

Krieger, Tommy

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Elites and Health Infrastructure Improvements in Industrializing Regimes

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Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

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Abstract

We collect information about more than 5,000 Prussian politicians, digitize administrative data on the provision of health-promoting public goods, and gather local-level information on workers' movements to study why elites in industrializing countries implement policies that improve the health of the poor. Exploiting county-level variation in elite structure, we present OLS and IV estimates, suggesting that elites improve access to health services due to pressure exerted by workers' movements and that they voluntarily implement policies that prevent disease outbreaks. An analysis of two rollcall votes substantiates the findings of the county-level analysis.

JEL-Codes: H110, H420, H750, I150, N330, O430, P160.

Keywords: distribution of power, elite structure, industrializing countries, political economy of health-promoting policies, Prussian history, redistribution, workers' movements.

Tommy Krieger
ZEW Leibniz-Centre for European Economic Research
Department of Corporate Taxation and Public Finance, L7 1
Germany – 68161 Mannheim
tommy.krieger@zew.de

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1 Introduction

The role of elites in the process of economic development is the topic of various studies in economics, history, and political science (Amsden et al., 2012). In the current debate, a key question is why elites implement reforms from which less wealthy segments of the society greatly benefit.¹ Broadly speaking, the literature presents two basic theories regarding this question. The first theory implies that elites are forced by non-elite people, for example through strikes or riots (see e.g. Acemoglu and Robinson, 2000, 2001). The alternative theory predicts that elites voluntarily implement reforms, for instance to raise the rates of returns on their physical capital investments (see e.g. Galor and Moav, 2006, Galor et al., 2009, Lizzeri and Persico, 2004).

During the last years, proponents of either of these popular theories provided qualitative and quantitative evidence that substantiates their preferred theory or invalidate the other.² In this project, we take a different approach. Rather than praising one specific theory, we argue that the two theories must be considered jointly in order to gain a solid understanding of reform processes in industrializing countries. To support our view, we consider policies that promote public health. More specifically, we distinguish policies preventing the outbreak and spread of infectious diseases (e.g. the construction of sewage systems) from measures that facilitate access to health care services (e.g. the opening of hospitals) and argue that elites voluntarily implement preventive measures, while the access to health services mainly improves due to pressure exerted by workers' movements.

In our empirical analysis, we focus on late-19th/early-20th century Prussia and exploit variation in elite structure to investigate why public health expenditures increase in industrializing regimes. The basis of our empirical strategy are models suggesting that the upper class of industrializing regimes can be split in a landowning and a landless elite and that these groups of people may differ in their policy preferences (see e.g. Galor et al., 2009). To build a (county-level) measure that reflects how the political power was distributed among the landowning and landless elite, we compile biographical information on more than 5,000 Prussian politicians. We also digitize local-level infrastructure data published by the Royal Prussian Statistical Office. Remarkable features of this data are that it provides information on eight health-promoting public goods and that these public goods

¹Examples in this regard are reforms that increase the number of people that enjoy political participation rights and measures that improve people's level of education and health status.

²See e.g. Aidt and Jensen (2014), Aidt and Franck (2015, 2019), Andersson and Berger (2019), Baten and Hippe (2018), Cvrcek and Zajicek (2019), Goni (2021), Hollenbach (2021), Mares and Queralt (2015, 2020), Nafziger (2011), Ramcharan (2010), Vollrath (2013), as well as Ziblatt (2008a,b).

affect public health in different ways. While three of them improve the access to medical care, the others prevent the outbreak of infectious diseases. Finally, we combine information on the voting results of the Social Democratic Party with newly digitized data on strikes and trade-union membership to create indicators, reflecting the strength of workers' movements.

We present results from cross-sectional OLS and 2SLS analyses, suggesting a strong relationship between elite structure and the provision of health-promoting public goods. More specifically, we find that the provision of such public goods increased in the political power of the landless elites. Various robustness checks confirm this result and rule out (among others) that our estimates simply reflect differences in industry structure, urbanization, fiscal capacity, or land inequality. When distinguishing between preventive measures and policies that improve the access to health care services, we detect that both of them were more frequently implemented in those counties where the landless elites enjoyed great influence. Finally, our mechanism analysis reveals that the landless elite implemented more preventive policies than the landowning elite, regardless of whether the workers' movements were strong or weak. This finding confirms political economy models predicting that elites voluntarily implement reforms. By contrast, with regard to measures that facilitate access to health care services, we find that landless elites differed in their behavior from landowning elites only if workers' movement were well organized in their county. We interpret this finding as evidence for theories, implying that elites redistribute (for instance via public good provision) to avoid instabilities.

To further support the view that landowning and landless elites differ in their willingness to implement health-promoting policies, we pay attention to two roll-call votes in the German parliament. The first vote took place in May 1883 and concerned the eligibility criteria for the compulsory health insurance, while the second vote took place 17 years later and was on a bill that aims to implement compulsory trichinella inspections. Consistent with the results of our county-level analysis, we observe in both votes that landowning politicians were less likely to approve the health-promoting reform than landless politicians. We also find that the voting behavior of the parliamentarians correlates with the vote share of the Social Democratic Party in the 1883 vote but not in the 1900 vote. This result is in line with our hypothesis that the pressure exerted by workers' movements only plays a role for policies that improve access to health services.

Our paper contributes to the literature that studies the role of elites and elite structure in the process of development. In contrast to most other papers in this field, we do not focus on education policies (see e.g. Andersson and Berger, 2019,

Baten and Hippe, 2018, Cinnirella and Hornung, 2016, Goni, 2021, Ramcharan, 2010) but on measures that improve health. The key insight of our paper is that elites often voluntarily implement health-promoting policies and that the threats imposed by the workers' movements only plays a role for some measures. To our knowledge, our paper is the first empirical analysis showing that the two main theories on the motives of elites jointly explain why public health expenditures considerably increase in industrializing countries. Methodologically, we differ from earlier studies in two ways. First, rather than using land inequality to proxy how politically powerful the landowning elites are in a region, we exploit biographical information on locally elected politicians. Consequently, we take into account the concern by Acemoglu et al. (2008) who show that high land inequality does not necessarily imply that landowning elites have great political power.³ Second, our paper analyzes both aggregated data and roll-call votes, whereas previous studies conduct only one type of analysis. Since both approaches have different pros and cons, we think that a combination of them is the best way for achieving credible results.⁴

Our paper is structured as follows. Section 2 provides background information, develops our hypotheses, and presents anecdotal evidence. Section 3 includes our county-level analysis, while Section 4 shows the roll-call vote analysis. Section 5 concludes.

2 Background

2.1 Historical background

As in many other industrializing regimes, the public authorities in late-19th and early-20th century Prussia devoted huge efforts to improve the health system. For instance, the total number of beds in hospitals increased from 76,310 in 1876 to 214,320 in 1900 (Guttstadt, 1900). At the same time, the number of physicians doubled (Spree, 1999). The total number of people working in the health sector even more than tripled between 1867 and 1907, according to the Prussian census

³In the Prussian context, using data on land inequality as proxy for the distribution of political power is also problematic because Cinnirella and Hornung (2016) establish land inequality as a measure for the extent of serfdom.

⁴With our paper, we also contribute to the political economy literature that studies why public health provision differs within and across countries. Existing studies in this field focus on the effects of franchise extensions (see e.g. Aidt et al., 2010, Fujiwara, 2015), democratization (see e.g. Besley and Kudamatsu, 2006, Kudamatsu, 2012), political selection (see e.g. Bhalotra and Clots-Figueras, 2014, Franck and Rainer, 2012), and government ideologies (see e.g. Potrafke, 2010).

data (Galloway, 2007). Furthermore, for workers, a compulsory health insurance system was introduced in 1884 (Scheubel, 2013). Last but not least, many health infrastructure projects were realized, including the construction of sewerage and water supply systems or the opening of slaughter houses, among others (Krabbe, 1985, Vögele, 2001).⁵

In Prussia, the political decisions behind the massive expansion of the public health system were almost exclusively made by the wealthy people. The primary reason for the enormous political power of the elite was the electoral rules that existed at that time (see Dawson, 2019, Grzywatz, 2003, Hofmann, 2007, among others).⁶ For instance, citizens who received any kind of pauper relief could not participate in elections. In addition, at the local level, suffrage was usually only granted to men who owned a dwelling house, paid a sufficiently high amount of taxes, or carried out a business. Finally, voting power was unequally distributed among eligible voters whereby the most wealthy voters typically had the largest impact on the election results (for further details regarding the electoral rules in Prussia and why they advantage wealthy people, see Appendix A.2).

Why did wealthy people in late-19th/early-20th century Prussia support policy measures that improve public health? A potential answer to this question is that Prussian elites were concerned about the growing popularity of social democratic ideas and movements (for further details on workers' movements in Prussia, see Appendix A.3). To slow down this development, they might have accepted policy reforms that promote the health of the poor people. Consistent with this view is Bismarck's 'carrots and sticks' approach. More specifically, on the one hand, the government implemented different laws (known as *Socialist Laws*) that punished social democratic activities (for details, see Appendix A.3). On the other hand, however, key demands of the workers' movement were (at least partly) satisfied, including the introduction of a compulsory health insurance for workers in 1884 (for details, see Appendix A.4 & Section 4). With the latter behavior, Bismarck aimed to lower the support for democratic reforms (see Leichter, 1979, Rosenberg, 1967, Schmidt, 2005, Tennstedt, 2017).

While concerns regarding the rise of the workers' movements is undoubtedly a very popular explanation for why the Prussian elites agreed to health-promoting measures in the late-19th/early 20th century, it is not the only reason that can be

⁵Ample research exists regarding the question of how such public measures reduce mortality and morbidity (see Alsan and Goldin, 2019, Bauernschuster et al., 2020, Chapman, 2019, Gallardo-Albarrán, 2020, among others).

⁶In Prussia, public elections took place for local councils, the lower chamber of the Prussian parliament (*Abgeordnetenhaus*), and the lower chamber of the German parliament (*Reichstag*). Detailed information regarding these elections and the administrative structure of the Prussian Kingdom can be found in Appendix A.1 & A.2.

found in the related literature. For instance, since upper class and working class people did not live in fully separated areas, diseases spread from the poor to the rich. To reduce the risk of becoming sick, elites therefore supported reforms that prevent the outbreak of diseases among the poor (see e.g. Krabbe, 1985, Leichter, 1979).⁷ Furthermore, Brown (1989) argues that elites supported the provision of health-promoting public goods for commercial reasons. In particular, he suggests that the Prussian elites were concerned that diseases spread among their workers and thereby cause costly production stoppages or delivery delays. Vögele (2001) points out that house owners had a great interest in improving the public health infrastructure as the connection to a water-pipe or sewer system allowed them to increase rents. He also suggests that elites considered some health infrastructure investments (e.g. the construction of waterworks) as a lucrative source of future municipal revenues (see also Krabbe, 1985).

2.2 Conceptual considerations

2.2.1 Elite’s motives for implementing health-promoting measures

As outlined above, qualitative studies in economics, history, and political science provide several (not necessarily mutually exclusive) reasons for why the elite in Prussia (and in other industrializing regimes) supported the provision of health-promoting public goods. Our paper complements these studies in two ways. The first is to develop a conceptual (non-formal) framework that unifies the existing explanatory approaches. In a second step, we present quantitative analyses that substantiates our conceptual considerations (for details, see Sections 3 & 4).

Our first conceptual step is to categorize the potential motives of an elite. We think that the reasons suggested in qualitative studies can be differentiated into three broad categories. First, elites may aim at improving their own health, for instance by easing their access to health care services or by lowering their risk of becoming infected with a disease. Second, elites may want to achieve a financial profit, for example by reducing the likelihood that an infectious disease spreads among their workers and thus causes production delays. Third, elites may try to please the working class people, for instance to decrease the risk of strikes and political turmoil or to obtain their support in elections. Below, we jointly refer to the first two motives when stating that the elite *voluntarily* implemented health-promoting measures, whereas we use *non-voluntary* or *forced* implementation to refer to the last motive.

⁷Examples for places where an epidemic cause local elites to invest in health-promoting public goods are the cities of Düsseldorf and Halle/Saale (Fuchs, 1910, Most, 1909).

Our next conceptual step is to distinguish different types of health-promoting public measures, depending on how they affect health. Below, we distinguish two main types. The first type are measures that ease people's access to health care services. Examples include openings of public hospitals or nursing facilities, the introduction of a compulsory health insurance system, and the establishment of municipal provident funds. For several reasons, such policies hardly affected the extent to which elite people had access to health care services in industrializing places such as late-19th/early-20th century Prussia. For instance, due to the low quality of state hospitals and an increased risk of becoming infected by diseases that predominantly spread among lower class people, elites usually received their treatments at home or in a non-public hospital (Labisch and Spree, 2001, Vögele, 2001). Elites also did not require public aid to cover the costs for their medical treatments and had the financial capabilities to insure themselves privately. Most workers, by contrast, could not pay such costs. A primary policy objective of the workers' movements was thus to ease the access to health care services for poor people. For instance, in its party program from 1891 (*Erfurt Program*), the Social Democratic Party (SPD) demanded free health care and that agricultural workers should not longer be excluded from the compulsory health insurance (see Specht, 1898).

The second type of public measures that improve peoples' health are measures that prevent the outbreak and spread of infectious diseases, including (e.g.) the construction of sewer or water-pipe systems, the opening of slaughter houses, and the establishment of waste collections. Apart from the way of how such measures affect mortality and morbidity, three remarkable differences exist compared to the measures that ease people's access to health care services. First of all, as briefly sketched at the end of Section 2.1 and described in detail by Brown (1989) and Vögele (2001), elites had significant financial gains from implementing preventive measures. Second, while elites could access health services even if no government actions took place, this was not possible for most of the preventive measures. For instance, building a sewage or water-pipe system was a large-scale infrastructure project whose costs widely exceeded the financial capacities of most people in the elite. Consequently, collective action was necessary. Furthermore, restricting the access to such systems to a small group of wealthy people was not economically attractive, for instance due to high fixed costs and increasing economies of scale. Third, while improving access to health care services for the poor people was a key demand of the workers' movements, demands for measures that prevent the outbreak and spread of infectious diseases only played a subordinate role in their programs. In a few instances, they even opposed preventive measures. A popular

example in this regard is the rejective stance of various social democrats towards vaccination campaigns (see Thießen, 2017).

From the above considerations, we derive the hypothesis that there is no single reason for why elites in Prussia (and other industrializing regimes) implemented health-promoting measures. In addition, we hypothesize that their motives vary, depending on the type of measure. More specifically, on the one hand, we suggest that elites established measures that facilitate access to health services to please working class people. This hypothesis is consistent with various political economy models predicting that elites accept redistribution policies to reduce the risk of turmoil (see Acemoglu and Robinson, 2000, 2001, 2005, Boix, 2003, Conley and Temimi, 2001, Dorsch and Maarek, 2015, Gilli and Li, 2015, among other). On the other hand, we argue that elites in industrializing regimes voluntarily supported measures that prevent the outbreak and the spread of infectious diseases. In this regard, we encourage theories implying that elites implement measures that are beneficial for the poor, even when no threat of revolution exists (see Ashraf et al., 2020, Galor and Moav, 2006, Galor et al., 2009, Lizzeri and Persico, 2004, Llavador and Oxoby, 2005, Doepke and Zilibotti, 2005, among others).

2.2.2 Elite structure

While the elite is often considered as a homogeneous group of people in political economy models, only a few of them distinguish between (two) different types of wealthy people. Examples are Akerman et al. (2016), Galiani and Torrens (2014), Galor et al. (2009), Ghosal and Proto (2009), and Llavador and Oxoby (2005). A common feature of these theoretical studies is that they refer to industrializing regimes as a prime example for a case in which the group of wealthy people can be divided into two subgroups. Typically, these two subgroups are referred to as *landowning* and *landless (capitalist)* elites. We aim to use this characteristic of industrializing regimes to provide empirical support for our hypotheses regarding elite's motives for supporting health-promoting policies. Galor and Moav (2006) use the same approach when shedding light on the reasons for why rich people promote education policies in later stages of an industrial revolution.

In late-19th/early-20th century Prussia, neither the landowning nor the landless elite required public support to get access to medical treatment because both of them were sufficiently wealthy to cover the costs for (qualitatively much better) private services. Thus, we do not consider it as likely that potential differences in the extent to which the landowning and landless elites in Prussia implemented measures that ease people's access to health care services can be explained with

differences in their willingness to improve their own health status. We also doubt that landowning and landless elites had notably different financial gains from the implementation of such measures because the reduction in sick leaves that might have resulted from giving workers more access to health care is unlikely to differ considerably between the agricultural and the non-agricultural sectors, especially when taking into account the fairly low quality of public health care facilities in Prussia. Put differently, we argue that these two different types of elites did not significantly differ in their willingness to voluntarily support public policies that facilitate the access to health care. However, we nonetheless expect that landless elites implemented more of these measures than landowning elites. The rationale behind our view is that the coordination costs were much larger for agricultural workers than for workers in other sectors. Landowning elites were therefore less threatened by workers' movements than landless elites and thus satisfied less of their demands.

As measures that prevent the outbreak and spread of infectious diseases only played a subordinate role in the programs of the workers' unions, we doubt that elites used such policies to please working class people. Consequently, we argue that potential differences in the extent to which landowning and landless elites implemented preventive measures cannot be explained by the fact that workers' movements were better organized in the non-agricultural sectors. By contrast, we presume for three reasons that landless elites may be more willing to voluntarily support preventive measures. First, the landless elites often lived less separated from the poor and thus faced a greater risk of getting infected by a disease that broke out among lower class people.⁸ Second, the share of workers that became (simultaneously) infected, if a disease broke out, was likely to be higher in non-agricultural sectors than in the agricultural sector since work spaces were more densely populated and propagation speeds thus higher. Third, the importance of high-skilled workers was larger in non-agricultural sectors (see Galor et al., 2009) and replacing them, when they get sick, was much more difficult than replacing low-skilled workers.

⁸An objection against this argument may be that some landowning elites had a residence in an urban place and therefore also faced the risk that they got infected by the diseases that spread among the poor. For two reasons, we are nevertheless convinced that our argument holds on average: first, we think it is plausible to assume that landless elites are more likely to have a residence in an urban place than landowning elites, and second, if a pandemic breaks out, landowning elites can easily reduce their infection risk by moving (at least temporarily) to their estate.

2.3 Anecdotal evidence

During our background research, we have found some anecdotal evidence for the hypotheses developed in the last section regarding the willingness of landowning and landless elites to implement health-promoting policies. This section shows a selection of examples. Our first example are the parliamentary debates about the introduction of the compulsory health insurance for workers in 1883. As already mentioned in Section 2.1, Bismarck’s motive for implementing this policy was to reduce the support for democratic reforms among working class people. A notable aspect about Bismarck’s health insurance is that it included almost all types of industrial workers, but excluded agricultural workers. For our purpose, even more remarkable is the fact that the compulsory health insurance would have included many agricultural workers if the final draft of the bill had been accepted by the parliamentarians. However, prior to the vote on the respective paragraph, three landowners filed a motion for dropping the subparagraph related to agricultural workers. This motion was accepted by 136 to 134 votes (see Reichstagsprotokolle, 1883).⁹

Bismarck’s approach of using social policy measures to reduce the support for democratic reforms was initially proposed by a group of (liberal) academics and intellectuals in the 1860s and early 1870s. Among the thought leaders were many economists, including Adolph Wagner (known for *Wagner’s law*) and Gustav von Schmoller. In later years, scholars like Max Weber, Walter Sombart, and Joseph Schumpeter belonged to the proponents of this school of thought. The common starting points of people like Wagner and Schmoller were concerns regarding the social problems that arose in Germany during the industrialization and the view that neither a socialist approach (as e.g. proposed by Karl Marx and Ferdinand Lassalle) nor a laissez-faire approach (as e.g. proposed by Ludwig Bamberger or Hermann Schulze-Delitzsch) can address these problems. To develop and discuss appropriate social policy measures, annual meetings took place. The first was in Eisenach in 1872. Among the 158 participants were not only academics, but also bureaucrats, parliamentarians, lawyers, and factory owners. Only a few of them were landowners. An immediate result of the 1872 meeting in Eisenach was the establishment of the *Verein für Socialpolitik* (VfS).¹⁰ Over the next decades, the publications and suggestions of the VfS and its members significantly influenced public debates and policy making (Boese, 1939, Stremmel et al., 2006, Verein für Socialpolitik, 1873).

⁹In Section 4, we study this vote and another vote in the Reichstag in greater detail.

¹⁰The VfS is still existing. Internationally, it is nowadays referred to as the German Economic Association (for details, see <https://www.socialpolitik.de/en>).

The VfS was by far not the only association that aimed at improving people's health. Another prominent example is the *Niederrheinische Verein für öffentliche Gesundheitspflege* (NrVföGp) which was founded by the physicians Eduard Lent, Eduard Graf, and Friedrich Emil Sander in Düsseldorf in 1869.¹¹ As the VfS, the NrVföGp held annual meetings and drew upon scientific evidence. In case of the NrVföGp, however, this evidence came from medical sciences rather than social sciences. More specifically, the activities and goals of the NrVföGp were largely influenced by the work of Max von Pettenkofer, a German pioneer in the field of hygiene. Based on his research, he concluded that environmental factors play an important role for the spread of infectious diseases. The NrVföGp thus promoted sanitary reforms, including (e.g.) the construction of sewer systems (Lent, 2014, Limper, 1940). According to Vögele (2001), most members of the NrVföGp were bureaucrats and entrepreneurs. Vögele (2001) also suggests that this membership structure was a reason for why the NrVföGp became quite influential at the local level. Lent (2014) points out that the NrVföGp served as a role model for various local associations all over German Empire. In 1873, an umbrella association was established.

