A Lesson from History? The 1918 Inuenza pandemic and the rise of Italian Fascism: A cross-city quantitative and historical text qualitative analysis

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Objectives: Evidence linking past experiences of worsening health and support for radical political views has generated concerns about the consequences of the COVID-19 pandemic. The influenza pandemic that began in 1918 had a devastating impact on mortality. We test the hypothesis that deaths from the 1918 influenza pandemic contributed to the rise of fascism in Italy.

Study design: Cross-sectional study comparing votes for the Fascist party and other mainstream parties in Italian cities in the general election of April 1924, using data that Corbetta and Piretti collected from state archives with yearly cause-specific mortality data, taken from the Italian historical statistical books (*Statistica Delle Cause di Morte*, edited by the *Ministero per L'Industria, Il Commercio e Il Lavoro*).

Methods: We linked city-level regression models of Fascist vote shares in the 1924 election on changes in deaths from influenza in 1918 in 73 Italian cities, adjusting for socioeconomic factors, city-characteristics and regional dummies. To provide a 'thicker' interpretation of these quantitative patterns, we applied historical text mining to the newspaper *Il Popolo d'Italia* (Mussolini's newspaper).

Results: 4.1 million Italians contracted influenza and about 500,000 died. In cities with higher influenza death rates the Fascists gained higher vote shares. Each additional 1 influenza death/1,000 population was associated with a 3.12-percentage-point increase in vote share for the Fascist party in 1924 (95% confidence interval [CI] = 0.44 to 5.79). These results were consistent even after adjusting for casualties in World War I and indicators of social conflicts and economic hardship. There was no association between higher mortality and vote share for the Socialist or Communist parties. Historical archival analysis also shows how the Fascists exploited the pandemic for political gain.

Conclusions: Death rates from influenza in Italian cities were associated with a higher share of votes for the Fascist party. Our observations are consistent with evidence from other contexts that worsening mortality rates can fuel radical politics. Unequal impacts of pandemics may have polarizing political consequences.

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1 Introduction

Are those living in communities experiencing rising death rates more likely to turn to radical politicians? A growing body of evidence suggests that they are. In the United States, Bor and colleagues found that those counties where life expectancy stagnated or declined between 1980 and 2014 were more likely to swing toward support for Donald Trump in the 2016 presidential election.[1–4] Communities experiencing worsening health in the UK has also been associated with support for Brexit.[5–7] The same association also holds in different historical settings. For instance, worsening mortality rates in German localities in the early 1930s were positively associated with the rise of the Nazi Party[8,9] and influenza deaths in 1918 also correlated with the Nazi electoral boost.[10]

Given these examples, there are some concerns that the COVID-19 pandemic could further boost populist parties that have been attracting growing support in some countries since the global financial crisis. The risks are clear; in many countries the pandemic has precipitated the biggest health, economic and social crisis since World War II and some researchers have suggested that democracies have fared worse that autocracies.[11] In addition, some populist politicians (like Jair Bolsonaro in Brazil) have exploited the crisis by sowing divisions in society, creating cleavages between young and old, immigrants and established populations, and the rich and poor. Others, such as India's Narendra Modi, have used the crisis to consolidate their power and suppress opposing voices.[12]

Here we test the relationship between the health consequences of a pandemic and support for fascism using a unique historical case: the rise of fascism in Italy that occurred in the aftermath of the 1918 influenza pandemic. It was devastating, infecting 4.1 million Italians, among them Mussolini's wife Rachele,[13] 500,000 of whom died (Figure 1). For comparison, as of June 2021, in several waves, COVID-19 had infected 4.2 million Italians of which 127,000 died. Since the beginning of the COVID-19 there has been a renewed interest in the 1918 pandemic. Yet while most articles have examined the economic aspects of, and governmental responses to, the pandemic,[14–17] there has been relatively little written on the political consequences of high death rates at that time. The Italian case is particularly important, as Italy was the first European nation to turn to authoritarianism during the Inter-War period (with Spain, Greece, Germany and others following later).

