Pandemics and Political Development: The Electoral Legacy of the Black Death in Germany

(Working Paper*)

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Abstract

Do pandemics have lasting consequences for political behavior? We address this question by examining the consequences of the most deadly pandemic of the last millennium: the Black Death (1347-1351). Our claim is that pandemics can influence politics in the long run if they impose sufficient loss of life so as to augment the price of labor relative to other factors of production. When this occurs, labor repressive regimes (such as serfdom) become untenable, which ultimately leads to the development of proto-democratic institutions and associated political cultures that shape modalities of political engagement for generations. We test our theory by tracing out the local consequences of the Black Death in German-speaking Central Europe. We find that areas hit hardest by the pandemic were more likely to: (1) adopt inclusive political institutions and equitable land ownership patterns; (2) exhibit electoral behavior indicating independence from landed elite influence during the transition to mass politics; and (3) have significantly lower vote shares for Hitler's National Socialist Party in the Weimar Republic's fateful 1930 and July 1932 elections.

* Comments are welcome.

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1 Introduction

Pandemics have shaped the course of human history, felling tottering empires, influencing colonization patterns, and endowing populations with competitive advantages. In specific circumstances, they can also restructure labor markets, with potentially drastic consequences for inequality and social organization.[1] Indeed, if the demographic shock imposed by a pandemic is sufficiently profound, it may fundamentally reconfigure the relative bargaining power of labor versus capital. This raises the possibility that pandemics may hold implications for the substance and conduct of politics in the long run.

This paper studies the long-term political impact of pandemic disease shocks by examining the localized consequences of the most deadly pandemic of the last millennium: the Black Death (1347-1351). The Black Death was an outbreak of plague that devastated Europe, resulting in a loss of life estimated at between thirty and sixty per cent of its total population. Figure 1 shows recorded outbreaks at the town level across the continent based on data by Remi Jedwab, Noel Johnson, and Mark Koyama.[2]

Among its many consequences, the Black Death radically altered relative factor prices. By culling the labor force but leaving land and capital assets intact, it transformed labor from an abundant to a scarce resource. The economic consequences were immediate and long-lasting.[3] For Western Europe, the pandemic ushered in an era of higher real wages—lasting approximately two hundred fifty years—along with a lessening of the obligations imposed on peasants in the manorial economy.[4]

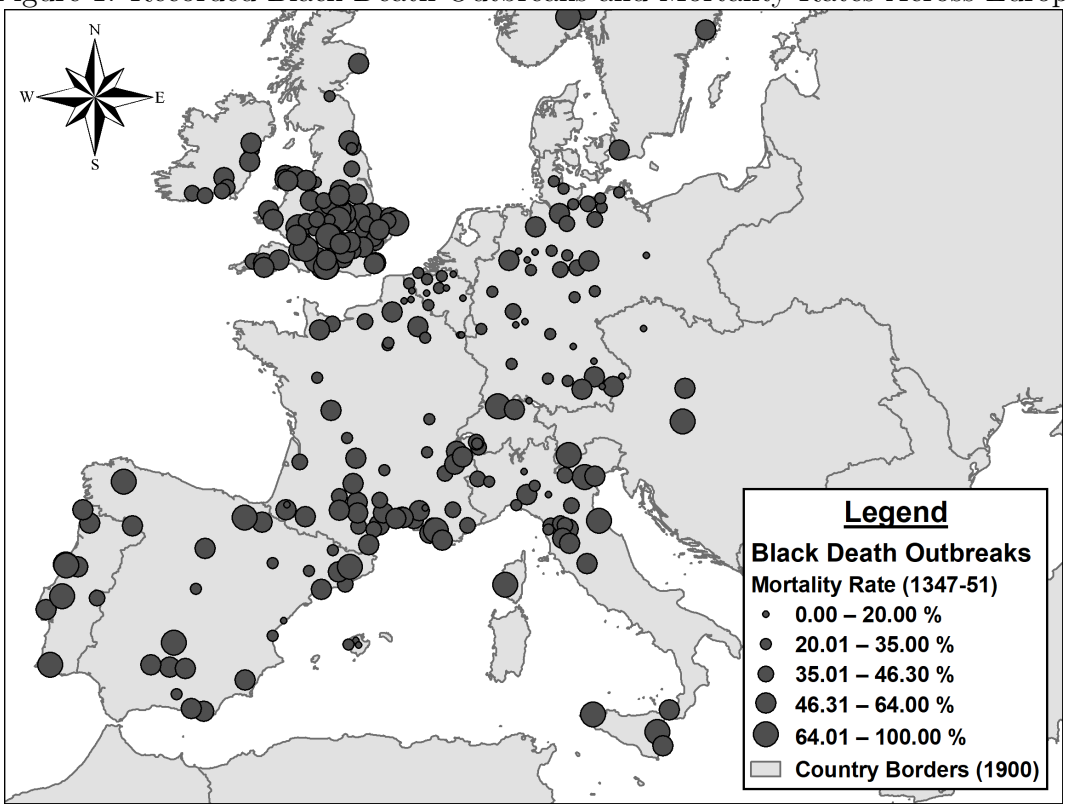
[1] Scheidel 2017.

[2] Jedwab, Johnson, and Koyama 2019a.

[3] The depth of the economic shock imparted by the Black Death may be unparalleled. Lead readings taken from an ice core in the Swiss-Italian Alps indicate that metal production during the Black Death outbreak was lower than at any other point in the last two thousand years of human history; More et al. 2017.

[4] Hilton 1969; Pamuk 2007.

Figure 1: Recorded Black Death Outbreaks and Mortality Rates Across Europe



The macro-level implications of the Black Death for economic development have been an object of inquiry for many years. Economic historians have argued that the Black Death led to the end of the Middle Age's so-called Malthusian trap, generating a shift from subsistence agriculture to economic production characterized by greater urbanization, increasing manufacturing capacity, technological development, and sustained growth.[5] These changes made possible the fiscal infrastructure necessary to support standing armies and create nation-states.[6] Given its epochal importance for economic organization, the Black Death is widely considered to have produced one of the most important critical junctures in recorded human history. Indeed, it is thought to be the starting point for what ultimately became large divergences in development between Western and Eastern Europe as well as Western Europe

[5]Postan 1966; Herlihy 1997; Voigtländer and Voth 2013.
[6]North and Thomas 1973.

and China.[7]

Due to the pioneering data collection effort of George Christakos and colleagues, the Black Death's local-level consequences have also recently become an object of scholarly inquiry.[8] Researchers have traced out the long-run consequences of Black Death intensity for city growth,[9] the timing of the demographic transition,[10] and the persecution of religious minorities.[11] Others have examined the impact of plague shocks more generally on public goods institutions that shape the accumulation of human capital.[12] These important advances notwithstanding, the Black Death's local-level consequences for political organization and behavior have yet to receive systematic empirical scrutiny.[13]

This is consistent with a general pattern of neglect within the discipline of political science. Despite the Black Death's prominent place in accounts of long-term economic development, it receives remarkably short shrift in treatments of the development of political representation and mass political behavior. For instance, the canonical investigation by Barrington Moore into the social origins of political regimes offers only a single passing reference to the Black Death (for the case of England);[14] the foundational study by Stein Rokkan of the origins of party politics in Europe ignores it entirely.[15] The classic political histories of European state formation are similarly neglectful of the Black Death: Joseph Strayer and Charles Tilly only mention it off-hand in general discussions of war and city growth.[16] There

[7] Acemoglu and Robinson 2012; Voigtländer and Voth 2013.
[8] Christakos et al. 2005.
[9] Jedwab, Johnson, and Koyama 2019b.
[10] Siuda and Sunde 2019.
[11] Finley and Koyama 2018; Jedwab, Johnson, and Koyama 2019a.
[12] Dittmar and Meisenzahl 2019.
[13] Naturally, historians have devoted considerable attention to the social and political consequences of the Black Death at the local level. However, their efforts concentrate on relatively narrow time horizons and do not exploit variation across localities to assess theories of how the Black Death shaped political development. For particularly rich local-level histories focusing on the case of England, see, *inter alia*, Mate 1984, Britnell 1990, Poos 1991, and Kissane 2017.
[14] Moore 1966.
[15] Rokkan 1970.
[16] Strayer 1973; Tilly 1990.

are exceptions: Margaret Peters studies the consequences of credit market access for patterns of labor coercion in the aftermath of the Black Death.[17] Yet consistent with earlier scholarship,[18] this work treats the Black Death as a uniform shock, concentrating its analyses on differences in initial conditions instead of the variegated impact of the disease.

We depart ways with existing scholarship by focusing systematically on the political implications of geographical variation in the loss of life caused by the Black Death. Specifically, using geocoded data on Black Death mortality rates, our paper examines the long-run socioeconomic and political consequences of localized Black Death exposure. The core of our study concentrates on the legacies of the Black Death for electoral behavior and land tenure patterns in Imperial Germany during the dawn of mass politics at the end of the nineteenth century. Additionally, we complement these findings with analyses that assess the effects of the Black Death at both earlier and later periods of history. For the pre-Reformation (pre-1517) period, we study the link between exposure to the Black Death and the emergence of early forms of participative institutions. For the period of full-fledged mass democracy (1918-1933), we identify the lingering effects of the democratic cultures bequeathed by the Black Death on patterns of voting behavior in the Weimar Republic.

The historical experience of the German cultural area is particularly apposite for evaluating the Black Death's long-term political consequences. This area was marked by significant regional variation in the mortality caused by the Black Death, making feasible the identification of distinct outcome patterns associated with differing levels of exposure to the outbreak. Equally important, there was no single, absolute ruler or other centralized political regime that governed the German-speaking territories. To the contrary, from the medieval period to the onset of Imperial Germany, the German-speaking parts of Europe were made up of a

[17] Peters 2018.
[18] Blum 1957; Brenner 1976.

decentralized patchwork of principalities, duchies, free cities, and other administrative units. This high level of decentralization created a context in which local political cultures, borne from the initial reactions to demographic collapse, had sufficient space to implant themselves and become more distinctive over time.

Our central contention is that the long-lived regional political cultures attributable to the Black Death significantly shaped patterns of political participation up until the early days of the German Empire's foundation and exhibited a weaker but still perceptible influence in the decades that followed. There are three steps in our argument.

First, differences in Black Death mortality led to differences in the persistence and depth of labor coercion during the early modern period (fourteenth/fifteenth centuries to late eighteenth century). In areas where the Black Death hit hard, elites were forced to abandon serfdom for an incipient free labor regime. By contrast, in areas where the toll of the Black Death was relatively mild, customary labor obligations were maintained (or even amplified).

Second, regional differences in the use of labor coercion, in turn, led to a divergence in socioeconomic and political organization. In areas where serfdom receded, the new freedoms granted to laborers encouraged the development of institutions for (limited) local self-government, produced greater employment outside of agriculture, and led to greater equality in landholding. In areas where serfdom was maintained or became more onerous, the development of participative institutions for local self-government was inhibited, the agricultural economy remained dominant, and high levels of inequality in landholding persisted over time.

Finally, with the advent of mass electoral politics in the late nineteenth century, the societal conditions generated by the distinct legacies of labor coercion shaped voters' electoral decisions. In the areas characterized by participatory institutions and relative equality, voters were inclined to reject the guidance of traditional elites, leading to weak support

for conservative parties and stronger support for liberal parties. Contrariwise, in the areas characterized by less inclusive institutions and high inequality, voters were more inclined to defer to the directives of traditional elites, leading to strong support for conservative parties and weaker support for liberal parties. Stated succinctly, strong Black Death shocks favored abbreviated experiences with serfdom, stronger self-government, and receptiveness to horizontally-oriented and inclusive political parties; contrariwise, weak Black Death shocks favored prolonged experiences with serfdom, weaker self-government, and receptiveness to parties with a hierarchical and illiberal orientation.

Our empirical findings are consistent with these expectations. Using district-level electoral data from the 1871 legislative elections of Imperial Germany, we find that geographical variation in exposure to the Black Death is strongly and negatively related to the percentage of the vote won by the Conservative Party—a party that was strongly antidemocratic in its means and ends. Moreover, we find that areas least affected by the Black Death were characterized by societal conditions in which the Conservative Party was likely to thrive. In particular, we find that landholding inequality in the late nineteenth century was significantly greater in areas with mild exposure to the Black Death than in areas where it had a profound impact.

In addition, our complementary analyses support both the tenor and mechanisms of our argument. The analysis of the pre-Reformation period provides evidence for our claim that the intensity of Black Death exposure was positively associated with subsequent *changes* in key aspects of political development. Specifically, we demonstrate that areas hit hard by the Black Death were more likely to experience the introduction of local participative elections from 1300 (pre-Black Death) to 1500 (post-Black Death) than areas that were not similarly affected. This gives us confidence that the Black Death encouraged the development of

distinctive regional political traditions that shaped political behavior in the long run. The analysis of the Weimar Republic, in turn, provides evidence that the link between Black Death exposure and support for illiberal parties is not an artifact of the idiosyncrasies of politics in early Imperial Germany. Examining spatial variation in the vote share of the Nazi party (*Nationalsozialistische Arbeiterpartei Deutschlands*, NSDAP) in the 1930 and July 1932 German federal parliamentary elections, we find that areas that had experienced high levels of exposure to the Black Death exhibited significantly lower levels of electoral support for the Nazis than areas that had experienced low levels of exposure. This gives us confidence that the regional political traditions that we attribute to the Black Death were robust and played a crucial role in German electoral politics during pivotal moments in the nation's history.

The remainder of this paper is organized as follows. First, we outline our contribution relative to existing studies of labor coercion and the long-run consequences of infectious diseases. Second, we provide a theory of how the Black Death impacted relative factor prices and the feasibility of labor coercion. Third, we introduce the empirical case and highlight the dimensions of greatest relevance to our study. Thereafter, we outline the framework of our empirical test. After a discussion of the results, we conclude and consider possible implications of our study.

2 Pandemics, Factor Prices, and Labor Coercion

Pandemics impose death, sometimes at a massive scale. When a pandemic produces a major demographic collapse, it can also change relative factor prices: the economic returns to *labor* versus *land* and/or *capital*. This may lead to substantial changes in economic and political organization. It is widely appreciated that differences in factor prices shape

economic inequality,[19] which, in turn, affects both the incidence of democracy[20] as well as the quality of democratic representation.[21]

In spite of the fact that factor prices are axes of social organization, pinpointing empirically how they shape political life can be challenging. As relative factor prices delimit the bargaining power of social groups, they both shape and are shaped by public policies.[22] The same can be said for political institutions, which structure how public policies are made.[23]

Since the causal arrow relating factor prices to policies and institutions goes in both directions, isolating the influence of the former requires one to identify an appropriate exogenous shock. The Black Death offers a good historical example of such a shock. Caused by the bacterium *Yersinia pestis* and transmitted to humans by infected rat fleas (and subsequently via human-to-human contact in its pneumonic strain), the etiology of the Black Death was completely unknown to medicine at the time.[24] Consequently, neither differences in rudimentary public health procedures nor preexisting levels of economic development appeared to determine its timing or intensity.[25] Proximity to trade routes was clearly important, but *conditional on trade exposure* plague mortality was nearly random.[26] Unlike contemporary pandemics, the Black Death did not overtly discriminate based on social status: It cut down both the wealthy and poor, claiming the lives of the King of Castile, large swathes of the clergy, and countless peasants.[27] At the same time, the intensity of the Black Death varied

[19] Piketty 2014; Piketty and Saez 2014.
[20] Boix 2003; Acemoglu and Robinson 2006; Ansell and Samuels 2014.
[21] Bartels 2008; Uslaner 2008; Gilens 2012.
[22] Hall and Soskice 2001; Beramendi and Anderson 2008; Rogowski 1989.
[23] Acemoglu 2010; Persson and Tabellini 2000.
[24] Snowden 2019, pp. 52–53, 69.
[25] Cf. Gottfried 1983; Christakos et al. 2005.
[26] Yue, Lee, and Wu 2017; Benedictow 2004. Importantly, the historical intensity of the plague was unrelated to the size of affected settlements, indicating that severe outbreaks occurred even in sparsely populated and rural areas; Campbell 2016, p. 303.
[27] While the plague's mortality rate was very high among the poorest, who were often malnourished and lived in poor sanitary conditions, better situated members of society were by no means excluded and also died in large numbers; Campbell 2016.

greatly across space.[28] These special features of the Black Death make it possible to discern the long-term influence of Black Death mortality, and, *ipso facto*, changes in relative factor prices, by employing a standard suite of econometric tools.