Entrepreneurs were not heavily involved in associations such as the VfS or the NrVföGp but also took other actions that improve the health of the poor. For instance, as the city council of Essen hesitated to agree to the construction of a water supply plant due to the high costs, the steel manufacturer Krupp and other businessmen awarded an interest-free loan (Krabbe, 1985).¹² Furthermore, various industrialists implemented policies that improved workers' access to health care services, for example by establishing company health insurance funds. Among the most popular examples are Alfred Krupp, Werner Siemens, and Karl Ferdinand Stumm. For these three entrepreneurs, it is also well documented that they used social policies to prevent the spread of social democratic ideas among their work force (see Dülmen and Jacob, 1993, Epkenhans and Stremmel, 2010, Kastl and Moore, 2010, among others).¹³

¹¹All of them were politically engaged. Lent was a city councilor in Cologne, whereas Graf and Sander were members of the city councils in Elberfeld and Barmen. Furthermore, Graf held a seat in the lower chamber of the Prussian parliament between 1883 and 1895 (Hainbuch and Tennstedt, 2010).

¹²Similarly, to accelerate the building process of a water supply plant, the industrialist Bethel Henry Strousberg offered a loan to the city of Dortmund. However, in contrast to Essen, this offer was not accepted by Dortmund's city councilors (Krabbe, 1985).

¹³For instance, in a letter from December 1872, Werner Siemens stated that a key purpose for implementing such measures was to "discipline" the workers (see Tennstedt et al., 2002).

3 Empirical analysis (county-level data)

3.1 Data

3.1.1 Distribution of political power

We perform two types of regression analyses to test the hypotheses developed in Section 2.2.2. The first analysis exploits data aggregated at the county level (for details on the second analysis, see Section 4). A necessary element for such an investigation is a measure that varies at this level and reflects how the political power was distributed between the landowning and landless elites. To meet this need, we apply an approach that uses biographical information of locally elected politicians.

Our starting point is the increasing number of political economy studies that measure the political influence of a social group with the share of political posts being occupied by the members of this group (see e.g. Clots-Figueras, 2011, 2012, Hyytinen et al., 2018).¹⁴ A natural measure for the local political power of the landless elite in a non-democratic regime is thus:

$$U = \frac{1}{n} \sum_{j=1}^n \omega_j (1 - p_j) \in [0, 1] \quad \text{with} \quad \sum_{j=1}^n \omega_j = 1 \quad (1)$$

where $n > 0$ denotes the number of politicians, $p_j \in \{0, 1\}$ whether politician j belongs to the landless ($p_j = 0$) or landowning elite ($p_j = 1$), and $\omega_j \in [0, 1]$ a weight reflecting the individual impact of a politician. The political power of the landowning elite is then:

$$A = 1 - U \in [0, 1].$$

In practice, computing U and A is challenging for multiple reasons. A major problem is that creating a list of all politicians is impossible due to limited data availability. Extensive searches in dictionaries yield that a full list of incumbents can be compiled for three types of elected politicians: (i) county directors,¹⁵ (ii)

¹⁴While Clots-Figueras (2011, 2012) uses the share of female parliamentarians to measure the political power of women, Hyytinen et al. (2018) measure the local political power of public employees with the share of local councilors that work in a public sector job. Implicitly, the assumption that the political power of a social group varies with the number of parliamentary seats is also made by studies that apply a Regression Discontinuity Design to check whether political selection affects policy outcomes (Pettersson-Lidbom, 2008).

¹⁵The Prussian authorities distinguished between counties (*Landkreise*) and county boroughs (*Stadtkreise*). The former were governed by a county administrator (*Landrat*), while the Lord Mayors of the eponymous towns served as the head of the county boroughs. We use the term "county director" to simultaneously refer to both of these posts.

members of the Prussian House of Representatives (*Abgeordnetenhaus*), and (iii) members of the German Parliament (*Reichstag*). In total, our three lists include 5,144 politicians (for details, see Table B.2). All of them were male and served between 1867 and 1914.

A second key challenge when building measures that reflect the distribution of political power between landowning and landless elites in Prussia is to establish criteria based on which we can classify the 5,144 politicians in our sample. Our guide in this regard is the literature on political selection (for literature reviews, see e.g. Besley, 2005 and Dal Bó and Finan, 2018). In particular, we take over the approach of using personal characteristics as the basis of classification. A policy maker is thus considered as a member of the landowning elite ($p_j = 1$) when he owned arable land or belonged to a family that owned such land (for details, see Appendix B.1).

Determining whether a politician owned land or had a landowning relative is cumbersome since no centralized source of information exists. Put differently, we have to run a separate information search for each of our 5,144 politicians. More specifically, we first check whether a politician has an entry in (i) Wikipedia, (ii) the online databases on important persons published by the states of Rhineland-Palatinate, Saarland, Hesse, North Rhine-Westphalia and Saxony, or (iii) the biographical handbooks published by Angerbauer (1996), Best and Schröder (1992), Dvorak (1996, 1999a,b, 2000, 2002, 2005, 2013, 2014), Gey (1976), Hansen and Tennstedt (2010), Hauf (1980), Haunfelder (1994), Herlemann and Schatz (1996), Klein (1988), Kühne (1994b), Mann (1988), Romeyk (1994), Wagner (1982), and Wegmann (1969). For the members of a noble family, we also browsed through various volumes of the *Gothaisches Genealogisches Taschenbuch*.¹⁶ If no primary source provided helpful information, we carried out an online search. After our search, we use the available information to classify each politician (for example cases, see Appendix B.2). To be transparent in our coding, we create a separate document that lists our references and includes a short explanation for all 5,144 decisions. Table B.1 presents an excerpt of this document.¹⁷

Finally, to obtain county-level measures that reflect the distribution of power

¹⁶The *Gothaisches Genealogisches Taschenbuch* is a regularly updated encyclopedia, including detailed information about German noble families.

¹⁷For 4 out of 2,657 members of the Prussian House of Representatives ($\approx 0.1\%$) and 144 out of 2,031 county directors ($\approx 7.1\%$), we find no adequate biographical information. 67 of these 144 county directors are from the provinces *Hanover* and *Schleswig-Holstein*, which are not part of the sample that we use in our empirical analyses. We label all persons for whom we have no information as representatives of the landowning elite. We proceed in this way as the resulting bias makes it most challenging to support the hypotheses developed in Section 2.2.2. We also conduct robustness checks in which we exploit measures that do not take into account these politicians (see Section 3.3).

between the landowning and the landless elites, we use an aggregation approach that consists of four steps.¹⁸ In the first step, we compute the fraction of time in which the director of a county (i) belonged to the landless elite:

$$U_{i,t}^{Admin} = \frac{1}{\tau_2 - \tau_1 + 1} \sum_{k=\tau_1}^{\tau_2} (1 - p_{i,k}^{Admin}) \quad (2)$$

where τ_1 and τ_2 denote the first and last year of period t . In the next two steps we produce equivalent sub-indicators for the members of the Prussian House of Representatives and the members of the Reichstag:

$$U_{i,t}^{MP_P} = \frac{1}{\tau_2 - \tau_1 + 1} \sum_{k=\tau_1}^{\tau_2} \left(\frac{1}{\lambda_{i,k}} \sum_{j=1}^{\lambda_{i,k}} (1 - p_{i,j,k}^{MP_{Prussia}}) \right) \quad (3)$$

$$U_{i,t}^{MP_R} = \frac{1}{\tau_2 - \tau_1 + 1} \sum_{k=\tau_1}^{\tau_2} \left(\frac{1}{\sigma_{i,k}} \sum_{j=1}^{\lambda_{i,k}} (1 - p_{i,j,k}^{MP_{Reich}}) \right) \quad (4)$$

where λ (σ) is the total number of politicians that represented county i in the Prussian (German) parliament.¹⁹ In the last steps, we aggregate the sub-indices to obtain an overall measure for the political power of the landless and landowning elites in late-19th/early-20th century Prussia. The basic version of our final index only takes into the county directors and the members of the Prussian House of Representatives:

$$U_{i,t}^{base} = \frac{1}{2} (U_{i,t}^{Admin} + U_{i,t}^{MP_P}) \quad \text{and} \quad A_{i,t}^{base} = 1 - U_{i,t}.^{20} \quad (5)$$

In robustness checks, we also incorporate the members of the Reichstag:

$$U_{i,t}^{all} = \frac{1}{3} \cdot (U_{i,t}^{Admin} + U_{i,t}^{MP_P} + U_{i,t}^{MP_R}) \quad \text{and} \quad A_{i,t}^{all} = 1 - U_{i,t}. \quad (6)$$

When producing our baseline measures, we include members of the Prussian but exclude the members of the German parliament due to differences in the voting system. As most local councilors, the members of the Prussian parliament were elected via the Three-Class Suffrage System. Therefore, it is relatively likely that members of the Prussian parliament had similar personal characteristics as local

¹⁸For a numerical example, see Table B.7.

¹⁹Some electoral districts included more than one county. The politicians that represented these electoral districts thus play a role for multiple counties.

²⁰We use an additive aggregation rule in our basic version since we think that our sub-indices constitute partial substitutes. In Section 3.3, we present a robustness check, showing that our results hold when using a multiplicative approach. For more details on the pros and cons of different aggregation methods see Gründler and Krieger (2021, 2022).

councilors. By contrast, in elections to the Reichstag, all votes counted the same. Working class people thus had much more power in these elections than in local elections. As a consequence, the members of the Reichstag might differ to some extent from the people that made the local policy decisions. Consistent with this view is the well-known fact that the share of social-democrats was higher in the Reichstag than in the local councils and the Prussian parliament.

Figure D.1 reports for each Prussian county how influential the landless elite was at turn of the 19th century, according to our measure. We observe notable heterogeneity, both across and within the Prussian Provinces. In particular, our measure suggests that the landless elite was least influential in the provinces of *Pomerania* and *East Prussia* and most powerful in the provinces of *Westphalia*, *Rhineland*, and *Hesse*. This pattern concatenates well with the assessments of a large number of historians (see e.g. Gerschenkron, 1943, Kühne, 1994a, Wagner, 2005, Wehler, 1987).

A concern about our measurement approach may be whether politicians that represent a county in the Prussian parliament or the Reichstag provide adequate information for producing a measure that allows us to investigate whether elite structure affects policy making at the local level. For three main reasons, we are convinced that this is indeed the case. First, as mentioned above, there existed substantial similarities between the voting systems used at the local level and in elections for the Prussian parliament (for further details, see Appendix A.2). We thus think that it is plausible to assume that similar people were elected in these elections. Second, for a large number of parliamentarians, we have evidence that they were active in local politics. A popular example for such a politician is the physician and professor Rudolf Virchow since he was not only a member of the Reichstag and Prussian House of Representatives but also served as councilor in Berlin for more than 40 years. In all parliaments, he advocated for policies that promote health. For instance, in the Prussian parliament, Virchow was a driving force behind the introduction of compulsory *Trichinella* examinations. In Berlin, Virchow pushed different sanitary reforms, including the construction of a sewer system (Ackerknecht, 1953, Goschler, 2021). Other examples of people who were engaged at different levels are the founding chairmen of the VfS, Rudolf Gneist, and the NrVföGp, Eduard Graf (Hansen and Tennstedt, 2010, Mann, 1988). To validate our measurement approach in a more systematic manner, we randomly choose 50 Reichstag parliamentarians and check for whom information exist that indicate local political engagement. For 38 of these 50 politicians, we find such information (see Table B.3). We repeat this test for the members of the Prussian parliament. Although biographical information on these politicians is scarcer, we

can confirm engagement in local politics for 28 out of the 50 politicians in our sample (see Table B.4).²¹ To support our view that differences in data availability constitute a plausible explanation for why we observe (much) more local political engagement for the members of the Reichstag, we consider those individuals that represented the city of Berlin in the German and Prussian parliament. We study Berlin, as data availability is relatively good for this place. As expected, we find that the differences disappear. We even observe that the share of locally engaged politicians is slightly higher for the members of the Prussian parliament than for the members of the Reichstag (63.04% vs. 58.97%; for details, see Table B.5 & B.6).²²

The third main reason for why we think that our approach is appropriate for measuring how the local political power was distributed among the landless and landowning elites is that our indicators strongly correlate with the allocation of seats in the county parliaments. To make this point, we digitize data by Meitzen (1869) who provides information on the composition of county parliaments in the 1860s. More specifically, Meitzen (1869) reports how many seats are occupied by estate owners, the representatives of the urban places, and the representatives of the rural municipalities. Figure B.5 highlights that share of seats held by estate owners is closely correlated with our main measure for the political power of the landless elite (U^{base}). The correlation coefficient is -0.658.²³

Although our binary classification of politicians is grounded in theory (see e.g. Galor et al., 2009), we think that it is quite legitimate to wonder whether a clear assignment to either the landowning or the landless elite is always possible. For instance, the literature presents numerous examples of successful capitalists who bought agricultural estates at some point in their life and of big landowners who were heavily engaged in industrial activities (see e.g. Ashraf et al., 2020, Eddie, 2008). We admit that classifying such individuals is a non-trivial task. For three major reasons, we label all persons who owned arable land as a member of the landowning elite, regardless of whether we find evidence for other entrepreneurial

²¹The Prussian laws prohibited that judges, clergymen, and government officials entered local parliaments. This rule explain why we find evidence no for local political engagement for six (five) members of the German (Prussian) parliament.

²²7 (4) out of 17 (16) members of the Prussian (German) parliament from Berlin were judges, government officials, and clergymen and thus not allowed to enter a local parliament. 3 (8) of these 17 (16) people were members of the SPD. Hugo Hermes could not become a member of Berlin's city parliament since his brother (Otto) held a seat in this council. Franz Duncker was the chairmen of the craftsmen association in Berlin. His brother, Hermann Duncker, served a mayor of Berlin.

²³The share of seats occupied by estate owners is not necessarily the same as the share of landowning elites in the county parliament since the representatives of the towns and (even more likely) those of the rural municipalities could have also been owners of arable land.

Table 1 List of health-related public amenities in our data set.

Public good	Type
Hospital	Access
Nursing home	Access
Public health fund	Access
Sewer system	Prevention
Water supply system	Prevention
Waste collection	Prevention
Public bath	Prevention
Slaughterhouse	Prevention

activities. First, data on whether landowner use their land (at least partly) for industrial activities is extremely scarce. Producing a reliable indicator that allows us to differentiate landowners that were only engaged in the agricultural sector from landowners that were also active in other sectors is not possible from our perspective. Second, when deciding about every uncertain case separately rather than applying a clear coding procedure, concerns that our coding is arbitrary or even strategically designed to get a particular empirical result may arise. Third, finding evidence for our hypothesis that public health spending increases in the political power of the landless elites is most challenging if we label persons for whom we face uncertainty as member of the landowning elite.

3.1.2 Provision of health-promoting public goods

As outlined in Section 2.2, public measures differ in the way of how they affect people’s health. More specifically, while some policies prevent the outbreak and spread of infectious diseases, others ease the access to medical services. For the purpose of this paper, this distinction is of importance because we expect some differences in the reasons for why elites in industrializing states implement such measures. To obtain data that allows us to differentiate between different types of measures, we digitize publications of the Royal Prussian Statistical Office (see Tetzlaff, 1911, 1914), including local-level data on the provision of eight health-related public goods. Three of them improve the access to health services for the poor, while the other five public goods have preventive purposes (for details, see Table 1).

Table E.3 exemplifies how we aggregate our raw data to compute county-level indices, reflecting the provision of health-promoting public goods. For each county, we first extract the total number of municipalities from Galloway (2007). We then use our digitized data to count how many municipalities provided a particular

health-promoting public good in 1911. Afterwards, we compute a coverage rate for each public good (g) and each county (i):

$$h_{i,1911}^g = \frac{1}{e_i} \cdot \sum_{j=1}^{e_i} D_{j,1911}^g \quad (7)$$

where $e > 0$ denotes the number of municipalities in i and $D \in \{0, 1\}$ a dummy that is equal to 1 when a municipality provided the respective health-promoting public good in 1911, and 0 otherwise. Our final index is the mean of the eight individual coverage rates:

$$H_{i,1911} = \frac{1}{8} \cdot \sum_{g=1}^8 h_{i,1911}^g. \quad (8)$$

Figure D.2 highlights the extent to which health-promoting public goods were provided in 1911, according to our measure. We observe remarkable differences, especially between eastern and western Prussia and between the counties and the county boroughs.

3.1.3 Strength of the working class

The third key ingredient that we require for testing the hypotheses developed in Section 2.2.2 is a measure, reflecting whether elites were threatened by workers' movements. To produce such a measure, we combine different information. The first information is the average vote share of the SPD in the Reichstag elections between 1871 and 1911.²⁵ Our data source is Galloway (2007). Second, we apply municipal-level data on trade union membership. More specifically, we digitize a report published by the General Commission of German Trade Unions, including membership figures for each union cartel in 1911.²⁶ We aggregate the data to the

²⁴We also compute separate measures for the public goods that provide access to health care services and those that prevent the outbreak and spread of infectious diseases.

²⁵The elections took place in 1871, 1874, 1877, 1878, 1881, 1884, 1887, 1890, 1893, 1898, 1903, 1907, and 1912. We exclude the 1912 election from our calculation because we have data on public good provision from 1911. We consider the elections for the Reichstag rather than the elections for the Prussian parliament because the latter were often boycotted by the SPD. A concern may be that the SPD could not participate in the elections from 1878, 1881, 1884, and 1887 because of the Socialist Laws. However, since SPD members circumvented this ban by running as independent candidates, vote shares of the SPD are also available for the period in which the Socialist Laws were in place. To study whether including these elections affects our measure in a notable manner, we compute the average vote share of the SPD in the elections from 1890 onwards. The correlation between the two version of our measure is 0.979. We thus consider it as unlikely that our empirical result are biased due to our choice.

²⁶The figures were published in the trade union magazine "Correspondenzblatt der Generalkommission der Gewerkschaften Deutschland" on 8 June 1912. A digital version of this issue is

county level and divide the aggregated figures by population size to increase the comparability. Third, we collect strike data for the period from 1899 to 1905 by digitizing 7 reports of the Royal German Statistical Office.²⁷ As for the second measure, we aggregate the data to the county level and express the number of strikes in per capita terms. Figures D.3 – D.5 show that the vote shares of the SPD (W^1), the number of trade union members (W^2), and the number of strikes (W^3) are strongly and positively correlated.

We proceed in two steps to aggregate W^1 , W^2 , and W^3 . In the first step, we dichotomize each of our three measures. In particular, we set $W^{1,b}$ ($W^{2,b}$, $W^{3,b}$) equal to one if W^1 (W^2 , W^3) is above the 80 percent quantile. The second step aggregates our three binary measures. We apply two different methods. The first procedure sums up our three binary measures, whereas the second is to take the maximum value:

$$W_i^g = W_i^{1,b} + W_i^{2,b} + W_i^{3,b} \quad \text{and} \quad W_i^b = \max(W_i^{1,b}, W_i^{2,b}, W_i^{3,b}). \quad (9)$$

3.2 Empirical methods

3.2.1 Basic model

We begin our empirical analysis on the impact of elite structure on public health investment with the regression model:

$$H_{i,1911} = \zeta + \beta \cdot U_{i,1871-1911} + \gamma \cdot \mathbf{X}_{i,1871} + \varepsilon_i, \quad (10)$$

where i denotes a county, H the level of public good provision (for details, see Section 3.1.2), and U the political influence of the landless elite (for details, see Section 3.1.1). When creating our basic measure for the distribution of political power, we take into account all county directors and all members of the Prussian parliament that were in office between 1871 and 1911. The parameter of interest is β , indicating whether the provision of health-promoting public goods increases ($\beta > 0$) or decreases ($\beta < 0$) in the political say of landless elites. As outlined in Section 2.2, we expect the parameter β to be positive, regardless of whether we jointly consider all health-promoting measures or whether we distinguish between preventive policies and policies that improve the access to health services.

available here: <http://library.fes.de/gewerkzs/correspondenzblatt/1912/pdf/1912-Statistische%20Beilage-005.pdf>

²⁷In its series “Statistik des Deutschen Reiches”, the Royal German Statistical Office provided information on strikes between 1899 and 1914. However, only until 1905, the data is published at the local level.

As shown in Table E.1, the way of how the local political power was shared between landowning and landless elites in late-19th/early-20th century Prussia is not random. For instance, we observe that the political influence of the landless elite was greater in places with a high population density or higher income tax revenues. A bivariate regression may therefore produce biased estimates of β . To reduce the risk that our results are indeed biased, we add a comprehensive set of control variables (\mathbf{X}) to our regression model. A notable pitfall in this regard is that these control variables may be “bad controls”, i.e. variables that are part of the channel via which elite structure affects the implementation of public health measures. Following Angrist and Pischke (2009), we thus only use variables that were determined prior to our main explanatory variable. More specifically, as U reflects how the political power was distributed between landowning and landless elites in the period from 1871 to 1911, we include county characteristics from the 1860s and early 1870s as control variables into our regression model. Hence, our multivariate regressions produce estimates of β , indicating whether two counties that had the same characteristics in the foundation phase of the German Empire but differed in the way of how the local political power was distributed between 1871 and 1911 implemented a different amount of health-promoting measures in 1911.

