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.

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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 (Scheidel, 2017). Indeed, if the demographic shock imposed by a pandemic is sufficiently deep and sudden, 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).[1] The Black Death was an outbreak of plague that devastated Continental Europe, resulting in a loss of life estimated at between thirty and sixty per cent of Europe's total population. Figure 1 shows recorded outbreaks at the town level across Europe based on data by Jedwab, Johnson and Koyama (2019*a*).

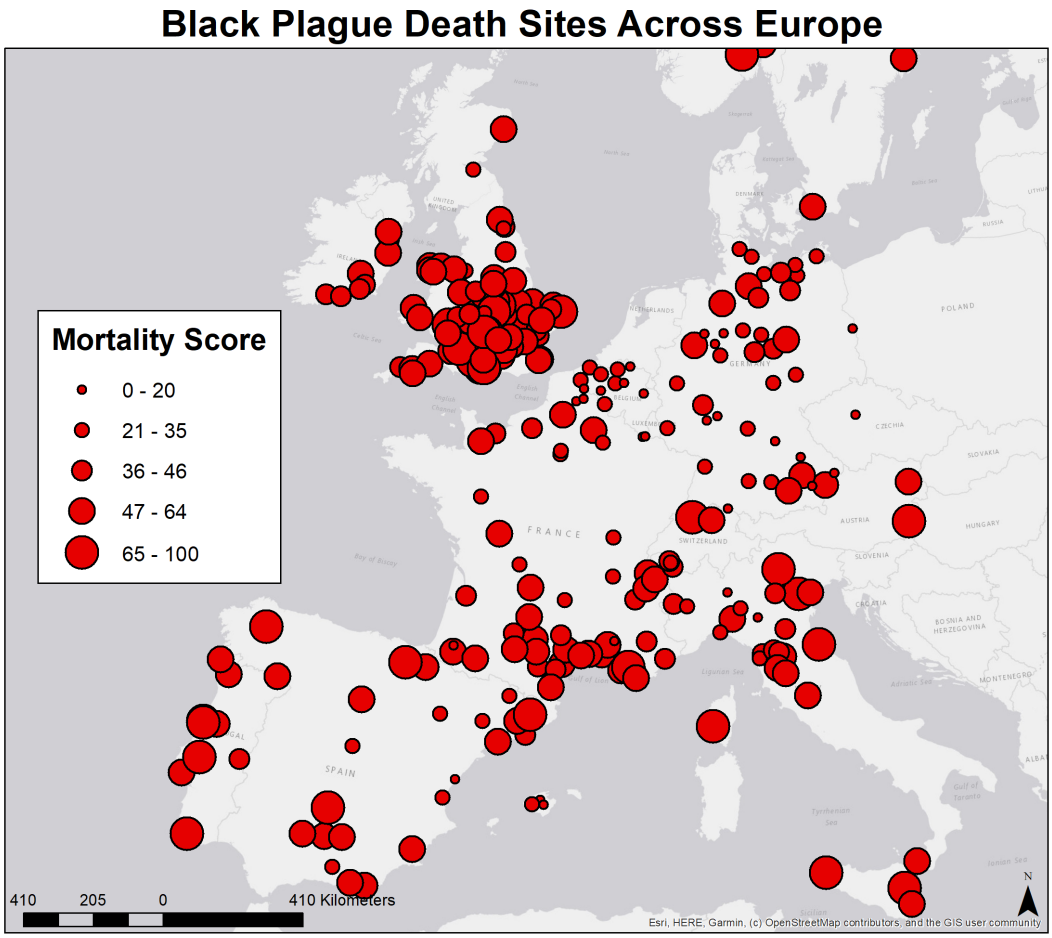
Among its many consequences, the Black Death radically restructured relative factor prices. By culling the labor force but leaving land and capital assets intact, it transformed labor from a highly abundant to a scarce resource. The economic consequences were immediate and long-lasting.[2] For Western Europe, the pandemic ushered in an era of higher real wages—lasting approximately 250 years—along with a lessening of the customary obligations

[1] The loss of life associated with the conquest of the Americas by Europeans, who carried various diseases with them on their journey, was probably even larger in percentage terms (Cook, 1998). However, multiple disease outbreaks and other factors were responsible for this outcome, which occurred over a much longer time period.

[2] 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 2000 years of human history (More, Spaulding, Bohleber, Handley, Hoffmann, Korotkikh, Kurbatov, Loveluck, Sneed and McCormick, 2017).

imposed on peasants in the manorial economy (Hilton, 1969; Pamuk, 2007).

Figure 1: Black Plague Death Sites Across Europe



The macro-level implications of the Black Death for European 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 a mode of economic production characterized by greater urbanization, increasing manufacturing capacity, technological development, and sustained economic growth (Herlihy, 1997; Postan, 1966; Voigtländer and Voth, 2013). These changes made possible the fiscal infrastructure necessary to support standing armies and create nation-states (North and Thomas, 1973). Given its epochal importance for economic

and political organization, the Black Death is widely considered to have produced one of the most important critical junctures in modern history. Indeed, it is thought to be the starting point for what ultimately became large divergences in development between Western and Eastern Europe (Acemoglu and Robinson, 2012) as well as Western Europe and China (Voigtländer and Voth, 2013).[3]

Due to the pioneering data collection effort of Christakos, Olea, Serre, Wang and Yu (2005), the local-level consequences of the Black Death have also recently become an object of scholarly inquiry. Researchers have traced out the long-run consequences of Black Death intensity for city growth (Jedwab, Johnson and Koyama, 2019*b*), the timing of the demographic transition (Siuda and Sunde, 2017), and the persecution of religious minorities (Finley and Koyama, 2018; Jedwab, Johnson and Koyama, 2019*a*). Others have examined the impact of plague shocks more generally on public goods institutions shaping the accumulation of human capital (Dittmar and Meisenzahl, 2019). These important advances notwithstanding, the local-level consequences of the Black Death for political organization and behavior have yet to receive empirical scrutiny.

This is consistent with a general pattern of neglect within the discipline of political science. In spite of 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 Moore (1966) into the social origins of political regimes offers only a single passing reference to the Black Death (for the case of England); the foundational study by Rokkan (1970) of the origins of party politics in Europe ignores it entirely. The classic political histories of European state formation are similarly neglectful of the Black Death: Strayer (1973)

[3]For a discussion of the concept of critical junctures, see Collier and Collier (1991).

and Tilly (1990) only mention it off-hand in general discussions of war and city growth. There are exceptions: Peters (2018) studies the consequences of credit market access for patterns of labor coercion in the aftermath of the Black Death. Yet consistent with earlier scholarship (Blum, 1957; Brenner, 1976), 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 the incidence and intensity of Black Death mortality, our paper examines the long-run social and political consequences of localized Black Death exposure. We concentrate on the historical experience of the German Empire, tracing the consequences of the Black Death from the pre-Reformation period through the end of the 19th century.

The historical experience of the greater German cultural area is particularly apposite for evaluating the long-term political consequences of the Black Death. There was significant regional variation in the mortality caused by the Black Death, making it feasible to identify 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, German-speaking Europe was made up of a 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 continued to shape patterns of political participation up until the early days of the Empire's foundation. 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 (14/15th century to late 18th century). In those areas where the Black Death hit hard, elites were forced to abandon serfdom for an incipient free labor regime. By contrast, in those 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 social 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 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 19th century, the societal conditions generated by the distinct legacies of labor coercion shaped the de facto autonomy of 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 strong support for more liberal parties and weak support for conservative 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 weak support for more liberal parties.

Our empirical findings are consistent with these expectations. Using district-level electoral data from the 1871 legislative elections of the German Empire, we find that geographical

exposure to the Black Death is strongly and negatively related to the percentage of the vote won by the Conservative Party. Moreover, we find that areas least affected by the Black Death were those characterized by societal conditions in which the Conservative Party was likely to thrive. In particular, we find that landholding inequality in the late 19th century was significantly greater in areas with mild exposure to the Black Death than in areas where it had a profound impact.

Additionally, we evaluate our claims about the proximate impact of the Black Death using outcomes from the pre-1517 (Protestant Reformation) period. We show that the intensity of Black Death exposure was positively associated with subsequent *changes* in 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 give us confidence that the Black Death encouraged the development of distinctive regional political traditions that shaped political behavior in the long run.

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 the relative prices of factors 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, including details on data and model specifications. After a discussion of the results, we conclude and consider possible implications of our paper.

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 major changes in economic and political organization. It is widely appreciated that differences in factor prices shape economic inequality (Piketty, 2014; Piketty and Saez, 2014), which, in turn, affects both the incidence of democracy (Acemoglu and Robinson, 2006; Ansell and Samuels, 2014; Boix, 2003) as well as the quality of democratic representation (Bartels, 2008; Gilens, 2012; Uslaner, 2008).

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 (Beramendi and Anderson, 2008; Hall and Soskice, 2001; Rogowski, 1989). The same can be said for political institutions, which structure how public policies are made (Acemoglu, 2010; Persson and Tabellini, 2000).

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. Such a shock must have peculiar characteristics. Holding demand constant, it must dramatically shift the supply of one factor of production while leaving the corresponding supply of the other factor unchanged. Moreover, it must truly be exogenous, in the sense of arising from a process not determined by extant policies and institutional structures.

Few contenders qualify. Natural disasters such as floods and earthquakes—intently studied by students of political accountability—may qualify according to the second criterion but not the first (cf. Gasper and Reeves, 2011; Healy and Malhotra, 2009). Disasters with

origins that are jointly climactic and policy-induced, such as famine, fail to satisfy the second criterion (Bates, 1989). Unambiguously manmade disasters, such as war, clearly fail to satisfy either criterion (Cederman, Gleditsch and Buhaug, 2013; Mansfield and Snyder, 2007). Pandemic diseases, on the other hand, can qualify in certain circumstances.

Pandemics obviously satisfy the first criterion: As agents of biological destruction, they kill workers but spare physical assets. For a pandemic to approximate the features of an exogenous shock, however, its incidence should be unrelated to public health infrastructure in place at the time of the outbreak. In the contemporary era, we know that this generally does not hold: The quality of a nation's public health apparatus is often an important determinant of mortality due to a pandemic (McMillen, 2016).

