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HISTORY'S MASTERS: THE EFFECT OF EUROPEAN MONARCHS ON STATE PERFORMANCE

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ABSTRACT

We create a novel reign-level dataset for European monarchs, covering all major European states between the 10th and 18th centuries. We first document a strong positive relationship between rulers’ intellectual capabilities and state-level outcomes. To address endogeneity issues, we exploit the facts that i) rulers were appointed according to primogeniture, independent of their ability, and ii) the wide-spread inbreeding among the ruling dynasties of Europe led to quasi-random variation in ruler ability. We code the degree of blood relationship between the parents of rulers. The ‘coefficient of inbreeding’ is a strong predictor of ruler ability, and the corresponding instrumental variable results imply that ruler ability had a sizeable bearing on the performance of states and their borders. This supports the view that ‘leaders made history,’ shaping the European map until its consolidation into nation states in the 19th century. We also show that rulers mattered only where their power was largely unconstrained. In reigns where parliaments checked the power of monarchs, ruler ability no longer affected their state’s performance. Thus, the strengthening of parliaments in Northern European states (where kin marriage of dynasties was particularly widespread) may have shielded them from the detrimental effects of inbreeding.

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A data appendix is available at http://www.nber.org/data-appendix/w28297

"It was a time ... 'when the destinies of nations were tied to bloodlines'."

– Robert Bartlett ("Blood Royal: Dynastic Politics in Medieval Europe," 2020, p.432)

1 Introduction

A growing literature points to the importance of leaders for the performance of their firms or organizations (c.f. Bertrand and Schoar, 2003; Malmendier and Tate, 2005; Dippel and Heblich, 2021). Likewise, characteristics of local leaders in developing countries have substantial effects on public goods provision and conflict in the region or community under their control (c.f. Chattopadhyay and Duflo, 2004; Do, Dray, Huillery, and Keene, 2020; Eslava, 2020). However, identifying such effects at the *national* level is difficult. The question whether national leaders can shape their countries' fortunes has been widely debated in social sciences over the past two centuries. Early advocates proposed the strong view that the "history of the world is but the biography of great men" (Carlyle, 1840, p. 47). Subsequent qualitative analyses of biographies and comparative studies have lent support to an important role played by individual leaders.[1] On the other hand, a literature in the Marxist tradition has argued that underlying structural demographic and economic forces determine both a state's performance and the endogenous emergence of its leaders. Scholars in this strand view leaders has "history's slaves" (Tolstoy, 2007, p. 605); in the words of (Braudel and Reynolds, 1992, p. 679): "Men do not make history, rather it is history above all that makes men."[2]

Economists have brought identification to this debate. Jones and Olken (2005) show that random leadership transitions due to natural death or accidents are followed by changes in economic growth over the post-WWII period, providing convincing evidence that leaders do indeed matter. Besley, Montalvo, and Reynal-Querol (2011) expand the underlying data to 1875-2004, documenting that random departures of educated leaders cause particularly strong reductions in growth. While these results are an important step forward in identifying a causal effect of leader capability on state performance, some open issues remain: The actual "quality" of leaders is unobserved;

[1] Pointing to the historical consequences of individual leaders' failures or success is common, particularly among military historians – see for example Kennedy (1989) and Gueniffey (2020). A literature in political psychology has also underlined the importance of leaders' intellectual capabilities (c.f. Simonton, 2006). Horowitz, Stam, and Ellis (2015, p. 11) conclude that "leaders do matter in systematic ways that we can understand."

[2] In his opus magnum 'War and Piece,' Russian writer Lev Tolstoy attested to leaders that "every act of theirs...is...predestined from eternity" (Tolstoy, 2007, p. 605). Karl Marx himself had stated: "Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past. The tradition of all dead generations weighs like a nightmare on the brains of the living" (Marx, 1852). Friedrich Engels elaborated: "But that in default of a Napoleon, another would have filled his place, that is established by the fact that whenever a man was necessary he has always been found: Caesar, Augustus, Cromwell, etc." (Engels, 1968). This alternative view, cautioning the interpretation of history through the biography of individuals, is well alive in the modern debate as well. March and Weil (2009, p. 97) assert that "it is not at all clear ... that major differences in the success of organizations reflect differences in the capabilities of their leaders, or that history is the product of leaders' actions."

it is estimated as the fixed effect in economic growth during a leader's rule and therefore captures a plethora of other factors. The estimated effects of leader quality are ultimately based on the variance in growth during transition periods. This approach has attracted criticism: Easterly and Pennings (2020) argue that the "average growth rate during tenure is largely useless" due to the high volatility in growth rates. In addition, while the timing of the transition is exogenously determined by death, the initial appointment of the deceased leader and the time in office of the subsequent one are endogenous. To address this, the analysis must be restricted to a subset of both rulers' reigns – typically 5 years before and after the transition. Consequently, the results do not shed light on long-term effects of leadership. To make progress on these fronts, the ideal experiment would feature a sequence of randomly appointed leaders with varying, observed capabilities who govern over a long horizon. To the best of our knowledge, no such setting exists. However, Europe's monarchies over the late medieval and early modern period provide a context that gets relatively close. While this period has been most intensely discussed in the debate about the role of leaders in history, it has thus far not been examined empirically.

We study European monarchs over the period 990-1800, assembling a novel dataset on ruler ability and state performance at the *reign* level. To identify a causal effect of ruler ability, we exploit two imminent features of ruling dynasties: First, primogeniture – the pre-determined appointment of rulers by birth order, independent of their ability. Second, variation in ruler ability due to the widespread inbreeding of dynasties. Importantly, the negative effects of inbreeding were not understood until the 20th century; if anything, rulers believed that inbreeding helped to preserve 'superior' royal traits. In addition, the full degree of consanguinity (genetic similarity) was unknown due to complex, interrelated family trees over generations. Together, these features deliver quasi-random variation, where ruler ability is unrelated to the performance or potential of their states at the beginning of their reign.

We collect data on the ability of 331 monarchs from 13 states, building on the work by historian Woods (1906), who coded rulers' intellectual capability and character traits based on hundreds of biographies. To instrument for ruler ability, we collect the coefficient of inbreeding for all rulers with the necessary information on family lineages from the rich genealogical database http://roglo.eu/. This variable is a strong and robust predictor of ruler ability. We use two measures of state performance. First, Woods (1913) assessed state performance drawing on the work by numerous historians. While Woods explicitly aimed to assess ruler's intellectual capability and character traits independent of the performance of their state, this coding is prone to endogeneity issues. Our instrument addresses these under the exclusion restriction that inbreeding affected ruler ability but is not related to state performance via other channels. A threat to this condition arises if inbreeding affected the *assessment* of state performance by historians – for example, if they hypothesized negative effects of inbreeding on rulers, and in turn of bad rulers on states. This is unlikely because our main source proposed the opposite hypothesis.[3] Nevertheless, we address this issue by using a second, objective, proxy for state performance: changes in area during each ruler's reign. We derive this variable from Abramson (2017), who provides European state borders at 5-year intervals over the period 1100-1795.

We find that ruler ability is strongly associated with both measures of state performance, and our IV results suggest that this relationship is causal. These findings hold using country and century fixed effects. A one standard deviation (std) increase in ruler ability leads to 0.7 std higher state performance, and to an expansion in territory by about 10 percent. We also study the institutional circumstances under which individual rulers mattered particularly strongly, similar to Jones and Olken (2005) and Besley et al. (2011). To shed light on this question, we construct a novel country-year specific measure of historical constraints on rulers, combining definitions of the modern Polity IV score with historical sources on factors such as the power of parliaments. To bypass endogeneity issues, we use constraints on rulers from the period just before they were appointed. We find that the ability of unconstrained leaders mattered particularly strongly, while the capability of constrained rulers made almost no difference for their countries' performance.

We run a battery of checks to confirm the robustness of our results. Our findings are unaffected when we exclude episodes of governments by regents (for example, when rulers were minor at the time of their appointment), when excluding episodes of foreign rule, or those when the same monarch governed more than one state.[4] We also verify and extend Woods' (1906) and (1913) coding of ruler ability and state performance, showing that our results are robust even to a conservative coding that specifies ambiguous cases so that they work against a positive association between state performance and ruler ability. Our findings are robust to numerous alternative specifications such as using dummies for different levels of ruler ability, using ordered Probit, as well as clustering at the country, dynasty, and century level. By controlling for country fixed effects, our baseline results compare rulers within states while capturing long-run time trends via century fixed effects. We confirm the robustness of our results in alternative pair-level regressions that compare concurrent rulers *across* countries within shorter time periods.[5]

[3] Woods was a proponent of 'Social Darwinism,' viewing history as a process of natural selection. Woods' (1913) hypothesis was that moral and intellectual ability is inheritable, so that kin marriage among successful dynasties would produce *better* rulers. This introduces a bias *against* our findings. In addition, the negative effects of inbreeding on fitness were not accepted in biology until the second half of the 20th century. Conclusions such as the following were common: "Inbreeding as such does not cause degeneration; the testimony of biologists is conclusive on this point" (White, 1948, p. 417). See Wolf (2005) for detail on this debate. Correct measures of inbreeding were first developed by Wright (1921). When these measures eventually became available, Asdell (1948) showed that Woods' hypothesis was wrong, using Woods' (1906) own coding of ruler ability.

