Long-Term Effects of Equal Sharing: Evidence from Inheritance Rules for Land*

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Abstract

What are the long-term economic effects of a more equal distribution of wealth? We investigate consequences of land inequality, exploiting variation in land inheritance rules that traverse political, linguistic, geological, and religious borders in Germany. In some German areas, inherited land was to be shared or divided equally among children, while in others land was ruled to be indivisible. Using a geographic regression discontinuity design, we first show a more equal land distribution in areas with equal division; other potential drivers of growth are smooth at the boundary and equal division areas were not historically more developed. Today, equal division areas feature higher average incomes and more entrepreneurship which goes in hand with a right-shifted skill, income, and wealth distribution. We show evidence consistent with the more even distribution of land leading to more innovative industrial by-employment during Germany's transition from an agrarian to an industrial economy which, in the long-run, led the ground for more entrepreneurship.

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1 Introduction

One of the oldest debates in economics concerns the effect of inequality on growth and development (e.g. Kuznets 1955). How would growth prospects change if income or wealth were counterfactually distributed more evenly? The answer to this question has become particularly relevant in recent decades due to rising levels of income and wealth inequality (Piketty & Saez 2014, Alvaredo, Atkinson, Piketty & Saez 2013). Yet, the debate has remained active due to the scarcity of suitable data and credible research designs that allow for an estimation of causally interpretable effects, as variations in inequality likely correlate with drivers of growth (Banerjee & Duflo 2003).

We contribute to this debate by leveraging sharp geographic variation in institutions that govern how resources are passed from parents to children. In unequal division areas, agricultural property was considered indivisible and had to be passed on to a single heir. In contrast, agricultural land had to be divided equally among all children in equal division areas. We digitized and geocoded data from fine-grained historical surveys to compile a map of inheritance rules across the entire German empire (see e.g. Sering 1897). Broadly speaking, equal division of agricultural land was prevalent in parts of Southern and Western Germany. The boundary between the two inheritance rule regimes traversed political, linguistic, geological, and religious borders. We analyze historical and long-run effects of these inheritance rules using OLS regressions with a rich set of controls and a geographic regression discontinuity (RD) design.

We first show that inheritance rules indeed affected the inequality of land – the key store of wealth in an agricultural society – during the peak of the industrialization period (1870-1914). This finding is non-trivial: for example, a Coasean argument would suggest that inter vivos land transactions may have counteracted the equalizing effect of equal division areas, e.g., if transaction costs were low and concentrated ownership optimal. This finding is in line with Bleakley & Ferrie (2014) who find that initial allocations of land in the US state of Georgia were quite persistent and disappeared only after 150 years.

The core result of our paper is that equal division of land has generated higher long-term growth through an occupational choice mechanism. Equal division provided *all* children with a piece of land or with some compensation for leaving the land to one of the siblings. This equalized opportunities and increased the pool of potential entrepreneurs in equal division areas compared to unequal division areas. We view inheritance rules for land as a spatial policy that proved crucial for the development of Germany's small- and medium-sized industry at the turn-of-the-century and permanently flipped the spatial distribution of economic activity in Germany (Lin & Rauch 2022).

Putting together a large panel data set starting with the early stages of industrialization, extending to Germany's industrial take-off, the interwar period, and the post-war period up until today, we are able to show when and how equal division areas became richer. In their domestic workshops on equal division farms, the more numerous entrepreneurs experimented, produced increasingly specialized goods and subsequently generated higher incomes. The development of Germany's high product diversity industry characterized by small- and medium-sized firms (the German *Mittelstand*) can be traced back to equal division inheritance rules (Herrigel 2000). Our modern data show that equal division areas host more firms that are smaller and more productive, i.e., they generate more GDP per working hour, and have more entrepreneurs as residents. The higher share of entrepreneurs in equal division areas today translates into a right-shifted skill, income, and wealth distribution.

Predictors of long-term development and also of a particular inheritance rule regime are smooth at the boundary, thereby suggesting that the variation in inheritance rules that we analyze is idiosyncratic and not systematically related to other drivers of growth. We find no evidence of more advantageous starting conditions for equal division areas before the Industrial Revolution with respect to agricultural productivity, general education, urban population, population density, fertility or outmigration to the United States. At a fine geographic level, the data therefore show a robust effect of lower levels of landholding inequality in the 19^{th} century –

caused by the equal division inheritance regime – on long-term economic outcomes and allow us to rule out a variety of potential confounders.

An influential body of literature hypothesizes that the distribution of wealth affects long-term growth through its effect on investment decisions and the occupational choice of individuals (see, e.g., Galor & Zeira 1993, Banerjee & Newman 1993, Ghatak & Nien-Huei Jiang 2002, Galor & Moav 2004). Dividing parental land equally between *all* siblings (or paying a financial compensation), alleviated credit constraints and provided a buffer to absorb the potential risks of innovating, investing in human capital, or becoming a part-time or full-time entrepreneur, all of which have favorable consequences for growth. In contrast, passing the entire agricultural property to a single heir in unequal division areas left the other siblings landless so that they worked as farmhands on the inheriting brother's farm (Cole & Wolf 1995) or in factories (Becker 1998). Hence, equal division increased the pool of potential entrepreneurs compared to unequal division during Germany's transition from an agrarian to an industrial economy. Social arrangements that had existed for centuries turned out to be beneficial as conditions changed.

We document that innovation and entrepreneurship was indeed higher in equal division areas during the period of high industrialization in Germany (1870-1914) as predicted by the models. Specifically, the population share working in manufacturing was higher and this gap widened between 1895 and 1907. The additional employment in manufacturing is fully accounted for by particularly innovative sectors with high patenting activity (defined following Streb, Baten & Yin 2006). Patenting activity itself was also higher in equal division areas between 1877 and 1914. Finally, historical accounts also provide evidence consistent with inheritance rules affecting long-term growth through an occupational choice mechanism.[1]

[1]For example, the Finance Minister in the Kingdom of Württemberg argued that Württemberg's economic strength at the time, in 1823, was "*the unconditionally permissible division of landed property. On property of paltry size, the industriousness, thrift and ingenuity of the owner blossoms. He nourishes himself in the character of a businessman [Gewerbsmann], indeed, he becomes [...] a business man. [...] No matter where one looks, one finds everywhere industrious artisans, highly skilled manufacturers and thoughtful merchants. That is the character of industry in this land. [...] Supported by their small farms they are at least able to salvage a meager existence until luck or genius brings to them better times*" (see Herrigel 2000, p.56).

Income differences were not yet visible at the turn-of-the century. But during the interwar period, data on tax revenue per capita point to a significant and widening income and wealth gap between equal and unequal division areas. During this period, the chemical and electronics industry further developed and the car industry (and its local supply chains) emerged, particularly in equal division areas. During the post-war period, the GDP per capita gap opened further and settled at around 15% in recent decades. Today, the income gap is ca. 6%. The observation that GDP is even higher than distributed income reflects that employees living in unequal division areas commute into equal division areas for work.

Our study emphasizes two key factors for entrepreneurial activities: low opportunity costs to become and stay an entrepreneur (Arora & Nandkumar 2011) and freedom to experiment (Azoulay, Graff Zivin & Manso 2011). Equal-division farmers and their families often produced and experimented in their own domestic workshops, so that there was, at least initially, no requirement for further investments in real estate. Agricultural income and wealth provided a risk buffer and gave freedom to experiment. Our findings support several models in which landholding inequality may inhibit economic growth by restricting occupational choice, and, in particular, are consistent with Doepke & Zilibotti (2008) who argue that occupational choice plays a crucial role during the Industrial Revolution and posits a concomitant downfall of the landed elite.[2] We also speak to the literature studying the economic and political consequences of landholding inequality (Gerschenkron 1966, Banerjee, Iyer & Somanathan 2005, Banerjee & Iyer 2005, Acemoglu, Bautista, Querubín & Robinson 2007, Ziblatt 2008, Becker, Cinnirella & Woessmann 2010, Bleakley & Ferrie 2016, Smith 2019) and agricultural property rights (Fritsch & Wyrwich 2021). More generally, our study adds causal evidence to the literature on the long-term effects of historical conditions on economic develop-

[2]Galor, Moav & Vollrath (2009) formalize in a theoretical model that a more equal land distribution supports the rise of a new entrepreneurial elite during industrialization. The entrepreneurial elite then supports education of the former unskilled labor force. Data on education spending during the high-school movement in the US delivers evidence for that model. Similarly, Cinnirella & Hornung (2016) find a negative cross-sectional relationship between large landholdings and primary school enrollment rates throughout the 19^{th} century in Prussia. Our study builds on previous research on industrialization in Germany Gerschenkron (1989), Tilly (1969), Eichengreen & Ritschl (2009), and Herrigel (2000).

ment[3] showing that an inclusive institution, leading to a more equal distribution of landed wealth, fostered long-term growth. Finally, our study provides new evidence on the historical origins and spatial persistence of entrepreneurial activity (Glaeser & Kerr 2009, Fritsch & Wyrwich 2014, Barrios, Hochberg & Macciocchi 2022).

Several previous studies have investigated the long-run effects of inheritance rules in Europe. Contrary to our findings, Duranton, Rodríguez-Pose & Sandall (2009) document lower GDP per capita levels across European regions in what we would classify as equal division areas. Yet, the comparability of their study and ours is limited due to the different aggregation of regions and classification of inheritance types.[4] Fertility, mobility and outmigration are often discussed in the context of inheritance rules: Unequal division areas are thought to have slower population growth and more outmigration because non-inheriting children had fewer ties to the parental home Habakkuk (1955). Analyzing micro-data from 19^{th} century Hesse-Cassel, Wegge (1998) finds some support for this hypothesis, whereas we do not detect significant differences in outmigration between equal and unequal division areas. Other effects of egalitarian inheritance rules include support for more generous pension systems (Galasso & Profeta 2018), higher female to male school enrollment rate ratios (Bertocchi & Bozzano 2015) and more political equality, e.g., more women in political councils and fewer aristocrats in the social elite (Rink & Hilbig 2019). Rink & Hilbig (2019) also document higher income inequality in equal sharing areas measured by the Gini coefficient of tax income; but their inequality measure covers different population shares across counties (poorer coun-

[3]See, e.g., La Porta, Lopez-de Silanes, Shleifer & Vishny (1998), Acemoglu, Johnson & Robinson (2001), Glaeser, La Porta, Lopez-de Silanes & Shleifer (2004), Nunn (2009), Alesina, Giuliano & Nunn (2013), Gennaioli, La Porta, Lopez-de Silanes & Shleifer (2013) or Donges, Meier & Silva (2022).

[4]Duranton et al. (2009) compare 190 European regions (NUTS-II), what results in 38 NUTS-II regions in Germany, while we use 397 NUTS-III counties in Germany. Duranton et al. (2009) classify 7 family types (absolute nuclear, egalitarian nuclear, stem family, incomplete stem family and communitarian family). In Germany, they classify most of our unequal division areas as stem families and most of our equal division areas as incomplete stem families. Their estimation strategy, which relies on 'Absolute Nuclear Families' (='equal division' in their setting) as base category, treats all German regions as non-equal division. Ultimately, the different results might also arise from different manufacturing productivity across European countries. While Duranton et al. (2009) document *lower* GDP pc from manufacturing in their equal division areas in North-Western France and the United Kingdom, we document *higher* GDP from manufacturing in our German equal division areas.

ties have drastically fewer taxpayers than richer counties). We compute income shares using county-level income tax data and national accounts, so that we can compare incomes of the same population segments applying state-of-the-art methods (Piketty 2003). Finally, our study also complements Huning & Wahl (2021*a*) who analyze municipalities in Baden-Württemberg since the 1950s and find higher incomes, a larger share of industrial areas and industrial buildings in equal division municipalities today.

Our paper proceeds as follows: Section 2 discusses the history and the hypothesized origins of agricultural inheritance rules in Germany. Section 3 gives an overview of the different data sets we use. We present and discuss our empirical strategy in Section 4. Section 5 shows the estimated effects of equal division and historical and on modern measures of inequality and economic well-being. Further, we discuss correlations between equal division and potential confounders. Section 6 provides evidence for an occupational choice mechanism. Section 7 concludes.

2 Historical Background of Inheritance Rules

Historically, two main rules of inheritance for farms and agricultural land existed in Germany, prescribing equal division ('Realteilung') and unequal division of land ('Anerbenrecht') (Rösener 2012).[5] Under unequal division inheritance, agricultural property is considered indivisible and has to be passed on to a single heir. The most common unequal division rule prescribed "primogeniture", i.e. making the oldest son the designated heir. Historically, daughters and last-borns did not have a claim to the parental land and received little or no compensation in most unequal division areas. As a consequence, the non-inheriting children typically became landless and worked as farmhands on the inheriting brother's farm (Cole & Wolf 1995) or in factories (Becker 1998), unless they married into a landed family. Under equal

[5]Variations in inheritance rules are also present in other parts of Europe. In England, for example, non-partible inheritance is traditionally applied (Alston & Schapiro 1984), while in the Netherlands (Alston & Schapiro 1984) and in France (Crouch 2005) the people divided farms equally (the Code civil introduced inheritance laws). Spain applies partible inheritance in the South (Andalusia) and non-partible inheritance in the other parts (Tur-Prats 2018).

division inheritance, land holding is divided equally among all children including daughters.

Eliminating equal division had been a recurring topic in the political debate since the 19^{th} century (Rouette 2003, Eheberg 1883). Again and again, equal division was argued to represent a threat to the productivity of agriculture and the existence of farmers. The Nazis implemented such a reform through the 'Reichserbhofgesetz' (State Hereditary Farm Law) of 1933 introducing unequal division all over Germany (Rouette 2003). However, Röhm (1957) and Röhm (1961) later finds evidence that equal division rules persisted regionally until the 1950s. Even today, inheritance of farms is locally regulated by the states.[6] The state-specific rules still suspend equal division of the inheritance among a community of heirs as prescribed by the German Civil Law Code (BGB §§1922). Bavaria, Saarland, Thuringia, Saxony, Saxony-Anhalt, Mecklenburg-Vorpommern, Brandenburg, and Berlin follow BGB §2049 and §2312 (Landgüterrecht) which in general prescribes equal division but regulates that farms are assessed at a lower value than other property. The aim remains to secure productivity of agriculture.

In order to prevent the infinite parcellation of arable land below subsistence levels, farmers in equal division areas undertook different measures. First, parental property was *sold* to the child to whom ownership and control was passed on exclusively. The price could be paid either to the parents or to the other siblings as a one-off payment or as a regular rent. Second, land was bought and sold, primarily within family networks, with the aim of stabilizing farm sizes in the long-run. The land market has developed earlier and has been more dynamic in equal division areas since the 18^{th} century. In this context, intermarriage started to play an increasing role (Rouette 2003). But still, we find significantly more small farms in equal division areas than in unequal division areas, suggesting that the

[6]Hamburg, North Rhine-Westphalia, Lower Saxony, and Schleswig-Holstein introduced unequal division inheritance by the Höfeordnung (HöfeO from 26 July 1976, BGBl. 1, S. 1933). Baden-Württemberg applies the Badisches Hofgütergesetz and Württembergisches Anerbengesetz. Hesse follows the Hessische Landgüterordnung, Rhineland-Palatinate the Rheinland-Pfälzische Höfeordnung, and Bremen the Bremisches Höfegesetz.

consequences of inheritance rules for land allocation were not fully undone by other mechanisms (see Section 5.1).

Since we use geographic variation in the historical prevalence of inheritance rules, the question of which factors lead to the adoption of a particular inheritance rule in a locality arises naturally. This question remains debated among historians, who concur that the rules had been in place since at least the Middle Ages: Two of the first written codices, the Lex Salica of 507 AD and the Sachsenspiegel of 1220 AD, regulated agricultural inheritance.[7] A hypothesis dating back to at least Weber (1924) is that unequal division was established where local feudal lords or the state had the power and incentives to prohibit the division of land as it was thought that larger land plots could be taxed more easily (Rösener 2012). Other scholars have suggested that the religion of the duke (Berkner 1976) or features of the terrain or the soil were conducive to the adoption of one inheritance rule over the other (Schröder 1979, Huning & Wahl 2021*b*). Following Boserup (1965) and Fastenmayer (2009) soil quality in combination with crops that support plough use would give an advantage to unequal division rules. Finally, Chu (1991) argued that unequal division, in the form of primogeniture, may arise as family's optimal policy to reduce the lineal extinction probability in a dynastic model.

