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Huning, Thilo Rene and Wahl, Fabian (2021) The origins of agricultural inheritance traditions. *Journal of comparative economics*. pp. 660-674. ISSN 0147-5967

<https://doi.org/10.1016/j.jce.2021.01.004>

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Highlights

The Origins of Agricultural Inheritance Traditions

- Agricultural inheritance traditions the southwestern German state of Baden-Württemberg, have persisted over centuries.
- Agricultural inheritance traditions are determined by geography.
- Good agricultural conditions and abundant free land are associated with egalitarian inheritance systems.
- European inheritance traditions were determined partly by settlement history and the rise of feudalism during the Middle Ages.
- Geographic and historical variables explain up to 30% of the local variation in inheritance traditions in Baden-Württemberg.

The Origins of Agricultural Inheritance Traditions

Abstract

We investigate the origins of agricultural inheritance traditions, equal partition and primogeniture. Our case study is the German state of Baden-Württemberg. Our empirical findings suggest that rural inheritance traditions were primarily determined by geography. First, fertile soils allowed splitting of the land among siblings for longer and with fewer conflicts, and hence we find more equal partition in areas with higher soil quality, especially at elevation levels conducive to intensive agriculture. Second, geography determined the settlement pattern. Areas that were settled before the Middle Ages, when land was abundant and free, are more likely to apply equal partition today. In areas that were largely uninhabited until the Middle Ages, primogeniture is the norm. We argue that these areas were deforested with the obligation of primogeniture, imposed by feudal lords.

Keywords: Inheritance Practices, Geography, Informal Institutions, Baden-Württemberg
JEL: N93, N94, Q15, R10, Z10

1. Introduction

What explains modern agricultural inheritance traditions? Were inheritance practices subject to the “self-induced modernization” of premodern Western Europe (Kuran, 2012, 81), or have they been shaped by events far before modernity and persisted ever since?

To address this central issue, our paper poses two questions in relation to the origins of modern inheritance traditions. Which mechanisms shaped the pattern of inheritance traditions we observe today? Do the reasons for today’s pattern lie in the medieval or premodern past, or in the modern era?

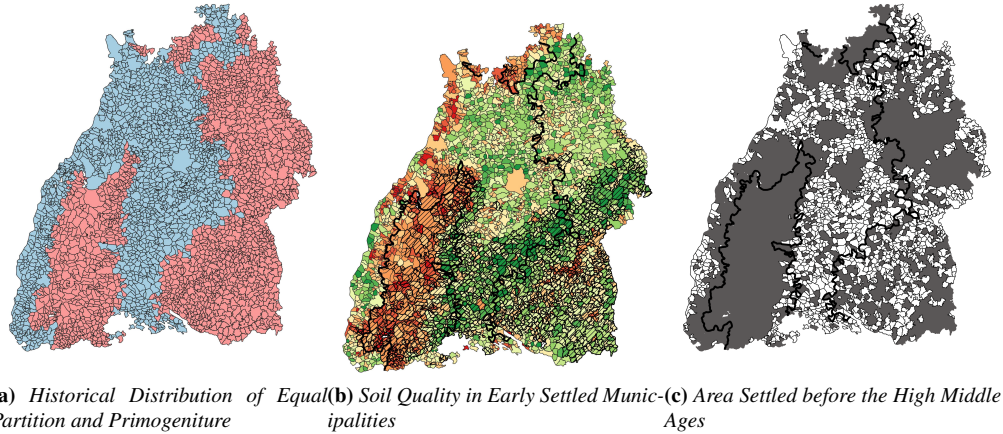
Our argument follows a rich economic literature pursuing a “cultural approach” on the origins of institutions (Ogilvie, 2007). Culture here is assumed to be endogenous to its environment. With respect to the transmission of inheritance traditions across generations, we resort to the theoretical framework by Bisin and Verdier (2001). We also follow up on the research by German-speaking and international scholars on how decisions within the family created social, economical, and political variation (e.g., Röhm, 1957; Todd, 1990) in inheritance practices (mainly equal partition and primogeniture). This historical research suggests that the origins of inheritance traditions lie primarily in natural conditions, especially by deciding over the supply of land which allowed intensive agriculture, in opposition to poor soils. The roots of primogeniture trace back to adverse agricultural conditions, but also to the rise of feudal states in the Middle Ages which enforced primogeniture on their serfs to ensure high in-kind tax returns. In our empirical section, we provide variables to explain whether a municipality uses equal partition. Our cross-sectional regressions on the distribution of equal partition within Baden-Württemberg suggest that the inheritance tradition was largely an outcome of geography and settlement history. In particular, our empirical results suggest that equal partition is significantly more likely to occur

in areas with better soil quality and lower elevation. Both variables together explain around 16% of the overall variation in inheritance traditions among municipalities in Baden-Württemberg. In further regressions, we show that, in line with the argument of historians, intensive agricultural activities (like wine-growing) are also conducive to the emergence of equal partition. Our results imply a significant role of settlement history. Conditional on geography, areas that were settled during the Neolithic period or by Germanic tribes during late antiquity and the early Middle Ages show a significantly higher probability of equal partition. In contrast, areas that were settled later, in the course of the deforestation efforts of the high Middle Ages, have a significantly lower probability of equal partition.

The maps in Figure 1 summarize our main argument: The historical equal partition and primogeniture areas can be seen in Panel (a). Panel (b) shows the distribution of soil quality along with the areas that are higher than 500m above sea level (shaded areas). The comparison of these two panels reveals some analogies, but is far from complete: soil quality or elevation alone cannot fully explain the inheritance pattern. Panel (c) shows the areas that were not settled before the Early Middle Ages in gray. Panels (a) and (c) suggest that later-settled areas apply more primogeniture today. Our results show that a combination of soil quality and elevation on the one hand and settlement history on the other can explain today's inheritance pattern. This result is in line with historical literature and economic reasoning, and it is statistically significant and robust to controlling for alternative channels and various other statistical sensitivity checks.

There are strong arguments for using German data to investigate into the inheritance traditions, even more for a focus on the state of Baden-Württemberg, with its extraordinary small-scale variation. A map by Todd (1990) shows that all other European countries either have a single norm, or are divided into two regions that are different in many other dimensions.¹ From the perspective of variation in outcomes, the equal partition and primogeniture regions have developed in a systematically different way (Hager and Hilbig, 2019; Huning and Wahl, 2019). The development of the German South from a region portrayed as backward (e.g. Weber, 1905) to a role model among German states has provoked ample research in the roots of this catch-up process. As pointed out by Hager and Hilbig (2019) the understanding of inheritance norms is crucial for efficient state intervention (i.e. arranging the tax system or the design of social security systems) by better explaining how these inheritance norms came along in one of the oldest welfare states can therefore guide policy makers elsewhere.

¹Spain's division lines for example are largely identical to its linguistic minorities.



Note: In Panel (a), primogeniture is shown in pink and equal partition in light blue. In Panel (b) soil quality increases from red to green. Hashed areas have an elevation of more than 500m. In Panel (c), municipalities settled before the medieval period are shown in white, while those settled only later are depicted in dark gray. In Panels (b) and (c) the historical border of the equal partition and primogeniture area is shown as solid black line.

Figure 1: *Inheritance Traditions, Settlement History and Soil Quality in Baden-Württemberg*

Inheritance is the largest factor in the re-allocation of assets outside of markets. Therefore, in particular, the implications of differences in the details of this allocation have inspired several scholarly traditions. There is a wide literature on the consequences of inheritance tradition on inequality, family structures, gender roles, and economic development (Eigner et al., 2018; Goody et al., 1978; Huning and Wahl, 2019; Kuran, 2012; Menchik, 1980; Hager and Hilbig, 2019). The present paper complements this literature by shedding light on the origins of the inheritance traditions.