[4] Foreign rule refers to instances when monarchs of one country temporarily ruled over another country. For instance, Philipp II of Spain ruled Spain and Portugal from 1580 to 1598. When excluding episodes of foreign rule, we drop this observation for Portugal. When excluding monarchs who governed in more than one country, we drop both observations, his reign in Spain and that in Portugal.

[5] We identify for each monarch all rulers from other countries that had at least a one-year overlap in their reigns. We

Our IV results, in particular, are robust to excluding cases of unusually high inbreeding coefficients, and to restricting the sample to those rulers for whom historical sources explicitly confirm that they rose to power via primogeniture; for example, these specifications exclude all cases where a ruler from a new dynasty came to power. We also discuss potential threats to the exclusion restriction. For instance, such a threat would arise if royals tended to marry their kin when state performance was low, and if, in addition, low state performance during parents' reign led to low performance during the reign of the offspring. We show that this is not the case – past state performance predicts neither current state performance nor ruler ability. Similarly, our IV results are robust to controlling for lags in the coefficient of inbreeding. Another threat to our identification would arise if monarchs made strategic decisions on kin marriage for reasons that are correlated with the *prospects* for future state performance.[6] We address this possibility by exploiting only the *hidden* component of inbreeding that was due to kin marriage over previous generations – and which could only be assessed with methods in genetics that emerged in the early 20th century. We confirm our IV results based on this restrictive measure of inbreeding.

We make novel contributions both in terms of data collection and empirical results. We are the first to track the performance of European states at the *reign* level over a horizon of several centuries, allowing for fluid changes in their borders. In contrast, previous papers have typically used today's country borders as their unit of analysis, and they have relied on (half-) century level outcomes such as GDP per capita or urbanization. Our dataset thus opens a new dimension to study Europe's economic history. Using this novel dataset, we contribute to a large literature that has debated the role of rulers for nationwide outcomes. We analyze a period that has been at the center of this debate since its beginning in the 19th century.[7] Our paper is the first to provide causal identification of the importance of European rulers over the late medieval and early modern period. State performance during this period had long-lasting consequences, as the foundations for the modern nation states were laid across Europe. Our findings suggest that the territorial organization of Europe as we know it is at least in part the result of chance, embodied in the ability of individual rulers. We also contribute to a strand of the literature that has underlined the importance of individual characteristics of leaders in both managerial and political settings.[8] In

then run pair-level regressions in differences, also controlling for reign-specific fixed effects. We find that differences in inbreeding across concurrently ruling monarchs are a strong predictor of differences in their ability, which in turn drives differences in country performance.

[6]Note that in this case, controlling for past state performance would not necessarily address the endogeneity issue because the potential for future performance may be uncorrelated with current performance.

[7]For proponents of the "rulers matter" view see for example Carlyle (1840), Weber (1921), William (1880), and Spencer (1896). For the opposite view that "history makes men" see Marx (1852), Engels (1968), Braudel and Reynolds (1992). More recent contributions to this debate include March and Weil (2009), Logan (2018), Simonton (2006), and Xuetong (2019).

[8]C.f. Bertrand and Schoar (2003), Malmendier and Tate (2005), Bloom and Van Reenen (2007), and Becker and Hvide (2013) for the importance of managerial traits; and Ferreira and Gyourko (2014), Yao and Zhang (2015), Logan (2018), and Dippel and Heblich (2021) for results on traits of political leaders.

the managerial literature, Clark, Murphy, and Singer (2014) have documented that CEOs matter less when they are constrained by a well-defined governance structure, echoing the findings on constrained politicians by Jones and Olken (2005) and Besley et al. (2011).[9] Our interaction results show that institutional constraints also mattered in checking the power of European monarchs. This is particularly interesting because the detrimental effects of inbreeding became particularly severe in the 18th and 19th century, after centuries of inbreeding.[10] By that time, parliaments across Northern Europe had expanded their power (Van Zanden, Buringh, and Bosker, 2012). Thus, our results suggest that parliaments protected (some) European states from the adverse effects of their ruling dynasties' inbreeding.[11]

The paper is organized as follows. Section 2 introduces the historical background of European monarchs and Section 3 discusses our data sources and coding. Section 4 shows our main empirical results and discusses our identification strategy. Section 5 examines heterogeneity by institutional constraints on rulers. Section 6 concludes.

2 Historical Background: European Monarchs, 1000-1800

This section briefly reviews the historical background of European monarchs in the late medieval and early modern period. We pay particular attention to those features that render the setting a rich testing ground for identifying the causal effect of national leaders on state performance. First, national leaders mattered back then: Europe was ruled by monarchs whose actions shaped their countries' performance. Second, they – by and large – ascended to power because they happened to be the oldest surviving offspring of the previous monarch. Third, intermarriage among ruling dynasties was common. These latter two features of the context enable our identification strategy.

2.1 Rulers and Country Performance

Historiography and political science is full of examples linking the fate of countries to certain ruler's actions and their ability.[12] Many observers have noted the series of able rulers accompanying Prussia's rise from small polity to great power.[13] Among many of such examples, Kennedy

[9]Besley and Reynal-Querol (2017) document higher economic growth under hereditary leaders when constraints on them were weak, using data from 1875 onwards.

[10]The average coefficient of inbreeding increased by 80% between the 15th and the 18th century. In Northern Europe (comprising the countries of England, Scotland, the Netherlands, Denmark, and Sweden), this increase was particularly pronounced, with 180% as compared to 42% in the remaining countries.

[11]Our results also relate to a literature that studies political dynasties in modern democracies, where some prominent families repeatedly have members *elected* to important offices (c.f. Dal Bó, Dal Bó, and Snyder, 2009; George and Ponattu, 2018). In contrast, in our setting, succession was guaranteed by law, and dynasties were the central governing bodies over the course of centuries.

[12]Biographies published by historians consistently emphasize the importance of certain individuals and their leadership qualities in shaping the nations they ruled – e.g. for the U.K. see Roberts (2018) and MacCulloch (2018) for the effects of Churchill's and Cromwell's actions and convictions upon their native England.

[13]In particular, Frederick William I. (the "Soldier King," who reigned 1713-1740) and his son, Frederick II. (the "Great," 1740-1786), facilitated the rise of Prussia into the rank of a Great Power of Europe with their administrative

(1989) notes that one of the factors aiding Sweden's "swift growth from unpromising foundations" was "a series of reforms instituted by Gustavus Adolphus and his aides" increasing the efficiency of administration and allowing Sweden under Gustavus to play an outsized role in the Thirty Years Wars, which, "militarily and economically, (..) was a mere pigmy" when he ascended to the throne. Furthermore, the *shortcomings* of individual monarchs have been linked to political failures, such as in the case of John I of England, whose personal incapability in military matters resulted in Britain losing most of its continental possessions.[14] Similarly, the rising militarism in Germany, the naval buildup aiming to contest British dominance at sea, the break-up of the intricate system of alliances designed by Chancellor Bismarck are all linked to individual decisions of Emperor Wilhelm II of Germany. Röhl (1996) emphasizes emphasizes Wilhelm's character's role and these decisions in paving the way to World War I.

A Tale of two Carloses

In the empirical analysis, we compare rulers of the same country. In what follows, we provide an illustrative example of such a comparison. Carlos II was king of Spain from 1665 to 1700. Hailing from a line of successive marriages of relatives from the Spanish and Austrian Habsburgs, he was highly incestuous and commonly described an unable ruler with little effective power. While his parents technically were 'merely' uncle and niece, the build-up of consanguinity over previous generations due to marriage among relatives resulted in Carlos' parents sharing as many genes as siblings would. As the pedigree in Appendix Figure 1 shows, all of Carlos II's grandparents descended from Joanna and Philip I of Castile (Alvarez, Ceballos, and Quinteiro, 2009). The degree of inbreeding was of no concern when Carlos II's parents married in 1649.[15]

The "inbreeding depression" resulting from intermarriage over generations left Carlos II hostage to physical and mental fragility.[16] Carlos II only started talking at age 4, and walking at age 8. Alvarez et al. (2009) describe him as "physically disabled, mentally retarded and disfigured." As Carlos II became king of Spain when he was 4 years old, his mother Mariana became regent and initially influenced his policies. The resulting power struggles between factious rivals to influence

reforms and military decisiveness. And albeit – by his fathers achievements – "Frederick the Great came into a rich inheritance, (...) the favorable circumstances do not in the least explain his great success." (Woods, 1913, p. 159). The often idiosyncratic decisions of earlier rulers shaped the polity similarly, as for instance that of Elector John Sigismund to convert to Calvinism in 1613 (Clark, 2007, p. 115).

[14] "John was little, if at all, lagging behind Philip [his adversary] in wealth and resources. The explanation of the defeat [which lead to losing England's continental possessions] does not reside in economics. It rests between John's fault as a commander and his faults as a man." (Bradbury, Bradbury, p. 349)

[15] As we discuss below, restrictions on cousin marriage were not enforced among the European nobility, and knowledge about the adverse effects of inbreeding only emerged in the early 20th century and was not widely accepted even in academic circles until the second half of the 20th century. In addition, the 'hidden' degree of inbreeding in Carlos II's pedigree was, if anything, interpreted as a positive feature, signaling a 'clean' royal bloodline (Van Den Berghe and Mesher, 1980; Scheidel, 1995) .

