 1907*b*) and 1912 (Kaiserliches Statistisches Amt, 1913*a*). For elections 1920 until 1933, we used municipality-level results in the dataset compiled by Falter and Hänisch (1990).

Vote shares Individual parties or candidates are classified into party groups as presented in Table D.1. Votes are then aggregated for each party group by election and constituency or city, respectively. Vote shares (incl. those for referenda) are calculated by dividing votes through the number of valid votes.

Turnout Turnout is calculated by dividing the sum of valid and invalid votes by the number of eligible voters. Size of electorate and invalid votes were not reported in 1919 which prohibits calculating turnout for this election.

New male voters Formed as the sum of the male cohorts born 1893-1898 in the 1910 census described below.

New female voters Formed as the sum of the female cohorts born before 1899 in the 1910 census described below.

Population data

Census 1895 Reported in Kaiserliches Statistisches Amt (1897). Data used: Total population counts.

Census 1900 Reported in Kaiserliches Statistisches Amt (1903). Data used: Total population counts.

Census 1905 Reported in Kaiserliches Statistisches Amt (1907*b*). Data used: Total population counts.

Census 1910 Reported in Kaiserliches Statistisches Amt (1915). Data used: Number of women and men by age cohorts <1893, 1893-1894, 1895-1896, 1897-1898, >1898 and Catholics.

Census 1910 (city-level) Reported in Volkswirtschaftliche Abteilung des Kriegsernährungsamtes (1917*a*). Data used: Total population counts.

Census 1916 Reported in Volkswirtschaftliche Abteilung des Kriegsernährungsamtes (1917*b*). Data used: Total population counts.

Census 1916 (city-level) Reported in Reichsgesundheitsamt (1919). Data used: Total population counts.

Census 1917 Reported in Statistisches Reichsamt (1918*b*). Data used: Total population counts, foreign prisoners of war, domestic military personnel.

Census 1917 (city-level) Reported in Reichsgesundheitsamt (1919). Data used: Total population counts.

Census 1919 Reported in Statistisches Reichsamt (1920). Data used: Total population counts.

Census 1925 Reported in Falter and Hänisch (1990). Data used: Total population counts.

Census 1933 Reported in Falter and Hänisch (1990). Data used: Total population counts.

Normalization Data are aggregated to the constituency- and district-level, assigned to cities via geo-matching, when necessary, and normalized by the 1910 population. To construct *Gender ratio 1910*, we divide female population in 1910 by male population in 1910.

District-level vitality data

Vital statistics 1904 Reported in Kaiserliches Statistisches Amt (1906). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1905 Reported in Kaiserliches Statistisches Amt (1907*a*). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1906 Reported in Kaiserliches Statistisches Amt (1908). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1907 Reported in Kaiserliches Statistisches Amt (1909). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1908 Reported in Kaiserliches Statistisches Amt (1910). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1909 Reported in Kaiserliches Statistisches Amt (1911). Data used: Number of stillbirths and total deaths by gender.

Vital statistics 1910 Reported in Kaiserliches Statistisches Amt (1913*a*). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1911 Reported in Kaiserliches Statistisches Amt (1913*c*). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1912 Reported in Kaiserliches Statistisches Amt (1916). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1913 Reported in Statistisches Reichsamt (1918*a*). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1914-1919 Reported in Statistisches Reichsamt (1922). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1920-1921 Reported in Statistisches Reichsamt (1924). Data used: Number of stillbirths and total deaths by gender.
Vital statistics 1922-1923 Reported in Statistisches Reichsamt (1926). Data used: Number of stillbirths and total deaths by gender.
Influenza deaths (Prussia) Reported in Preußisches Statistisches Landesamt (1921). Data used: Number of influenza deaths in 1918.
Military deaths 1914-1919 (Prussia) Reported in Preußisches Statistisches Landesamt (1922). Data used: Number of killed soldiers in WWI for each year 1914 to 1919.
Normalization All data are normalized by the 1910 population.

County-level vitality data

Vital statistics 1904-1906 Reported in Kaiserliches Statistisches Amt (1909). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1907 Reported in Kaiserliches Statistisches Amt (1910). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1908 Reported in Kaiserliches Statistisches Amt (1911). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1909 Reported in Kaiserliches Statistisches Amt (1913*b*). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1910 Reported in Kaiserliches Statistisches Amt (1913*c*). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1911 Reported in Kaiserliches Statistisches Amt (1916). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1912-1913 Reported in Statistisches Reichsamt (1918*b*). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1914-1919 Reported in Statistisches Reichsamt (1922). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1920-1921 Reported in Statistisches Reichsamt (1924). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1922-1923 Reported in Statistisches Reichsamt (1926). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1924-1927 Reported in Statistisches Reichsamt (1930). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1928 Reported in Statistisches Reichsamt (1931). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1929-1930 Reported in Statistisches Reichsamt (1933). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1931 Reported in Statistisches Reichsamt (1934). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Vital statistics 1932-1933 Reported in Statistisches Reichsamt (1938). Data used: Number of live births, stillbirths, total deaths and deaths below age 1.
Normalization All data are aggregated to the constituency-level and normalized by the 1910 population.