Our central claim is that, by increasing the price of labor relative to land, Black Death mortality shaped patterns of labor coercion and the long-term development of local political cultures. Extant studies offer two competing approaches for thinking about the starting point of this argument: the effect of changes in factor prices on labor coercion.

The standard account can be classified as the theory of "Malthusian Exit." According to this view, shocks that generate a high level of labor scarcity (increasing labor's shadow price) catalyze a series of economic and social changes that move a society away from a subsistence economy based on labor coercion to one with manufacturing potential based on free labor.[29] Specifically, the scarcity of labor improves the outside options of laborers, forcing elites to reduce coercive practices, which in turn creates greater and more variegated forms of consumption. As demand for manufactured goods increases, new technologies develop, urban areas expand, and the power of landed elites begins to wane. This theory is often invoked to explain Western Europe's development in the wake of the Black Death.

An alternative account can be classified as the theory of "Elite Reaction." In this account, elites respond to an increase in the scarcity of labor by doubling down on coercion.[30] In particular, elites utilize greater amounts of coercion to arrest the wage increases and improvements in living standards that would otherwise follow a reduction in labor force size. The overall system of labor coercion remains in place, with labor obligations and the policing of labor becoming only more burdensome. The agrarian economy remains supreme, techno-

[28] The German cities of Bremen and Nuremberg illustrate this fact. Although both were roughly the same size, Bremen lost between one half to two thirds of its population while Nuremberg only lost ten percent; Gottfried 1983, p. 68.

[29] Postan 1966; North and Thomas 1973; Voigtländer and Voth 2013.

[30] Cf. Blum 1957; Brenner 1976; Domar 1970.

logical innovation is suppressed, and the power of landed elites remains uncontested. This is the theory often invoked to explain the recrudescence of serfdom and underdevelopment in Eastern Europe in the wake of the Black Death.

In an important theoretical contribution, Daron Acemoglu and Alexander Wolitzky present a framework integrating the mechanisms underlying both accounts.[31] The framework's central implication is that the impact of labor scarcity on coercion depends on outside options of laborers versus the price of the landed elites' good. If the outside option effect dominates, then labor coercion will wane. However, if the value of the good produced by landed elites increases to a sufficiently high level, then coercion will become more intense.

Empirical studies that speak to the relative purchase of each theory are limited and offer contradictory findings.[32] In truth, much of the existing empirical work provides limited guidance for understanding the consequences of a labor market shock like that generated by the Black Death. This is because previous contributions are largely concerned with tracing out the consequences of variation in relative factor prices along the intensive margin, that is, for small amounts of change within the respective society. The Black Death, by contrast, generated change along the *extensive* margin. Indeed, at an aggregate level it was one of the largest—and possibly *the* largest—labor market shocks in recorded human history. As we will argue in the subsequent section, the depth of labor scarcity is important in understanding elite reaction to a labor supply shock. Reactions to minor shocks will not be the same as those to large ones.

The empirical findings of our paper about the long-term legacy of the Black Death contribute to a prominent literature on the economic and political consequences of infectious

[31] Acemoglu and Wolitzky 2011.

[32] For instance, the findings of Naidu and Yuchtman 2013 and Klein and Ogilvie 2017 are largely consistent with Elite Reaction theory, whereas those of Dippel, Greif, and Trefler 2016 and Ardanaz and Mares 2014 are consistent with the logic of Malthusian Exit theory.

diseases. The incidence of infectious diseases has been tied to low levels of labor productivity and investment, and ultimately to the emergence of 'poverty traps' in tropical areas.[33] Exposure to disease for populations in utero creates developmental disabilities that reduce levels of educational attainment, an important contributor to economic growth.[34] In a long-term perspective, diseases may also determine the composition and behavior of the ruling elite. According to Jared Diamond, the immunological advantages conferred upon Europeans by living in proximity to livestock (and suffering through repeated disease waves) partially explain the ease with which they were able to conquer the Americas.[35]

More directly related to the paper at hand, Acemoglu, Simon Johnson, and James Robinson argue that the disease environment at the time of colonization determined the types of institutions colonizers implanted in their colonies, thereby shaping the quality of government and prospects for economic development in the long run.[36] Our study can be seen as a natural complement to theirs. Whereas they demonstrate that diseases can affect political development via the external imposition of institutions, we demonstrate that diseases can also catalyze processes of institutional change that are internal to societies.

Our paper is also linked to a contribution by Emily Sellars and Jennifer Alix-Garcia, who study how disease-driven demographic collapse in colonial Mexico shaped land tenure patterns. Contrary to the tenor of our findings for the Black Death, the authors find that landed estates in 1900 were more prominent in areas that had previously experienced a population collapse.[37] We attribute the differences in our findings to distinct starting points: Whereas indigenous communities held substantial land in early colonial Mexico, the manorial economy (dominated by landed elites) was more or less a constant in medieval Europe. Given the

[33] Sachs and Warner 1997; Gallup and Sachs 2001; Bonds et al. 2010.
[34] Almond 2006.
[35] Diamond 1998.
[36] Acemoglu, Johnson, and Robinson 2001.
[37] Sellars and Alix-Garcia 2018.

pre-Black Death land ownership structure encountered in German-speaking Central Europe, it follows that the primary consequence of population decline would be an increase in labor's bargaining power.

In examining how demographic change reshapes social and political organization in agrarian societies, our paper also contributes to the study of landed elite power and its implications for democracy. Historical investigations of political change have long emphasized that the economic and political power of the landed elite tends to delay or preclude the transition to democracy.[38] Moreover, for countries that have already made the transition, the presence of a powerful landed elite fundamentally shapes the manner in which elections are contested.

Practices such as clientelism and vote brokerage are held to be especially effective in contexts in which landed elites employ a large segment of the labor force.[39] Consequently, in agrarian settings with dominant landowners, voters are often induced to vote for the politicians that elites prefer, typically conservative politicians inclined to defend the extant property rights regime.[40] Our contribution to this literature is to endogenize the sources of landed elite power in a long-term historical perspective. Specifically, we show how shocks to the labor supply can undermine the landed elite's political influence. In so doing, we offer a novel account of the historical genesis of programmatic versus clientelistic linkages between citizens and politicians.[41]

Finally, our paper contributes to the literature on how patterns of labor coercion shape political development in the long-run. Influential treatments of the subject have long emphasized that traditions of servile labor inhibit state building and/or dampen the prospects for democracy.[42] Following in these footsteps, a recent wave of empirical scholarship ex-

[38] Moore 1966; Rueschemeyer, Stephens, and Stephens 1992; Ziblatt 2008.
[39] Scott 1972; Stokes et al. 2013; Anderson, Francois, and Kotwal 2015.
[40] Baland and Robinson 2008; Gingerich and Medeiros 2020; Gingerich 2020; Mares 2015.
[41] Cf. Kitschelt and Wilkinson 2007.
[42] Anderson 1974; Kurtz 2013; Mahoney 2001; Mahoney 2010.

plores how legacies of specific of types of labor coercion—serfdom, slavery, and forced labor drafts—shape norms and political behavior[43] as well as patterns of economic activity.[44] Of a piece with this scholarly agenda, our work seeks to deepen understanding of the political consequences of serfdom by tracing out the repercussions of a plausibly exogenous shock to this institution: mortality due to the Black Death.

3 The Long-Term Implications of Labor Supply Shocks for Electoral Behavior

In this section of the paper, we explicate the theoretical mechanisms tying labor supply shocks to long-run electoral behavior. Our starting point is the premise that the magnitude of the initial shock is crucial. Labor supply shocks that are sufficiently profound create a new institutional equilibrium that recasts the relationship between lord and peasant, producing more inclusive modes of political engagement that, in the long run, structure mass political behavior. Labor supply shocks that are weaker lead to a retrenchment of socioeconomic hierarchies and obligations, producing exclusionary modes of political engagement that also structure mass political behavior, albeit in a very different way.

Consider the relationship between labor supply shocks and labor coercion. If a demographic collapse radically reduces the labor supply, then this has two immediate consequences. First, the shadow price of the coerced worker's labor skyrockets.[45] The economic returns to work outside the manor to which the laborer is bound become much greater, so the attractiveness of risking punishment by seeking employment elsewhere increases signif-

[43]Nunn and Wantchekon 2011; Lowes and Montero 2017; Acharya, Blackwell, and Sen 2018.

[44]Dell 2010; Markevich and Zhuravskaya 2018; Buggle and Nafziger 2019.

[45]In England, the Black Death led to an immediate increase of fifty percent in the real wages of farm workers; Campbell 2016, p. 310.

icantly. For the elites, keeping what remains of the labor force in place requires either an increase in wages (and a lessening of customary obligations) or greater investment in the monitoring and punishment of laborers. Given economies of scale in policing labor, the per-laborer cost of dissuading exit through coercion will be exorbitantly high. Thus, unless labor productivity increases immensely as a consequence of the shock, movement towards an incipient free wage regime will be seen by elites as the least detrimental option.

The second consequence of a negative labor supply shock concerns the prospects for coordination among agrarian elites. Given the reality of a decimated labor force, the competition among elites for laborers will be quite intense: Success or failure in poaching the labor of neighboring manors may mean the difference between bringing a crop to harvest or having it rot in the fields. Consequently, to keep wages low and laborers on their manors, elites must expend significant effort in creating and policing an anti-poaching cartel among themselves. The larger the shock, however, the greater the returns to each member of the elite from defecting from the cartel. Thus, for a sufficiently large shock, maintaining the anti-poaching cartel will be next to impossible. An incipient free wage regime emerges by default.

If the shock to the labor supply is relatively minor, then these dynamics will be very different. With only a moderate reduction in the labor force, the returns to laborers from fleeing their manors will be smaller and for elites the per-laborer cost of dissuading exit through coercion will be much more manageable. Moreover, given the smaller returns to elites from poaching the laborers of their peers, it will be feasible to sustain a cartel. Consequently, whereas large labor supply shocks will prompt an early exit from labor coercion, smaller shocks will be associated with its persistence.

The abandonment or persistence of labor coercion, in turn, has implications for economic, social, and political organization. In settings where labor coercion has diminished, the free-

dom of movement for laborers contributes to greater urbanization as well as a restructuring of relationships in the countryside. With greater urbanization and higher living standards comes the development of new technologies that jump-start new forms of manufacturing (such as textile production or the production of books based on moveable type). Overall, the weight of agriculture in the economy diminishes. Agricultural production itself shifts away from the classic manorial model where land and property rights are vested solely in elites to one in which land rights become more widely shared. The roots of a system of small farming are established, and formerly gaping inequalities in landownership become more modest.[46] The improvements in employment opportunities and diversification of property rights naturally lead to a more variegated social structure and a populace characterized by greater heterogeneity of preferences. The new social groups, in turn, demand channels for the representation of their interests. At the local level, this leads to the development of institutions such as the election of mayors and town councils, providing for a (limited form) of self-government. Although traditional elites frequently enjoy initial veto power over such institutions, their very existence encourages non-elite coordination and demand-making.[47] The seeds for autonomous political participation are thus sown.

In settings where labor coercion persists unabated over a long period of time, the aforementioned occurrences do not come to pass. Peasants remain tied to the land and urban areas are small and few and far between. The adoption of technological innovations, to the extent that these emerge from elsewhere, is actively discouraged by the traditional elites. Land tenure patterns evolve at a glacial pace, if they evolve at all. True political power remains vested in the landed aristocracy, which perpetuates its status through the use of

[46] See Alfani, Gierok, and Schaff 2020 for direct evidence on the reduction in wealth inequality in German-speaking Europe following the Black Death. Similar evidence is provided by Alfani 2015 and Alfani and Ammannati 2017 for the Piedmont and Tuscany regions of Italy, respectively.

[47] Cf. Giuliano and Nunn 2013.

enforcers deployed to police labor. The economy gravitates around agriculture, which in turn is dominated by a small number of large landholdings. Institutions designed to channel the demands of non-elite actors are unlikely to emerge, and if they do, they perish quickly. The great mass of the citizenry gains little or no experience in advocating for their own interests, and most certainly not in a way that might conflict with the desires of the agrarian elite. In this context, the prospects for autonomous political participation are dim.

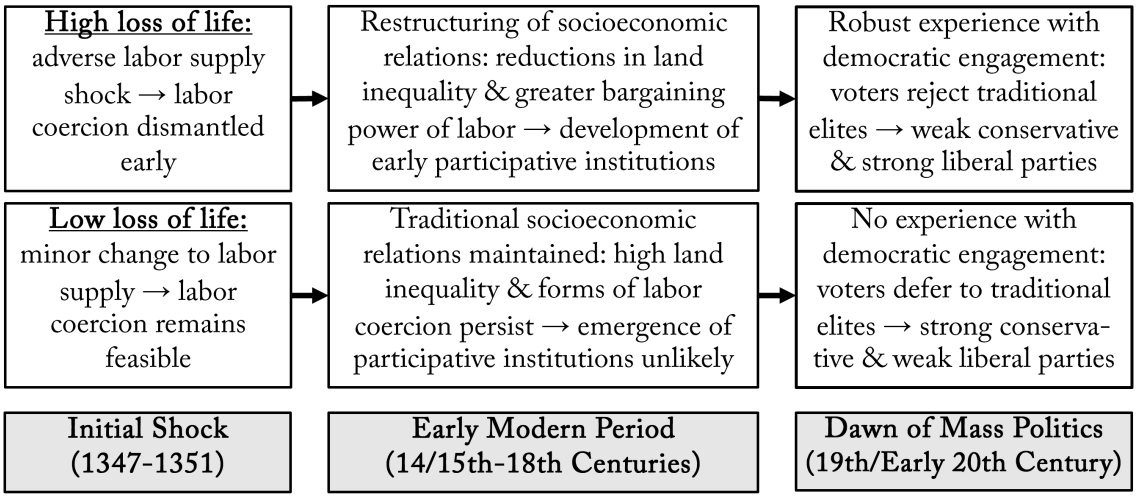
The divergent paths of labor coercion that emerge in the wake of labor supply shocks create very different environments for the practice of electoral politics once the era of mass politics begins. Areas where labor coercion was dismantled early differ from those where it persisted over time in four crucial ways. First, early reforming areas have more differentiated economies, giving more voters viable employment opportunities outside of their current job. As a consequence, they will not so easily be intimidated by employers who wish to sway their votes one way or another.[48] Second, the opportunities afforded to laborers in early reforming areas encourage greater human capital development, and in particular, higher levels of education. As a result, voters are more likely to be politically engaged, with greater awareness of what their political options are and a keener sense of how different contenders do or do not reflect their interests.[49] Third, because of the legacies of labor coercion for urbanization, voters in early reforming areas are likely to be located in more densely populated communities than those in late reforming areas. Greater population density makes it more difficult for traditional elites to monitor and profit from clientelistic exchanges, thereby limiting the influence of material inducements on voting patterns.[50] Finally, and arguably most importantly, due to the erosion of traditional socioeconomic hierarchies in early reforming areas, voters in these areas are less likely to adhere to norms dictating deference to elites. Among

[48] Cf. Frye, Reuter, and Szakonyi 2014; Mares 2015.
[49] Dee 2004; Milligan, Moretti, and Oreopoulos 2004; Sondheimer and Green 2010.
[50] Brusco, Nazareno, and Stokes 2004; Gingerich and Medina 2013.

such norms are norms of reciprocity, which have historically facilitated the ability of local elites to guide the electoral choices of voters.[51] Seen more broadly, such deference norms reflect political cultures in which citizens view themselves as the subjects of political and economic elites, a state of affairs conducive to the growth of illiberal political movements.[52]

To summarize, the societal context bequeathed by the early erosion of labor coercion is one where, in the long run, voters (1) have a clear sense of for whom they would prefer to vote; (2) enjoy the economic and cultural autonomy to vote as they wish. In contrast, the societal context bequeathed by the late or incomplete erosion of labor coercion is one where voters ultimately neither have strong preferences over contending political forces nor the wherewithal to resist the voting instructions of traditional elites. Figure 2 summarizes the theory.[53]

Figure 2: Long-Term Consequences of the Black Death



[51] Finan and Schechter 2012; Lawson and Greene 2014.

[52] Lewin 1943; Almond and Verba 1963.