[16] While population biology strongly suggests that inbreeding was further responsible for Carlos II's mental fragility, such assertions cannot be proven for historical cases, because genetic information is not available.

Carlos II did not aid in solving the domestic and foreign challenges Spain faced (Mitchell, 2013).[17]

The power struggles that followed Carlos II's death brought a new dynasty to the Spanish throne – the Spanish Bourbons. The ranks of the Bourbon dynasty first led to two relatively undistinguished monarchs.[18] Thereafter, the highly capable Carlos III came to inherit the throne in 1759 via the rules of primogeniture from his brother, who had left no heirs. Spain flourished under his reign, and contemporaries and historians hold him in high regards: He "was probably the most successful European ruler of his generation. He had provided firm, consistent, intelligent leadership (...) [and] had chosen capable ministers" (Payne, 1973, p. 371). Consequently, Carlos III's reign saw the "continued improvement in financial and commercial conditions, including agriculture and the useful arts" (Woods, 1913, p. 331). Importantly for our instrumental variable strategy, Carlos III's parents were cousins of third degree, and the hidden component of inbreeding was about that of first cousins, both substantially smaller than that of Carlos II a century earlier.

2.2 Dynastic Rule and Primogeniture

The vast majority of European monarchs came to power according to fixed rules of accession. While these rules differed across countries and time, primogeniture became increasingly common. Primogeniture determines that the eldest living offspring of the current ruler becomes the country's next ruler. This practice was common on the Iberian peninsula early on, from where it spread to other countries quickly (to England in 1066, and France in 1222). It gradually replaced the two other common forms of successions, that by siblings and other relatives of the current ruler, as well as election of rulers by feudal elites.[19] In most cases, agnatic primogeniture was practiced, implying that he eldest living male offspring was heir apparent. In the absence of a heir, for instance due to premature death of the current ruler dies, the reign passed on to close relatives.[20] Due of primogeniture, monarchs of the same country often were related by blood across many generations. For example, until the French revolution, all kings of France were direct ancestors

[17]"Diseased in mind and body from infancy, and constantly preoccupied with his health and eternal salvation, Charles II was incapable not only of governing personally but of either selecting his ministers or maintaining them in power. From the assumption of the regency by the Queen Mother, Mary Anne of Austria (...) to the death of Charles II not one of the many individuals who rose to power displayed genuine ability" (Hamilton, 1938)

[18]Philipp V (ruled from 1700 to 1745) and Ferdinand IV (1745-1759) "both were undistinguished rulers frequently incapacitated by near lunacy (Philip v dined at 5 a.m. and went to bed at 8 a.m., refusing to change his clothes)"(Carr, 1991). In both reigns, Spain's economic fortune improved moderately, starting off from the low levels left behind by Carlos II.

[19]Tullock (1987) describes theoretically that both current monarchs and elites favor primogeniture over other forms of succession, as it delivers political stability. Kokkonen and Sundell (2014) provide empirical evidence for this in our sample period. Often, kings crowned their sons while they were still alive to ensure a stable succession (Bartlett, 2020, p. 93).

[20]In general, the reign passed on to those individuals with the closest genealogical distance to the last male monarch. Whether this includes female lines of succession and the exact definition of genealogical distance differs by ruling dynasty according to their "house law". In some cases, such laws of ascension where incomplete and left multiple potential claimants to the throne. As in the case of the heirless death of Carlos II, such cases often resulted in succession crisis, sparked conflicts, and, later, amendments to succession laws to prevent such.

of Hugh Capet, who had ruled eight centuries earlier, from 987 to 996 and founded the "Capetian dynasty." Not all of the French kings after Capet are counted as member of this dynasty, as a few kings died heirless, and the direct line of succession from father to son broke twice until Napoleon. This happened first in 1328 (triggering a succession crisis that resulted in the Hundred Years War), when the Valois dynasty came to power, and again in 1589 with the rise of the Bourbon dynasty.[21] In general, only slightly more than half of the reigns for which we could unearth such information are clear cut cases of ascension to throne by primogeniture. More than three quarters of successors in Austria, Prussia, and France ascended through explicit primogeniture, but less than half did in England, Denmark, Russia, and Sweden.

2.3 Intermarriage Among Dynasties

Also *across* the countries of Europe, monarchs often were related by blood. The leaders of the Spanish and Austrian Habsburgs, for instance, practiced cousin marriages over multiple generations in the 16th century, culminating in Carlos II, as described above. Alvarez et al. (2009) argue that the frequent dynastic marriages ultimately resulted in the extinction of the Spanish Habsburgs. While the Catholic Church had formal restrictions on cousin marriage, these were rarely enforced for European monarchs.[22] In fact, intermarriage among royal dynasties *increased* throughout the early modern period (Benzell and Cooke, 2018), relatively unfettered by the Catholic Church's ban (which was eased from 7th to 4th degree cousins in 1215), and aided by Protestantism lifting the ban entirely. Even for Catholic rulers, however, the pope could – and usually did – grant "dispensations" (exceptions) from the ban.

2.4 The Negative Effects of Inbreeding on Capability

Offspring of repeated dynastic marriages were less likely to be capable monarchs. Inbreeding reduces genetic diversity and evolutionary fitness (Robert, Toupance, Tremblay, and Heyer, 2009; Ceballos and Álvarez, 2013; Royuela-Rico, 2020). It also systematically increases the risk of genetic disorders, affecting physical and mental capability. Children of first cousins have a five times higher risk of mental retardation (Morton, 1978) and their intelligence is reduced by 10% (Afzal et al., 1993). Inbreeding further results in lower height and weight (Fareed and Afzal, 2014b),

[21] The ascension of the Valois dynasty in 1328 illustrates the complexities of these successions. The sons of Philip IV all died heirless after relatively short reigns, so that multiple candidates were considered for the succession. Primarily the decision was between Philip VI, the son of Charles of Valois, brother of Philip IV, and Edward, offspring of a daughter of Philip IV and Edward II, King of England. The French estates and legal experts then excluded female lines from succession, such that Philip IV became the first king of France of the Valois dynasty. Note that, while starting a new dynasty, he was directly related to the former one, as Philip IV was his uncle. Uncertainties regarding the legal procedure in his ascension to the throne became a stepping stone into the Hundred Years War and led to British kings claiming heritage to the French throne for centuries.

[22] Restrictions on cousin marriage had been put in place starting from the 8th century to inhibit the formation of closed kinship networks through repeated intermarriage (Schulz, 2016). These restrictions increased the likelihood that bequests would fall to the Church (Goody, 1983), and would weaken the political power of kinship networks (Ausenda, 1999).

and it decreases fertility while raising child mortality (Fareed, Ahmad, Anwar, and Afzal, 2017), thus lowering the probability of successfully producing heirs for the dynasty (Alvarez et al., 2009). Indeed, Asdell (1948) shows that more inbred rulers were assessed by Woods (1906, 1913) as systematically less capable – despite the fact that Woods had the opposite hypothesis (see footnote 3).

In sum, our setting features rulers who ascended to power by pre-defined rules, independent of their inherent ability for office. At the same time, the frequent intermarriage and negative effects of incest yield quasi-exogenous variation in these monarchs' ability.

3 Data

In this section we describe our dataset of ruler ability and country performance at the reign-level.

3.1 Ruler Ability

Our measure of ruler ability comes from the work of Frederick Adam Woods. A lecturer in biology at MIT at the beginning of the 19th century, he took an interest in heredity and, ultimately, history. To understand the heredity of moral and mental status between generations, Woods turned his attention to the royal families of Europe.[23] In his 1906 publication on "Mental and Moral Heredity in Royality" (Woods, 1906), he "graded" more than 600 individual members of royal families on their mental and moral qualities. This grading (on a 0–10 scale) was based on adjectives used in written sources that describe these individuals. Woods concluded that mental and moral status is heritable.[24] In his endeavor to test for the heredity of mental and moral status, Woods ventured beyond the realm of biology to the "great men" debate in history (Carlyle, 1840). Woods noticed a correlation between able rulers and favorable political and economic conditions in the country they ruled. In his chapter on Portugal, he provided a tabular statement of graded ruler abilities and a brief textual description of Portugal's material conditions.

Our main data source is Woods' (1913) publication "The Influence of Monarchs." In this work, he extended his 1906 tabulation of the ability of rulers and their states' performance from Portugal to 13 states, ranging from their foundation until the French Revolution.[25] Woods coded the ability

[23] The appeal of this group of people to study heredity was manifold to Woods: The pedigrees of royal families were (and are) comparably well documented over multiple generations. Further, for most of these individuals, their life, character, and achievement was documented from letters, court biographies, or other written sources.

[24] Woods was part of a (then active) research agenda in biology on heredity sparked by the publication of Darwin's "Origin of Species" in 1859 and Galton's "Hereditary Genius" in 1869. Social Darwinism, foremost that of Grant (1919), had an influence on the eugenics crusade in the United States and the Immigration legislation after World War I (Saini, 2019). After World War II and the horrors of the Holocaust, Social Darwinism was largely discredited, as was the concept of heritability of traits such as mental or moral qualities (at the level of societies). While heritability of intelligence at the individual level is sizable (Neisser, Boodoo, Bouchard Jr, Boykin, Brody, Ceci, Halpern, Loehlin, Perloff, Sternberg, et al., 1996; Devlin, Daniels, and Roeder, 1997), differences between population groups are resulting from other environmental differences (Lewontin, 1970).