City-level data

Vital statistics 1904 Reported in Kaiserliches Gesundheitsamt (1905). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.

Vital statistics 1905 Reported in Kaiserliches Gesundheitsamt (1906). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1906 Reported in Kaiserliches Gesundheitsamt (1907). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1907 Reported in Kaiserliches Gesundheitsamt (1908). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1908 Reported in Kaiserliches Gesundheitsamt (1909). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1909 Reported in Kaiserliches Gesundheitsamt (1910). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1910 Reported in Kaiserliches Gesundheitsamt (1911). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1911 Reported in Kaiserliches Gesundheitsamt (1912). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1912 Reported in Kaiserliches Gesundheitsamt (1913). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1913 Reported in Kaiserliches Gesundheitsamt (1914). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause.
Vital statistics 1914-1918 Reported in Reichsgesundheitsamt (1919). Data used: Number of live births, stillbirths, deaths below age 1 and deaths by cause, gender and military status.
Welfare recipients 1910 Reported in Landsberg (1913). Data used: Number of households and individuals receiving continuous financial support.
Welfare recipients 1911 Reported in Landsberg (1914). Data used: Number of households and individuals receiving continuous financial support.
Welfare recipients 1912 Reported in Landsberg (1916). Data used: Number of households and individuals receiving continuous financial support.
Welfare recipients 1926 Reported in Helbling (1927). Data used: Number of households and individuals receiving continuous financial support.
Welfare recipients 1927 Reported in Helbling (1928). Data used: Number of households and individuals receiving continuous financial support.
Welfare recipients 1928 Reported in Helbling (1930). Data used: Number of households receiving continuous financial support.
Welfare recipients 1929 Reported in Helbling (1931). Data used: Number of households receiving continuous financial support.
City spending 1908 Reported in Bleicher and Most (1912). Data used: Ordinary city spending in Mark.
City spending 1911 Reported in Kieseritzky (1914). Data used: Ordinary city spending in Mark.
City spending 1912 Reported in Kieseritzky (1916). Data used: Ordinary city spending in 100 Mark (sum of spending on own administration and third parties).
City spending 1925 Reported in Seutemann (1927). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1927 Reported in Seutemann (1928). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1928 Reported in Seutemann (1929). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1929 Reported in Seutemann (1930). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1930 Reported in Seutemann (1933). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1931 Reported in Seutemann (1934). Data used: Ordinary city spending in Reichsmark per capita.
City spending 1933 Reported in Rübel (1935). Data used: Ordinary city spending in 1,000 Reichsmark (difference between total and extra-ordinary spending).
Normalization Non-spending data are normalized by the 1910 population or households, respectively. Spending data reported in nominal amounts are normalized by the 1910 population for 1908, 1911 and 1912 and by the 1933 population for 1933. Nominal monetary amounts are converted to 1910 Mark equivalents using Deutsche Bundesbank (2024).

Occupation data

Source Data comes from the occupational census 1907 reported in Kaiserliches Statistisches Amt (1910) and the health occupational census 1909 in Kaiserliches Gesundheitsamt (1912).

Agricultural Number of women and men with primary occupation in agriculture (codes A1-A6) and their dependants in 1907.

Blue-collar Number of women and men with primary occupation in mining and manufacturing (codes B1-B166) and their dependants in 1907.

Middle class Number of women and men with primary occupation in trade, domestic work and civil administration (codes C1-C27, D1-D2 and E2-E8) and their dependants in 1907.

Coal Number of women and men with primary occupation in coal mining and coke production (code B4) and their dependants in 1907.

Poor Number of women and men without occupation, living from welfare benefits or in poor houses (code F2, F4, F5 and F9) in 1907.

Male employees Number of men with a primary occupation in 1907 (codes A1-A6, B1-B166, C1-C27, D1-D2 and E1-E8).

Female employees Number of women with a primary occupation in 1907 (codes A1-A6, B1-B166, C1-C27, D1-D2 and E1-E8).

Doctors Number of doctors and medical personnel licensed to practise medicine in 1909.