We are interested in how rural areas contributed to cultural persistence and change in premodern Europe (Alesina and Fuchs-Schündeln, 2007; Bazzi et al., 2020; Giuliano and Nunn, 2020), and how medieval institutions shaped Western institutions to this day (Schulz et al., 2019). To do so, we outline the historical literature on European and German inheritance traditions in Section 2. We link these ideas to the theoretical literature on the origins of institutions, land rights, and their cultural transmission in Section 3. This is followed by the presentation of our data in Section 4. We progress to the empirical sections on the origins of inheritance traditions (Section 5). We discuss the implications of our findings for the literature on the consequences of inheritance traditions in Section 6. We conclude in Section 7.

2. The Literature on the Origins of Inheritance Traditions

In this section, we present the literature that suggests our two main channels: geography and settlement history.

2.1. How Geography Shaped Inheritance Traditions

Whether for reasons of efficiency or because it reduced conflict within communities: Geography shaped the spatial distribution of inheritance traditions (Schröder, 1980; Rösener, 2012).

We hypothesize that, at the margin, better geographic circumstances enabled more frequent partitioning of land and with less conflict. Where suitable soil became too scarce to allow further partitions and there was no other land to expand to, conflict emerged within societies that applied equal partition and primogeniture served as an “emergency brake” to halt overfragmentation. As such, a defining aspect of this shift was land quality. Where the quantity of the land was small compared to the amount of heirs, but the quality of the land was high, the option of intensifying agriculture and subsist on smaller plots prevented conflict. Factors which increased the profitability of intensive agriculture (fruit plantation, wine yards, vegetable farming) relative to extensive agriculture (forage crops, animal husbandry) also increase the probability of finding equal partition there today. The “emergency brake” did not have to be pulled, or it was released before primogeniture became local tradition.² Reasons for this could lie in exogenous variation of first nature (or topological) geography, but also in partly endogenous variation in second nature (or human) geography (see Krugman, 1991). Concerning first nature geography, a higher soil quality and a lower elevation (better climatic conditions as well as better access to water) are linked to intensive agriculture.

2.2. *Settlement History*

The majority of the literature (explicitly or implicitly) agrees that equal partition is the original tradition, or the natural state of human inheritance, and primogeniture is this “emergency brake” (Röhm, 1957; Rösener, 2012; Willenbacher, 2003). Here, the “Urgesellschaft” is viewed as egalitarian: anyone had a say on how to use the tribal land, and there was no individual property of land. A lot of the land was free to use and belonged to nobody.

This is because Europe was sparsely settled until only centuries ago. In fact, large parts of Baden-Württemberg were deforested as late as the Middle Ages, which gives rise to the political economy of feudalism as an explanation for some of the variation in modern inheritance tradition. According to Röhm (1957) and Rösener (2012), medieval lords in Southern Germany assigned newly deforested land with the obligation to primogeniture. This way, they avoided that the fixed cost of tax collection (mostly in kind) would become more burdensome with an increase in the number of farms with each generation. Therefore, we expect areas settled before Middle Ages to apply equal partition today, while areas settled during the Middle Ages should predominantly use primogeniture.

3. **The Cultural Transmission of Inheritance Norms**

The economic theory in regard to the transmission of cultural traits is rich and growing. Our approach follows the ideas and terminology of the workhorse model by Bisin and Verdier (2001).

We are interested in the cultural transmission of two cultural traits, primogeniture and equal partition. These traits are not necessarily limited to the act of passing down the property. We can assume that each of these inheritance forms is associated with other instrumental institutions. For example, we can allow the marriage market in equal partition areas to better address the overfragmentation issue; the primogeniture areas had more rules and norms that address the

²Interviews conducted by Krafft (1930) in the 1920s highlight the immaterial value children attributed to keeping the land in the family (even if they no longer served as burial grounds as argued by Fukuyama (2011)). The majority of the non-inheriting children accepted and supported primogeniture because it guarantees that the family lands remain family property. The interviewees were convinced that only primogeniture prevents the farm from becoming too small, and hence highlight the production potential of the farm.

threat of excessive emigration. Land markets were also organized differently, depending on the inheritance tradition, equal partition land markets usually being thicker (Röhm, 1957). Equal partition areas had more common land, while primogeniture often had none (Röhm, 1957). Bisin and Verdier (2001) distinguish two ways in which children can be socialized to a certain trait. First, by learning from their parents, via *direct vertical socialization*. Second, from the outside world, via *oblique socialization*. The literature on cultural traits has coined the state at which one trait is abandoned in favor of another as the tipping point (see Novak, 2020, for a recent example).

It is important to note that tipping was rare. As we will show, most communities have remained with the same inheritance tradition ever since they were first inhabited. Their tradition of primogeniture was not an outcome of cultural transmission but of the expansion of human settlement. Large swathes of what is today the primogeniture area were uninhabited by the Early Middle Ages. The foundations of new communities on ‘a blank canvas’ allowed the interruption of direct vertical socialization to equal partition. Historical records show that lords, with an eye on easing tax collection, gave away the newly deforested lands on the condition of primogeniture (Röhm, 1957; Rösener, 2012; Schröder, 1980). As such, it was not the trait of primogeniture that conquered equal partition territory, but that people who migrated into new areas were not allowed to bring their cultural traits with them.

However, there are some villages for which we can take tipping as a historical fact. To analyze the conditions, we are interested in the probability that a single child from a village with one trait is socialized to the other trait. To our understanding, there are two entities that affect this probability: first the geographic properties of the inheritance, and second other members of the community, via oblique socialization.

To analyze the effect of geography, let us first consider the case of two villages, completely isolated from any influence of primogeniture (similar to the lightly settled areas of South Western Germany around 800). The standardized factor endowment with land in the first village is double as much as the endowment of the second, for example, because it has more acreage, has a higher soil suitability, or might be closer to markets. Fertility is exogenous, and in each generation any individual has two children. Now consider that there is some minimum land endowment for each individual to subsist of the inheritance.³ Wherever we set such a minimum, we know from the exponential population growth that if the less endowed village approaches this minimal land endowment in some generation, the better-endowed village experiences this problem later, in this example exactly one generation later. Probably connected to a compensation via another instrumental institution (be it morally or monetarily), one of the two children of the less endowed village may forfeit the rights to the land, most commonly the youngest. Given that parents anticipate this effect, to best prepare the non-inheriting child for a life outside of the family farm, it would be reasonable (and compatible with the view of limited altruism) to socialize the children according to the cultural trait of primogeniture. This effectively means that the children will grow up differently. The inheriting child is socialized to take over village land, the non-inheriting child is prepared for a life elsewhere. As such, primogeniture can emerge as an outcome of direct vertical socialization. We can extend this thought experiment by introducing heterogeneous families to our villages, and expect that in each village, the family with the lowest land endowment will be the first to change to primogeniture. In this example, and in the absence

³The outside option is not necessarily death. Emigration, for example to nearly deforested areas or to cities, was always an option.

of any technological progress that would increase the endowment with land over time, such a village would never switch back to equal partition.

The existence of primogeniture villages within our world of villages, or the existence of primogeniture families within a single village, can foster oblique socialization. The more a village is surrounded by primogeniture villages, and the more a village is inhabited by families practicing primogeniture, the more likely it is that the norms and customs associated with this inheritance tradition are copied, and children are socialized to a different trait than their parents were. It is plausible to assume that a village shifts towards equal partition before it approaches the minimal land endowment. This could be a conscious decision directly linked to the inheritance form, but it could be more related to instrumental institutions of these inheritance forms. For example, it could be attractive for families of equal partition villages to become culturally more similar to the neighboring primogeniture villages (to exchange, or combine the marriage markets, or other institutions with returns to scale and cultural similarity). The more equal partition families and villages shift towards primogeniture, the more likely oblique socialization to primogeniture becomes.

The predictions of these ideas are straightforward. The observation that a village tipped from equal partition to primogeniture does not require a historical instance of approaching overfragmented land on which no one could subsist. While a theoretical first family or village that ‘invented’ primogeniture likely did so out of necessity, the idea of primogeniture was likely adopted via another learning mechanism, and was from that point transmitted culturally.