[25] In the appendix we show the covered states in selected years (Figure A.1) and a timeline of coverage for each state (Figure A.2). The states covered are Castile, Aragon (Spain), Portugal, France, Austria, England, Scotland, Holland,

of rulers for more than 300 European reigns by classifying the rulers into three distinct classes, namely into those exhibiting superior ability, inferior ability, and those in between.[26] Similar to his earlier 1906 work, this grading is largely based on the assessment of historians and contemporaries, as distilled by Woods from reference works and country-specific histories. Woods assigned a "+" to able rulers, a "-" to incapable ones and "±" to those not clearly capable or incapable. We transform these into "1", "-1", and "0" respectively.[27] Out of 331 reigns for which we have information on both the monarchs ability and the performance of the country, 124 are rated as clearly incapable, 120 as clearly capable, and 87 as neither.[28] For each of the reigns, Woods provided a brief summary underlying his assessment and references. For instance, Carlos III is described as "enlightened, efficient, just, and sincere. Not brilliant, but had a very well-balanced mind". Woods is brief on Carlos II, whom he summarized as an "imbecile" with negative virtues.

Anticipating concerns of data quality, Woods appealed to the coarse nature of the measurement and challenged that few revisions would be necessary by other individuals attaining similar assessments of monarch ability.[29] Thorndike (1936) had his student, Dr. Edith E. Osburn, "grade" the morality and intellect on a scale from zero to ten of more than 300 individuals rated earlier in Woods (1906).[30] At the same time, Thorndike had five more research assistants independently do the same coding. This data quality assessment resulted in correlations of the intellectual grade across different graders (including Woods) ranging from 0.73 to 0.82. We similarly asked a research assistant to assess the capability of individual rulers on the three-point scale of Woods (1913) based on articles in online encyclopedias. This exercise also largely confirmed Woods' coding (see Appendix A.3).

Another concern in measurement is bias in Wood's assessment or in the consulted historiography itself. Monarchs that happened to reign in a fortuitous period might have been assessed well because the country did well, not because of their capability. Such a bias is directly addressed by

Denmark, Sweden, Prussia, Russia, and Turkey. In contrast, most of the analysis in Woods (1906) did not extend before the 16th century.

[26]"Out of large groups, some few stand out as distinctly superior, some few as distinctly deficient, and between the two a mediocre class" (Woods, 1913)

[27]Cases where Woods expressed a doubt by, say, "+ or ±" are averaged, in this case to 0.5. In a robustness check, we recode all these cases conservatively so as to work against our baseline.

[28]Woods collected information for 368 reigns in total. Especially for early and short reigns, Woods did not provide an assessment. In instances of co-reign, as for Ferdinand and Isabella of Castile from 1479 to 1504, we generally take the assessment of one individual if it is only available for one of two rulers. When both are available, we use the assessment of the individual working against our hypothesis.

[29]"As there are only three grades, and the doubtful cases are allotted in a way to give the benefit of the doubt to an opponent of the conclusions, my position in the matter is a very safe one, and the assignment of grades becomes very easy. (...) I am ready to ask – who will challenge more than a very small per cent of these assignments ?" (Woods, 1913, p. 6).

[30]"[She] read what was printed about each of about four hundred of the persons studied by Woods, in each of the six biographical dictionaries used by him. This occupied her about forty hours a week for about eight weeks. She then read through the entire set of references again." (Thorndike, 1936, p. 322).

our instrumental variable strategy.

3.2 State Performance

We collect two measures of state performance at the reign-level. Our first measure again comes from Woods (1913). Corresponding to ruler ability assessments, he provides assessments of the political and economic ("material") condition during each reign. In particular, he aimed at covering the following affairs: "finances, army, navy, commerce, agriculture, manufacture, public building, territorial changes, condition of law and order, general condition of the people as a whole, growth and decline of political liberty, and the diplomatic position of the nation, or its prestige when viewed internationally," while purposefully excluding "literary, educational, scientific, or artistic activities " (Woods, 1913, p. 10). As with the assessment of ruler ability, Woods coded a three-valued variable summarizing the political and economic performance of the country during each reign as "+","±", and "-", which we transform to 1,0,-1.[31] Consider again the two Carloses of Spain. The incapable Hapsburg king Carlos II reigned over a country characterized by "misery, poverty, hunger, disorders, decline, especially in agriculture, finances and strength of the army" while a century later, Carlos III reign saw "continued improvement in financial and commercial conditions, including agriculture and the useful arts". As an additional example, consider Maria Theresa, who reigned over Austria from 1740 to 1780, and was judged by Woods as "able and very industrious". Under her reign, "the various portions of the kingdom [were] unified and centralized" and "Austria gained slightly in territory and greatly in prestige", while "industry, commerce, and agriculture improved." Many of the components of this composite measure are of a rather subjective nature, and furthermore individually assessed and then combined by Frederick Adam Woods, the very same person already assessing the ability of monarchs.

Our second measure of country performance therefore focuses on a continuously and objectively measurable aspect. We calculate the change in area ruled during the reign of each monarch. Abramson (2017) provides borders and the area of the independent polities of Europe at five year intervals from 1100 to 1795. We link these to the beginning and end of each reign and calculate the percentage change in area ruled during reign, $\Delta log(Area)$.[32] Figure A.4 shows an example of this measure of state performance. Austria during the reign of Maria Theresa lost some areas from 1740 to 1780 (in red) and gained some areas (in green), such that in net terms, Austria increased its area by 7%.

[31] We asked a research assistant to verify Woods' coding based on online encyclopedias, largely confirming his assessment.

[32] We link end dates of reigns to the closest larger five-year observation and start dates to the closest smaller five-year observation.

3.3 Coefficient of Inbreeding for European Monarchs

Our instrument for ruler ability is the coefficient of inbreeding – the risk of genetic disorders of rulers, resulting from their parents' consanguinity. The first correct measure of the degree of similarity in the genes of offspring due to common ancestors was developed by Wright (1921). This "coefficient of inbreeding" is the probability that both gene copies at any locus in an individual are identical by descent, i.e., from a common ancestor. Offspring of siblings or of parent-offspring couples have $F = 25$, while offspring of first cousins or of uncle-nice couples have $F = 12.5$.[33]

A rich literature in biology documents that higher levels of F result in "inbreeding depression," i.e., lower evolutionary fitness due to the higher average homozygosity, that is, having more gene copies at any locus that are identical by descent (Robert et al., 2009; Ceballos and Álvarez, 2013). In particular, the effects on many individual physical and psychological traits associated with successful leadership are large and negative.[34] European royal families did not defy the laws of biology. Asdell (1948, p. 175), using Woods' data and the coefficient of inbreeding, documents "a progressive decline in intelligence as inbreeding increases."

We collect F for 246 monarchs from http://roglo.eu/, a crowd-sourced online data source of the genealogy of European noble families. For the 246 monarchs with available information, we first identify the parents. For these, in turn, http://roglo.eu/ calculates the coefficient of inbreeding for their offspring, relying on rich data on relationships between their ancestors.[35] Figure 4 shows a histogram of the coefficient of inbreeding for all monarchs in our dataset. The figures also provides two illustrative examples. Carlos II is the individual with the highest coefficient of inbreeding. With $F = 25.36$, he is more inbred than offspring of siblings would be. Yet, his parents were "merely" uncle and niece (which in itself would imply $F = 12.5$). This points to an important feature of our setting: A sizable amount of the observed inbreeding is not the result of just one generation of consanguineous mating, but rather driven by a "build up" of inbreeding over previous

[33] The coefficient of inbreeding ranges from 0 to 100 (%). Humans inherit one allele at each locus from each parent. Because humans carry two alleles at each locus (humans are "diploid"), the probability that to pass on a particular allele to a particular offspring is 0.5. Hence, the offspring of self-fertilization would have $F = 50$, as there is a one in a half chance for each locus that the entire pair of alleles was passed on. Hypothetically, with repeated self-fertilization, F would approach 100. Offspring of completely unrelated parents have $F = 0$. We provide more detail on the details of the calculation in Appendix D.

[34] The literature on leadership traits has emphasized the importance of cognitive capabilities for leadership, see e.g. Judge, Colbert, and Ilies (2004). Yet empirical evidence causally linking specific traits to leadership success is scant. Adams, Keloharju, and Knüpfer (2018) show that cognitive and non-cognitive ability, measured during military tests in Sweden, are strongly positive associated with individuals assuming leadership roles – becoming CEO's – later in life. If the allocation of talent works in Sweden, and individuals with leadership abilities do assume leadership roles, these traits are important for leaders. Their evidence on family compared to non-family run business further supports this. Importantly for our argument, there is a large literature documenting that inbreeding negatively affects all of these (Afzal et al., 1993; McQuillan, Eklund, Pirastu, Kuningas, McEvoy, Esko, Corre, Davies, Kaakinen, Lyytikäinen, et al., 2012; Fareed and Afzal, 2014b,a).

[35] We cross-checked and validated the coefficients we obtained from http://roglo.eu/ extensively with other publications, among them Asdell (1948) and Alvarez et al. (2009). Turkey is not covered by this source and is thus not included in our IV results.

generations.[36] We will use this "hidden" component of inbreeding explicitly in robustness analyses later (see appendix E.1).