Health employees Number of doctors and medical personnel licensed to practise medicine, paramedics, nurses and other qualified health personnel in 1909.

Normalization Data are aggregated to the constituency- and district-level, assigned to cities via geo-matching, when necessary, and normalized by the 1907 or 1909 population reported in the respective sources. To construct **Female-to-male employment ratio 1907**, we divide female employees in 1907 by male employees in 1907. To construct **Female labor force participation 1907**, we divide female employees in 1907 by the female population in 1910 in the age cohorts <1895, i.e. women aged at least 13 in 1907.

Soldier data

Source Data comes from Blum and Bromhead (2019) and was originally collected by Rass and Rohrkamp (2009).

Height Soldier's height at point of military physical examination.

Cohort Calendar year of soldier's birth date.

Siblings Categorical variables for soldier's number of siblings.

Father's occupation Categorical variables for soldier's father's occupation being unskilled, semi-skilled, skilled, semi-professional or professional following Blum and Bromhead (2019).

Geo-referencing Where possible, soldier's place of birth is matched to the cities in our dataset and city-level information is added accordingly.

Other data

WWI casualties Taken from Verein für Computergenealogie (2024). Birth place locality strings are matched to coordinates in three steps: first, we apply an improved mapping provided to us by Sascha O. Becker and Hans-Joachim Voth. For non-matched strings, we use the original mapping in the data referring to the coordinates provided by 'The Historic Gazetteer' database (Verein für Computergenealogie, 2024*a*). Only records with valid birth place coordinates within the boundaries of Weimar Germany, date and casualty status 'tot' (dead) are kept. Using the coordinates, each record is assigned to a constituency and the data is subsequently collapsed at the constituency-year level. For large cities containing several constituencies (Berlin, Breslau, Dresden, Hamburg, Munich), casualty counts are distributed proportionately according to the 1871 population split.

Proximity to frontlines We obtained and geocoded maps of exact frontline locations around the pandemic onset provided in Stamps and Esposito (1950) from the website `www.firstworldwar.com`. The exact dates are August 30th 1918 for the Western front, March 3rd (Treaty of Brest-Litovsk) for the Eastern front, June 15th for the Souther (Italian) front and September 14th for the Balkan front. Based on the geocoded maps, we calculated the distance of each city or constituency centroid to the nearest point on each of the four frontlines.

Proximity to garrisons Pre-WWI locations of all garrisons within the German Empire are reported in the map provided by Ruhl (1914). We assigned each location a longitude-latitude coordinate and calculated the distance of each city or constituency centroid to the nearest listed garrison.

Proximity to coal deposit We use a digital map by Asch (2005) showing the geological strata (including subterranean coal beds) created during the Carboniferous period. We calculated the distance of each city or constituency centroid to the nearest point of the nearest strata.

Income and wealth distribution 1914 (Prussia) Calculated from Königlich Preussisches Statistisches Landesamt (1916). Data used: share of household heads with an income above 900, 3,000, 6,500, and 9,500 Marks and wealth above 6,000, 20,000, 52,000 and 100,000 Marks. Gini coefficients are calculated under the assumption of uniform distribution within income and wealth brackets.

Female WWI benefit eligibles Reported in Statistisches Reichsamt (1925). Data used: Number of female recipients of WWI-related benefits by insurance districts in 1924. Insurance districts were matched to counties using Reichsarbeitsministerium (1930).

Normalization Proximity data are aggregated to the district-level using a (1910) population-weighted average. Non-proximity data are aggregated at the constituency-level and normalized by the 1910 population.