The variation in inheritance rules we exploit traverses political, linguistic, geological, and religious borders. Figure A1 illustrates variation in the prevalence of equal vs. unequal division of land from one village to the next within the same county. Moreover, the border between inheritance rules does not generally follow political boundaries. Similarly, the figure illustrates that the inheritance rule variation also traverses a linguistic boundary between Swabian and East Franconian German dialects.

Figure 1 Panel (a) is based on our digitization efforts, which we describe below, and shows the overall spatial distribution of different inheritance rules in 19^{th}

[7]The Lex Salica prescribed equal division among male offspring in Frankish lands (South-Western Germany) (Behrend 1897), whereas the Sachsenspiegel prescribed a single heir in parts of the North-East (Blanckmeister 1913).

century Germany that we exploit for our analysis.[8] We distinguish equal division (green) from unequal division areas (blue). Unequal division is prevalent in a majority of regions. With several exceptions, equal division is predominantly found in the southwest of Germany. The map is a combination of various sources in form of maps and texts from the late 19^{th} century: The first comprehensive overview of the geographic distribution of inheritance rules in Prussia was created in 1894 when the Prussian government conducted a survey among judges and county administrators to inquire into the nature and history of inheritance rules in their jurisdiction (Rouette 2003). Around the same time, similar surveys were conducted in the other kingdoms of the German Empire by Verein für Socialpolitik (1883), Grossherzogliches Ministerium des Inneren (1883), Miaskowski (1884), Fick (1895), and Krafft (1930). Several decades later, the geographers Hartke & Westermann (1940) created an overview map that depicted the local prevalence of particular inheritance rules based on the results published by Sering (1897) and others. These surveys allow a very fine-grained categorization of inheritance rules by locality, typically at the village level.[9] In our sample, the inheritance rule of each county is classified by the inheritance rule of the majority of the area of a county.

3 Data

This section provides a detailed description of our data sources and shows summary statistics of how equal and unequal division counties differed. The unit of observation throughout is a county in Germany at different points in time. The counties' locations are indicated by historical and modern maps of German counties provided by MPIDR [Max Planck Institute for Demographic Research] and CGG [Chair for

[8]We stick to the maps provided by the sources in the late 19^{th} century. While Rouette (2003) highlights the overall stability of inheritance rules over centuries, she also points out that only rare changes occurred in the 19^{th} century: while the county of Olpe and the rural county of Paderborn increasingly practiced unequal division, other counties of the industrialized Ruhr area switched from unequal to equal division.

[9]Where possible, we follow the original sources rather than Hartke & Westermann (1940), whose work was published during the Nazi regime and might have been influenced by the propaganda similar to Huppertz (1939). For counties for which we could not identify the prevalent inheritance rule from the original sources we filled the gaps from the comprehensive map of Hartke & Westermann (1940).

Geodesy and Geoinformatics, University of Rostock] (2011) and the German Federal Institute for Research on Building, Urban Affairs, and Spatial Development (BBSR). We link our historical sample, consisting of 900 rural German counties in 1895, either spatially, via official county codes, or via county names to our modern sample of 397 counties in 2013. While we focus on rural counties in our historical analysis,[10] our modern sample consists of the full set of German counties only excluding 5 large urban counties of Berlin, Cologne, Hamburg, Hannover, and Munich (402-5=397 counties). Hence, urban counties in the center of "donut-shaped" rural counties are excluded from the historical sample, but included in the modern sample.

3.1 Data Sources

Our main outcome variables stem from censuses, national accounts and tax records of the Federal Statistical Office of Germany or its predecessors from the late 19^{th} century onward. In order to measure income inequality within and between regions in the 19^{th} century and today, we draw on income tax records and compute top income shares following the standards of the World Inequality Database, i.e., we apply the Pareto interpolation method as established by Piketty (2003). Our regional income inequality series for Germany represents a new and unique contribution to international inequality data, because existing long-run inequality series measure inequality at the national level – with one regional exception for the United States.[11]

Historical Outcomes Historical data on farm sizes and occupations stem from the first comprehensive agricultural census for the German Empire (Kaiserliches

[10]Sample restrictions exclude independent cities from our historical analysis for several reasons. First, agriculture played a minor role in cities. Second, urbanization triggered migration into cities at a large scale and brings people with unequal division origin into areas of equal division and vice versa. Migrants' behavior influences the outcome variables of cities and we cannot distinguish if this is driven by people with equal or unequal division background.

[11]Bartels (2019) provides the WID series for Germany. The Pareto interpolation method additionally draws on population statistics for the total number of potential taxpayers and national accounts for total income as income tax statistics are restricted to the taxpaying part of the population. See Bartels (2019) for a detailed description of the method and its application to German income tax statistics 1871 to 2014.

Statisisches Amt 1912) and from two censuses on occupations and businesses (Kaiserliches Statisisches Amt 1897, Kaiserliches Statisisches Amt 1910) that we digitized. These statistics allow us to calculate average farm sizes, the share of farms across size categories, the population per county and employment shares in agriculture, manufacturing, and trade and services. Within occupations, we can identify innovative branches in manufacturing as specified in Streb et al. (2006). We enrich agricultural information by data on landholding inequality from 1895 provided by Ziblatt (2008). Patent data from Streb et al. (2006) which includes all valuable patents filed in Germany between 1877 and 1914 serves as a second measure for innovative activity.[12] For the estimation of income inequality within and between counties, we use county-level income tax tabulations that provide information on income bins, including the mean income and the number of taxpayers within each bin. We digitized historical county-level income tax tabulations from Baden, Hesse and Württemberg (see Table A4 for data sources).[13] Further measures of economic development come from the census on occupations and businesses from 1925 which allows us to distinguish between employees and laborers (Fritsch & Wyrwich 2016).[14]

Modern Outcomes Income, education, and industry structure on the county level are from the INKAR 2013/2014 data set, which includes official aggregated information and is provided by the BBSR. For finer measures of income and labor productivity, we incorporate county-level national accounts and income tax records provided by the German Federal Statistical Office and the Statistical Offices of the Laender. Our between-county inequality measures are the log mean and median income, the log mean income of the top 10% and the top 1% as well as the share of households in each county belonging to the bottom 40% or bottom 20% of the national income distribution.[15] For the measurement of wealth, we draw on wealth

[12]We thank Jochen Streb for kindly sharing his data.

[13]Bavaria did not publish county-level income tax information before World War I. Prussia only published tax tabulations on the more aggregate level of the *Regierungsbezirk*.

[14]We thank Michael Wyrwich for kindly sharing their data.

[15]Income tax records today exclude about a third of the population which is tax exempt. We focus on top income inequality measures for which we have suitable data. More encompassing inequality measures like the Gini coefficients or 90/10 percentile ratios would require the full income distribution from bottom to top. Using the Socio-Economic Panel (SOEP), we estimate that the bottom 40% of potential tax households in Germany earned less than €20.000 and the

data from the last collection of the German wealth tax in 1995, that lists wealth taxpayers and millionaires per 10.000 inhabitants by county.

Control Variables We use three types of control variables: geographical variables, cultural and institutional variables, and controls for the location. The geographic control variables come from GIS raster data depicting current information on soil, climate, elevation, and navigable waterways. We rely on data from the European Soil Data Base, the free climate data from WorldClim.org and navigable waterways from Kunz (2004). The calculation of average elevation of a county is based on data from Jarvis, Reuter, Nelson & Guevara (2006). Cultural and institutional control variables come from various sources: The share of protestants in a county stems from Konversationslexikon (1905) and the general law type stems from a map by Schröder (1870). Hanseatic involvement is inferred from a map by Helmolt (1902) as is an indicator for belonging to the Frankish territory from Shepherd (1911). We include controls for location in the form of longitude and latitude of the centroid of a county as well as an indicator for the historical state the county belongs to.

Pre-Industrial Development For agricultural productivity before and after 1500 we use data on caloric output of land by Galor & Özak (2016). Another measure of pre-industrial economic development is population data, which we obtain from Bairoch, Batou & Chevre (1988) and the Statistical Office of the German Empire, which published the population of 1375 German towns and cities in 1867, 1871, and 1875 (Kaiserliches Statistisches Amt 1877). Fertility is measured by the number of births per county recorded by the Statistical Office of the German Empire. To measure outmigration to the United States, we use a subsample of the German Emigration Database of the 1880s. Additionally, we use data from the iPEHd on Prussia provided by Becker, Cinnirella, Hornung & Woessmann (2014)

bottom 20% earned less than €10.000. The SOEP allows us to rank potential tax households by their gross income according to tax law definitions so that we can identify income thresholds of the bottom 40% and bottom 20%, respectively, and then estimate their population share.

to evaluate pre-industrial development. Tables A2 and A3 in the Appendix provide a brief overview of the variables we use from these data sets.

3.2 Summary Statistics

Table A1 shows summary statistics for equal and unequal division counties, which illustrate to what extent the two groups differed in their control characteristics. Panel A lists the geographic controls. In equal division areas, the average temperature and elevation are slightly higher. Unequal division areas have a significantly higher share of sand, silt, and loam in the soil, while the share of loess, which is favorable for agriculture, does not differ significantly between the two groups. Panel B shows the summary statistics of the cultural and institutional control variables. Figures 2 displays the variation of our geographic control variables over German counties in its modern borders. It highlights that counties largely do not differ discontinuously in geographic characteristics, such as soil quality, temperature, or roughness, at the border between the two inheritance regimes.

While Frankish territory and Napoleonic Code mainly appear in equal division areas and the Hanseatic League and Prussian Law in unequal division areas, the share of protestants does not differ significantly between inheritance rules.

We conclude that equal and unequal division areas are not completely balanced but differ in some aspects; therefore, we include the geographic and cultural control variables later on in our analyses and use geographic regression discontinuity models with counties close to the boundary as our preferred specification.

4 Empirical Strategy

We apply two empirical strategies to estimate the effect of equal division on inequality and economic development. First, we estimate OLS regressions with a rich set of control variables, including flexible controls for the location of the county. Second, we view the location where unequal division changes to equal division as a boundary and discontinuous jump in inheritance rules which is determined by longi-

tude and latitude. In this framework we apply a multidimensional, semi-parametric regression discontinuity (RD) approach similar to Dell (2010) to identify the effect of equal division. RD approaches have been used earlier to analyze the impact of inheritance rules in Germany (Rink & Hilbig 2019, Huning & Wahl 2021*a*). Our estimation model is:

$$Y_c = \alpha + \gamma \cdot Equal\ Division_c + X_c^{'}\beta + f(Geographic\ Location_c) + \phi_{s(c)} + \epsilon_c. \quad (1)$$

The outcome Y_c is a specific outcome measure of county c. *Equal Division* is an indicator variable for equal division inheritance in county c. The coefficient of interest γ measures the effect of equal division and the outcome variable Y_c. The matrix X_c contains control variables for county c. The term $\phi_{s(c)}$ determines the state in which county c is located. Independent cities of one state are clustered locally. Therefore, the historical state dummies divide the border of inheritance rule into nine different segments.[16]

The polynomial $f(Geographic\ Location_c)$ is a linear function of longitude and latitude in the OLS specification. Our RD specification additionally includes distance to the boundary and an interaction term of treatment and distance to the border to allow the slope to vary on either side of the border. As a robustness check, we use a quadratic polynomial that controls for squared longitude, latitude, and distance to the boundary, as well as interactions between longitude and latitude, longitude and distance to border and, finally, latitude and distance to border. Our main results are qualitatively and quantitatively robust to using the quadratic polynomial instead.

We use our full sample of German counties in a specific year for the OLS specification. For the RD specification, we reduce the sample to counties with a centroid in a 35 km radius of the border as Figure 1 Panel (b) shows. We test the robustness of the RD results by varying the distance to border (see Figures 4 to 5). Standard errors are clustered at the district level which is one aggregation level above the

[16]The nine segments (which include both types of inheritance rule) are: Prussia, Bavaria, Baden, Württemberg, Hessia, Schwarzburg Rudolstadt, Sachsen Weimar Eisenach, Sachsen Meinigen Gotha, Sachsen Coburg Gotha.

county level.[17] We also present HAC standard errors following Conley (1999) to account for spatial autocorrelation. Counties are weighted by the number of their inhabitants in order to allow a population-related interpretation of our results.[18] In our historical analysis, we focus on rural counties and exclude independent cities. In our analysis of modern outcomes, we use the full set of German counties only excluding five large urban counties (Berlin, Cologne, Hamburg, Hannover, Munich).

4.1 Identification Assumption

The RD approach relies on the identification assumption that the characteristics between the two groups - i.e. across the border - vary smoothly. In order to test this assumption, we test whether predictors of inheritance rules or of long-term development differ discontinuously at the boundary between the two regimes. We predict each relevant outcome based on a linear specification using all our control variables as potential predictors.

Figure 3 Panel (a) plots the predicted equal division against the distance of a county to the border of inheritance rule. No jump or discontinuity in the outcome variable at the boundary can be detected. Moreover, Figure 3 reveals that the relationship between controls and inheritance rule in a range of 35 km left and right of the border can be well approximated with a linear specification. Taken together, this evidence supports the identification assumption and suggests that, close to boundary, equal and unequal division areas did not differ discontinuously in the characteristics that determine particular inheritance rules in the cross-section.

We next check the continuity of indicators of predicted long-term development at the boundary in Figure 3 Panels (b) and (c). If counties sorted into equal division based on unobserved characteristics, which are positively correlated with income today, Figure 3 Panels (b) and (c) would reveal a positive discontinuity with respect to GDP per capita and household income per household member, respectively. The evidence does not support such a conclusion. For a measure of predicted GDP per capita, no large positive discontinuity at the boundary is discernible. For predicted

[17] There are 51 districts i.e. clusters in a 35 km radius to the inheritance rule border.
[18] Non-weighted results are similar and available from the authors upon request.

household income, we find an economically small change at the boundary, with equal division areas having features that are associated with, if anything, slightly lower long-term household income levels. Taken together, the results in Figure 3 lend support to a geographic discontinuity strategy.

5 Results

Our analysis proceeds in two parts: First, we provide evidence on the historical effects of equal division on inequality throughout the Industrial Revolution. Second, we assess the long-term effects of historical inheritance rules on modern outcomes and their distribution.

5.1 Effects of Equal Division at the Turn of the 19^{th} Century

The first step of our empirical analysis is to assess if, historically, equal division of land resulted in lower inequality. While we find significantly less landholding inequality in equal division areas at the turn of the 19^{th} century, significant income and income inequality differences have not yet emerged.

Landholding Inequality Table 1 shows regression results for landholding inequality in 1897. Landholding Gini coefficients are significantly lower by about a third of a standard deviation (SD) in our RD specification.[19] The distribution of farms sizes in equal division areas is shifted to the left. There are significantly more small farms below 5 hectares and less large farms between 5 and 20 hectares or between 20 and 100 hectares.[20] This higher share of small farms in equal division is also visible in pre-industrial Prussian census data of 1816 (see Appendix Table A6). Landholding inequality and farm size effects are robust to including geographic and cultural controls (Panel B), to the restrictions of the RD approach (Panel C), to

[19]This finding is robust to including the quadratic polynomial instead, as shown in Column 2.

[20]The census also includes a category for farms above 100 hectares. There are no significant differences between equal and unequal division counties in the share of farms above 100 ha. It is likely that church land and feudal estates which existed in both inheritance regimes fall in that category and were not affected by inheritance rules.

allowing to the slope to vary on either side of the inheritance regime border (Panel D) and to varying the distance to border (Figure 4).

The snapshot in 1895 does not reveal whether equal division was still performed at the end of the 19^{th} century. Differences might have emerged hundreds of years ago and may not have faded away by 1895. Appendix Table A7 shows that equal division was indeed still performed: a difference-in-differences analysis between 1895 and 1907 shows that within 12 years farms in equal division areas became significantly smaller and the share of small farms increased even more.