Yet in the specific case of the Black Death there was no link between disease incidence and public health infrastructure. Caused by the bacteria *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 disease was completely unknown to medicine at the time. Consequently, neither differences in rudimentary public health procedures nor preexisting levels of economic development appeared to determine its timing or intensity (cf. Christakos et al., 2005; Gottfried, 1983).[4] Proximity to trade routes clearly played a role in both respects, but conditional on trade exposure plague mortality was approximately random (Benedictow, 2004; Yue, Lee and Wu, 2017). The Black Death did not seem to discriminate based on social status: It cut down both the wealthy and poor, claiming the lives of the King of Spain, large swathes of the clergy, and countless peasants. At the same time, its geographical intensity was highly uneven: Mortality from the Black Death varied greatly

[4]Ex-post containment measures, such as human quarantines, were similarly ineffective since authorities failed to recognize rats bearing fleas as the vector of transmission.

from locality to locality.[5]

These special features of the Black Death pandemic make it possible to discern the long-term influence of Black Death mortality by employing a limited set of well-defined control variables. Put in more technical terms, the Black Death was a 'treatment' with an allocation rule that is now well-understood by scientists (although it was not understood at all at the time of its spread). Consequently, ex-post statistical control is more likely to illuminate its true impact than would be the case for most phenomena studied in an observational setting.

Our central claim is that mortality from the Black Death influenced the relative price of labor versus land, in turn shaping 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 (North and Thomas, 1973; Postan, 1966; Voigtländer and Voth, 2013). 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 (especially of manufactured goods). 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 the development of Western Europe in the wake of the Black Death.

An alternative account can be classified as the theory of "Elite Reaction." In this account,

[5]The German cities of Bremen and Nuremberg illustrate this unevenness. In spite of the fact that 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, 68).

elites respond to an increase in the scarcity of labor by doubling down on coercion (cf. Blum, 1957; Brenner, 1976; Domar, 1970). 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, technological 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, Acemoglu and Wolitzky (2011) present a framework integrating the mechanisms underlying both accounts. The central implication of the framework 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 labor scarcity increases the value of the good produced by landed elites 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. The examination by Naidu and Yuchtman (2013) of price shocks and labor coercion in industrializing 19th-century Great Britain is largely consistent with Elite Reaction theory, as is the investigation of land-labor ratios and serfdom in 18th-century Bohemian villages by Klein and Ogilvie (2017). On the other hand, the study of workers' outside options and reductions in labor coercion in 19th-century British West Indies by Dippel, Greif and Trefler (2016) is consistent with the logic of Malthusian Exit theory; as is the work of Ardanaz and Mares (2014) on rural wage ratios and elite choices over labor coercing electoral institutions in early 20th-century Prussia.

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, i.e. for small amounts of change within the society being analyzed. The Black Death, by contrast, generated change along the *extensive* margin. Indeed, at an aggregate-level it was one of the largest labor market shocks in modern human history. As we will argue in the subsequent section, the depth of labor scarcity is important in understanding elite reaction to a shock. Reactions to small 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 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 (Bonds, Keenan, Rohani and Sachs, 2010; Gallup and Sachs, 2001; Sachs and Warner, 1997). Exposure to disease for populations in utero has been shown to create developmental disabilities that reduce levels of educational attainment, an important contributor to economic growth (Almond, 2006). In a long-term perspective, diseases may also determine the composition and behavior of the ruling elite. According to Diamond (1998), the immunological advantages conferred upon Europeans by living in proximity to livestock (and suffering through repeated waves of diseases) explain the ease with which they were able to conquer the Americas.

More directly related to the current paper, Acemoglu, Johnson and Robinson (2001) argue that the disease environment at the time of colonization determined the types of political institutions colonizers implanted in their colonies, thereby shaping the quality of government and prospects for economic development in the long run. Our paper 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 Sellars and Alix-Garcia (2018), who study how disease-driven demographic collapse in Mexico during the 16th and 17th centuries shaped rural population dynamics at the turn of the 20th century. Contrary to the tenor of our findings for the Black Death, the authors find that landed estates in 1900 were more populous in areas that had previously experienced a population collapse. We attribute the differences in our findings to very different 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 uniform land ownership structure encounted in German-speaking Europe, it makes sense that the primary consequence of population decline would be an increase in the bargaining power of labor.

In examining how demographic change reshapes social organization and political practices 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 (Moore, 1966; Rueschemeyer, Stephens and Stephens, 1992; Ziblatt, 2008). Moreover, for countries that have already made the transition, the presence of a powerful landed elite fundamentally shapes the manner in which democratic processes play out.

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 (Anderson, Francois and Kotwal, 2015; Scott, 1972; Stokes, Dunning, Nazareno and Brusco, 2013). Consequently, in agrarian settings with dominant landowners, voters are often induced to vote for the politi-

cians that elites prefer, typically conservative politicians inclined to defend the extant property rights regime (Baland and Robinson, 2008; Gingerich, 2020; Gingerich and Medeiros, 2020; Mares, 2015). Our contribution to this literature is to endogenize the sources of landed elite power in a long-term historical perspective. Specifically, we show how exogenous shocks to the labor supply can fundamentally 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 (cf. Kitschelt and Wilkinson, 2007).

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 of the utmost importance. Labor supply shocks of a sufficiently profound magnitude create a new institutional equilibrium that recasts the relationship between lord and peasant, producing more inclusive political traditions that, in the long run, structure mass political behavior. Labor supply shocks that are weaker lead to a retrenchment of social hierarchies and obligations, producing exclusionary political traditions 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. The first is that the shadow price of the coerced laborer's labor skyrockets. 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 in-

creases significantly. 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. Presuming that there are 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 major reduction in the labor supply concerns the prospects for coordination among agrarian elites. Given the reality of a decimated labor force, the competition among agrarian 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.[6] 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 an agrarian

[6]Landlords in England and Spain did this by pressing their Crowns to prohibit the payment of wages at levels higher than those that existed prior to the Black Death. Once promulgated, such statutes proved impossible to enforce and had no lasting effect on wages.

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 its turn, has implications for economic, social, and political organization. In settings where labor coercion has diminished, the freedom 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 jumpstart 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.[7] 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. This leads to the development at the local-level of institutions, such as elected town councils, providing for a (limited form) of self-government. Although traditional elites initially enjoy veto power over such institutions, their very existence encourages non-elite coordination and demand-making. 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. Rather, the basic tripartite Middle Ages class

[7] See Alfani (2015) and Alfani and Ammannati (2017) for direct evidence on the reduction in wealth inequality in the Piedmont and Tuscany regions of Italy following the Black Death.

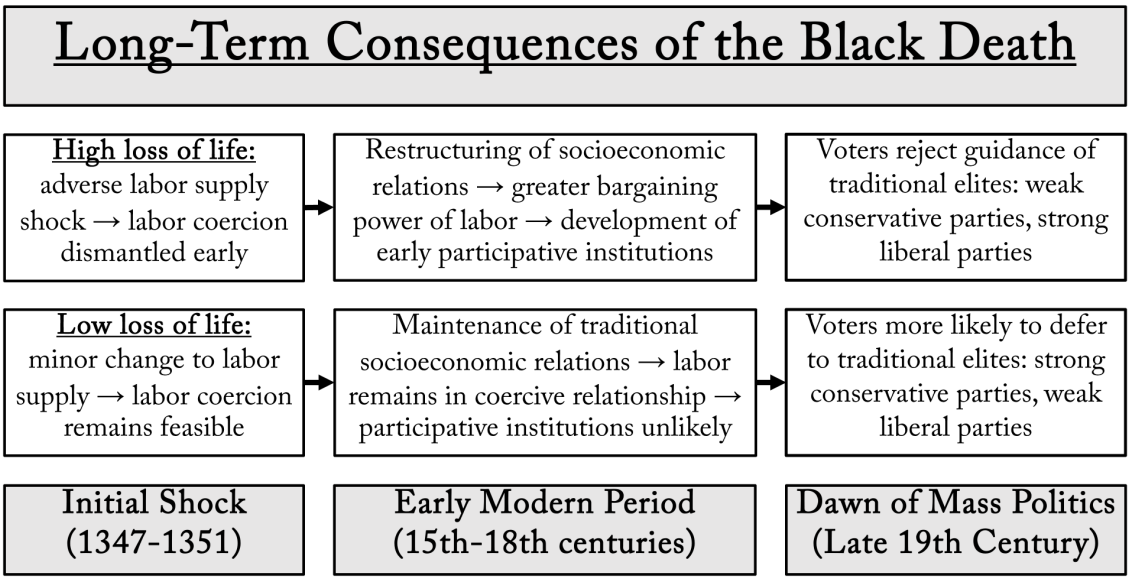
hierarchy—landed elite, clergy, peasants—remains fundamentally unaltered. Peasants remain tied to the land and urban areas are small and few and far between. The adoption of technological innovations, to the extent that these emerge from elsewhere, is actively discouraged by the traditional elites. Land tenure patterns evolve at a glacial pace, if they evolve at all. True political power remains vested in the landed elite, which perpetuates its status through the use of 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 (cf. Frye, Reuter and Szakonyi, 2014; Mares, 2015). 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 (Dee, 2004; Milligan, Moretti and Oreopoulos, 2004; Sondheimer and Green, 2010). 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 (Brusco, Nazareno and Stokes, 2004; Gingerich and Medina, 2013; Weitz-Shapiro, 2012). Finally, due to the erosion of traditional social hierarchies in early reforming areas, voters in these areas are less likely to adhere to norms dictating deference to economic elites. Among such norms are norms of reciprocity, which have historically played an important role in the capacity of local elites to guide the voting decisions of voters (Finan and Schechter, 2012; Lawson and Greene, 2014).

To summarize, the societal context bequeathed by the early erosion of labor coercion is one where 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 neither have strong preferences over contending political forces nor the wherewithal to resist the voting instructions of traditional elites. Figure 2 summarizes the theory.

Figure 2: Long-Term Consequences of the Black Death



4 Background on the Case of Germany

The main 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 14th to 19th 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 the historical experience of this geographic area. The first reason is significant regional variation in the intensity of the Black Death. Much of Germany's 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. Unlike Britain and France, Germany remained politically fragmented for centuries, allowing for local political traditions to persist over extensive time periods (Blanning, 2012; Frost, 2012; Wilson, 2002). In fact, Germany remained split into *hundreds* of principalities, city-states, kingdoms, and Church possessions.

The combination of (1) significant variation in Black Death intensity and (2) the absence of a strong central state makes Germany the ideal case for studying the pandemic's long-term effects. While in other countries a central state was able to supplant local institutions, in Germany local traditions and norms had ample space to survive throughout the period we examine.