We compile our control variables from various sources (for a complete list of variables and summary statistics, see Appendix C). First, we exploit Galloways’ database to get information on population and industry structure, fertility and mortality, urbanization, and income tax payments. We also use the Ifo Prussian Economic History Database (Becker et al., 2014), for instance to obtain data on education and land concentration. Furthermore, as qualitative studies argue that public saving banks often granted credits to local governments to finance public health infrastructure investments, we digitize a publication of the Royal Prussian Statistical Office, including local-level information on the amount of deposits and number of saving accounts. We also compute the distance to the capital city of Prussia (Berlin) and the nearest coal fields. For calculating the latter, we follow Fernihough and O’Rourke (2021). From Meitzen (1869), we extract data on road and train networks and soil texture. Finally, we control for the differences in the extent to which people had access to health services in the 1870s. To this end, we digitize lists published by Engel (1877), including county-level information on the number of beds in general and maternity hospitals, and use data on the share of people working in the health sector, published by Galloway (2007).²⁸

²⁸Unfortunately, no variables are available that allow to control for potential differences in the implementation of preventive policies in the 1870s. However, we expect these differences to be

3.2.2 Instrumental variable approach

Despite the large set of controls in our basic regression models (see Eq. 10), we cannot fully rule out that our measure for the distribution of political power does not correlated with the error term. A key reason is that limited data availability prevents us from controlling for all potential confounders. Another reason is that our measure suffers from measurement error. To mitigate these issues, we apply a two-stage least squares (2SLS) approach.²⁹

Using the 2SLS approach requires an instrumental variable (IV). To be a good instrument, such a variable needs to satisfy two conditions (Angrist and Pischke, 2009): first, it has to be correlated with our measure, reflecting how the political power was divided between landowning and landless elites in late-19th/early-20th century Prussia, and second, conditional on controls, the instrument affects the implementation of health-promoting policies only via the distribution of political power. To come up with an idea for a variable that meets the two conditions, we build on the conceptual framework developed by Acemoglu et al. (2005). In this framework, the distribution of political power is determined by the distribution of economic resources and the institutional rules. For producing our instrument, we focus on the second determinant.

At the lowest administrative level, the Prussian laws distinguish three types of municipalities: towns, rural communities, and estates (for further details on the administrative structure of Prussia, see Appendix A.1). In the towns and rural communities, policy decisions were made by a local council, whereas every estate owner had the right to decides alone about municipal matters (for institutional details, see Appendix A.2). For our purpose remarkable is the fact that Prussian estate owners differed by law in their political rights, despite their common right to manage their territory according to their own will. The basic idea of our 2SLS approach is to exploit such differences. More specifically, our first-stage regression model is:

$$U_{i,1871-1911} = \zeta + \alpha \cdot K_i + \gamma \cdot \mathbf{X}_{i,1871} + \varepsilon_i. \quad (11)$$

where K is the share of knight estates (*Rittergüter*) among all rural places. To compute our instrument, we use two data sources. The first is Rauer (1857) who lists all knight estates in 1856. The other is a census report, including the total number of rural places in 1849 (Statistisches Bureau zu Berlin, 1851). The ratio between the two figures is our instrumental variable.

small since the expansion of preventive measures had just started at this time.

²⁹In economic history studies on Prussia, the 2SLS approach is the most common strategy to address endogeneity issues (see e.g. Ashraf et al., 2020, Becker et al., 2010, 2012, 2011, Becker and Woessmann, 2009, Cinnirella and Hornung, 2016, Hornung, 2014).

For several reasons, we consider the share of knight estates as an appropriate instrumental variable for our county-level measure of the distribution of political power between the landowning and landless elites in late-19th/early-20th century Prussia. First of all, compared to virtually all other landowners, owners of knight estates had more political rights. For instance, until the 1870s, all knight estate owners automatically occupied a seat in a county parliament. By contrast, other landowners were (if at all) represented by some deputies in these parliaments. In addition, these deputies were not only selected by landowners but also by other people that lived in the rural areas of a county. We can therefore expect that a higher share of knight estates leads to more political influence for the landowning elite. Consistent with this expectation, we find a strong correlation between our instrument and our main explanatory variable. In Figure D.6, we illustrate this relationship. When presenting our regression results, we report the first-stage F-statistic to indicate the strength of our instrumental variable.

Another main reason for why we are convinced by our instrument is that the number of knight estates is rather stable during the 19th century. In particular, Rauer (1857) suggests that only a bit more than 300 of the nearly 12,000 knight estates lost their status between 1834 and 1856. We also check on a random basis whether the knight estates indicated by Rauer (1857) are still described as such landholdings in the census documents from 1871. For the vast majority of knight estates, this is the case. Thus, which landholdings were knight estates and how many landowners thus had special political rights was already determined in the 1820s as the respective registers of knight estates were first created. At that time, the industrial revolution in Prussia was (if at all) at a very early stage, workers' movements hardly existed, and the general opinion was that sanitation does not affect health.³⁰

A third aspect that speaks in favor of our 2SLS approach is that the decision which landholding is a knight estate was not made by the local authorities but rather by the Prussian government. Similarly, the institutional rules that created political privileges for the owners of knight estates were designed at the national level. Aidt et al. (2010) argue that such a setting can be used for developing an instrumental variable strategy because national laws and rules are unlikely to be determined by the political or economic situation of a particular municipality or county.

³⁰Many historians place the start of the industrial revolution in Prussia in the mid-1830s (see Hoffmann, 1963, Tilly, 1996). The first workers' movements in Prussia emerged in 1848 (see Balser, 1962). The first scientific proof that sanitation has an impact on health was made by Ignaz Semmelweis in the 1840s. Until the 1860s, even most scientists did not believe in a relationship between sanitation and health (see Best and Neuhauser, 2004).

A concern regarding our procedure may be whether our instrument meets the exclusion restriction. We aim to alleviate this legitimate concern by showing that our second-stage estimates hardly change when we add control variables to our regression model. Such a robustness is reassuring since our controls block other channels through which the share of knight estates might affect the provision of health-promoting public goods. The list of control variables is the same as in the basic analysis and includes (e.g.) the number of towns, rural communities, and estates, variables that reflect the industry structure of a county, and proxies for fiscal capacity (for a list with all controls, see Appendix C). Another but related concern might be that the share of knight estates is used as an indicator for the extent of serfdom by Cinnirella and Hornung (2016), whereas Ashraf et al. (2020) consider it as a proxy measure of land concentration among the Prussian elites. Therefore, it might be that the share of knight estates affects the distribution of power not only through institutional rules but also via other channels. For our IV approach, such alternative channels are problematic if they shape the provision of health-promoting public goods not only via the distribution of power among the landowning and landless elites. We cannot fully rule out the existence of such an alternative channel. For instance, some studies suggest that both the extent of serfdom and land concentration have an effect on education (see e.g. Baten and Hippe, 2018, Cinnirella and Hornung, 2016, Goni, 2021), which, in turn, might influence the provision of health-promoting public goods. We block this specific channel by controlling for differences in the level of education. Section 3.3 also presents results from regression models that explicitly control for land inequality. Neither our first- nor our second-stage results change in a notable way in these robustness checks. An interesting note in this context is that we also observe a strong relationship between land inequality and the distribution of power in the first-stage models. Our findings are thus in line with the framework proposed by Acemoglu et al. (2005) because we see that the distribution of political power is determined by the distribution of resources (captured by land concentration) and institutional rules (captured by the share of knight estates).

3.2.3 Augmented model

In Section 2.2.2, we do not only argue that landless elites provide more health-promoting public goods than landowning elites, but also establish the hypothesis that the reasons for why landless elites are more active in this regard are not the same for preventive measures and measures that ease the access to health care services. More specifically, we think that the differences in the latter type can be explained with differences in the extent to which the landless and the landowning

elites are threatened by workers' movements. For preventive measures, we do not expect that this difference plays a role. Rather, we argue that landless elites have more incentives to voluntarily implement such measures. To empirically test our hypotheses, we use two different strategies. The first approach is to estimate the regression model:

$$H_{i,1911} = \zeta + \beta_1 \cdot U_{i,1871-1911} + \beta_2 \cdot W_{i,1871-1911} + \beta_3 \cdot (U_{i,1871-1911} \times W_{i,1871-1911}) + \gamma \cdot \mathbf{X}_{i,1871} + \varepsilon_i. \quad (12)$$

where W is one of our measures for the strength of the workers' movements (for details, see Section 3.1.3). The parameters of interest are β_1 and β_3 . The former indicates whether landless elites implement more health-promoting policies than landowning elites if workers are not well organized and elites thus not concerned about strikes or political turmoil. By contrast, the parameter β_3 reflects how the behavior of the landless elite changes if the workers are better organized. If our theoretical considerations are valid, we find $\beta_1 > 0$ and $\beta_3 = 0$ for preventive measures and $\beta_1 = 0$ and $\beta_3 > 0$ for measures that facilitate people's access to medical services.

The second procedure that we use in our mechanism analysis is to divide our sample, according to whether workers' movements are weak ($W^b = 0$) or strong ($W^b = 1$). In each of the sub-samples, we then apply our 2SLS approach. If our expectation about the mechanisms at work are correct, we observe in both sub-samples that the implementation of preventive policies increases in the political power of the landless elite. By contrast, for measures that improve the access to health care services, we only find evidence for an effect of elite structure on the provision of health-promoting public goods in the sub-sample that consists of the counties in which the workers are well organized.

3.3 Results

3.3.1 Main finding

In Table 2, we present results of eight regressions. These regressions share three features. First, they all exploit a sample including 15 county boroughs and 320 counties. Second, all non-binary variables are standardized such that they have a mean of zero and a standard deviation of one (for summary statistics, see Table C.1). Third, the outcome variable takes into account all of our health-promoting

measures, regardless of whether they are preventive or ease the access to health care services (for the full list of measures, see Table 1).

In Column 1, we show OLS results from a regression model that includes two explanatory variables: a dummy that is equal to one for the 15 county boroughs, and our indicator of how politically powerful the landless elite was in the period from 1871 to 1911 (for details, see Section 3.1.1). Our first estimate indicates a positive and statistically significant relationship between the political influence of the landless elite and the implementation of health-promoting public policies. In particular, we observe that a one standard deviation increase in the power of the landless elite is associated with a 0.157 standard deviation increase in our main outcome variable.³¹

The OLS estimate reported in Column 1 might be biased, for instance due to measurement error in our measure for the political power of the landless elite or unobserved confounders. To alleviate this concern, we show results from our 2SLS approach in Column 2. Reassuringly, our parameter estimate of interest remains positive and statistically significant at the one percent level. The 2SLS estimate ($\hat{\beta}_{IV} = 0.22$) even slightly exceeds the OLS estimate ($\hat{\beta}_{OLS} = 0.16$). Our first-stage diagnostics indicate that our second-stage estimate does not suffer from a weak-instrument bias (for first-stage and reduced-form estimates, see Table E.4). For instance, the first-stage F-statistic is 66.40 and thus considerably above the commonly used threshold of 10.

In Columns 3 & 4, we augment our initial regression models by nine province fixed effects and thereby control for all institutional, economical, demographical, historical, cultural, and geographical factors that vary between provinces. Given that regional differences were substantial in late-19th/early-20th century Prussia (especially between Eastern and Western provinces), we believe that this model extension constitutes an important and demanding check. We find that our OLS estimate decreases from 0.16 to 0.11, but also that it continues to be statistically significant at the one percent level. For our 2SLS estimate, we observe a similar pattern. Consequently, we interpret the results presented in Columns 3 and 4 as evidence for our hypothesis that landless elites implement more health-promoting measures than landowning elites.

In Columns 5 & 6, we replace our province fixed effects by 25 district (*Regierungsbezirk*) fixed effects to control in a more detailed way for regional differences.

³¹As evident from Table C.1, the standard deviation in our outcome variable is nearly twice as large as the mean. Thus, 0.157 standard deviations are roughly the same as one third of the sample mean. A transition from an environment where the landless elite has no power to an environment where the landless elite possess all power is equivalent to a 4 standard deviation increase in our main explanatory variable.

Table 2 Baseline analysis (OLS and 2SLS estimates).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Landless elite	0.157*** (0.0222)	0.221*** (0.0356)	0.109*** (0.0284)	0.197*** (0.0651)	0.099*** (0.0285)	0.312*** (0.0760)	0.083*** (0.0258)	0.292*** (0.0743)
Approach	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
SW F-Stat.	-	66.40	-	19.40	-	17.10	-	21.30
Observations	335	335	335	335	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	No	No	Yes	Yes	No	No	No	No
District FE	No	No	No	No	Yes	Yes	Yes	Yes
Health	No	No	No	No	Yes	Yes	Yes	Yes

Notes: This table shows OLS and 2SLS estimates. The dependent variable is a coverage rate that takes into account eight health-promoting public goods (for details, see Section 3.1.2). All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We report robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Our OLS estimate hardly changes due to this model adjustment, while our 2SLS estimate increases from 0.20 to 0.31. We also observe that both estimates remain statistically significant at conventional levels. Table E.4 shows that the rise in the 2SLS estimate is caused by a stronger reduced-form relationship.

Ideally, we would like to extend our regression models with a measure that is produced in the same way as our dependent variable and reflects the provision of health-promoting public goods in 1871. With such a variable, we could further address the concern that our previous results might be driven by an unobserved cultural or historical factor. Unfortunately, creating such a measure is impossible because of limited data availability. As an alternative, we expand our regression model by variables that characterize the level of health and public health care in the early 1870s. These variables are (i) the crude death rate, (ii) the death rate of newborns, (iii) the per-capita number of people working in the health sector, (iv) the per-capita number of public hospital beds, and (v) the per-capita number of beds in public maternity hospitals. Columns 7 & 8 imply that adding these five variables to our regression model only has little impact on our estimates.

In our conceptual considerations (see Section 2.2), we argue that landless and landowning elites differ in their policy preferences and thus do not put the same emphasis on the implementation of measures that improve the health of working class people. While the results shown in Table 2 are consistent with this line of argument, other potential explanations exist for them. For instance, it might be that places that are governed by landless elites have a higher fiscal capacity and thus more health-promoting public goods than places in which landowning elites dominate. To verify whether this alternative mechanism is likely to explain our baseline estimates, we expand the regression models applied in Columns 7 & 8 of Table 2 by three variables. The first reflects income tax revenues (per capita) in 1876. The other variables are the total number of accounts (per capita) and the

total amount of deposits (per capita) in public saving banks in 1875. While the former variable is a common proxy for fiscal capacity (see Karaman and Pamuk, 2013), we think that information on local public saving banks are an important complement in our case since these banks often provided loans for public health infrastructure projects in Prussia (see e.g. Krabbe, 1985, Vögele, 2001). The OLS and 2SLS estimate reported in the first column of Table E.5 (see Panel A & B) illustrate that our results do not depend on whether we control for fiscal capacity. Consequently, we consider it as unlikely that differences in fiscal capacity explain why the provision of health-promoting public goods increases in the power of the landless elite.

In Column 2 of Table E.5, we aim at alleviating the concern that our previous regression models do not adequately control for urbanization. This concern may exist since health conditions were much worse in urban areas in late-19th/early-20th century Prussia. Thus, the need for health-promoting reforms was higher in urban places than in rural places. At the same time, we can expect that landless elites were more powerful in urban environments. We capture local differences in urbanization by controlling for the share of people that lived in a town and the population density. In addition, we control for the total number of towns, rural communities, and estates, respectively. Compared to Columns 7 & 8 of our main table (Table 2), we find slightly smaller estimates when controlling for these five variables. However, we also observe that our estimates continue to be statistically significant at conventional levels. Therefore, we doubt that our baseline estimates simply reflect differences in urbanization.

Columns 3 – 8 of Table E.5 show the results of further model extensions. In neither of these robustness checks, we find strong changes in our estimates. More specifically, in Column 3, we control for industry structure. To this end, we use census data on the share of workers in the industrial, transport, service, mining, education, and agricultural sector. In Column 4, we show how our results change when adding the share of literate males and females as proxies for the level of education to our model. We consider this robustness check as crucial due to the positive effects of education on health (Cervellati and Sunde, 2005, Hansen and Strulik, 2017) and since economic theory implies that landless elites have greater benefits from educating their workers than landowning elites (Galor et al., 2009). Column 5 addresses the concern that landowning elites might be more willing to privately provide services that are beneficial for workers and thus do not need to implement public measures. Because we lack data on private health services, we exploit education data to rule out this alternative explanation. In particular, in Column 5, we are controlling for the share of private schools, the share of pupils

enrolled in private schools, and the share of teachers working in private schools. Column 6 examines whether our estimates may reflect that places dominated by landless elites are better connected with other places and thus have more/better information about health-promoting technologies and measures. To this end, we expand our models by variables indicating the total length of all country roads, navigable rivers, and railway tracks. In Columns 7 & 8, we control for standard demographic characteristics (e.g. share of females, Catholics, young people, and migrants) and geographic characteristics (e.g. soil texture, distance to Berlin and the nearest coal field, longitude, latitude).

Column 9 of Table E.5 adds a measure of land inequality to our models. As outlined in Section 3.2, we think for several reasons that this robustness test is essential. For instance, land inequality correlates with the distribution of power between the landowning and landless elites and the share of knight estates (our instrumental variable). A reasonable concern is thus whether land concentration constitutes an alternative mechanism through which the share of knight estates influences the implementation of health-promoting policies. However, the results from our model extension suggest that this is unlikely since our estimates only change marginally when controlling for differences in land inequality. Especially notable in this regard are the results of our first-stage regression since we find a strong relationship between land inequality and the distribution of the political power (not reported), but also that the estimate showing the relationship of our instrumental variable and the distribution of power is nearly the same as in the baseline model (see Column 4 of Table E.4) and the other model extensions (see Columns 1 – 8 of Table E.5).

In addition to our model extensions, we perform some subsample analyses to check the robustness of our baseline estimates. Table E.6 presents the results of these analyses. More specifically, we first exclude all 15 county boroughs from our sample. Column 1 indicates that this restriction only has minor consequences. In Column 2, we study the Eastern parts of Prussia. Then, our estimates are smaller than in the baseline models (see Columns 7 & 8 of Table 2), but continue to be positive. Our IV estimate also remains statistically significant at the one percent level. The p-value of the OLS estimate is 0.109 and thus close to be statistically significant at conventional levels. If we exclude the county boroughs, the level of statistical significance improves slightly (see Column 3). Columns 4 & 5 replicate the previous analyses for the two Western provinces and suggest that our results also hold for this part of Prussia. Notably, we find only minor differences in our 2SLS estimates when comparing the results for the Eastern and Western regions. Column 6 illustrates that our estimates hold when we drop all counties without a

town. In Column 7, we exclude all counties that experienced a territorial change between 1871 and 1911, either due to a district reform or because a town became independent. This sample restriction does not affect our findings in a significant manner. Furthermore, Figures D.7 – D.12 present the results of various jackknife analyses and indicate that our estimates are not driven by a particular district, province or health-promoting public good. Lastly, we show in Table E.7 that our results are robust to methodological changes in our key explanatory variable. In particular, Columns 1 & 2 illustrate that our results remain virtually unchanged when applying a multiplicative rather than an additive aggregation procedure. In Columns 3 & 4, we additionally take into account the members of the Reichstag when producing our measure for the distribution of power. Our estimates hardly change when using this broader approach. Columns 5 & 6 show that our results hold if we only consider politicians that were active between 1900 and 1911. In Columns 7 & 8, we highlight that dropping politicians for which we do not find biographical information has no notable effects on our estimates.

In sum, the results shown in this section suggest that the provision of health-promoting public goods in late-19th/early-20th century Prussia increased in the political power of the landless elite. This finding is consistent with the theoretical considerations presented in Section 2.2.2. Section 4 provides further support for our basic hypothesis by exploiting two roll-call votes in the Reichstag. However, before turning to this analysis, we differentiate between preventive measures and measures that improve the access to health services (see Section 3.3.2) and shed some light on the mechanisms at work (see Section 3.3.3).

3.3.2 Different types of health-promoting measures

In Table 3, we apply the same regression models as in Columns 7 and 8 of our baseline table (see Table 2) but distinguish between measures that ease people's access to health services and measures that prevent the outbreak and spread of infectious diseases. If the line of argument developed in Section 2.2.2 is solid, we should observe that both types of measures were more frequently implemented in those Prussian counties where the landless elite is powerful. Our estimates are in line with this prediction. More specifically, our regression results imply a positive relationship between our measure reflecting the political influence of the landless elite and our type-specific measures for the provision of health-promoting public goods. Our 2SLS estimates and the OLS estimate that we obtain if we consider preventive policies are even statistically significant at the one percent level. The other OLS estimate is statistically significant at the ten percent level.

Table 3 Different types of health-promoting public goods.

	Access to health services		Preventive measures	
	(1)	(2)	(3)	(4)
Landless elite	0.064* (0.0357)	0.334*** (0.1124)	0.090*** (0.0240)	0.257*** (0.0643)
Approach	OLS	2SLS	OLS	2SLS
SW F-Stat.	-	21.30	-	21.30
Observations	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes

Notes: This table shows OLS and 2SLS estimates. In Columns 1 & 2, the dependent variable is a coverage rate that takes into account three health-promoting public goods that ease access to health services. In Columns 3 & 4, the dependent variable is a coverage rate that takes into account five preventive measures. All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We report robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To assess the robustness of the estimates shown in Table 3, we made the same model extensions as in Section 3.3.1. Table E.8 reports the estimates. The basic structure of this table is the same as the structure of Table E.5. We observe that our 2SLS estimates continue to be positive and statistically significant at the one percent level in each extension. For the OLS estimates, this pattern holds when studying preventive measures. By contrast, for measures that facilitate the access to medical services, we have some specifications where the OLS estimate is not statistically significant at standard levels.³² We believe that the differences in the level of statistical significance are not implausible because we expect the landless elites to voluntarily implement preventive measures, while they improve access to health services only when being forced by the working class people. In the next section, we substantiate this view.