[53] In the supplementary material, we apply this theoretical framework to an extended historical discussion of Black Death severity, the evolution of serfdom, and the development of distinctive political traditions across various regions in German-speaking Central Europe. The reader interested in a more comprehensive understanding of how our proposed mechanisms operated over time in specific principalities in the German-speaking lands will find a wealth of detail in that section.

4 Background on the Case of Germany

The subject of our empirical analysis is an area in Central Europe that, in the present-day, is mostly referred to as Germany. For nearly the entire time period under consideration (the fourteenth to nineteenth centuries), however, "Germany" remained politically fragmented. Because of the Holy Roman Empire's status as a confederation—as opposed to a centralized nation-state—Germany can also be understood as a *cultural entity*, united primarily by a common language and shared customs.

4.1 Rationale for Case Selection

There are two primary reasons for concentrating on this geographic area. The first is significant regional variation in the Black Death's intensity. Much of Germany's west, southwest, and parts of the north were subject to devastating outbreaks while many towns and settlements in the easternmost parts were relatively unaffected.

The second reason is Germany's historically high level of political decentralization, allowing local traditions to persist over extensive time periods.[54] In fact, Germany remained split into *hundreds* of principalities, city-states, kingdoms, and other administrative units. This combination makes Germany the ideal case for studying the pandemic's long-term effects. While in other countries, such as France and Britain, a central state was able to supplant local institutions, in Germany diverging local political traditions had ample space to survive until at least the late nineteenth century—and possibly beyond.

[54] Blanning 2012; Frost 2012; Wilson 2003.

4.2 Imperial Germany: Socioeconomic Conditions and Political Outcomes

In 1871, following the *Wars of German Unification* (1864-1871), Prussia united most of the German cultural region (excluding Austria) under a single political system known as "Imperial Germany" or the "German Empire." Based on our theory about the social transformation associated with the Black Death, we use this case to investigate long-term variation in both (1) fundamental socioeconomic structures and (2) local political behavior. Since both outcomes reflect aspects of long-term political-economic equilibria affected by Black Death exposure, their combined analysis is of prime importance to our argument.

In terms of socioeconomic structures, we focus on the level of landholding inequality. This feature of society is often deeply rooted in historical events. Where land inequality is high, a small number of landholders have a disproportionate share of property in the agricultural sector, indicating that it is more elite-dominated. Such elite domination of rural property rights is often associated with elite domination of politics.[55]

In terms of political outcomes, we consider voting behavior in elections of the Imperial Diet (*Reichstag*), the lower chamber of the Empire's legislature. Although it was less powerful than many present-day parliaments, its elections generated intense public interest. Importantly, the *formal* conditions of the elections (electoral rules, voting age, suffrage restrictions) were homogeneous across Germany, making it suitable for a cross-sectional analysis.[56] Two outcomes are of greatest interest to us: (1) the vote share that the Conservative party received in 1871[57] and (2) the number of electoral disputes between 1871 and 1912,

[55] Ziblatt 2008; Ziblatt 2009. Since the socioeconomic relevance of land inequality could be affected by the overall economic importance of agriculture, we account for this possibility in an extension in the supplementary material.

[56] Formally, all males aged 25 or above were allowed to give a direct and secret vote in a majoritarian single-member district electoral system.

[57] In the supplementary material, we also analyze the electoral results of other parties as well as the 1874 election.

with the latter indicating violations of electoral rules (typically by elites) and being studied extensively by Daniel Ziblatt as well as Isabela Mares and Boliang Zhu.[58] Electoral disputes arise when formal democratic procedures are undermined in some form (e.g., through coercion, clientelism, or threats to voters). Where such disputes occur at a high frequency, they indicate elite domination of politics and a poorly developed democratic culture.

We focus on the Conservative Party of the early 1870s because it was inherently elitist in both means and ends. Its stated goal was to defend traditional social structures, i.e. the privileged position of the landed elites. Moreover, in line with its historical roots, it turned against popular democracy, resisted the socioeconomic changes caused by industrialization, and railed against national unification, as the latter was perceived to threaten the aristocracy.[59] Although the party ran in formally democratic elections, the landed elites used intimidation, clientelism, and the coerced mobilization of agricultural workers to improve their chances of victory.[60]

As such tactics demonstrate, while formal electoral regulations were the same across Germany, local socioeconomic conditions and political norms varied significantly.[61] This diversity also led to variation in the parties that ran across different districts.[62] In some districts, parties did not encounter the necessary socioeconomic conditions or political traditions to be viable competitors.[63] For the Conservative Party, the socioeconomic and political structures associated with high landholding inequality—reflecting an institutional equilibrium

[58] Ziblatt 2009; Mares and Zhu 2015.

[59] Anderson 2000, Ch. 6; Berdahl 1972, esp. pp. 3-4, 18; Berdahl 1988; Eley 1986; Retallack 1988, pp. 13–14; Retallack 2006. This was especially true for 1871, when the Conservative Party still endorsed an "estate society." Yet the incompatibility of the party's stance with capitalist development led it to give up on this goal, as expressed in the party's reorganization in 1876 as the "German Conservative Party"; Berdahl 1972, pp. 2–3.

[60] Anderson 1993; Anderson 2000, Ch. 6; Mares 2015, Ch. 3-5; Nipperdey 1961, Ch. 5.

[61] Eley 1986.

[62] Sperber 1997, pp. 26, 114.

[63] This is likely one of the reasons for why the Conservative Party chose to not nominate candidates in many urban settings; cf. Nipperdey 1961, p. 247.

that facilitated abuses of power and undermined democratic elections—were a key factor determining its electoral viability.[64] Yet where these conditions did not exist, the Conservative Party had little chance of succeeding in open electoral competition, leading to the absence of an appreciable party organization in those locations.[65] Besides the Conservative Party, there was one more conservatively-oriented party: the Free Conservative Party. Unlike the Conservative Party, however, this party's leadership included industrialists who embraced economic progress and did not defend an estate society.[66] Moreover, in addition to several smaller parties that could often only be found in limited areas, there were four other major moderate/liberal parties that were competitive across large areas of Imperial Germany in the 1871 election: (1) the National Liberal Party, (2) the German Center Party, (3) the Liberal Reich Party, and (4) the German Progress Party.[67]

Considering the influence of deeply-rooted political norms and socioeconomic circumstances on electoral outcomes is in line with previous scholarly work. Most importantly, Rainer Lepsius argues that parties in nineteenth-century Germany reflected "sociomoral milieus,"[68] which were themselves based on deeply-rooted factors, such as culture, socioeconomic conditions, and political norms.[69] Importantly, this variation predated the Empire's

[64] Anderson 2000, Ch. 6; Lepsius 1966; Ziblatt 2008; Ziblatt 2009.

[65] Across Imperial Germany, the Conservative Party had at least one candidate in 46 out of 67 government districts (*Regierungsbezirk*). Government districts are higher-level units that encompass multiple electoral districts. While these numbers show that the party was capable of running in a large cross section of Imperial Germany, its practical electoral viability was severely limited in certain parts of the country. In only 27 government districts did it receive an average of more than 10% of the vote. Due to the aforementioned divergence in socioeconomic conditions and political traditions, it was also often unable to field candidates in all electoral districts of any given government district. These circumstances highlight the spatial divergence caused by the Black Death.

[66] This is the primary reason for why we do not include it in our main analysis. In the supplementary material, we elaborate in more detail on the issue. Furthermore, there we also provide an analysis that simultaneously accounts for both conservative parties.

[67] In the supplementary material, we provide an analysis that considers the combined vote shares of all these parties as the dependent variable.

[68] Lepsius 1966.

[69] Hübinger 2008; Sperber 1997, p. 3. Such variations in local culture and norms can persist over long time periods and shape political-economic outcomes; Alesina and Giuliano 2015; Acharya, Blackwell, and Sen 2018; Vogler 2019.

political system.[70]

We initially focus on electoral outcomes in 1871 because, with national unification just beginning, local political traditions are most likely to manifest themselves in the recorded electoral behavior of this period. However, in the following section, we also consider the Weimar Republic's crucial 1930 and 1932 elections. These additional analyses are meant to explore if the political-economic equilibria created by differential exposure to the Black Death persisted into interwar Germany. Furthermore, to ensure that our initial results are not merely driven by Prussia's military victory in 1871 or other idiosyncratic factors related to any specific election, we also consider the results of the 1874 election in the supplementary material.

4.3 Weimar Germany: Persistence of Local Political Cultures and Votes for the National Socialist Party

Given our contention that differing levels of exposure to the Black Death bequethed distinctive and enduring political traditions that contributed to the electoral viability of illiberal parties, it is worthwhile to investigate if the divergence caused by the Black Death is still visible in later elections, especially the fateful German federal elections of 1930 and July 1932. Because these parliamentary elections ultimately gave rise to National Socialism as a major force in German politics—and thus represent the precursor to the barbaric crimes committed, the wars initiated, and the exploitation conducted by the Nazi regime[71]—their relevance for the course of world history is unquestionable.

Specifically, in 1930, Hitler's NSDAP was able to increase its vote share from 2.6% to 18.3%, increasing the numbers of seats almost ten-fold, from 12 to 107. Therefore, this

[70] Sperber 1997, pp. 4–5.
[71] Mazower 2009; Rich 1992.

election is considered to have been a "breakthrough election" for the National Socialists.[72] Moreover, in the July 1932 election, the NSDAP became the parliament's largest party with slightly more than 37% of the vote.[73]

At first glance, a number of factors cast doubt on the proposition that the changes brought by the Black Death would still be visible in the Weimar Republic. For one, after the 1870s, politics in Germany became more nationalized, impacting social attitudes and ultimately leading to the development of a national democratic culture.[74] This development may have entailed a move away from the highly decentralized initial conditions. Additionally, after 1871, the second wave of industrialization took off in Germany and led to comprehensive social transformation.[75] The consequences included the rise of Social Democracy and a realignment of the party system.[76] In particular, the year 1890 is viewed as the turning point from more elite-centered politics to more popular politics.[77]

This combination of national trends likely decreased the influence of regional political traditions derived from experiences with the Black Death.[78] It is also the reason for why we initially focus on the early 1870s election.[79] Yet if the political cultures shaped by differences in Black Death intensity had been able to survive for more than five hundred years, the remnants of these political cultures may still have been visible in the Weimar period (1918-1933).[80]

Indeed, several studies suggest that, similar to Imperial Germany, Weimar Germany re-

[72] O'Loughlin 2002, pp. 220–224.
[73] O'Loughlin 2002, pp. 220–221.
[74] Anderson 2000; Anderson 1993.
[75] Hahn 2011; Sperber 1997, p. 5; Streb, Baten, and Yin 2006.
[76] Berman 2001, esp. pp. 441-442, 445–446; Sperber 1997, esp. p. 7.
[77] Sperber 1997, p. 19. For instance, as of 1890 all major parties began to become more active in rural areas; Eley 1986.
[78] Moreover, WWI not only brought death at a massive scale, but also further socioeconomic changes, such as the integration of women into the labor force.
[79] In terms of electoral disputes, we investigate a longer period as detailed in the next section.
[80] Lepsius 1966.

tained a geographically fragmented electoral landscape, with election outcomes—including voting patterns for the NSDAP—often strongly influenced by local socioeconomic configurations, culture, and traditions.[81] If local conditions and traditions greatly differed across space, the Nazis' potential for electoral success likely varied accordingly.[82]

Thus, despite the aforementioned national trends, the regional political traditions generated by differential exposure to the Black Death may still have affected electoral outcomes in the Weimar Republic.Specifically, John O'Loughlin suggests that a possible interpretation of spatial differences in the Nazi party's success is the following:

> Weimar Germany was simply a complex mosaic of culturally identifiable microregions, a product of history of local principalities, weak central authority, and intense political-confessional competition.[83]

There are several reasons for why we would expect the Nazi party to perform well in areas that do not have a long history of social equity and self-government. Most importantly, the Nazi party promoted a modernized variation—and in many ways an even more extreme and aggressive version—of the hierarchical and strongly illiberal political views that had been championed by the Conservative Party in the early 1870s.[84] Accordingly, if there were still remnants of the regional political cultures created by the Black Death, then we should observe that the NSDAP performed best in those areas of Germany that developed cultures of deference due to being spared from the most severe Black Death outbreaks.

[81] Ault and Brustein 1998; O'Loughlin 2002; O'Loughlin, Flint, and Anselin 1994; Flint 2000; Frøland, Jakobsen, and Osa 2019; Flint 1998.

[82] For instance, Satyanath, Voigtländer, and Voth 2017 show that differences in social capital across towns predicts entry into the Nazi party, which, in turn, predicts the party's electoral success. Additionally, Thurner, Klima, and Küchenhoff 2015 suggest that agricultural structure was a key factor in determining the NSDAP's electoral outcomes. Anheier 2003 finds that right-wing social networks amplified Nazi political mobilization. A similar argument is made by Berman 1997. Finally, Brustein 1996 and King et al. 2008 argue that economic conditions and incentives likely played an important role in shaping voting behavior. All of these factors varied widely across Germany, with their configuration shaped by historical patterns.

[83] O'Loughlin 2002, p. 232.

[84] Of course, there were also important differences between these two parties. Among others, National Socialist ideology put significantly more emphasis on nationalism, anti-semitism, and racism than the Conservative Party of the 1870s.

5 Empirical Design

In this section, we describe the construction of our main independent variable, additional data we employ, and the specifications utilized in our empirical analysis.

5.1 Measuring the Intensity of the Plague: The *Black Death Exposure Intensity (BDEI) Score*

Since (1) the Black Death's impact varied widely across Central Europe and (2) its intensity represents our key explanatory variable, the construction of an appropriate measurement is of prime importance. To this end, we use data by Jedwab, Johnson, and Koyama on recorded outbreaks in European towns,[85] which itself is primarily based on Christakos and colleagues,[86] to compute a measure of "Black Death Exposure Intensity" (the *BDEI score*).

While we have data on mortality rates for a number of individual medieval towns that we use to assess the Black Death's impact, our score is not simply a reflection of how intense the outbreak was in the nearest town only. Instead, it is a *composite* measurement, accounting for the extent to which the area *around* any specific location was affected. The key substantive reason for computing the score in this manner is as follows: Labor is a highly mobile factor of production. Accordingly, if the Black Death only has a minor impact or only hits a small number of locations in an area, labor supply can return to an old equilibrium more quickly due to regional market forces.[87] But if many locations in an area are severely hit by an adverse shock at the same time, then returning to a previous equilibrium is much more difficult, even with a mobile production factor like labor.

Mathematically, the *BDEI score* represents the sum of recorded outbreak intensities

[85] Jedwab, Johnson, and Koyama 2019a.
[86] Christakos et al. 2005.
[87] Cf. Hilton 1969, p. 32. On high labor mobility in the wake of the Black Death, see also Bergdolt 2006.

inversely weighted by the distance to any specific location. The weighting is inverse (and exponentially decreasing) because outbreaks in the closest vicinity are most relevant.[88]

5.2 Imperial Germany: Outcome Variables

The analysis of outcomes in Imperial Germany is at the level of the electoral district. Based on our theory and the specific empirical case, we consider three main outcome variables that reflect distinct political-economic equilibria:

Socioeconomic Conditions

1. ***Landholding inequality (Gini coefficient):*** Data on landholding inequality are provided by Ziblatt, who uses the Gini coefficient to compute a score between 0 (absolute equality) and 1 (absolute inequality).[89] Especially in societies with large agrarian sectors, high levels of landholding inequality indicate socioeconomic power imbalances.[90] Significant power imbalances in this domain are indicative of the political-economic equilibrium associated with low Black Death intensities.

Political Outcomes

2. ***Conservative Party vote share (1871):*** Data on electoral outcomes are provided by Jonathan Sperber.[91] These data reflect the Conservative Party's vote share in the 1871 elections. As a political force that promoted extremely hierarchical social structures and opposed democratization, the Conservative Party's vote share directly reflects the political-economic equilibrium associated with low intensities of the Black Death.

[88] It is important to acknowledge that the underlying data we use to compute this score is imperfect as it simply does not cover every single European town. Nevertheless, the data's geographic distribution is in line with knowledge on the plague's historical spread and they represent the best and most fine-grained measures currently available. Thus, our score provides a reasonable approximation to the Black Death's historical intensity. Furthermore, we provide results based on two alternative datasets of outbreaks in the supplementary material.