The historical literature also discusses the case of villages that tipped from primogeniture to equal partition, mostly connected to the proximity to other equal partition villages. As such, this is in line with the argument of oblique socialization.

4. Data

In the following paragraphs, we elaborate on our data on inheritance traditions and introduce the definition and sources of the variables used to analyze the origins and change of equal partition later on.

4.1. Inheritance Traditions

Our empirical approach relies on the data of Röhms (1957). After World War II, the federal state of Baden-Württemberg was founded with 3,382 municipalities, each on average only 10.56km² in size.⁴ In 1953, Röhms sent a one-page questionnaire to each municipality’s mayor. Questions included the predominant inheritance tradition in the municipality at the time, but also whether it had changed in the last 100 years, and if so, what was the original form.⁵ Respondents had to decide between a ‘main form’ (*Hauptform*), primogeniture, or equal partition, but could also choose from different transitional and mixed forms. A mixed form could be that small farms are subject to equal partition, while primogeniture applies to large farms.⁶ A finding of Röhms’ research is that there existed almost no transitional or mixed forms in 1850.

⁴The following paragraphs draw heavily from Huning and Wahl (2019) which introduces the inheritance data in more detail.

⁵The vast majority of the changes were from an original main form to a transitional or mixed form. Only 22 municipalities (0.7 % of all municipalities) experienced a change in the main form between 1850 and today. This suggests that the traditions were relatively persistent.

⁶He also inquired about further details, for example, if the oldest or youngest son inherits.

Röhm then drew a sharp historical border between the main forms. He assigned all municipalities to their original main form, based on the practice in 1953, and where he found some mixed form, he grouped the municipalities according to the ‘original form’ they had in 1853. We use this border to code a dummy variable “historical equal partition area” that we will use to empirically investigate the origins of equal partition. This assumes that before the 19th century the inheritance traditions remained stable over time. In light of case study evidence showing temporary changes in inheritance traditions in small regions during the medieval period (e.g. in response to the Black Death), this cannot be taken for granted (Röhm, 1957; Strobel, 1972). Systematic data on inheritance traditions for earlier periods does not exist to the best of our knowledge. Another downside of Röhm’s approach is that it relies on the best knowledge of the mayors, and to a minor extent on the honesty of the mayors.⁷ The questionnaire also allowed free comments. We compare his data with other (earlier) data to reduce these biases.

The survey created a map in which municipalities were assigned to one of nine predominant inheritance traditions, each with different color or shading (the original map is printed in the Online Appendix, Figure A.1). These inheritance practices are listed in Table 1.

Table 1: Inheritances Traditions Identified by Röhm (1957)

1.	<i>Primogeniture</i> , i.e. the farm as a whole is given to one son (usually the oldest but sometimes the youngest) and the other children were compensated with (comparatively small amounts of) money and were allowed to stay on the farm, living for free and working there. The parents were also allowed to stay on the farm and live there for free. Daughters usually do not inherit the farm.
2.	<i>Equal Partition</i> , i.e. the land owned by the parents is equally split among all children, daughters and sons alike. The buildings and capital goods belonging to the farm were often given to one of the children only.
3.	<i>Transitional Form of Primogeniture</i> , where the large farms were given to one son but smaller farms were partitioned equally among all children.
4.	<i>Transitional Form of Equal Partition</i> , where one son inherited the largest part of the farm and only the rest is equally partitioned among the others.
5.	Municipalities in which both form 3 and 4 existed (municipalities with mixed form)
6.	Municipalities with predominantly primogeniture but notable prevalence of form 3
7.	Municipalities with predominantly equal partition but notable prevalence of form 3
8.	Municipalities with predominantly primogeniture but notable prevalence of form 4
9.	Municipalities with predominantly equal partition but notable prevalence of form 4

Forms 3, 6, and 8 are transitional forms of primogeniture. Forms 4, 7, and 9 are transitional forms of equal partition whereas form 4 stands for mixed traditions. We study these transitional and mixed forms to investigate the determinants of changes in inheritance practices in the period from 1853 to 1953 (see section A.3.3. of the Online Appendix).

The application of one or the other tradition was largely untouched by state regulation, such as the German Civil Law.⁸ The German inheritance laws allowed farm owners to pass their property almost as they wished. If they wanted to apply primogeniture, however, they had to register this fact in the “Höferolle” (comparable to a commercial register). Local laws of primogeniture

⁷Eight years after the collapse of the Nazi regime this could be a bias, because the political debate emphasized primogeniture as the ‘true’ Germanic, and therefore superior, tradition.

⁸The companion law to introduce the German Civil Code (*Einführungsgesetz zum Bürgerlichen Gesetzbuche*) excluded farm inheritance explicitly.

(which varied only in minor aspects) were then applied. If the inheritor changed his mind, he could still choose to pass his farm in another way. Farms were predominantly passed down to the children during the lifetime of the parents. A usual age to do so was around 60, and therefore the inheritance from a deceased parent was the exception (Krafft, 1930; Sering and von Dietze, 1930).

Table 2 gives an overview of the prevalence and distribution of these five inheritance traditions across Baden-Württemberg and Figure 2 shows the digitized version of Röhm’s map where each of the five different traditions is depicted by a different color, i.e. blue is equal partition, light blue are municipalities with transitional forms of equal partition, red is primogeniture, orange represents transitional forms of primogeniture, and green are mixed traditions. As reported in Table 2, primogeniture is the most frequent inheritance tradition and is applied in around 38% of all municipalities. Transitional and mixed forms are predominant in around one third of all municipalities. This makes them another relevant field of study.

Table 2: *Prevalence of Inheritance Traditions in Baden-Württemberg*

Inheritance Tradition	Frequency	Percent	Cumulative
Primogeniture	1,279	37.82	37.82
Equal Partition	1,044	30.87	68.69
Transitional Form of Primogeniture	409	12.09	80.78
Transitional Form of Equal Partition	519	15.35	96.13
Mixed Form	131	3.87	100
Total	3,382	100	

The black line depicts the border of the equal partition and primogeniture areas. To further establish whether transitional forms were less prevalent at the beginning of the 20th century and to assess the validity of Röhm’s map, we use maps on the prevalence of inheritance traditions from 1905 as printed in Krafft (1930) and Sering and von Dietze (1930). The map of inheritance traditions in 1905 as printed in Krafft (1930) is depicted in Figure 3. The map is based on a survey of the ministry of law of Württemberg which asked notaries about the inheritance traditions prevalent in their jurisdiction. According to Röhm (1957) the 1905 map is less detailed than his own map. This is because it only distinguishes between the two basic forms of equal partition and primogeniture and mixed traditions (where both is applied). The 1905 map not only largely confirms the location of the border but also establishes that in 1900 only a few areas at the border of both basic traditions predominantly applied mixed inheritance practices. We cross-checked this with the maps from Huppertz (1939) and Karg (1932) to validate Röhm’s map and found that it is the most accurate and detailed one available. Nevertheless, we will check whether our empirical results are significantly different when we base our equal partition variable on the map of Krafft (1930).

Figure 2 also shows that there are several exclave municipalities that historically applied primogeniture or equal partition surrounded by the other tradition.

4.2. Predictors

Our predictors of equal partition originate from a large variety of data sources. We take the area of each municipality in km² and in hectare from the official municipal statistics of 1950 (Statistical Office of Baden-Württemberg, 1952).

Our measure of soil suitability is based on the agricultural suitability index of Zabel et al. (2014). The measure used in the paper is average agricultural suitability in the period 1961–1990. Zabel et al. (2014) consider climate (temperature, precipitation, solar radiation), soil (pH value, texture, salinity, organic carbon content, etc.), and topography (elevation and slope) of a grid cell of 30 arc seconds \times 30 arc seconds (0.86 km² at the equator) in size. The measure is calculated for 16 different crops and then averaged over all of them. We calculate the municipal averages of this measure by overlaying their raster data with the municipal borders.