[Figure 1 about here]

To test the hypothesis that communities experiencing influenza deaths saw greater support for the Fascists, we collected historical cause specific-mortality data and linked it to vote shares for Fascist party in 73 Italian cities in the 1924 election.

2 Methods

We obtained official city-level data on voting patterns for the Fascist party and its main political competitors, in the general election of April 1924, using data from Corbetta and Piretti[18] and originally collected from official local state archives and historical newspapers

(N=73). Further details are in Appendix A, showing the location and spatial distribution of the cities. Ideally, we would look at election outcomes over time, but we are restricted to just one election (1924). Although the Fascist party was created in 1919, in the election of that year the fascists presented candidates in only a few electoral districts and in 1921 they were part of the *Blocchi Nazionali* (a coalition of moderate and conservative parties). Hence it was difficult to capture local fascist support before 1924.

Fascist support is measured as the ratio of the number of votes for the Fascist party (*Partito Nazionale Fascista*) to the total number of votes cast in the 1924 election. For the 73 cities included, we manually extracted cause-specific mortality data for each year from 1916 to 1924 the statistical books *Statistica Delle Cause di Morte*, edited by the *Ministero per L'Industria, Il Commercio e Il Lavoro*. Specifically, we collected data on city-level deaths from influenza and other leading causes of death, including from accidents (that correlate with the economic conditions in each city), cancer (used as a placebo, as there is a long lag between carcinogenesis and death), tuberculosis (to assess whether results are explained specifically by influenza or simply as part of worsening deaths from infectious and communicable diseases) and all deaths (to measure the overall worsening health). Because age-specific mortality data are unavailable at city level in historical Italian records, we expressed the number of deaths from each specific cause as the unstandardized rate per 1,000 population. Nonetheless, as we show in Appendix B, the pandemic had very little impact on older people and most deaths occurred between the ages of 20 and 39. Our regional fixed effects would have accounted for any time-invariant characteristics of the local age distribution however.

We employ multivariate regression models to adjust for several socioeconomic and demographic factors in the following way:

$$Fascist_{1924} = Spanish\ flu\ deaths_{c,t} + \Lambda' \mathrm{X}_{c,1924} + \gamma_s + \varepsilon_{c,t} \quad (1)$$

where *Fascist* is the ratio of the number of votes to the Fascist Party to the total number of votes cast in each city c in the 1924 election, *Spanish flu deaths* measures the size of the pandemic as the change in the deaths from influenza between 1916 and 1918 (being 1916 a pre-pandemic year) and per 1,000 population. $\Lambda'\mathrm{X}$ is a matrix of controls, γ_s denotes state-level fixed effects, absorbing much of the unobservable characteristics or the Italian states, and $\varepsilon_{c,t}$ is the error term. Since we are using a range of controls measured in different units, we standardize data to have a mean of zero and a standard deviation of one so coefficients across models are directly comparable. In all models we also cluster robust standard errors at the city level, through clustering at the higher levels of aggregation (i.e., province or state) displays the same levels of statistical significance. We also present R^2 values as a measure of goodness of fit.

We add city-level controls to adjust for economic decline and the local characteristics of the cities. The variable population (using data from the census of 1921) controls for the size of the city and to account for spatial autocorrelation we add its latitude and longitude.[19] We also control for the occupational and social structure of each city, with the share of workers in the primary sector, in industry, in liberal occupations and owners out of its total population. Occupational data are from the census of 1921. Similar to Acemoglu et al.[20] we control for World

War I soldier casualties (per 1,000 population) using data from the *Statistica Delle Cause di Morte*. Finally, we also proxy for economic downturn and the effects of the *Biennio Rosso* (a period of intense social conflict between 1919 and 1920). We control for the city's fiscal deficit and levels of unemployment (both measured in 1924 and expressed per capita). Fiscal deficit is the difference between total revenue and spending (i.e., spending beyond the city's means) measured in thousand *lire*, using a previously untapped data source: the *Annuario Statistico Delle Città Italiane* (edited by the *Confederazione Generale Enti Autarchici*). Unemployment rates in industry and agriculture are hand-collected from *I Conflitti del Lavoro in Italia and La Disoccupazione e L'Assicurazione conto la Disoccupazione in Italia* (both edited by the *Ministero Dell'Economia Nazionale*).