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 variation in both (1) fundamental socioeconomic structures and (2) local political behavior. The combined analysis of both outcomes is of prime importance to our argument. Here, we provide a discussion of these outcomes and their relevance in Imperial Germany.

In terms of socioeconomic structures, we study an outcome that reflects power differentials between socioeconomic groups in agrarian societies: the level of land inequality. This is a feature of societies that is often deeply rooted in historical events. Where land inequality is high, a small number of landholders have a disproportionately high share of property in the

agricultural sector, indicating that it is more elite-dominated. By reflecting socioeconomic power asymmetries, land inequality likely is indicative of expected political outcomes as well.[8]

In terms of political outcomes, we consider voting behavior in elections of the Imperial Diet (*Reichstag*). The Imperial Diet was the lower chamber of the Empire's legislature. Although it was less powerful than many present-day parliaments, its elections still 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.[9] Two outcomes are of greatest interest to us: (1) the vote share that the Conservative party received in 1871 and (2) the number of electoral disputes between 1871 and 1912, with the latter indicating violations of electoral rules (typically by elites) and being studied extensively by Ziblatt (2009) and Mares and Zhu (2015).[10]

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, against socioeconomic changes caused by industrialization, and against national unification, as the latter was perceived to threaten the aristocracy (Anderson, 2000, Ch. 6; Berdahl, 1972, esp. 3-4, 18; Berdahl, 1988; Eley, 1986; Retallack, 1988, 13-14; Retallack, 2006).[11] While the party ran in formally democratic elections, it used intimidation, clientelism, and the coerced mobilization of agricultural workers to improve

[8]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 to our empirical analysis (subsection A.6).

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

[10]For a concrete example of an intensely contested election, see Anderson (2013).

[11]This was especially true for 1871, when the Conservative Party still endorsed an "estate society." Yet their vision's incompatibility with capitalist development made the party give up on this goal, as was expressed in the party's reorganization in 1876 as the "German Conservative Party" (Berdahl, 1972, 2-3).

its chances of victory (Anderson, 1993; Anderson, 2000, Ch. 6; Mares, 2015, Ch. 3-5; Nipperdey, 1961, Ch. 5). Anderson (2000, 164) describes some of the tactics used by the landed elites to shape election outcomes:

> "[E]state officials ... were rarely nice about the methods they used to produce election results. Burly forest wardens stationed themselves at the polls, grabbed hapless citizens, and searched him for offending ballots. His pockets turned inside out, the bread lord's ballot thrust into his hand, ordered to keep his hands high above his head, the voter was then shoved or kicked up to the voting table."

As such tactics demonstrate, while formal regulations of elections were the same across Germany, local socioeconomic conditions and political norms varied significantly (Eley, 1986). This significant divergence also led to a variation in the parties that ran across different districts (Sperber, 1997, 26, 114). In some electoral districts, parties did not find the necessary social or economic conditions to be viable competitors.[12] For the Conservative Party, land inequality was a key factor determining its electoral viability, and the socioeconomic structures associated with high land inequality created a political culture that facilitated abuses of power and undermined democratic elections (Anderson, 2000, Ch. 6; Ziblatt, 2008; Ziblatt, 2009). Yet where these conditions did not exist, the Conservative Party had little chance of succeeding in open electoral competition.

Considering socioeconomic circumstances as important determinants of electoral outcomes is in line with previous scholarly work on Imperial Germany. Most importantly, Lepsius (1966) argues that parties in 19th-century Germany reflected "sociomoral milieus," which were themselves based in deeply rooted factors, such as culture, socioeconomic conditions, and political norms (Hübinger, 2008; Sperber, 1997, 3).[13] Importantly, this variation

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

[13] Variations in local culture and norms can persist over long time periods and shape political-economic outcomes (Acharya, Blackwell and Sen, 2018; Alesina and Giuliano, 2015; Vogler, 2019).

predated industrial society and thus also the Empire's political system (Sperber, 1997, 4-5).

We focus on electoral outcomes in 1871 because electoral politics in the following decades became more nationalized, impacting social attitudes and ultimately leading to the development of a national democratic culture (Anderson, 1993, 2000). This entailed a move away from the highly decentralized initial conditions. Additionally, after 1871, the second wave of industrialization took off in Germany and lead to rapid and comprehensive social transformation (Hahn, 2011; Sperber, 1997, 5; Streb, Baten and Yin, 2006). One of the consequences was the rise of Social Democracy and a realignment of the party system (Berman, 2001, esp. 441-442, 445-446; Sperber, 1997, esp. 7). In particular, the year 1890 is viewed as the turning point from more elite-centered politics to more popular politics (Sperber, 1997, 19).[14] Because of all these subsequent developments, we focus on electoral outcomes in 1871.[15]

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 (2019*a*) on

[14] For instance, as of 1890 all major parties began to become more active in rural areas that had previously been dominated by the landed elites (Eley, 1986).

[15] In terms of electoral disputes, however, we investigate a longer period as detailed in the next section.

recorded outbreaks in European towns, which itself is primarily based on Christakos et al. (2005), 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 in specific locations, 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 the following: 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. But if many locations in an area are hit by an adverse shock at the same time, then it is much more difficult to return to a previous equilibrium, even with a mobile production factor like labor.

Mathematically, the *BDEI score* represents the sum of recorded outbreak intensities 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.[16]

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:

Socioeconomic Conditions

1. ***Land inequality (Gini coefficient):*** Data on land inequality in Imperial Germany

[16]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 historical knowledge on the spread of the Plague and they represent the best and most fine-grained measures currently available. Thus, our score provides a reasonable approximation to the historical intensity of Black Death outbreaks at any given location.

are provided by Ziblatt (2009), who uses the Gini coefficient to compute a score between 0 (absolute equality) and 1 (absolute inequality).[17]

Political Outcomes

2. ***Conservative Party vote share (1871):*** Data on electoral outcomes are provided by Sperber (1997). These data reflect the vote share of the Conservative Party in the 1871 elections.

3. ***Net electoral disputes (1871-1912):*** Data on electoral disputes in Imperial Germany are originally collected by Robert Arsenschek and provided in a digital format by Ziblatt (2009).[18] These data reflect the cumulative number of disputes that occurred in all peacetime elections of Imperial Germany.[19]

5.3 Imperial Germany: Control Variables

It is crucial to control for factors that could affect both historical Black Death intensity and subsequent long-run political-economic outcomes. While the electoral districts of 1871 were an entirely novel unit of organization for which there were no prior *unit-specific* historical data collected, 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 that were often transported by merchants and commercial ships. All these geographic measures were computed in ArcGis or in R using data by GeoNames (2020).

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. Therefore, urban density

[17] Furthermore, in the appendix (subsection A.6), we provide results of a land inequality measure conditional on the size of the agricultural workforce to account for variation in the relevance of agriculture. See Mares (2015, 23-24, Ch. 4) for a directly related argument. Data on the size of the agricultural workforce are by Reibel (2007), with Ziblatt (2009) offering a digitized version.

[18] See also Arsenschek and Ziblatt (2008).

[19] The primary reason for 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.

in 1300 is a key control variable. We use data by Wahl (2019) on town population sizes to compute a historical urban density score for each of our electoral districts.[20]

2. ***Distance to the nearest major port:*** This measure reflects the distance to the nearest major port. As one of the ways the Black Death spread was through infected rats on trade ships, this is an important variable to include. It could also influence present-day outcomes by having a long-term impact on commerce levels and economic activity.

3. ***Distance to the nearest medieval trade town:*** This measure reflects the distance to the nearest medieval trade town. The reason for inclusion is the same as above.[21]

4. ***Distance to the ocean:*** While major ports were the primary centers of sea trade, we do not have precise data on distance to minor ports. Therefore, we include distance to the ocean as a proxy.

5. ***Distance to the nearest large river:*** Much trade took place on large, navigable rivers. Therefore, we include an additional control showing distance to the nearest large river.

6. ***Elevation***: Elevation could have an impact on the spread of the Black Death by affecting the accessibility of population centers to outsiders. It may also directly affect political-economic outcomes, making it an important control variable.

5.4 Imperial Germany: Extensions

In the study's appendix, we present multiple extensions of the empirical test. In the first extension, we include additional covariates for the *population size* of electoral districts and a dummy variable indicating if a district belonged to *Prussia*. In the second extension, we take into account a variable that reflects variations in the long-term impact of the Reformation: *the share of Catholics* in an electoral district. In the third extension, we calculate the *BDEI score* on an alternative set of outbreak observations. In the fourth extension, we condition *land inequality* on the overall relevance of agriculture in a specific electoral district. In the

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

[21] See Wahl (2016*a*) for a detailed examination of the long-run influence of trade on economic development.

fifth and most important extension, we use the timing of the Plague outbreak to isolate quasi-random variation in mortality rates. Specifically, we conduct a two-stage least squares (2SLS) analysis where we instrument for Black Death mortality using the quarter and calendar year of the local-level outbreak. This strategy is based on the observation that the Plague was most severe in the spring and summer and that its intensity waned over time (Benedictow, 2004; Gottfried, 1983). We then check if our 2SLS results are consistent with the original OLS estimates. In the final extension, we replace our absolute distance measures to geographic features with dummy variables indicating a distance of less than 10 km from the electoral district. All details on these six extensions can be found in the appendix.

5.5 Pre-Reformation Germany: Introduction of Participative Elections (1300-1500)

In addition to our primary analysis detailed above, we add a secondary set of empirical tests focused on changes in participative institutions at the town level between 1300 to 1500. This set of analyses is meant to evaluate empirical support for the transmission mechanisms outlined in our theoretical framework.

Here, we focus on a binary dependent variable based on data compiled by Wahl (2016*b*): *introduction of participative elections (1300-1500)*. This variable is equal to 1 for towns that newly adopted local participative elections during the 1300-1500 period; 0 otherwise.[22] Note that "participative elections" in medieval Germany did not refer to a participatory democracy with full voting rights for all citizens. Instead, such elections consisted of contests for the city council or other local offices, usually with limited public participation. That said, even these forms of "moderate" citizen participation are still indicative of important changes in

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

political institutions and norms.[23]

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

Specifically, we include control 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 (2019), which provides significant detail on coding procedures.

5.6 Empirical Specifications

We use a range of outcome variables with different properties and adjust our empirical models accordingly. With respect to *land inequality* and *conservative vote share*, we primarily use OLS regression with clustered standard errors.[24] Since these two variables are truncated, i.e. they all have an upper and lower limit in their value, we also provide an alternative set of results using Tobit models in the appendix.