3.3.3 Mechanism

As outlined in more detail in Section 3.2.3, we use two different approaches to shed light on the reasons for why landless elites in late-19th/early-20th century Prussia implemented more health-promoting policies than landowning elites. The first approach is to estimate an interaction model (see Eq. 12), using OLS. Our second approach is to split our sample into two parts based on how well workers were organized. For each subsample, we can then apply our instrumental variable strategy. In Table 4, we present the results of both approaches, but separately for measures that facilitate access to medical services and measures that prevent the outbreak and spread of infectious diseases.

In Columns 1 & 2 of Table 4, we use interaction models to highlight why the

³²We also find for the 2SLS estimates that the p-values are smaller when focusing on preventive measures.

Table 4 Mechanism analysis.

	Access to health services				Preventive measures			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Landless elite	-0.008 (0.0340)	-0.018 (0.0347)	-0.142 (0.1108)	0.367** (0.1519)	0.059*** (0.0206)	0.047** (0.0209)	0.148** (0.0612)	0.305*** (0.1149)
Landless elite × Strength workers	0.136* (0.0778)	0.144** (0.0641)			0.068 (0.0609)	0.087* (0.0451)		
Approach	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Sample	Full	Full	$W = 0$	$W > 0$	Full	Full	$W = 0$	$W > 0$
SW F-Stat.	-	-	9.23	10.23	-	-	9.23	10.23
Observations	335	335	223	112	335	335		
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	No	No	Yes	Yes	No	No	Yes	Yes
District FE	Yes	Yes	No	No	Yes	Yes	No	No
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS and 2SLS estimates. In Columns 1 – 4, the dependent variable is a coverage rate that takes into account three health-promoting public goods that ease access to health services. In Columns 5 – 8, the dependent variable is a coverage rate that takes into account five preventive measures. All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

access to health care services increases in the political power of the landless elite. The difference between the two models concerns the way of how we measure the strength of the worker’s movements: while we apply our graded measure (W^g) in Column 1, the binary version (W^b) is used in Column 2 (for details, see Section 3.1.3). The set of control variables is the same as in Column 7 of Table 2 and Columns 1 & 3 of Table 3. In line with our theoretical arguments, our estimates show that landless and landowning elites do not differ in the extent to which they facilitate people’s access to medical services if workers are weakly organized. By contrast, if workers’ movements are strong, we find that landless elites are more active in providing health-promoting public goods that ease the access to health care services. The results of our second approach fully confirm this pattern (see Columns 3 & 4 of Table 4). In Table E.9, we illustrate that these findings also hold when adding further control variables to our regression models.

In Columns 5 - 8, we examine why landless elites implement more preventive measures. As outlined in Section 2.2.2, our basic hypothesis is that landless elites voluntarily support the provision of public goods that prevent the outbreak and spread of infectious diseases. Put differently, if our argumentation is correct, we should find that an increase in the political power of landless elites leads to an increase in the implementation of preventive policies, regardless of how well the workers are organized. Our estimates indicate that this is indeed the case. More specifically, we observe positive and statistically significant estimates in our two subsamples. When using the interaction model, we see that the main effects are statistically significant at common levels, while the interaction terms are (at best) weakly significant. Table E.10 suggests that the interactions become statistically

insignificant at conventional levels if we expand our regression model. The other estimates change only little in these robustness checks.

In sum, our results substantiate the hypotheses that the reasons for why the landless elite of an industrializing regime provides more health-promoting public goods than the landowning elite depends on the nature of the public good. More specifically, for measures that ease the access to health services for working class people, we observe that the distribution of the political power plays a role only if workers' movements are strong. Since workers in late-19th/early-20th century Prussia were better organized in the non-agricultural sectors than workers in the agricultural sectors, we interpret our findings as evidence for theories, suggesting that elites redistribute to reduce the risk of strikes and political turmoil (see e.g. Acemoglu and Robinson, 2000, 2001). By contrast, for measures that prevent the outbreak and spread of infectious diseases, we find that landless elite implement them more frequently, irrespective of the strength of the workers' movement. We believe that this result is consistent with theories, implying that elites voluntarily conduct reforms that are beneficial for the poor (see e.g. Galor and Moav, 2006, Galor et al., 2009, Lizzeri and Persico, 2004).

4 Empirical analysis (roll-call votes)

The results reported in the previous section strongly suggest that the landowning elite in late-19th/early-20th century Prussia were not as active in implementing health-promoting measures as the landless elite. We explain our key finding with differences in preferences and differences in the extent to which the two types of elites were threatened by workers' movements. To exclude other explanations for our results (e.g. differences in fiscal capacity), we add a large number of control variables to our regression models. However, a concern regarding our county-level analysis might still be that aggregated data cannot be used to illustrate that the landowning (landless) elites actively oppose (support) health-promoting policies. The purpose of this section is to allay this legitimate concern by using roll-call votes. In the (historical) political economy literature, studying roll-call votes is a common method to reveal differences among landowning and landless elites. For instance, Galor and Moav (2006) use such an analysis to examine whether landowning and landless elites differ in their attitudes towards education policies (see also Cvrcek and Zajicek, 2019). For Prussia, roll-call votes were (e.g.) studied by Becker and Hornung (2020) and Ziblatt (2008a). To our best knowledge, no study exists that focuses on roll-call votes that are related to health policies.

4.1 Background information

4.1.1 Compulsory health insurance for workers

We consider the votes of two ballots in the German parliament (Reichstag). The first concerns the introduction of the compulsory health insurance for workers. As sketched in Section 2 and described in more detail in Appendix A.4, this health-promoting policy was part of Bismarck’s ‘carrots and sticks’ approach with which he aimed to reduce the support for social-democratic ideas and movements. The final votes on the respective bill took place in May 1883.

The minutes from the related parliamentary debates clearly indicate that the compulsory health insurance for workers was controversially discussed among the Reichstag parliamentarians. In particular, great disagreement existed with regard to the question of who should be eligible for this insurance. In the final bill, the eligibility criteria were specified in §1, §1a, §2, and §3. More specifically, §1 states that participation is compulsory for all industrial wage earners, while §1a defines that wage workers in the agricultural sectors also need to participate. §2 and §3 specify exemptions (e.g. civil servants and apprentices). In the second reading of the bill in April 1883, a majority of the parliamentarians approved that all four paragraphs should belong to the final bill.

Prior to the final vote on the bill in Mai 1883, three members of the German parliament (Georg von Hertling, Wilhelm von Minnigerode, Otto Uhden) filed a motion that aimed to restrict eligibility, especially for agricultural workers. Their motion was approved by 136 to 134 votes. Because of the request of the liberal politician Alexander Meyer, the vote on this motion was a roll-call vote. We can thus exploit this motion to study whether landowners differ from other elites in their willingness to support a policy that improves workers’ access to health care services.

4.1.2 Compulsory trichinella inspection

Contaminated meat was a frequent cause of illness and death in Germany in the second half of the 19th century. To address this health issue, some (but not all) German states passed laws that regulate the slaughter of animals. Most of these states also introduced compulsory trichinella inspections. For instance, in Prussia, trichinella inspections became mandatory in 1866. In 1899, the government of the German Empire presented a bill that aims to establish a uniform regulation. As mentioned by the Interior Minister Graf Arthur von Posadowsky-Wehner in the parliamentary debate on 17 April 1899, some interest groups opposed this bill for

economic reasons. The minutes from this and other debates suggest that a main point of contention was §8 of the draft bill. The objective of this paragraph was to make trichinella inspections compulsory for virtually all slaughters. The only exception concerned slaughters for own use.

After intensive discussion, the final vote on the bill concerning the inspection of animals of slaughter and meat (*Gesetz betreffend die Schlachtvieh- und Fleischbeschau*) took place in March 1900. Prior to the vote on §8 on March 10, the president of the German health department, Dr. Karl Köhler, clearly stated that establishing compulsory trichinella inspections is very important from a medical point of view and desired by the government. The parliamentarians nevertheless rejected this paragraph by 165 to 66 votes. Since the final vote on §8 was a roll-call vote, we can use it to examine whether landowning and landless elites voted differently on a policy that aims to prevent the outbreak of a disease.

4.2 Data

To identify how parliamentarians voted in the above-mentioned votes, we exploit the minutes of the parliamentary sessions on 25 May 1883 and 10 March 1900, respectively. We distinguish three types of voting behavior: voting in favor of a health-promoting policy ($V = 2$), abstention from voting ($V = 1$), and voting against a health-promoting policy ($V = 0$). To decide whether a parliamentarian belongs to the landowning or the landless elite, we use the same procedure as in Section 3 (for details, see Appendix B). Our key data source is the handbook by Best and Schröder (1992) which includes detailed biographical information on all members of the Reichstag. From their handbook, we also extract other personal information such as date of birth, religion, party affiliation, electoral district, and whether a parliamentarian holds a PhD. Finally, we exploit Specht and Schwabe (1904) to obtain constituency-level data on the vote share of the SPD.

4.3 Results

Following Galor and Moav (2006), we perform ordered probit regressions to test whether landowning and landless elites voted differently in the votes on 25 May 1883 and 10 March 1900. Our regression results are reported in Table 5. In all regressions, we exclude the parliamentarians from the SPD since they reflect the interests of the workers.

Column 1 of Table 5 shows results from a parsimonious regression model. The only explanatory variable in this model is a dummy variable, reflecting whether a parliamentarian belongs to the landless or the landowning elite. Our estimates

Table 5 Roll-call vote analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Compulsory health insurance								
Landless elite	0.681*** (0.1183)	0.664*** (0.1345)	0.729*** (0.1451)	0.713*** (0.1454)	0.766*** (0.1735)	0.456*** (0.1535)	0.446*** (0.1540)	0.560*** (0.2094)
Vote share SPD				0.017* (0.0095)	0.035*** (0.0125)		0.014 (0.0096)	0.053*** (0.0151)
Observations	379	379	379	379	379	379	379	379
Panel B: Compulsory trichinella inspection								
Landless elite	0.743*** (0.1265)	0.802*** (0.1418)	0.882*** (0.1552)	0.862*** (0.1561)	0.770*** (0.1762)	0.608*** (0.1659)	0.602*** (0.1656)	0.578*** (0.1868)
Vote share SPD				0.008 (0.0061)	0.010 (0.0072)		0.004 (0.0063)	0.008 (0.0074)
Observations	335	335	335	335	335	335	335	335
Region FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Personal characteristics	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Levels (dep. var.)	3	3	3	3	3	2	2	2

Notes: This table shows results from ordered probit regressions. The dependent variable reflects the voting behavior of the parliamentarians. Robust standard errors are reported in parentheses. We use the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

support our hypothesis that landless elites are more willing to implement health-promoting policies than landowning elites. More specifically, Panel A implies that the parliamentarians without land ownership were significantly more likely to vote against the motion that aims to tighten the eligibility criteria for the compulsory health insurance than parliamentarians that owned arable land. Panel B suggests that the landowning parliamentarians voted significantly more often against the compulsory trichinella inspection than the landless parliamentarians.

Columns 2 – 4 of Table 5 gradually expand the regression model estimated in Column 1. In particular, we add region fixed effects in Column 2 and personal characteristics (age, religion, PhD) in Column 3.³³ Our estimates hardly change because of these model extensions. In Column 4, we show that our results hold when controlling for the vote share of the SPD. Interestingly, we only observe in Panel A that the vote share of the SPD is significantly correlated with the voting behavior of the parliamentarians. We consider this result as consistent with our hypothesis that the strength of the workers' movements plays a role when elites decide about policies that ease access to health care services, but does not shape their support for preventive measures.

Among studies that analyze roll-call votes, disagreement exists about how the politicians that abstain from voting should be taken into account. In our baseline model, we follow Galor and Moav (2006) and differentiate three different voting behaviors. In our robustness check, we distinguish parliamentarians that actively

³³We use five ten-year age cohort dummies to control for differences in the age of the parliamentarians. The region fixed effects divide the territory of the German Empire into eighteen regions.

support the health-promoting policies from other parliamentarians (for a similar approach, see Cvrcek and Zajicek, 2019). Column 5 presents the results of this robustness check. The only notable change is that the estimate that reflects the relationship between the voting behavior of the parliamentarians and SPD’s vote share is statistically stronger in Panel A.

Finally, we augment the models estimated in Columns 3 – 5 by dummies that indicate the political orientation of a politicians. We differentiate three types of political background: (i) member of a regional party, (ii) member of a right-wing party, and (iii) member of a center-left party. The effect of controlling for party affiliation is that our point estimates remain statistically significant but decrease slightly (see Column 6 – 8). From our perspective, the changes in the size of the estimates are not surprising since the share of landowners is much smaller in the center-left parties than in the other parties.

5 Conclusion

This paper uses newly digitized data from late-19th/early-20th century Prussia to examine why elites of industrializing regimes increase public health spending. Our results imply that their motives depend on the type of health-promoting policy. More specifically, we conclude that elites voluntarily implement policies that may prevent the outbreak and spread of infectious diseases. This conclusion is in line with the conclusion drawn by Aidt et al. (2010) for 19th century Britain and fits nicely together with qualitative evidence provided by historians (see e.g. Brown, 1988, 1989, Krabbe, 1985, Vögele, 2001). We also observe that elites improve the access to health services since they feared social and political turmoil. Consistent with this conclusion is that several historians explain the introduction of public health insurances in the German, Austrian, and Russian Empire with the rising support for workers’ movements (see e.g. Frenkel, 2000, Rosenberg, 2014).

The data that we compiled for this project complements existing data sets on Prussia (see especially Becker and Cinnirella, 2020, Becker et al., 2014, Galloway, 2007) and thus opens prospects for future research. From our perspective, a very relevant question is which factors determined the distribution of political power between landowning and landless elites. We also think that it is crucial to pay attention to other policies for getting a comprehensive understanding of how the behavior of elites affect development. Finally, a deeper analysis of the differences within the landless elites may be useful, especially to shed light on the between-city differences in the implementation of human-capital promoting policies. Such analyses may also help to disentangle different reasons for why elites voluntarily

implement preventive measures. For Prussia, it would be cumbersome to perform such a study since no centralized source exists that provides information on the composition of city councils.

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Appendix for online publication

A Additional background information

A.1 Administrative structure

The German Empire was a federal state that was established in 1871 after the Prussian victory in the Franco-Prussian War. In total, it consisted of more than twenty member states. Almost all of them were (semi-)constitutional monarchies. Compared to present-day Germany, the territory of the German Empire was 50 percent larger. The Kingdom of Prussia was, by far, the largest member of the German Empire, occupying two-thirds of the German territory and hosting three-fifths of the German population. Prussia was also politically dominant since the King of Prussia served as the Emperor of Germany.

The Prussian government applied a multilevel system to organize its territory (Hubatsch et al., 1975). At the highest sub-level, Prussia was divided into 12 – 14 provinces (*Provinzen*).¹ Most of them were headed by an appointed governor (*Oberpräsident*) and had an indirectly elected parliament.² At the second-highest administrative sublevel, Prussia consisted of 35/36 districts (*Regierungsbezirke*).³ Apart from their size, districts differ from provinces for two key reasons: first, no parliaments existed at the district level, and second, the district governor (*Regierungspräsident*) had to be a senior civil servant.

At the third-highest sub-level, the Prussian administrative system distinguished between counties (*Landkreisen*), which in turn consisted of towns (*Städte*), rural communities (*Landgemeinden*), and estates (*Gutsbezirke*), and county boroughs (*Stadtkreise*).⁴ The latter were those towns that reached a particular population threshold and decided to become independent.⁵ All counties were governed by a

¹The total number of provinces increased in 1877 and 1881 as the province of Prussia was split into an eastern and a western part and as Berlin was separated from the province of Brandenburg. Table E.2 lists all Prussian provinces.

²The rules that were determining the composition of the provincial parliaments varied across provinces and changed over time. We do not describe these various rules since the provincial parliaments do not play a role in this study. The elected Lord Mayor of Berlin served as the governor of the eponymous province.

³The total number of districts was 35 in 1871 and increased by one in 1905 as the district of Allenstein was founded in the province of East Prussia. Table E.2 lists all Prussian districts.

⁴Both towns and rural communities varied considerably in their size. For instance, in 1871, the smallest rural communities had less than 100 inhabitants, whereas the largest had more than 15,000 inhabitants (Becker and Cinnirella, 2020).

⁵The actual population threshold varied across provinces. In most provinces, the threshold was 25,000 inhabitants. The exceptions were the provinces of Rhineland (40,000 inhabitants) and Westphalia (30,000 inhabitants).

county administrator (*Landrat*). The head of a county borough was the mayor of the eponymous towns. Local parliaments existed at the county level, and in both towns and rural communities.

A.2 Political system

In Section 2.1, we briefly sketched why the electoral rules in late-19th/early-20th century Prussia favored wealthy people. In this appendix section, we complement these statements by providing more details regarding the voting procedures that were in place at the different levels of government.

A.2.1 Municipal parliaments

The rules governing the elections of local councils in late-19th/early-20th century Prussia differed across regions. Two main reasons exist for these differences. The first is that three of the provinces (*Schleswig-Holstein*, *Hesse-Nassau*, *Hanover*) were not a part of the Prussian Empire until 1866. After having occupied these regions, the Prussian government maintained some traditional principles to avoid discontent. Second, as a result of the French influence during the Napoleonic era, the rules in the Western provinces (*Rhineland*, *Westphalia*) differed from the rules established in the Eastern provinces (*East Prussia*, *West Prussia*, *Poznan*, *Silesia*, *Brandenburg*, *Pomerania*, *Saxony*). However, for the purpose of this paper, the institutional differences between the Eastern and Western provinces are of minor importance. In the following, we focus on the rules applied in the “old” Prussian provinces since we need to exclude all “new” provinces from our analysis due to limited data availability.

A local council existed in all towns and rural communities (*Landgemeinden*). Estates (*Gutsbezirke*) were governed by the owner. Other people who lived in an estate usually had no political rights. Typically, the municipal councils in Prussia consisted of two chambers. The members of the upper house were elected by the members of the lower house, while public elections determined the composition of the lower house. A notable exception in this regard is the *Rhineland* where local councils only consisted of one publicly elected chamber. For three main reasons, working class people had hardly any political influence in municipal councils. The first is the suffrage which had only been granted to males who owned a dwelling house, paid sufficient income tax, or carried out a business. Furthermore, citizens lost the right to vote if they received any kind of pauper relief, went bankrupt, or delayed tax payments. A consequence of these rules was that only relatively few people were allowed to vote or to become a local councilor. For instance, Krabbe

(1985) indicates that only 2,743 of the roughly 45,000 inhabitants of Dortmund (*Westphalia*) had the right to participate in the municipal election in 1873.

A second main reason for why municipal councils were dominated by wealthy people is the voting system, known as Three-Class Franchise System (*Dreiklassenwahlrecht*). A key feature of this voting system is that it translates tax payments into political power (see Becker and Hornung, 2020, Dawson, 2019, Krabbe, 1989, Kühne, 1994a). More specifically, prior to an election, the voters were first ranked based on their tax amounts and then split into three groups such that the sum of all tax payments was the same in all groups. Often, the first group only included very few voters, whereas the bulk of the electorate belonged to the third group. In various cases, the first group only consisted of one voter. For example, in the city of Essen (*Rhineland*), the steel manufacturer Alfred Krupp was the only first-class voter from 1886 to 1894 (Krabbe, 1989). The unequal group sizes are remarkable because each of the three groups elected a third of the municipal councilors. Put differently, the few voters in the first group were as influential as all the voters in the third group. In the city of Essen, Krupp therefore chose the same number of councilors in 1891 as the 393 voters in the second class and the 3650 voters in the third class (Krabbe, 1989). A result of this unequal distribution of power was that the working class people hardly ever became members of the municipal councils. For example, in the Westphalian cities of Dortmund and Münster, working class people were not represented in the city councils till the 1890s. Between 1900 and 1914, the share of councilors that belonged to the working class was smaller than 10 percent in both cities (Krabbe, 1985).

Third, leading local politicians such as mayors (*Bürgermeister*) or community leaders (*Gemeindevorsteher*) needed approval by the Prussian government. As the Prussian government aimed to keep the political power of the working class people as small as possible, a person with social-democratic views could hardly occupy a leading position even if he would be nominated by the responsible council.

A.2.2 County parliaments

All Prussian counties had an indirectly elected parliament and were headed by a county administrator. The rules that determined the composition of the county parliaments differed slightly across regions and changed notably in the 1870s and 1880s. As in Section A.2.1, we only describe the rules that were place in the old Prussian provinces.

Prior to the reforms of the county codes (*Kreisordnungen*), the county councils consisted of: (i) all principals (*Reichsfürsten*), imperial counts (*Reichsgrafen*), and

mediatised houses (*Standesherren*), (ii) all owners of knight estates (*Rittergutsbesitzer*), (iii) the representatives of the towns, and (iv) the representatives of the rural communities. After the reforms, the county councilors represented the large landowners (*Großgrundbesitzer*), the rural communities, and the towns. Two rules determined the distribution of seats: First, the share of seats allocated to urban representatives equaled the urbanization rate, if less than half of the inhabitants lived in an urban place. Otherwise, this share was set to 50 percent. Second, the seats that had not been assigned to the towns were equally split among the large landowners and the rural communities (Wagner, 2005).