3 Results

Figure 2 depicts the positive and statistically significant unadjusted association of influenza deaths and proportions voting for the Fascist party (Pearson's r = 0.29; P < 0.001). Each increase of 1 death from influenza per 1,000 was associated with a 3.12-percentage-point increase in vote shares to the Fascist party in 1924 (95% confidence interval [CI] = 0.44, 5.79).

[Figure 2 about here]

Table 1 then shows the results of multivariate regression models presented in equation 1. Here, each one-standard-deviation increase in influenza death rates was associated with between one fifth to one quarter of one standard deviation of the dependent variable. Adjusting for the local characteristics of the cities (population size, occupation and occupational structure) attenuated the association but not significantly so. The effect of adding a control for World War I casualties is also limited. This variable might be colinear with influenza deaths as most soldiers who died in October and early November 1918, died from influenza rather than military action.[21] As reported in the fascist newspaper *Il Popolo d'Italia* (24 December 1918), "the influenza epidemic has killed many victims on victors and added a new massacre to that of the war; creating a threatening atmosphere". When we proxy for the lasting effects of the *Biennio Rosso*, both the fiscal deficit and unemployment increased standard errors, but results remained statistically significant (P<0.001). Overall, despite the importance of these factors, when all covariates were included in the final model, it only attenuated the association between influenza death rates and radical voting, as results remain highly statistically significant at 1% level of confidence (0.26, 95% CI = 0.10, 0.42). Finally, we also show the isolated effect of influenza deaths on the rise of Fascism. The association is not driven by a general worsening of mortality, as when we look at all deaths or non-influenza deaths, results are not statistically significant; reflecting the role of the Spanish flu as an important correlate.

Table 1: Association between changes in influenza and overall mortality death rates between 1916 and 1918, and vote share for the Fascist party in 1924.

	Deaths from influenza (△ 1916-1918)		All causes of death (△ 1916-1918)		All causes of death excl. influenza (△ 1916-1918)	
	B (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2
Unadjusted	0.23 (0.07, 0.39)	0.52	0.02 (-0.21, 0.25)	0.44	0.12 (-0.32, 0.55)	0.45
Population	0.24 (0.07, 0.40)	0.52	0.04 (-0.19, 0.27)	0.45	0.14 (-0.30, 0.59)	0.45
Location	0.22 (0.09, 0.36)	0.53	0.03 (-0.20, 0.27)	0.46	0.10 (-0.30, 0.50)	0.46
Occupational structure	0.21 (0.08, 0.34)	0.56	0.11 (-0.15, 0.36)	0.52	0.26 (-0.16, 0.68)	0.53
WW1 soldier casualties	0.24 (0.08, 0.40)	0.52	0.10 (-0.30, 0.51)	0.44	0.11 (-0.34, 0.57)	0.45
Fiscal deficit	0.24 (0.09, 0.40)	0.52	0.02 (-0.21, 0.25)	0.44	0.12 (-0.33, 0.57)	0.45
Unemployment	0.24 (0.08, 0.41)	0.53	0.03 (-0.21, 0.26)	0.45	0.12 (-0.30, 0.54)	0.45
Fully adjusted	0.26 (0.10, 0.42)	0.60	0.37 (-0.17, 0.91)	0.56	0.23 (-0.31, 0.78)	0.54

Note. CI = confidence interval. Parameter estimates are standardized regression coefficients to have a mean of zero and a stan-dard deviation of one, so coefficients across models are directly comparable, representing the vote share for the Fascist party in the 1924 election associated with an increase of 1 death per 100,000 population between 1916 and 1918. All models include state-level fixed effects with robust standard errors clustered at that city level. N=72.