3.4 Constraints on Ruler Power

We collect data on the legal and de facto constraints on the power of monarchs from a variety of sources. Our baseline variable refines and extends the measure "constraints on the executive" from Acemoglu, Johnson, and Robinson (2005), which is available between 1000 CE and 1850 (first at the century level and after 1700 CE in fifty-year intervals). Acemoglu et al.'s measure was coded following the approach of the Polity IV project (Marshall, Jaggers, and Gurr, 2017) at the level of today's countries. Using the same coding approach, we refine the coding of "constraints on the executive" on a *year-by-year* basis at the *historical state* level, guided by the Polity IV rating and the same primary sources used by Acemoglu et al. (2005). Appendix F explains our methodology in detail. Figure 7 illustrates the improved measure using England in the turbulent seventeenth century. The black solid line depicts the fact that, according to Acemoglu et al. (2005), England exhibited "Substantial Limitations on Executive Authority" from 1600 to 1700 CE. Our measure, depicted as the dashed green line in the figure, shows the variability in constraints on the monarch in that century. Consider 1629, when parliament was dissolved and "Charles [I] governed without a parliament, raising money by hand-to-mouth expedients, reviving old taxes and old feudal privileges of the crown and selling mentarians contrary to the spirit of the constitution (..)"(Stearns and Langer, 2001). This results in sharp drop of our measure from substantial limitations on the monarchs authority ("5") to unlimited authority ("1"). Constraints became stronger during the "Long Parliament" from 1640-1660, as a consequence of the "Triennial Act [of 1641], requiring the summoning of parliament every three years without an initiative of the crown. (...) [This was] followed by (...) [a] bill to prevent the dissolution or proroguing of the present parliament without its own consent (...)".

Based on our year-reign specific measure for constraints on the executive, we define a ruler to be *constrained* if the constraints on the executive during the five years prior to the beginning of the reign were (on average) above a specific cutoff. As our baseline, we use "Substantial Limitations on Executive Authority" (the fifth out of seven categories) as this cutoff, but we document robustness to different cutoffs in Appendix F.[37]

Second, we use the original measure by Acemoglu et al. (2005).[38] To map the century-

[36] Consider again the pedigree of Carlos II (Figure 1). While Philipp IV, the father of Carlos II, married his niece, past consanguineous marriage weighted heavy in opening up many pathways for the common ancestors Joanna, "The Mad" and her husband Philip generations earlier.

[37] This baseline cutoff is defined as follows: "The executive has more effective authority than any accountability group but is subject to substantial constraints by them." In our sample, this applies to 20 monarchs, of which 11 are rulers of England.

[38] The matching from their countries to the states in our sample is mostly straightforward. Following their sources, we assign their measure for Spain to Castile, and do not assign values to Aragon when using their measure.

frequency to our reign-level data in coherence with our main measure, we assign the average "constraints on the executive" over the five years before a ruler came to power. For example, a ruler ascending to power in 1500 receives the value of the 15th century in the country, and a ruler ascending to power after 1505 the value of the 16th century.

Finally, we use parliamentary activity as a proxy for constraints on the executive. Van Zanden et al. (2012) compile the frequency of parliamentary meetings across European countries from the twelfth to the eighteenth century. Based on this, we calculate the average of parliamentary activity five years before the reign, and identify rulers as constrained if parliamentary activity was above the 90th percentile of the entire sample.[39]

4 Main Empirical Results

In this section we document a strong association between the capability of European monarchs and the performance of their countries during their reign. We show that this association is robust to measurement, specification and in different samples. We then proceed by presenting our identification strategy based on inbreeding of dynasties, followed by our IV results.

4.1 Baseline OLS Results

Our baseline regressions are at the country-reign level:

$$y_{r,s} = \beta RulerAbility_{r,s} + \delta_s + \gamma X_{r,s} + \varepsilon_{r,s} \ , \tag{1}$$

where $y_{r,s}$ is either the performance of state s in reign r, assessed by historian Woods (1906, 1913) or the state's percentage change in land area during reign r. $RulerAbility_{r,s}$ is the assessment of the ability of the monarch of reign r. For a straightforward interpretation of coefficients, we standardize the assessments of state performance and of ruler ability so that both variables have mean zero and standard deviation one.[40] We include state fixed effects δ_s, so that we effectively compare rulers of the same state over time. $X_{r,s}$ are additional control variables, such as fixed effects for time periods or dynasties that rulers belonged to. Throughout, we report robust standard errors.

Table 1 shows that ruler ability is strongly associated with country performance. Column 1 reports the raw correlation. The coefficient of interest, β, is highly significant and sizable: Moving from an incapable ("-1") to a capable monarch ("1") is associated with an increase in state

[39] Van Zanden et al. (2012) collect the information on the relative frequency of meetings of parliaments from a variety of sources. For all countries except Turkey, we can link this to our data set. We link Prussia to the "Brandenburg Diet" and the "Generallandtag" of Austria to the Habsburgs. All other matches are straightforward, as the data is separately available for Scotland and England, Castile (and Leon) which we match to Castile, and Aragon. All other matches are straightforward.

[40] Note that while both are categorical variables, we treat them as continuous variables for ease of estimation throughout the paper. We provide a robustness check using ordered probit below.

performance by more than one, which corresponds to a move from a middling performance ("0") to strong state performance ("1"). [41] Column 2 shows that this association is unchanged when we add state fixed effects, thus comparing only monarchs who ruled the same state (henceforth our baseline specification). The results are also stable when we additionally include century fixed effects.[42] Columns 4-6 use the reign-specific percentage change in state area as outcome variable. Since this as on 'objective' measure, it is not subject to concerns about biased coding that potentially affects Woods' state performance measure. For this continuous outcome variable, we again document a significant and sizable association with ruler ability. Again, these results are stable when we include state or century fixed effects. Moving from an incapable (-1) to a capable monarch (1) in the same state and century is associated with land area expanding by 20%.

4.2 Robustness

Next, we examine the robustness of our baseline OLS results. Table 2 successively reduces the sample. In column 2, we focus on reigns in which the ruler was linked to a dynasty. Thereby we exclude cases of interregna, regencies in which non-royal individuals exerted power, and instances of non-monarchical governance (as in the Netherlands).[43] The coefficient increases slightly and remains highly significant. Column 3 excludes regencies, independent of whether the regent was a dynasty member or not. The coefficient remains essentially unchanged. Note that the variation explained (R^2) actually increases in columns 2 and 3, indicating that indeed monarchs hailing from dynasties are crucial to the relationship between ruler ability and state performance. Column 4 excludes the few instances of foreign rule, e.g., Scotland during the reign of James VI of England. Column 5 excludes all individuals who appeared as rulers in more than a single reign. These are either monarchs that repeatedly came to power in the same country, or who ruled in more than one country contemporaneously. In both columns 4 and 5, the coefficient remains significant and

[41] A one standard deviation increase in ruler ability is associated with a 0.62 standard deviation increase in country performance. The standard deviation in ruler ability is 0.87. Woods (1913) himself had also manually computed the correlation coefficient of 0.6 in his raw data. He asserted a causal direction from monarch ability to country performance: "Only very rarely has a nation progressed in its political and economic aspects, save under the leadership of a strong sovereign." While Woods was well aware of reverse causality concerns, he provided descriptive evidence in favor of this conclusion. We go beyond Woods' findings by exploring richer specifications and, in particular, by providing an identification strategy.

[42] Note that century fixed effects require us to assign reigns to centuries. In column 3 we use the century corresponding to the first year of the reign. Other means of assigning reigns to centuries, e.g., based on the century wherein most of the reign lies, yield quantitatively very similar estimates. Below we present an alternative, more flexible method to filter out time effects: regressions at the ruler pair level, comparing monarchs in different states who ruled contemporaneously.

[43] Interregna are periods between the rule of two monarchs when no monarch is present. Regencies are periods of government by others (regents) in lieu of the designated ruler. Usually, these are close relatives such as the mother of an underage monarch, but sometimes these can be officials or members of the elite. In column 2, we exclude all rulers during whose reign regents from outside their dynasty governed. We still include cases of rule by relatives of the designated heir until the heir assumed office. For example, Mariana was regent for Carlos II of Spain until he reached adulthood, and then tried to regain regency by arguing that he was unfit for office.

similar in size to the baseline. Finally, column 6 applies all restrictions of the preceding columns simultaneously. With only 70% of the initial sample left, the coefficient remains almost unchanged, and the variation in country performance explained by ruler ability is actually higher than in the baseline.

We document further robustness checks in Appendix B. Table A.2 documents robustness to measurement. We show that results also hold when we use our own coding of state performance and ruler ability, based on internet encyclopedias, which in turn draw on historical sources. In addition, we find that our results based on Woods' (1913) original coding are highly robust when we exclude cases that Woods coded with intermediate values for state performance or ruler ability, indicating that he felt a clear judgment was not warranted by the underlying information. Finally, results are even robust when we recode all those middling values to work *against* a positive association between ruler ability and country performance. Table A.3 shows robustness to different specifications, such as using dummies for different values of state and ruler performance, ordered probit, as well as clustering at the state, century, and dynasty levels.