D. Party classification

Table D.1 — Party coding

Election/Party group	Party names (English)	Party names (German)
1893-06-15		
Communist	*Not running*	*Not running*
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Poles; Other parties; Unaffiliated candidates; Splinter parties	Zentrum; Polen; Andere Parteien; Unbestimmt; Zersplittert
Liberal	National-Liberals; South German People's Party; Free-thinking People's Party; Free Thinkers' Union	Nationalliberale Partei; Süddeutsche Volkspartei; Freisinnige Volkspartei; Freisinnige Vereinigung
Conservative	German Conservatives; German Empire Party	Deutschkonservative Partei; Deutsche Reichspartei
Antisemitic	German Reform Party and Antisemites	Deutsche Reformpartei und Antisemiten
1898-06-16		
Communist	*Not running*	*Not running*
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Poles; Other parties; Unaffiliated candidates; Splinter parties	Zentrum; Polen; Andere Parteien; Unbestimmt; Zersplittert
Liberal	National-Liberals; German People's Party; Free-thinking People's Party; Free Thinkers' Union	Nationalliberale Partei; Deutsche Volkspartei; Freisinnige Volkspartei; Freisinnige Vereinigung
Conservative	German Conservatives; German Empire Party	Deutschkonservative Partei; Deutsche Reichspartei
Antisemitic	Antisemites; Farmers Union; Peasants Union	Antisemiten; Bund der Landwirte; Bauernbund
1903-06-16		
Communist	*Not running*	*Not running*
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Poles; Other parties; Unaffiliated candidates; Splinter parties	Zentrum; Polen; Andere Parteien; Unbestimmt; Zersplittert
Liberal	National-Liberals; German People's Party; Free-thinking People's Party; Free Thinkers' Union	Nationalliberale Partei; Deutsche Volkspartei; Freisinnige Volkspartei; Freisinnige Vereinigung
Conservative	German Conservatives; German Empire Party	Deutschkonservative Partei; Deutsche Reichspartei
Antisemitic	Antisemites; Farmers Union; Peasants Union	Antisemiten; Bund der Landwirte; Bauernbund
1907-01-25		
Communist	*Not running*	*Not running*
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Poles; Other parties; Unaffiliated candidates; Splinter parties	Zentrum; Polen; Andere Parteien; Unbestimmt; Zersplittert
Liberal	National-Liberals; German People's Party; Free-thinking People's Party; Free Thinkers' Union	Nationalliberale Partei; Deutsche Volkspartei; Freisinnige Volkspartei; Freisinnige Vereinigung
Conservative	German Conservatives; German Empire Party	Deutschkonservative Partei; Deutsche Reichspartei
Antisemitic	Federation of Farmers and Economic Union; German Reform Party, Antisemites and German Social Party	Bund der Landwirte und Wirtschaftliche Vereiningung; Deutsche Reformpartei, Antisemiten und Deutschsoziale Partei

Table D.1: Party coding (continued)

1912-01-12		
Communist	*Not running*	*Not running*
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Poles; Other parties; Unaffiliated candidates; Splinter parties	Zentrum; Polen; Andere Parteien; Unbestimmt; Zersplittert
Liberal	National-Liberals; Progressive People's Party	Nationalliberale Partei; Fortschrittliche Volkspartei
Conservative	German Conservatives; German Empire Party	Deutschkonservative Partei; Deutsche Reichspartei
Antisemitic	German Reform Party; Economic Union	Deutsche Reformpartei; Wirtschaftliche Vereiningung
1919-01-19		
Communist	Independent Social Democratic Party	Unabhängige Sozialdemokratische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Other parties	Zentrum; Andere Parteien
Liberal	German People's Party; German Democratic Party	Deutsche Volkspartei; Deutsche Demokratische Partei
Conservative	German National People's Party	Deutschnationale Volkspartei
Antisemitic	*Not running*	*Not running*
1920-06-06		
Communist	Communist Party of Germany; Independent Social Democratic Party	Kommunistische Partei Deutschlands; Unabhängige Sozialdemokratische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Bavarian People's Party; Bavarian Peasants' League; Polish Catholic Party of Upper Silesia, Lusatian People's Party and National Democratic People's Party; Other parties	Zentrum; Bayrische Volkspartei; Bayerischer Bauernbund; Polnisch-Katholische Partei Oberschlesiens, Lausitzer Volkspartei und Nationaldemokratische Volkspartei; Andere Parteien
Liberal	German People's Party; German Democratic Party	Deutsche Volkspartei; Deutsche Demokratische Partei
Conservative	German National People's Party	Deutschnationale Volkspartei
Antisemitic	German Middle Class Party	Deutsche Mittelstandspartei
1924-05-04		
Communist	Communist Party of Germany; Independent Social Democratic Party	Kommunistische Partei Deutschlands; Unabhängige Sozialdemokratische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Bavarian People's Party; Economic Party of the German Middle Class; Other parties	Zentrum; Bayrische Volkspartei; Wirtschaftspartei des deutschen Mittelstandes; Andere Parteien
Liberal	German People's Party; German Democratic Party	Deutsche Volkspartei; Deutsche Demokratische Partei
Conservative	German National People's Party	Deutschnationale Volkspartei
Antisemitic	German Social Party; German Völkisch Freedom Party	Deutschsoziale Partei; Deutschvölkische Freiheits-Partei

Table D.1: Party coding (continued)