We performed a series of robustness and sensitivity tests. First, in table 2, we predict the Fascist vote share in 1924 with deaths from influenza and other leading causes of death from 1916 to 1924 using yearly data in separate models. Only influenza mortality in the year 1918 predicts the vote share of the Fascist party (0.62, 95% CI = 0.26, 0.97). In none of the other years are deaths from influenza associated with Fascism. Thus, the association we are exploring is not just capturing worsening economic or environmental conditions, via communicable and infectious diseases in general, but the exogenous impact of influenza. The same appears to be true when looking at other important communicable causes of death like tuberculosis. As another placebo, we compare these patterns with causes of death that are less responsive to short-term social conditions, using deaths from cancer. Here, none of the models display statistically significant coefficients. Finally, we tested the association between Fascist vote shares and changes in overall mortality to provide reassurance that our findings are specific to deaths from influenza rather than simply reflecting broader mortality patterns.

Table 2: Association between influenza, cancer, tuberculosis and overall death rates between 1916 and 1918, and vote share for the Fascist party in 1924.

	All deaths		Influenza		Cancer		Tuberculosis	
	B (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2
1916	0.29 (-0.24, 0.83)	0.54	0.10 (-0.16, 0.37)	0.53	-0.12 (-0.61, 0.37)	0.53	0.12 (-0.36, 0.60)	0.53
1917	0.14 (-0.33, 0.61)	0.53	0.10 (-0.18, 0.37)	0.53	-0.17 (-0.48, 0.14)	0.53	-0.08 (-0.38, 0.23)	0.53
1918	0.39 (-0.14, 0.92)	0.56	0.62 (0.26, 0.97)	0.63	-0.14 (-0.44, 0.16)	0.53	-0.01 (-0.32, 0.30)	0.52
1919	-0.23 (-0.55, 0.08)	0.54	-0.24 (-0.50, 0.02)	0.55	-0.18 (-0.51, 0.15)	0.54	0.02 (-0.35, 0.40)	0.52
1920	0.16 (-0.41, 0.74)	0.53	0.01 (-0.42, 0.44)	0.52	-0.09 (-0.43, 0.26)	0.53	0.02 (-0.35, 0.39)	0.52
1921	0.03 (-0.23, 0.29)	0.53	0.04 (-0.18, 0.27)	0.53	-0.09 (-0.41, 0.22)	0.53	0.05 (-0.27, 0.37)	0.53
1922	0.07 (-0.14, 0.28)	0.53	0.12 (0.17, 0.40)	0.54	-0.07 (-0.39, 0.26)	0.53	0.07 (-0.23, 0.37)	0.53
1923	-0.00 (-0.28, 0.28)	0.52	0.16 (-0.13, 0.46)	0.54	-0.09 (-0.43, 0.25)	0.53	0.00 (-0.21, 0.22)	0.52
1924	0.07 (-0.18, 0.32)	0.53	0.20 (-0.15, 0.54)	0.55	-0.07 (-0.42, 0.28)	0.53	-0.06 (-0.33, 0.20)	0.53

Note. CI = confidence interval. Parameter estimates are standardized regression coefficients to have a mean of zero and a stan-dard deviation of one, so coefficients across models are directly comparable, representing the vote share for the Fascist party in the 1924 election associated with an increase of 1 death per 100,000 population between 1916 and 1924. Each model has been estimated independently and all models include state-level fixed effects with robust standard errors clustered at that city level. N=72.

Second, instead of models in levels presented in table 2, in Appendix C we also use equation 1 and measure t by the change between 1916 and 1919, between 1916 and 1920, and so on, to show that Fascism is only predicted by influenza deaths when we look at the change between pre-pandemic year (i.e., 1916 or 1917) and 1918 (the pandemic year), as subsequent pairs (1916-1919, 1916-1920, 1916-1921, etc.) have low predictive power. We tested nonlinearities by using a quadratic term and although the size of the coefficient is substantially reduced (0.05, 95% CI = 0.01, 0.10), together with the visual aid of a locally weighted smoother, we conclude that the assumption of linearity is largely appropriate. From table 1, we also weight the fully adjusted regression by the level of population in 1919, to emphasize the data from the larger cities and eliminate undue influence of smaller towns, with no material change in our results (0.20, 95% CI = 0.01, 0.39). Our bottom line is that the association between influenza mortality and Fascism persists even after adjusting for a range of factors. Certainly, it is not reflecting a common trend in overall mortality or deaths from infectious and communicable diseases, nor influenza years outside the pandemic year. This implies that pandemic influenza is not simply a proxy or mediator for a relationship between income and Fascist support.