Prussian county administrators were not elected by the members of the county parliament, but appointed by the Prussian King. The parliamentarians could only propose candidates. As Prussian kings fought off social-democratic ideas, it was nearly impossible that people with such attitudes became county administrator. Another main reason for why this influential position could hardly be filled by a representative of the poor was that a county administrator had either to be a landowner or a jurist that worked before for the Prussian government.

We cannot fully exclude that Prussian county parliaments included members/supporters of the Social-Democratic Party or another movement that represented workers' interests because lists providing information on the composition of these parliaments are only available for a few counties and periods. However, for three reasons, we are convinced that the number of such people is small. First, related studies in history suggest that county parliaments were dominated by elites (see Nern, 2011, Wagner, 2005). Second, the representatives of the rural communities and towns were chosen by their councils, and thus by wealthy people (for details, see Section A.2.1).⁶ Third, the available lists of county parliaments only include people with a high socio-economic status.⁷

A.2.3 Prussian chamber of deputies

The parliament of the Kingdom of Prussia consisted of two chambers. The upper house (*Herrenhaus*) mainly included representatives of the nobility and appointed intimates of the Prussian King. The members of the lower house (*Abgeordnetenhaus*), by contrast, were elected by male taxpayers aged 24 or older. The voting system was a variant of the Three-Class Franchise System used in the municipal elections. As outlined in Section A.2.1, a key feature of this voting rule is that it translates tax payments into voting power (Becker and Hornung, 2020, Kühne,

⁶The large landowners hold a meeting to decide who of them serves as county parliamentarians.

⁷For example, in 1912, the county parliament *Grevenbroich (Westphalia)* consisted of 17 landowners, 7 firm owners, 1 jurist, and 1 physician (Grevenbroicher Stadtverwaltung, 1912).

1994a).

Elections for the Prussian House of Representatives took place in two steps. In the first step, each constituency was divided into wards (*Urwahlbezirke*) and each ward elected 3 – 6 electoral delegates (*Wahlmänner*).⁸ At the ward level, eligible voters were first ranked according to their tax payments and then split into three groups such that the sum of all tax payments did not vary across groups.⁹ On an election day, all three groups held, one by one, a non-secret election to select 1 – 2 electoral delegates. In the second step of the electoral process, the delegates of a constituency met to elect 1 – 3 men to represent the constituency in the House of Representative during the next legislative period.¹⁰ A candidate became elected if more than 50 percent of the present electoral delegates voted for him (Becker and Hornung, 2020, Heimann, 2011, Kühne, 1994a).

As outlined in Section A.2.1, the Prussian elite benefited from the Three-Class Voting System since the number of voters differed considerably across the three groups. While the first group often only included 1, 2, or 3 wealthy persons, the third group usually consisted of more than 80 percent of the electorate (Kühne, 1994a). Furthermore, becoming an electoral delegate was rather unattractive for men with low or intermediate incomes since no compensations were paid for the losses of working hours.¹¹

A.2.4 Reichstag

The German Empire was a semi-constitutional monarchy whose legislative body consisted of two parliamentary chambers. The upper house (*Bundesrat*) included 58/61 deputies who were appointed by the governments of the different members states. The lower house (*Reichstag*), by contrast, consisted of 397 directly elected politicians. Each of them represented a constituency.¹² The borders of these 397

⁸The total number of electoral constituencies was 256 until 1908, and 276 afterwards. Various constituencies thus included multiple counties and county boroughs. The city of Berlin was the only county borough that was split in more than one constituency. Wards had to have between 750 and 1750 inhabitant and were designed by the county administrator. Gerrymandering took place frequently (Heimann, 2011, Kühne, 1994a). Wards elected one electoral delegate per 250 inhabitants.

⁹The threshold that specified which taxpayer belonged to which group were calculated at the municipal level until 1893 and at the ward level afterwards. Relevant for the classification were only direct taxes (i.e. class-tax, income tax, real estate and property tax, and business tax).

¹⁰A legislative term lasted three years until 1888, and five years afterwards. If a parliamentarian withdrew, a by-election took place.

¹¹Kühne (1994a) suggests that men who did not live in or close to the place where the electoral delegates met often lost three working days when participating in the meeting of the electoral delegates.

¹²A candidate required the absolute majority of valid votes to become the representative of a single constituency. If no candidate received a majority in the first round, a runoff election took place between the two strongest candidates. The legislative term of a successful candidate was three

constituencies were drawn in 1867/71 and did not change over time. The suffrage was equal, secret, and restricted to German males aged 25 or older. People who received pauper reliefs were not allowed to vote as in all other elections. Another notable restriction that applied to all elections was that most of the people who lived on an estate (excluding the owner, among other) were disenfranchised.

The suffrage was not the only reason for why elites were overrepresented in the Reichstag. In particular, the fact that the borders of the constituencies remained unchanged over time despite notable migration flows greatly benefited the land-owning elite. In addition, members of the *Reichstag* did not receive parliamentary allowances until 1906. Covering all the day-to-day costs and expanses of being a parliamentarian was thus hardly possible without assets or employees that took care of the everyday business of the politician.

A.3 Workers movements

In Prussia (and Germany), the interests of the workers were represented by two types of organizations: the *Social Democratic Party of Germany* (SPD) and the trade unions. The SPD was founded in 1875 as a result of a merger between the *Social Democratic Workers' Party of Germany* (SDAP) and the *General German Workers' Association* (ADAV). The ADAV, in turn, was fathered by Ferdinand Lassalle in Leipzig in 1863, while the SDAP was initiated by August Bebel and Wilhelm Liebknecht in Eisenach in 1869.¹³ The first party program of the SPD (*Gotha Program*) included political demands, such as the introduction of direct, universal, secret, and equal suffrage in all elections, and social demands, such as bans on child labor and health-damaging women's work or policies that improve workers' health (Guttsman, 2019, Roth, 1979, Specht, 1898). The first nationwide trade unions were founded by cigar workers and book printers in Leipzig in 1865 and 1866, respectively. The primary objective of the trade unions was to improve the working and living conditions of the union members (Schroeder, 2013, Tennstedt, 1983).

In their first years, the activities of the SPD and the trade unions were greatly impeded by the Prussian and German government. A prominent example in this regard are the Socialist Laws, which were in place between 1878 and 1890. This series of laws was established by the Bismarck government as a reaction to two attempted assassinations of the German Emperor King Wilhelm I.¹⁴ The Social-

years until 1888 and five years afterwards.

¹³Neither Leipzig nor Eisenach belonged to the Prussian Empire. While Leipzig was a part of the Kingdom of Saxony, Eisenach was located in the Thuringian Grand Duchy Saxe-Weimar-Eisenach.

¹⁴Without evidence, Chancellor Bismarck and his government hold the SPD responsible for the

ist Laws prohibited all meetings that aimed at spreading social-democratic ideas, outlawed the trade unions, and led to the closing of many newspapers. The SPD itself was not forbidden, but due to the restrictions, SPD members had to run as independent candidates in elections (Lidtke, 1966).

After the repeal of the Socialist Laws in 1890, the support of the SPD grew steadily. In 1914, the SPD had approx. 1 million members and was (by far) the largest political party in Germany. The Reichstag election in 1912 was the first in which the SPD won most of the parliamentary seats. In local parliaments and the Prussian chamber of deputies, however, the SPD occupied only a few seats due to the electoral laws. A common way of how the SPD tried to influence local policy making was thus to put pressure on the elite by organizing protest events (see e.g. Steinmetz, 1990).

The Socialist laws are widely considered as a major reason for why the various trade unions did not found an umbrella organization until the establishment of the *General Commission of German Trade Unions* in 1890. From 1893 onward, trade unions also steadily increased their cooperation at the local level, especially by forming local associations, called *union cartels* (*Gewerkschaftskartelle*). In 1913, such associations existed in about 750 German places with a total of 2.3 million members. To achieve their goals, the trade unions used various measures, such as going on strikes, launching labor disputes, or calling for boycott (Schroeder, 2013, Tennstedt, 1983).

A.4 Bismarck's health insurance

To reduce the support for workers' movement, the Bismarck government did not only implement repressive measures (such as the Socialist Laws) but also proposed a number of social policies. The most prominent measures in this regard is the establishment of a social insurance system. This system consisted of three main pillars: the health insurance, the accident insurance, and the pension insurance. Below, we focus on the health insurance as the other two insurances do not play a role in our study.

The Compulsory Health Insurance Bill (*Gesetz betreffend der Krankenversicherung der Arbeiter*) was approved by the German parliament in May 1883 and implemented in December 1884.¹⁵ Since then, industrial wage earners in mines, factories, ironworks, ship-building yards and similar workplaces were obligated to have a health insurance. Other occupational groups (such as public servants, day-

attempted assassinations.

¹⁵In the final vote, the members of the SPD and most (left-)liberal politicians voted against the bill since they wanted a more comprehensive insurance system.

laborers, agricultural workers, and self-employed) were excluded from Bismarck's compulsory health insurance (see Bauernschuster et al., 2020, Leichter, 1979). The exclusion of the agricultural wage earners is especially remarkable since the final draft of the bill specified that these workers are also eligible. However, due to a motion filed by three parliamentarians, the respective paragraph was dropped last minute (for more details on this motion, see Section 4).

The compulsory health insurance for workers improved their access to health services for several reasons. For instance, the insured received a sick pay for 13 weeks. The actual amount differed, but it was at least 50% of the average local wage. In addition, medical care, dental care, and prescribed medicine were free of charge for the insured. Incidental care and treatments in hospital were exempt from charges for up to 13 and 26 weeks, respectively. Health funds also provided maternity benefits and paid a death grant. The insurance premium depended on individual earnings and were partly paid by the employer (Bauernschuster et al., 2020, Scheubel, 2013).

B Classification of politicians

As explained in Section 3.1.1, we collected biographical data on more than 5000 Prussian politicians and used this data to create a dummy variable (p_j) for each incumbent, indicating whether he belongs to the landowning or landless elite. In this supplementary section, we provide further information regarding our coding procedure and present some examples.

B.1 Coding rules

We classify a person as a member of the landowning elite if at least one of the following four conditions applies:

- (a) The politician owned arable land.
- (b) The politician had a close relative (e.g. father, grandfather, brother, uncle, father-in-law) that owned arable land.
- (c) The politician was born, lived, or died at a manor or an agricultural estate.
- (d) A landowner with the same (family) name as the politician existed in the county (or a close-by county) in which the politician was born, worked, or died.

A potential concern regarding our coding rules, and in particular with regard to conditions (c) and (d), might be that their application creates misclassifications. For two main reasons, we are little concerned about this issue. First, the total number of cases in which our coding decision is only based on (c) or (d) is small. Second, the measurement error that may result from our coding rules reduce the chance that we find support for the hypotheses developed in Section 2.2.2.

B.2 Coding examples

Example 1: Rudolf Hornig

Rudolf Hornig occupied a seat in the Prussian chamber of deputies from 1893 to 1903 and represented the constituency *Liegnitz 5* which consisted of the Silesian counties *Haynau-Goldberg* and *Liegnitz*. Due to his mandate, we find biographical information about him in the handbook by Bernhard Mann (see Figure B.2). In particular, Mann (1988) reports that Hornig was born in 1855 and that he died in 1904. His birthplace was a manor in the county of Haynau-Goldberg. Mann'

handbook also indicates that he owned a manor ('Gutsbesitzer'). Hence, Rudolf Hornig is classified as a member of the landowning elite.

Example 2: Karl Leopold von Reichenbach

Hubatsch et al. (1975) report that Karl Leopold von Reichenbach served as the county administrator of *Bunzlau* (Silesia) between 1848 and 1874. The 3rd edition of the *Gothaisches Genealogisches Taschenbuch der briefadligen Häuser* indicates that he was born in 1821. His father was Lorenz Leopold von Reichenbach who owned the manors *Ober Mois* and '*Dippeldorf*' (see Figure B.3). Because of his family background, we label him as a member of the landowning elite.

Example 3: Karl Robert-Tornow

Karl Robert-Tornow was the county administrator of *Labiau* (1880 – 1891) and member of the Prussian parliament (1888 – 1892). His constituency was *Königsberg 2*, consisting of the East-Prussian counties *Labiau* and *Wehlau*. According to Mann (1988), Karl Robert-Tornow was Protestant and born in 1851 (see Figure B.4). His birthplace was a Pomeranian manor, called *Ruhnow*. Haunfelder (1994) indicates that this manor was once owned by Ferdinand Robert-Tornow and that this manor owner was a relative of Karl Robert-Tornow. Consequently, we assign Karl Robert-Tornow to the landowning elite.

Example 4: Ernst Birck

Ernst Birck was the county administrator of *Bergheim* (*Rhineland*) between 1868 and 1876 (Romeyk, 1994). He was born in Cologne in 1848 and died in 1881 in Bonn. Birck's father was a bureaucrat, his father-in-law a landowner (see Figure B.1). Because of his father-in-law, we label Ernst Birck as a member of the landowning elite.

Example 5: Emil Kautz

Emil Kautz served as county administrator of *Johannisburg* (*East Prussia*) from 1901 to 1904 (Stüttgen, 1980). His Wikipedia page suggests that he was born in *Hohenstein* which is located in the county of *Osterode* (*East Prussia*) in 1866. Unfortunately, more information cannot be found about him. However, Ellerholz and Lodemann (1879) indicate that Franz Kautz and Wilhelm Kautz owned land in Osterode in 1879. We presume that Emil Kautz is a relative of these landowners and thus label him as a member of the landowning elite.

Example 6: Rudolph von Oersten

Rudolph von Oersten was the county administrator of *Anklam (Pomerania)* from 1853 to 1889. His Wikipedia page reports that he was born in 1819. No further personal information are available. However, we have four other members of the family “von Oersten” in our database. According to our references, three of them owned a manor by themselves. The fourth had a landowning father. Rudolph von Oersten is likely to be a relative of these politicians and we thus label him as a member of the landowning elite.

Example 7: Heinrich Macco

Heinrich Macco was a member of the Prussian chamber of deputies from 1899 to 1918. According to Mann (1988), he was born in the city of *Siegen (Westphalia)* in 1843. His father was a lawyer, his grandfather and father-in-law worked as a merchant (Gerstein, 1987). Heinrich Macco himself was trained as engineer and a leading member of an association that represented the interests of manufacturers (Mann, 1988). Hence, we classify him as a member of the landless elite.

Example 8: Franz Engel

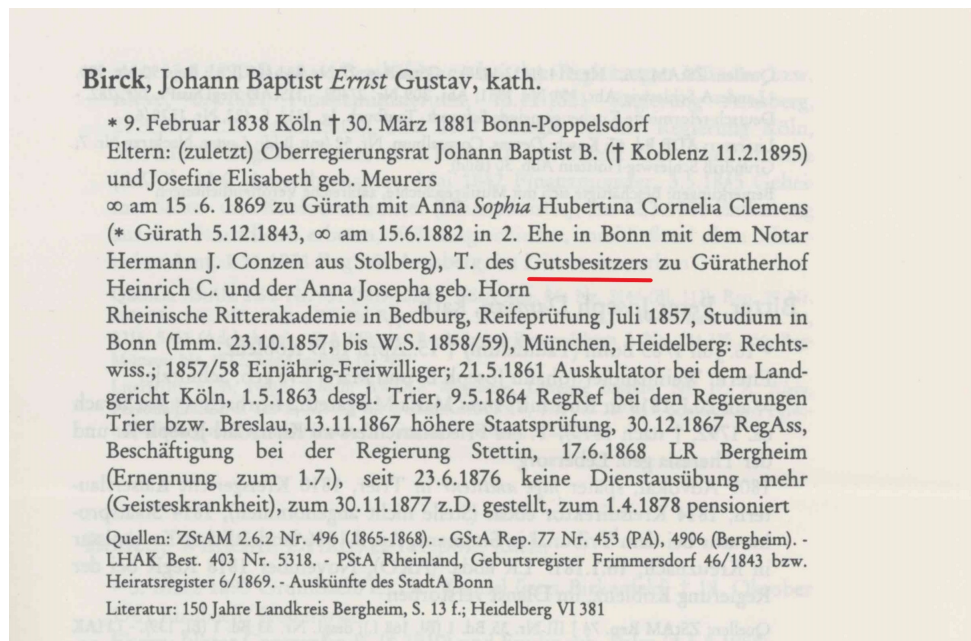
Franz Engel was born in 1799 in *Leobschütz (Silesia)*. After finishing school, he became a tanner and took over the firm of his father (Best and Schröder, 1992, Haunfelder, 2004). From 1867 to 1873, Franz Engel was the representative of the constituency *Oppeln 9 (Leobschütz)* in the Reichstag. In 1877, he died in his home town. Due to his background, we assign Franz Engel to the landless elite.

Example 9: Friedrich von Wolffgramm

Friedrich (von) Wolffgramm received his noble title in 1890 and served as the administrator of the East-Prussian counties *Stallupönen* (1872 – 1874) and *Gerdauen* (1874 – 1884). He was born in *Königsberg (East Prussia)* in 1836 as the son of a soldier. His father and his mother were born in Magdeburg (Saxony), one of the largest Prussian cities at that time. Since Janecki (1893) provides no information, suggesting that Friedrich von Wolffgramm owned arable land or had landowning relatives, we classify him as a member of the landless elite. To double check our classification, we use the list by Ellerholz and Lodemann (1879). In their list, we find no landowner named “Wolffgramm” in the province of *East Prussia*.

B.3 Illustrative material

Figure B.1 Biographical information about Ernst Birk.



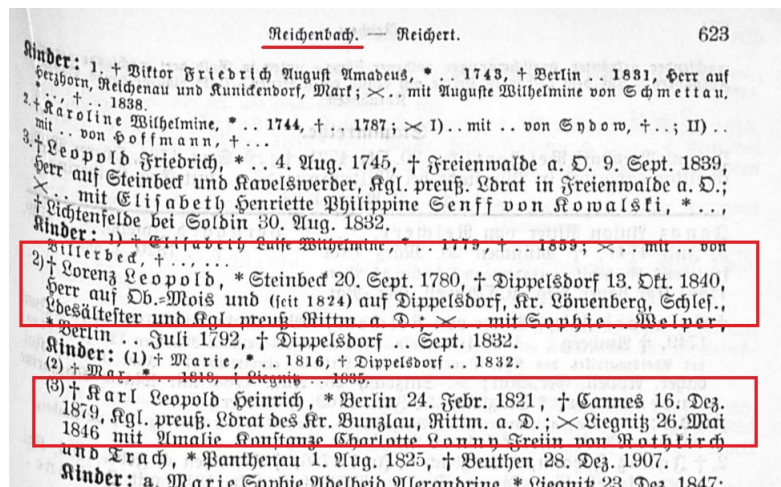
Source: Horst Romyek (1994): *Die leitenden staatlichen und kommunalen Verwaltungsbeamten der Rheinprovinz 1816 – 1945.*

Figure B.2 Biographical information about Rudolf Hornig.

Hornig 980
Rudolf
* 1855 (6. Juni) Märsdorf bei Kaiserswaldau, ev.
† 1904 (6. Juni)
1894 (Gutsbesitzer, Amts- und Gemeindevor-
steher; Modelsdorf) – 1903 (Gutsbesitzer; Halle/
Saale)
18–19: Liegnitz 5 (Haynau-Goldberg, SK + LK
Liegnitz); K
Früher Landwirtschaftsbeamter • Kreistag

Source: Bernhard Mann (1988): *Biographisches Handbuch für das preussische Abgeordnetenhaus: 1867 – 1918.*

Figure B.3 Biographical information about Karl Leopold von Reichenbach.



Source: *Gothaisches genealogisches Taschenbuch der briefadeligen Häuser* (1909).

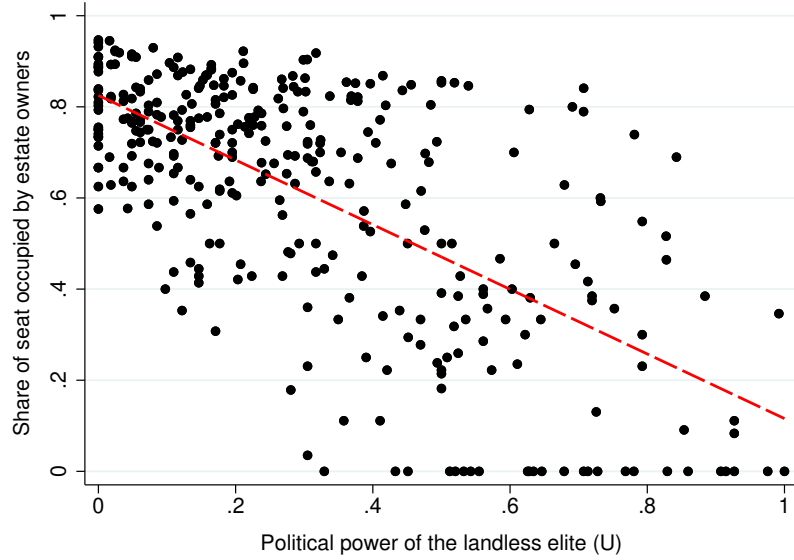
Figure B.4 Biographical information about Karl Robert-Turnow.