Our results on landholding inequality establish two core facts: First, until the end of the 19^{th} century, equal division affected the distribution of land. Second, although people could have sold their inherited land and moved to cities or abroad, this practice was not common enough to overturn the effects of inheritance rules on inequality. A Coasean argument would suggest that inter vivos land transactions should have concentrated land ownership in equal division areas if transaction costs were low and if concentrated land ownership were optimal for agricultural productivity. Yet, the evidence shows persistent differences in landholding inequality at the boundary between the two inheritance regimes, contrary to a Coasean argument.[21]

Income Inequality We might expect that the smaller land parcels in equal division areas generated lower incomes and less income inequality. On the other hand, farmers with small landholdings in equal division areas topped up their smaller agricultural incomes with income from industrial by-employment, so that they might have reached similar income levels as in unequal division areas. Our evidence provides evidence for the latter hypothesis: Average incomes, top 10% average incomes

[21]Not only the production factor land but also inputs into physical development like food appear to have been distributed more equally in equal division counties: We find significantly less variation in height in equal division counties (see Appendix Table A15). We use the SD of individual height of 20-year-old conscripts in Bavarian counties in the 19^{th} century combined with information on their county of origin (see Baten (1999) and Baten (2000)), which is a well established measure of individual well-being in terms of nourishment and health (van Zanden, Baten, d'Ercole, Rijpma, Smith & Timmer 2014, Fogel 1986). To check weather Bavaria is a good case study for the effect of equal division, we estimated the same regressions as in Table 1 but only for Bavaria in Appendix Table A10. As the number of observations is strongly reduced, the effects are hardly significant. However, the percentages of farms in specific size categories are similar to our findings for whole Germany, indicating that Bavaria qualifies as an appropriate sample of the whole population.

and top 10% income shares did not significantly differ between equal and unequal division areas, neither in 1895 nor in 1907 (see Table A8). Yet, average business incomes were significantly higher in equal division areas (column 1 in Appendix Table A17). This lends plausibility to our suggested occupational choice mechanism, which we explore in more detail in Section 6. As we will demonstrate in the following, the entrepreneurial activities emerging in equal division areas during the transition phase from an agricultural to industrial economy provided the ground for more dynamic economic activities in the long-run.

5.2 Long-Term Effects of Equal Division: Modern Outcomes

Here, we show that the equal division of land practiced over centuries had persistent effects through a greater supply of entrepreneurs in these areas. Higher average incomes in equal division areas today coincide with a right-shifted distribution of skill, income and wealth.

Average Income Table 2 shows that inheritance rules had persistent effects on average income, which are positive, highly statistically significant, and robust across all specifications. The results are robust to allowing the slope to vary on either side of the inheritance regime border (Table 2 Panel D) and to varying the distance to border (Figure 5). Further, the effects are robust to using the quadratic polynomial including interactions between longitude, latitude and distance to border (see Appendix Table A5). The magnitudes for all income measures are around 45 percent of a SD (except for median income at about 27 percent). Household income and taxable income is about 6 percent higher in equal division counties, while GDP pc is about 14 percent higher. The difference between these income measures indicates that more income is produced than distributed in equal division areas. In other words, some share of equal division counties' GDP might flow to commuting residents of unequal division areas.

Firms, Human Capital and Productivity Results on firms, educational outcomes, productivity and industry structure (Table 4) provide a first hint as to

why these large differences in income might have emerged. There are more firms present (particularly small firms) in equal division counties, and the percentage of the population with a college degree is about three percentage points higher (see Table 4). Simultaneously, the share of people with a vocational degree is lower, while the share of people without a degree does not differ (not shown). Additionally, equal division counties have higher employment in the trade and service sector and particularly in creative industries. Equal division counties reveal significantly higher labor productivity measured as GDP per hour worked. These differences suggest that human capital and industry structure contribute to the large income differences today.

Wealthy entrepreneurs The greater presence of entrepeneurs in equal division counties is also reflected in income and wealth distributions documented by tax records. Top incomes are significantly higher in equal division counties, as shown in Table 3. We find that the top decile and the top percentile in equal division counties earn 9-14 percent more than their counterparts in unequal division counties. This means that the income gap *between* equal and unequal division areas exists for average income earners *and* for top income earners.

Income concentration *within* equal division counties is significantly higher, what again speaks to the greater presence of entrepreneurs. As business owners typically earn higher incomes than their employees, a higher population share of business owners mechanically increases income concentration at the top. Across all counties, the top 10% earn 37 percent of total income and the top 1% earn 11 percent. In equal division areas, the top 10% income share is about two percentage points higher and the top 1% income share is about one percentage point higher. These magnitudes are around 30 percent and 45 percent of a SD, respectively.[22]

The last collection of the German wealth tax in 1995 shows that equal division areas are the home of about 35 more wealth-tax payers and about seven more

[22]The share of low-income households is lower in equal division counties. More precisely, there are fewer households in equal division counties who belong to the bottom 40% ($<$ €20.000) or bottom 20% ($<$ €10.000) of the national income distribution, respectively. This suggests that higher income concentration at the top in equal division countries does not come at the expense of lower bottom incomes.

millionaires per 10.000 inhabitants, on average (see the last two columns of Table 3). These magnitudes correspond to around 60 percent of a SD. If tax data document higher top incomes and wealth in equal division areas and firm data show more firms, then the entrepreneurs owning these more numerous firms must have their primary residence (and be taxable) in the county.

6 Occupational Choice Mechanism

Why do equal division counties enjoy higher income, wealth and education levels today? Our results support an occupational choice mechanism, through which landholding inequality may have affected long-term outcomes. A class of models hypothesizes that a more equal distribution of wealth may increase long-term growth by giving broader parts of the population the chance to become skilled workers or entrepreneurs (see, e.g., Galor & Zeira 1993, Banerjee & Newman 1993, Ghatak & Nien-Huei Jiang 2002, Galor & Moav 2004). Compared to a situation in which a large part of the population has essentially no wealth, a more even distribution of wealth can provide a buffer to absorb the potential risks of becoming an entrepreneur, investing in human capital, or innovating, or it can alleviate credit constraints in parts of the population, all of which have favorable consequences for growth.[23] Additionally, a more equal wealth distribution might induce individuals to take greater risks if they care for their relative status (Robson 1992).

Equal division provided *all* children with a piece of land or with some compensation for leaving the land to one of the siblings. At the same time, the small and fragmented peasant holdings often required to engage in industrial by-employment as compensatory strategy (Herrigel 2000). Owning land, and potentially a house,

[23] Analyzing deposits and credits from local savings banks, we do not find evidence for less formal credit constraints in equal division no significant differences between equal and unequal division areas in loans granted by savings banks (*Sparkassen*) or credit associations (*Kreditvereine*) in 1895 and 1907 (see Table A16). But most of the literature on industrialization in South-West Germany stresses the enduring importance of private, informal lending (see Fischer 1972) with the financial market in 19^{th} century Germany still in its infancy. On average, every fifth person held a savings account at a savings bank in 1895, which increased to every fourth person until 1907 (see Table A16). In 1907, average deposits at savings banks amounted to less than a third of average annual income.

enabled children of equal division areas to work in their own domestic workshop (Lerner 1965, p.211). Providing all children with some form of inheritance increased the pool of potential entrepreneurs in equal division areas compared to unequal division areas. Recall that in unequal division areas, one son inherited the farm. His siblings mostly stayed as farm hands because they received little or no compensation, which would have enabled them to start a living elsewhere (Cole & Wolf 1995).

Throughout the process of industrialization, the domestic workshops of equal division farmers became more specialized. They evolved from satisfying the local demand for textiles, furniture, watches, soap, perfume, washing soda, fertilizer and artificial colors to producing more advanced machinery and chemicals. After World War I, the car and supplier industry and electronics developed in these regions (Eiler 1984, Lerner 1965). The entrepreneurial businesses and cultures that the equal division farmers created, in turn, provided the ground for long-term economic growth and shaped Germany's industrial geography. In the following, we show evidence for both incentives and opportunities for farmers to innovate and, ultimately, become entrepreneurs.

6.1 Incentives for Industrial By-Employment

The smaller land parcels in equal division areas were often not large enough to nourish a family. Eiler (1984, p.81) provides an account of how household labor allocation switches from agriculture to by-employment as land parcels become smaller. 3-5 ha would provide enough for a family; 2-3 ha provided a share, but some family members would have to engage in by-employment; families with less than 2 ha would have to dedicate at least half of the family work to industrial by-employment. On average, ca. 22% of the farms in equal division areas were smaller than 5 ha and ca. 8% were smaller than 2 ha (see Appendix Table A2).[24]

[24]Pfister (2004) assembled examples of household labor allocation in the canton of Zürich in 17th and 18th centuries that show family members working either on the farm or in by-employment like spinning cotton or weaving (see Appendix Figure A3).

Our data reveal that (innovative) manufacturing was indeed a function of farm size: Interacting farm size with the equal division indicator, we find a significant additional effect of farm size on (innovative) manufacturing (columns 3 (6) of Table 5). Soil quality is another indicator for by-employment incentives. The lower the soil quality in equal division areas, the higher was employment in (innovative) manufacturing in equal division areas (see columns 2 (5) of Table 5). Finally, significantly more patents were filed in equal division areas of our border sample if soil quality is lower (see columns 8, 10 and 12 of Table 5). We will discuss the role of innovation in more detail in the following.

6.2 Opportunity for Innovation and Entrepreneurship

Entrepreneurship Our evidence shows that farmers became businessmen: First, we find that per capita business incomes recorded in local income tax statistics are significantly higher in equal division areas in 1907 (see Table A17). Today, residents of equal division areas earn more and are wealthier than their counterparts in unequal division areas (see Table 3). Note that modern top incomes and top wealth stem from entrepreneurship. Second, self-employment out of agriculture in 1925 was significantly higher in equal division countries (see Table A18).[25] Huning & Wahl (2021*a*) highlight that equal division areas became cities' extended workbenches as new factories were set up in equal division areas to employ workers from small domestic workshops (putting-out system). But even if some of the firms in rural equal division areas belonged to investors from the city, this does not exclude farmers to also become entrepreneurs. Quite the opposite, the emergence of externally-funded factories might have provided an inspiration for entrepreneurial activities and likely extended the local network of potential suppliers and clients.

[25] Additionally, there is some weak evidence that the density of middle schools and the share of middle-school pupils is slightly higher in equal division counties. These schools were primarily attended by students who wanted to become an apprentice in a particular trade. These additional results are not robust across specifications and the effects are only imprecisely estimated but are broadly consistent with landholding inequality affecting longer-term outcomes through occupational choice.

Innovation The effect of equal division on innovative employment and patents is presented in Table 5. Employment in innovative branches of manufacturing was two to three percent higher in equal division areas (columns 1-6 of Table 5), which is sizable given that about 7% of the rural population was employed in manufacturing at the time. We distinguish between 163 occupations in manufacturing in 1907 and follow Streb et al. (2006) who categorize metal working, industry of machines and instruments, chemical industry, printing, and photography as innovative branches based on the number of patents between 1877 and 1914. According to (Atack, Margo & Rhode 2022), these sectors showed both the highest degree of mechanization as well as productivity differences between hand and machine labor analyzing the 1899 U.S. Commissioner of Labor report. Given that the coefficients for innovative employment (Table 5) and for total employment in manufacturing (Table 6) are of similar magnitude, we conclude that the additional employment in manufacturing comes almost entirely from occupations in innovative branches. The number of firms pc in innovative sectors like chemicals, machinery, and printing was significantly higher in equal division areas of our border sample in 1895, while the total number of firms did not significantly differ between the two regimes.

Patent data of Streb et al. (2006) provide further evidence that innovative activity was higher in equal division counties from 1877 to 1914 (columns 7-12 of Table 5). The positive correlation holds when using an indicator variable for having filed a patent in that time, using a log of the total number of patents[26] to include only counties with patenting activity, and when using the log total number of patents including the counties with no patenting activity as zeros. The magnitude is quite large at about a third of a SD.

6.3 Earlier Industrial Take-off

As a result of the above factors, we observe an earlier industrial take-off in equal division counties: Equal division areas exhibit significantly lower agricultural em-

[26]Using the log is necessary as there are some counties with extreme outliers in patenting activity compared to the other counties. While the 50^{th} percentile of filed patents is 1, the 99^{th} percentile lies at 123 patents and the maximum is 913 filed patents between 1877 and 1914.

ployment and higher manufacturing employment in 1895 and this gap opens even further until 1907. Table 6 reveals that the coefficient of manufacturing amounts to about a quarter of a SD and increased by 35 percent of a SD from 1895 to 1907. The economic gap between equal division and unequal division counties widened during the interwar period. Figure 6 shows that per capita revenues of the payroll tax, income tax, turnover tax and wealth tax were significantly higher in equal division counties in almost all years from 1926 to 1938 and increasingly so. Drawing on county-level GDP per capita, which become available from the statistical office in the late 1950s, we show that the income gap further increased in the post-war period and then stabilized at around 15% (Figure 7).

6.4 Small and Flexible Firms

Our evidence highlights the importance of small and flexible firms, which is another long-term result of industrial by-employment in equal division areas. Today, firms in equal division areas are smaller, on average (see column 9 of Table 4) and more productive at the same time (see column 7 of Table 4). Herrigel (2000) emphasizes that small- and medium-sized German firms proved able to adapt to the accelerating pace of product and technological change of the new world market conditions in the 1980s, when the era of mass production in post-war Germany came to an end.[27] Streeck (1991, pp.27) identifies two factors contributing to the long-run economic success of Germany's small- and medium-sized firms. First, the "customisation of products, differentiation of product ranges and high product quality" provided shelter from price competition. Second, the "close, privileged and trust-based cooperation" which is needed in high product diversity industries, because small firms are competitors and potential allies at the same time. We argue that the equal division of inheritances represents a social institution that might have contributed to more trust-based cooperation.

[27]See, for example, Boch (1997) on the production of cutlery around the equal division city of Solingen, which can be seen as a "classical" example of a historical industrial system based on "flexible specialization."

6.5 Robustness Checks

We finally assess whether the long-term relationship between equal division inheritance and long-term outcomes might be spurious and driven by other long-term differences between equal and unequal division inheritance counties.

We first show that equal division counties did not have significant advantages in economic development before industrialization started in the mid 19^{th} century. The large income gaps between equal and unequal division counties today might be driven by unobserved characteristics which have made equal division counties better off ever since. As measures for pre-industrial wealth and development are rare and hardly available at a geographically disaggregated level for the whole German territory[28], we draw on different data sets and subsamples that provide evidence that equal division counties were not better off until the end of the 19^{th} century. Our analysis includes five observable determinants of long-term growth: (1) agricultural productivity measured directly by potential caloric output per hectare per year, average farm sizes, and Prussian grain yields; (2) long-run economic development which is examined by population density data across Germany (3) early economic progress by Prussian census data; human capital development as covered by Prussian educational censuses.

Second, we investigate if migration flows to the cities had a differential impact by inheritance regime. Our data reveal that innovation in cities did not differ between equal and unequal sharing areas.

Agricultural Productivity We test whether equal division counties had more favorable conditions for agriculture that might have contributed to different long-term development trajectories. An index of caloric output per hectare per year before the year 1500 constructed by Galor & Özak (2016) is the outcome variable in column 1 of Table A11. Although the coefficient is positive, it is not robust to the inclusion of controls and vanishes in the RD specification. In addition to differences in land, there might be discrepancies between potential productivity of

[28]Germany was split into independent kingdoms and principalities until German unification in 1871.

land and realized output. In column 2 we draw on data on grain yields from Prussia in 1878 which show slightly lower yields in equal division counties, although the difference is far from being economically or statistically significant. These results provide evidence for the hypothesis that agricultural productivity was similar in equal division and unequal division counties.

Long-Run Economic Development Long-term data with direct evidence on levels of economic development is scarce so we draw on urban population data for Germany from year 1500 onwards based on Bairoch et al. (1988) to assess measures of development before the Industrial Revolution in equal and unequal division areas. We find that the density of urban population developed similarly in equal and unequal division areas (Figure A2). A potential objection to the use of urban population data in the context of our study might be that rural population density could be a better measure for development in the context of agricultural inheritance rules. In Table A11 columns 3 and 4, we show that population density in Prussia in 1816 and across the entire German empire in 1895 was not higher in equal division counties, but we can detect relative increases by 1907 (column 5). This density increase 1895-1907 is significantly higher in equal division counties (column 6) which is, however, driven by counties which surround independent cities. Excluding these counties from the sample eliminates statistical significance.

To cross-check the results from population density measures, we can compare fertility rates between the two inheritance regimes. One might expect higher fertility in equal division areas because inherited land put a larger share of adults into the position to start a family. Analyzing the birth rate in German counties in 1894, 1895 and 1896, shows that equal division areas had one birth more per 1,000 inhabitants (see Table A14). However, the effect is only significant if we restrict the sample to the border sample and if we allow the slopes to vary on either side of the border (Panel D). For this specification, the difference increases to 1.8 additional births in equal sharing areas. This finding matches the more rapidly growing population density between 1895 and 1907. One should note that this fertility surplus is small and compares to today's birth rate difference between Germany and Switzerland.