To provide a 'thicker' interpretation of these quantitative findings, we used text mining in the newspaper *Il Popolo d'Italia* from the 1st of June 1918 until 31st July 1919. In Appendix D we also outline some anecdotical evidence showing that Mussolini was viewed as the man who could stop the pandemic.

Overall, we found that Mussolini's newspaper tended to: blame "others" for the pandemic, such as Spaniards (*Il Popolo d'Italia*, 13 June, 1918) and portrayed themselves as the voice of the common people against an out-of-touch 'elite', exploiting the health crisis for political gain. As an example of blaming others for political gain, at the height of the pandemic the newspaper said that "In Milan, there was a serious medical disorganization in via Palermo, where the current inept leaders... always arrive late, and given their habitual lethargy, they

had to say something on that" (6 October, 1918), while it argued that "the pandemic has affected many military wives leaving their poor children without assistance" (23 October, 1918).

On 14 April 1919, the fascists also said that "On the most important issues concerning the eight-hour day, we demanded an allowance for the flu epidemic" and denounced how "on the request of the special allowance requested for the flu epidemic... Minister Bonomi [from the Socialist party] has decided to replace it with an indemnity justified by the greater work in the last four years". When the pandemic stabilized, in the mid-1919, the fascists denounced its long-lasting consequences saying that "many people have suffered from the grippe, the Spanish grippe, the flu. Many did not succumb to this epidemic evil, but there are many who, although relatively favored, resent the terror of the evil and it is unknown if they will ever manage to get rid of it properly" (9 June, 1919). Beyond this qualitative evidence, a famous oddity of that time is that, *Il Duce*, replaced the handshake with the Roman salute, allowing for social distancing as he considered that the handshake was unhygienic and bourgeoise. Modern scholars like Acemoglu et al.,[20] are also of the opinion that "greater mortality from the Spanish flu pandemic... led to greater local Fascist Party activity".

4 Conclusion

Despite the renewed interest in the 1918 influenza pandemic as a frame of reference for anticipating potential effects of COVID-19, evidence of its impact has largely come from economic and social studies. Here we extended this work by looking at political outcomes and suggest a *prima facie* case for its contribution to the rise of populism: the Italian fascism. Our analysis shows a significant correlation between influenza deaths and vote share for the Fascist party in 1924, even after accounting for other determinants of the rise of Fascism.

As with all observational studies, our analysis had several important limitations. First, we were unable to adjust for the age distribution in cities, creating potential for error. However, our state fixed effects would have adjusted for any time-invariant characteristics of the age distribution. Second, our result rest on a balanced panel of 73 cities. While we lack complete national coverage, our data allow us to control for observables. Indeed, in these 73 cities we capture more than 65 percent of the total Italian population and still in the 1920s, Italy was a poorly developed agricultural economy.

Third, it could be that the same settings that in Acemoglu et al.[20] correlate with Socialist vote in 1919-1921 (such as casualty rates from World War I), do also correlate with the Fascist vote in 1924. However, in Appendix E we show that the Fascist party was the only party that managed to transform the pandemic experience into more votes. Neither parties on the left (the Socialists in the 1919 or 1921 elections) or far-left (the Communists), nor parties at the center (such as the Italian People's Party), saw gains in support. We interpret this as evidence that at times when people are suffering, they may be more open to the siren calls of right-wing radical populist parties. Finally, it is possible that a third, underlying factor

drove both influenza rises and Fascist vote shares. Recent research has shown that welfare generosity buffers the mortality-voting relationship.[1,8–9] Hence the observational analysis can only demonstrate correlation, rather than causal chains. However, whether or not influenza in 1918 was a direct cause of fascism, pandemics do appear to be early-warnings of political polarization.