The mean elevation of each municipality is measured in meters above sea level. We base our variable on the Digital Elevation Model (DEM) of the U.S. Geological Survey’s Center for Earth Resources Observation and Science (EROS), the GTOPO30 data set. Data on wine-growing before 1624 comes from a map of the “Historischer Atlas von Baden-Württemberg” (Historical Atlas of Baden-Württemberg) which we digitized (Kommission für geschichtliche Landeskunde in Baden-Württemberg, 1988). Soil suitability, elevation, and wine-growing are proxies for the natural conditions for agriculture, or more precisely, the suitability of a municipality’s area for intensive-agriculture.

We digitized data on the location of areas that were first settled and deforested during the Middle Ages from a map by Ellenberg (1990). From this source, we also got data on the location of areas that were forested and hence mostly uninhabited in the 19th century. Most historical variables stem from Huning and Wahl (2020), namely distance to the closest Imperial city, the share of each municipality located within an Imperial city (both in 1556), historical political instability and fragmentation, the share of each municipality located in church territories in 1556, and a dummy equal to one if a municipality was located within the historical Duchy of Württemberg in 1789.

To measure settlement history, we have collected data on the location of Celtic graves, early medieval (Germanic) settlements, and Neolithic settlement areas coming from maps of the “Historischer Atlas von Baden-Württemberg” (Historical Atlas of Baden-Württemberg). We use the atlas maps to compute a dummy variable equal to one if at least one Celtic grave was found there, and another one whether one early medieval village was within the municipality. Furthermore, we calculate the share of each municipality that was settled during the Neolithic period.

To account for the possible impact of Roman legacies on inheritance traditions we resort to a shapefile of the Roman road network as depicted in Talbert (2000). We use it to calculate the density of Roman roads for each municipality (km of certain Roman roads per km²).

We consider the market size of a municipality’s products by calculating domestic (inside Baden-Württemberg) market potential in 1500. We base this calculation on the data set of historical city population by Bairoch et al. (1988) and follow the methodology of Crafts (2005).⁹

The Online Appendix provides an overview of all variables used in the empirical analysis, alongside a short description.¹⁰

Figures 4 and 5 show the spatial distribution of several geographic and historical variables among the municipalities of Baden-Württemberg and the historical inheritance border. The equal partition area has more intersecting Roman roads, fewer areas which were deforested and first settled during the Middle Ages, fewer ecclesiastical territories, and fewer Imperial cities. It also shows more early medieval Germanic settlements. The positive relationship between political

⁹For a comprehensive description of both variables, the reader is referred to the Data Appendix.

¹⁰There, we also have a table of bivariate correlations between all the variables used in the empirical analysis (Table A.2). In most cases, the correlations between the predictor variables are modest, and they are never larger than -0.41 (between the share of pre-medieval forest area and elevation.).

stability and equal partition, as shown in Figure 5(d) exists solely because of the green area in the middle (which is almost identical to the Duchy of Württemberg).

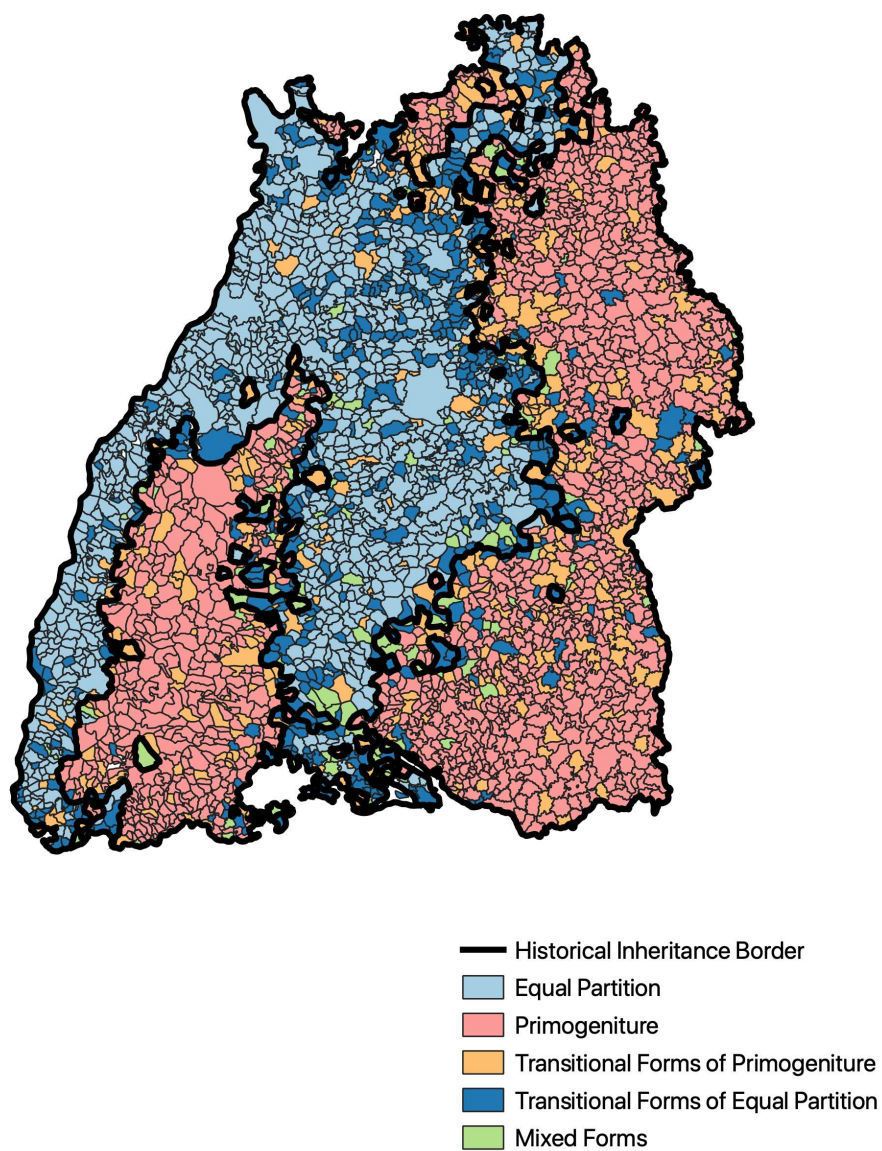


Figure 2: *Inheritance Practices and the Historical Inheritance Border (with Exclaves) in 1953 (according to Röhm (1957))*