[89] Ziblatt 2009. Furthermore, in the supplementary material, we provide results on the determinants of landholding inequality limited to contexts in which the agricultural workforce's relative size is large. For a directly related argument, see Mares 2015, 23–24, Ch. 4. Data on the agricultural workforce are by Reibel 2007, with Ziblatt 2009 offering a digitized version.

[90] Ziblatt 2008.

[91] Sperber 1997.

3. ***Net electoral disputes (1871-1912):*** Data on electoral disputes are by Robert Arsenschek and Ziblatt.[92] These data reflect the cumulative number of disputes that occurred in all peacetime elections.[93] Electoral disputes highlight violations of democratic procedures, that is, the subversion of formal democratic regulations. Such violations are more likely to occur in areas without experience with democratic engagement or with influential (landed) elites, which we linked to low Black Death intensities.

5.3 Imperial Germany: Control Variables

Controlling for factors that could affect both historical Black Death intensity and subsequent long-run political-economic outcomes is crucial. Several geographic features as well as historical levels of urban density are taken into account in our analysis. Our geographic controls in particular reflect the importance of trade in disease transmission: The Black Death spread through rats often transported by merchants and commercial ships.[94]

Specifically, our control variables are the following:

1. ***Urban density in 1300:*** Historical levels of urban density could influence both Black Death intensity and long-term political-economic outcomes. We use data by Fabian Wahl to compute a historical urban density score for each electoral district.[95]

2. ***Distance to the nearest major port:*** In addition to the fact that the Black Death spread through trade, proximity to major ports could also influence commerce and economic activity in the long run.[96]

3. ***Distance to the nearest medieval trade city:*** For similar reasons as above, we also include distance to the nearest medieval trade city.[97]

4. ***Distance to the ocean:*** While major ports were the primary centers of sea trade, there may have been a number of minor ports. Therefore, we include distance to the ocean (the North Sea or the Baltic Sea) as a proxy.

[92] Arsenschek and Ziblatt 2008. Note that Ziblatt 2009 considers *landholding inequality* the key explanatory factor when it comes to *electoral disputes*. By contrast, we consider both outcomes to be key aspects of long run equilibria that result from variation in Black Death intensity.

[93] The primary reason why we use the entire span of the existence of Imperial Germany is that this is a count variable. If we restrict the analysis to an individual year, we observe zero inflation.

[94] All geographic measures were computed in ArcGis or in R using data by GeoNames 2020.

[95] Wahl 2019. Similar to the *BDEI score's* construction, this measure reflects the sum of towns' *population sizes (log)* inversely weighted by their distance to the electoral district under consideration.

[96] Benedictow 2004, p. 186.

[97] Hribar 2016. See Wahl 2016a for a detailed examination of the influence of trade on economic development.

5. ***Distance to the nearest large river:*** Much trade took place on large, navigable rivers, likely spreading the plague.[98] Therefore, we include distance to the nearest large river.[99]

6. ***Elevation***: Elevation could affect the accessibility of population centers to outsiders and animals carrying the plague,[100] influencing both plague intensity and long-term political-economic outcomes.

5.4 Weimar Germany: Persistence of Local Political Cultures and Votes for the National Socialist Party

As an extension to our empirical analysis, we consider the spatial association between Black Death exposure intensities and the vote share for the National Socialist Workers' Party of Germany (NSDAP) in the elections of Weimar Germany.

Specifically, we consider two primary outcome variables:

1. ***NSDAP vote share (1930):*** For the 1930 election, data on electoral outcomes at the level of the town and city are provided by Jürgen Falter and Dirk Hänisch Falter and Hänisch 1990. As an extremely illiberal and antidemocratic party, high NSDAP vote shares are indicative of the political-economic equilibrium associated with low Black Death intensities.

2. ***NSDAP vote share (Jul. 1932):*** For the election of July 1932, data on electoral outcomes at the level of county are also provided by Falter and Hänisch.[101]

We use the same set of control variables as in our main analysis. The geographic data used to compute them were obtained from Peter Selb and Simon Munzert.[102]

[98] Benedictow 2004, p. 202.
[99] European Environment Agency 2020.
[100] Bossak and Welford 2016, p. 72.
[101] Falter and Hänisch 1990. Unfortunately, town-level data are not available for this specific election.
[102] Selb and Munzert 2018. In addition, we also tested our argument using the alternative data by John O'Loughlin, Colin Flint, and Luc Anselin; O'Loughlin 2000; O'Loughlin 2002; O'Loughlin, Flint, and Anselin 1994. These additional tests also fully confirm our empirical expectations. Relevant tables are omitted from the manuscript for space reasons and available from the authors upon request.

5.5 Mechanisms, Part I: Pre-Reformation Germany — Introduction of Participative Elections (1300-1500)

In addition to our primary analysis, we add a secondary set of empirical tests focused on changes in participative institutions at the town level between 1300 to 1500. These analyses are meant to evaluate empirical support for the political transmission mechanisms outlined in our theory.

Here, we focus on a binary dependent variable based on data compiled by Wahl: *introduction of participative elections (1300-1500)*.[103] This variable is equal to 1 for towns that newly adopted local participative elections during the 1300-1500 period; 0 otherwise.[104] Note that "participative elections" in medieval Germany did not refer to a participatory democracy with full voting rights for all adults. Instead, such elections consisted of contests for the mayor, town council or other local offices, usually with participation limited to adult male property owners. That said, even these forms of "moderate" participation are still indicative of important changes in political institutions and norms.[105]

Because our unit of analysis here is the town—an organizational unit that existed long before and after the time period that we investigate—additional control variables are available for different points in time for several units. Thus, we account for several socioeconomic and geographic factors that could have an impact on early democratic development.

Specifically, we include variables for (1) *elevation*, (2) *distance to the nearest river*, (3) *roman road in vicinity*, (4) *agricultural suitability*, (5) *population in 1300 (log)*, (6) *ruggedness*, (7) *urban potential (1300)*, (8) *trade city (1300)*, and (9) *proto-industrial city (1300)*. We draw these variables from Wahl, who provides detail on coding procedures.[106]

[103] Wahl 2016b.

[104] No towns with participative elections in 1300 discontinued these in 1500. Regardless of whether we include these towns, our substantive findings do not change.

[105] Further details on the underlying data and coding are provided by Wahl 2016b.

[106] Wahl 2019.

5.6 Mechanisms, Part II: Early Nineteenth-Century Prussia — The Black Death and the Footprints of Serfdom

In addition to the pre-1500 analysis focused on changes in *political* institutions, we evaluate if our proposed mechanisms are consistent with observed differences in *socioeconomic* structures across regions afflicted with greater or lesser amounts of Black Death mortality. Our theoretical framework emphasizes that serfdom as a socioeconomic institution should have waned in those areas severely affected by the Black Death, whereas it should have grown in strength in those areas largely spared from it. We provide a wealth of qualitative evidence in favor of this proposition in the supplementary material, which draws on the voluminous historiography on agrarian organization in western versus eastern German-speaking Central Europe during the medieval and early modern periods. In order to complement this discussion of the link between the Black Death and changes in serfdom, here we also empirically assess the degree to which variations in mortality are associated with two key empirical footprints of serfdom visible in early nineteenth-century Prussia: (1) the dominance of large estates in agriculture and (2) the prevalence of agricultural servants. The underlying measures were originally compiled by the Prussian state as part of the first available dataset of socioeconomic characteristics collected in a standardized and comparable fashion across large parts of German-speaking Central Europe.[107]

Specifically, we analyze the spatial association between historical Black Death intensities and the following two outcome variables:

1. ***Large estates as a proportion of all agricultural properties (1816):*** Data on the number of different types of farms are provided by Sascha Becker and colleagues.[108] Using these data, we compute the proportion of farms in the largest category recorded by the Prussian census, which is "over 300 Prussian morgen."[109] As we describe in

[107] The data were collected in the early nineteenth century because, following the Napoleonic Wars, Prussia integrated many West German territories into its own administrative structures.

[108] Becker et al. 2014.

[109] A Prussian morgen is approximately 0.3 hectares in size.

the supplementary material, the coercive imposition of onerous labor obligations in the German-speaking lands went hand-in-hand with the consolidation of large, export-oriented estates. Thus, we expect Black Death exposure intensity to be negatively associated with this measure.

2. ***Agricultural servants as a proportion of the overall population (1816/19):*** These data record the proportion of agricultural servants in the overall population, which is arguably an even more direct measure of the legacy of serfdom. Although agricultural servants and serfs are not one and the same (since serfdom was formally abolished in Prussia in 1807), in practice most freed serfs continued to work their lords' lands as renters and wage laborers. Thus, the number of agricultural servants likely represents a good proxy for the former population of serfs. Due to limitations on data availability, the number of servants is from the year 1819 and the population numbers are from the year 1816. As above, we expect Black Death exposure intensity to be negatively associated with this measure.

We use the same set of control variables as in our main analysis. The geographic data on the location of Prussian counties were provided by the Ifo Institute for Economic Research (*ifo Zentrum für Bildungsökonomik*).[110]

5.7 Empirical Specifications

We use a range of outcome variables with different properties and adjust our models accordingly. With respect to *land inequality* and *Conservative Party vote share*, we primarily use OLS regression with clustered standard errors.[111] Similarly, we also use OLS regression when analyzing a number of variables in our extensions and mechanism sections.[112] For all outcome variables that are truncated, that is, which have an upper and/or lower limit in their value, we also discuss an alternative set of results using Tobit models in the supplementary material.

[110]Because our data are from different years, we merge data according to the merging keys provided by Becker et al. 2014.

[111]Errors are clustered at the level of the government district (*Regierungsbezirk*).

[112]In our major extension regarding NSDAP vote shares in Weimar Germany, we cluster errors at the level of the electoral district (*Wahlkreis*).

The format of our OLS regressions is the following:

$$y_i = \beta_0 + \beta_1 \; BDEI \; Score_i + \mathbf{x_i'} \; \boldsymbol{\beta} + \varepsilon_\mathbf{i} \tag{1}$$

where y_i is the respective outcome and $\mathbf{x_i}$ represents a vector of covariates at the electoral district level (i). β_1 represents the coefficient of the *BDEI score*.

We depart from OLS when doing so is called for based on the nature of our outcome variables. When considering net electoral disputes, which is a count variable, we use quasi-Poisson models. Moreover, we use logistic regression when analyzing the binary variable *introduction of participative elections (1300-1500)*.

The *BDEI score* is computed in the following way:

$$Raw \; BDEI \; Score_i = \sum_{j=1}^{n} LMR_j * (1 - DIST_{ij})^k \tag{2}$$

where $LMR_j \in (0, 1]$ is the local mortality rate at outbreak site j and $DIST_{ij} \in (0, 1]$ is the distance between i and j, which is used as the weight (with locations farther away from i being weighted down).[113] The parameter $k \in \{3, 6, 9, 12, 15\}$ for versions 1 through 5 of BDEI, respectively, represents the distance discount factor. We compute different versions of the *BDEI score* to demonstrate that results are not dependent on any single value of k.[114] The further an outbreak site is from the location under consideration i, the more it

[113]For example, consider an individual electoral district. When computing the *BDEI score* for this district, we calculate the distances to all known outbreak sites and then use distances according to the above formula to assign weights to the observed local mortality rates (LMR). In this calculation, the upper bound of 1 for the distance parameter $DIST_{ij}$ represents the maximum distance in the universe of cases under consideration, i.e. the maximum distance between any district and any recorded outbreak site. For computational reasons, a district's centroid is used when identifying distances to outbreak observations. Given the small overall size of electoral districts, this procedure does not substantively differ from the alternative of using a district's polygon.

[114]In the computation, we take all outbreaks into account without making discrete choices as to which ones to include or exclude. This is because such decisions could be considered arbitrary. Instead, our formula allows for a smooth, exponential discounting of observations at a greater distance through parameter k. Furthermore, in the supplementary material we also manually limit the regions used to calculate the *BDEI*

is exponentially discounted. In order to make the different versions of the *raw BDEI score* more comparable and our results easier to interpret, we standardize them to have a mean of $\mu = 0$ and a standard deviation of $\sigma = 1$.

6 Results

6.1 Imperial Germany: Socioeconomic Conditions and Political Outcomes

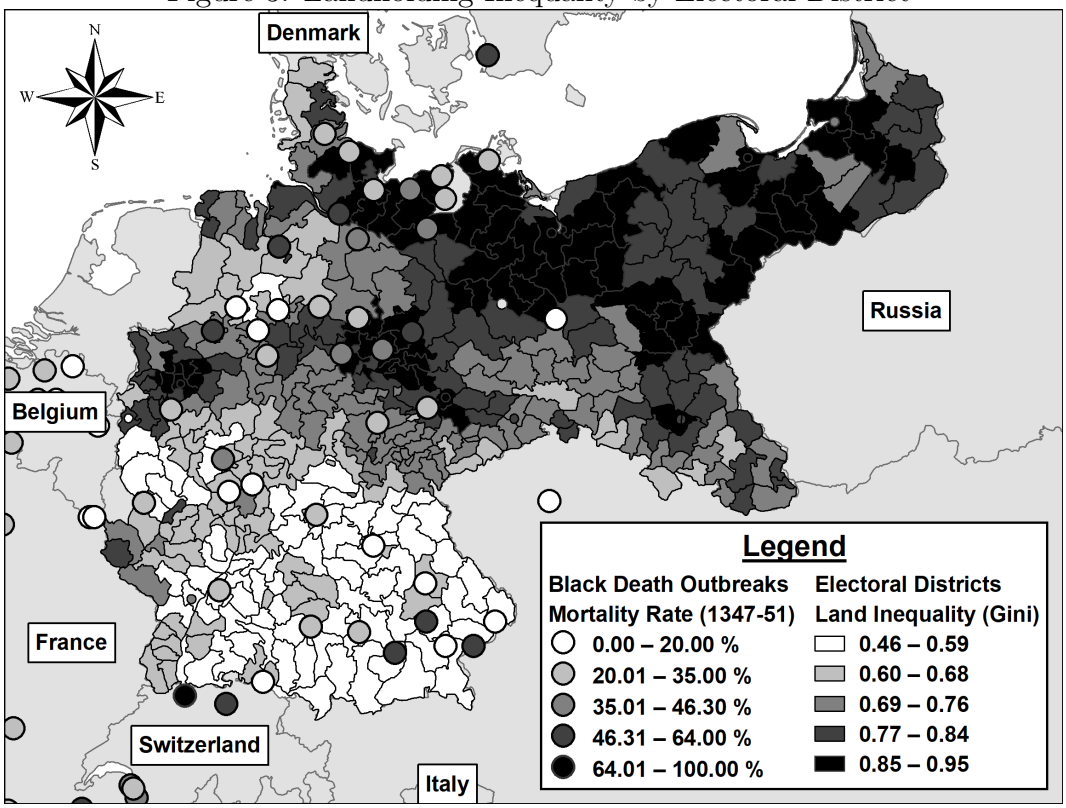
The results of our empirical analysis reveal a strong relationship between the Black Death's historical intensity and long-term political and socioeconomic outcomes in Imperial Germany. We begin by considering a graphical overview of *landholding inequality* across Germany's electoral districts as provided in Figure 3.[115] The towns with recorded outbreaks are displayed as circles and the outbreaks' intensity is visible in the circles' color. The northeastern districts in particular exhibit high levels of landholding inequality. Additionally, almost all electoral districts in the easternmost parts, where the plague was least severe, have above-average levels of landholding inequality.

As discussed earlier, we also expect a long-term impact of variation in Black Death intensity on *Conservative Party vote share*, with high vote shares indicating the political-economic equilibrium linked to high landholding inequality. This is clearly reflected in Figure 4. The party's vote share is systematically higher in areas with fewer and less intense recorded outbreaks. Importantly, as indicated earlier, in many places socioeconomic conditions (and associated political cultures) were such that the Conservative Party did not have a realistic chance to succeed in open electoral competition, as reflected by the absence of an appreciable

score. Our results hold, indicating that parameter k sufficiently discounts observations at a greater distance.