Text Box 1

In 1922 the Italian fascists seized power with the March of Rome. They drew support from a broad spectrum, including the army and the business class. This was followed by the general elections of April 1924, in which the National Fascist Party won 65% of all votes. Multiple explanations exist for the rise of fascism. One is the so-called *Biennio Rosso* which occurred between 1919 and 1920,[22–24] a short-lived period of labor unrest, unemployment, and economic disruption. Another is the distributional battles between agricultural workers and land-owners,[25–26] and the support of large landowners not just in the South, but also in Northern areas such as Bologna and Ferrara.[27–29] Political instability also mattered, as between 1919 and 1922, the Italian parliament built five different coalitions, creating space for new parties, such as the Fascists in 1919, to emerge.[26] Other explanations point to the terror and violence instigated by the "black-shirts", a renewed sense of nationalism to reunify Italy, and the threat from Socialism and Bolshevism. Others highlight the high casualty rates during World War I, and especially returning soldiers with disabilities, giving rise to the term "*vittoria mutilata*". Acemoglu et al.[20] found that Italian Fascism benefited from the perceived threat of Socialism in the aftermath of WWI, which made many landowners and businesses turn to them.

Although an estimated 460,000 Italian soldiers died at the front during the Great War, often in terrible circumstances in the high mountain passes (out of a population of 36 million), the influenza pandemic killed no less than 410,000 Italians in 1918, rising to 466,000 when numbers are up to 1920 are included, with 4.5 million infected.[30–31] Despite the Great War and the Spanish flu were separate events (only overlapping during October and the first week of November of 1918), the 1918 pandemic is believed to have already killed 70,000 soldiers that were at the front or returning home at the time of the pandemic.[32]

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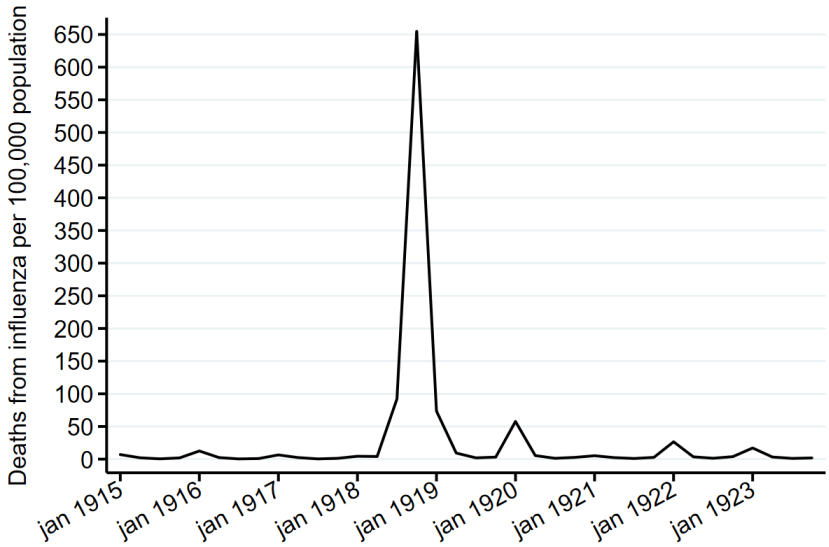
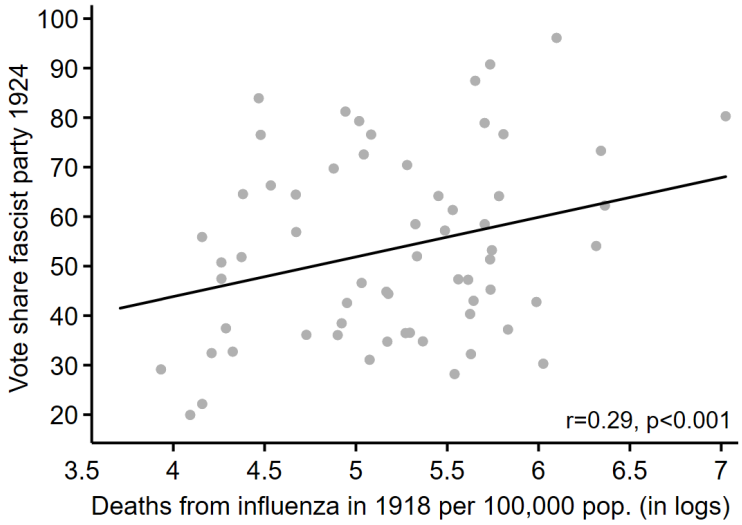
Figure 1: Quarterly deaths from Influenza per 100,000 population.