4.3 Heterogeneity

How does the association between state performance and ruler capability vary across time, space, and personal characteristics of rulers? In Table 3, we include interaction terms between ruler ability and numerous characteristics.[44] For column 1, we define a dummy indicating whether a monarch was female, which was the case for 36 of the 308 reigns to which a gender was assignable.[45] We find no evidence that the association between ruler ability and country performance varied by the ruler's gender. In column 2, we similarly interact our baseline regression with a variable indicating whether a monarch ascended to the throne before the median age of ascension (29 years). The positive (albeit insignificant) interaction term suggests that the relationship between ruler capability and state performance was somewhat stronger when rulers ascended to the throne early in their lives. Column 3 uses a dummy indicating whether a ruler was raised as designated heir. This means that a ruler was raised as monarch, rather than ascending to the throne because another designated heir unexpectedly died earlier, or ascending to the throne by other means.[46] Again, we document a positive yet imprecisely estimated interaction effect. Finally, in column 4, we find a significantly positive interaction term for the 136 individuals who ascended to power by the rules of primogeniture (overall 271 rulers, for whom this information is unambiguous). This indicates that when rulers ascended to power by predefined rules, their ability was more strongly associated with state performance during their reign, for the better or worse. We also note that

[44] We collect the variables used in this section from encyclopedias and biographies, as explained in Appendix A.2

[45] For 25 reigns we cannot assign a gender. As explained in Appendix A.2, these other instances are reigns were councils are in power or multiple regents are.

[46] Note that we were only able to assess whether monarchs were raised for particular roles for 140 observations, of which 120 where raised as monarchs.

none of the dummies in Table 3 are themselves statistically significant. That is, ruler gender, age at ascension, being raised as a designated hair, or ascension due to primogeniture, are by themselves not associated with state performance.

Did the relationship between monarchs' ability and state performance change over time? Figure 2 depicts the corresponding coefficients by broad time periods, showing a statistically highly significant correlation throughout.[47] After 1500, the coefficient size decreases somewhat. This period also coincides with the rise of parliaments in Western Europe (Van Zanden et al., 2012). Below, we examine whether this trend may have affected the role of ruler ability in their states' performance. Figure 3 provides further preliminary evidence on the role of Parliaments: It shows the correlation between ruler ability and state performance for all states in our sample.[48] The association between ruler capability and state performance is relatively similar across states, and it is statistically highly significant for all states except for Denmark.[49] The coefficient is strongest for Prussia, implying that this state fared particularly well under good rulers and/or suffered particularly strongly under bad ones. Prussia institutional setting featured few if any constraints on the monarchs executive power. The other extreme is England, where the association between ruler ability and country performance is less pronounced. This is particularly true after 1600, when the English Parliament gained power vis-à-vis the Crown. For this period, we observe no more relationship between ruler ability and the country's performance.

4.4 IV Results

In what follows we provide evidence for a causal relationship between ruler ability and country performance. We first discuss our identification strategy based on primogeniture and inbreeding. Then we introduce our instrument – the coefficient of inbreeding – and document that it is a strong predictor of ruler ability. The corresponding IV results reveal a positive causal effect of ruler ability on country performance in the second stage.

Identification

An interpretation of our OLS coefficients as a causal estimate is subject to numerous concerns. Omitted variables could influence both the performance of a country and the ability of the ruler in power, or the fact which ruler ascended to power. Similarly, reverse causality, by which country performance drives ruler ability is a concern: Positive expectations about a countries' economic and political future might lead to the selection or emergence of capable rulers.

[47] As before, reigns are allocated to time periods according to the start year of each reign. Table A.5 in the appendix provides point estimates for these broad periods and also in a more disaggregate fashion, by century.

[48] Table A.4 provides the corresponding regression estimates.

[49] A possible explanation is that Danish crown had not fully transitioned to a hereditary monarchy. Danish kings were de jure elected by the nobility. However, de facto the oldest son of ruler was usually elected as his successor (Bartlett, 2020, p. 398). Therefore, Danish monarchs actually might been impeded by relatively strong constraints on their executive power, and the absence of an effect could be in line with our interpretation in section 5.

Our identification strategy enables us to address both of these concerns. It relies on two crucial features. First, primogeniture results in a pre-determined appointment independent of ruler ability. By primogeniture, the next ruler is automatically set to be the individual with the closest genealogical distance to the last male monarch. Second, drawing on a literature in population biology and rich genealogical data, we leverage quasi-random variation in ruler capability. Centuries of intermarriage within and between the ruling dynasties of Europe resulted in a fairly sizable degree of 'hidden' genetic closeness between the potential marriage partners of Europe's monarchs. Unbeknownst to the royal families, Woods, or the historians on which Woods based his assessments on, such genetic closeness between partners carries an increased risk of genetic disorders for their offspring. These disorders in turn likely render rulers incapable to effectively fulfill the duties of their offices.

First Stage

Our first stage shows that monarchs with a higher coefficient of inbreeding are significantly less capable rulers. Formally, our first stage is:

$$RulerAbility_{r,s} = \delta F_{r,s} + \delta_s + \varepsilon_{r,s} \ , \tag{2}$$

where $F_{r,s}$ is the coefficient of inbreeding of the ruler of state s in reign r (as described in Section 3.3), $RulerAbility_{r,s}$ is the capability of said ruler, and δ_s are state fixed effects. Again, we use robust standard errors to allow for heteroskedasticity.

Column 1 of table 4 documents a strongly negative raw relationship between a rulers coefficient of inbreeding and her or his capability. Column 2 adds country fixed effects and is our preferred first stage estimate. The effect is sizable and highly significant, even when comparing only rulers within the same country: Hypothetically increasing the coefficient of inbreeding of a ruler by one standard deviation decreases ruler ability by 0.29 standard deviations (standardized beta, unreported). Figure 5 shows a binned scatter plot of the variation underlying column 2.

The following two columns of table 4 show that the first stage is not driven by individuals with extremely high coefficients of inbreeding. Excluding individuals whose parents were as related as siblings are (column 3) or uncle-niece are (column 4) barely affects the estimate, which retains its significance. In column 5, we focus on cases of documented primogeniture, that is those cases for which we could explicitly confirm from historical sources that the ruler ascended to power according to the laws of primogeniture as the closest relative of the former ruler.

Second Stage Results

Table 5 presents second stage results. In column 1 we again display the baseline OLS result. Column 2 limits the sample to those reigns for which F could be collected.[50] Column 3 then shows IV results. Note first the instrument is strongly relevant (F-statistic of 46). The IV coefficient is positive and strongly significant. The ability of monarchs had a strong positive effect on the performance of the countries they reigned.

The following three columns again direct attention to smaller samples, excluding offspring of highly consanguineous relationships in columns 4 and 5. Column 6 focuses on the 120 cases for which we could confirm ascension by primogeniture. The IV coefficients tend to be larger than the corresponding OLS coefficients, if not significantly different from them. For instance, in column 6, the corresponding OLS coefficient is 0.70 (unreported), and the IV coefficients is 0.89, 27% larger. These larger coefficients could result from Woods' coding and IV addressing this measurement problem. Woods had a bias in favor of rulers hailing from old dynasties, and thus assigned better grades to inbred rulers, and correspondingly, worse grades for less inbred rulers. The instrument then corrects this biased measurement and uncovers larger effects. Indeed, Woods' hypothesis was that intermarriage among what he considered the superior stock of royal families lead to more capable rulers works against us.[51] Further, the correct measurement of inbreeding was unknown when Woods was writing in 1913, and the fact that inbreeding has negative consequences was not widely accepted in academic circles decades later.[52] Therefore, the timing of scientific progress on inbreeding renders breaking the exclusion restriction purely by Woods' or historians' assessment of monarchs unlikely.

Our IV strategy addresses reverse causality and some, but not all, omitted variable biases. In particular, if Woods first observed the ability of rulers and this assessment biased his coding of countries, then our IV does not address this. To speak to that concern, columns 7 and 8 turn to our second outcome variable, the change in land area during the tenure of each monarch. Again, both OLS and IV coefficients point to a positive, large, and significant effect of ruler ability on country performance.

[50]This mainly excludes interregna (periods without rulers), regencies where the regent was not of dynastic descent, and phases of republican government, as in the Netherlands in some periods.

[51]"The very formation of royal families was thus a question of selection of the most of able in government and war. From their intermarriage with their own kind, in connection with the force of heredity, we find an explanation in their relative superiority"(Woods, 1906, p. 302). This turned out to be wrong later, as Asdell (1948) showed that opposite is true due to inbreeding.

[52]In 1927, Bronislaw Malinowski, one of the "founding father[s] of social anthropology" (Young, 2004), stated that "biologists are in agreement that there is no detrimental effect produced upon the species by incestuous unions" (Malinowski, 1927). See Wolf (2005).

Threats to Identification

We discuss several threats to our identification strategy in separate appendices. First, we show that monarchs anticipating the negative effects of marriage between technically close relatives – such as between uncles and nieces – does not drive our results. Using only the "hidden" component of the coefficient of inbreeding – that coming from distant common ancestors rather than recent marriages among kin – yields larger IV coefficients (Appendix section E.1). The exclusion restriction would further be violated if royals marry kin when state performance is low, *and* past bad state performance lowers performance during the reign of their offspring. We show that past state performance does not drive current state performance or lead to differently able leaders. Therefore it does not affect our IV results (Appendix section E.2).[53] Neither does conflict, as we document in Appendix section B.3. Further, if monarchs were to select the most able leader among their sons as successor, this works against our first stage. Brothers share the same coefficient of inbreeding, and we would be less likely to observe the worst realizations of the potential for genetic disorders.