Outmigration might have absorbed some of this small fertility surplus. Analyzing the share of outmigration to the United States in the 1880s, we find a small positive, but insignificant effect for equal sharing areas (see Appendix Table A13).

Early Industrialization Data on the number of factories, mills, and looms in Prussia 1821 shed light on the economic situation of equal division counties before industrialization started.[29] The industrial take-off of Germany is generally dated to the period 1840-1870. Table A11 shows that there are hardly any significant differences between equal and unequal division counties in Prussia in 1821. If anything, coefficients are negative for the density of factories, mills, and looms, suggesting that adoption of new technologies must have started later than 1821. Although Prussia had only very few equal division counties, Table A9 shows that our main results on land inequality also hold in a subsample of (historical) Prussia.

Human Capital We rely on Prussian educational censuses which document the number of schools, students, and literacy rates early on to shed light on the human capital stock and development in equal and unequal division counties. Table A12 reveals that the percentage of people who could read and write and the percentage of illiterate people were not significantly different between equal and unequal division counties in 1871 when including our controls or RD approach. There are no differences between equal and unequal division counties in school density or pupils in pre-industrial 1816 or in 1886 which falls into the period of high industrialization (1870-1914).

Migration Flows Did the landless sons of unequal division farms move to the cities and become innovative entrepreneurs there? If so, we would overestimate innovation and entrepreneurship in rural equal division areas during industrialization. As stated above, population density was indeed slightly higher in unequal division cities. But comparing innovation between equal to unequal division cities in Appendix Tables A20 and A19 does not confirm such a hypothesis. The sign of

[29] More information about Prussian census data is given in Becker et al. (2014).

the coefficients points at more innovative employment and less patents in unequal division cities, but these differences are not statistically significant.

Did the landless sons of unequally divided farms move to equal division areas (cities or countryside), instead of unequal division cities? We would expect such migration patterns if equal division areas created more firms and more jobs over the path of industrialization. As stated above, we find some evidence for such migration flows to counties which surround independent cities between 1895 and 1907 (see Table A11).

Bringing the results on agricultural productivity, population, early industrialization, and education together, reveals that equal division counties did not have more advantageous starting conditions than unequal division counties before the Industrial Revolution. This allows us to rule out a broad class of potential confounders that could have contributed to the large differences in outcomes we observe in 2013. We can rule out that the migration of sons from unequal division areas to cities contributed to different innovation patterns during industrialization.

7 Conclusion

In this paper, we present long-term consequences of spatial variation in a historical institution, namely agricultural inheritance rules which regulated the distribution of land in Germany since the Middle Ages. Agricultural inheritance rules vary between unequal division where land is indivisible and is passed on to a single heir and equal division of land among all siblings. We have found that equal division counties had historically lower landholding inequality. This lends support to the canonical theoretical models on inheritance rules and inequality predicting less inequality under an equal division regime than under primogeniture (Stiglitz 1969, Blinder 1973, Pryor 1973, Menchik 1980). We found no evidence for advantages conferred by equal division before the advent of industrialization, which occurred relatively late in Germany taking off in the middle of the 19^{th} century. In sharp contrast, we find positive effects of equal division on long-term productivity and income.

We find evidence indicating that the equal division of land spurred industrial by-employment, in particular in innovative and entrepreneurial activities.

Our evidence lends support to models in which a more equitable distribution of wealth can spur occupational upgrading and the decision to become an entrepreneur (see, e.g., Galor & Zeira 1993, Banerjee & Newman 1993, Ghatak & Nien-Huei Jiang 2002, Galor & Moav 2004). The more equal distribution of land – the key store of wealth in 19^{th} century Germany – enabled broad parts of the population to engage in entrepreneurial activities, what provided the breading ground for today's innovative *Mittelstand* and shaped Germany's industrial geography. Equal division of land proved to be an inclusive economic institution in the long run.

Which may initially surprise, higher long-term growth in equal division areas has resulted in a more dispersed distribution of income and wealth. At least two channels may have contributed to turn a more even historical distribution into a more uneven distribution today. First, family firms are unlikely to be equally divided among siblings. The desire to leave the business intact in the hands of a single descendant may induce firm owners to give a higher portion of the firm to one child that will take over control of the firm. A larger portion assigned to the controlling heir of the family firm alleviates credit constraints if capital markets are imperfect and, thereby, expand the firm's ability to invest (Ellul, Pagano & Panunzi 2010). Second, large inheritances – here in the form of businesses – are more likely to persist over time, while smaller inheritances are depleted through increased consumption (Nekoei & Seim forthcoming).

We close with several reflections on the institutional context and potential limitations of our study. Our evidence lends support to the idea that the long-term consequences of institutions are context-dependent and may be particularly important at critical junctures (Acemoglu, Johnson & Robinson 2005): while equal division and a more equitable distribution of land did not appear to confer advantages before industrialization, they turned out to be an important mediator of the path of industrialization across German regions. A limitation of our study is that while geographic variation in inheritance rules is sharp and local, the origins of differences in inheritance rules are not fully understood and institutional differ-

ences have existed for centuries before we observe crucial differences in the paths of industrialization.

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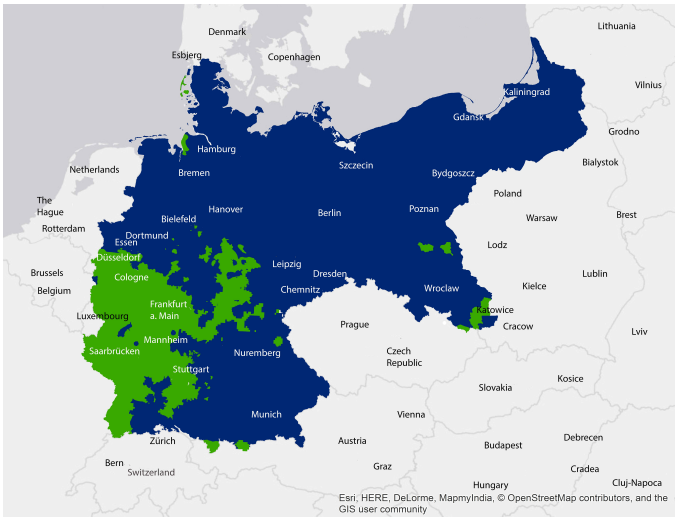
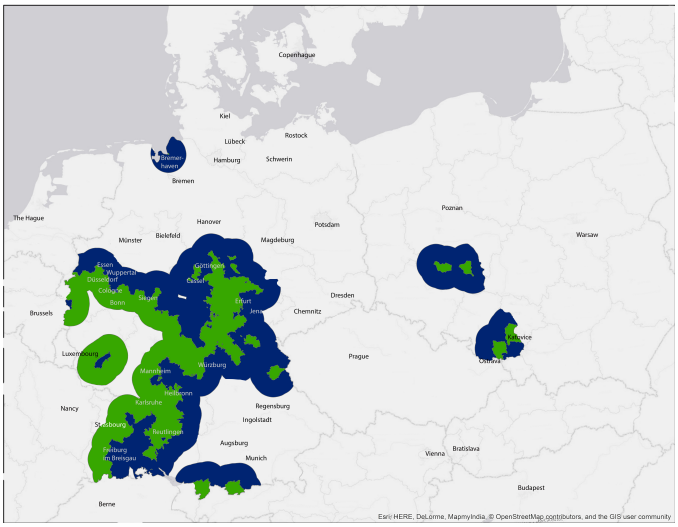
Figures and Tables

Figure 1: Prevalence of Inheritance Rules: Equal and Unequal Division

(a) German Empire

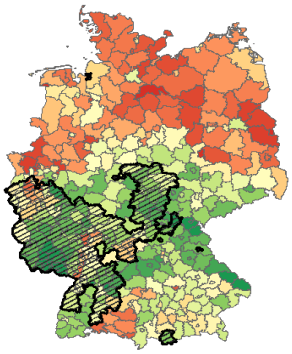


(b) Regression Discontinuity Sample: Areas Within 35 km of Inheritance Regime Border

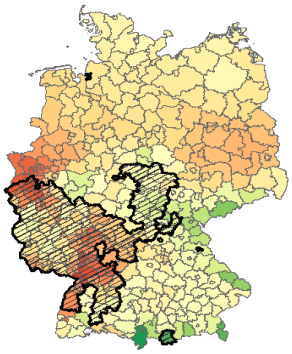


The figure shows a map of the prevalence of inheritance rules in the German Empire. Dark blue denotes areas with unequal sharing or indivisibility of land. Green denotes areas with equal sharing of land among children. Panel (b) plots areas less than 35 km away from the nearest border with the opposite inheritance regime; the corresponding counties constitute our regression discontinuity sample.

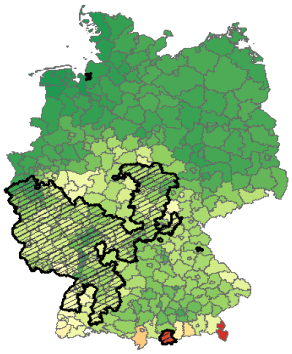
Figure 2: Inheritance Rules and Geography



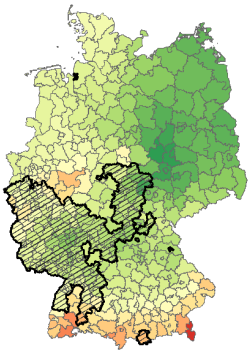
a) Share of loam, sand and silt



(b) Temperature



(c) Roughness

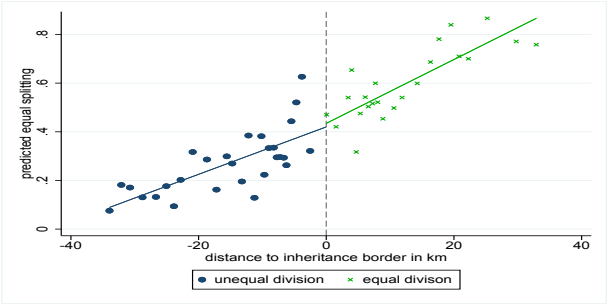


(d) Precipitation

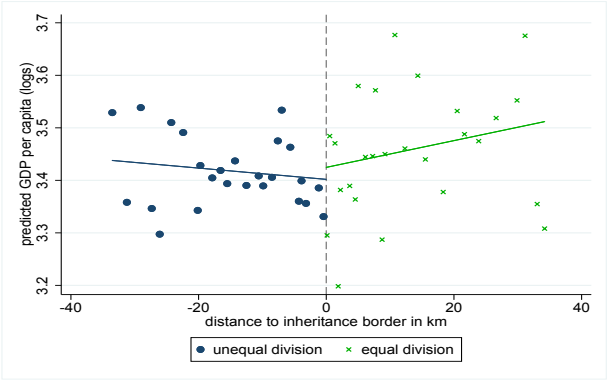
Note: The figure shows a map of the prevalence of inheritance rules in the German counties in modern borders. Share of loam, sand and silt, temperature, roughness and precipitation increases from green to red.

Figure 3: Predictors of Equal Division and Long-Term Development Are Smooth at the Border

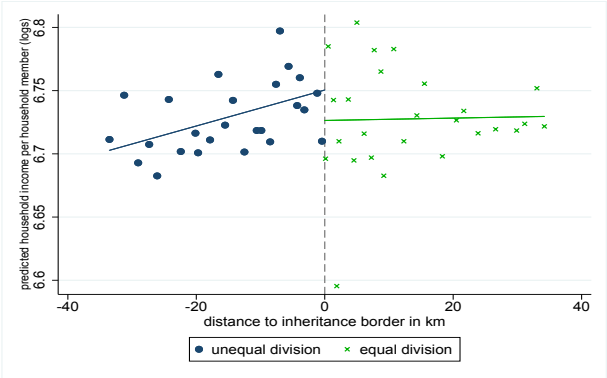
(a) Outcome: Equal Inheritance Predicted Based on Covariates