Quarterly mortality data from influenza are from *Statistica Delle Cause di Morte*, edited by the *Ministero per L'Industria, Il Commercio e Il Lavoro* (several issues), and yearly population data from the *Movimento Della Popolazione*, edited by the *Ministero Di Agricoltura, Industria e Commercio* (several issues). We linearly interpolate the yearly population data into the different quarters of the year.

Figure 2: Percentage of vote share to the Fascist party in the 1924 election by change in death rates from influenza between 1916 and 1918 (in logs) in the different Italian cities.



Appendix A: Spatial distribution of cities in our sample

Appendix B: Influenza mortality per 100,000 population by different age groups and age-adjusted mortality, 1915-1923.

	1 month		1-12 month2		1-4 years		5-9 years		10-19 years		20-39 years		40-59 years		60-79 years		+80 years		All	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1915	n/a	n/a	n/a	n/a	5,3	4,6	6,2	5,5	6,5	7,8	4,2	5	6,6	6,1	7,1	8	7,1	8	5,7	6,1
1916	n/a	n/a	n/a	n/a	6,9	6,6	9,1	9,2	7,7	9,4	4	7,3	8	8,3	9,8	12,2	10,3	11,6	7,7	8,8
1917	n/a	n/a	n/a	n/a	5,4	5,1	6,2	6,1	5,2	6,1	2,4	3,6	5,8	6,3	6,5	7,3	6,8	7,1	5,5	5,8
1918	60,1	62,3	216,6	234,7	367,8	409	n/a	n/a	425,7	472,4	879,8	478,9	248,9	273,5	71,5	92,9	22,1	26,4	215,6	264,8
1919	3,7	3,9	16,3	16,1	40,9	44,3	69,7	84,7	111,6	121,2	99,5	138,3	64,4	61,3	22,9	22,7	8,1	9,3	44,3	51,4
1920	2,9	2,9	12,2	10,3	31,3	32,3	48,6	51,8	77,7	70,5	70,2	97,8	55,2	55,7	27,7	27,7	11,7	12,3	33,7	38,7
1921	2,6	1,5	5,6	5,3	6,6	6,5	11	8,2	11,6	13,7	9,1	9	9,1	8,5	6	6,4	4,2	3,9	6,6	6,5
1922	4,1	4,2	15	13,2	22,7	19,9	21,9	21,2	25,5	24,3	21,4	26,1	27,8	25,9	22,9	24	17	14	20,2	20,3
1923	6	4,4	12,7	11,1	13	13	17,6	17,4	16,8	17,8	13,9	15,9	14,3	16,4	15,8	17,2	15	15,2	13,8	14,6

Note. The age-adjusted figures in column *All* need to be taken with care and just for descriptive purposes. First, at the beginning of the period the number of deaths from influenza in the 5-9 age group was unreported in the Italian historical statistics and it was subsumed in the age band 10-19. As a result, when calculating the age-adjusted data, we make an adjustment in the data and separate the number of deaths in the age groups 5-9 and 10-19 based on the age proportions in 1919. Second, also at the beginning of the period, the age-adjusted data are not taking into account the number of deaths below the age of 1, and for those between 1 and 12 months, since the data from 1915 and 1916 were unreported. Here we adjusted the number of deaths according to the proportion of deaths for the years 1919-1923. Age-specific population data are form the census of 1921 (Direzione Generale della Statistica. Censimento della popolazione del Regno d'Italia al 1. Dicembre 1921).

Appendix C: Association between changes in influenza between different pairs of years, and vote share for the Fascist party in 1924.