Lastly, note that the monotonicity assumption required for IV is likely fulfilled. In our setting, this assumption requires that the instrument does not trigger "defiers," i.e., that inbreeding does not (by accident) lead to ingenious leaders. The literature in genetics documents that "inbreeding depression" only has negative effects on fitness (c.f. Robert et al., 2009; Ceballos and Álvarez, 2013), and therefore in all likelihood on leader ability. It is also not the case that inbreeding increases variance in ability, i.e., it is essentially impossible that inbreeding leads to "genius" by accident.

5 Constraints on Ruler Power

Were incapable rulers always bad for the country they reigned? The modern literature in political economy and management suggests that leaders matter particularly when they act in institutionally unconstrained environments. Clark et al. (2014) show that "leaders matter most when ownership and governance structures correspond with a weak or ambiguous institutional logic". Jones and Olken (2005) finds particularly strong effects for autocratic leaders. While in our setting most leaders are autocrats, there remain important differences in how their actions were legally and de-facto constrained over time and space. Besley and Reynal-Querol (2017) document higher economic growth under hereditary leaders when constraints on them are weak using modern data from 1875 onwards. In this section, we systematically measure these constraints for our data set and document that institutions mitigated the effects of rulers in our data set. We first describe a motivating example – monarchs in England only mattered before a strong parliament emerged – and then present our results. A separate appendix provides more detail on measurement and

[53] Relatedly, we show that our results are similarly not driven by strategic marriages *outside* of the kin network in Appendix section E.4

additional robustness.

5.1 Example: Constraints on England's Monarchs in the 17th Century

Consider the cross-country variation of our baseline OLS association documented before. The coefficient of England was rather small, especially when compared to other Western European monarchies of Europe, such as France and Spain. In figure 6, we split England into two separate observations, one containing the reigns before the turbulent seventeenth century and one after (including it). In the seventeenth century, civil conflict and the Glorious Revolution lead to increased constraints on the monarch in power. As evident from the figure, England before then was a rather standard Western European country in terms of the effect we document. After 1600, we fail to document an effect of the ability of monarchs on country performance for England.

5.2 Results: Constrained Monarchs Matter Less

To assess whether constrained monarchs matter less we estimate interaction models:

$$y_{r,s} = \beta_1 RulerAbility_{r,s} \times Constr_{r,s} + \beta_2 RulerAbility_{r,s} + \beta_3 Constr_{r,s} + \delta_s + \varepsilon_{r,s} \quad (3)$$

where, $y_{r,s}$ is either of our proxies of state performance of state s in reign r, $RulerAbility_{r,s}$ is the assessed capability of the individual monarch, and $Constr_{r,s}$ is a dummy variable indicating whether a ruler was constrained in her or his actions, according to the various measures described in Section 3.4. Finally, δ_s denotes state fixed effects.

In the first three columns of Table 6 we present results of OLS estimations using the three data sources as a base for the dummies indicating constrained monarchs. In column 1, "Constrained Ruler" indicates whether, five years prior to the start of a reign, constraints on the executive were substantial, based on our own compiled measure at the year level.[54] As is evident, there is a significant and sizable difference in whether the ability of monarchs matters for state performance according to the institutional set-up in place *before* the monarchs ascended to power. On the other hand, this institutional feature by itself only has a small and statistically insignificant effect on country performance. In column 2, we define constrained rulers based on the data of Acemoglu et al. (2005), available at century and then 50 year intervals. Constrained rulers' ability still matter less, but constraints by themselves now exhibit a significant and sizable effect on state performance. Column 3 repeats the analysis, using the activity of parliaments measure of Van Zanden et al. (2012) to construct the dummy indicating constrained rulers. This different indicator confirms the baseline result from both earlier columns: Throughout, capable rulers are associated with better state performance, and less capable rulers with worse performance, while this association is weakened for constrained rulers. Column 4 documents that this similarly is the case when using

[54] In Appendix F we provide detail and an example of this measure.

the coefficient of inbreeding as an instrument for ruler ability. Columns 5 and 6 show comparable results when using the change in area ruled as our proxy for country performance.

In Appendix section F, we provide further detail on the measure of constraints on executive and an example of its year-by-year variation. Further, we provide robustness to different cutoffs and using only monarchs ascending to power according to primogeniture.

In sum, our baseline association is weaker for constrained monarchs. Whether they were capable or not was of less importance when and where their actions were partially bound by strong parliaments. In our setting parliaments, and therefore the constraints on monarchs, only gradually became stronger and especially pronounced in Northern Europe (Acemoglu et al., 2005). At the same time, the dynasties ruling Europe increasingly drew on an ever smaller pool of potentially suitable royal marriage partners, reflecting the success of preceding generations in consolidating the map of Europe. In turn, this increased the coefficient of inbreeding throughout, and particularly so Northern Europe. Therefore, the earlier emergence of strong parliaments there may thus have shielded states there from the likely negative capabilities of ever more inbred royal elites.

6 Conclusion

The importance of individual leaders for the course of history has been subject to continued debate since the times of Napoleon. The Emperor of the French also illustrates a central identification problem: rather than 'great men' shaping history, historical opportunities may give rise to 'great men,' who find their way into office even when born to a modest family on a far off Mediterranean island. In other words, it is hard to disentangle a causal effect of leaders on their country's performance from unobserved factors or even reverse causality. We explore the period that has been most prominently debated in this context: Europe between the 10th and 18th century.

This paper is the first to provide systematic causal evidence that more capable European rulers boosted outcomes for the states they governed. To identify these effects, we explored the fact that European monarchs ascended to power by primogeniture, independent of their ability. In addition, ruler ability varied because of century-long inbreeding within dynasties. The detrimental effects of inbreeding were unknown until the 20th century; in fact, a popular belief among European dynasties was that kin marriage helped to preserve royal virtues. In addition, a significant part of consanguinity (the degree of genetic similarity) was 'hidden' in the history of kin marriage during previous generations. In combination, these features yield quasi-random variation in ruler ability, allowing us to identify the effects of ruler ability on state performance. We find sizeable coefficients, with a one standard deviation increase in leader ability lifting a country's performance from 'mediocre' to 'good,' corresponding to a 10 percent expansion in its land area. Our results thus suggest that European rulers did 'make history,' with their actions shaping the European map during the period that laid the foundations for modern nation states.

We also find that institutional constraints checked the power of European monarchs, showing that the relationship between ruler ability and state performance is muted in states with strong parliaments. Parliaments, in turn, were most active in Northern Europe, where inbreeding of dynasties surged between the 15th and 18th century. Our results suggest that parliaments shielded Northern Europe's states from the adverse effects of inbreeding within their ruling dynasties.

The basis of our empirical analysis is a novel *reign* level dataset for European states over a horizon of several centuries. We are in the process of adding more states, as well as disaggregated measures of state performance during the various reigns, such as administrative efficiency and the implementation of reforms. Our dataset will allow researchers to study Europe's economic history through a novel, sharper lens.

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FIGURES

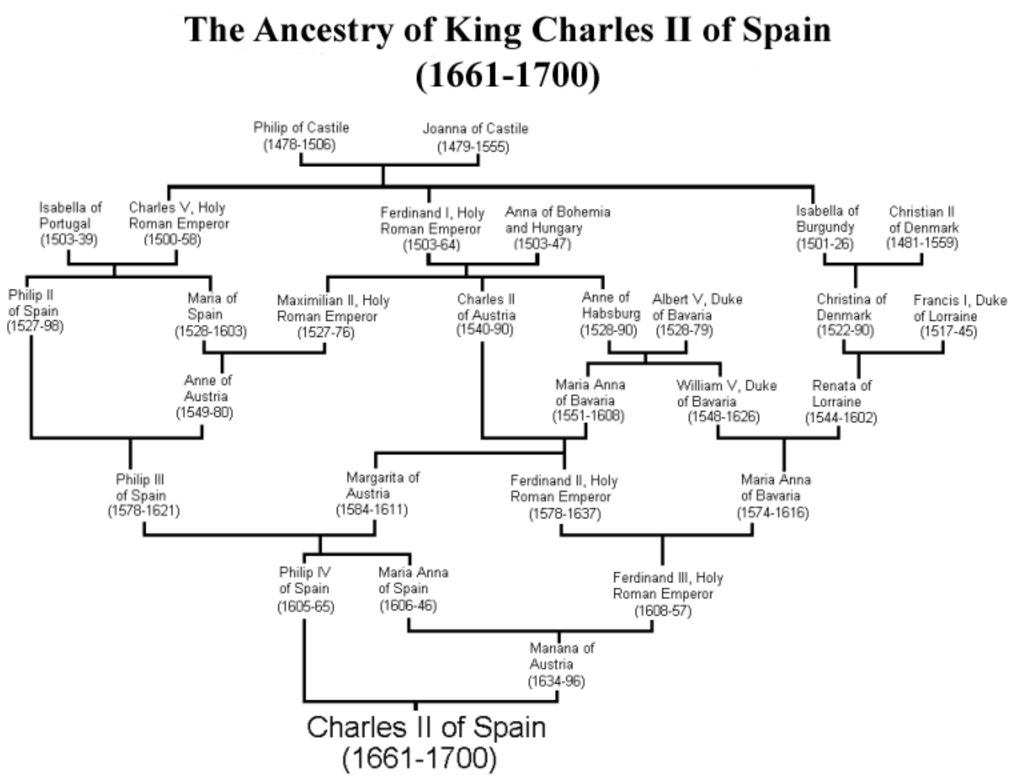

Figure 1: Pedigree of Carlos II. of Spain

Note: The figure shows the pedigree of Carlos II., King of Spain from 1665 to 1700. Note the intricate links to common ancestors of both his parents, stretching back over multiple generations.