1924-12-07		
Communist	Communist Party of Germany; Independent Social Democratic Party	Kommunistische Partei Deutschlands; Unabhängige Sozialdemokratische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party; Bavarian People's Party; Economic Party of the German Middle Class; Other parties	Zentrum; Bayrische Volkspartei; Wirtschaftspartei des deutschen Mittelstandes; Andere Parteien
Liberal	German People's Party; German Democratic Party	Deutsche Volkspartei; Deutsche Demokratische Partei
Conservative	German National People's Party	Deutschnationale Volkspartei
Antisemitic	German Social Party; National Socialist Freedom Movement	Deutschsoziale Partei; Nationalsozialistische Freiheitsbewegung
1928-05-20		
Communist	Communist Party of Germany	Kommunistische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party and Bavarian People's Party; German Farmers' Party; Reich Party of the German Middle Class; Reich Party for Civil Rights and Deflation; Other parties	Zentrum und Bayrische Volkspartei; Deutsche Bauernpartei; Wirtschaftspartei; Volksrechtpartei; Andere Parteien
Liberal	German People's Party; German Democratic Party	Deutsche Volkspartei; Deutsche Demokratische Partei
Conservative	German National People's Party; Christian-National Peasants' and Farmers' Party	Deutschnationale Volkspartei; Christlichnationale Bauern- und Landvolkpartei
Antisemitic	National Socialist German Workers' Party	Nationalsozialistische Deutsche Arbeiterpartei
1930-09-14		
Communist	Communist Party of Germany	Kommunistische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party and Bavarian People's Party; Reich Party of the German Middle Class; Other parties	Zentrum und Bayrische Volkspartei; Wirtschaftspartei; Andere Parteien
Liberal	German People's Party; German State Party	Deutsche Volkspartei; Deutsche Staatspartei
Conservative	German National People's Party; Christian-National Peasants' and Farmers' Party; Christian Social People's Service; Conservative People's Party	Deutschnationale Volkspartei; Christlichnationale Bauern- und Landvolkpartei; Christlich-Sozialer Volksdienst; Konservative Volkspartei
Antisemitic	National Socialist German Workers' Party	Nationalsozialistische Deutsche Arbeiterpartei
1932-07-31		
Communist	Communist Party of Germany	Kommunistische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party and Bavarian People's Party; Reich Party of the German Middle Class; Other parties	Zentrum und Bayrische Volkspartei; Wirtschaftspartei; Andere Parteien
Liberal	German People's Party; German State Party	Deutsche Volkspartei; Deutsche Staatspartei
Conservative	German National People's Party; Christian-National Peasants' and Farmers' Party; Christian Social People's Service	Deutschnationale Volkspartei; Christlichnationale Bauern- und Landvolkpartei; Christlich-Sozialer Volksdienst
Antisemitic	National Socialist German Workers' Party	Nationalsozialistische Deutsche Arbeiterpartei

Table D.1: Party coding (continued)

1932-11-06		
Communist	Communist Party of Germany	Kommunistische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party and Bavarian People's Party; German Farmers' Party; Reich Party of the German Middle Class; Other parties	Zentrum und Bayrische Volkspartei; Deutsche Bauernpartei; Wirtschaftspartei; Andere Parteien
Liberal	German People's Party; German State Party	Deutsche Volkspartei; Deutsche Staatspartei
Conservative	German National People's Party; Christian Social People's Service	Deutschnationale Volkspartei; Christlich-Sozialer Volksdienst
Antisemitic	National Socialist German Workers' Party	Nationalsozialistische Deutsche Arbeiterpartei
1933-03-05		
Communist	Communist Party of Germany	Kommunistische Partei Deutschlands
Socialist	Social Democratic Party	Sozialdemokratische Partei Deutschlands
Catholic-Minority	Centre Party and Bavarian People's Party; German Farmers' Party; German-Hanoverian Party; Other parties	Zentrum und Bayrische Volkspartei; Deutsche Bauernpartei; Deutsch-Hannoversche Partei; Andere Parteien
Liberal	German People's Party; German State Party	Deutsche Volkspartei; Deutsche Staatspartei
Conservative	Black-White-Red Struggle Front; Christian Social People's Service	Kampffront Schwarz-Weiß-Rot; Christlich-Sozialer Volksdienst
Antisemitic	National Socialist German Workers' Party	Nationalsozialistische Deutsche Arbeiterpartei

References

Asch, Kristine (2005), 'The 1:5 Million International Geological Map of Europe and Adjacent Areas'. Available at: https://www.bgr.bund.de/EN/Themen/Sammlungen-Grundlagen/GG_geol_Info/Karten/Europa/IGME5000/IGME_Project/IGME_Projectinfo.html.

Bleicher, Heinrich and Otto Most (1912), Finanzstatistische Hauptübersicht für das Jahr 1908, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 18, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 639–676.