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*. When we do not include

[23] Further details on the underlying data and coding are provided by Wahl (2016*b*).

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

covariates, $\mathbf{x_i'}\,\boldsymbol{\beta}$ is omitted.

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

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

where $LMR_j \in (0, 1]$ is the local mortality rate at outbreak site j and $DIST_{ji} \in (0, 1]$ is the distance between i and j, which is used as the weight (with locations farther away from i being weighted down).[25] The parameter $k \in \{3, 6, 9, 12, 15\}$ for versions 1 through 5 of BDEI, respectively, represents the distance discount factor. It is roughly equivalent to a bandwidth parameter in nonparametric regression. The further an outbreak site is from the location under consideration i, the more it 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 all of them to have a mean of $\mu = 0$ and a standard deviation of $\sigma = 1$.

Moreover, when considering net electoral disputes, which is a count variable, we use quasi-Poisson models. Quasi-Poisson models are based on regular Poisson regressions and begin with the following equation:

$$Pr(Y = y_i|\mu_i) = \frac{e^{-\mu_i}{\mu_i}^{y_i}}{y_i!}, \quad y_i = 0, 1, 2, \ldots \tag{3}$$

For each observation i, μ_i is determined by:

$$log(\mu_i) = \beta_0 + \beta_1\ BDEI\ Score_i + \mathbf{x_i'}\,\boldsymbol{\beta} \tag{4}$$

[25] The upper bound of 1 represents the maximum distance in the universe of cases under consideration.

The coefficient estimates (β) of the quasi-Poisson model are the same as in the standard Poisson model. Additionally, going beyond standard Poisson models, to account for variation in dispersion of the count variable, the quasi-Poisson adjusts the standard errors and p-values of the coefficients.

Finally, we use logistic regression when analyzing the binary variable *introduction of participative elections (1300-1500)*. The logistic regressions have the following form:

$$Pr(Y_i = 1) = \frac{e^{\beta_0 + \beta_1 \ BDEI \ Score_i + \mathbf{x_i'} \ \boldsymbol{\beta}}}{1 + e^{\beta_0 + \beta_1 \ BDEI \ Score_i + \mathbf{x_i'} \ \boldsymbol{\beta}}} \tag{5}$$

6 Results

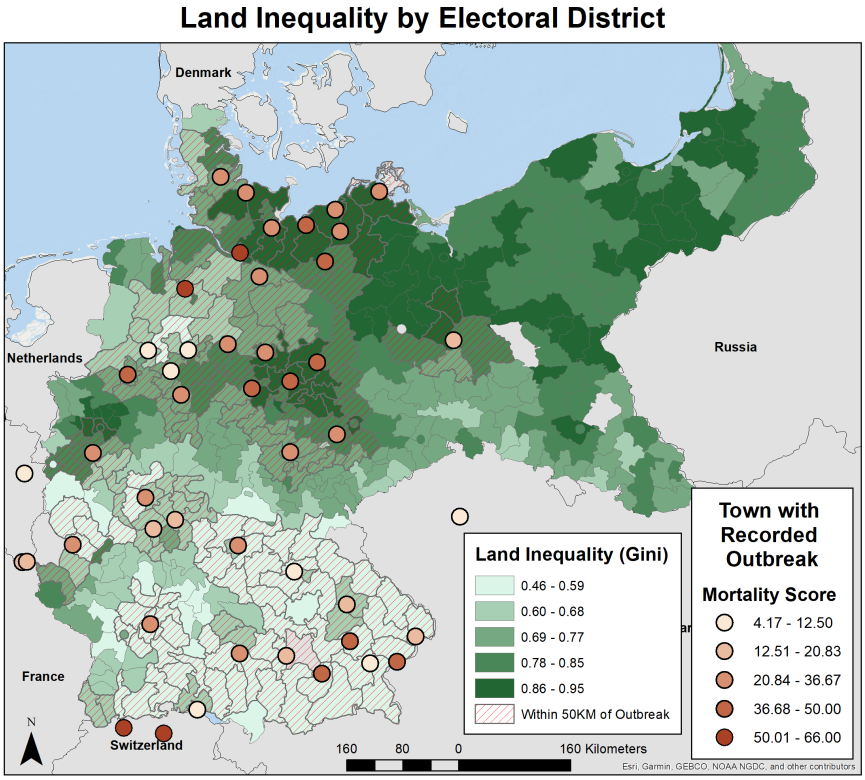
In this section, we discuss the results of our empirical analysis, beginning with the outcomes in Imperial Germany and then moving on to an examination of the pre-Reformation period.

6.1 Imperial Germany: Socioeconomic Conditions and Political Outcomes

The results of our empirical analysis show a strong relationship between the intensity of the Black Death and political-economic outcomes in Imperial Germany.

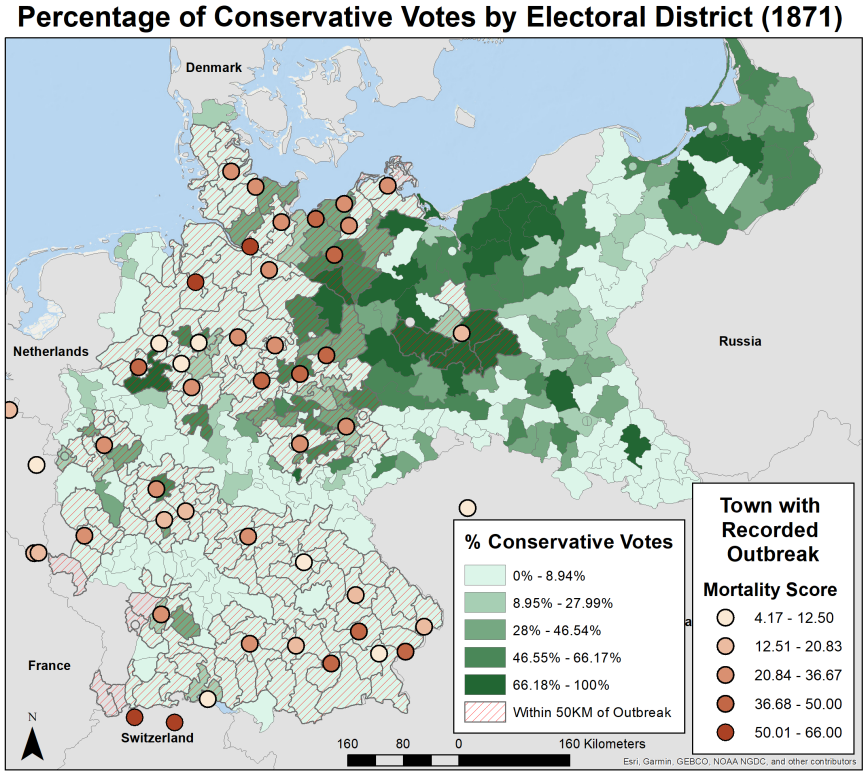
We begin by considering a graphical overview of *land inequality* across the German electoral districts as provided in Figure 3. The towns with recorded outbreaks of the Black Death are displayed as circles and the intensity of the outbreak is visible in the circles' color. As evident in the figure, the electoral districts in northeastern Germany in particular exhibit high levels of land inequality. Additionally, almost all electoral districts in the easternmost parts have above-average levels of inequality in landholding.

Figure 3: Land Inequality by Electoral District



As discussed earlier, we also expect a long-term impact on *Conservative Party vote share*. This is clearly reflected in Figure 4, which shows the party's vote share across electoral districts. As we can see, the Conservative Party is systematically stronger in the areas of Germany where there were fewer and less intense recorded Black Death outbreaks. At the same time, as suggested earlier, landholding inequality appears to also have a positive impact on conservative votes. In many other places, though, the socioeconomic conditions were such that the Conservative Party did not even nominate a candidate, resulting in a vote share of zero.

Figure 4: Percentage of Conservative Votes by Electoral District (1871)



Next we turn to our regression analysis. Table 1 shows our findings with respect to *land 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 all previously discussed control variables. Across all empirical 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 *land inequality (Gini)* that ranges from 0.044 to 0.061, depending on model specification. Figure 5 shows the marginal effects of *BDEI score v1*. Additional Tobit models can be found in the appendix (subsection A.2).

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) the full set of control

variables. In line with our theory, the Conservative party is weak 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 conservative vote share ranging from 0.109 to 0.139, depending on model specification. The results are comparable to the above findings, highlighting the pandemic's long-term influence. Figure 6 shows the marginal effects of *BDEI score v1*. Additional Tobit models with this outcome variable can be found in the appendix (subsection A.2).

Finally, Table 3 shows the results of quasi-Poisson regressions on electoral disputes. Here we also find a result that is in line with our theoretical expectations: In places where the Black Death was more intense, 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 -0.168 to -0.275, depending on model specification.

In the extensions located in the appendix, we find that our results generally hold. Most importantly, we also use a 2SLS approach in which we first predict the intensity of outbreaks based on the timing of the first incident and then, in a second step, calculate new *BDEI scores*. Using this two-stage method, our baseline results are confirmed again.

In short, we find comprehensive evidence that the Black Death shaped socioeconomic structures and local political behavior in the long run. Both in terms of land inequality and the electoral viability of the Conservative Party, we find that regional variation in the intensity of plague outbreaks in the 14th century has strong predictive power for economic and political outcomes in the 19th century.