Robert-Tornow 1897
 Karl
 * 1851 (14. April) Ruhnow/Pommern, ev.
 † 1892 (21. Jan.) Labiau
 1888–1892 (Landrat; Labiau)
 16,3: Königsberg 2 (Labiau, Wehlau); K
 17,1–17,4: Königsberg 2, K
 1880/81–1891 Landrat in Labiau

Source: Bernhard Mann (1988): *Biographisches Handbuch für das preussische Abgeordnetenhaus: 1867 – 1918.*

B.4 Additional material

Figure B.5 Validation of measurement approach.



Notes: This figure illustrates the correlation between our county-level measure for the political power of the landless elite (for details, see 3.1.1) and the share of seats in the county council that are definitely occupied by landowners in the 1860s. The latter information is taken from Meitzen (1869).

Table B.1 Documentation of the data collection process (excerpt).

Name	Landed elite	References	Note
		⋮	
Becker, Hermann	0	Mann (1988), Romeyk (1994)	He was a merchant before he became a politician. Father was a physician, father-in-law a merchant.
Becker, Leo	1	Best and Schröder (1992)	Owner of a manor.
Becker, Wilhelm (von)	1	Romeyk (1994)	Father was a pastor. Father-in-law was a business man and owned a manor. Received noble title in 1911.
Beckerath, Gustav Adolf von	0	Romeyk (1994)	Father and father-in-law were factory owners.
		⋮	

Notes: Based on four examples, this table shows how we document our data collection process. The final documentation file consists of more than 300 pages and is available upon request.

Table B.2 Overlaps between different political posts.

Category	Total number of individuals
County director	1629
MP <i>Abgeordnetenhaus</i>	1723
MP <i>Reichstag</i>	789
County director & MP <i>Abgeordnetenhaus</i>	256
County director & MP <i>Reichstag</i>	69
MP <i>Abgeordnetenhaus</i> & MP <i>Reichstag</i>	601
County director & MP <i>Abgeordnetenhaus</i> & MP <i>Reichstag</i>	77

Notes: Several politicians in our database occupied more than one political post between 1867 and 1914. This table provides detailed information about the overlap.

Table B.3 Local political engagement of members of the Reichstag.

Name	Local engagement
Johannes Semler	Member of a city parliament.
Ferdinand Kersting	Member of a county committee.
<i>Ludwig Jacobi</i>	No evidence.
Robert Lucius	Member of a county parliament.
Arthur Will	Community leader and member of a county parliament.
Hermann Hepp	Mayor and member of county parliament.
Hermann Wamhoff	Member of a county parliament
Emil Victor von Sperber	Leader of an Amtsbezirk.
Cuno Jeschke	No evidence.
Emile Göllner	Community leader
Adolph Cronemeyer	Member of a local council.
<i>Eduard Böhmer</i>	No evidence.
Ernst von Heydebrand und der Lasa	County administrator.
Karl Bernhardri	Member of a local council.
Otto Stavenhagen	County administrator.
Hermann Delius	Member of a local council.
Georges von Cottenet	County administrator.
Karl Tölke	Member of a county parliament.
Feodor Wilisch	Member of a local council.
Carl Joseph Kuckhoff	No evidence
Karl Friedrich von Vicnke	Member of a county parliament.
Ludwig Werner	No evidence
Ulrich von Winterfeldt	County administrator.
Carl Rudolf Bohtz	Community leader and member of a county parliament.
<i>Adolf Fervers</i>	No evidence.
Ferdinand Ohm	Member of a local council.
Achatius von Auerswald	County administrator.
Hans von Kanitz	County administrator.
Friedrich Hegenscheidt	County administrator.
Louis Jordan	Member of a local council and county parliament.
<i>Joseph Nathan</i>	No evidence.
Kunibert Böning	Community leader and member of a county parliament.
August List	Member of a local council.
Stanislaus von Chlapowski	Member of a county parliament.
Max Görcke	No evidence.
Karl Haberland	Member of a local council.
<i>August von Bernuth</i>	No evidence.
Friedrich von Carmer-Osten	County deputy.
Hermann zu Solms-Braunfels	No evidence.
<i>August Evelt</i>	No evidence.
Ludwig von Slaski	Member of a county parliament.
Jacob Pauly	Member of a local council and county parliament.
Hans von Reibnitz	Leader of an Amtsbezirk.
Robert Meibauer	Member of a local council.
Georg von Dannenberg	No evidence.
Ernst Friedrich von Eicke	County administrator.
Michael von Sczaniecki	Member of a county parliament.
Eduard Maubach	County administrator.
Leopold Sonnemann	Member of a local council.
Emanuel Wulfshein	Mayor.

Notes: This table shows for 50 randomly chosen members of the German parliament whether we find evidence for local political engagement. We use *italic*-font to highlight politicians who are not allowed to hold a seat in a local parliament because of their job as a judge, government official, or clergyman.

Table B.4 Local political engagement of members of the Prussian parliament.

Name	Local engagement
Karl Oetker	Member of a local council.
Hermann Reiner	Community leader and county deputy.
Konrad von Kleist	Member of a county parliament.
Waldemar Wolff	No evidence.
Albrecht von Rehdiger	Community leader and member of a county parliament.
Louis Fischer	No evidence.
Friedrich Otto	Mayor.
Fritz Preuß	Mayor.
Alexander Groschke	County administrator.
Heinrich Theissing	Member of a local council and county parliament.
<i>Ludolf Parisius</i>	No evidence.
Wolfgang von Kries	County administrator.
Wilhelm Laporte	Member of a local council.
Adolf Nickisch von Rosenegk	County administrator.
Friedrich von Kölichen	Member of a county parliament.
Heinrich Runge	Member of a local council.
Gottfried Ruegenberg	No evidence.
<i>Wilhelm von Beaulieu-Marconnay</i>	No evidence.
Johann Ludwig Mahraun	No evidence.
<i>Franz Andreas Rust</i>	No evidence.
Ernst Mackensen	No evidence.
Eugen von Zastrow	Member of a county parliament.
Hartwig Spanjer	No evidence.
Friedrich Baudri	Member of a local council.
Karl Ollmert	Member of a local council.
Ferdinand van Vleuten	No evidence.
Karl Frank	No evidence.
Alexander Pohlmann	Member of a local council.
Heinrich Herkenrath	Member of a local council and county parliament.
Heinrich Ostrop	Community leader and member of a local council.
Friedrich von Born-Fallois	Member of a county parliament.
Heinrich von Webern	No evidence.
Hans von Finckenstein	No evidence.
<i>Robert Havenstein</i>	No evidence.
Johann Friedrich Kerkhof	No evidence.
Heinrich Tramm	Mayor.
Hans von Götz	Community leader.
Max Rewoldt	No evidence.
Eugen von Seherr-Thoß	No evidence.
Wilhelm Simon	No evidence.
<i>Eduard Herrmann</i>	No evidence.
Hermann von Busse	County administrator.
Hermann Loew	No evidence.
Ernst Albert Fischer	Member of a local council.
Ernst Grundmann	Member of a county parliament.
Hermann Rasche	No evidence.
Richard Pfeffer	No evidence.
Emil Buchholtz	County deputy.
Wilhelm von Kardorff	County administrator.
Ernst Bock von Wülffing	Member of a county parliament.

Notes: This table shows for 50 randomly chosen members of the Prussian parliament whether we find evidence for local political engagement. We use *italic*-font to highlight politicians who are not allowed to hold a seat in a local parliament because of their job as a judge, government official, or clergyman.

Table B.5 Local political engagement of members of the Reichstag (from Berlin).

Name	Local engagement
Edward Banks	Member of a local council.
Karl Baumbach	Mayor.
Otto Büchner	Member of a local council.
Franz Duncker	No evidence.
Gustav Eberty	Member of a local council.
Richard Fischer	No evidence.
Friedrich Fritzsche	No evidence.
Sigmund Günther	No evidence.
Adolf Hagen	Member of a local council.
Wilhelm Hasenclever	No evidence.
Wolfgang Heine	No evidence.
<i>Carl Herz</i>	No evidence.
Max Hirsch	No evidence.
Adolph Hoffmann	Member of a local council.
Leopold von Hoverbeck	Member of a county parliament.
Johannes Kaempf	Member of a local council.
<i>Moritz Klotz</i>	No evidence.
Robert Kreitling	Member of a local council.
Paul Langerhans	Member of a local council.
<i>Eduard Lasker</i>	No evidence.
Georg Ledebour	No evidence.
Wilhelm Liebknecht	No evidence.
Ludwig Loewe	Member of a local council.
Alexander Meyer	Member of a local council.
August Munckel	Member of a local council.
Wilhelm Pfannkuch	Member of a local council.
Eugen Richter	Member of a local council.
Heinrich Runge	Member of a local council.
Robert Schmidt	No evidence.
Hermann Schulze-Delitzsch	No evidence.
Paul Singer	Member of a local council.
Albert Traeger	Member of a local council.
Rudolf Virchow	Member of a local council.
Ewald Vogtherr	Member of a local council.
Kurt von Saucken-Tarputschen	Member of a county parliament.
Benedikt Waldeck	Member of a local council.
<i>Moritz Wiggers</i>	No evidence.
Eduard Windthorst	Member of a local council.
Eduard Zimmermann	Member of a local council.
Hermann Zwick	Member of a local council.

Notes: This table shows for all politicians that represented the city of Berlin in the German parliament whether we find evidence for local political engagement. We use *italic*-font to highlight people who are not allowed to hold a seat, in, a, local, parliament because of their job as a judge, government official, or clergyman.

Table B.6 Local political engagement of members of the Prussian Parliament (from Berlin).

Name	Local engagement
Julian Borchardt	No evidence.
Hermann Borgmann	Member of a local council.
Franz Duncker	No evidence.
Gustav Eberty	Member of a local council.
Hugo Gerschel	No evidence.
Karl Goldschmidt	Member of a local council.
Hugo Heimann	Member of a local council.
Hugo Hermes	No evidence.
Otto Hermes	Member of a local council.
Paul Hirsch	Member of a local council.
Max Hirsch	No evidence.
Adolph Hoffmann	Member of a local council.
Paul Hoffmann	Member of a local council.
Friedrich Hofmann	Member of a local council.
Johann Jacoby	No evidence.
Oskar Kassel	Member of a local council.
Samuel Kerst	No evidence.
<i>Moritz Klotz</i>	No evidence.
<i>Gustav Knörcke</i>	No evidence.
Julius Kopsch	No evidence.
Robert Kreitling	Member of a local council.
Paul Langerhans	Member of a local council.
Karl Liebknecht	Member of a local council.
Ludwig Loewe	Member of a local council.
Wilhelm Loewe	No evidence.
Franz Mehring	No evidence.
Alexander Meyer	Member of a local council.
Karl Mommsen	Member of a local council.
Otto Mugdan	No evidence.
<i>Julius Leopold Müller</i>	No evidence.
Hermann Müller	Member of a local council.
August Munckel	Member of a local council.
<i>Ludolf Parisius</i>	No evidence.
Eugen Richter	Member of a local council.
Leopold Rosenow	Member of a local council.
Heinrich Runge	Member of a local council.
<i>Maximilian Runze</i>	No evidence.
Max Schulz	Member of a local council.
Hermann Schulze-Delitzsch	No evidence.
Wolfgang Strassmann	Member of a local council.
Heinrich Ströbel	No evidence.
Albert Traeger	Member of a local council.
Rudolf Virchow	Member of a local council.
Benedikt Waldeck	Member of a local council.
Otto Wiemer	Member of a local council.
Robert Zelle	Mayor.
Eduard Zimmermann	Member of a local council.
Hermann Zwick	Member of a local council.

Notes: This table shows for all politicians that represented the city of Berlin in the Prussia parliament whether we find evidence for local political engagement. We use *italic*-font to highlight people who are not allowed to hold a seat, in, a, local, parliament because of their job as a judge, government official, or clergyman.

Table B.7 Calculation example: Distribution of political power (Waldenburg, Silesia, 1871 – 1911).

Year	County administrator	Abgeordnetenhaus (Seat 1)	Abgeordnetenhaus (Seat 2)	Abgeordnetenhaus (Seat 3)	Reichstag
1871	Zedlitz, Conrad von (1)	Lent, Wilhelm (0)	Braun, Karl (0)	Zedlitz, Conrad von (1)	Pieß, Hans von (1)
1872	Zedlitz, Conrad von (1)	Karsten, Lorenz (0)	Braun, Karl (0)	Zedlitz, Conrad von (1)	Pieß, Hans von (1)
1873	Zedlitz, Conrad von (1)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1874	Zedlitz, Conrad von (1)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1875	Bitter, Rudolf von (0)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1876	Bitter, Rudolf von (0)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1877	Bitter, Rudolf von (0)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1878	Bitter, Rudolf von (0)	Braun, Karl (0)	Kletschke, Julius (0)	Lipke, Gustav (0)	Pieß, Hans von (1)
1879	Bitter, Rudolf von (0)	Bitter, Rudolf von (0)	Schneider, Heinrich (1)	Kletschke, Julius (0)	Pieß, Hans von (1)
1880	Bitter, Rudolf von (0)	Bitter, Rudolf von (0)	Schneider, Heinrich (1)	Kletschke, Julius (0)	Pieß, Hans von (1)
1881	Bitter, Rudolf von (0)	Bitter, Rudolf von (0)	Schneider, Heinrich (1)	Kletschke, Julius (0)	Pieß, Hans von (1)
1882	Dörnberg, Karl von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Schneider, Heinrich (1)	Pieß, Hans von (1)
1883	Dörnberg, Karl von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Schneider, Heinrich (1)	Pieß, Hans von (1)
1884	Dörnberg, Karl von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Schneider, Heinrich (1)	Winckelmann, Carl von (1)
1885	Lieres und Wilkau, Kurt von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Hagens, Franz (0)	Winckelmann, Carl von (1)
1886	Lieres und Wilkau, Kurt von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Hagens, Franz (0)	Winckelmann, Carl von (1)
1887	Lieres und Wilkau, Kurt von (1)	Bitter, Rudolf von (0)	Lückhoff, Louis (0)	Hagens, Franz (0)	Websky, Egmont (1)
1888	Lieres und Wilkau, Kurt von (1)	Ritter, Paul (1)	Lückhoff, Louis (0)	Simon, Wilhelm (0)	Websky, Egmont (1)
1889	Lieres und Wilkau, Kurt von (1)	Ritter, Paul (1)	Lückhoff, Louis (0)	Simon, Wilhelm (0)	Websky, Egmont (1)
1890	Lieres und Wilkau, Kurt von (1)	Ritter, Paul (1)	Lückhoff, Louis (0)	Simon, Wilhelm (0)	Eberty, Eduard (0)
1891	Lieres und Wilkau, Kurt von (1)	Ritter, Paul (1)	Lückhoff, Louis (0)	Simon, Wilhelm (0)	Eberty, Eduard (0)
1892	Lieres und Wilkau, Kurt von (1)	Ritter, Paul (1)	Lückhoff, Louis (0)	Simon, Wilhelm (0)	Eberty, Eduard (0)
1893	Lieres und Wilkau, Kurt von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Lieres und Wilkau, Kurt von (1)	Möller, Heinrich (0)
1894	Lieres und Wilkau, Kurt von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Lieres und Wilkau, Kurt von (1)	Möller, Heinrich (0)
1895	Lieres und Wilkau, Kurt von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Lieres und Wilkau, Kurt von (1)	Möller, Heinrich (0)
1896	Lieres und Wilkau, Kurt von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Lieres und Wilkau, Kurt von (1)	Möller, Heinrich (0)
1897	Lieres und Wilkau, Kurt von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Lieres und Wilkau, Kurt von (1)	Möller, Heinrich (0)
1898	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1899	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1900	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1901	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1902	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1903	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1904	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1905	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1906	Scharmer, Robert (0)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1907	Zedlitz-Neukirch, Robert von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Isner, Ernst (0)	Sachse, Hermann (0)
1908	Zedlitz-Neukirch, Robert von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Zedlitz, Octavio von (1)	Sachse, Hermann (0)
1909	Zedlitz-Neukirch, Robert von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Zedlitz, Octavio von (1)	Sachse, Hermann (0)
1910	Zedlitz-Neukirch, Robert von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Zedlitz, Octavio von (1)	Sachse, Hermann (0)
1911	Zedlitz-Neukirch, Robert von (1)	Krause, Hermann (0)	Lückhoff, Louis (0)	Zedlitz, Octavio von (1)	Sachse, Hermann (0)
$U_{i,1871-1911}^{Admin} = 0.3902$					$U_{i,1871-1911}^{MPR} = 0.5365$
$U_{i,1871-1911}^{base} = 0.6057 \Rightarrow A_{i,1871-1911}^{base} = 0.3943$					$U_{i,1871-1911}^{all} = 0.5826 \Rightarrow A_{i,1871-1911}^{all} = 0.4174$

Notes: This presents an example to illustrate how we measure the political power of the landless elite. In parentheses, we report whether a politician is a representative of the landowning elite. For a formal description of the measurement procedure, see Section 3.1.1.

C Control variables

In Section 3.1, we describe in detail how we measure the distribution of political power between the landowning and landless elites (Section 3.1.1), the provision of health-promoting public goods (Section 3.1.2), and the strength of the workers' movements (Section 3.1.3). This section complements the data description in the main part of the paper by providing information about our control variables. Our data sources are reported in Table C.1.

County borough

A dummy variable that is equal to one for all county boroughs (*Stadtkreise*).

Deaths

The ratio between the total number of deaths in 1871 and the population size of a county.

Stillbirths

The share of stillbirths among all births in 1871.

Beds in public hospitals

The total number of beds in public hospitals in 1875 divided by the total number of inhabitants.

Beds in maternity hospitals

The ratio between the total number of beds in maternity hospitals in 1875 and the total number of inhabitants.

Workers in health sector

The total number of people working in the health sector in 1871 divided by the total number of workers.

Income tax revenues

The total amount of income tax revenues in 1876 divided by population size.

Saving deposits

The total amount of deposits in public saving banks in 1875 divided by the total number of inhabitants.

Saving accounts

The ratio between the total number of saving accounts in public saving banks in 1875 and the number of inhabitants.

Population density

The total number of inhabitants in 1871 divided by the area of a county.

Urbanization rate

The ratio between the total number of people that lived in a town in 1875 and the total population of a county. .

Towns

The total number of towns (*Städte*) in a county in 1875.

Rural communities

The total number of rural communities (*Landgemeinden*) in a county in 1875.

Estates

The total number of estates (*Gutsbezirke*) in a county in 1875.

Workers in agricultural sector

The ratio between the total number of agricultural workers in 1871 and the total number of workers.

Workers in mining sector

The share of workers in the mining sector in 1871 among all workers.

Workers in service sector

The total number of people working in the service sector in 1871 divided by the total number of workers.

Workers in education sector

The share of people employed in the education sector in 1871 among the working population.

Workers in transport sector

The total number of workers in the transportation sector in 1871 divided by the total number of workers.

Workers in industrial sector

The ratio between the total number of industrial workers in 1871 and the total number of workers.

Literate men

The total number of men (aged 10 or above) that were able to write and read in 1871 divided by the total male population.

Literate women

The total number of women (aged 10 or above) that were able to write and read in 1871 divided by the total number of women.

Private schools

The ratio between the total number of private schools and the total number of schools in 1864.

Private teachers

The share of teachers that work in private schools in 1864 among all teachers.

Private students

The share of students enrolled in private schools in 1864 among all students.

Country roads

The length of country roads in 1868 divided by the area of a county.

Navigable rivers

The length of navigable rivers in 1868 divided by the area of a county.

Railway network

The length of the railway network in 1868 divided by the area of a county.

Sandy soils

The share of a county's total area whose texture is defined as sandy soils.

Sandy loam and loamy sand soils

The share of a county's total area whose texture is defined as either sandy loam soils or loamy sand soils.

Clay soils

The share of a county's total area whose texture is defined as clay soils.

Coast

A dummy variable that is equal to one only if a county is located at a seashore.

Border

A dummy variable that is equal to one only if a county borders another country.

Distance to coal field

The Euclidean distance (in kilometer) of a county to the nearest coal field.

Distance to Berlin

The minimal Euclidean distance (in kilometer) of a county and Berlin.

Catholics

The share of a county's inhabitants that were Catholics in 1871.

Men

The share of a county's inhabitants that were male in 1871.

Young people

The share of a county's inhabitants that were at most 19 years old in 1871.

Married people

The share of a county's inhabitants that were married in 1871.

Workers

The ratio between the total number of workers in 1871 and the total number of inhabitants.

Births

The ratio between the total number of births in 1871 and the total number of inhabitants.

Migrants

The share of a county's inhabitants in 1871 that were not born in this county.

Population

The total number of inhabitants.

Germans

The share of a county's inhabitants that held a German citizenship in 1875.

Military persons

The ratio between the total number of military persons that were stationed in a county in 1875 and the total number of inhabitants.

Land inequality

The share of landholdings with an area larger than 300 Prussian Morgen among all landholdings in 1858.