Blum, Matthias and Alan de Bromhead (2019), 'Rise and fall in the Third Reich: Social advancement and Nazi membership', *European Economic Review* **120**(2), 103312.

Deutsche Bundesbank (2024), 'Kaufkraftäquivalente historischer Beträge in deutschen Währungen'. Available at: https://www.bundesbank.de/resource/blob/615162/94b87ff6d25eceb84c9cfb801162b334/mL/kaufkraftaequivalente-historischer-betraege-in-deutschen-waehrungen-data.pdf.

Falter, Jürgen W. and Dirk Hänisch (1990), Election and Social Data of the Districts and Municipalities of the German Empire from 1920 to 1933, Data file Version 1.0.0, Study No. ZA8013, GESIS Data Archive, Cologne.

Helbling, E. (1927), Die öffentliche Fürsorge im Jahre 1925, *in* Verband der deutschen Städtestatistiker, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 22, Friedrich Brandstetter, Leipzig, pp. 431–487.

Helbling, E. (1928), Die öffentliche Fürsorge im Jahre 1926, *in* Verband der deutschen Städtestatistiker, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 23, Friedrich Brandstetter, Leipzig, pp. 122–161.

Helbling, E. (1930), Die öffentliche Fürsorge: Ergebnisse der Reichsfürsorgestatistik für das Jahr 1928, *in* Verband der deutschen Städtestatistiker, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 25, Gustav Fischer, Jena, pp. 475–500.

Helbling, E. (1931), Die öffentliche Fürsorge: Ergebnisse der Reichsfürsorgestatistik für das Jahr 1929, *in* Verband der deutschen Städtestatistiker, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 26, Gustav Fischer, Jena, pp. 328–345.

ICPSR (1991), German Reichstag Election Data, 1871-1912, ICPSR Study 43, Inter-university Consortium for Political and Social Research, Ann Arbor, MI.

Kaiserliches Gesundheitsamt (1905), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1904', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **29**, 1361–1369.

Kaiserliches Gesundheitsamt (1906), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1905', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **30**, 1177–1185.

Kaiserliches Gesundheitsamt (1907), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1906', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **31**, 1245–1253.

Kaiserliches Gesundheitsamt (1908), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1907', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **32**, 1011–1020.

Kaiserliches Gesundheitsamt (1909), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1908', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **33**, 1109–1118.

Kaiserliches Gesundheitsamt (1910), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1909', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **34**, 947–956.

Kaiserliches Gesundheitsamt (1911), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1910', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **35**, 907–916.

Kaiserliches Gesundheitsamt (1912), 'Verbreitung des Heilpersonals usw. am 1. Mai 1909', *Medizinal-statistische Mitteilungen aus dem Kaiserlichen Gesundheitsamte (Beihefte zu den Veröffentlichungen des Kaiserlichen Gesundheitsamts)* **15**, 1*–367*.

Kaiserliches Gesundheitsamt (1913), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1912', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **37**, 823–833.

Kaiserliches Gesundheitsamt (1914), 'Nachweisung der Bevölkerungsvorgänge in deutschen Orten mit 15 000 und mehr Einwohnern im Jahre 1913', *Veröffentlichungen des Kaiserliches Gesundheitsamtes* **38**, 747–757.

Kaiserliches Statistisches Amt (1897), 'Die Bevölkerung der kleineren Verwaltungs-Bezirke am 2. Dezember 1895', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **6**(4), 182–204.

Kaiserliches Statistisches Amt (1899), 'Statistik der Reichtstagswahlen von 1898', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **8**(Supplement for 1).

Kaiserliches Statistisches Amt (1904), 'Allgemeine Statistik der Reichtstagswahlen von 1903', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **13**(Supplement for 1).

Kaiserliches Statistisches Amt (1906), 'Die Eheschließungen, Geborenen, Gestorbenen und der Geburtenüberschuß im Jahre 1904 nach Staaten und Landesteilen', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **15**(1), 116–119.

Kaiserliches Statistisches Amt (1907*a*), 'Die Eheschließungen, Geborenen, Gestorbenen und der Geburtenüberschuß im Jahre 1905 nach Staaten und Landesteilen', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **16**(1), 162–165.

Kaiserliches Statistisches Amt (1907*b*), 'Statistik der Reichtstagswahlen von 1907', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **16**(Supplement for 1).

Kaiserliches Statistisches Amt (1908), 'Die Eheschließungen, Geborenen, Gestorbenen und der Geburtenüberschuß im Jahre 1906 nach Staaten und Landesteilen', *Vierteljahreshefte zur Statistik des Deutschen Reichs* **17**(1), 130–133.