Figure 5: Marginal Effects Plot: BDEI Score v1 and Land Inequality (Gini)

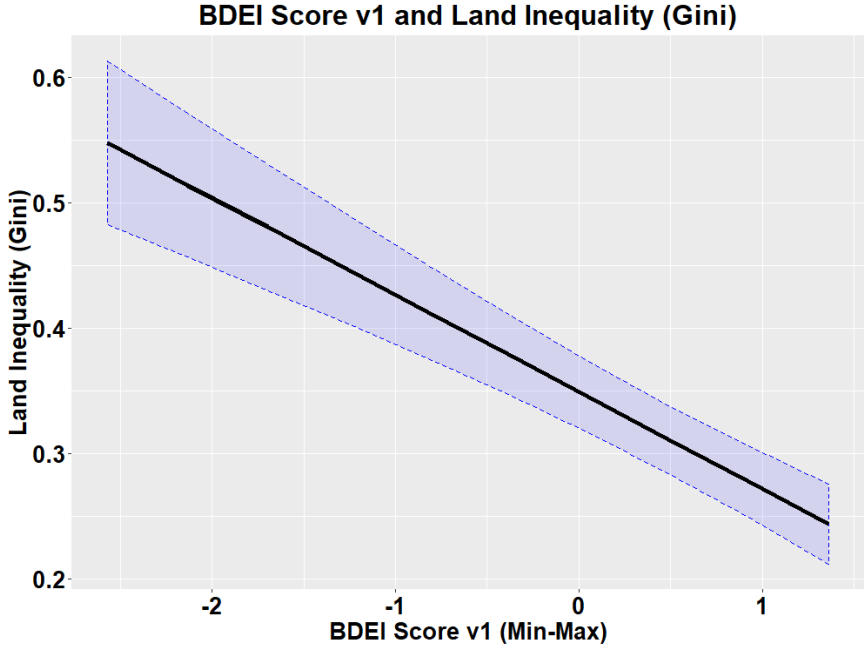


Figure 6: Marginal Effects Plot: BDEI Score v1 and Conservative Party Vote Share

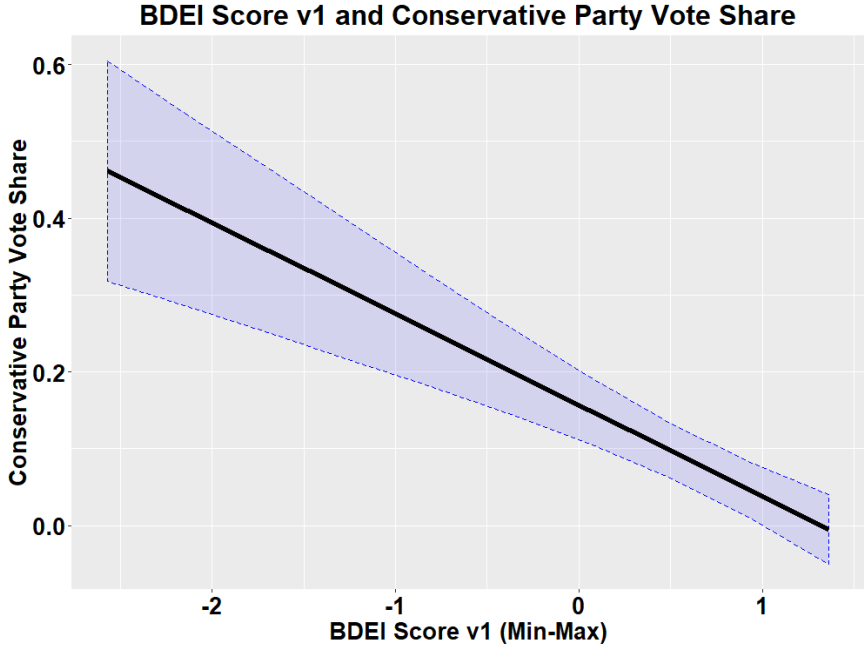


Table 1: Land Inequality (OLS)

	Dependent variable:									
	Land Inequality (Gini)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	-0.061^{***}					-0.054^{***}				
	(0.011)					(0.014)				
BDEI Score v2		-0.060^{***}					-0.049^{***}			
		(0.011)					(0.013)			
BDEI Score v3			-0.059^{***}					-0.047^{***}		
			(0.011)					(0.013)		
BDEI Score v4				-0.057^{***}					-0.046^{***}	
				(0.011)					(0.013)	
BDEI Score v5					-0.053^{***}					-0.044^{***}
					(0.011)					(0.013)
Urb. Dens. 1300						0.023^{*}	0.018^{*}	0.016	0.017	0.017
						(0.012)	(0.011)	(0.010)	(0.011)	(0.011)
Dist. Maj. Port						-0.0001^{*}	-0.0001^{*}	-0.0001^{**}	-0.0002^{**}	-0.0002^{**}
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Trade Town						-0.0001	-0.0001	-0.0001	-0.0001	-0.00004
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Ocean						-0.0001^{**}	-0.0001^{**}	-0.0001^{**}	-0.0001^{**}	-0.0001^{*}
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. River						-0.0001	-0.00004	-0.00003	-0.00002	-0.00001
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Elevation						-0.0002^{***}	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}
						(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)
Constant	0.725^{***}	0.725^{***}	0.725^{***}	0.725^{***}	0.725^{***}	0.849^{***}	0.850^{***}	0.852^{***}	0.855^{***}	0.860^{***}
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.020)	(0.020)	(0.020)	(0.019)	(0.019)
Observations	385	385	385	385	385	385	385	385	385	385
R^2	0.261	0.255	0.243	0.223	0.194	0.573	0.571	0.567	0.560	0.551
Adjusted R^2	0.259	0.253	0.241	0.221	0.192	0.565	0.563	0.558	0.552	0.543

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	-0.119^{***}					-0.139^{***}				
	(0.022)					(0.033)				
BDEI Score v2		-0.118^{***}					-0.126^{***}			
		(0.023)					(0.031)			
BDEI Score v3			-0.116^{***}					-0.121^{***}		
			(0.023)					(0.030)		
BDEI Score v4				-0.113^{***}					-0.121^{***}	
				(0.024)					(0.032)	
BDEI Score v5					-0.109^{***}					-0.122^{***}
					(0.025)					(0.034)
Urb. Dens. 1300						0.054	0.040	0.036	0.040	0.047
						(0.039)	(0.037)	(0.037)	(0.039)	(0.042)
Dist. Maj. Port						-0.00004	-0.00005	-0.0001	-0.0001	-0.0002
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Dist. Trade Town						0.0001	0.0001	0.0001	0.0002	0.0002
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Dist. Ocean						-0.0004^{**}	-0.0004^{**}	-0.0004^{**}	-0.0004^{**}	-0.0003^{*}
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Dist. River						-0.0002	-0.0002	-0.0002	-0.0002	-0.0001
						(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Elevation						0.00003	0.00002	0.00001	0.00000	-0.00001
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	0.157^{***}	0.157^{***}	0.157^{***}	0.157^{***}	0.158^{***}	0.248^{***}	0.250^{***}	0.255^{***}	0.263^{***}	0.274^{***}
	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.070)	(0.071)	(0.071)	(0.072)	(0.073)
Observations	370	370	370	370	370	370	370	370	370	370
R^2	0.217	0.215	0.209	0.200	0.186	0.298	0.294	0.290	0.287	0.284
Adjusted R^2	0.215	0.213	0.207	0.197	0.184	0.284	0.280	0.276	0.273	0.270

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	−0.198***					−0.275***				
	(0.052)					(0.087)				
BDEI Score v2		−0.198***					−0.245***			
		(0.056)					(0.083)			
BDEI Score v3			−0.194***					−0.232***		
			(0.057)					(0.082)		
BDEI Score v4				−0.184***					−0.223***	
				(0.058)					(0.082)	
BDEI Score v5					−0.168***					−0.209**
					(0.059)					(0.083)
Urb. Dens. 1300						0.146**	0.114*	0.105	0.106	0.106
						(0.068)	(0.064)	(0.065)	(0.068)	(0.073)
Dist. Maj. Port						0.0002	0.0002	0.0001	0.00001	−0.0001
						(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dist. Trade Town						0.0003	0.0003	0.0003	0.0004	0.0004
						(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dist. Ocean						−0.001	−0.001	−0.001	−0.001	−0.001
						(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dist. River						0.002*	0.002*	0.002*	0.002*	0.002*
						(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Elevation						−0.0004	−0.0004	−0.0004	−0.0004	−0.0005
						(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Constant	0.854***	0.854***	0.855***	0.857***	0.860***	0.923***	0.928***	0.939***	0.957***	0.979***
	(0.066)	(0.066)	(0.066)	(0.067)	(0.067)	(0.148)	(0.149)	(0.149)	(0.149)	(0.149)
Observations	385	385	385	385	385	385	385	385	385	385

Note: Quasi-Poisson, Clust. SE

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

6.2 Pre-Reformation Germany: Introduction of Participative Elections

Next we focus on a second 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 4 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 4: Introduction of Participative Elections (1300-1500)

	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 5, we add a variety of control variables, including geographic factors. While the results are not significant or only weakly in two specifications, the direction of the

effect remains the same and the lower level of significance is likely partially related to the much smaller number of cases for which data on covariates 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 19th century.

Table 5: Introduction of Participative Elections (1300-1500)

	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)
Elevation	−0.002	−0.001	−0.001	−0.001	0.0002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Distance to River	0.007	0.008	0.008	0.008	0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Roman Road	−0.137	−0.060	0.098	0.310	0.466
	(1.045)	(1.030)	(1.014)	(1.003)	(1.000)
Coast	−18.130	−18.129	−18.050	−16.895	−16.721
	(2,355.184)	(2,381.540)	(2,407.436)	(1,472.045)	(1,479.105)
Agricult. Suit.	0.020	0.020	0.020	0.019	0.017
	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)
Population (Log.)	−0.423	−0.403	−0.377	−0.355	−0.335
	(0.411)	(0.409)	(0.407)	(0.405)	(0.405)
Ruggedness	−0.064**	−0.064**	−0.063**	−0.061**	−0.058**
	(0.031)	(0.031)	(0.030)	(0.029)	(0.028)
Urban Potential 1300	−0.001	−0.001	−0.001	−0.0005	−0.0002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.0004)
Trade City 1300	−4.744	−4.618	−4.397	−4.068	−3.753
	(6.797)	(6.396)	(5.698)	(4.971)	(4.573)
Proto-Indust. City 1300	4.888	4.878	4.726	4.407	4.046
	(6.750)	(6.355)	(5.663)	(4.941)	(4.543)
Constant	9.264	8.204	6.583	4.502	2.593
	(5.827)	(5.522)	(5.118)	(4.661)	(4.279)
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

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 (cf. Collier and Collier, 1991; Mahoney, 2001). As moments in time, critical junctures are defined by significant upheaval and fluidity (Capoccia, 2015): 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 (Roberts, 2002; Tarrow, 2017). 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 paper examined 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-14th 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, the study explicitly laid out all four stages of analysis necessary for establishing the importance of a critical juncture (Collier and Munck, 2017): (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 19th century).

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

veloped more inclusive political institutions at the local-level and more equitable ownership of land. Contrariwise, those areas less affected by the Black Death maintained political institutions and land ownership patterns that concentrated political and economic power. In the first set of areas, voters in the late 19th century would come to reject the Conservative Party in electoral competition, an outcome indicative of autonomy of voters from the directives of the landed elite. In the second set of areas, voters would overwhelmingly cast their votes in favor of the Conservative Party, indicative 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.