(b) Outcome: Ln GDP Per Capita (2013) Predicted Based on Covariates

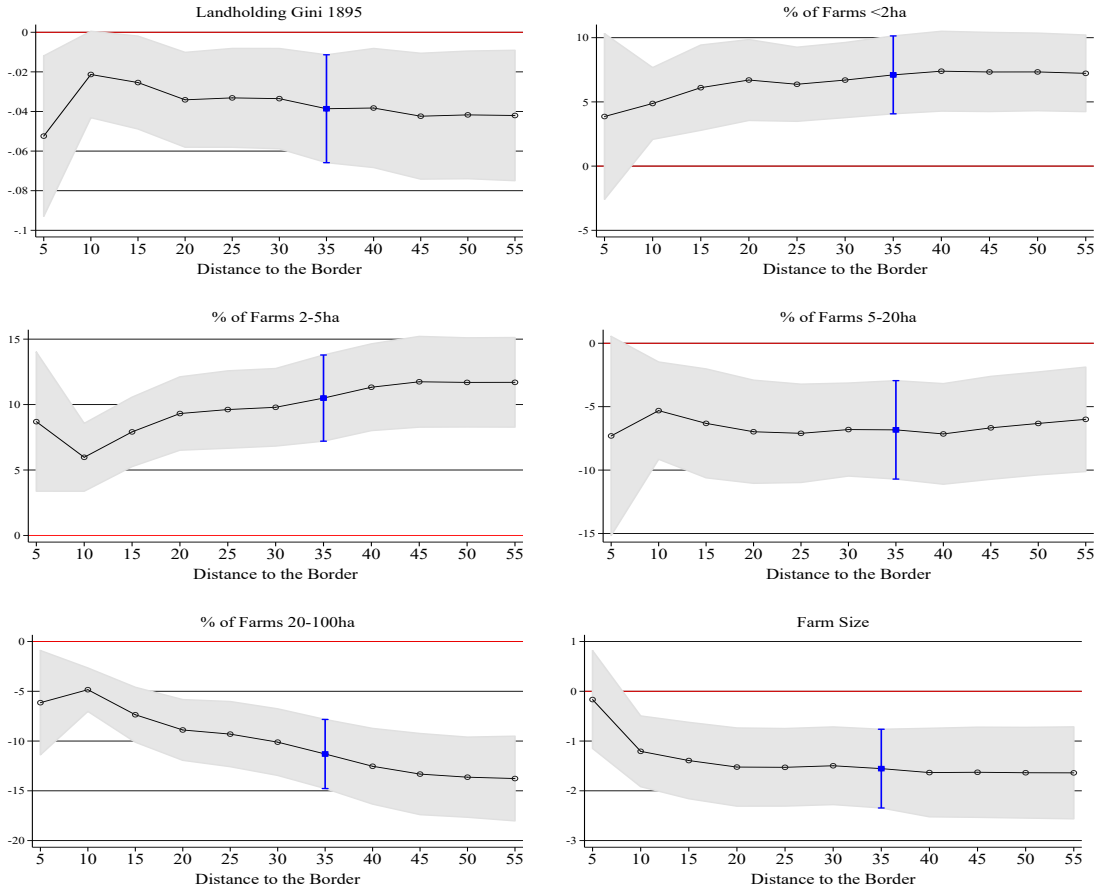


(c) Outcome: Modern Ln Income Per Capita (2013) Predicted Based on Covariates



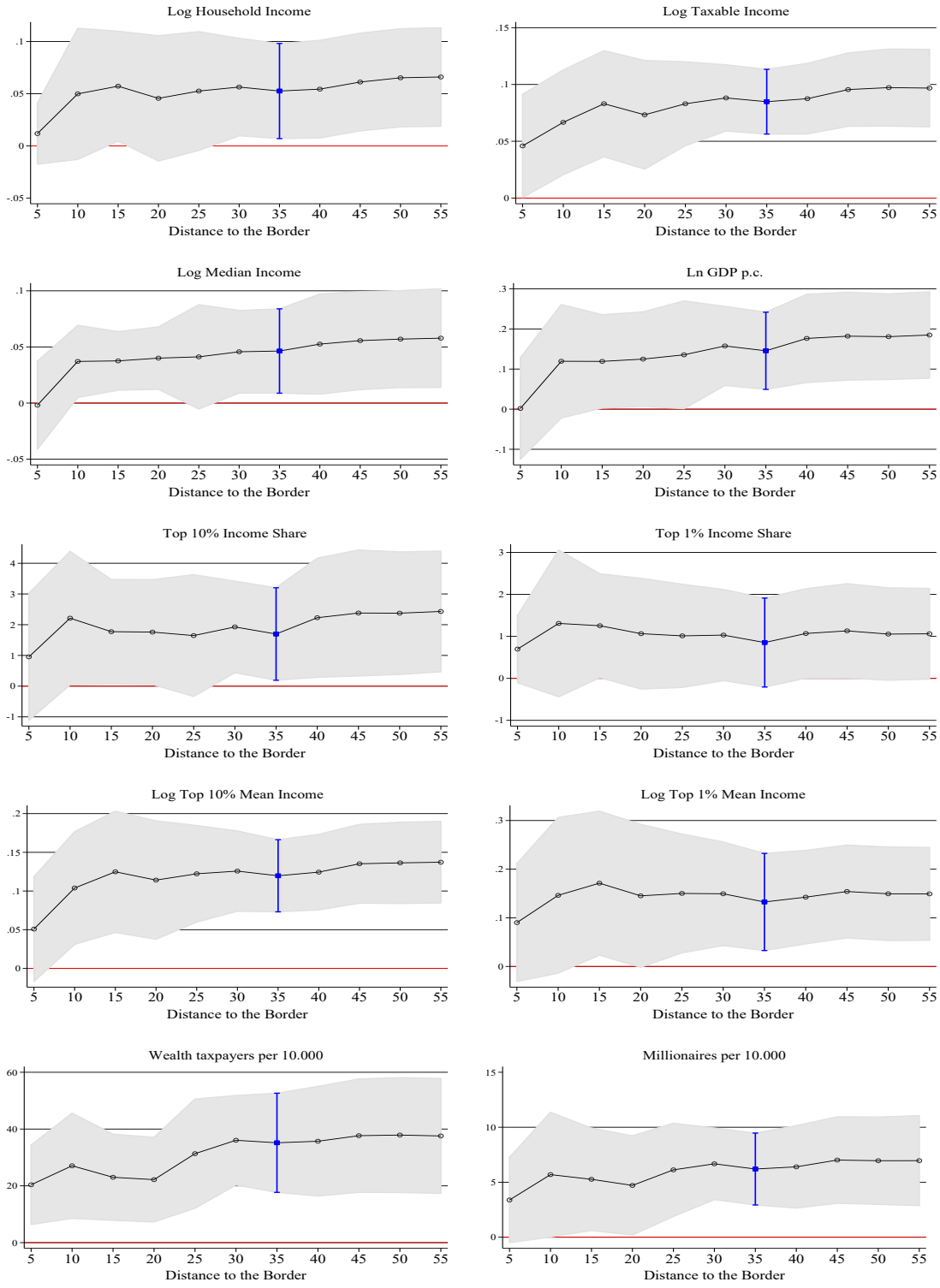
Note: The figures plot regression discontinuity specifications using binned scatter plots and local polynomial specification in a 35 km bandwidth. The running variable is distance to the nearest inheritance regime change border. The outcome variables are *predicted* based on the control variables reported in Table A1. The outcome variable in panel (a) is an indicator for a county having an equal division inheritance regime, the outcome variable in panel (b) is the logarithm of GDP per capita in 2013, the outcome variable in panel (c) is average log household income per household member in 2013.

Figure 4: RD Results by Distance to the Border: Historical Inequality



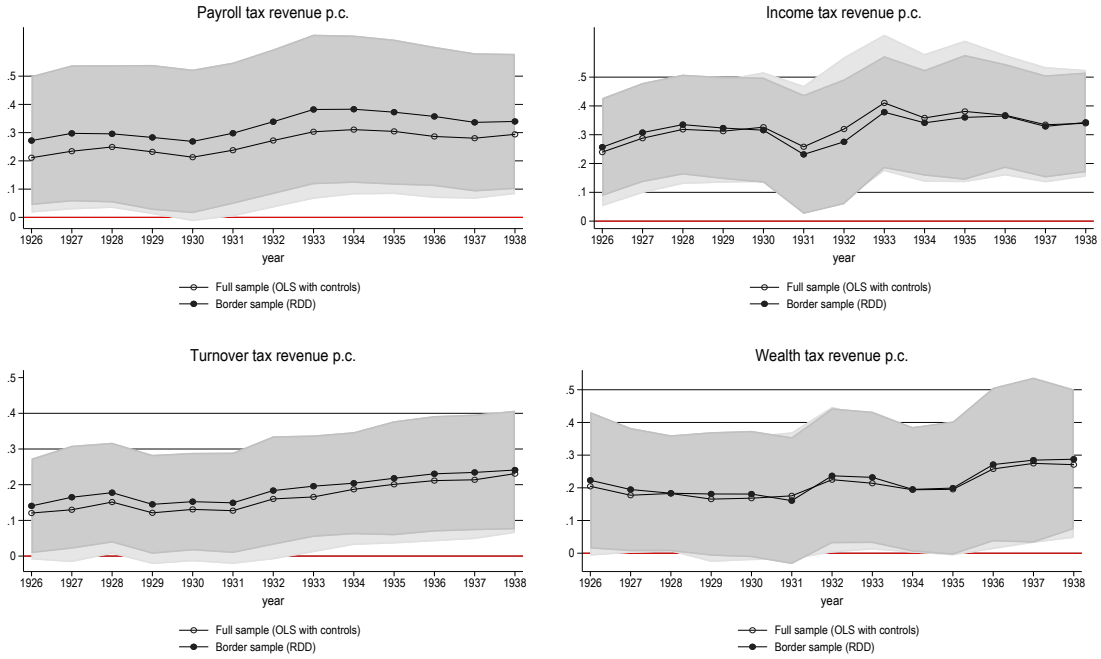
Note: The figure plots the effect of equal division on the outcome reported in the title of the figure. The sample is reduced to counties near the border of the inheritance rule varying distance to the border.

Figure 5: RD Results by Distance to the Border: Modern Income and Inequality Measures



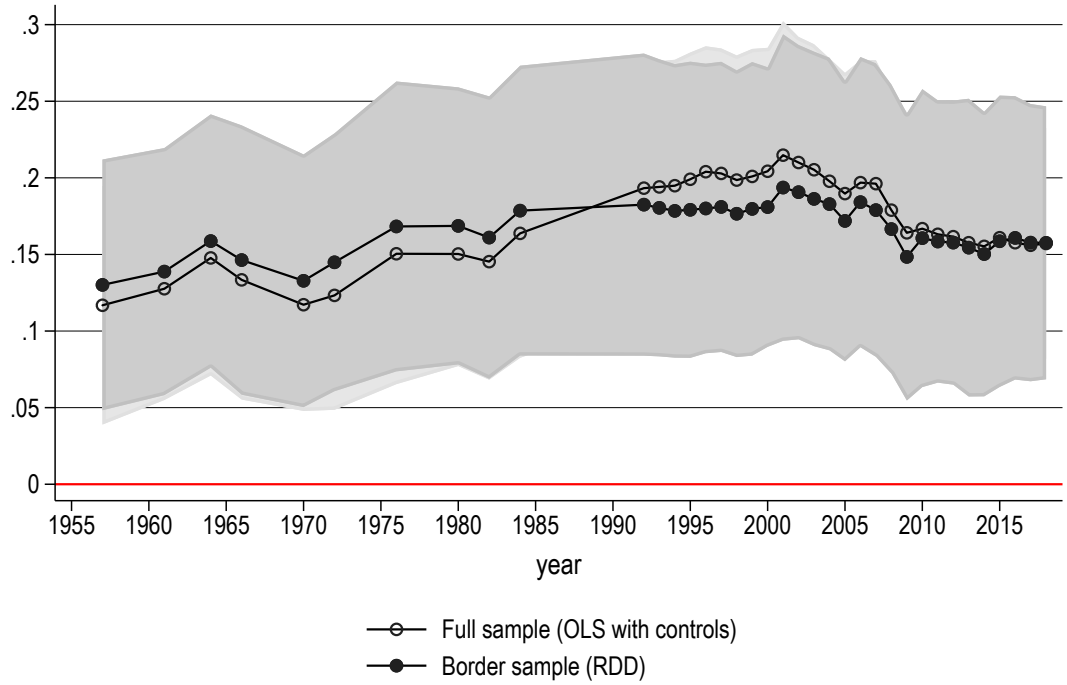
Note: The figure plots the effect of equal division on the outcome reported in the title of the figure. The sample is reduced to counties near the border of the inheritance rule varying distance to the border.

Figure 6: Economic Gap Between Equal and Unequal Division Areas, 1926-1938



Note: The figure plots the effect of equal division on the outcome reported in the title of the figure. Tax revenue data per capita are from Brockmann, Halbmeier & Sierminska (2022). County borders are in current borders using the geographical harmonization method described in Brockmann et al. (2022).

Figure 7: GPD PC Gap Between Equal and Unequal Division Areas, 1957-2018



Note: The figure plots the effect of equal division on GDP per capita, which is collected from various national account publications of the German statistical office and the statistical offices of the Laender. County borders are in current borders using the geographical harmonization method described in Brockmann et al. (2022).

Table 1: Equal Division and Landholding Inequality 1895

	Landholding Gini 1895		% of Farms in Size Category				Farm Size	Number of Farms
	(1) Linear RD Poly.	(2) Quad. RD Poly.	(3) <2 ha	(4) 2-5 ha	(5) 5-20 ha	(6) 20-100 ha	(7) in ha	(8) per 1000 Inhabitants
Panel A. OLS								
Equal Division	-0.0382**	-0.0353*	7.280***	11.87***	-1.863	-17.89***	-1.866***	4.787
	(0.0181)	(0.0198)	(1.346)	(1.502)	(2.125)	(2.168)	(0.545)	(7.004)
	[0.0131]	[0.0143]	[0.964]	[1.581]	[2.324]	[1.646]	[0.293]	[4.985]
Observations	931	931	930	930	930	929	927	931
Panel B. With Controls								
Equal Division	-0.0537***	-0.0505***	6.835***	11.07***	-3.830*	-13.36***	-1.573***	8.756
	(0.0124)	(0.0126)	(1.019)	(1.546)	(2.104)	(1.691)	(0.269)	(6.618)
	[0.00995]	[0.0103]	[0.969]	[1.589]	[2.048]	[1.436]	[0.240]	[5.204]
Observations	931	931	930	930	930	929	927	931
Panel C. Distance to Border								
Equal Division	-0.0459***	-0.0500***	5.798***	9.512***	-5.046***	-10.29***	-1.246***	5.874
	(0.00939)	(0.00986)	(1.021)	(1.592)	(1.683)	(1.618)	(0.164)	(5.750)
	[0.00919]	[0.00891]	[1.003]	[1.582]	[1.855]	[1.492]	[0.194]	[4.917]
Observations	397	397	394	394	394	393	391	397
Panel D. Distance to Border × Equal Division								
Equal Division	-0.0323***	-0.0337***	3.287**	6.445***	-4.510**	-4.355**	-0.708**	6.111
	(0.0119)	(0.0121)	(1.505)	(1.929)	(2.105)	(2.004)	(0.265)	(6.583)
	[0.0111]	[0.0114]	[1.220]	[1.920]	[2.302]	[1.583]	[0.207]	[6.288]
Observations	397	397	394	394	394	393	391	397
mean outcome	0.716	0.716	8.242	13.34	33.84	27.08	5.997	127.7
SD outcome	0.123	0.123	7.031	10.69	15.04	16.06	3.318	45.65

Notes: Share of farms in 5 size categories as stated in 'Statistik des Deutschen Reichs' Vol. 109. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Table 2: Equal Division and Income Measures 2013

	(1) Log Household Income	(2) Log Taxable Income	(3) Log Median Income	(4) Log GDP p.c.
Panel A. OLS				
Equal Division	0.0690***	0.0726***	0.0499**	0.133**
	(0.0236)	(0.0205)	(0.0186)	(0.0562)
	[0.0174]	[0.0211]	[0.0142]	[0.0324]
Observations	397	374	397	397
Panel B. With Controls				
Equal Division	0.0617***	0.0637***	0.0446***	0.144***
	(0.0193)	(0.0195)	(0.0103)	(0.0379)
	[0.0145]	[0.0177]	[0.0138]	[0.0369]
Observations	397	374	397	397
Panel C. Distance to Border				
Equal Division	0.0572***	0.0663***	0.0438***	0.143***
	(0.0167)	(0.0168)	(0.00986)	(0.0481)
	[0.0146]	[0.0179]	[0.0127]	[0.0452]
Observations	198	178	198	198
Panel D. Distance to Border × Equal Division				
Equal Division	0.0463*	0.0492**	0.0317**	0.112*
	(0.0242)	(0.0221)	(0.0147)	(0.0573)
	[0.0192]	[0.0221]	[0.0134]	[0.0576]
Observations	198	178	198	198
Mean Outcome	6.719	3.461	7.956	3.447
SD Outcome	0.115	0.146	0.162	0.336

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. Data on income and GDP per capita stem from the Federal Statistical Office of Germany and INKAR of 2013/14. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. Five large urban counties with more than 1 mio. inhabitants (Berlin, Cologne, Hamburg, Hannover, and Munich) are excluded (402-5=397 counties). Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Table 3: Equal Division and Inequality Measures 2013 and 1995

	(1) top 10% inc. share (%)	(2) top 1% inc. share(%)	(3) log mean income top 10%	(4) log mean income top 1%	(5) share with inc. $< 10.000 Euro$	(6) share with inc. $< 20.000 Euro$	(7) Wealth taxpayers per 10.000	(8) Millionaires per 10.000
Panel A. OLS								
Equal Division	2.282**	0.847	0.105***	0.102*	-1.433*	-1.523*	34.92***	6.258***
	(0.874)	(0.566)	(0.0324)	(0.0580)	(0.809)	(0.769)	(8.454)	(1.990)
	[0.579]	[0.368]	[0.0299]	[0.0401]	[0.785]	[0.781]	[8.863]	[1.605]
Observations	395	395	395	395	395	395	319	319
Panel B. With Controls								
Equal Division	2.071***	1.141**	0.0954***	0.131**	-1.235*	-1.331*	35.16***	7.504***
	(0.629)	(0.485)	(0.0268)	(0.0514)	(0.705)	(0.682)	(10.55)	(1.945)
	[0.618]	[0.368]	[0.0266]	[0.0391]	[0.716]	[0.738]	[8.482]	[1.579]
Observations	395	395	395	395	395	395	319	319
Panel C. Distance to Border								
Equal Division	1.656**	1.158**	0.0861***	0.135***	-1.443*	-1.525*	30.97***	6.403***
	(0.751)	(0.541)	(0.0217)	(0.0466)	(0.817)	(0.783)	(10.78)	(1.774)
	[0.789]	[0.455]	[0.0258]	[0.0416]	[0.803]	[0.808]	[10.01]	[1.870]
Observations	196	196	196	196	196	196	172	172
Panel D. Distance to Border × Equal Division								
Equal Division	2.102*	1.518*	0.0744**	0.137*	-0.422	-0.610	16.21*	4.466**
	(1.030)	(0.758)	(0.0308)	(0.0670)	(1.205)	(1.115)	(9.154)	(2.141)
	[0.920]	[0.596]	[0.0298]	[0.0528]	[0.954]	[0.971]	[10.89]	[2.473]
Observations	196	196	196	196	196	196	172	172
Mean Outcome	37.37	10.98	11.69	12.76	36.71	50.90	150.4	22.14
SD Outcome	5.034	2.613	0.224	0.306	7.239	8.051	54.17	10.12

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. Income inequality measures calculated from 2013 income tax statistics, national accounts and population statistics of the Federal Statistical Office of Germany. Income bins are available with aggregate income per bin and number of people in that bin. Wealth inequality measures calculated from 1995 wealth tax statistics of the Federal Statistical Office of Germany. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border.Five large urban counties with more than 1 mio. inhabitants (Berlin, Cologne, Hamburg, Hannover, and Munich) are excluded (402-5=397 counties). Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Table 4: Equal Division and Education, Industry Structure and Productivity 2013