	Deaths from Influenza (△ 1916-1919)		Deaths from Influenza (△ 1916-1920)		Deaths from Influenza (△ 1916-1921)		Deaths from Influenza (△ 1916-1922)		Deaths from Influenza (△ 1916-1923)		Deaths from Influenza (△ 1916-1924)	
	B (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2	*B* (95% CI)	R^2
ADJ	-0.00 (-0.37,0.36)	0.53	0.06 (-0.16,0.28)	0.54	0.11 (-0.24,0.46)	0.54	0.18 (0.02,0.34)	0.57	0.12 (-0.11,0.35)	0.55	0.20 (-0.04,0.44)	0.57

Note. CI = confidence interval. Parameter estimates are standardized regression coefficients to have a mean of zero and a standard deviation of one, so coefficients across models are directly comparable, representing the vote share for the Fascist party in the 1924 election associated with an increase of 1 death per 100,000 population between different pairs of years as denoted by △ (△ = 1916-1919, 1916-1920,..., 1916-1924). If we take the change between 1916 and 1917 (△=1916-1917) results are also not statistically significant (0.09, 95% CI = -0.18, 0.36). All models include state-level fixed effects with robust standard errors clustered at that city level.

Appendix D: Punch Magazine Cartoon. Mussolini and Influenza, the "Big Sneeze"

NO ADMITTANCE.

SIGNOR MUSSOLINI (*to Influenza*). "GO AWAY! *I* AM THE BIG SNEEZE HERE."

[Extract from bulletin issued by the Health Section of the League of Nations:—"Italy reports: 'Sanitary conditions in kingdom excellent. No centres of epidemic influenza have so far been reported.'"]

Appendix E: Association between changes in influenza and overall mortality death rates between 1916 and 1918, and vote share for the Socialist party in 1921 and 1924, and the Communist and People's Party in 1924.

	Socialist vote share 1921		Socialist vote share 1924		Communist vote share 1924		People's party vote share 1924	
	Deaths from Influenza		Deaths from Influenza		Deaths from Influenza		Deaths from Influenza	
	△ 1916-1918		△ 1916-1918		△ 1916-1918		△ 1916-1918	
	N=72		N=72		N=72		N=72	
	B (95% CI)	R^2	B (95% CI)	R^2	B (95% CI)	R^2	B (95% CI)	R^2
Unadjusted	-0.01 (-0.12,0.10)	0.46	-0.09 (-0.25,0.07)	0.40	-0.01 (-0.14,0.11)	0.29	-0.18 (-0.41,0.06)	0.46
Population	-0.01 (-0.13,0.11)	0.47	-0.11 (-0.26,0.05)	0.50	0.00 (-0.10,0.11)	0.33	-0.18 (-0.39,0.03)	0.48
Location	-0.01 (-0.13,0.10)	0.46	-0.07 (-0.20,0.06)	0.49	-0.02 (-0.14,0.11)	0.29	-0.18 (-0.43,0.06)	0.47
Occupational	-0.00 (-0.13,0.12)	0.48	-0.07 (-0.20,0.07)	0.52	0.00 (-0.14,0.15)	0.31	-0.15 (-0.41,0.10)	0.52
WW1 sol.	-0.00 (-0.11,0.10)	0.46	-0.09 (-0.26,0.08)	0.40	-0.02 (-0.15,0.10)	0.30	-0.17 (-0.40,0.07)	0.47
Fiscal def.	0.00 (-0.12,0.13)	0.46	-0.12 (-0.27,0.04)	0.42	-0.00 (-0.12,0.12)	0.30	-0.17 (-0.42,0.08)	0.46
Unem	-0.01 (-0.13, 0.10)	0.44	-0.09 (-0.26,0.07)	0.40	-0.00 (-0.13,0.13)	0.31	-0.17 (-0.39,0.06)	0.47
Adjusted	0.06 (-0.08,0.20)	0.53	-0.10 (-0.26,0.06)	0.62	0.06 (-0.05,0.18)	0.40	-0.17 (-0.44,0.10)	0.56

Note. CI = confidence interval. Parameter estimates are standardized regression coefficients to have a mean of zero and a standard deviation of one, so coefficients across models are directly comparable, representing the vote share for the Socialist, Communist and People's Party in the 1924 election associated with an increase of 1 death per 100,000 population between 1916 and 1918. All models include state-level fixed effects with robust standard errors clustered at that city level.