What lessons does the Black Death offer about the potentially transformative role of pandemics more generally? 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 twist of irony, the experience of the Black Death demonstrates that the long-term political independence of labor may have in fact 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 sufficiently 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 (cf. Hossain, Phillips and LeGrand, 2007).

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.

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A Appendix

This appendix includes additional empirical evidence and further discussions of claims that were made in the main body of the paper. In subsection A.1, we provide summary statistics for electoral districts in Imperial Germany. In subsection A.2, we show the results when using Tobit models instead of OLS regression. In subsection A.3, we include additional control variables that were not in the main analysis because they may be subject to posttreatment bias. In subsection A.4, we provide a second empirical response to the argument that the Reformation could be responsible for the observed patterns in 19th-century Germany. In subsection A.5, we exclude a number of observations when calculating the *BDEI score*. In subsection A.6, we provide results for a measure of land inequality that is conditioned on the relevance of agriculture versus other sectors of the economy. In subsection A.7, we use the timing of the Black Death outbreak as an instrument in a two-stage regression format to more effectively isolate the quasi-random component of Black Death intensities. In subsection A.8, we show results when using dummy variables instead of absolute distances to geographic features. In subsection A.9, we provide summary statistics for towns in pre-Reformation Germany.

A.1 Imperial Germany: Descriptive Summary Statistics

Table A1 shows descriptive summary statistics for electoral districts in Imperial Germany.

Variable	n	Min	q_1	$\bar{x}$	$\tilde{x}$	q_3	Max	IQR
BDEI Score v1	385	-2.57	-0.68	0.00	0.22	0.86	1.36	1.54
BDEI Score v2	385	-2.24	-0.75	0.00	0.20	0.86	1.42	1.62
BDEI Score v3	385	-2.11	-0.77	0.00	0.23	0.83	1.47	1.61
BDEI Score v4	385	-2.07	-0.79	0.00	0.29	0.82	1.42	1.60
BDEI Score v5	385	-2.06	-0.77	0.00	0.39	0.80	1.31	1.57
Land Inequality (Gini)	397	0.46	0.63	0.73	0.73	0.83	0.95	0.20
Conserv. Party Vote Share (1871)	382	0.00	0.00	0.16	0.00	0.29	1.00	0.29
Net Electoral Disputes (1871-1912)	397	0.00	1.00	2.39	2.00	3.00	10.00	2.00
Urban Density 1300 (Standardized)	385	-3.04	-0.37	0.00	0.25	0.76	1.20	1.13
Dist. to Major Port (km)	385	0.00	173.91	262.03	273.77	358.70	460.33	184.80
Dist. to Trade Town (km)	385	0.00	34.54	91.18	62.85	114.99	470.02	80.45
Dist. to Ocean (km)	385	0.00	87.03	221.23	215.47	348.16	582.91	261.13
Dist. to Large River (km)	385	0.00	0.00	34.32	19.66	56.75	157.30	56.75
Elevation	385	-15.00	70.00	223.18	159.00	330.00	979.00	260.00
Population	391	32.06	91.67	103.30	104.40	114.34	208.00	22.67
Prussia	397	0.00	0.00	0.59	1.00	1.00	1.00	1.00
Percent Catholic (1871)	397	0.00	0.02	0.37	0.23	0.73	1.00	0.71
BDEI Score v1 (Alt.)	385	-2.65	-0.72	0.00	0.18	0.81	1.58	1.53
BDEI Score v2 (Alt.)	385	-2.41	-0.75	0.00	0.22	0.77	1.63	1.52
BDEI Score v3 (Alt.)	385	-2.31	-0.69	0.00	0.29	0.76	1.60	1.45
BDEI Score v4 (Alt.)	385	-2.24	-0.68	0.00	0.39	0.73	1.51	1.41
BDEI Score v5 (Alt.)	385	-2.17	-0.71	0.00	0.47	0.75	1.39	1.46
BDEI Score v1 (St. 2)	385	-2.61	-0.70	0.00	0.23	0.87	1.32	1.57
BDEI Score v2 (St. 2)	385	-2.28	-0.78	0.00	0.23	0.89	1.35	1.67
BDEI Score v3 (St. 2)	385	-2.13	-0.77	0.00	0.23	0.87	1.34	1.64
BDEI Score v4 (St. 2)	385	-2.06	-0.79	0.00	0.29	0.86	1.30	1.66
BDEI Score v5 (St. 2)	385	-2.01	-0.83	0.00	0.37	0.83	1.22	1.66
Dummy Major Port ($\leq$ 10km)	385	0.00	0.00	0.03	0.00	0.00	1.00	0.00
Dummy Trade Town ($\leq$ 10km)	385	0.00	0.00	0.11	0.00	0.00	1.00	0.00
Dummy Ocean ($\leq$ 10km)	385	0.00	0.00	0.13	0.00	0.00	1.00	0.00
Dummy River ($\leq$ 10km)	385	0.00	0.00	0.40	0.00	1.00	1.00	1.00

Table A1: Descriptive Statistics: Imperial Germany

A.2 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Tobit Models as an Alternative Specification

In our main empirical analysis we use OLS regression to estimate the impact of the *BDEI score* on *land inequality* and *Conservative Party vote share*. Because these two outcome variables have an upper and lower bound, we also use Tobit models as an alternative empirical specification.

Table A2 shows the results with respect to *land inequality* when using Tobit models. Furthermore, Table A3 shows the results with respect to *Conservative Party vote share* when using Tobit models. In both cases, the direction, magnitude, and significance of the coefficients do not change in a way that would alter our previous interpretation.

Table A2: Land Inequality (Tobit)

	Dependent variable:									
	Land Inequality (Gini)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	-0.061^{***}					-0.054^{***}				
	(0.005)					(0.007)				
BDEI Score v2		-0.060^{***}					-0.049^{***}			
		(0.005)					(0.006)			
BDEI Score v3			-0.059^{***}					-0.047^{***}		
			(0.005)					(0.006)		
BDEI Score v4				-0.057^{***}					-0.046^{***}	
				(0.005)					(0.006)	
BDEI Score v5					-0.053^{***}					-0.044^{***}
					(0.005)					(0.007)
Urb. Dens. 1300						0.023^{***}	0.018^{***}	0.016^{**}	0.017^{**}	0.017^{**}
						(0.007)	(0.006)	(0.006)	(0.007)	(0.007)
Dist. Maj. Port						-0.0001^{**}	-0.0001^{**}	-0.0001^{**}	-0.0002^{***}	-0.0002^{***}
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Trade Town						-0.0001	-0.0001	-0.0001	-0.0001	-0.00004
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Ocean						-0.0001^{***}	-0.0001^{***}	-0.0001^{**}	-0.0001^{**}	-0.0001^{*}
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. River						-0.0001	-0.00004	-0.00003	-0.00002	-0.00001
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Elevation						-0.0002^{***}	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}
						(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Constant	0.725^{***}	0.725^{***}	0.725^{***}	0.725^{***}	0.725^{***}	0.849^{***}	0.850^{***}	0.852^{***}	0.855^{***}	0.860^{***}
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Observations	385	385	385	385	385	385	385	385	385	385
Log Likelihood	329.752	328.187	325.240	320.141	313.038	435.393	434.396	432.475	429.644	425.875

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

Table A3: Conservative Party Vote Share (Tobit)

	Dependent variable:									
	Conservative Party Vote Share									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.234***					−0.285***				
	(0.027)					(0.045)				
BDEI Score v2		−0.235***					−0.257***			
		(0.027)					(0.042)			
BDEI Score v3			−0.232***					−0.246***		
			(0.027)					(0.041)		
BDEI Score v4				−0.225***					−0.244***	
				(0.027)					(0.041)	
BDEI Score v5					−0.215***					−0.244***
					(0.027)					(0.042)
Urb. Dens. 1300						0.122***	0.091**	0.084**	0.090**	0.102**
						(0.042)	(0.039)	(0.039)	(0.040)	(0.042)
Dist. Maj. Port						0.0002	0.0002	0.0001	−0.00002	−0.0002
						(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Dist. Trade Town						0.00000	−0.00000	0.00002	0.0001	0.0001
						(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Dist. Ocean						−0.001***	−0.001***	−0.001***	−0.001***	−0.001**
						(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Dist. River						−0.0001	0.00003	0.0001	0.0001	0.0002
						(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Elevation						−0.0002	−0.0002	−0.0002	−0.0002	−0.0003
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Constant	−0.085***	−0.086***	−0.086***	−0.085***	−0.084***	0.145*	0.148*	0.158**	0.174**	0.195**
	(0.032)	(0.032)	(0.032)	(0.032)	(0.032)	(0.078)	(0.078)	(0.078)	(0.078)	(0.078)
Observations	370	370	370	370	370	370	370	370	370	370
Log Likelihood	−208.833	−209.094	−210.278	−212.386	−215.291	−184.447	−185.536	−186.410	−187.164	−187.989

Note: Tobit

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

A.3 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 1: Including Additional Covariates

In the main body of the paper we did not include any political or social control variables specific to 19th-century Germany due to the possibility of introducing *post-treatment bias*. Nevertheless, in a limited number of cases, the inclusion of further controls from this time period may be justified due to their substantive or technical relevance. We elaborate on two specific instances below. Importantly, these results can only be seen as complementary to our main results, not as a substitute.

First, while most electoral districts were similar in population size (as they were based on an 1864 census), some were above or below the average, for example in cases in which migratory movements after 1864 had changed district sizes. Therefore, we control for the *population size* of electoral districts.

Second, historians often differentiate between Prussian and "non-Prussian" Imperial Germany, especially when it comes to electoral outcomes (Sperber, 1997, 29). Doing so would also be important for a substantive political reason: the Conservative Party originated in Prussia and did not have a sufficient party organization in many other parts of the country. Of course, this is clearly *linked* to differing socioeconomic conditions in terms of landholding inequality that we have analyzed in detail and that are a long-term outcome of variations in Black Death intensities. Nevertheless, including a control variable for Prussia may be considered an even more "conservative" empirical strategy.

The results we obtain can be found in Table A4. For the most part, they confirm previous findings and are in line with our theory. It is noticeable that Prussian districts experienced a significantly higher number of *net electoral disputes*.