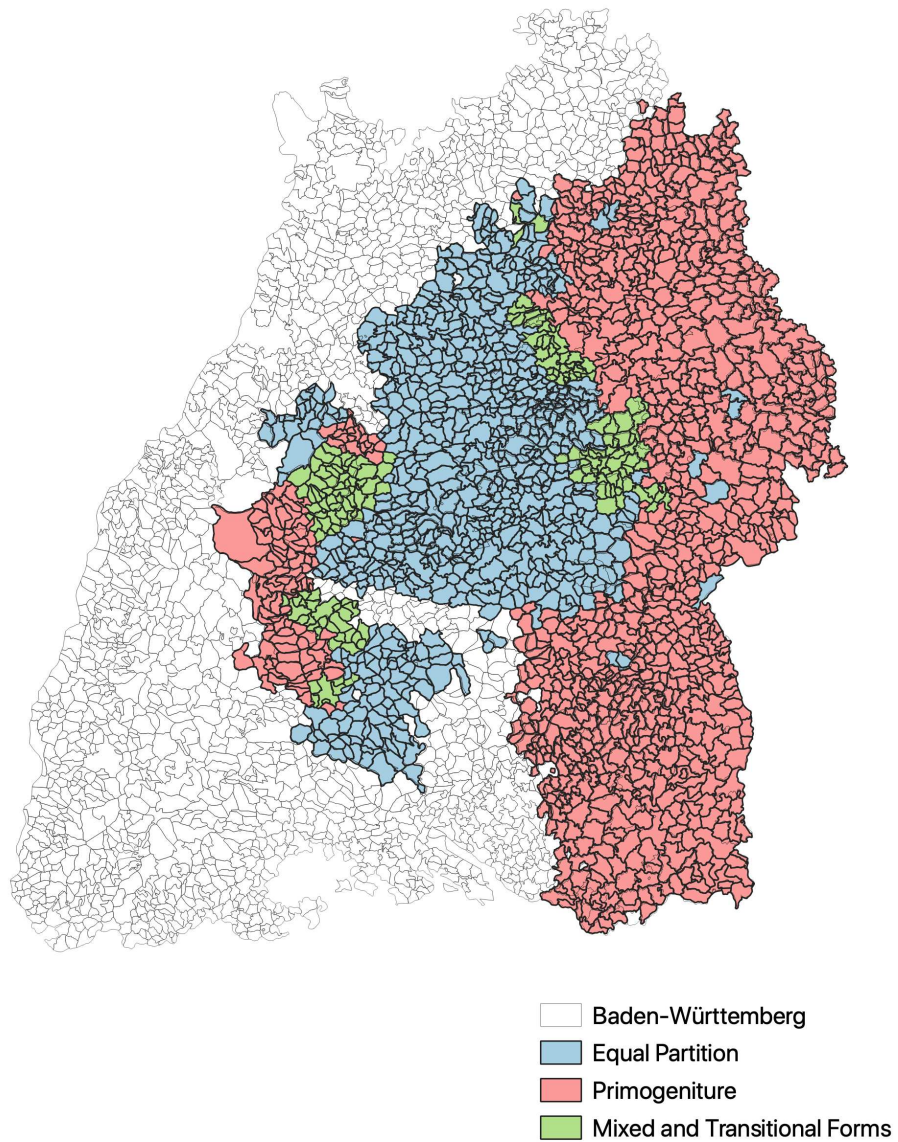
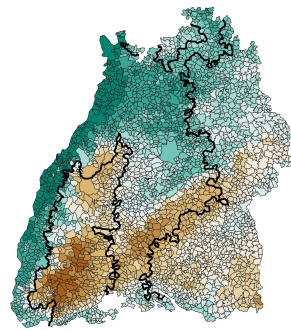
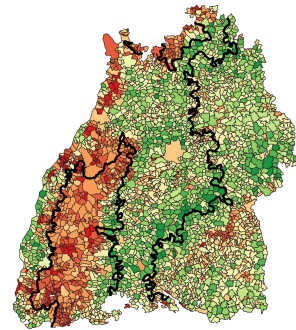


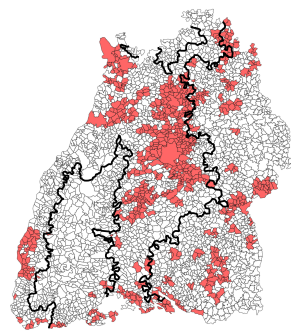
Figure 3: *Inheritance Practices in Württemberg in 1905 (according to Krafft (1930))*



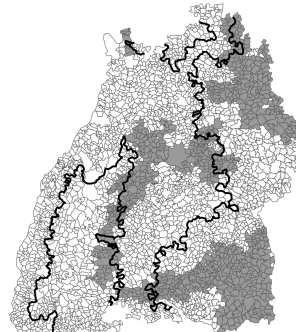
(a) *Elevation (mean)*



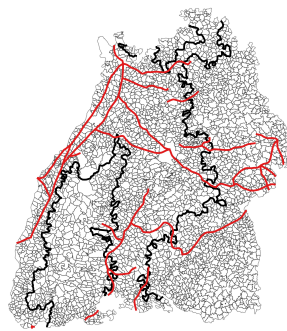
(b) *Soil Suitability*



(c) *Neolithic Settlement Area*



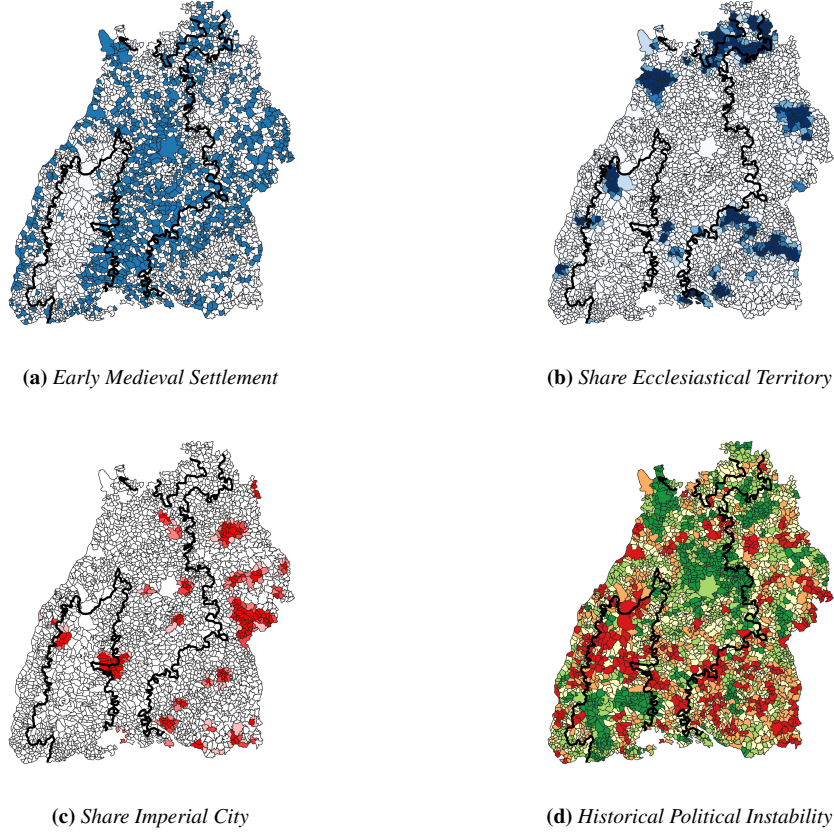
(d) *Pre-Medieval Forest Area*



(e) *Certain Roman Roads*

Note: In Panel (a), elevation increases from dark green to dark brown. Panel (b), shows average soil suitability in a municipality, with the dark green indicating high soil suitability and red low suitability.

Figure 4: *Potential Geographic and Early Historical Determinants of Equal Partition and the Historical Inheritance Border*



Note: In Panel (b), the darker blue the municipality is colored the more of its territory was located in an ecclesiastical state, white indicates a share of zero. In Panel (c), the darker red the municipality is colored the more of its territory was located in an Imperial city, white indicates a share of zero. In Panel (d), the dark green indicates high political stability and red high political instability.

Figure 5: *Potential Medieval and Early Modern Determinants of Equal Partition and the Historical Inheritance Border*

5. Explaining Equal Partition in Baden-Württemberg

This section presents the regression results that explain the prevalence of equal partition to this day, and hence tests our hypotheses.

5.1. Explaining the Origins of Equal Partition

To explain the origins of equal partition in Baden-Württemberg before 1850, we run probit models of the following form:

$$\begin{aligned} & \Pr(EP_i | \mathbf{G}_i, \mathbf{SETHIST}_i, \mathbf{X}_i) \\ & = \Phi(\alpha + \beta' \mathbf{G}_i + \gamma' \mathbf{SETHIST}_i + \delta' \mathbf{X}_i + \epsilon_i) \end{aligned} \quad (1)$$

EP_i is a dummy variable that indicates whether a municipality i is located in the historical equal partition area (where it was dominant before 1850). G_i is a set of variables measuring potentially relevant geographical factors (elevation and soil suitability). $SETHIST_i$ are historical factors capturing the settlement history of a municipality. Consequently, these are dummy variables indicating whether archaeologists found at least one Celtic grave in the municipality, the share of a municipality's area located in the Neolithic settlement area, a dummy variable equal to one if a municipality was settled during the early medieval period (before 800) by a Germanic tribe, and the share of a municipality's area that was settled only during the early Middle Ages (and then often deforested).