	Education		Employment					Firms	
	(1) College Degree	(2) Vocational Training	(3) Agric.	(4) Manuf.	(5) Trade and Services	(6) Creative Ind.	(7) Lab. prod.	(8) Per Pop	(9) Size
Panel A. OLS									
Equal Division	3.343***	-3.819***	-0.259***	-4.613***	4.882***	1.266***	5.149***	0.00127*	-0.387
	(0.734)	(0.940)	(0.0913)	(1.365)	(1.381)	(0.343)	(1.345)	(0.000715)	(0.387)
	[0.734]	[0.851]	[0.0850]	[1.473]	[1.495]	[0.286]	[1.131]	[0.000514]	[0.300]
Observations	397	397	397	397	397	397	395	380	380
Panel B. With Controls									
Equal Division	2.789***	-2.759***	-0.397**	-2.902*	3.300*	1.187***	3.698***	0.00205***	-0.907**
	(0.696)	(0.608)	(0.155)	(1.608)	(1.630)	(0.357)	(1.084)	(0.000594)	(0.401)
	[0.788]	[0.695]	[0.123]	[1.528]	[1.540]	[0.304]	[0.970]	[0.000615]	[0.366]
Observations	397	397	397	397	397	397	395	380	380
Panel C. Distance to Border									
Equal Division	2.388***	-2.371***	-0.326***	-1.539	1.870	1.088***	3.317***	0.00195***	-0.706*
	(0.729)	(0.634)	(0.104)	(1.970)	(1.976)	(0.388)	(1.131)	(0.000612)	(0.385)
	[0.789]	[0.658]	[0.154]	[1.962]	[2.024]	[0.349]	[0.888]	[0.000673]	[0.406]
Observations	198	198	198	198	198	198	196	183	183
Panel D. Distance to Border × Equal Division									
Equal Division	1.866*	-1.183	-0.328**	-0.0733	0.433	0.934*	1.744	0.00148*	-0.550
	(1.087)	(0.885)	(0.139)	(2.220)	(2.259)	(0.456)	(1.414)	(0.000819)	(0.485)
	[0.829]	[0.772]	[0.187]	[2.185]	[2.261]	[0.411]	[1.029]	[0.000806]	[0.494]
Observations	198	198	198	198	198	198	196	183	183
Mean Outcome	11.19	64.51	1.052	32.40	66.55	2.645	47.22	0.0261	14.41
SD Outcome	4.873	6.396	1.260	10.49	10.66	2.090	8.504	0.00355	1.983

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. Data on education and industry structure stem from INKAR data of 2013/14. Labor productivity is measured as GDP per working hour and stems from National Accounts of the Laender (`www.vgrdl.de`). Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. Five large urban counties with more than 1 mio. inhabitants (Berlin, Cologne, Hamburg, Hannover, and Munich) are excluded (402-5=397 counties). Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Table 5: Equal Division and Innovation 1877 to 1914

	Employment in Innovative Manufacturing						Patents					
	in % of Total Pop.			in % of Manufacturing Pop.			Patent Dummy		Log Patents		Log Patents w/ Zero	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A. OLS												
Equal Division	2.125**	-1.004	4.783***	3.048**	-0.904	7.180***	0.0837	0.142	0.646***	0.329	0.739**	0.671
	(0.938)	(1.372)	(1.533)	(1.383)	(1.772)	(2.512)	(0.0744)	(0.132)	(0.231)	(0.366)	(0.317)	(0.494)
	[0.854]	[1.180]	[1.657]	[1.269]	[1.759]	[2.600]	[0.0591]	[0.0786]	[0.189]	[0.297]	[0.221]	[0.294]
Equal Division x Low Soil Quality		8.249***			11.11***			-0.0997		0.873		0.393
		(2.276)			(3.264)			(0.229)		(0.604)		(0.383)
		[2.380]			[3.161]			[0.167]		[0.507]		[0.661]
Equal Division x Farm Size			-1.261***			-1.411***						
			(0.321)			(3.264)						
			[0.306]			[3.161]						
Observations	900	900	896	900	900	896	899	899	499	499	899	899
Panel B. With Controls												
Equal Division	2.358***	-0.451	5.441***	3.299**	-0.629	7.627***	0.138	0.167	0.561**	0.318	0.888**	0.910*
	(0.766)	(1.119)	(1.569)	(1.368)	(1.785)	(2.717)	(0.0837)	(0.116)	(0.226)	(0.355)	(0.344)	(0.511)
	[0.794]	[1.096]	[1.626]	[1.282]	[1.722]	[2.597]	[0.0553]	[0.0636]	[0.193]	[2.78]	[0.196]	[0.255]
Equal Division x Low Soil Quality		7.787***			10.89***			-0.0841		0.680		-0.0627
		(2.157)			(3.307)			(0.169)		(0.600)		(0.793)
		[2.056]			[2.897]			[0.128]		[0.398]		[0.499]
Equal Division x Farm Size			-1.215***			-1.302**						
			(0.367)			(0.583)						
			[0.312]			[0.485]						
Observations	897	897	893	897	897	893	899	899	499	499	899	899
Panel C. Distance to Border												
Equal Division	2.493***	-0.874	3.933**	3.207**	-2.030	4.699	0.105*	0.00365	0.472**	-0.00934	0.623**	0.0495
	(0.843)	(1.273)	(1.624)	(1.461)	(2.117)	(3.039)	(0.0582)	(0.0748)	(0.224)	(0.254)	(0.246)	(0.298)
	[0.797]	[1.247]	[2.088]	[1.353]	[2.058]	[3.375]	[0.0533]	[0.0640]	[0.165]	[0.264]	[0.163]	[0.239]
Equal Division x Low Soil Quality		9.186***			14.29***			0.275**		1.337**		1.566**
		(2.658)			(4.242)			(0.134)		(0.558)		(0.587)
		[2.399]			[3.713]			[0.134]		[0.347]		[0.512]
Equal Division x Farm Size			-0.849**			-0.746						
			(0.392)			(0.602)						
			[0.428]			[0.673]						
Observations	390	390	388	390	390	388	390	390	228	228	390	390
Panel D. Distance to Border x Equal Division												
Equal Division	2.201*	-0.885	3.789*	1.690	-3.045	3.381	0.158*	0.0714	0.529	0.102	0.644*	0.114
	(1.260)	(1.480)	(1.954)	(2.206)	(2.508)	(3.612)	(0.0938)	(0.103)	(0.348)	(0.352)	(0.358)	(0.385)
	[1.075]	[1.429]	[2.060]	[1.884]	[2.511]	[3.611]	[0.0686]	[0.0780]	[0.249]	[0.300]	[0.205]	[0.255]
Equal Division x Low Soil Quality		9.184***			14.09***			0.288**		1.376**		1.578**
		(2.718)			(4.276)			(0.133)		(0.582)		(0.595)
		[2.392]			[3.693]			[0.134]		[0.357]		[0.513]
Equal Division x Farm Size			-0.852**			-0.774						
			(0.392)			(0.617)						
			[0.427]			[0.677]						
Observations	390	390	388	390	390	388	390	390	228	228	390	390
Mean Outcome	6.874	6.874	6.865	16.177	16.177	16.168	0.669	0.669	1.979	1.979	1.994	1.994
SD Outcome	5.664	5.664	5.666	8.639	8.639	8.645	0.471	0.471	1.542	1.542	1.886	1.886

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. Soil quality is measured by the share of loam, sand and silt. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population in 1907. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

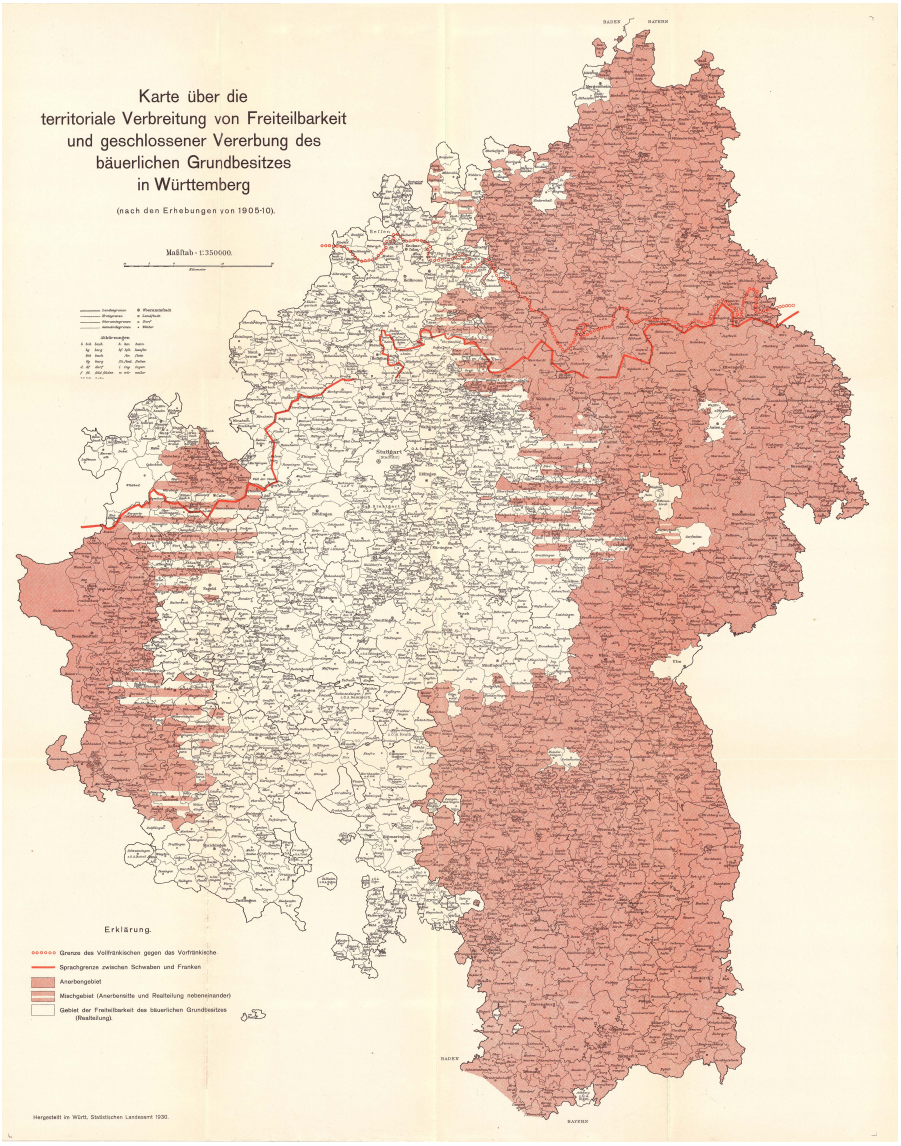
Table 6: Equal Division and Sectoral Employment and Firms 1895 and 1907

	Employment 1895			Firms 1895		Employment 1907		
	(1) Agric.	(2) Manuf.	(3) Trade and Services	(4) All	(5) Innovative	(6) Agric.	(7) Manuf.	(8) Trade and Services
Panel A. OLS								
Equal Division	-2.489	0.304	0.165	-3.499	-0.163	-3.998	1.130	0.277
	(2.085)	(1.427)	(0.174)	(2.830)	(0.171)	(2.729)	(1.507)	(0.214)
	[1.354]	[0.917]	[0.152]	[1.907]	[0.214]	[1.807]	[0.973]	[0.179]
Observations	889	889	889	879	879	900	900	900
Panel B. With Controls								
Equal Division	-2.578*	1.040	0.220*	-3.745	0.189	-4.104**	2.253**	0.309*
	(1.296)	(1.036)	(0.130)	(2.624)	(0.162)	(1.694)	(1.067)	(0.184)
	[1.256]	[0.881]	[0.130]	[2.311]	[0.217]	[1.585]	[0.907]	[0.153]
Observations	886	886	886	876	876	897	897	897
Panel C. Distance to Border								
Equal Division	-2.109**	1.577**	0.273**	-1.740	0.311*	-3.832***	2.624***	0.312**
	(1.001)	(0.767)	(0.120)	(2.239)	(0.165)	(1.308)	(0.810)	(0.154)
	[1.046]	[0.730]	[0.135]	[2.230]	[0.231]	[1.395]	[0.804]	[0.154]
Observations	382	382	382	379	379	390	390	390
Panel D. Distance to Border × Equal Division								
Equal Division	-1.729	2.031*	0.111	-2.406	0.267	-3.503*	3.434***	0.00949
	(1.223)	(1.079)	(0.193)	(2.353)	(0.182)	(1.759)	(1.256)	(0.289)
	[1.292]	[0.927]	[0.219]	[2.158]	[0.271]	[1.730]	[1.073]	[0.262]
Observations	382	382	382	379	379	390	390	390
Mean Outcome	19.190	14.560	3.428	56.623	2.052	20.359	16.471	4.208
SD Outcome	8.941	6.783	2.174	20.369	1.533	11.893	7.376	2.721

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. Employment in sectors and occupations as stated in 'Statistik des Deutschen Reichs' Vol. 109 for 1895 and 209 for 1907 as percent of total population in each district. Number of firms per 1000 inhabitants. Firms as stated in 'Statistik des Deutschen Reichs' Vol. 116 for 1895. Innovative firms include firms (*Betriebe*) in chemicals, machinery and printing. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Additional Figures and Tables

Figure A1: Illustration: Prevalence of Inheritance Rules in Württemberg, 1905-1910



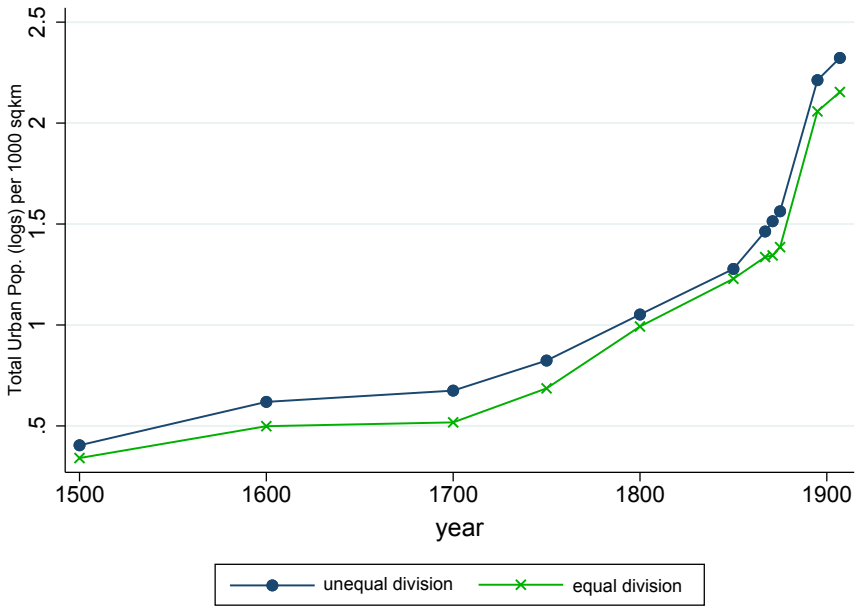
Source: The figure illustrates the local variation of inheritance rules for agricultural land in the South-Western German region of Württemberg. Areas depicted in white feature equal division rules, areas in red unequal division. The figure illustrates the fine-grained nature of the variation in inheritance rules, which traverses geographic boundaries, e.g., from one village to the next within the same county, as well as linguistic borders. To illustrate, the red line denotes the linguistic border between Swabian and East Franconian German. The figure is taken from Krafft (1930).