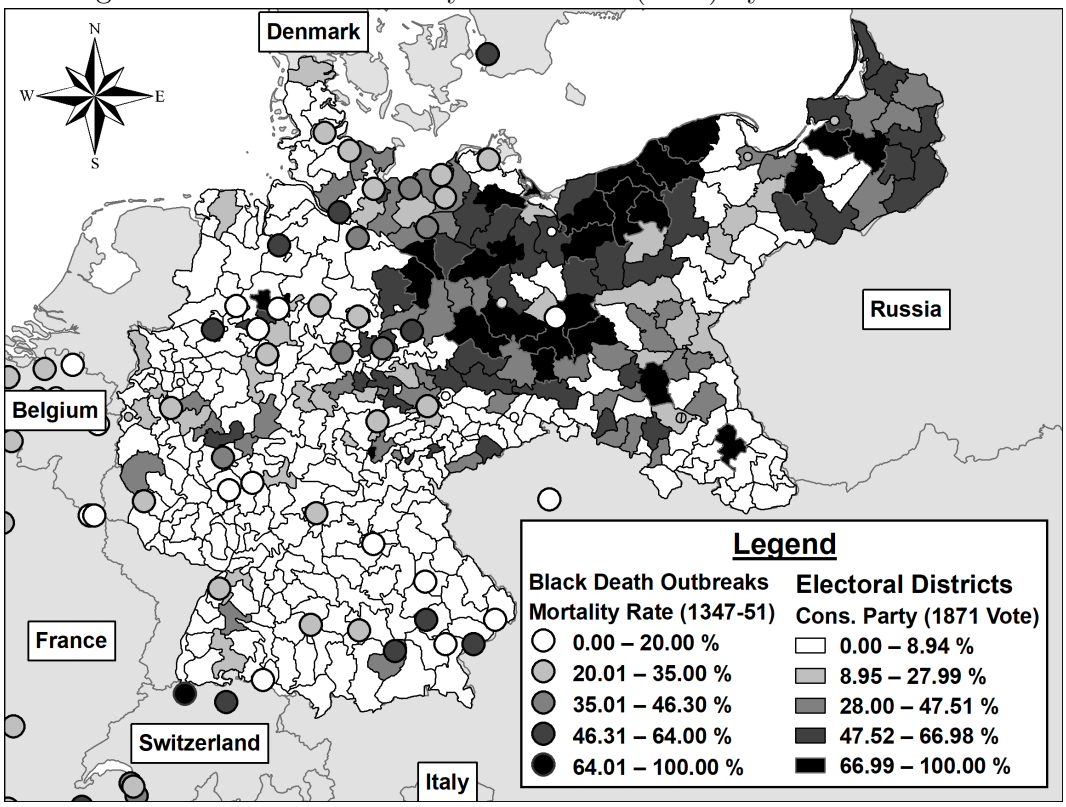
[115] These maps are based on data by Nüssli and Nüssli 2008b, Jedwab, Johnson, and Koyama 2019a, Sperber 1997, and Ziblatt 2009.

Figure 3: Landholding Inequality by Electoral District



local party organization and/or minimal vote shares.

Figure 4: Conservative Party Vote Share (1871) by Electoral District



Next we turn to our regression analysis. Table 1 shows our findings with respect to *landholding inequality*. In addition to a first set of models (1-5) that are based on our key independent variable only, we provide a second set of models (6-10) that include the previously discussed controls. Across all specifications, the *BDEI score* has a significant negative impact on *land inequality*, indicating the Black Death's persistent influence on socioeconomic conditions. Specifically, a one standard deviation increase in the *BDEI score* results in a decrease in the value of *landholding inequality (Gini)* that ranges from 0.042 to 0.061 (0.350 to 0.508 standard deviations). Figure 5 shows the predicted values for different magnitudes of *BDEI score v1*.

Table 2 shows the results with respect to *Conservative Party vote share*. As with the previous analysis, we also provide models without (1-5) and with (6-10) control variables. In line with our theory, the Conservative Party is weaker in areas that had more severe Black

Death outbreaks, indicated by a high *BDEI score*. Specifically, a one standard deviation increase in the *BDEI score* leads to a reduction in the party's vote share ranging from 0.106 (10.6%) to 0.141 (14.1%) (0.426 to 0.566 standard deviations). The results are comparable to the above findings, highlighting the pandemic's long-term influence. Figure 6 shows the predicted values for different magnitudes of *BDEI score v1*.

Finally, Table 3 shows the results of quasi-Poisson regressions on electoral disputes. Here we also find a result in line with our theoretical expectations: In places with more intense outbreaks, one encounters significantly fewer electoral disputes. Specifically, a one standard deviation increase in the *BDEI score* leads to a change in the logs of expected counts ranging from -0.172 to -0.313.

In sum, we find comprehensive evidence that the Black Death shaped socioeconomic structures and local political behavior in the long run. Both in terms of landholding inequality levels and the Conservative Party's electoral viability, we find that regional variation in the intensity of plague outbreaks in the fourteenth century has strong predictive power for outcomes in the nineteenth century. These results indicate that this historical shock fundamentally reshaped society in areas where it hit hardest, while it reinforced socioeconomic and political hierarchies in other regions, leading to distinct institutional equilibria that persisted for generations. As discussed in more detail below and in the extensions located in the supplementary material, we find that our results are robust across a large set of alternative approaches to measurement and statistical analysis.

Figure 5: Predicted Values Plot: BDEI Score v1 and Landholding Inequality (Gini)

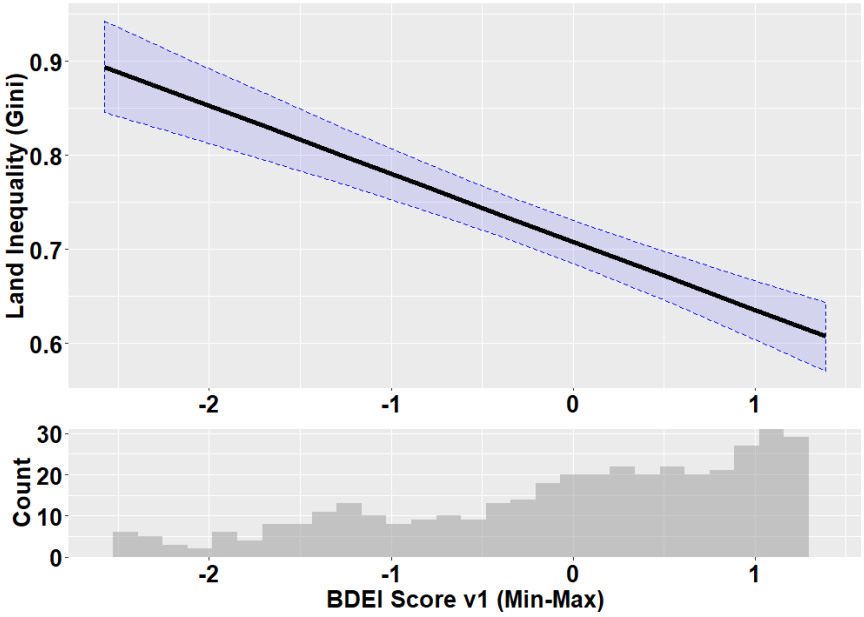


Figure 6: Predicted Values Plot: BDEI Score v1 and Conservative Party Vote Share (1871)

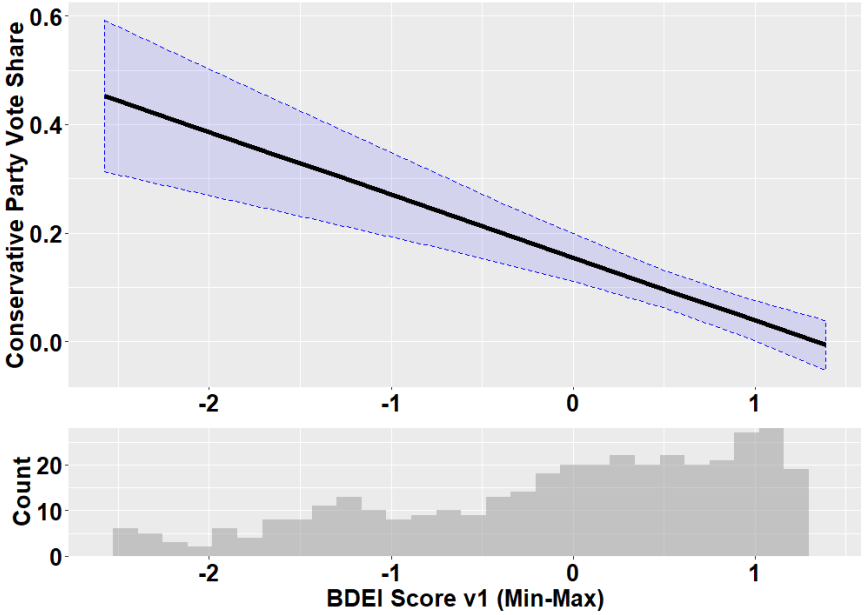


Table 1: Landholding Inequality (OLS)

	Dependent variable:									
	Landholding Inequality (Gini)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.061***					−0.053***				
	(0.011)					(0.015)				
BDEI Score v2		−0.061***					−0.049***			
		(0.011)					(0.014)			
BDEI Score v3			−0.059***					−0.048***		
			(0.011)					(0.014)		
BDEI Score v4				−0.057***					−0.046***	
				(0.011)					(0.013)	
BDEI Score v5					−0.053***					−0.042***
					(0.011)					(0.013)
Constant	0.726***	0.726***	0.726***	0.726***	0.726***	0.844***	0.844***	0.843***	0.843***	0.842***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.026)	(0.025)	(0.025)	(0.025)	(0.024)
Control Variables						✓	✓	✓	✓	✓
Observations	397	397	397	397	397	397	397	397	397	397
R^2	0.260	0.255	0.243	0.223	0.193	0.641	0.641	0.638	0.632	0.623
Adjusted R^2	0.259	0.253	0.242	0.221	0.191	0.634	0.635	0.632	0.626	0.616

Note: Clust. SE *p<0.1; **p<0.05; ***p<0.01

Table 2: Conservative Party Vote Share (OLS)

	Dependent variable:									
	Conservative Party Vote Share									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	-0.116^{***}					-0.141^{***}				
	(0.021)					(0.035)				
BDEI Score v2		-0.115^{***}					-0.132^{***}			
		(0.022)					(0.032)			
BDEI Score v3			-0.113^{***}					-0.130^{***}		
			(0.023)					(0.031)		
BDEI Score v4				-0.110^{***}					-0.133^{***}	
				(0.023)					(0.033)	
BDEI Score v5					-0.106^{***}					-0.136^{***}
					(0.024)					(0.035)
Constant	0.155^{***}	0.154^{***}	0.155^{***}	0.155^{***}	0.156^{***}	0.208^{***}	0.206^{***}	0.207^{***}	0.211^{***}	0.216^{***}
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.065)	(0.064)	(0.063)	(0.062)	(0.060)
Control Variables						✓	✓	✓	✓	✓
Observations	382	382	382	382	382	382	382	382	382	382
R^2	0.212	0.208	0.202	0.193	0.180	0.318	0.319	0.318	0.318	0.315
Adjusted R^2	0.210	0.206	0.200	0.191	0.178	0.305	0.306	0.306	0.305	0.302

Note: Clust. SE $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 3: Net Electoral Disputes (Quasi-Poisson)

	Dependent variable:									
	Net Electoral Disputes									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.200***					−0.313**				
	(0.051)					(0.135)				
BDEI Score v2		−0.200***					−0.287**			
		(0.055)					(0.125)			
BDEI Score v3			−0.196***					−0.284**		
			(0.056)					(0.123)		
BDEI Score v4				−0.186***					−0.291**	
				(0.057)					(0.125)	
BDEI Score v5					−0.172***					−0.294**
					(0.058)					(0.128)
Constant	0.850***	0.850***	0.851***	0.853***	0.855***	1.122***	1.114***	1.118***	1.133***	1.150***
	(0.065)	(0.065)	(0.065)	(0.066)	(0.066)	(0.154)	(0.152)	(0.153)	(0.159)	(0.168)
Control Variables						✓	✓	✓	✓	✓
Observations	397	397	397	397	397	397	397	397	397	397

Note: Quasi-Poisson, Clust. SE

*p<0.1; **p<0.05; ***p<0.01

6.2 Imperial Germany: Extensions of the Empirical Analysis

In the supplementary material, we present multiple extensions. In the first extension, we add covariates for *population size* and *Prussia*. In the second extension, we take into account a variable that reflects variation in the Reformation's long-term impact: a district's *share of Catholics*. In the third extension, we calculate the *BDEI score* based on an alternative set of outbreak observations. In the fourth extension, we condition our analysis of *landholding inequality* on the relevance of agriculture in the district. In the fifth extension, we use the *timing of outbreaks* in a 2SLS setup to isolate exogeneous variation in mortality rates.[116] In the sixth extension, we replace our distance measures to geographic features with dummy variables. In the seventh extension, we control for variability in agricultural potential to account for historical information asymmetries.[117] In the eighth extension, we include quasi-random spatial fixed effects to address suggestions made by Thomas Pepinsky, Sara Wallace Goodman, and Conrad Ziller.[118] In the ninth extension, we use two alternative datasets of plague outbreaks to compute the *BDEI score*.[119] In the tenth extension, we use data by MPIDR and CGG to introduce fixed effects based on pre-treatment administrative borders.[120] In the eleventh extension, we consider three alternative outcome measures: (1) *the combined vote share of all conservative parties (1871)*, (2) *the combined vote share of all major liberal and moderate parties (1871)*, and (3) *the Conservative Party's vote share in the 1874 election*. In the twelfth extension, we account for cities' population sizes when computing the *BDEI score*. In the thirteenth extension, we manually limit the regions used to construct the *BDEI score* to neighboring ones. Finally, in the fourteenth extension, we

[116] This strategy is based on the observations that the Black Death was most severe in the spring and summer and that its intensity waned over time; Benedictow 2004; Gottfried 1983; Campbell 2016.
[117] Ahmed and Stasavage 2020.
[118] Pepinsky, Goodman, and Ziller 2020.
[119] Büntgen et al. 2012; Schmid et al. 2015.
[120] Nüssli and Nüssli 2008a.

account for pre-1500 *caloric potential*.[121]

6.3 Weimar Germany: Persistence of Local Political Cultures and Votes for the National Socialist Party

In addition to the extensions discussed above, the substantively most important addition to our main empirical test is an analysis of the 1930 and July 1932 elections in Weimar Germany. Do we observe an association between the Black Death's historical intensity and the strength of the NSDAP in these critical elections? Indeed, as shown in Figure 7 and Figure 8, the electoral strength of the NSDAP in both elections is highly correlated with the Black Death's historical intensity as measured by *BDEI score v1*. In areas that were historically hit hardest by the Black Death, we expect the NSDAP to perform most poorly. Vice versa, in areas historically only lightly hit, we expect the NSDAP to perform best.

Table 4 and Table 5 provide further details with respect to these results, underscoring that there is a persistent negative association between historical *Black Death exposure intensity* and the NSDAP's vote share. In the 1930 elections, a one standard deviation increase in the *BDEI score* leads to a reduction in the expected vote share of the NSDAP ranging from 0.017 (1.7%) to 0.028 (2.8%) (0.160 to 0.264 standard deviations). In the elections of July 1932, a one standard deviation increase in the *BDEI score* leads to a reduction in the expected vote share of the NSDAP ranging from 0.034 (3.4%) to 0.088 (8.8%) (0.233 to 0.603 standard deviations). These results indicate that important aspects of the spatial divergence in political cultures created by the Black Death persisted into the Weimar Republic, in spite of the socioeconomic and geographic dislocations ushered in by industrialization and WWI.

[121] Galor and Özak 2016.