Kaiserliches Statistisches Amt (1909), *Bewegung der Bevölkerung im Jahre 1907*, Vol. 223 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1910), *Bewegung der Bevölkerung im Jahre 1908*, Vol. 227 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1911), *Bewegung der Bevölkerung im Jahre 1909*, Vol. 236 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1913*a*), *Bewegung der Bevölkerung im Jahre 1910*, Vol. 246 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1913*b*), *Bewegung der Bevölkerung im Jahre 1911*, Vol. 256 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1913*c*), *Die Reichtstagswahlen von 1912*, Vol. 250,3 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1915), *Die Volkszählung im Deutschen Reiche am 1. Dezember 1910*, Vol. 240 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt (1916), *Bewegung der Bevölkerung im Jahre 1912*, Vol. 266 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt, ed. (1903), *Die Volkszählung im Deutschen Reich am 1. Dezember 1900*, Vol. 150 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Kieseritzky, Ernst (1914), Finanzübersicht für das Jahr 1911, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 20, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 787–885.

Kieseritzky, Ernst (1916), Finanzübersicht für 1912, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 21, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 791–850.

Königlich Preussisches Statistisches Landesamt (1916), 'Stand und Bewegung der Bevölkerung im Jahresdurchschnitt 1909/1913 und Einkommens- und Vermögensgliederung im Steuerjahre 1914', *Statistisches Jahrbuch für den Preussischen Staat* **13**, 408–437.

Landsberg, Otto (1913), Armenpflege in den Jahren 1909 und 1910, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 19, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 656–692.

Landsberg, Otto (1914), Armenpflege im Jahre 1911, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 20, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 416–444.

Landsberg, Otto (1916), Armenpflege im Jahre 1912, *in* M.Neefe, ed., 'Statistisches Jahrbuch deutscher Städte', Vol. 21, Verlag von Wilhelm Gottlieb Korn, Breslau, pp. 78–105.

Preußisches Statistisches Landesamt (1921), 'Influenza (Grippe)', *Medizinalstatistische Nachrichten* **9**(2), 124–131.

Preußisches Statistisches Landesamt (1922), *Die Geburten, Eheschließungen und Sterbefälle im Freistaat Preußen während des Jahres 1919*, Vol. 265 of *Preußische Statistik*, Verlag des Preußischen Statistischen Landesamts, Berlin.

Rass, Christoph and René Rohrkamp (2009), The supraregional exploitation of individual-related sources on members of armed forces of the Third Reich. (German soldiers 1939 until 1945), Study No. ZA8410, GESIS Data Archive, Cologne.

Reichsarbeitsministerium (1930), 'Verzeichnis der Hauptversorgungsämter, Versorgungsämter und der sonstigen Dienststellen der Reichsversorgung mit ihren Bezirken: Stand am 1. Januar 1931'.

Reichsgesundheitsamt (1919), *Bevölkerungsstatistik der Kriegsjahre 1914-1918*, BArch R86/4486, Bundesarchiv.

Rübel, Gustav (1935), Finanzübersicht für 1933, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch Deutscher Gemeinden’, Vol. 30, Gustav Fischer, Jena, pp. 461–511.

Ruhl, Moritz, ed. (1914), *Garnison-Karte der Deutschen Armee*, Verlag von Moritz Ruhl, Leipzig.

Seutemann, Karl (1927), Finanz-übersicht nach den Voranschlägen für 1925, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch deutscher Städte’, Vol. 22, Friedrich Brandstetter, Leipzig, pp. 1–55.

Seutemann, Karl (1928), Finanzübersicht nach den Voranschlägen für 1927, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch deutscher Städte’, Vol. 23, Friedrich Brandstetter, Leipzig, pp. 290–346.

Seutemann, Karl (1929), Finanzübersicht nach den Voranschlägen für 1928, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch deutscher Städte’, Vol. 24, Friedrich Brandstetter, Leipzig, pp. 182–232.

Seutemann, Karl (1930), Finanzübersicht nach den Voranschlägen für 1929, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch deutscher Städte’, Vol. 25, Gustav Fischer, Jena, pp. 168–206.

Seutemann, Karl (1933), Finanzübersicht nach der Rechnung 1930, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch deutscher Städte’, Vol. 28, Gustav Fischer, Jena, pp. 189–234.

Seutemann, Karl (1934), Finanzübersicht nach der Rechnung 1931, *in* Verband der deutschen Städtestatistiker, ed., ‘Statistisches Jahrbuch Deutscher Gemeinden’, Vol. 29, Gustav Fischer, Jena, pp. 211–248.