Table A1: Summary Statistics

		Summary statistics		T-test	
		unequal division	equal division	difference	se
Geographic Controls					
temperature in °C	mean	8.125	8.820	0.241	0.142*
	sd	(0.784)	(0.903)		
precipitation in mm	mean	59.769	61.940	-3.594	2.313
	sd	(12.345)	(8.543)		
elevation in m	mean	249.349	313.408	-45.241	23.185*
	sd	(223.019)	(159.704)		
roughness: difference in elevation	mean	3.820	6.347	0.643	0.469
	sd	(3.172)	(3.352)		
distance to navigable waterway in km	mean	25.840	20.704	-3.930	2.912
	sd	(21.606)	(16.831)		
soil characteristics					
soil: share of sand	mean	0.219	0.012	-0.096	0.033***
	sd	(0.274)	(0.074)		
soil: share of loam, sand, silt	mean	0.609	0.300	-0.145	0.053***
	sd	(0.340)	(0.269)		
soil: share of loess	mean	0.098	0.130	-0.014	0.042
	sd	(0.189)	(0.202)		
Cultural Controls					
Frankish territory in 507 AD	mean	0.093	0.473	0.275	0.075***
	sd	(0.291)	(0.500)		
protestants in %	mean	65.272	47.368	-8.317	6.709
	sd	(38.008)	(33.602)		
Hanseatic league	mean	0.404	0.103	-0.249	0.074***
	sd	(0.491)	(0.304)		
general law					
common law	mean	0.449	0.433	-0.100	0.120
	sd	(0.498)	(0.497)		
Prussian	mean	0.453	0.076	-0.236	0.085***
	sd	(0.498)	(0.265)		
Saxonian	mean	0.040	0.000		
	sd	(0.196)	(0.000)		
Code Napoleon	mean	0.015	0.371	0.329	0.095***
	sd	(0.121)	(0.484)		
Badish	mean	0.043	0.121	0.007	0.005
	sd	(0.203)	(0.326)		
observations	obs	676	224		

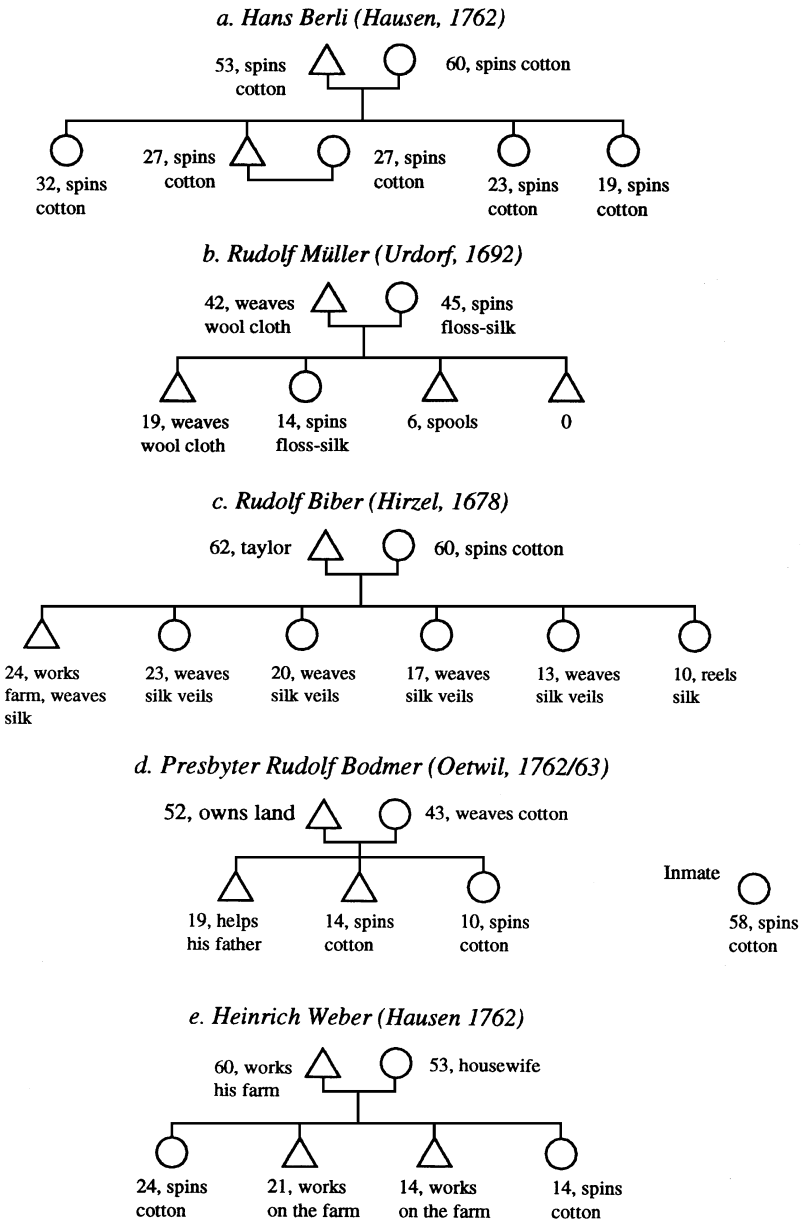
The table shows summary statistics for our control variables in rural German counties in 1895. Column 1 gives the mean and standard deviation of the control variables in unequal division counties while column 2 shows means and standard deviation for equal division counties. Column 3 and 4 show the difference between these groups and test if the difference is equal to zero. The difference and the standard errors stem from a regression which includes longitude, latitude, state-fixed effects, clusters standard errors on the district (Regierungsbezirk) level and weighs observations by population. Notes: * p<0.1, ** p<0.05, *** p<0.01

Figure A2: Urban Population Density (1500 to 1907)



Source: The figure reports urban population density in cities by inheritance regime based on the data in Bairoch et al. (1988). The density measure is log population per 1000 km^2.

Figure A3: Examples of household labor allocation in canton of Zürich, 17th and 18th century



Source: Pfister (2004).

Table A2: Overview of Main Historical Outcome Variables

Outcome		**mean (sd)**	**min**	**max**	**Explanation**	**Source**
income inequality	top 10% income share 1895	30.3 5.6	17.4	48.4	Pareto interpolation using income tax tabulations and wages	statistical offices of Baden and Hesse
	top 1% income share 1895	8.9 3.3	5.0	21.4	Pareto interpolation using income tax tabulations and wages	statistical offices of Baden and Hesse
	ratio 1/90 1895	13.3 6.6	6.0	41.6	top 1% share/(100-top 10% share)	statistical offices of Baden and Hesse
	log mean income 1895	6.8 0.14	6.5	7.3		statistical offices of Baden and Hesse
	mean income 1895	900 144	681	1504	total income/total population	statistical offices of Baden and Hesse
	top 10% income share 1907	36.8 8.0	21.6	52.4	Pareto interpolation using income tax tabulations and wages	statistical offices of Baden, Hesse and Wuerttemberg
	top 1% income share 1907	11.0 3.3	4.8	20.4	Pareto interpolation using income tax tabulations and wages	statistical offices of Baden, Hesse and Wuerttemberg
	ratio 1/90 1907	18.2 7.0	6.3	38.6	top 1% share/(100-top 10% share)	statistical offices of Baden, Hesse and Wuerttemberg
	log mean income 1907	6.8 0.25	6.5	7.5		statistical offices of Baden, Hesse and Wuerttemberg
	mean income 1907	896 245	694	1755	total income/total population	statistical offices of Baden, Hesse and Wuerttemberg
landholding inequality	landholding gini 1895	0.716 0.123	0.426	0.948	For more information about this measure see Ziblatt (2008).	Ziblatt (2008)
distribution of farm sizes 1895	<2 ha	8.242 7.031	0.65	41.86	Percentage of farms below 2 ha number stated in source	Kaiserliches Statistisches Amt (1898)
	2-5 ha	13.336 10.692	0.76	61.71	Percentage of farms between 2-5 ha number stated in source	
	5-20 ha	33.843 15.044	3.03	70.54	Percentage of farms between 5-20 ha number stated in source	
	20 -100 ha	27.081 16.055	0.3	82.17	Percentage of farms between 20-100 ha number stated in source	
	> 100 ha	17.483 19.319	0	80.8	Percentage of farms above 100 ha number stated in source	

Notes: This table gives an overview of the outcome variables used in Tables 2 and 3 which are our main historical tables. Column 3 shows means and standard deviations in parentheses. Column 4 and 5 show the minimum and the maximum of the variable. The construction of the variables is described in column 6 and the sources are given in column 7. The precise reference for some of the sources can be found in the bibliography. See Table A4 for more details on the data sources used for the computation of top income shares.

Table A3: Overview of Main Modern Outcome Variables

Outcome		mean (sd)	min	max	Explanation	Source
income 2013	log household income 2013	6.719 0.115	6.448	7.46	Log of household income	Bundesamt für Bauwesen und Raumforschung, INKAR Indikatoren und Karten zur Raum- , und Stadtentwicklung, from www.inkar.de
	household income 2013	833.531 103.02	631.6	1737.281	The average monthly household income 2013 in Euro in 2013 divided by the average household size in 2012	
	log taxable income 2014	3.46 0.146	3.107	4.022	Log of average taxable income	Federal Statistical Office of Germany, from https://www.destatis.de
	taxable income 2014	32.181 4.809	22.352	55.808	Average taxable income in thousand Euro	
	log median income 2013	7.956 0.162	7.555	8.383	Log of median income	INKAR Indikatoren und Karten zur Raum- und Stadtentwicklung, from www.inkar.de
	median income 2013	2889.439 455.414	1910	4371	Median monthly income in Euro in 2013	Bundesamt für Bauwesen und Raumforschung.
	log GDP p.c. 2013	3.447 0.336	2.674	4.964	Log of GDP p.c.	
	GDP p.c. 2013	33.494 14.404	14.5	143.1	GDP p.c. in 2013 in thousand Euro	
income inequality 2013	top 10% income share	36.9 5.1	26.7	63.1	Pareto interpolation using income tax tabulations, national accounts and population statistics	Federal Statistical Office of Germany and statistical offices of the Laender
	top 1% income share	10.9 2.8	6.7	33.6	Pareto interpolation using income tax tabulations, national accounts and population statistics	
	log mean income top 10%	6.8 0.14	6.5	7.3		
	mean income top 10%	119,534 29,452	72,247	318,532	total income of top 10% in Euro/10% of population	
	log mean income top 1%	12.7 0.32	12.1	14.4		
	mean income top 1%	357,066 144,362	178,810	1,844,190	total income of top 10% in Euro/10% of population	
	share with income $<$ 10.000	36.7 7.1	22.1	64.5	no of tax units with income <10.000/total population	
	share with income $<$ 20.000	51.2 8.0	35.1	77.3	no of tax units with income <20.000/total population	
wealth inequality	wealth taxpayers per 10.000	149.7 54.9	40	418	no of wealth taxpayers/total population in 10.000	Federal Statistical Office of Germany, Fachserie 14, Reihe 7.4, Vermögensteuer Hauptveranlagung 1995, p.119-127.
1995	millionaires per 10.000	21.4 10.5	7	89	no of tax units with wealth $>$ 1 Mio. DM/total population in 10.000	

Notes: This table gives an overview of the outcome variables used in Tables 4 and 5 which are our main long-run tables. Column 3 shows means and standard deviations in parentheses. Column 4 and 5 show the minimum and the maximum of the variable. The construction of the variables is described in column 6 and the sources are given in column 7. The precise reference for some of the sources can be found in the bibliography. See Table A4 for more details on the data sources used for the computation of top income shares.

Table A4: Sources for Income Inequality Measures

area	data year	explanation	source
Baden	1895	income tax tabulations	Statistik der badischen Einkommensteuer 1896, p.52-53
	1907	income tax tabulations	Statistisches Jahrbuch für das Großherzogtum Baden 1909, p.634-635
Hesse	1894	income tax tabulations	Mittheilungen der Großherzoglich Hessischen Centralstelle für die Landesstatistik 1895, p.226-231
Hesse	1907	income tax tabulations	Mittheilungen der Großherzoglich Hessischen Centralstelle für die Landesstatistik 1909, p.4-13,20,27
Wuerttemberg	1906	income tax tabulations	Württembergische Jahrbücher für Statistik und Landeskunde 1908, Vol. 1, p.24-28; Vol. 2, p.110-115
German Empire	1895	total population (=total no. of potential taxpayers)	Kaiserliches Statisisches Amt (1897)
German Empire	1907	total population (=total no. of potential taxpayers)	Kaiserliches Statisisches Amt (1910)
German Empire	1873 -1913	wages	Kuczynski, J. (1947): Die Geschichte der Lage der Arbeiter in Deutschland von 1789 bis in die Gegenwart, Band 1. Tribüne.
Germany	2013	income tax tabulations	Lohn- und Einkommensteuerstatistik: Kreise (Code 73111-02-01-4), Federal Statistical Office of Germany, from `https://www.regionalstatistik.de`
Germany	2013	primary income	Volkswirtschaftliche Gesamtrechnungen der Länder (Code R2B1, R2B2,R2B3) statistical offices of the Laender, from `https://www.vgrdl.de`
Germany	2011	marital status	Census 2011 (Code 12111-05-01-5), Federal Statistical Office of Germany from `https://www.regionalstatistik.de`
Germany	2013	population by age	Population update (Code 12411-02-03-4), Federal Statistical Office of Germany from `https://www.regionalstatistik.de`

Notes: This table gives an overview on the data sources for our inequality measures used in Tables 5. Column 3 shows the area covered by the data source. Column 4 shows the data year. The content of the data source is described in column 6 and the respective publications are given in column 7.

Table A5: Equal Division and Income Measures 2013 - Quadratic RD Polynomial

	(1) Log Household Income	(2) Log Taxable Income	(3) Log Median Income	(4) Log GDP p.c.
Panel A. OLS				
Equal Division	0.0700***	0.0739***	0.0501***	0.133**
	(0.0223)	(0.0209)	(0.0181)	(0.0554)
	[0.0161]	[0.0189]	[0.0152]	[0.0359]
Observations	397	374	397	397
Panel B. With Controls				
Equal Division	0.0569***	0.0573***	0.0424***	0.136***
	(0.0186)	(0.0177)	(0.0109)	(0.0362)
	[0.0143]	[0.0170]	[0.0139]	[0.0368]
Observations	397	374	397	397
Panel C. Distance to Border				
Equal Division	0.0488**	0.0506***	0.0434***	0.146**
	(0.0187)	(0.0159)	(0.0123)	(0.0539)
	[0.0175]	[0.0211]	[0.0149]	[0.0600]
Observations	198	178	198	198
Panel D. Distance to Border × Equal Division				
Equal Division	0.0377	0.0318	0.0238	0.0981
	(0.0262)	(0.0236)	(0.0142)	(0.0690)
	[0.0157]	[0.0176]	[0.0139]	[0.0521]
Observations	198	178	198	198
Mean Outcome	6.719	3.461	7.956	3.447
SD Outcome	0.115	0.146	0.162	0.336

Notes: Data on income and GDP per capita stem from the Federal Statistical Office of Germany and INKAR of 2013/14. In comparison to table 2 this table includes a quadratic RD polynomial in all panels. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Panel D additionally includes an interaction term between distance to the border and treatment allowing the slope to vary on either side of the border. Five large urban counties with more than 1 mio. inhabitants (Berlin, Cologne, Hamburg, Hannover, and Munich) are excluded (402-5=397 counties). Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. Conley standard errors in square brackets. * p<0.1, ** p<0.05, *** p<0.01

Table A6: Equal Division and Farm Sizes in Prussia 1816

	(1) Small Landholdings	(2) Medium Landholdings (per 1000 People)	(3) Large Landholdings
Panel A. OLS			
Equal Division	26.32***	13.47	-0.291
	(7.614)	(7.969)	(0.264)
Observations	305	305	305
Panel B. With Controls			
Equal Division	21.33***	7.484	0.0333
	(5.706)	(5.465)	(0.178)
Observations	305	305	305
Panel C. Distance to Border			
Equal Division	8.472*	2.327	0.0550
	(4.666)	(6.067)	(0.166)
Observations	123	123	123
Mean Outcome	50.10	40.42	1.340
SD Outcome	37.12	21.96	1.496

Notes: This table uses the earliest available measure of the distribution of farm sizes of German lands from Prussia in 1816. Column 1 shows the percent of small landholdings per 1000 people. Column 2 the percent of medium landholdings and column 3 the percent of large landholdings per 1000 people. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A7: Change in Farm Sizes and Their Distribution

	(1) Average Farmsize ha	(2) $<$ 2 ha	(3) 2-5 ha	(4) 5-20 ha	(5) 20-100 ha	(6) $>$ 100 ha
Panel A. OLS						
Equal Division x 1907	-0.288***	1.018**	0.212	-3.068***	0.869	0.935
	(0.105)	(0.434)	(0.351)	(0.538)	(0.777)	(0.566)
Observations	1870	1873	1873	1873	1871	1739
Panel B. With Controls						
Equal Division x 1907	-0.279***	1.027**	0.275	-2.987***	0.716	0.850
	(0.103)	(0.423)	(0.310)	(0.524)	(0.710)	(0.596)
Observations	1870	1873	1873	1873	1871	1739
Panel C. Distance to Border						
Equal Division x 1907	-0.221**	1.513***	0.155	-3.112***	1.624**	0.0294
	(0.0959)	(0.511)	(0.354)	(0.665)	(0.793)	(0.644)
Observations	795	798	798	798	796	715
Mean Outcome	5.818	8.607	13.60	35.05	26.49	17.46
SD Outcome	3.403	7.636	10.95	15.07	16.02	18.68

Notes: Average farm size and shares of farms in 5 size categories as stated in 'Statistik des Deutschen Reichs' Vol. 109(1895) and Vol. 209(1907). The regressor is the interaction term of 'equal division' (compared to 'unequal division') and year 1907 (compared to 1895). The results show the change in farm sizes between 1895 and 1907. Panel A includes besides main effects longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A8: Equal Division and Income Inequality 1895 and 1907