Figure 7: Predicted Values Plot: BDEI Score v1 and NSDAP Vote Share (1930)

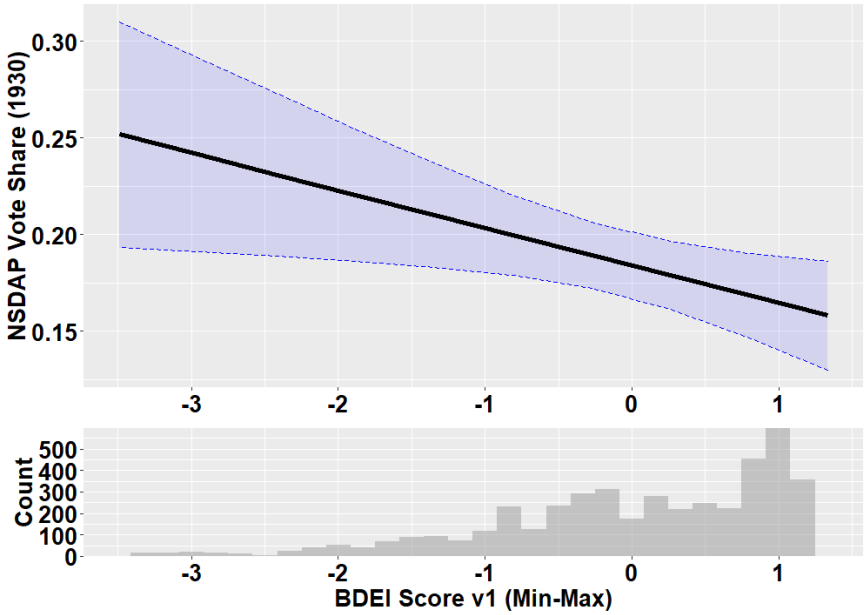


Figure 8: Predicted Values Plot: BDEI Score v1 and NSDAP Vote Share (Jul. 1932)

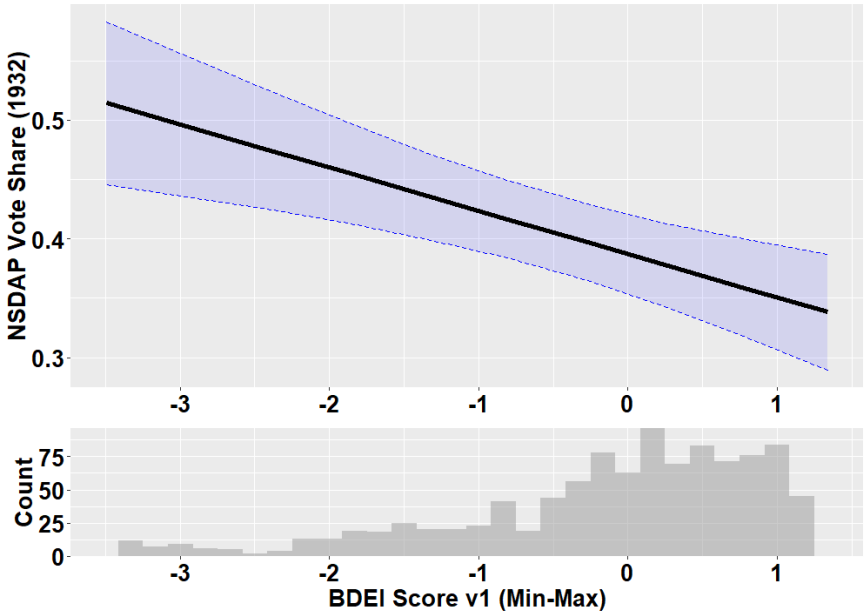


Table 4: NSDAP Vote Share (1930) (OLS)

	Dependent variable:									
	NSDAP Vote Share (1930)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.019**					−0.028**				
	(0.008)					(0.012)				
BDEI Score v2		−0.020**					−0.028**			
		(0.008)					(0.012)			
BDEI Score v3			−0.020**					−0.028**		
			(0.008)					(0.012)		
BDEI Score v4				−0.019**					−0.028**	
				(0.009)					(0.012)	
BDEI Score v5					−0.017*					−0.026**
					(0.009)					(0.013)
Constant	0.184***	0.184***	0.184***	0.184***	0.184***	0.205***	0.206***	0.206***	0.206***	0.204***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.030)	(0.031)	(0.031)	(0.032)	(0.032)
Control Variables						✓	✓	✓	✓	✓
Observations	3,347	3,347	3,347	3,347	3,347	3,346	3,346	3,346	3,346	3,346
R^2	0.031	0.032	0.032	0.029	0.023	0.076	0.078	0.079	0.078	0.074
Adjusted R^2	0.031	0.032	0.032	0.029	0.023	0.074	0.076	0.077	0.076	0.072

Note: Clust. SE *p<0.1; **p<0.05; ***p<0.01

Table 5: NSDAP Vote Share (Jul. 1932) (OLS)

	Dependent variable:									
	NSDAP Vote Share (Jul. 1932)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.037***					−0.085***				
	(0.010)					(0.019)				
BDEI Score v2		−0.038***					−0.082***			
		(0.011)					(0.018)			
BDEI Score v3			−0.039***					−0.084***		
			(0.011)					(0.017)		
BDEI Score v4				−0.037***					−0.087***	
				(0.011)					(0.017)	
BDEI Score v5					−0.034***					−0.088***
					(0.011)					(0.017)
Constant	0.387***	0.387***	0.387***	0.387***	0.388***	0.488***	0.487***	0.489***	0.494***	0.498***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.028)	(0.028)	(0.028)	(0.029)	(0.031)
Control Variables						✓	✓	✓	✓	✓
Observations	1,037	1,037	1,037	1,037	1,037	1,036	1,036	1,036	1,036	1,036
R^2	0.069	0.071	0.072	0.068	0.059	0.227	0.230	0.236	0.241	0.239
Adjusted R^2	0.068	0.070	0.071	0.067	0.058	0.222	0.225	0.231	0.236	0.234

Note: Clust. SE *p<0.1; **p<0.05; ***p<0.01

6.4 Mechanisms, Part I: Pre-Reformation Germany — Introduction of Participative Elections

Next we focus on the underlying mechanisms by which we postulate the Black Death exerted a long-term effect on political outcomes in Germany. In this respect, we begin with a set of analyses that examine pre-Reformation Germany. We study outcomes prior to the Protestant Reformation, which began in 1517, to rule out the possibility that it could be responsible for the outcomes observed in Imperial Germany. By showing that the Black Death is associated with key changes in proto-democratic institutions by 1500 (when compared to 1300), we demonstrate that some of the mechanisms discussed can be observed many years *before* the Reformation impacted Germany's political landscape.

Table 6 shows results for *introduction of participative elections (1300-1500)* for 325 towns. The results indicate that towns that were more strongly exposed to the Black Death were significantly more likely to adopt participative institutions by 1500.

Table 6: Introduction of Participative Elections (1300-1500) (Logit)

	Dependent variable:				
	Introduction of Participative Elections (1300-1500)				
	(1)	(2)	(3)	(4)	(5)
BDEI Score v1	0.572***				
	(0.184)				
BDEI Score v2		0.527***			
		(0.174)			
BDEI Score v3			0.466***		
			(0.166)		
BDEI Score v4				0.397**	
				(0.161)	
BDEI Score v5					0.322**
					(0.159)
Constant	−1.836***	−1.821***	−1.802***	−1.782***	−1.764***
	(0.171)	(0.168)	(0.165)	(0.162)	(0.160)
Observations	325	325	325	325	325
Log Likelihood	−132.288	−132.751	−133.617	−134.660	−135.714
Akaike Inf. Crit.	268.575	269.501	271.235	273.319	275.428

Note: Logit *p<0.1; **p<0.05; ***p<0.01

In Table 7, we add a variety of control variables, including geographic factors. While the results are at or below the threshold of statistical significance in two specifications, the direction of the effect remains the same. Indeed, the lower level of significance is likely due to the much smaller number of cases for which covariate data is available. Overall, the evidence suggests that demographic collapse from the Black Death set in motion institutional changes that are consistent with the patterns of political behavior observed in the nineteenth century.

Table 7: Introduction of Participative Elections (1300-1500) (Logit)

	Dependent variable:				
	Introduction of Participative Elections (1300-1500)				
	(1)	(2)	(3)	(4)	(5)
BDEI Score v1	2.203**				
	(1.030)				
BDEI Score v2		2.022**			
		(0.965)			
BDEI Score v3			1.751**		
			(0.890)		
BDEI Score v4				1.326*	
				(0.777)	
BDEI Score v5					0.861
					(0.646)
Constant	9.264	8.204	6.583	4.502	2.593
	(5.827)	(5.522)	(5.118)	(4.661)	(4.279)
Control Variables	✓	✓	✓	✓	✓
Observations	86	86	86	86	86
Log Likelihood	−28.884	−29.010	−29.306	−29.854	−30.468
Akaike Inf. Crit.	81.769	82.021	82.612	83.707	84.937

Note: Logit *p<0.1; **p<0.05; ***p<0.01

6.5 Mechanisms, Part II: Early Nineteenth-Century Prussia — The Black Death and the Footprints of Serfdom

In the final set of empirical analyses, we analyze socioeconomic outcomes in early nineteenth-century Prussia. These analyses are meant to evaluate if geographical variation in Black Death exposure intensity is associated with proxy measures of the strength of serfdom prior

to the late nineteenth-century transition to mass politics.

Our results indicate that both the *proportion of large estates (1816)* and the *proportion of agricultural servants (1816/1819)* are clearly associated with the Black Death's historical intensity. Specifically, Table 8 shows a persistent negative relationship between the *BDEI score* and the *proportion of large estates*, indicating that, in areas that were hit hardest by the Black Death, we observe the smallest relative number of large estates in 1816. Moreover, Table 9 shows a similar pattern when it comes to *agricultural servants as a proportion of the overall population*. The results indicate that areas hit hardest by the Black Death have a significantly smaller number of agricultural servants, indicating a less hierarchical and less agriculturally-centered economy. These findings are fully compatible with our suggested mechanisms.

Table 8: Proportion of Large Estates (1816) (OLS)

	Dependent variable:									
	Proportion of Large Estates (1816)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.010***					−0.012***				
	(0.001)					(0.002)				
BDEI Score v2		−0.010***					−0.012***			
		(0.001)					(0.002)			
BDEI Score v3			−0.010***					−0.013***		
			(0.001)					(0.002)		
BDEI Score v4				−0.009***					−0.013***	
				(0.001)					(0.002)	
BDEI Score v5					−0.009***					−0.014***
					(0.001)					(0.003)
Constant	0.017***	0.017***	0.017***	0.017***	0.017***	0.023***	0.025***	0.026***	0.027***	0.027***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)
Control Variables						✓	✓	✓	✓	✓
Observations	267	267	267	267	267	266	266	266	266	266
R^2	0.213	0.215	0.209	0.196	0.179	0.413	0.426	0.431	0.432	0.430
Adjusted R^2	0.210	0.212	0.206	0.193	0.176	0.397	0.411	0.416	0.417	0.414

Note: OLS *p<0.1; **p<0.05; ***p<0.01

Table 9: Proportion of Agricultural Servants (of Total Population) (1816/1819) (OLS)

	Dependent variable:									
	Proportion of Agricultural Servants (of Total Population) (1816/1819)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	-0.012^{***}					-0.018^{***}				
	(0.002)					(0.005)				
BDEI Score v2		-0.012^{***}					-0.018^{***}			
		(0.002)					(0.004)			
BDEI Score v3			-0.012^{***}					-0.018^{***}		
			(0.002)					(0.004)		
BDEI Score v4				-0.012^{***}					-0.019^{***}	
				(0.002)					(0.005)	
BDEI Score v5					-0.012^{***}					-0.020^{***}
					(0.002)					(0.005)
Constant	0.092^{***}	0.092^{***}	0.092^{***}	0.092^{***}	0.092^{***}	0.160^{***}	0.161^{***}	0.161^{***}	0.162^{***}	0.162^{***}
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Control Variables						✓	✓	✓	✓	✓
Observations	280	280	280	280	280	279	279	279	279	279
R^2	0.103	0.101	0.100	0.098	0.095	0.296	0.299	0.300	0.300	0.298
Adjusted R^2	0.100	0.098	0.096	0.095	0.092	0.278	0.281	0.282	0.282	0.280

Note: OLS $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

7 Conclusion

Contemporary social science emphasizes the importance of actions taken during critical junctures in explanations of differences in the nature, scope, and quality of government across societies.[122] As moments in time, critical junctures are defined by significant upheaval and fluidity:[123] Institutional structures and social arrangements long taken for granted are suddenly amenable to changes that would have been inconceivable in normal circumstances. Such windows for change do not open easily. The antecedent to a critical juncture may be a shock that profoundly reorders economic circumstances and/or the balance of de facto power in a society.[124] Among the various types of shocks that may produce such an alteration in circumstances, demographic collapses due to pandemics surely number among the most consequential.

Our study examines the long-term legacy of one of the most profound demographic shocks in European history: the loss of life due to the Black Death in the mid-fourteenth century. Concentrating on the historical experience of the German-speaking areas of Europe from the arrival of the Black Death until the onset of the German Empire in 1871 and beyond, the study explicitly lays out all four stages of analysis necessary for establishing the importance of a critical juncture:[125] (1) characterization of the shock (i.e., the intensity of exposure to the Black Death); (2) the critical juncture itself (i.e., the decision to roll back or augment labor coercion); (3) the mechanisms of production of the legacy (i.e., changes in economic arrangements and political institutions resulting from changes in labor coercion); (4) the legacy (i.e., electoral behavior in the late nineteenth century and in the Weimar Republic).

Empirically, our paper shows that areas more intensely affected by the Black Death de-

[122] Cf. Collier and Collier 1991; Mahoney 2001.
[123] Capoccia 2015.
[124] Roberts 2002; Tarrow 2017.
[125] Collier and Munck 2017.

veloped more inclusive political institutions at the local level and more equitable ownership of land, both reflecting a fundamentally changed political-economic equilibrium. Contrariwise, those areas less affected by the Black Death maintained political institutions and land ownership patterns that concentrated political and economic power in a small elite. In the first set of areas, voters in the late nineteenth century would come to reject the Conservative Party at the ballot box, an outcome indicative of autonomy of voters from the directives of the landed nobility. In the second set of areas, voters overwhelmingly cast their votes in favor of the Conservative Party, indicative not only of an antidemocratic political culture, but also of the ability of the landed elite to guide voters' decisions at the ballot box. By restructuring political institutions and social organization at the local level, the Black Death had significant consequences for how citizens would come to engage in mass politics.

Importantly, the remarkable spatial divergence in political cultures created by the Black Death created a political conflict between conservative and progressive forces that persisted well into the Weimar Republic, one that is evident in the clear association between historical Black Death exposure and votes for the National Socialist Party. The NSDAP's extremely hierarchical and illiberal political views—which later led to barbaric crimes of unprecedented magnitude—found fertile ground in the areas of Germany that had limited historical experience with democratic participation at the local level. Thus, the Black Death not only shaped institutional development in Central Europe during the early modern period and electoral outcomes during the nineteenth century, but its echoes may be found in the party politics of the Weimar Republic's doomed experiment with mass democracy.

The experience of the German-speaking lands in the wake of the Black Death makes clear that abrupt and dramatic shifts in relative factor prices may have significant consequences for long-run institutional development. Of course, pandemics are not alone in their ability

to shift prices in this way—major wars can produce similar effects, as can large-scale migration and instances of revolutionary technological change. What makes pandemics like the Black Death so special are the opportunities for inference that they offer to social scientists. Since pandemics are not products of human choice in the same way that the aforementioned developments are, they may—in certain circumstances—perturb relative factor prices in a manner more akin to a random shock. Thus, while pandemics are not necessarily uniquely impactful for institutional development, they can be especially revealing about how institutional development responds to changes in the relative power of labor versus capital and land.

What specific lessons does the Black Death offer about the potentially transformative role of pandemics? One important lesson is that the depth of the shock matters. As the Black Death made its way through Europe, it imposed physical and emotional suffering of an incalculable magnitude, profoundly darkening the tenor of literature, music, and the visual arts. Yet, in spite of the death and suffering associated with the disease outbreak, the world inherited by survivors and their descendants in areas ravaged by the Black Death was in many ways favorable to the world in which their ancestors had long toiled. Massive demographic collapse had improved the bargaining power of labor, leading to major changes in social organization and political institutions. These developments would improve living standards and provide opportunities for meaningful political engagement. In a dark twist of irony, the experience of the Black Death demonstrates that the long-term political independence of labor may have blossomed from the graves of workers.