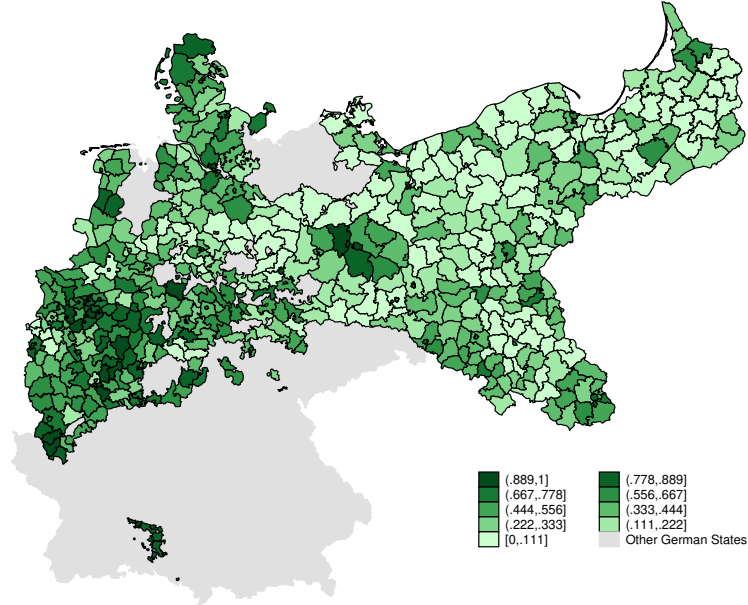
Table C.1 Summary statistics (county-level analysis).

Variable	Year/Period	Mean	Std. dev.	Data source
Panel A: Main variables				
Power of landless elite	1871 – 1911	0.304	0.2467	See Section 3.1.1
Share of knight estates	1856	0.178	0.1488	Rauer (1857)
Public good provision	1911	0.100	0.1931	See Section 3.1.2
Public good provision (access)	1911	0.125	0.1896	See Section 3.1.2
Public good provision (prevention)	1911	0.085	0.203	See Section 3.1.2
Strength workers' movements (ord.)	1871 – 1911	0.594	0.9708	See Section 3.1.3
Strength workers' movements (bin.)	1871 – 1911	0.334	0.4725	See Section 3.1.3
Panel B: Health				
Deaths	1871	0.030	0.0052	Galloway (2007)
Stillbirths	1871	0.041	0.0136	Galloway (2007)
Beds in public hospitals	1875	0.001	0.0013	Engel (1877)
Beds in maternity hospitals	1875	0.00001	0.00007	Engel (1877)
Workers in health sector	1871	0.003	0.0018	Galloway (2007)
Panel C: Fiscal capacity				
Income tax revenues (log)	1876	1.245	0.6394	Galloway (2007)
Saving deposits (log)	1875	2.624	1.5468	Engel (1876)
Saving accounts (log)	1875	0.066	0.0890	Engel (1876)
Panel D: Urbanization				
Population density (log)	1871	-0.165	1.008	Galloway (2007)
Urbanization rate	1875	0.283	0.2120	Galloway (2007)
Towns	1875	2.988	2.136	Galloway (2007)
Rural communities	1875	88.137	62.1866	Galloway (2007)
Estates	1875	45.704	50.0784	Galloway (2007)
Panel E: Industry				
Workers in agricultural sector	1871	0.510	0.1920	Galloway (2007)
Workers in mining sector	1871	0.020	0.0579	Galloway (2007)
Workers in service sector	1871	0.108	0.0546	Galloway (2007)
Workers in education sector	1871	0.008	0.0021	Galloway (2007)
Workers in transport sector	1871	0.029	0.0156	Galloway (2007)
Workers in industrial sector	1871	0.225	0.1149	Galloway (2007)
Panel F: Education				
Illiteracy rate (male)	1871	0.079	0.0818	Becker et al. (2014)
Illiteracy rate (female)	1871	0.123	0.0988	Becker et al. (2014)
Panel G: Private provision of public goods				
Private schools	1864	0.093	0.0948	Becker et al. (2014)
Private teacher	1864	0.078	0.0793	Becker et al. (2014)
Private students	1864	0.029	0.0420	Becker et al. (2014)
Panel H: Infrastructure				
Country roads	1868	1.192	1.0487	Meitzen (1869)
Navigable rivers	1868	0.211	0.4301	Meitzen (1869)
Railway network	1868	0.328	0.5640	Meitzen (1869)
Panel I: Demographics				
Catholics	1871	0.385	0.3870	Galloway (2007)
Men	1871	0.491	0.0239	Galloway (2007)
Young people	1871	0.0455	0.0367	Galloway (2007)
Married people	1871	0.336	0.0246	Galloway (2007)
Workers	1871	0.365	0.0499	Galloway (2007)
Births	1871	0.035	0.0046	Galloway (2007)
Migrants	1875	0.210	0.0992	Galloway (2007)
Population (log)	1871	10.883	0.4362	Galloway (2007)
Germans	1875	0.997	0.0059	Galloway (2007)
Military persons	1875	0.008	0.0161	Galloway (2007)
Panel J: Geography				
Sandy soils	Time-invariant	0.240	0.2273	Becker et al. (2014)
Sandy loam & loamy sand soils	Time-invariant	0.304	0.2275	Becker et al. (2014)
Clay soils	Time-invariant	0.397	0.3560	Becker et al. (2014)
Longitude	Time-invariant	13.524	4.8598	Own calculation
Latitude	Time-invariant	52.049	1.3971	Own calculation
Distance to Berlin	Time-invariant	312.05	162.524	Own calculation
Distance to coal field	Time-invariant	63.431	107.0518	Own calculation
Border	Time-invariant	0.158	0.3655	Own calculation
Coast	Time-invariant	0.093	0.2902	Own calculation
Panel K: Land inequality				
Land concentration	1858	0.024	0.0259	Becker et al. (2014)

Notes: This table presents summary statistics for the variables that we use in our county-level analyses.

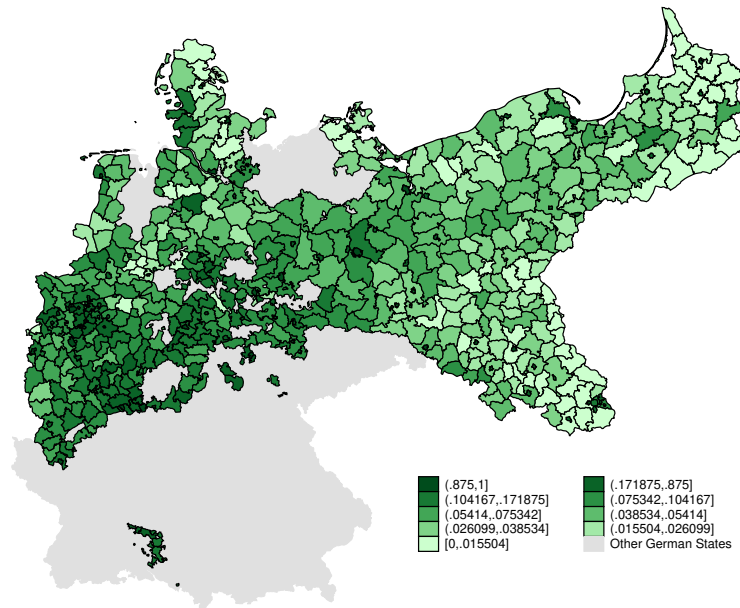
D Additional figures

Figure D.1 Political power of the landless elite in Prussian counties (1890 – 1910).



Notes: This figure presents a map of the German Empire in the borders of 1890. The shade of green indicates how powerful the landless elite was between 1890 and 1910. A dark (light) shade of green suggests that the landless (landowning) elite enjoyed great political influence.

Figure D.2 Provision of health-promoting public goods in Prussian counties in 1911.



Notes: This figure presents a map of the German Empire in the borders of 1911. The shade of green reflects the extent of public good provision. The darker the shade of green, the more health-promoting public goods were provided.

Figure D.3 Correlation between number of strikes and number of trade union members.

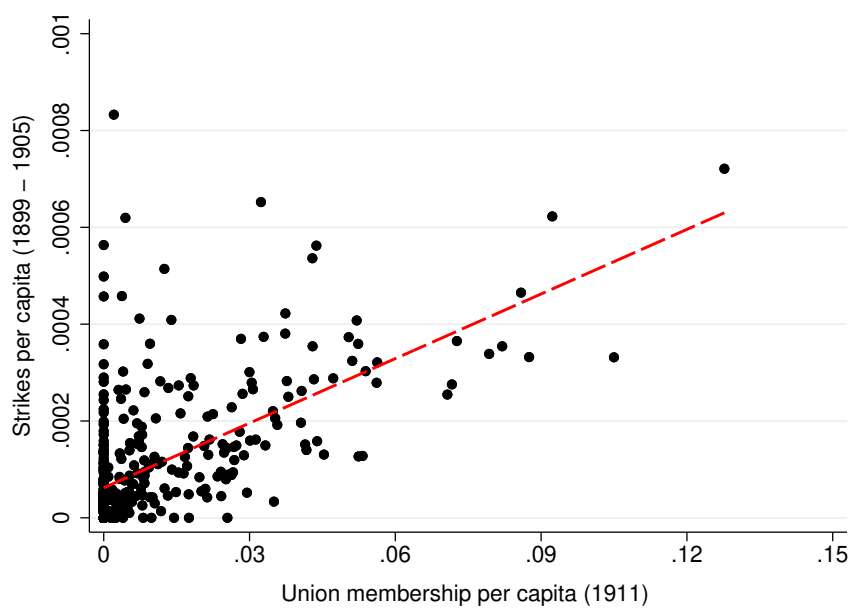


Figure D.4 Correlation between number of strikes and vote share of SPD.

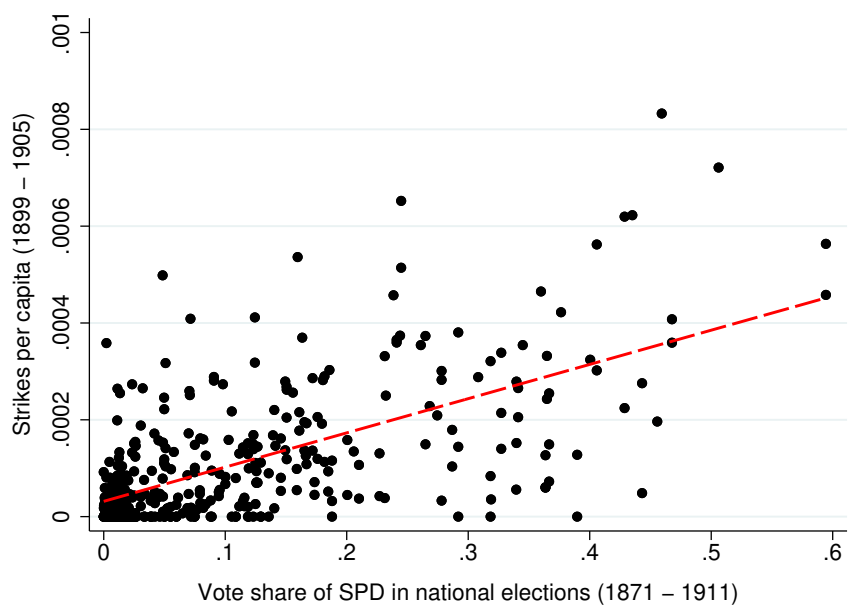


Figure D.5 Correlation between number of trade union members and vote share of SPD.

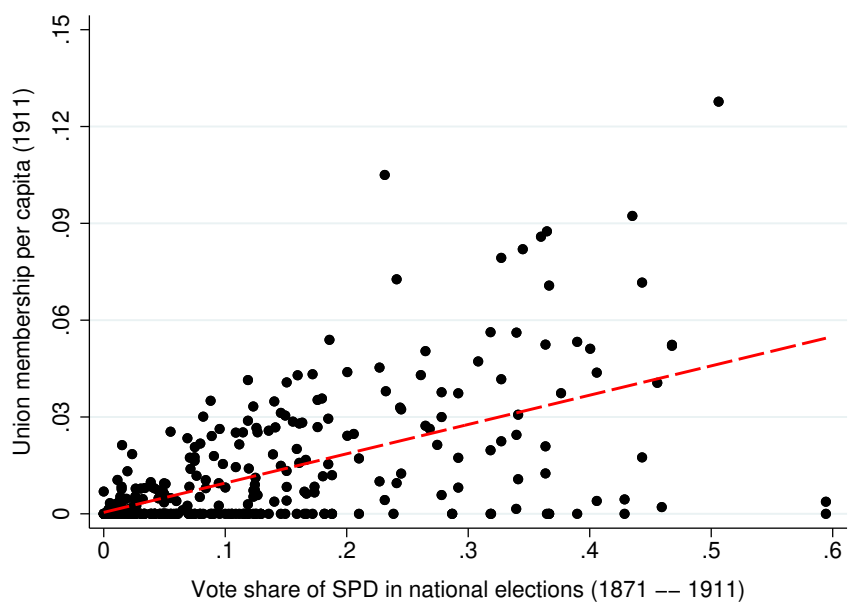


Figure D.6 First-stage relationship.

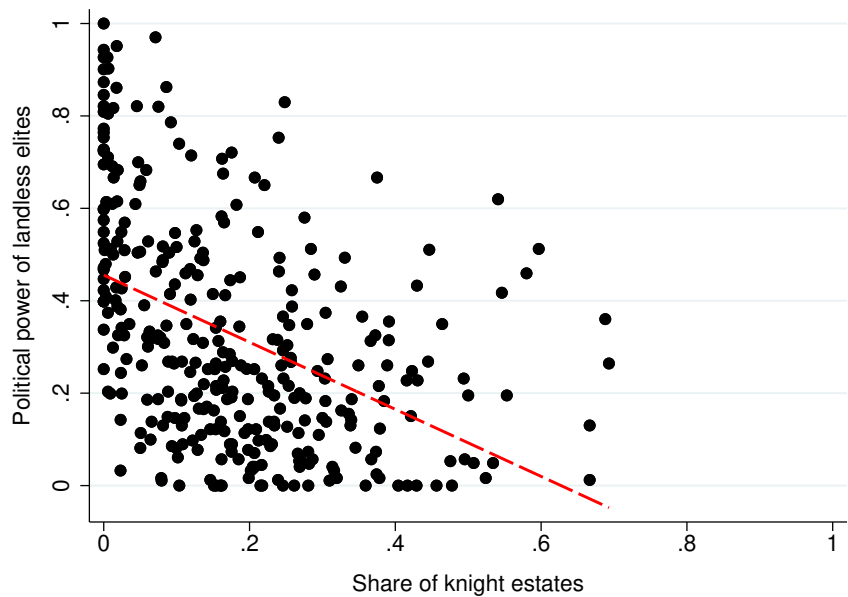
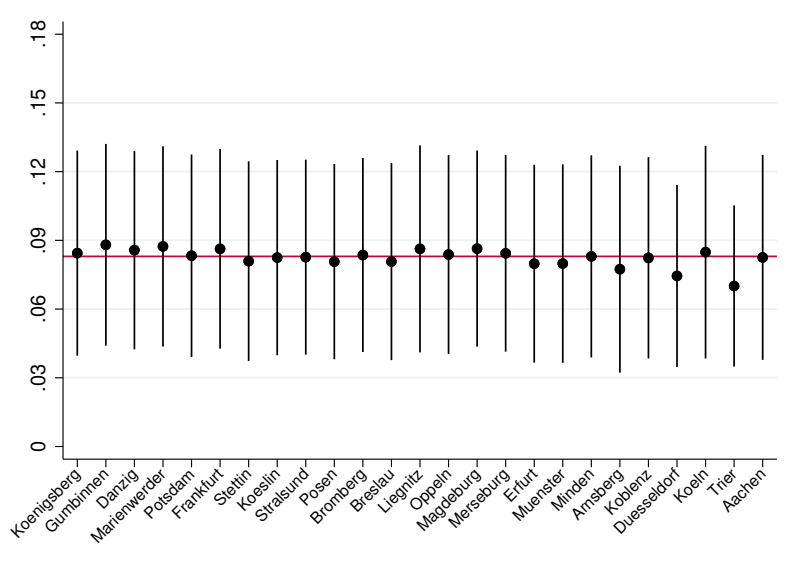
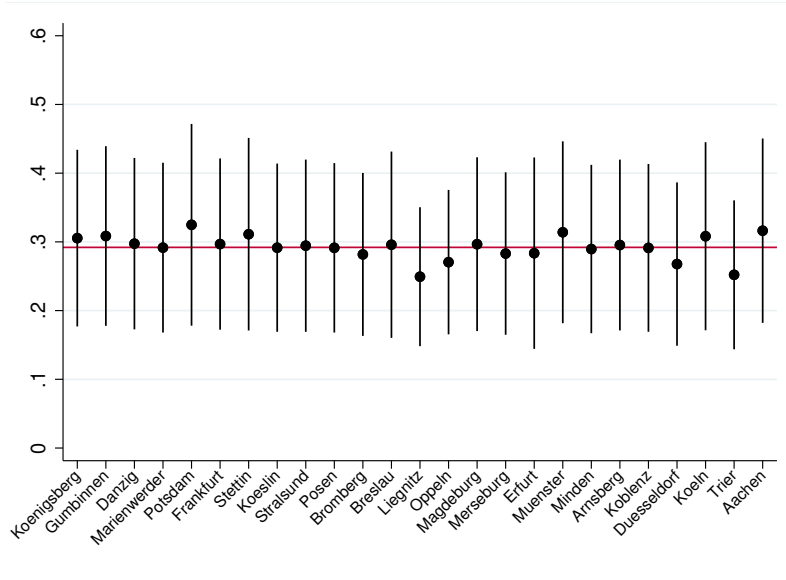


Figure D.7 Jackknife analysis (districts, OLS).



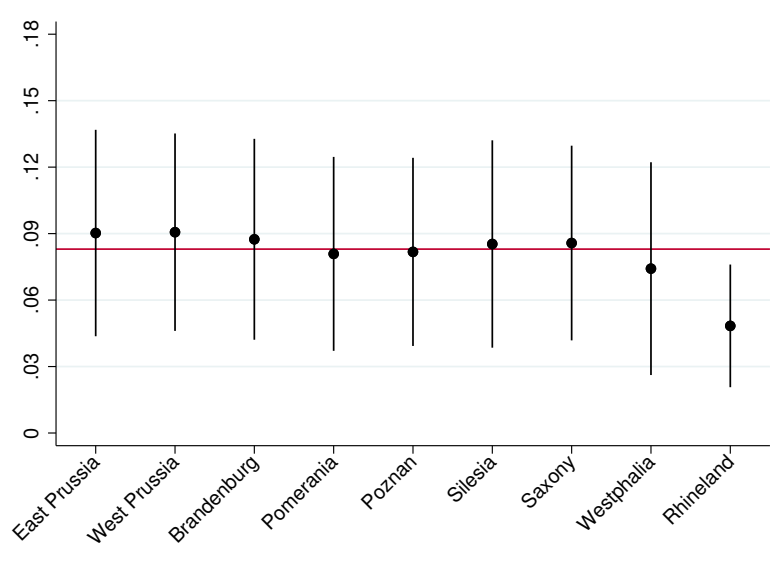
Notes: This figure presents the results of a jackknife analysis in which we consecutively exclude each district from our sample. The black dots indicate the OLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline OLS estimate (see Column 7 of Table 2).

Figure D.8 Jackknife analysis (districts, 2SLS).



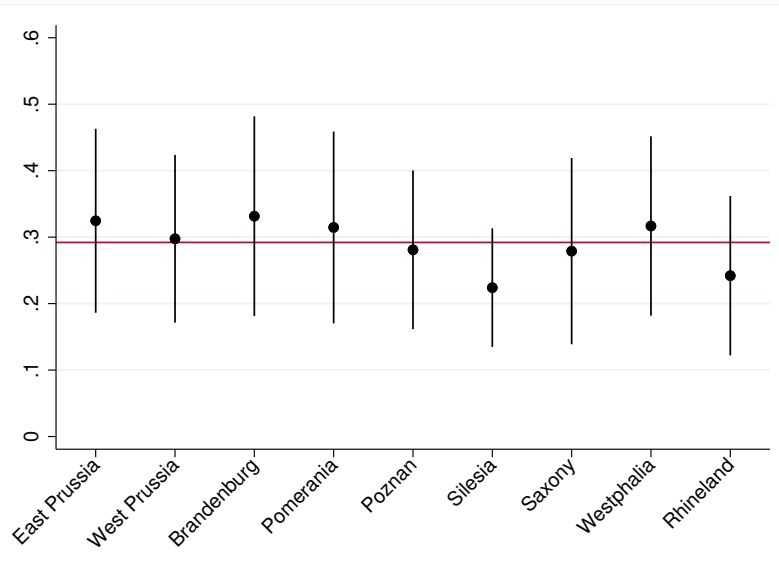
Notes: This figure presents the results of a jackknife analysis in which we consecutively exclude each district from our sample. The black dots indicate the 2SLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline 2SLS estimate (see Column 8 of Table 2).

Figure D.9 Jackknife analysis (provinces, OLS).



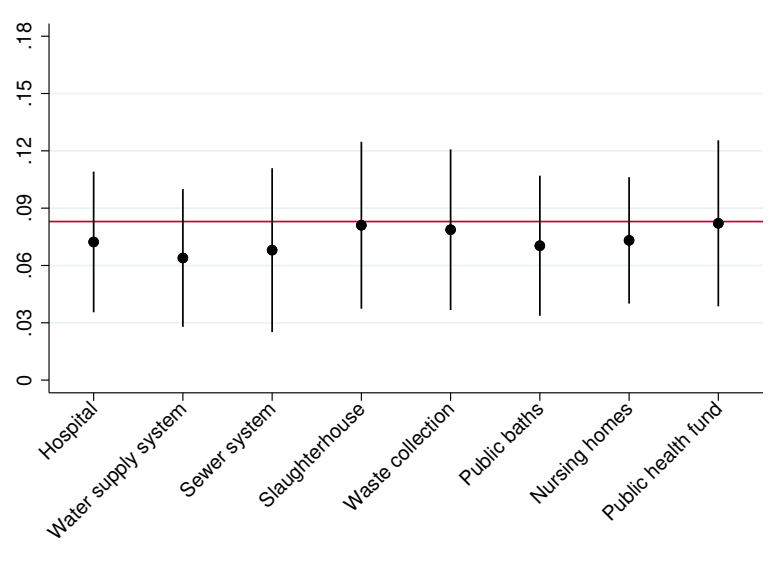
Notes: This figure presents the results of a jackknife analysis in which we consecutively exclude each province from our sample. The black dots indicate the OLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline OLS estimate (see Column 7 of Table 2).