Table A4: Extension 1: Including Additional Covariates

	Dependent variable:					
	Land Inequality (Gini)		Conservative Party Vote Share		Net Electoral Disputes	
	OLS		*OLS*		*glm: quasipoisson link = log*	
	(1)	(2)	(3)	(4)	(5)	(6)
BDEI Score v1	−0.053***		−0.146***		−0.263***	
	(0.014)		(0.028)		(0.088)	
BDEI Score v5		−0.043***		−0.129***		−0.192**
		(0.014)		(0.030)		(0.085)
Population	0.0003	0.0003	−0.001**	−0.001**	0.004	0.004
	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.003)	(0.003)
Prussia	0.027	0.027	0.107**	0.103**	0.339***	0.339***
	(0.020)	(0.021)	(0.045)	(0.045)	(0.111)	(0.112)
Urb. Dens. 1300	0.027**	0.022**	0.076**	0.069*	0.193***	0.148**
	(0.011)	(0.011)	(0.036)	(0.040)	(0.067)	(0.073)
Dist. Maj. Port	−0.0001**	−0.0002***	−0.0001	−0.0003	−0.0001	−0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Trade Town	−0.00004	−0.00002	0.0003	0.0003*	0.001	0.001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Ocean	−0.0001	−0.0001	−0.0003	−0.0002	−0.0002	−0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)	(0.0005)
Dist. River	−0.00003	0.00001	−0.0003	−0.0002	0.003**	0.003**
	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.001)	(0.001)
Elevation	−0.0002***	−0.0002***	0.0001	0.00002	−0.0002	−0.0003
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Constant	0.792***	0.805***	0.285***	0.322***	0.201	0.262
	(0.030)	(0.034)	(0.093)	(0.096)	(0.282)	(0.294)
Observations	385	385	370	370	385	385
R^2	0.583	0.561	0.334	0.319		
Adjusted R^2	0.573	0.551	0.317	0.302		

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

A.4 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 2: Accounting for a Potential Effect of the Reformation

In this extension, we provide a second empirical response to the argument that the Reformation—and not the Black Death—could be responsible for some of the variation we observe in Imperial Germany. During the Reformation, which began in 1517, many rulers of principalities across Germany turned away from the Catholic Church and towards Protestantism. While we have already demonstrated that key changes in political institutions at the town level *predate* the Reformation period, we include additional models that account for the *proportion of an electoral district's population that is Catholic* (based on data by Sperber (1997)). This control variable picks up differences between areas of Germany where Catholicism is strong and those where Protestantism is strong, which largely is a long-term outcome of the Reformation.

Table A5 shows the results of our extended analysis. The findings are again mostly in line with our theory and confirm previously obtained results. Only the effect of the *BDEI score* on *net electoral disputes* is no longer significant. However, as with extension 1, we caution the reader to carefully interpret these results due to the high likelihood of post-treatment bias.

Table A5: Extension 2: Accounting for a Potential Effect of the Reformation

	Dependent variable:					
	Land Inequality (Gini)		Conservative Party Vote Share		Net Electoral Disputes	
	OLS		*OLS*		*glm: quasipoisson link = log*	
	(1)	(2)	(3)	(4)	(5)	(6)
BDEI Score v1	−0.039**		−0.095***		0.019	
	(0.017)		(0.034)		(0.106)	
BDEI Score v5		−0.028*		−0.083**		0.031
		(0.016)		(0.034)		(0.093)
Percent Catholic	−0.046**	−0.061***	−0.184***	−0.203***	−1.038***	−1.045***
	(0.023)	(0.022)	(0.056)	(0.055)	(0.180)	(0.170)
Population	0.0003	0.0003	−0.001***	−0.002***	0.004*	0.004*
	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.002)	(0.002)
Prussia	0.031	0.033	0.127***	0.126***	0.430***	0.431***
	(0.020)	(0.021)	(0.046)	(0.046)	(0.110)	(0.109)
Urb. Dens. 1300	0.013	0.005	0.024	0.017	−0.086	−0.096
	(0.014)	(0.013)	(0.034)	(0.035)	(0.084)	(0.075)
Dist. Maj. Port	−0.0002**	−0.0002***	−0.0002	−0.0003	−0.0004	−0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Trade Town	−0.0001	−0.0001	0.0002	0.0002	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0005)	(0.0005)
Dist. Ocean	−0.0001	−0.00002	−0.0001	−0.00002	0.0004	0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.0005)
Dist. River	−0.0001	−0.0001	−0.0005	−0.0005	0.001	0.001
	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.001)	(0.001)
Elevation	−0.0002***	−0.0002***	0.0001	0.0001	0.0003	0.0003
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Constant	0.804***	0.816***	0.335***	0.364***	0.387	0.381
	(0.030)	(0.032)	(0.083)	(0.084)	(0.270)	(0.282)
Observations	385	385	370	370	385	385
R^2	0.594	0.582	0.373	0.371		
Adjusted R^2	0.583	0.571	0.356	0.353		

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

A.5 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 3: Alternative Version of the BDEI Score

The formula on which the *BDEI score* is based automatically and exponentially discounts the weight of observations that are farther away from a location under consideration. Therefore, the observations in the immediate vicinity of Germany have by far the largest impact on the score, while the weight of observations that are farther away approaches zero.

Despite the score's technical features and despite the fact that sea travel was often much more efficient than land travel (which justifies the general inclusion of observations from the British Isles in our calculations), we also present results based on an alternative *BDEI score* that systematically excludes all recorded outbreaks on the British Isles.

The results can be found in Table A6 and are almost identical to previously obtained results, even when including control variables. The fact that the results remain largely unchanged in substantive terms indicates that the formula that is the basis of the *BDEI score* already sufficiently discounts observations at a greater distance, rendering their impact marginal.

Table A6: Extension 3: Excluding Outbreaks on the British Isles

	Dependent variable:					
	Land Inequality (Gini)		Conservative Party Vote Share		Net Electoral Disputes	
	OLS		*OLS*		*glm: quasipoisson link = log*	
	(1)	(2)	(3)	(4)	(5)	(6)
BDEI Score v1 (Alt.)	-0.075^{***}		-0.160^{***}		-0.435^{***}	
	(0.016)		(0.043)		(0.109)	
BDEI Score v5 (Alt.)		-0.055^{***}		-0.132^{***}		-0.232^{***}
		(0.011)		(0.046)		(0.089)
Urb. Dens. 1300	0.035^{***}	0.029^{***}	0.062	0.063	0.243^{***}	0.138^{*}
	(0.013)	(0.011)	(0.043)	(0.052)	(0.077)	(0.082)
Dist. Maj. Port	-0.0001^{*}	-0.0003^{***}	-0.0001	-0.0003	0.0002	-0.0003
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Trade Town	-0.0001	0.00000	0.0002	0.0003	0.0003	0.001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Ocean	-0.0001	-0.00005	-0.0003	-0.0002	-0.0004	-0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. River	-0.0002	-0.00002	-0.0004	-0.0001	0.002	0.002^{*}
	(0.0001)	(0.0001)	(0.0005)	(0.0005)	(0.001)	(0.001)
Elevation	-0.0002^{***}	-0.0002^{***}	0.0001	0.00001	-0.00003	-0.0004
	(0.00005)	(0.00004)	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Constant	0.823^{***}	0.854^{***}	0.198^{***}	0.259^{***}	0.775^{***}	0.962^{***}
	(0.020)	(0.018)	(0.072)	(0.075)	(0.154)	(0.154)
Observations	385	385	370	370	385	385
R^2	0.597	0.557	0.278	0.265		
Adjusted R^2	0.590	0.549	0.264	0.251		

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

A.6 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 4: Conditioning Land Inequality on the Size of the Agricultural Workforce

In this extension, we respond to the argument that *land inequality* should be conditioned on the overall socioeconomic relevance of the agricultural sector. The homogeneity/heterogeneity of an economy may influence the extent to which elites can use their dominant position in influencing voting patterns (Mares, 2015, 23-24, Ch. 4). Specifically, we obtain the product of land inequality and the proportion of the population that is economically engaged in agriculture versus other sectors of the economy (Ziblatt, 2009). This means that the value of our variable is highest in places where land inequality is high *and* agriculture is the dominant economic sector. Simultaneously, it is lowest in places where land inequality is low and agriculture is an insignificant economic sector.

We replicate all previous analyses with this new dependent variable (*land inequality (Gini) conditioned on the size of the agricultural workforce*) and find that most results still hold. Table A7 shows these results for models without (1-5) and with (6-10) control variables. While all results without control variables hold, the significance has decreased to the lowest level ($\alpha < 0.1$) in the regressions with controls and one model is insignificant.

Moreover, when applying Tobit models as shown in Table A8, we also find results similar to previous Tobit regressions.

Table A7: Extension 4: Land Inequality (Gini) Conditioned on Size of the Agricultural Workforce

	Dependent variable:									
	Land Inequality (Gini) Conditioned on Size of the Agricultural Workforce									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	−0.077***					−0.038				
	(0.010)					(0.023)				
BDEI Score v2		−0.076***					−0.037*			
		(0.011)					(0.022)			
BDEI Score v3			−0.075***					−0.036*		
			(0.011)					(0.022)		
BDEI Score v4				−0.075***					−0.037	
				(0.012)					(0.023)	
BDEI Score v5					−0.073***					−0.038
					(0.012)					(0.025)
Urb. Dens. 1300						−0.035	−0.037*	−0.037*	−0.036	−0.033
						(0.024)	(0.022)	(0.022)	(0.023)	(0.025)
Dist. Maj. Port						−0.0003**	−0.0003**	−0.0003**	−0.0003**	−0.0004***
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Trade Town						0.0001	0.0001	0.0001	0.0001	0.0001
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Ocean						−0.00000	−0.00000	0.00000	0.00001	0.00003
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. River						0.0002	0.0003	0.0003	0.0003	0.0003
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Elevation						0.00005	0.00005	0.00004	0.00004	0.00004
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	0.349***	0.349***	0.349***	0.349***	0.349***	0.404***	0.404***	0.406***	0.408***	0.412***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.031)	(0.030)	(0.030)	(0.029)	(0.029)
Observations	385	385	385	385	385	385	385	385	385	385
R^2	0.237	0.229	0.225	0.221	0.214	0.309	0.310	0.311	0.311	0.310
Adjusted R^2	0.235	0.227	0.223	0.219	0.212	0.296	0.297	0.298	0.298	0.298