X_i is a set of ancient, late medieval, and early modern predictors. We consider Roman road density (km of Roman road per km² of municipal area). This accounts for the idea that the Romans brought their culture into the Germanic lands, and hence shaped the pattern of modern Germany's inheritance tradition, specifically by introducing more written wills and more individual (and more egalitarian) inheritance (see, e.g. Huppertz, 1939; Röhm, 1957; Schröder, 1980; Willenbacher, 2003). We further include the share of a municipality's areas that were part of an ecclesiastical state or an Imperial city, a dummy equal to one if a municipality was located in the duchy of Württemberg in 1789, and distance to the closest Imperial city. This accounts for the fact that, according to the literature (see, e.g. Röhm, 1957) ecclesiastical territories and Imperial cities had a tendency to enforce primogeniture, while the dukes of Württemberg enforced equal partition in their realm.¹¹ Distance to the closest Imperial city is a measure for the strength of the outside option, meaning how easy it was for non-inheriting children to migrate from a rural village to a city. It also reflects second nature geography by accounting for the fact that land close to urban markets is more intensively cultured—an idea going back to von Thünen (1826).¹² Finally, we include measures of historical political fragmentation and historical political instability. Those are meant to account more broadly for the effect of the political environment and the capacity of rulers to enforce one or the other practice in general. ϵ_i is the error term. We cluster the standard errors on county level and report average marginal effects in the regression tables.

At first, we analyze the effect and explanatory power of geographic variables and deep-rooted, historical factors connected to the settlement history of a municipality. The first two columns of Table 3 show the average marginal effects resulting from estimating probit models with these variables. We start by only including geographic variables. These are statistically significant and show the expected signs (elevation has a negative, soil quality a positive coefficient). They alone explain around a sixth of the occurrences of equal partition. As presumed before, equal partition is significantly more likely in areas with favorable natural conditions (low elevations and high soil suitability).

In column (2), we consider variables proxying for settlement history until the Middle Ages. The share of Neolithic settlement area and early Germanic settlements have a significant and positive impact on the probability of equal partition and the share of a municipality settled only during medieval times is negatively significant. They explain around 7% of the variation in inheritance traditions among municipalities. This provides suggestive evidence for the non-negligible role of the feudal system, enforcing primogeniture on the serfs and limiting the amount of freely available land. In combination, the latter two results support Röhm's hypothesis that equal par-

¹¹Explanations for their behavior vary. Usually, the literature connects these efforts to the Dukes becoming Protestants. But it might well be that they wanted to prevent the creation of powerful landed estates in their duchy.

¹²Data on Prussian agriculture supports this idea within the context of Germany (Kopsidis and Wolf, 2012). This establishes a causal link from the proximity of cities to more equal partition.

tion has Germanic roots, is the original inheritance practice, and that primogeniture emerged during the Middle Ages in areas newly deforested by territorial rulers and settled with serfs.

In column (3), we study factors and phenomena from different time periods that could also potentially affect inheritance traditions. We test the importance of factors like Roman presence, the urban outside option, political fragmentation, or politics by the rulers (especially the dukes of Württemberg). The variables measured in the early modern period are potentially already endogenous to inheritance traditions and hence their estimated coefficients should be interpreted with caution. In particular, we add variables for the density of Roman roads, and average levels of medieval and early modern political fragmentation and instability, which measure the effect of particular types of states, like ecclesiastical states, Imperial cities, or the Duchy of Württemberg, and for domestic (within Baden-Württemberg) market potential. Here, Roman road density and distance to Imperial city, as a measure for the strength of the outside option of non-inheriting children, are robustly significant yet the latter only shows a comparatively small effect (increase in the probability of equal partition by 1%). Having been part of the Duchy of Württemberg also matters as well as market potential. When comparing the Pseudo- R^2 values of these regressions to that of the geographic or early historical variables, it turns out that all these actors together only explain around 17% of the variation in the dependent variable. Thus, their explanatory power is roughly the same as those of the two geographic variables.

In column (4), all the different variables are included in the regression simultaneously. All the geographic and settlement historical variables including Celtic graves show robustly significant coefficients in line with our expectations. A one unit increase in soil suitability increases the probability of practicing equal partition by on average around 0.9%. To put this into perspective, if soil quality increases by one standard deviation (8.3 units), the probability of equal partition increases on average by around 7.4%. An increase in elevation by one meter decreases it by 0.07%. Equal partition is also more like to occur in areas with Roman activity and those that were settled before the feudal system was developed in the early Middle Ages when land was free and abundant. Complementary to this, we also learn that equal partition is significantly less likely in areas deforested and settled only during the Middle Ages, where an increase in the share of medieval settlement area in a municipality's total area by one standard deviation (36%) decreases the likelihood of equal partition by 5.9%.¹³

To summarize, these regressions suggest that geography and settlement history, but also the emergence of feudalism, the outside options provided by proto-industry in early modern cities, and the policy decisions by the Dukes of Württemberg can explain around one third of the historical prevalence of equal partition. Two thirds of the variation however remain unexplained by these factors and may result from regional idiosyncrasies, random cultural drift, or unobserved factors.

¹³This is calculated as follows: The average marginal effect shown in Table 3, column (4) is -0.1656. The standard deviation of the variable is 0.363. Thus, the effect of an increase in the share of medieval settlement area is given by multiplying -0.1656*0.36, which is -0.059616, or 5.9% as stated in the text.

Table 3: *Explaining Equal Partition with Geography and Historical Factors*

Dep. Var.	(1)	(2)	(3)	(4)
	Historical Equal Partition Area			
Elevation	-0.0011*** (0.000)			-0.0007*** (0.000)
Soil Suitability	0.0071*** (0.003)			0.0092*** (0.002)
Celtic Grave		0.0360 (0.041)		0.0500** (0.024)
Share Neolithic Settlement Area		0.8503*** (0.188)		0.3403** (0.139)
Early Medieval Settlement		0.0660** (0.033)		0.0795*** (0.025)
Share Medieval Settlement		-0.2897*** (0.083)		-0.1656*** (0.058)
Roman Road Density			0.6545*** (0.137)	0.3756*** (0.110)
Historical Political Fragmentation			-0.0000 (0.000)	0.0000 (0.000)
Historical Political Instability			-0.0131 (0.013)	-0.0028 (0.010)
Share Ecclesiastical Territory			0.0315 (0.072)	-0.0282 (0.062)
Share Imperial City			-0.1985 (0.142)	-0.1229 (0.110)
Württemberg 1789			0.1528** (0.065)	0.1758*** (0.047)
Distance to Imperial City			0.0086** (0.004)	0.0084*** (0.003)
Domestic Market Potential			0.3919*** (0.104)	0.2188** (0.097)
Pseudo- R^2	0.164	0.066	0.17	0.309
Observations	3,378	3,374	3,374	3,374

Notes. Standard errors clustered on county (Landkreis) level are in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 % and *10 % level. The table shows Probit estimates and the coefficients report average marginal effects. The unit of observation is a municipality in 1953. All regressions include a constant not reported.

5.2. Robustness of the Results

To test the sensitivity of our results we conduct various robustness checks in Tables 4. The first concern we deal with is connected to areas not settled and forested until the 19th century.¹⁴ In areas with a high proportion of forests, other types of agriculture were present, and lumber

¹⁴The share of pre-19th century forest areas is highly correlated with soil suitability (bivariate correlations is 0.41). To include both in one regression might lead to collinearity.

industry probably played an important role. We run a regression that excludes all municipalities that overlap with areas that were not settled or deforested before the 19th century (Table 4, column (1)). The results change to a minor extent when these areas are excluded, and soil suitability remains significant.