As a general matter, however, one should not expect that pandemics will usually have these types of consequences. In order to radically restructure labor relations—the catalyst for the subsequent social and political changes wrought by the Black Death—a disease shock has

to be very large, affect individuals in their prime working age, and not be easily reversible. Pandemics that infect great numbers of individuals but which have relatively low mortality rates—such as the Spanish Flu of 1918 or today's Covid-19 outbreak—do not change the labor supply to the extent necessary to fundamentally alter factor prices. The same is true for pandemics that have a high mortality rate but limited contagiousness, as was the case for HIV/AIDS prior to the widespread use of antiretroviral drugs. Diseases that primarily afflict children, such as measles and polio, also do not reconfigure relative factor prices—at least not in the long run—as fertility strategies may compensate for heightened mortality in children.[126]

To produce a labor market shock that generates dynamics comparable to that initiated by the Black Death, a pandemic would have to combine high contagiousness with high mortality for working age adults. The Ebola virus seemingly had this potential, but the recent development of a vaccine has thankfully reduced the threat to life posed by this disease. Although no obvious alternative threat lies on the horizon, the present combination of high population density and unprecedented global interconnectedness will surely make the next great pandemic all the more destructive when (not if) it does emerge. What the Black Death offers us, at the end, is an important reminder: When the next wave of destruction emerges, the particular set of labor repressive institutions of our contemporary era may be washed away in its wake.

[126] Cf. Hossain, Phillips, and LeGrand 2007.

References

Acemoglu, Daron (2010). "Institutions, Factor Prices, and Taxation: Virtues of Strong States?" In: *American Economic Review* 100.2, pp. 115–19. DOI: 10.1257/aer.100.2.115.

Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation". In: *American Economic Review* 91.5, pp. 1369–1401. DOI: 10.1257/aer.91.5.1369.

Acemoglu, Daron and James A. Robinson (2006). *Economic Origins of Democracy and Dictatorship*. Cambridge, UK: Cambridge University Press.

— (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York, NY: Crown Books.

Acemoglu, Daron and Alexander Wolitzky (2011). "The Economics of Labor Coercion". In: *Econometrica* 79.2, pp. 555–600. DOI: 10.3982/ECTA8963.

Acharya, Avidit, Matthew Blackwell, and Maya Sen (2018). *Deep Roots: How Slavery Still Shapes Southern Politics*. Princeton, NJ: Princeton University Press.

Ahmed, Ali T. and David Stasavage (2020). "Origins of Early Democracy". In: *American Political Science Review* 114.2, 502–518. DOI: 10.1017/S0003055419000741.

Alesina, Alberto and Paola Giuliano (2015). "Culture and Institutions". In: *Journal of Economic Literature* 53.4, pp. 898–944. DOI: 10.1257/jel.53.4.898.

Alfani, Guido (2015). "Economic Inequality in Northwestern Italy: A Long-Term View". In: *Journal of Economic History* 75, pp. 1058–1096. DOI: 10.1017/S0022050715001539.

Alfani, Guido and Francesco Ammannati (2017). "Long-Term Trends in Economic Inequality: The Case of the Florentine State, *c.* 1300–1800". In: *Economic History Review* 70, pp. 1072–1102. DOI: 10.1111/ehr.12471.

Alfani, Guido, Victoria Gierok, and Felix Schaff (2020). *Economic Inequality in Preindustrial Germany, ca. 1300–1850*. Working Paper, Available at: https://www.researchgate.net/publication/339781476_Economic_Inequality_in_Preindustrial_Germany_ca_1300_-_1850.

Almond, Douglas (2006). "Is the 1918 Influenza Pandemic Over? Long-Term Effects of *In Utero* Influenza Exposure in the Post-1940 US Population". In: *Journal of Political Economy* 114.4, pp. 672–712. DOI: 10.1086/507154.

Almond, Gabriel and Sidney Verba (1963). *The Civic Culture: Political Attitudes and Democracy in Five Nations*. Princeton, NJ: Princeton University Press.

Anderson, Margaret Lavinia (1993). "Voter, Junker, *Landrat*, Priest: The Old Authorities and the New Franchise in Imperial Germany". In: *The American Historical Review* 98.5, pp. 1448–1474. DOI: 10.2307/2167062.

— (2000). *Practicing Democracy: Elections and Political Culture in Imperial Germany*. Princeton, NJ: Princeton University Press.

Anderson, Perry (1974). *Lineages of the Absolutist State*. London, UK: New Left Books.

Anderson, Siwan, Patrick Francois, and Ashok Kotwal (2015). "Clientelism in Indian Villages". In: *American Economic Review* 105.6, pp. 1780–1816. DOI: 10.1257/aer.20130623.

Anheier, Helmut (2003). "Movement Development and Organizational Networks: The Role of 'Single Members' in the German Nazi Party, 1925–30". In: *Social Movements and Networks: Relational Approaches to Collective Action*. Ed. by Mario Diani Doug McAdam. Oxford, UK: Oxford University Press, pp. 49–74.

Ansell, Ben W. and David J. Samuels (2014). *Inequality and Democratization: An Elite-Competition Approach*. Cambridge, UK: Cambridge University Press.

Ardanaz, Martin and Isabela Mares (2014). "Labor Shortages, Rural Inequality, and Democratization". In: *Comparative Political Studies* 47.12, pp. 1639–1669. DOI: 10.1177/0010414013512609.

Arsenschek, Robert and Daniel Ziblatt (2008). *Complete Reichstag Election Disputes Dataset, 1871–1914*. https://dataverse.harvard.edu/dataverse/dziblatt.

Ault, Brian and William Brustein (1998). "Joining the Nazi Party: Explaining the Political Geography of NSDAP Membership, 1925–1933". In: *American Behavioral Scientist* 41.9, pp. 1304–1323. DOI: 10.1177/0002764298041009008.

Baland, Jean-Marie and James A. Robinson (2008). "Land and Power: Theory and Evidence from Chile". In: *American Economic Review* 98.5, pp. 1737–65. DOI: 10.1257/aer.98.5.1737.

Bartels, Larry M. (2008). *Unequal Democracy: The Political Economy of the New Gilded Age*. Princeton, NJ: Princeton University Press.

Becker, Sascha O. et al. (2014). "iPEHD—the ifo Prussian Economic History Database". In: *Historical Methods: A Journal of Quantitative and Interdisciplinary History* 47.2, pp. 57–66. DOI: 10.1080/01615440.2013.852370.

Benedictow, Ole J. (2004). *The Black Death, 1346-1353: the Complete History*. Woodbridge, UK: Boydell & Brewer.

Beramendi, Pablo and Christopher J. Anderson (2008). *Democracy, Inequality, and Representation in Comparative Perspective*. New York, NY: Russell Sage Foundation.

Berdahl, Robert M. (1972). "Conservative Politics and Aristocratic Landholders in Bismarckian Germany". In: *The Journal of Modern History* 44.1, pp. 2–20. DOI: 10.1086/240704.

— (1988). *The Politics of the Prussian Nobility: The Development of a Conservative Ideology, 1770-1848*. Princeton, NJ: Princeton University Press.

Bergdolt, Klaus (2006). *Die Pest: Geschichte des Schwarzen Todes*. Munich, Germany: C.H. Beck.

Berman, Sheri (1997). "Civil Society and the Collapse of the Weimar Republic". In: *World Politics* 49.3, 401–429. DOI: 10.1353/wp.1997.0008.

Berman, Sheri E. (2001). "Modernization in Historical Perspective: The Case of Imperial Germany". In: *World Politics* 53.3, pp. 431–462. DOI: 10.1353/wp.2001.0007.

Blanning, Tim (2012). "The Holy Roman Empire of the German Nation Past and Present". In: *Historical Research* 85.227, pp. 57–70. DOI: 10.1111/j.1468-2281.2011.00579.x.

Blum, Jerome (1957). "The Rise of Serfdom in Eastern Europe". In: *The American Historical Review* 62.4, pp. 807–836. DOI: 10.2307/1845515.

Boix, Carles (2003). *Democracy and Redistribution*. Cambridge, UK: Cambridge University Press.

Bonds, Matthew H. et al. (2010). "Poverty Trap Formed by the Ecology of Infectious Diseases". In: *Proceedings of the Royal Society B: Biological Sciences* 277.1685, pp. 1185–1192. DOI: 10.1098/rspb.2009.1778.

Bossak, Brian H. and Mark R. Welford (2016). "Spatio-Temporal Characteristics of the Medieval Black Death". In: *Spatial Analysis in Health Geography*. Ed. by Pavlos Kanaroglou, Eric Delmelle, and Antonio Páez. New York, NY: Routledge, pp. 93–106.

Brenner, Robert (1976). "Agrarian Class Structure and Economic Development in Pre-Industrial Europe". In: *Past & Present* 70.1, pp. 30–75. DOI: 10.1093/past/70.1.30.

Britnell, Richard (1990). "Feudal Reaction after the Black Death in the Palatinate of Durham". In: *Past & Present* 128, pp. 28 –47. DOI: 10.1093/past/128.1.28.

Brusco, Valeria, Marcelo Nazareno, and Susan C. Stokes (2004). "Vote Buying in Argentina". In: *Latin American Research Review* 39.2, pp. 66–88. DOI: 10.1353/lar.2004.0022.

Brustein, William (1996). *The Logic of Evil: The Social Origins of the Nazi Party, 1925–1933*. New Haven, CT: Yale University Press.

Buggle, Johannes and Steven Nafziger (2019). "The Slow Road from Serfdom: Labor Coercion and Long-run Development in the Former Russian Empire". In: *Forthcoming in Review of Economics and Statistics*. DOI: 10.1162/rest_a_00857.

Büntgen, Ulf et al. (2012). "Digitizing Historical Plague". In: *Clinical Infectious Diseases* 55.11.

Campbell, Bruce M. S. (2016). *The Great Transition: Climate, Disease, and Society in the Late Medieval World*. Cambridge, UK: Cambridge University Press.

Capoccia, Giovanni (2015). "Critical Junctures and Institutional Change". In: *Advances in Comparative-Historical Analysis*. Ed. by James Mahoney and Kathleen Thelen. Cambridge, UK: Cambridge University Press, pp. 147–179.

Christakos, George et al. (2005). *Interdisciplinary Public Health Reasoning and Epidemic Modelling: the Case of Black Death*. Berlin, Germany: Springer.

Collier, David and Gerardo L. Munck (2017). "Building Blocks and Methodological Challenges: A Framework for Studying Critical Junctures". In: *Qualitative and Multi-Method Research* 15, pp. 2–9.

Collier, Ruth Berins and David Collier (1991). *Shaping the Political Arena: Critical Junctures, Trade Unions, and the State in Latin America*. Princeton, NJ: Princeton University Press.

Dee, Thomas S. (2004). "Are there Civic Returns to Education?" In: *Journal of Public Economics* 88.9-10, pp. 1697–1720. DOI: 10.1016/j.jpubeco.2003.11.002.

Dell, Melissa (2010). "The Persistent Effects of Peru's Mining Mita". In: *Econometrica* 78, pp. 1863 –1903. DOI: 10.3982/ECTA8121.

Diamond, Jared M. (1998). *Guns, Germs and Steel: a Short History of Everybody for the Last 13,000 Years*. New York, NY: Random House.

Dippel, Christian, Avner Greif, and Daniel Trefler (2016). "The Rents from Trade and Coercive Institutions: Removing the Sugar Coating". In: *Rotman School of Management Working Paper* 2864727. DOI: 10.2139/ssrn.2864727.

Dittmar, Jeremiah E. and Ralf R. Meisenzahl (Feb. 2019). "Public Goods Institutions, Human Capital, and Growth: Evidence from German History". In: *The Review of Economic Studies* 87.2, pp. 959–996. ISSN: 0034-6527. DOI: 10.1093/restud/rdz002.

Domar, Evsey D. (1970). "The Causes of Slavery or Serfdom: a Hypothesis". In: *Journal of Economic History* 30.1, pp. 18–32. DOI: 10.1017/S0022050700078566.

Eley, Geoff (1986). "The German Right, 1860–1945: How It Changed". In: *From Unification to Nazism: Reinterpreting the German Past*. Ed. by Geoff Eley. Boston, MA: Allen & Unwin, pp. 171–199.

European Environment Agency (2020). *WISE Large Rivers and Large Lakes*. https://www.eea.europa.eu/data-and-maps/data/wise-large-rivers-and-large-lakes, Data Accessed April 20, 2020.

Falter, Jürgen W. and Dirk Hänisch (1990). *Election and Social Data of the Districts and Municipalities of the German Empire from 1920 to 1933. GESIS Data Archive, Cologne. ZA8013 Data file Version 1.0.0*. https://doi.org/10.4232/1.8013, Data Accessed October 27, 2020.

Finan, Frederico and Laura Schechter (2012). "Vote-Buying and Reciprocity". In: *Econometrica* 80.2, pp. 863–881. DOI: 10.3982/ECTA9035.

Finley, Theresa and Mark Koyama (2018). "Plague, Politics, and Pogroms: The Black Death, the Rule of Law, and the Persecution of Jews in the Holy Roman Empire". In: *The Journal of Law and Economics* 61.2, pp. 253–277. DOI: 10.1086/699016.

Flint, Colin (1998). "Forming Electorates, Forging Spaces: The Nazi Party Vote and the Social Construction of Space". In: *American Behavioral Scientist* 41.9, pp. 1282–1303. DOI: 10.1177/0002764298041009007.

— (2000). "Electoral Geography and the Social Construction of Space: The Example of the Nazi Party in Baden, 1924–1932". In: *GeoJournal* 51.3, pp. 145–156. DOI: 10.1023/A:1017900418261.

Frøland, Hans Otto, Tor Georg Jakobsen, and Peder Berrefjord Osa (2019). "Two Germanys? Investigating the Religious and Social Base of the 1930 Nazi Electorate". In: *Social Science History* 43.4, 765–784. DOI: 10.1017/ssh.2019.33.

Frost, Robert (2012). "The Impact of War: The Holy Roman Empire and Poland-Lithuania, c. 1600–1806". In: *The Holy Roman Empire, 1495-1806: A European Perspective*. Ed. by Robert J. W. Evans and Peter H. Wilson. Boston, MA: Brill, pp. 237–257.

Frye, Timothy, Ora John Reuter, and David Szakonyi (2014). "Political Machines at Work: Voter Mobilization and Electoral Subversion in the Workplace". In: *World Politics* 66.2, pp. 195–228. DOI: 10.1017/S004388711400001X.

Gallup, John Luke and Jeffrey D. Sachs (2001). "The Economic Burden of Malaria". In: *The American Journal of Tropical Medicine and Hygiene* 64.1_suppl, pp. 85–96. DOI: 10.4269/ajtmh.2001.64.85.

Galor, Oded and Ömer Özak (2016). "The Agricultural Origins of Time Preference". In: *American Economic Review* 106.10, pp. 3064–3103. DOI: 10.1257/aer.20150020.

GeoNames (2020). *GeoNames Geographical Database*. http://www.geonames.org/, Accessed April 4, 2020.

Gilens, Martin (2012). *Affluence and Influence: Economic Inequality and Political Power in America*. Princeton, NJ: Princeton University Press.

Gingerich, Daniel W. (2020). "Buying Power: Electoral Strategy before the Secret Vote". In: *American Political Science Review* 114.4, pp. 1086–1102. DOI: 10.1017/S0003055420000568.

Gingerich, Daniel W. and Danilo Medeiros (2020). "Vote Secrecy With Diverse Voters". In: *Comparative Political Studies* 53.3-4, pp. 567–600. DOI: 10.1177/0010414019859040.

Gingerich, Daniel W. and Luis Fernando Medina (2013). "The Endurance and Eclipse of the Controlled Vote: a Formal Model of Vote Brokerage Under the Secret Ballot". In: *Economics & Politics* 25.3, pp. 453–480. DOI: 10.1111/ecpo.12020.

Giuliano, Paola and Nathan Nunn (2013). "The Transmission of Democracy: From the Village to the Nation-State". In: *American Economic Review* 103, pp. 86–92. DOI: 10.1257/aer.103.3.86.

Gottfried, Robert S. (1983). *The Black Death: Natural and Human Disaster in Medieval Europe*. New York, NY: The Free Press.

Hahn, Hans-Werner (2011). *Die Industrielle Revolution in Deutschland*. Oldenbourg Verlag.

Hall, Peter A. and David Soskice (2001). *Varieties of Capitalism: the Institutional Foundations of Comparative Advantage*. Oxford, UK: Oxford University Press.

Herlihy, David (1997). *The Black Death and the Transformation of the West*. Cambridge, MA: Harvard University Press.

Hilton, Rodney Howard (1969). *The Decline of Serfdom in Medieval England*. London, UK: Palgrave MacMillan.