Figure D.10 Jackknife analysis (provinces, 2SLS).



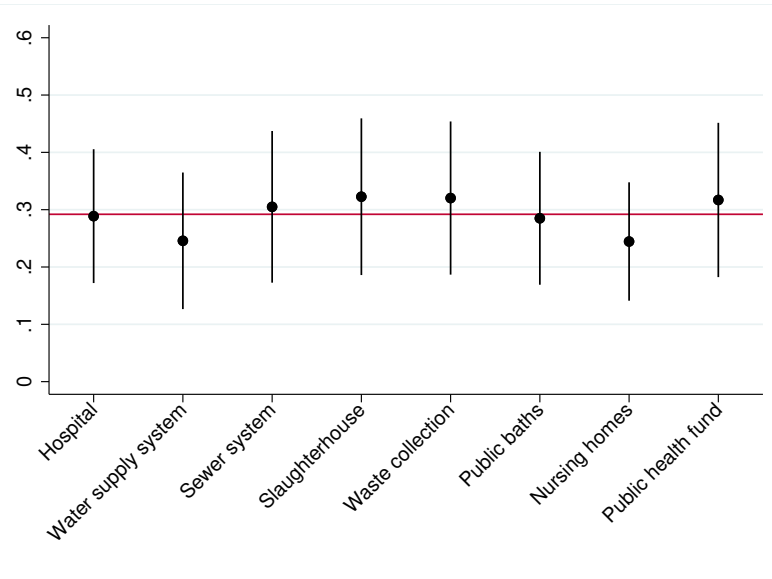
Notes: This figure presents the results of a jackknife analysis in which we consecutively exclude each province from our sample. The black dots indicate the 2SLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline 2SLS estimate (see Column 8 of Table 2).

Figure D.11 Jackknife analysis (health-promoting public goods, OLS).



Notes: This figure presents the results of a jackknife analysis that consecutively excludes one health-promoting public good. The black dots indicate the OLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline OLS estimate (see Column 7 of Table 2).

Figure D.12 Jackknife analysis (health-promoting public goods, 2SLS).



Notes: This figure presents the results of a jackknife analysis that consecutively excludes one health-promoting public good. The black dots indicate the 2SLS estimates for our main variable of interest. The black vertical lines show the 90 percent confidence intervals. The red horizontal line reflects our baseline 2SLS estimate (see Column 8 of Table 2).

E Additional tables

Table E.1 Balance tests.

Variable	Year	Coefficient	Std. Error
Deaths	1871	0.138	(0.1768)
Stillbirths	1871	0.054	(0.1568)
Beds in public hospital	1875	0.255	(0.1881)
Beds in maternity hospital	1875	0.246*	(0.1283)
Workers in health sector	1875	0.149	(0.1524)
Income tax revenues (log)	1876	0.300***	(0.1145)
Saving deposits (log)	1875	0.005	(0.0953)
Saving accounts (log)	1875	-0.019	(0.0898)
Population density (log)	1871	0.337***	(0.1027)
Urbanization rate	1875	0.413***	(0.1349)
Towns	1875	0.138	(0.1333)
Rural communities	1875	-0.066	(0.0831)
Estates	1875	-0.147**	(0.0647)
Workers in agricultural sector	1871	-0.604***	(0.1473)
Workers in mining sector	1871	0.396	(0.2625)
Workers in service sector	1871	0.518***	(0.1537)
Workers in education sector	1871	0.054	(0.1380)
Workers in transport sector	1871	0.183	(0.1518)
Workers in industrial sector	1871	0.402***	(0.1517)
Illiterate (male)	1871	0.017	(0.0654)
Illiterate (female)	1871	0.007	(0.0664)
Private schools	1864	0.235*	(0.1383)
Private teachers	1864	0.236	(0.1962)
Private students	1864	0.117	(0.1680)
County roads	1868	0.147	(0.1199)
Navigable rivers	1868	0.185	(0.2199)
Railway network	1868	0.358	(0.1989)
Sandy soil	Time-invariant	-0.089	(0.1243)
Sandy loam and loamy sand soils	Time-invariant	-0.034	(0.1427)
Loamy soil	Time-invariant	0.059	(0.1259)
Latitude	Time-invariant	-0.053	0.127
Longitude	Time-invariant	-0.006	0.0142
Coast	Time-invariant	-0.126	0.0809
Border	Time-invariant	0.068	0.1589
Distance to coal field	Time-invariant	0.005	0.0319
Distance to Berlin	Time-invariant	0.017	0.0308
Catholics	1871	-0.009	(0.1445)
Men	1871	0.504***	(0.1849)
Young people	1871	0.084	(0.1396)
Married people	1871	0.137	(0.1537)
Workers	1871	0.018	(0.1373)
Births	1871	0.319	(0.1616)
Legitimate births	1871	0.097	(0.0846)
Migrants	1871	0.447***	(0.1624)
Population (log)	1871	0.464***	(0.1559)
Germans	1875	-0.233**	(0.1106)
Military persons	1875	0.169	(0.1976)
Land inequality	1858	-0.103	(0.0846)

Notes: This table presents results from OLS regressions. The reported coefficients reflect the extent to which counties where the political power of the landless elites is relative large ($U > 0.5$) differ from counties where the political power of the landless elites is relative small ($U \leq 0.5$). All regressions include a full set of district fixed effects and a dummy variable that is equal to 1 for county boroughs. We use the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.2 List of Prussian provinces and districts.

Provinces	Districts
East Prussia	Königsberg, Gumbinnen, Allenstein
West Prussia	Danzig, Marienwerder
Berlin	Berlin
Brandenburg	Potsdam, Frankfurt
Pomerania	Stettin, Köslin, Stralsund
Poznan	Posen, Bromberg
Silesia	Breslau, Liegnitz, Oppeln
Saxony	Magdeburg, Merseburg, Erfurt
<i>Schleswig-Holstein</i>	<i>Schleswig Holstein</i>
<i>Hanover</i>	<i>Hanover, Hildesheim, Lüneburg, Stade, Osnabrück, Aurich</i>
Westphalia	Münster, Minden, Arnsberg
<i>Hesse-Nassau</i>	<i>Kassel, Wiesbaden</i>
Rhineland	Koblenz, Düsseldorf, Köln, Trier, Aachen
<i>Hohenzollern</i>	<i>Sigmaringen</i>

Notes: The provinces of East and West Prussia formed together the province of Prussia until 1877. Berlin belonged to the province of Brandenburg until 1881. The district of Allenstein was founded in 1905. We use *italic* font to mark the districts and provinces that are not part of our regression sample due to limited data availability.

Table E.3 Calculation examples: Provision of health-promoting public goods (Waldenburg & Reichenbach, Silesia, 1911)

Public Good	Waldenburg (107 Muni.)	Reichenbach (90 Muni.)
Hospitals	7 [0.065]	1 [0.011]
Nursing homes	36 [0.336]	5 [0.056]
Public health funds	2 [0.019]	1 [0.011]
Sewer systems	7 [0.065]	2 [0.022]
Water supply systems	17 [0.159]	1 [0.011]
Waste collections	1 [0.009]	1 [0.011]
Public baths	1 [0.009]	1 [0.011]
Slaughterhouses	2 [0.019]	2 [0.022]
Total coverage rate (H)	0.0886	0.0194

Table E.4 Baseline analysis (reduced-form and first-stage estimates).

	(1)	(2)	(3)	(4)
Panel A: Reduced-form estimates				
Knight estates	-0.093*** (0.0150)	-0.046*** (0.0154)	-0.073*** (0.0175)	-0.071*** (0.0166)
Panel B: First-stage estimates				
Knight estates	-0.422*** (0.0518)	-0.234*** (0.0532)	-0.235*** (0.0568)	-0.243*** (0.0526)
Observations	335	335	335	335
District FE	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes
Fiscal Capacity	Yes	Yes	Yes	Yes

Notes: This table shows OLS estimates. In Panel A, the dependent variable is a coverage rate that takes into account eight health-promoting public goods (for details, see Section 3.1.2). In Panel B, the dependent variable is a measure reflecting the political power of the landless elite (for details, see Section 3.1.1). All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and use the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.5 Baseline analysis (additional control variables).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: OLS estimates									
Landless elite	0.075*** (0.0245)	0.052** (0.0211)	0.050** (0.0227)	0.084*** (0.0254)	0.080*** (0.0266)	0.069*** (0.0241)	0.069*** (0.0251)	0.084*** (0.0280)	0.079* (0.0264)
Panel B: 2SLS estimates									
Landless elite	0.301*** (0.0826)	0.290*** (0.0870)	0.297*** (0.0836)	0.285*** (0.0731)	0.278*** (0.0721)	0.300*** (0.0748)	0.312*** (0.0880)	0.308*** (0.0757)	0.318*** (0.0893)
SW F-Stat.	18.31	14.44	16.96	21.19	19.00	22.10	17.11	23.03	16.51
Panel C: Reduced-form estimates									
Knight estates	-0.07*** (0.0156)	-0.06*** (0.0149)	-0.06*** (0.0159)	-0.07*** (0.0163)	-0.06*** (0.0157)	-0.07*** (0.0162)	-0.07*** (0.0195)	-0.08*** (0.0175)	-0.07*** (0.0167)
Panel D: First-stage estimates									
Knight estates	-0.22*** (0.0524)	-0.21*** (0.0543)	-0.21*** (0.0520)	-0.25*** (0.0534)	-0.23*** (0.0531)	-0.25*** (0.0528)	-0.24*** (0.0574)	-0.26*** (0.0536)	-0.21*** (0.0522)
Observations	335	335	335	335	335	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal Cap.	Yes	No	No	No	No	No	No	No	No
Urbanization	No	Yes	No	No	No	No	No	No	No
Industry struct.	No	No	Yes	No	No	No	No	No	No
Education	No	No	No	Yes	No	No	No	No	No
Private prov.	No	No	No	No	Yes	No	No	No	No
Infrastructure	No	No	No	No	No	Yes	No	No	No
Demographics	No	No	No	No	No	No	Yes	No	No
Geography	No	No	No	No	No	No	No	Yes	No
Land inequality	No	No	No	No	No	No	No	No	Yes

Notes: This table shows OLS and 2SLS estimates. In Panel A – C, the dependent variable is a coverage rate that takes into account eight health-promoting public goods (for details, see Section 3.1.2). In Panel D, the dependent variable is a measure reflecting the political power of the landless elite (for details, see Section 3.1.1). All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and use the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.6 Baseline analysis (subsample analyses).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: OLS estimates							
Landless elite	0.062*** (0.0212)	0.024 (0.0150)	0.026* (0.0154)	0.117** (0.0442)	0.115** (0.0444)	0.087*** (0.0264)	0.088*** (0.0320)
Panel B: 2SLS estimates							
Landless elite	0.252*** (0.0677)	0.262*** (0.0831)	0.256*** (0.0753)	0.272** (0.1170)	0.255** (0.1133)	0.296*** (0.0763)	0.285*** (0.0782)
SW F-Stat.	16.53	9.75	10.55	13.04	12.02	20.22	16.39
Observations	320	236	227	99	93	323	258
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Boroughs	No	Yes	No	Yes	No	Yes	Yes
East	Yes	Yes	Yes	No	No	Yes	Yes
West	Yes	No	No	Yes	Yes	Yes	Yes
At least 1 town	Yes	Yes	Yes	Yes	Yes	No	Yes
Border changes	Yes	Yes	Yes	Yes	Yes	Yes	No

Notes: This table shows OLS and 2SLS estimates. The dependent variable is a coverage rate that takes into account eight health-promoting public goods (for details, see Section 3.1.2). All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We report robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.7 Baseline analysis (approach used for measuring distribution of political power).

	Multipl. approach		Include Reichstag		1900 – 1911		No. biograph. data	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Landless elite	0.060** (0.0247)	0.304*** (0.0832)	0.090*** (0.0246)	0.310*** (0.0813)	0.065*** (0.0173)	0.350*** (0.1172)	0.078*** (0.0246)	0.295*** (0.0759)
Approach	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
SW F-Stat.	-	19.14	-	21.60	-	10.67	-	20.88
Observations	335	335	335	335	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS and 2SLS estimates. The dependent variable is a coverage rate that takes into account eight health-promoting public goods (for details, see Section 3.1.2). All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We report robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.8 Different types of health-promoting public goods (additional control variables).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: OLS estimates (access to health care)									
Landless elite	0.050 (0.0331)	0.027 (0.0302)	0.031 (0.0327)	0.066* (0.0357)	0.063* (0.0349)	0.045 (0.0328)	0.053 (0.0354)	0.068 (0.0392)	0.058 (0.0363)
Panel B: 2SLS estimates (access to health care)									
Landless elite	0.329*** (0.1194)	0.270** (0.1226)	0.348*** (0.1301)	0.349*** (0.1145)	0.316*** (0.1088)	0.334*** (0.1132)	0.363*** (0.1329)	0.342*** (0.1091)	0.362*** (0.1336)
SW F-Stat.	18.31	14.44	16.96	21.19	19.00	22.10	17.11	23.03	16.51
Panel C: OLS estimates (preventive measures)									
Landless elite	0.087*** (0.0238)	0.065*** (0.0211)	0.059*** (0.0212)	0.091*** (0.0237)	0.087*** (0.0259)	0.081*** (0.0232)	0.076*** (0.0225)	0.090*** (0.0250)	0.088*** (0.0248)
Panel D: 2SLS estimates (preventive measures)									
Landless elite	0.274*** (0.0742)	0.290*** (0.0816)	0.257*** (0.0711)	0.237*** (0.0607)	0.245*** (0.0653)	0.270*** (0.0653)	0.271*** (0.0718)	0.278*** (0.0673)	0.281*** (0.0770)
SW F-Stat.	18.31	14.44	16.96	21.19	19.00	22.10	17.11	23.03	16.51
Observations	335	335	335	335	335	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal Cap.	Yes	No	No	No	No	No	No	No	No
Urbanization	No	Yes	No	No	No	No	No	No	No
Industry struct.	No	No	Yes	No	No	No	No	No	No
Education	No	No	No	Yes	No	No	No	No	No
Private prov.	No	No	No	No	Yes	No	No	No	No
Infrastructure	No	No	No	No	No	Yes	No	No	No
Demographics	No	No	No	No	No	No	Yes	No	No
Geography	No	No	No	No	No	No	No	Yes	No
Land inequality	No	No	No	No	No	No	No	No	Yes

Notes: This table shows OLS and 2SLS estimates. In Panel A & B, the dependent variable is a coverage rate that takes into account three health-promoting public goods that ease access to health services. In Panel C & D, the dependent variable is a coverage rate that takes into account five preventive measures. All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.9 Mechanism analysis (additional control variables, access to health care)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: OLS estimates (W^g)									
Landless elite	-0.012 (0.0338)	-0.027 (0.0312)	-0.025 (0.0324)	-0.006 (0.0326)	-0.009 (0.0322)	-0.012 (0.0350)	-0.010 (0.0343)	-0.002 (0.0374)	-0.016 (0.0353)
Landless elite × Strength workers	0.134* (0.0762)	0.113 (0.0817)	0.146* (0.0746)	0.146* (0.0759)	0.136* (0.0749)	0.125* (0.0710)	0.125 (0.0769)	0.135* (0.0796)	0.138* (0.0774)
Observations	335	335	335	335	335	335	335	335	335
Panel B: OLS estimates (W^b)									
Landless elite	-0.021 (0.0343)	-0.035 (0.0324)	-0.029 (0.0329)	-0.014 (0.0342)	-0.015 (0.0339)	-0.020 (0.0353)	-0.016 (0.0343)	-0.013 (0.0384)	-0.026 (0.0357)
Landless elite × Strength workers	0.135** (0.0616)	0.124* (0.0691)	0.139** (0.0635)	0.144** (0.0617)	0.142** (0.0603)	0.121** (0.0561)	0.132** (0.0659)	0.143** (0.0656)	0.148** (0.0640)
Observations	335	335	335	335	335	335	335	335	335
Panel C: 2SLS estimates ($W^b = 0$)									
Landless elite	-0.106 (0.1124)	-0.193 (0.1332)	-0.090 (0.0948)	-0.126 (0.1104)	-0.165 (0.1159)	-0.113 (0.0987)	-0.063 (0.0869)	-0.066 (0.1180)	-0.178 (0.1293)
Observations	223	223	223	223	223	223	223	223	223
SW F-Stat.	7.87	4.74	8.32	8.44	9.42	9.43	10.60	7.03	7.17
Panel D: 2SLS estimates ($W^b = 1$)									
Landless elite	0.393** (0.1781)	0.308** (0.1485)	0.447** (0.2054)	0.362** (0.1478)	0.417** (0.1721)	0.381** (0.1500)	0.302* (0.1833)	0.330** (0.1425)	0.449** (0.2064)
Observations	112	112	112	112	112	112	112	112	112
SW F-Stat.	8.08	10.52	7.52	11.04	8.17	10.81	6.72	15.79	7.23
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal Cap.	Yes	No	No	No	No	No	No	No	No
Urbanization	No	Yes	No	No	No	No	No	No	No
Industry struct.	No	No	Yes	No	No	No	No	No	No
Education	No	No	No	Yes	No	No	No	No	No
Private prov.	No	No	No	No	Yes	No	No	No	No
Infrastructure	No	No	No	No	No	Yes	No	No	No
Demographics	No	No	No	No	No	No	Yes	No	No
Geography	No	No	No	No	No	No	No	Yes	No
Land inequality	No	No	No	No	No	No	No	No	Yes

Notes: This table reports OLS and 2SLS estimates. The dependent variable is a coverage rate that takes into account three health-promoting public goods that ease access to health services. All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E.10 Mechanism analysis (additional control variables, preventive measures)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: OLS estimates (W^g)									
Landless elite	0.059*** (0.0205)	0.053*** (0.0197)	0.036** (0.0180)	0.056*** (0.0203)	0.056*** (0.0206)	0.055*** (0.0203)	0.063*** (0.0203)	0.061*** (0.0207)	0.056*** (0.0214)
Landless elite × Strength workers	0.066 (0.0611)	0.034 (0.0562)	0.071 (0.0571)	0.077 (0.0593)	0.067 (0.0618)	0.066 (0.0617)	0.027 (0.0519)	0.065 (0.0617)	0.069 (0.0607)
Observations	335	335	335	335	335	335	335	335	335
Panel B: OLS estimates (W^b)									
Landless elite	0.048** (0.0206)	0.044** (0.0200)	0.032* (0.0178)	0.046** (0.0208)	0.048** (0.0211)	0.044** (0.0200)	0.055*** (0.0208)	0.047** (0.0204)	0.044** (0.0218)
Landless elite × Strength workers	0.082* (0.0453)	0.046 (0.0414)	0.068 (0.0418)	0.091* (0.0443)	0.082* (0.0477)	0.078* (0.0460)	0.043 (0.0392)	0.086* (0.0452)	0.088* (0.0451)
Observations	335	335	335	335	335	335	335	335	335
Panel C: 2SLS estimates ($W^b = 0$)									
Landless elite	0.164** (0.0669)	0.244** (0.1111)	0.145** (0.0569)	0.142** (0.0618)	0.152** (0.0644)	0.161*** (0.0638)	0.150** (0.0633)	0.155** (0.0738)	0.174** (0.0740)
Observations	223	223	223	223	223	223	223	223	223
SW F-Stat.	7.87	4.74	8.32	8.44	9.42	9.43	10.60	7.03	7.17
Panel D: 2SLS estimates ($W^b = 1$)									
Landless elite	0.327** (0.1316)	0.320** (0.1363)	0.311** (0.1462)	0.290*** (0.1010)	0.311** (0.1229)	0.339*** (0.1189)	0.256** (0.1288)	0.375*** (0.1132)	0.297** (0.1428)
Observations	112	112	112	112	112	112	112	112	112
SW F-Stat.	8.08	10.52	7.52	11.04	8.17	10.81	6.72	15.79	7.23
Observations	335	335	335	335	335	335	335	335	335
Borough FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fiscal Cap.	Yes	No	No	No	No	No	No	No	No
Urbanization	No	Yes	No	No	No	No	No	No	No
Industry struct.	No	No	Yes	No	No	No	No	No	No
Education	No	No	No	Yes	No	No	No	No	No
Private prov.	No	No	No	No	Yes	No	No	No	No
Infrastructure	No	No	No	No	No	Yes	No	No	No
Demographics	No	No	No	No	No	No	Yes	No	No
Geography	No	No	No	No	No	No	No	Yes	No
Land inequality	No	No	No	No	No	No	No	No	Yes

Notes: This table shows OLS and 2SLS estimates. The dependent variable is a coverage rate that takes into account five preventive measures. All variables are standardized to have a mean of 0 and a standard deviation of 1. For summary statistics and a list of controls, see Table C.1. We show robust standard errors in parentheses and apply the following notation to highlight point estimates that are significantly different from zero: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.