This suggests that the impact of soil suitability is not primarily driven by the low soil quality of forested areas that were also mountainous, like the Black Forest. Nevertheless, Figures 4 and 5 suggest that the western primogeniture area is similar, yet not identical to the extent of the Black Forest. To further elaborate on this point and to ensure that the effect of geography from the baseline results is not entirely explained by this area, we estimate a regression excluding all municipalities within the western primogeniture area (column (2)). Soil suitability stays significant, but its coefficient is smaller than before. The additional variables, including elevation, remain significant and their coefficients are rather stable.¹⁵

To reduce unobserved heterogeneity and spatial autocorrelation, we introduce historical state fixed effects (column (3)). We assign each municipality in our data set to the state it belonged in 1789. The assignment is based on maps of historical territories in the Holy Roman Empire in 1789 from Wolff (1877) which we digitized and introduced in Huning and Wahl (2020). The overall conclusions are left intact, but the Celtic grave dummy is significant and increases in coefficient. The negative coefficient of the share of a municipality located in a previous Imperial city is significant too. This is in line with historical arguments about the importance of state policies. It is likely that Imperial cities preferred to be surrounded by larger farms in order to feed their population at scale, and hence actively enforced primogeniture in their proximity.

In column (4), we control for the effect of historical wine-growing. Historians consider wine-growing to be one of the most decisive intensive-agricultural activities responsible for the emergence of equal partition. It is, however, also an endogenous variable, very likely reflecting demand and therefore market size. The inclusion of a dummy variable equal to one if a municipality produced wine before 1624 does not affect the results of the other variables very much, but the dummy itself is significant and positive. This implies that historical wine municipalities have a 15% higher probability of applying equal partition. This once more underscores the importance of agricultural conditions and activities for the equal partition.

We investigate whether our results are different when we turn to the geographic pattern of inheritance norms in 1953. We re-estimate our probit regression from Table 3 this time using a dummy variable equal to one if equal partition was the dominant inheritance practice in 1953. We also take into account that in various municipalities in the historical equal partition area, mixed or transitional inheritance practices were prevalent in the middle of the 20th century. These mixed and transitional forms can potentially bias our results as the municipality in which it occurred is not random.

¹⁵Another set of robustness checks tests the sensitivity of the results with regard to the estimation method. Results should not change decisively if one estimates a logit or a linear probability (OLS) model. In both cases, the results are virtually identical to probit ones. Another issue with the baseline estimates could be the presence of spatial autocorrelation. While clustering standard errors on county level already mitigates this issue, it is necessary to account for this more thoroughly. Therefore, we estimated the baseline regression as linear probability model and compute Conley standard errors that adjust for spatial autocorrelation (Conley, 1999) within 100km. Most of the time, the Conley Standard errors are slightly smaller or similar to the ones clustered on county level, and consequently, the significance level of the coefficients is always the same. Results of those regressions are available from the authors upon request.

Table 4: Determinants of Equal Partition—Robustness Check

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)
	Historical Equal Partition Area				Equal Partition in 1953	
	Without Forests	Without Western Primogeniture Area	States 1789 FEs	Including Historical Wine-growing	Equal Partition in 1953 w.o.Transitional Forms	With Early Settlement Dummy & Distance
Robustness Check						
Elevation	-0.0005*** (0.000)	-0.0005*** (0.000)	-0.0007*** (0.000)	-0.0006*** (0.000)	-0.0007*** (0.000)	-0.0008*** (0.000)
Soil Suitability	0.0041** (0.002)	0.0050** (0.002)	0.0104*** (0.002)	0.0084*** (0.002)	0.0085*** (0.002)	0.0091*** (0.002)
Celtic Grave	0.0050 (0.020)	0.0202 (0.023)	0.0683*** (0.023)	0.0455** (0.023)	0.0613** (0.024)	
Share Neolithic Settlement	0.3086** (0.135)	0.4010*** (0.149)	0.2001** (0.081)	0.2281* (0.124)	0.3198** (0.128)	
Germanic Settlement	0.0485** (0.024)	0.0595** (0.024)	0.0509** (0.020)	0.0732*** (0.025)	0.0838*** (0.024)	
Share Medieval Settlement	-0.2399*** (0.056)	-0.1815*** (0.059)	-0.0367 (0.052)	-0.1621*** (0.057)	-0.1554*** (0.058)	-0.1247** (0.060)
Roman Road Density	0.2636** (0.104)	0.3157** (0.123)	0.2261*** (0.081)	0.3871*** (0.106)	0.3360*** (0.090)	0.3362*** (0.112)
Historical Political Fragmentation	0.0000 (0.000)	0.0000 (0.000)	-0.0000 (0.000)	0.0000 (0.000)	-0.0000 (0.000)	0.0000 (0.000)
Historical Political Instability	-0.0034 (0.010)	-0.0097 (0.011)	-0.0022 (0.009)	-0.0026 (0.010)	0.0029 (0.009)	-0.0087 (0.010)
Share of Ecclesiastical Territory	-0.0163 (0.063)	-0.0453 (0.063)	-0.0461 (0.049)	-0.0116 (0.059)	-0.0464 (0.054)	-0.0263 (0.061)
Share Imperial City	-0.0509 (0.083)	-0.1505* (0.088)	-0.1024** (0.042)	-0.1182 (0.110)	-0.1651* (0.089)	-0.1060 (0.106)
Württemberg 1789	0.2572*** (0.046)	0.1833*** (0.055)	0.5088*** (0.079)	0.1528*** (0.047)	0.2111*** (0.044)	0.2173*** (0.044)
Distance to Imperial City	0.0133*** (0.002)	0.0120*** (0.003)	0.0044 (0.003)	0.0090*** (0.002)	0.0088*** (0.002)	0.0069*** (0.003)
Domestic Market Potential	0.1656* (0.099)	0.2226** (0.102)	0.1492** (0.064)	0.2257** (0.090)	0.2664*** (0.102)	0.1846** (0.094)
Historical Wine-growing				0.1420*** (0.038)		
Early Settlement						0.1462*** (0.028)
Distance to Medieval Settlement						0.0039** (0.002)
Observations	2,324	2,688	3,208	3,374	2,318	3,374
Pseudo- R^2 / R^2	0.344	0.338	0.531	0.327	0.421	0.318

Notes. Standard errors clustered on county (Landkreis) level are in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 % and *10 % level. The table shows probit models in columns (1), (2), (4)–(6). Coefficients of probit models report average marginal effects. The unit of observation is a municipality in 1953. Regressions in column (6) include a constant not reported.

Thus, we exclude municipalities with mixed or transitional inheritance traditions from this regression. The results (visible in column (5)), are similar to those obtained for the historical inheritance traditions. Again, the only exception is the Celtic grave dummy which becomes marginally significant, without being substantially larger than in the main regressions.

In conclusion, the same set of factors explains both contemporary and historical inheritance practices.

In column (6), we use the three variables measuring settlement history (Celtic graves, early medieval settlements, and the share of Neolithic settlements) to code a new dummy variable “Early Settlement”, which is equal to one if the Celtic grave or the early medieval Germanic settlement dummy are one, or the share of Neolithic settlement area is larger than zero. Thus, we combine these variables into one and test whether this single variable is significant. We also include a variable for the distance of each municipality to the medieval deforestation/settlement areas as an additional variable. This is to test our argument about the impact of feudalism and the resulting scarcity of free land more explicitly. The reasoning is that in areas close to the ones newly deforested and settled with serfs during the Middle Ages, free land should have become most scarce. Thus, municipalities there maybe switched from equal partition to primogeniture. Therefore, we expect a positive relationship between equal partition and distance to these areas. However, it is clear that our data does not allow us to differentiate between municipalities that switched to primogeniture, and ones that had already introduced it before the medieval deforestation. Therefore, the results regarding these points are highly suggestive. It turns out that the early settlement dummy is highly statistically significant and positive and the distance to medieval settlements is positively and significantly related to equal partition too.