	(1) Log mean inc. 1895	(2) Log mean inc. 1907	(3) Log mean inc. top 10% 1895	(4) Log mean inc. top 10% 1907	(5) Top 10% inc. share 1895	(6) Top 10% inc. share 1907
Panel A. OLS						
Equal Division	0.0380	0.0509	0.0645	0.0403	0.872	-0.154
	(0.0410)	(0.0412)	(0.0951)	(0.146)	(1.864)	(1.316)
Observations	70	133	70	71	70	133
Panel B. With controls						
Equal Division	-0.0171	-0.0106	-0.0424	-0.0418	-0.835	-1.434
	(0.0506)	(0.0436)	(0.131)	(0.149)	(2.455)	(1.535)
Observations	70	133	70	71	70	133
Panel C. Distance to border						
Equal Division	0.0224	0.0162	0.0361	0.0406	0.587	-0.693
	(0.0483)	(0.0355)	(0.129)	(0.148)	(2.424)	(1.281)
Observations	64	119	64	65	64	119
mean outcome	13.76	13.75	8.029	8.248	33.00	35.80
SD outcome	0.187	0.301	0.392	0.411	7.096	5.880

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. County income tax tabulations are from the annual publications of the statistical offices of Baden (1895,1907), Hesse (1894,1907) and Württemberg (1907). Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A9: Landholding Inequality 1895 in Prussia

	Landholding Gini Coeff. 1895		% Farms in Size Category...			
	(1) Linear RD Polyn.	(2) Quad. RD Polyn.	(3) < 2 ha	(4) 2-5 ha	(5) 5-20 ha	(6) 20-100 ha
Panel A. OLS						
Equal Division	-0.0612**	-0.0562*	5.268***	9.776***	1.841	-14.61***
	(0.0290)	(0.0314)	(1.856)	(2.065)	(2.465)	(2.781)
Observations	490	490	488	488	488	488
Panel B. With Controls						
Equal Division	-0.0490***	-0.0471***	5.970***	9.381***	-2.524	-13.10***
	(0.0169)	(0.0170)	(1.273)	(1.573)	(2.754)	(2.380)
Observations	490	490	488	488	488	488
Panel C. Distance to Border						
Equal Division	-0.0423***	-0.0450***	5.169***	8.055***	-3.138	-8.303***
	(0.0114)	(0.0134)	(1.289)	(1.608)	(1.973)	(2.486)
Observations	157	157	155	155	155	155
Mean Outcome	0.770	0.770	7.627	10.45	27.97	29.23
SD Outcome	0.0975	0.0975	6.727	8.458	12.56	15.92

Notes: This table shows the results of table 2 for Prussia only. Share of farms in 5 size categories as stated in 'Statistik des Deutschen Reichs' Vol. 109. Panel A includes longitude, latitude, and state-fixed effects. Panel additionally B includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A10: Landholding Inequality 1895 in Bavaria

	Landholding Gini Coeff. 1895		% Farms in Size Category...			
	(1) Linear RD Polyn.	(2) Quad. RD Üolyn.	(3) < 2 ha	(4) 2-5 ha	(5) 5-20 ha	(6) 20-100 ha
Panel A. OLS						
Equal Division	0.0232	-0.00513	3.321	2.706	-4.445	-2.872
	(0.0286)	(0.0182)	(2.424)	(2.524)	(5.379)	(2.779)
Observations	189	189	190	190	190	190
Panel B. With Controls						
Equal Division	0.00820	0.00519	-1.426**	-4.663*	3.013	1.507
	(0.0137)	(0.0124)	(0.590)	(2.005)	(3.714)	(2.933)
Observations	189	189	190	190	190	190
Panel C. Distance to Border						
Equal Division	0.00283	0.000992	-0.703	-2.821	2.410	0.509
	(0.0114)	(0.00974)	(0.445)	(2.274)	(2.769)	(2.363)
Observations	84	84	84	84	84	84
Mean Outcome	0.557	0.557	5.353	14.98	49.75	27.27
SD Outcome	0.0549	0.0549	5.084	8.552	10.27	14.43

Notes: This table shows the results of table 2 for Bavaria only. Share of farms in 5 size categories as stated in 'Statistik des Deutschen Reichs' Vol. 109. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A11: Equal Division and Agricultural Productivity, Population Density, and Technological Progress 1821

	Agricultural Productivity		Population Density				Technological Progress 1821		
	(1) Mean Caloric Output Pre 15000	(2) Prussia: Grain Yields kg/ha	(3) Prussia 1816	(4) 1895	(5) 1907	(6) DID	(7) Factories (per 1000 people)	(8) Mills (per 1000 people)	(9) Looms (per 1000 people)
Panel A. OLS									
Equal Division	68.12***	-3.112	1.507	63.73	117.5	75.86	-0.0895	0.105	-5.217*
	(25.39)	(7.277)	(9.257)	(88.75)	(115.1)	(95.07)	(0.0878)	(0.286)	(2.926)
Equal Division x 1907						31.33			
						(22.75)			
Observations	935	415	318	937	948	1885	318	318	318
Panel B. With Controls									
Equal Division	3.323	-3.392	-14.65**	76.68	131.9*	91.42	0.00689	0.231	-7.419*
	(16.63)	(5.004)	(6.754)	(58.79)	(70.90)	(58.54)	(0.0731)	(0.320)	(4.044)
Equal Division x 1907						28.08			
						(21.03)			
Observations	935	415	318	937	948	1885	318	318	318
Panel C. Distance to Border									
Equal Division	10.50	-2.065	2.608	55.48	101.8*	56.08	-0.0703*	-0.207	-0.633
	(9.863)	(4.951)	(4.080)	(44.05)	(51.91)	(42.45)	(0.0329)	(0.185)	(4.690)
Equal Division x 1907						47.76**			
						(20.85)			
Observations	396	190	95	398	406	804	95	95	95
Mean Outcome	2211.4	74.77	58.80	169.2	220.5	196.3	0.254	1.111	5.492
SD Outcome	152.1	24.44	35.89	283.9	369.3	332.6	0.238	0.986	12.83

The table uses in column 1 an index of caloric output per hectare per year before the year 1500 as outcome variable which is constructed by Galor & Özak (2016). In column 1 we use the whole sample of the German Empire in 1895. In column 2 grain yields in kilogram per hectare from Prussia in 1878 is the outcome variable. The sample is reduced to the 415 Prussian counties. In column 3 population density stems from Prussian counties in 1816. In column 4 and 5 from the whole sample of the German Empire in 1895 and 1907, respectively. Column 6 shows a DID approach estimating the change in population density in rural German counties between 1895 and 1907. Column 7 uses factories, column 8 mills and column 9 looms per 1000 people of Prussian counties as outcome variable. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A12: Equal Division and Education 1886

	1871		1816		1886	
	(1) Percent Able to Read and Write	(2) Percent Illiterate	(3) Schools	(4) Pupils (per 1000 People)	(5) Schools	(6) Pupils
Panel A. OLS						
Equal Division	-6.103**	4.564**	0.0609	-32.82***	0.203	1.808
	(2.528)	(1.737)	(0.227)	(9.807)	(0.160)	(13.04)
Observations	415	415	308	305	415	415
Panel B. With Controls						
Equal Division	-1.135	-0.102	0.414	-3.967	0.0144	-10.59
	(1.824)	(1.035)	(0.247)	(10.55)	(0.168)	(13.52)
Observations	415	415	308	305	415	415
Panel C. Distance to Border						
Equal Division	-0.0543	-0.574	0.0395	-4.428	-0.114	-15.70
	(1.847)	(0.629)	(0.111)	(8.813)	(0.150)	(15.63)
Observations	190	190	90	87	190	190
Mean Outcome	62.57	9.544	1.928	110.7	1.328	169.8
SD Outcome	12.03	9.305	0.923	43.72	0.533	43.13

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. The table uses data on education levels in Prussia as outcome variables. In column 1 and 2 the data stems from 1871 and shows the percent of the population which is able to read and write. In column 2 the percent of illiterate people is used. Earliest measures of education come from the documented number of schools and pupils in Prussian counties in 1816 (column 3 and 4). In 1886 the same measures are documented for Prussia again. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. The historical sample consists of rural counties excluding independent cities. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A13: Outmigration

	(1) Outmigration % 1880
Panel A. OLS	
Equal Division	0.0376
	(0.0252)
Observations	900
Panel B. With Controls	
Equal Division	0.00194
	(0.0209)
Observations	897
Panel C. Distance to Border	
Equal Division	-0.00845
	(0.0263)
Observations	390
Panel D. Distance to Border × Equal Division	
Equal Division	0.00980
	(0.0274)
Observations	390
Mean Outcome	0.259
SD Outcome	0.503

Notes: The table shows data from the 'Deutsche Auswanderer Datenbank' (German Emigration Database) a project by the Historical Museum Bremerhaven which collects and digitizes passenger lists of ships to the US starting from German ports from 1820-1897. Here we use a subsample of 1880s emigrants. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. The historical sample consists of rural counties excluding independent cities. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A14: Fertility

	(1) Average Birthrate 1894-1896	(2) Birthrate 1895
Panel A. OLS		
Equal Division	0.000683	0.000766
	(0.00155)	(0.00151)
Observations	882	882
Panel B. With Controls		
Equal Division	0.000809	0.000811
	(0.00106)	(0.00103)
Observations	879	879
Panel C. Distance to Border		
Equal Division	0.000953	0.000877
	(0.000639)	(0.000622)
Observations	379	379
Panel D. Distance to Border × Equal Division		
Equal Division	0.00184*	0.00170*
	(0.000961)	(0.000941)
Observations	379	379
Mean Outcome	0.038	0.038
SD Outcome	0.006	0.006

Notes: This table uses data from the 'Kaiserliches Statistisches Amt' on the number of births per county in the German Reich in 1894, 1895 and 1896. In the first column we use an average of births per county in these three years. In the second column we use only births 1895. Births are weighted by county population in 1895 (in thousands). Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. The historical sample consists of rural counties excluding independent cities. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A15: Height of Bavarian conscripts in 19^{th} century

	(1) Height (cm)	(2) SD (cm) within County
Panel A. OLS with Individual Controls		
Equal Division	-0.345**	-0.166***
	(0.155)	(0.00258)
Observations	19048	19048
Panel B. Additional Geographic Controls		
Equal Division	1.097	-3.182***
	(1.645)	(0.187)
Observations	19047	19047
Panel C. Border Sample		
Equal Division	0.0717	-0.265***
	(1.235)	(6.71e-12)
Observations	4982	4982
Mean Outcome	165.6	6.250
SD Outcome	6.353	0.201

Notes: The table uses absolute height in centimeter of Bavarian conscripts in the 19th century as outcome variable in column 1. Column 2 uses the standard deviation of height in centimeter within a Bavarian county as outcome variable. The variation in equal division comes from the county level. There are 181 counties in the sample. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. The historical sample consists of rural counties excluding independent cities. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A16: Deposits at and Credit from Savings Banks and Credit Associations 1895 and 1907

	(1) Depositors pc (1895)	(2) Depositors pc (1907)	(3) Deposits pc (1895)	(4) Deposits pc (1907)	(5) Credit pc (1895)	(6) Credit pc (1907)
Panel A. OLS						
Equal Division	0.0101	0.0227	2.563	-2.809	10.49*	-81.96*
	(0.0158)	(0.0351)	(9.006)	(27.37)	(5.610)	(39.21)
Observations	69	70	126	70	124	69
Panel B. With Controls						
Equal Division	-0.00398	0.00946	-7.438	-34.65	-4.083	-64.75
	(0.0214)	(0.0377)	(12.37)	(47.49)	(5.228)	(47.27)
Observations	69	70	126	70	124	69
Panel C. Distance to Border						
Equal Division	0.0000760	0.0271	-3.240	-19.67	2.342	-25.25
	(0.0170)	(0.0308)	(10.49)	(33.96)	(4.017)	(44.78)
Observations	63	64	112	64	110	63
Mean Outcome	0.186	0.257	98.60	296.5	61.74	234.6
SD Outcome	0.0616	0.0891	112.3	159.2	59.43	151.0

Notes: The table uses per capita data from local savings banks (Baden, Hesse, Württemberg) and credit associations (Baden) aggregated at the county level. The number of savings banks' depositors is available in Baden and Hesse, deposits in RM at savings banks in Baden, Hesse and Württemberg (only 1895) and credit in RM in Baden (only credit associations), Hesse and Württemberg (only 1895). Sources are Statistisches Jahrbuch für das Großherzogtum Baden 1895/6 and 1908/9, Mitteilungen der Großherzoglich Hessischen Zentralstelle für Landesstatistik 1895 and 1909, and Statistisches Handbuch für das Königreich Württemberg 1896. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. The historical sample consists of rural counties excluding independent cities. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A17: Equal Division and Income Composition

	(1) Business income (pc)	(2) Real estate income (pc)	(3) Capital income (pc)	(4) Labor income (pc)
Panel A. OLS				
Equal Division	40.99*	-4.810	23.31	91.75
	(21.06)	(9.933)	(27.24)	(58.27)
Observations	115	115	115	115
Panel B. With controls				
Equal Division	22.07*	-14.01	4.020	41.83
	(10.88)	(9.242)	(12.09)	(25.71)
Observations	115	115	115	115
Panel C. Distance to border				
Equal Division	21.24*	-13.92	3.573	39.98
	(10.62)	(9.730)	(13.64)	(25.22)
Observations	106	106	106	106
mean outcome	109.0	127.1	57.14	188.0
SD outcome	116.8	54.75	114.0	245.3

Notes: The table uses county level aggregates from the income tax collection in Baden 1908 and Württemberg 1907. Income tax statistics included roughly a third of the population. Real estate includes both land and buildings. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Column 3 reduces the sample to counties in 35 km distance to the border of the inheritance rule. The historical sample consists of rural counties excluding independent cities. Regressions are weighted by population in 1907. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A18: Equal Division and Innovation and Entrepreneurship: Appendix Material

	Employment 1925:	Prussia 1816:	
	(1)	(2)	(3)
	Self Empl. out of Agric.	Middle Schools	Middle School Pupils
		(per 1000 People)	
Panel A. OLS			
Equal Division	0.0656	-0.0113	-0.338
	(0.0848)	(0.0195)	(1.210)
Observations	779	311	311
Panel B. With Controls			
Equal Division	0.151	0.0180	1.943**
	(0.118)	(0.0129)	(0.803)
Observations	763	311	311
Panel C. Border Sample			
Equal Division	0.309*	0.0347**	1.934
	(0.162)	(0.0158)	(1.450)
Observations	329	90	90
Mean Outcome	4.415	0.0430	2.305
SD Outcome	1.540	0.0804	4.503

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is a county. In column 1 the percent of people in self-employment out of agriculture (manufacturing and trade and services) is used as outcome variable for the sample of the whole German Empire in 1925. In column 2 and 3 the sample is reduced to Prussian counties. The number of middle schools (column 2) and the number of pupils in middle schools (column 3) per 1000 people are used as outcome variables. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A19: Equal Division and Innovation in Cities: Innovative Employment

	(1) in % of total population	(2) in % of manufacturing population
Panel A. OLS		
Equal Division	-3.961***	-2.152
	(1.170)	(2.183)
Observations	148	148
Panel B. With Controls		
Equal Division	-2.845	-1.667
	(1.953)	(4.094)
Observations	127	127
Panel C. Distance to Border		
Equal Division	-3.176	-3.228
	(3.840)	(7.127)
Observations	51	51
Mean Outcome	6.874	16.177
SD Outcome	5.664	8.639

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. The unit of observation is an independent city. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01

Table A20: Equal Division and Innovation in Cities: Patents

	(1) Patent Dummy	(2) Log Patents	(3) Log Patents w/ Zero
Panel A. OLS			
Equal Division	0.0272	0.366	0.515
	(0.0221)	(0.416)	(0.401)
Observations	149	129	149
Panel B. With Controls			
Equal Division	-0.0525	0.376	0.0897
	(0.0694)	(0.530)	(0.608)
Observations	128	115	128
Panel C. Distance to Border			
Equal Division	0.0221	0.760	0.804
	(0.0285)	(0.548)	(0.556)
Observations	51	49	51
Mean Outcome	0.976	4.094	4.970
SD Outcome	0.154	1.700	1.854

Notes: The table reports the effect of equal division on the outcomes reported in the column headers. TThe unit of observation is an independent city. Panel A includes longitude, latitude, and state-fixed effects. Panel B additionally includes geographic and cultural controls as specified in summary statistics. Panel C reduces the sample to counties in 35 km distance to the border of the inheritance rule. Regressions are weighted by population. Standard errors clustered at the district (Regierungsbezirk) level. * p<0.1, ** p<0.05, *** p<0.01