Note: Clust. SE

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

Table A8: Extension 4: Land Inequality (Gini) Conditioned on Size of the Agricultural Workforce (Tobit)

	Dependent variable:									
	Land Inequality (Gini) Conditioned on Size of the Agricultural Workforce									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
BDEI Score v1	-0.077^{***}					-0.038^{***}				
	(0.007)					(0.011)				
BDEI Score v2		-0.076^{***}					-0.037^{***}			
		(0.007)					(0.010)			
BDEI Score v3			-0.075^{***}					-0.036^{***}		
			(0.007)					(0.010)		
BDEI Score v4				-0.075^{***}					-0.037^{***}	
				(0.007)					(0.010)	
BDEI Score v5					-0.073^{***}					-0.038^{***}
					(0.007)					(0.011)
Urb. Dens. 1300						-0.035^{***}	-0.037^{***}	-0.037^{***}	-0.036^{***}	-0.033^{***}
						(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
Dist. Maj. Port						-0.0003^{***}	-0.0003^{***}	-0.0003^{***}	-0.0003^{***}	-0.0004^{***}
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Trade Town						0.0001	0.0001	0.0001	0.0001	0.0001
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. Ocean						-0.00000	-0.00000	0.00000	0.00001	0.00003
						(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dist. River						0.0002	0.0003	0.0003	0.0003	0.0003
						(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Elevation						0.00005	0.00005	0.00004	0.00004	0.00004
						(0.00005)	(0.00005)	(0.00005)	(0.00005)	(0.00005)
Constant	0.349^{***}	0.349^{***}	0.349^{***}	0.349^{***}	0.349^{***}	0.404^{***}	0.404^{***}	0.406^{***}	0.408^{***}	0.412^{***}
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Observations	385	385	385	385	385	385	385	385	385	385
Log Likelihood	214.340	212.291	211.169	210.249	208.468	233.444	233.724	233.860	233.891	233.746

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

A.7 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 5: Two-Stage Least Squares

In our main analysis, we include a large number of geographic variables and urban density in 1300 to account for factors that could influence both local Black Death intensities and long-term political-economic outcomes. Despite our comprehensive attempts to control for these geographic variables, it would be desirable to more rigorously isolate the quasi-random component of Black Death intensities. In this respect, we follow a similar strategy as Jedwab, Johnson and Koyama (2019*b*), who use the timing of the onset of the Plague to predict mortality rates in an instrumental-variable framework.

Similarly, as shown in Table A9 we use a combination of quarterly and yearly dummy variables to predict local mortality rates (LMR). The first-stage regressions show two interesting patterns. First, Plague outbreaks that began in the second quarter (April, May, June) led to the highest mortality rates. Second, places that were hit in later years had significantly lower mortality rates. These findings are fully consistent with the observations of historians that (1) the Black Death was most severe when it was able to spread in the late spring and summer months and (2) the overall intensity of the Plague decreased over time (Benedictow, 2004; Gottfried, 1983).

In a second step, we compute a new *BDEI score* based on the predicted rather than the actual values of local mortality rates. The results of the analysis for this second-stage *BDEI score* are in Table A10. The estimated effects of Black Death intensity are statistically significant and similar in magnitude to those reported in the main text. To the degree there is any change, the estimated impacts of the Black Death based on the 2SLS procedure is slightly larger for *Conservative Party vote shares* and *net electoral disputes* than the original OLS estimates.

Table A9: Predicting Outbreak Intensity Based on Timing

	Dependent variable:
	Local Mortality Rate (LMR)
First Quarter	0.035
	(0.038)
Second Quarter	0.087^{**}
	(0.035)
Third Quarter	-0.024
	(0.037)
1348	-0.157^{**}
	(0.061)
1349	-0.215^{***}
	(0.063)
1350	-0.301^{***}
	(0.069)
Constant	0.584^{***}
	(0.053)
Observations	178
R^2	0.188
Adjusted R^2	0.160
Note: OLS	*p<0.1; **p<0.05; ***p<0.01

Table A10: Extension 5: Using a Two-Stage Regression Approach

	Dependent variable:					
	Land Inequality (Gini)		Conservative Party Vote Share		Net Electoral Disputes	
	OLS		*OLS*		*glm: quasipoisson link = log*	
	(1)	(2)	(3)	(4)	(5)	(6)
BDEI Score v1 (St. 2)	−0.058***		−0.147***		−0.304***	
	(0.014)		(0.035)		(0.092)	
BDEI Score v5 (St. 2)		−0.049***		−0.129***		−0.209**
		(0.013)		(0.036)		(0.089)
Urb. Dens. 1300	0.026**	0.021*	0.060	0.052	0.167**	0.104
	(0.012)	(0.011)	(0.040)	(0.043)	(0.070)	(0.075)
Dist. Maj. Port	−0.0001*	−0.0002**	−0.00003	−0.0001	0.0002	0.00001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Trade Town	−0.0001	−0.0001	0.0001	0.0002	0.0003	0.0004
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. Ocean	−0.0001**	−0.0001**	−0.0004**	−0.0004**	−0.001	−0.001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.001)	(0.001)
Dist. River	−0.0001	0.00003	−0.0003	−0.00005	0.002*	0.003**
	(0.0001)	(0.0001)	(0.0005)	(0.0004)	(0.001)	(0.001)
Elevation	−0.0002***	−0.0002***	0.00005	−0.00001	−0.0003	−0.0005
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Constant	0.844***	0.855***	0.238***	0.262***	0.899***	0.960***
	(0.020)	(0.019)	(0.070)	(0.071)	(0.149)	(0.151)
Observations	385	385	370	370	385	385
R^2	0.578	0.559	0.298	0.289		
Adjusted R^2	0.570	0.551	0.285	0.275		

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

A.8 Imperial Germany: Socioeconomic Conditions and Political Outcomes — Extension 6: Using Dummy Variables Instead of Absolute Distances

In our main regression analysis, we use absolute distances to several geographic features (such as the ocean or large rivers) to account for variation in proximity to trade routes. An alternative approach is to use dummy variables that indicate if a feature is within a certain distance. This approach is motivated by the possibility that areas in close vicinity to the ocean or a large river could be disproportionately affected by trade levels. Accordingly, in this extension, we replace all absolute distance measures with dummy variables indicating if any of our original geographic features are located at a distance of 10 km or less from the electoral district. The results can be found in Table A11 and are fully in line with previous findings (with small changes to the magnitude of coefficients).

Table A11: Extension 6: Using Dummy Variables Instead of Absolute Distances for Geographic Features

	Dependent variable:					
	Land Inequality (Gini)		Conservative Party Vote Share		Net Electoral Disputes	
	OLS		*OLS*		*glm: quasipoisson link = log*	
	(1)	(2)	(3)	(4)	(5)	(6)
BDEI Score v1	-0.055^{***}		-0.131^{***}		-0.272^{***}	
	(0.014)		(0.034)		(0.089)	
BDEI Score v5		-0.041^{***}		-0.106^{***}		-0.192^{**}
		(0.012)		(0.035)		(0.087)
Urb. Dens. 1300	0.023^{**}	0.014	0.031	0.014	0.138^{**}	0.082
	(0.011)	(0.010)	(0.038)	(0.038)	(0.070)	(0.072)
Dummy M. Port	0.005	0.008	-0.116	-0.110	-0.060	-0.045
	(0.025)	(0.025)	(0.101)	(0.102)	(0.139)	(0.142)
Dummy Trade T.	0.0004	0.001	-0.069^{***}	-0.068^{***}	-0.038	-0.033
	(0.016)	(0.016)	(0.025)	(0.026)	(0.130)	(0.132)
Dummy Ocean	0.030^{*}	0.035^{*}	0.006	0.017	0.032	0.048
	(0.018)	(0.019)	(0.054)	(0.056)	(0.162)	(0.163)
Dummy River	-0.007	-0.010	-0.044^{*}	-0.050^{**}	-0.215^{**}	-0.232^{**}
	(0.012)	(0.013)	(0.025)	(0.025)	(0.106)	(0.105)
Elevation	-0.0003^{***}	-0.0003^{***}	-0.0002^{***}	-0.0003^{***}	-0.001^{**}	-0.001^{**}
	(0.00004)	(0.00004)	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Constant	0.796^{***}	0.801^{***}	0.238^{***}	0.250^{***}	1.097^{***}	1.129^{***}
	(0.016)	(0.015)	(0.041)	(0.044)	(0.122)	(0.118)
Observations	385	385	370	370	385	385
R^2	0.532	0.501	0.268	0.244		
Adjusted R^2	0.524	0.492	0.254	0.230		

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

A.9 Pre-Reformation Germany: Descriptive Summary Statistics

Table A12 shows descriptive summary statistics for towns in pre-Reformation Germany.

Table A12: Descriptive Statistics: Pre-Reformation Germany

Variable	n	Min	q_1	$\bar{x}$	$\tilde{x}$	q_3	Max	IQR
BDEI Score v1	325	-2.78	-0.71	0.00	0.18	0.86	1.92	1.57
BDEI Score v2	325	-2.52	-0.72	0.00	0.12	0.79	2.45	1.52
BDEI Score v3	325	-2.46	-0.69	0.00	0.10	0.73	3.01	1.42
BDEI Score v4	325	-2.52	-0.63	0.00	0.15	0.62	3.51	1.24
BDEI Score v5	325	-2.65	-0.52	0.00	0.21	0.52	3.87	1.05
Introduction of Participative Elections (1300-1500)	325	0.00	0.00	0.15	0.00	0.00	1.00	0.00
Elevation	86	2.72	79.33	227.90	187.22	357.24	852.91	277.91
Dist. to River	86	0.13	12.69	51.90	50.53	78.28	143.05	65.59
Roman Road	86	0.00	0.00	0.26	0.00	0.75	1.00	0.75
Coast	86	0.00	0.00	0.08	0.00	0.00	1.00	0.00
Agricultural Suitability	86	0.00	19.25	35.91	37.33	50.42	69.27	31.17
Population (Log)	86	6.91	7.70	8.57	8.70	9.28	10.90	1.58
Ruggedness	86	2.21	11.14	34.75	25.91	46.03	342.94	34.89
Urban Potential 1300	86	2252.19	4437.69	5147.74	4998.34	5852.00	8224.76	1414.31
Trade City 1300	86	0.00	0.00	0.06	0.00	0.00	1.00	0.00
Proto-Industrial City 1300	86	0.00	0.00	0.05	0.00	0.00	1.00	0.00