To test whether the results from Baden-Württemberg in 1953 hold for inheritance traditions in an earlier period and another sampling area, we look at the determinants of equal partition in the kingdom of Württemberg in 1905 (from Krafft, 1930).¹⁶ A focus on Württemberg also cuts out large parts of the potentially idiosyncratic Black Forest area. The rest of the variables come from the same sources and were calculated according to the same methodologies as for 1950.¹⁷ We re-estimate Table 3, for the 1,912 municipalities Württemberg possessed in 1905. Table 5 shows the results. The results are almost identical. Settlement history and geographic factors are also important for explaining inheritance traditions in 1905. However, there are differences to the baseline results. Roman road density is not significant anymore. Both historical political fragmentation and instability are indeed significant, and instability has an unexpected negative sign. Distance to Imperial cities is also not significant anymore. This puts into question whether the results for the early modern factors are generalizable; however, as these are potentially endogenous to the inheritance traditions, one should not make too much of these results.

¹⁶We thank Sebastian Braun for having provided us with the shapefile of the borders of the municipalities in Württemberg in 1905.

¹⁷A descriptive overview of this data set is provided in the Online Appendix, Table A.2.

Table 5: Explaining Equal Partition in the Kingdom of Württemberg in 1905

Dep. Var.	(1)	(2)	(3)	(4)
	Equal Partition in 1905			
Elevation	-0.0008*** (0.000)			-0.0008*** (0.000)
Soil Suitability	0.0056* (0.003)			0.0083*** (0.002)
Celtic Grave		0.0560 (0.042)		0.0767*** (0.028)
Share Neolithic Settlement		1.0005*** (0.187)		0.5160*** (0.139)
Share Early Medieval Settlement		0.0525 (0.039)		0.0519** (0.021)
Share Medieval Settlement		-0.1946** (0.081)		-0.1151** (0.053)
Roman Road Density			8.4812 (9.051)	4.5828 (6.993)
Historical Political Fragmentation			0.0000** (0.000)	0.0000*** (0.000)
Historical Political Instability			-0.068*** (0.017)	-0.0584*** (0.014)
Share Ecclesiastical Territory			-0.0543 (0.099)	-0.0025 (0.082)
Share Imperial City			-0.0243 (0.094)	-0.0019 (0.075)
Württemberg 1789			0.3233*** (0.062)	0.2903*** (0.052)
Distance to Imperial City			-0.0008 (0.006)	0.0024 (0.004)
Domestic Market Potential			0.3780* (0.203)	0.6721*** (0.154)
Pseudo- R^2	0.069	0.095	0.214	0.405
Observations	1,912	1,910	1,909	1,907

Notes. Standard errors clustered on county (Landkreis) level are in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 % and *10 % level. The table shows Probit estimates and the coefficients report average marginal effects. The unit of observation is a municipality in 1895. All regressions include a constant not reported.

5.3. Additional Results

Our theoretical considerations discuss the conditions for change in the inheritance traditions. Historical and economic literature suggests that until 1800 the inheritance traditions were stable. However, 19th century industrialization, and the increase in social interactions and mobility it brought along, should have led to changes in the historical inheritance traditions in some places. We investigate the factors determining changes in inheritance traditions between 1850 and 1950 in Online Appendix A.3. There, we discuss the relevant literature and provide empirical evidence showing that social interaction, imitation, and the exchange of ideas seem to be a major

factor driving cultural change. However, measures of industrialization (like railway access and population density) also seem to matter for changes in inheritance traditions.¹⁸

6. Discussion and Implications

Inheritance traditions have raised the attention of scholars around the world. In this paper, we have exploited small-scale geographic data to understand in detail how different traditions that shape the endowment with land to the day have been shaped historically. These are related to the understanding of income differences, particularly via institutional divergences in the wider world, but also related to the understanding of Europe's and Germany's specific path to affluence.

In the context of the Great Divergence debate, it is a classical argument that Britain benefited from primogeniture (see O'Brien, 1996, for an overview). Already Fairbank (1978) argued that China on the contrary was held back by equal partition. On the 'Long Divergence' between Western Europe and the Middle East, Kuran (2012) suggests that, among other factors like institutional and organizational stagnation, Islamic Law that constituted the right to bequeath to many relatives led to asset fragmentation, and fostered the emergence of despotic regimes in the Middle East.

On Western Europe, Popa (2019) claimed that unequal partition (which includes primogeniture) fostered urbanization, and finds a negative correlation between urbanization and equal partition. Hager and Hilbig (2019), a recent study of Germany which uses the same data source as our paper, finds that Western German areas of equal partition have a more egalitarian wealth distribution. There are also fewer aristocrats within the elites, and more women are elected into power. They view this as a consequence of wealth equality and pro-egalitarian preferences. In Huning and Wahl (2019), we exploit a spatial discontinuity design and find that inheritance tradition can explain more than a third of inter-regional income differences. Its results suggest that more than a third of the overall inter-regional difference in average per capita income in present-day Baden Württemberg, or 597 Euro, can be explained by equal partition. Regarding Western off-springs, Menchik (1980) studies the influence of immigrants' inheritance traditions on wealth distribution in the United States.

Our paper can help to study all these aspects and regions as it draws attention to the origin of inheritance traditions. Despite the fact that our study is limited in geographic scope, our analysis is aimed at supporting the literature by further understanding the causal effect of informal institutions on worldwide inequality and development, both in the past and present, and to identify temporal dynamics and interaction with other phenomena like the industrialization, or the demographic transition.

7. Conclusion

This paper studies the origins of agricultural inheritance traditions in the German state of Baden-Württemberg. It finds that a combination of historical and geographical factors are responsible for the emergence and persistence of these traditions up to the present day. Deep-rooted historical factors like settlement history significantly correlate with their presence. Importantly,

¹⁸Our theoretical reasoning also implies an association of equal partition with the abandonment of villages during the Middle Ages. If it is correct, we should see a positive and statistically significant relationship between deserted villages and equal partition. We test this in Appendix A.3.1 (Table A.5) and found suggestive evidence for this being true.

geographic factors, such as elevation, or land scarcity, are particularly important for explaining their prevalence. In addition, there is a role played by political aspects, including the rise of feudalism and decisions of individual actors as well as for Roman legacies. Nevertheless, geographic factors matter more for explaining the historical prevalence of the inheritance traditions than all the other factors. The Germanic tradition of giving the father complete freedom in inheriting agricultural property resulted from the fact that land was free and abundant, and that the land in these areas was good enough to allow for small farms. Thus, it seems that geography and natural conditions imprinted cultural practices and social norms, as argued by Henrich (2015); Giuliano and Nunn (2020), and also seem responsible for the documented large persistence of these practices until the period of industrialization and up to the present day.

We emphasize that more research and collection of data on inheritance traditions for earlier periods is necessary to get a full understanding of the origins and especially the long-term evolution of agricultural inheritance rules. With this data, scholars will be able to more closely investigate the determinants of change in inheritance traditions occurring since the 19th century. They can also have a closer look at the reasons behind the Roman legacy of agricultural inheritance traditions this study has revealed. Our theoretical considerations and empirical results could guide such future research attempts towards avenues of general interest for scholars who study the origin and persistence of, and changes to, cultural practices in an economic context.

Acknowledgements

We would like to thank the editor, Timur Kuran, as well as two anonymous reviewers for their constructive and helpful comments. We also thank Sibylle Lehmann-Hasemeyer, Nikolaus Wolf, Eric Chaney, Giacomo De Luca, Alexander Donges, Matthias Morys, Nathan Nunn, Steven Pfaff, Ulrich Pfister, Andrew Pickering, Yannay Spitzer, Jochen Streb, and Max Winkler. We also thank seminar participants in York, Hohenheim, and Göttingen as well as the participants of the III. Congress on Economic and Social History 2019 in Regensburg and the 18th Annual ASREC Conference 2019 in Boston, especially Jared Rubin, Mark Koyama, and Sascha Becker, and the 2nd Workshop on Geodata in Economics 2019 in Hamburg especially Stefano Falcone, Maxim Pinkovskiy and David Weil.

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