Hossain, Mian Bazle, James F. Phillips, and Thomas K. LeGrand (2007). "The Impact of Childhood Mortality on Fertility in Six Rural Thanas of Bangladesh". In: *Demography* 44.4, pp. 771–784. DOI: 10.1353/dem.2007.0047.

Hribar, Georgeanne (2016). *Medieval European Trade Cities*. https://www.arcgis.com/home/item.html?id=6e1f6f76cd57498185cd7c0c3ee608eb, Accessed October 29, 2020.

Hübinger, Gangolf (2008). "„Sozialmoralisches Milieu". Ein Grundbegriff der deutschen Geschichte". In: *Soziale Konstellation und historische Perspektive: Festschrift für M. Rainer Lepsius*. Ed. by Steffen Sigmund et al. Wiesbaden, Germany: VS Verlag für Sozialwissenschaften, pp. 207–227.

Jedwab, Remi, Noel D. Johnson, and Mark Koyama (2019a). "Negative Shocks and Mass Persecutions: Evidence from the Black Death". In: *Journal of Economic Growth* 24.4, pp. 345–395. DOI: 10.1007/s10887-019-09167-1.

— (2019b). *Pandemics, Places, and Populations: Evidence from the Black Death*. CESifo Working Paper No. 7524, Available at SSRN: https://ssrn.com/abstract=3343855.

King, Gary et al. (2008). "Ordinary Economic Voting Behavior in the Extraordinary Election of Adolf Hitler". In: *The Journal of Economic History* 68.4, pp. 951–996. ISSN: 00220507, 14716372. DOI: 10.1017/S0022050708000788.

Kissane, Alan (2017). *Civic Community in Late Medieval Lincoln: Urban Society and Economy in the Age of the Black Death, 1289-1409*. Woodbridge, UK: Boydell Press.

Kitschelt, Herbert and Steven Wilkinson (2007). "Citizen-Politician Linkages: An Introduction". In: *Patrons, Clients, and Policies*. Ed. by Herbert Kitschelt and Steven Wilkinson. Cambridge, UK: Cambridge University Press, pp. 1–49.

Klein, Alexander and Sheilagh Ogilvie (2017). *Was Domar Right? Serfdom and Factor Endowments in Bohemia*. CEPR Discussion Paper No. DP12388, Available at SSRN: https://ssrn.com/abstract=3057322.

Kurtz, Marcus (2013). *Latin American State Building in Comparative Perspective: Social Foundations of Institutional Order*. Cambridge, UK: Cambridge University Press.

Lawson, Chappell and Kenneth F. Greene (2014). "Making Clientelism Work: How Norms of Reciprocity Increase Voter Compliance". In: *Comparative Politics* 47.1, pp. 61–85. DOI: 10.5129/001041514813623173.

Lepsius, M. Rainer (1966). "Parteiensystem und Sozialstruktur. Zum Problem der Demokratisierung der deutschen Gesellschaft". In: *Wirtschaft, Geschichte und Wirtschaftsgeschichte: Festschrift zum 65. Geburtstag von Friedrich Lütge*. Ed. by M. Rainer Lepsius and Abel Wilhelm. Stuttgart, Germany: Fischer, pp. 371–393.

Lewin, Kurt (1943). "The Special Case of Germany". In: *Public Opinion Quarterly* 7.4, pp. 555–566. DOI: 10.1086/265642.

Lowes, Sara and Eduardo Montero (2017). *Blood Rubber: The Effects of Labor Coercion on Institutions and Culture in the DRC*. Working Paper, http://economics.yale.edu/sites/default/files/lowes_montero_rubberv2_jmp.pdf.

Mahoney, James (2001). *The Legacies of Liberalism: Path Dependence and Political Regimes in Central America*. Baltimore, MD: Johns Hopkins University Press.

— (2010). *Colonialism and Postcolonial Development: Spanish America in Comparative Perspective*. Cambridge, UK: Cambridge University Press.

Mares, Isabela (2015). *From Open Secrets to Secret Voting: Democratic Electoral Reforms and Voter Autonomy*. Cambridge, UK: Cambridge University Press.

Mares, Isabela and Boliang Zhu (2015). "The Production of Electoral Intimidation: Economic and Political Incentives". In: *Comparative Politics* 48.1, pp. 23–43. DOI: 10.5129/001041515816075204.

Markevich, Andrei and Ekaterina Zhuravskaya (2018). "The Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire". In: *American Economic Review* 108, pp. 1074 –1117. DOI: 10.1257/aer.20160144.

Mate, Mavis (1984). "Agrarian Economy After the Black Death: the Manors of Canterbury Cathedral Priory, 1348-91". In: *Economic History Review* 37, pp. 341 –354. DOI: 10.2307/2597285.

Mazower, Mark (2009). *Hitler's Empire: How the Nazis Ruled Europe*. New York, NY: Penguin.

Milligan, Kevin, Enrico Moretti, and Philip Oreopoulos (2004). "Does Education Improve Citizenship? Evidence from the United States and the United Kingdom". In: *Journal of Public Economics* 88.9-10, pp. 1667–1695. DOI: 10.1016/j.jpubeco.2003.10.005.

Moore, Barrington Jr. (1966). *Social Origins of Dictatorship and Democracy: Lord and Peasant in the Making of the Modern World*. Boston, MA: Beacon.

More, Alexander F. et al. (2017). "Next-Generation Ice Core Technology Reveals True Minimum Natural Levels of Lead (Pb) in the Atmosphere: Insights from the Black Death". In: *GeoHealth* 1.4, pp. 211–219. DOI: 10.1002/2017GH000064.

Naidu, Suresh and Noam Yuchtman (2013). "Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain". In: *American Economic Review* 103.1, pp. 107–44. DOI: 10.1257/aer.103.1.107.

Nipperdey, Thomas (1961). *Die Organisation der deutschen Parteien vor 1918*. Düsseldorf, Germany: Droste Verlag.

North, Douglass C. and Robert Paul Thomas (1973). *The Rise of the Western World: A New Economic History*. Cambridge, UK: Cambridge University Press.

Nunn, Nathan and Leonard Wantchekon (2011). "The Slave Trade and the Origins of Mistrust in Africa". In: *American Economic Review* 101, pp. 3221 –3252. DOI: 10.1257/aer.101.7.3221.

Nüssli, Christos and Marc-Antoine Nüssli (2008a). *Georeferenced Historical Vector Data 1300*. https://www.euratlas.net/shop/maps_gis/gis_1300.html, Data Accessed on October 12, 2020.

— (2008b). *Georeferenced Historical Vector Data 1900*. http://www.euratlas.net/shop/maps_gis/gis_1900.html, Data Accessed through the Duke University Library, February 28, 2017.

O'Loughlin, John (2000). "Can King's Ecological Inference Method Answer a Social Scientific Puzzle: Who Voted for the Nazi Party in Weimar Germany?" In: *Annals of the Association of American Geographers* 90.3, pp. 592–601. DOI: 10.1111/0004-5608.00213.

— (2002). "The Electoral Geography of Weimar Germany: Exploratory Spatial Data Analyses (ESDA) of Protestant Support for the Nazi Party". In: *Political Analysis* 10.3, pp. 217–243. ISSN: 10471987, 14764989. DOI: 10.1093/pan/10.3.217.

O'Loughlin, John, Colin Flint, and Luc Anselin (1994). "The Geography of the Nazi Vote: Context, Confession, and Class in the Reichstag Election of 1930". In: *Annals of the Association of American Geographers* 84.3, pp. 351–380. DOI: 10.1111/j.1467-8306.1994.tb01865.x.

Pamuk, Şevket (2007). "The Black Death and the Origins of the 'Great Divergence' Across Europe, 1300–1600". In: *European Review of Economic History* 11.3, pp. 289–317. DOI: 10.1017/S1361491607002031.

Pepinsky, Thomas B., Sara Wallace Goodman, and Conrad Ziller (2020). *Does Proximity to Nazi Concentration Camps Make Germans Intolerant? Modeling Spatial Heterogeneity and Historical Persistence*. Working Paper, Available at SSRN: https://ssrn.com/abstract=3547321 or http://dx.doi.org/10.2139/ssrn.3547321, Accessed May 3, 2020.

Persson, Torsten and Guido Tabellini (2000). *Political Economics: Explaining Economic Policy*. Cambridge, MA: The MIT Press.

Peters, Margaret (2018). *Government Finance and Imposition of Serfdom After the Black Death*. Working Paper, Available at SSRN: https://ssrn.com/abstract=3320807 or http://dx.doi.org/10.2139/ssrn.3320807, Accessed February 24, 2020.

Piketty, Thomas (2014). *Capital in the Twenty-First Century*. Cambridge, MA: Harvard University Press.

Piketty, Thomas and Emmanuel Saez (2014). "Inequality in the Long Run". In: *Science* 344.6186, pp. 838–843. DOI: 10.1126/science.1251936.

Poos, Lawrence (1991). *A Rural Society After the Black Death: Essex 1350-1525*. Cambridge, UK: Cambridge University Press.

Postan, Michael M. (1966). "Medieval Agrarian Society in its Prime: England". In: *The Cambridge Economic History of Europe: Volume 1, Agrarian Life of the Middle Ages*. Ed. by Michael M. Postan. Cambridge, UK: Cambridge University Press, pp. 549–632.

Reibel, Carl-Wilhelm (2007). *Handbuch der Reichstagswahlen 1890-1918: Bündnisse, Ergebnisse, Kandidaten [Handbook of Imperial Diet Elections 1890-1918: Coalitions, Results, Candidates]*. Vol. 1. Düsseldorf, Germany: Droste Verlag.

Retallack, James (2006). *The German Right, 1860–1920: Political Limits of the Authoritarian Imagination*. Toronto, Canada: University of Toronto Press.

Retallack, James N. (1988). *Notables of the Right: The Conservative Party and Political Mobilization in Germany, 1876-1918*. Boston, MA: Unwin Hyman.

Rich, Norman (1992). *Hitler's War Aims: Ideology, the Nazi State, and the Course of Expansion*. New York, NY: WW Norton & Company.

Roberts, Kenneth M. (2002). "Social Inequalities Without Class Cleavages in Latin America's Neoliberal Era". In: *Studies in Comparative International Development* 36.4, pp. 3–33. DOI: 10.1007/BF02686331.

Rogowski, Ronald (1989). *Commerce and Coalitions: How Trade Affects Domestic Political Alignments*. Princeton, NJ: Princeton University Press.

Rokkan, Stein (1970). *Citizens, Elections, Parties: Approaches to the Comparative Study of the Processes of Development*. Oslo, Norway: Scandinavian University Books.

Rueschemeyer, Dietrich, Evelyne Huber Stephens, and John D. Stephens (1992). *Capitalist Development and Democracy*. Chicago, IL: The University of Chicago Press.

Sachs, Jeffrey D. and Andrew M. Warner (1997). "Sources of Slow Growth in African Economies". In: *Journal of African Economies* 6.3, pp. 335–376. DOI: 10.1093/oxfordjournals.jae.a020932.

Satyanath, Shanker, Nico Voigtländer, and Hans-Joachim Voth (2017). "Bowling for Fascism: Social Capital and the Rise of the Nazi Party". In: *Journal of Political Economy* 125.2, pp. 478–526. DOI: 10.1086/690949.

Scheidel, Walter (2017). *The Great Leveler. Violence and the Global History of Inequality from the Stone Age to the Present*. Princeton, NJ: Princeton University Press.

Schmid, Boris V. et al. (2015). "Climate-Driven Introduction of the Black Death and Successive Plague Reintroductions into Europe". In: *Proceedings of the National Academy of Sciences* 112.10, pp. 3020–3025. DOI: 10.1073/pnas.1412887112.

Scott, James C. (1972). *Comparative Political Corruption*. Englewood Cliffs, NJ: Prentice Hall.

Selb, Peter and Simon Munzert (2018). "Examining a Most Likely Case for Strong Campaign Effects: Hitler's Speeches and the Rise of the Nazi Party, 1927–1933". In: *American Political Science Review* 112.4, pp. 1050–1066. DOI: 10.1017/S0003055418000424.

Sellars, Emily and Jennifer Alix-Garcia (2018). "Labor Scarcity, Land Tenure, and Historical Legacy: Evidence from Mexico". In: *Journal of Development Economics* 135, pp. 504–516. DOI: 10.1016/j.jdeveco.2018.07.014.

Siuda, Fabian and Uwe Sunde (2019). "Disease and Demographic Development: The Legacy of the Black Death". In: *Working Paper, May 8, 2019*.

Snowden, Frank M. (2019). *Epidemics and Society: From the Black Death to the Present*. New Haven, CT: Yale University Press.

Sondheimer, Rachel Milstein and Donald P. Green (2010). "Using Experiments to Estimate the Effects of Education on Voter Turnout". In: *American Journal of Political Science* 54.1, pp. 174–189. DOI: 10.1111/j.1540-5907.2009.00425.x.

Sperber, Jonathan (1997). *The Kaiser's Voters: Electors and Elections in Imperial Germany*. Cambridge, UK: Cambridge University Press.

Stokes, Susan C. et al. (2013). *Brokers, Voters, and Clientelism: The Puzzle of Distributive Politics*. Cambridge, UK: Cambridge University Press.

Strayer, Joseph (1973). *On the Medieval Origins of the Modern State*. Princeton, NJ: Princeton University Press.

Streb, Jochen, Jörg Baten, and Shuxi Yin (2006). "Technological and Geographical Knowledge Spillover in the German Empire 1877–1918". In: *The Economic History Review* 59.2, pp. 347–373. DOI: 10.1111/j.1468-0289.2006.00347.x.

Tarrow, Sidney (2017). ""The World Changed Today!" Can We Recognize Critical Junctures When We See Them?" In: *Qualitative and Multi-Method Research* 15.1, pp. 9–11.

Thurner, Paul W., André Klima, and Helmut Küchenhoff (2015). "Agricultural Structure and the Rise of the Nazi Party Reconsidered". In: *Political Geography* 44, pp. 50 –63. ISSN: 0962-6298. DOI: 10.1016/j.polgeo.2014.08.004.

Tilly, Charles (1990). *Coercion, Capital, and European States, 990–1990*. Boston, MA: Basil Blackwell.

Uslaner, Eric M. (2008). *Corruption, Inequality, and the Rule of Law*. Cambridge, UK: Cambridge University Press.

Vogler, Jan P. (2019). "Imperial Rule, the Imposition of Bureaucratic Institutions, and their Long-Term Legacies". In: *World Politics* 71.4, pp. 806–863. DOI: 10.1017/S004388711900008X.

Voigtländer, Nico and Hans-Joachim Voth (2013). "The Three Horsemen of Riches: Plague, War, and Urbanization in Early Modern Europe". In: *Review of Economic Studies* 80.2, pp. 774–811. DOI: 10.1093/restud/rds034.

Wahl, Fabian (2016a). "Does Medieval Trade Still Matter? Historical Trade Centers, Agglomeration and Contemporary Economic Development". In: *Regional Science and Urban Economics* 60, pp. 50–60. DOI: 10.1016/j.regsciurbeco.2016.06.011.

— (2016b). "Participative Political Institutions in Pre-Modern Europe: Introducing a New Database". In: *Historical Methods: A Journal of Quantitative and Interdisciplinary History* 49.2, pp. 67–79. DOI: 10.1080/01615440.2015.1033582.

— (2019). "Political Participation and Economic Development. Evidence from the Rise of Participative Political Institutions in the Late Medieval German Lands". In: *European Review of Economic History* 23.2, pp. 193–213. DOI: 10.1093/ereh/hey009.

Wilson, Peter (2003). *German Armies: War and German Society, 1648–1806*. London, UK: UCL Press/Taylor & Francis.

Yue, Ricci P.H., Harry F. Lee, and Connor Y.H. Wu (2017). "Trade Routes and Plague Transmission in Pre-Industrial Europe". In: *Scientific Reports* 7.1, pp. 1–10. DOI: 10.1038/s41598-017-13481-2.

Ziblatt, Daniel (2008). "Does Landholding Inequality Block Democratization?: A Test of the "Bread and Democracy" Thesis and the Case of Prussia". In: *World Politics* 60.4, pp. 610–641. DOI: 10.1353/wp.0.0021.

— (2009). "Shaping Democratic Practice and the Causes of Electoral Fraud: The Case of Nineteenth-Century Germany". In: *American Political Science Review* 103.1, pp. 1–21. DOI: 10.1017/S0003055409090042.