Stamps, T. Dodson and Vincent J. Esposito, eds (1950), *A Short Military History of World War I*, United States Military Academy, Department of Military Art and Engineering, West Point.

Statistisches Reichsamt (1918*a*), *Bewegung der Bevölkerung im Jahre 1913*, Vol. 275 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Statistisches Reichsamt (1919), ‘Nachtrag zur Wahlstatistik’, *Vierteljahreshefte zur Statistik des Deutschen Reichs* **28**(4), 277–285.

Statistisches Reichsamt (1920), ‘Die Volkszählung am 8. Oktober 1919: Nachweisung der ortsanwesenden und der Wohnbevölkerung’, *Vierteljahreshefte zur Statistik des Deutschen Reichs* **29**(2), 134–145.

Statistisches Reichsamt (1922), *Bewegung der Bevölkerung in den Jahren 1914 bis 1919*, Vol. 276 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Statistisches Reichsamt (1924), *Bewegung der Bevölkerung in den Jahren 1920 und 1921 mit vorläufigen Angaben für die Jahre 1922 und 1923*, Vol. 307 of *Statistik des Deutschen Reichs*, Puttkammer & Mühlbrecht, Berlin.

Statistisches Reichsamt (1925), ‘Zahl der versorgungsberechtigten Kriegsbeschädigten und Kriegshinterbliebenen im Deutschen Reich nach der Erhebung vom 5. Oktober 1924’, *Vierteljahreshefte zur Statistik des Deutschen Reichs* **34**(4), 104–116.

Statistisches Reichsamt (1926), *Die Bewegung der Bevölkerung in den Jahren 1922 und 1923 und Die Ursachen der Sterbefälle in den Jahren 1920 bis 1923*, Vol. 316 of *Statistik des Deutschen Reichs*, Verlag von Reimar Hobbing, Berlin.

Statistisches Reichsamt (1930), *Die Bewegung der Bevölkerung in den Jahren 1925 bis 1927 mit vorläufigen Ergebnissen für die Jahre 1928 und 1929*, Vol. 360 of *Statistik des Deutschen Reichs*, Verlag von Reimar Hobbing, Berlin.

Statistisches Reichsamt (1931), *Die Bewegung der Bevölkerung in den Jahren 1928 und 1929 mit vorläufigen Ergebnissen für das Jahr 1930*, Vol. 393 of *Statistik des Deutschen Reichs*, Verlag von Reimar Hobbing, Berlin.

Statistisches Reichsamt (1933), *Die Bewegung der Bevölkerung im Jahre 1930 mit vorläufigen Ergebnissen für das Jahr 1931*, Vol. 423 of *Statistik des Deutschen Reichs*, Verlag von Reimar Hobbing, Berlin.

Statistisches Reichsamt (1934), *Die Bewegung der Bevölkerung im Jahre 1931 mit vorläufigen Ergebnissen für die Jahre 1932 und 1933*, Vol. 441 of *Statistik des Deutschen Reichs*, Verlag von Reimar Hobbing G.m.b.H., Berlin.

Statistisches Reichsamt (1938), *Die Bewegung der Bevölkerung in den Jahren 1932, 1933 und 1934 mit vorläufigen Ergebnissen für die Jahre 1935 bis 1937*, Vol. 495.1 of *Statistik des Deutschen Reichs*, Verlag für Sozialpolitik, Wirtschaft und Statistik, Paul Schmidt, Berlin.

Statistisches Reichsamt, ed. (1918*b*), *Hauptergebnisse der Volkszählung im Deutschen Reich am 5. Dezember 1917*, Reichsdruckerei, Berlin.

Verein für Computergenealogie (2024*a*), 'Nutzt Daten des Geschichtlichen Ortsverzeichnisses GOV, Version 2024/07/01'. Available at: http://gov.genealogy.net.

Verein für Computergenealogie (2024*b*), 'Verlustlisten Erster Weltkrieg'. Available at: http://wiki-de.genealogy.net/Verlustlisten_Erster_Weltkrieg.

Volkswirtschaftliche Abteilung des Kriegsernährungsamtes, ed. (1917*a*), *Die Gemeinden mit 10 000 und mehr Einwohnern nach der durch die Volkszählung am 1. Dezember 1916 festgestellten ortsanwesenden Bevölkerung*, Reichsdruckerei, Berlin.

Volkswirtschaftliche Abteilung des Kriegsernährungsamtes, ed. (1917*b*), *Die Gemeinden mit 10 000 und mehr Einwohnern nach der durch die Volkszählung am 1. Dezember 1916 festgestellten ortsanwesenden Bevölkerung*, Reichsdruckerei, Berlin.