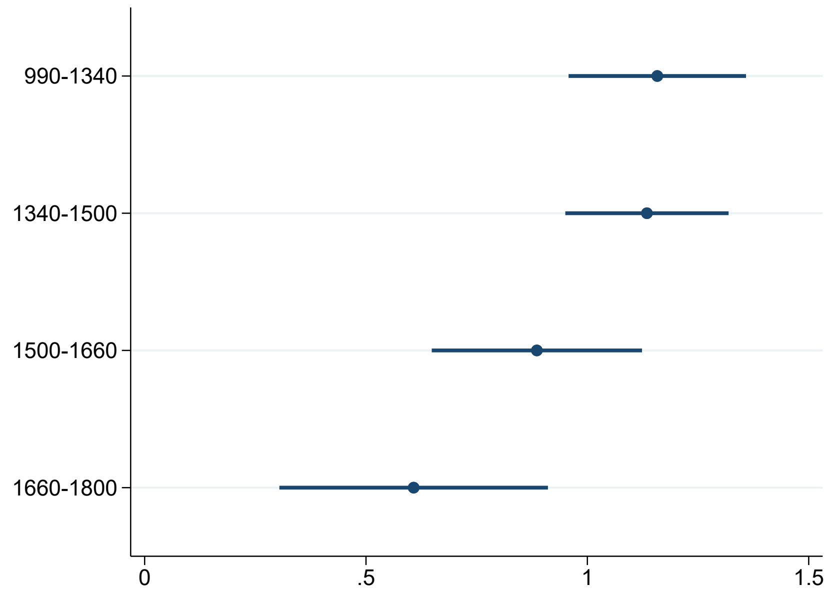

Figure 2: Association of Monarch Ability and Country Performance by Time Period

Note: The figure shows coefficient of broad time periods and 90% confidence intervals from a joint OLS estimation including country fixed effects and using robust standard errors.

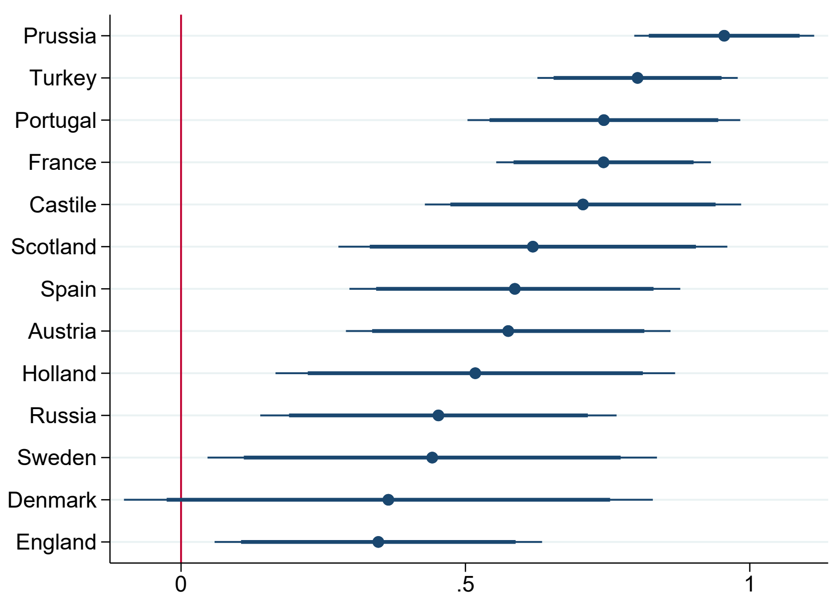

Figure 3: Association of Monarch Ability and Country Performance by Country

Note: The figure shows coefficient of each country and 90% confidence intervals from a joint OLS estimation including country fixed effects and using robust standard errors.

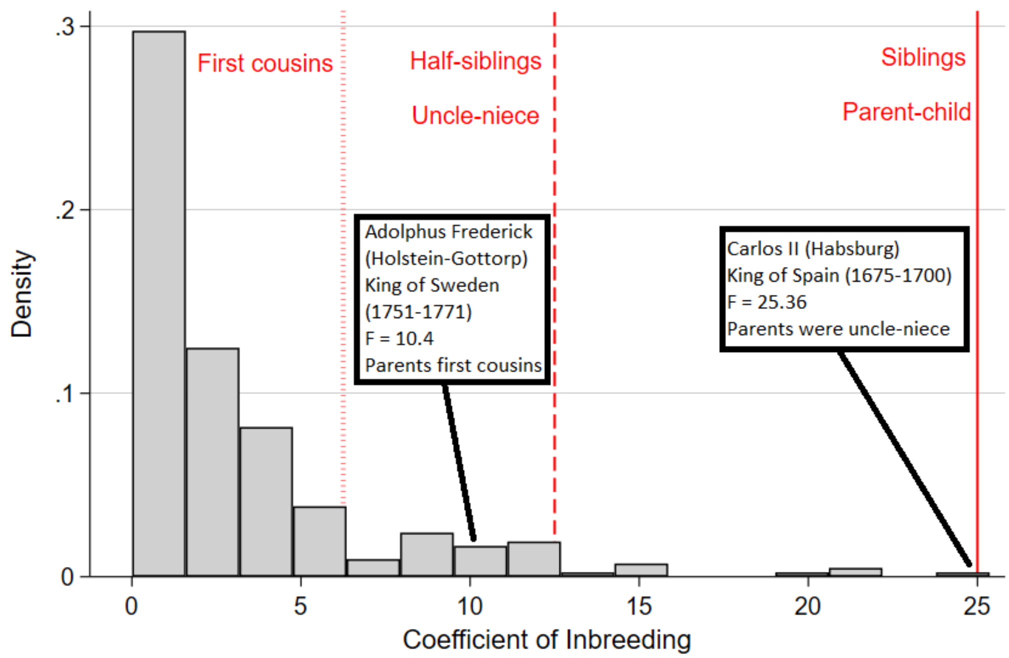

Figure 4: Histogram: Coefficient of inbreeding of Monarchs

Note: The figure shows the "coefficient of inbreeding"(F) – the instrument for ruler ability in our analysis – for the 246 European Monarchs. F=0 indicates no relation among the parents of a monarch, F=50 would theoretically result from self-fertilization.

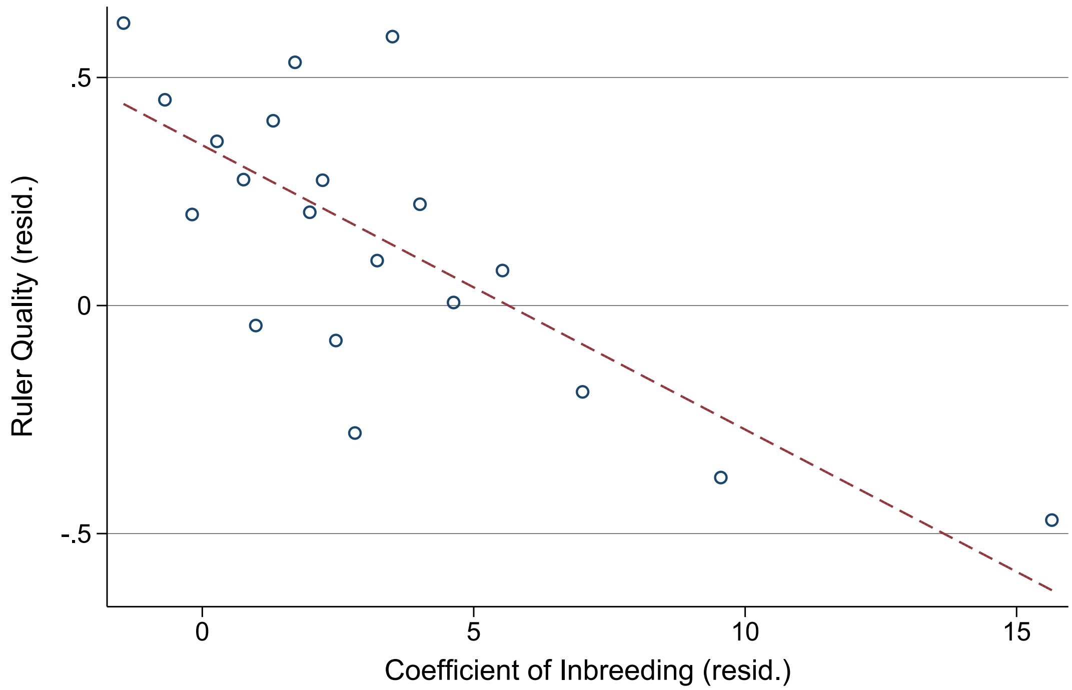

Figure 5: First Stage: Binscatter with Country Fixed Effects

Note: The figure shows a binned scatter plot of the first stage between a monarch's coefficient of inbreeding and the ability of the monarch. The first stage includes country fixed effects.

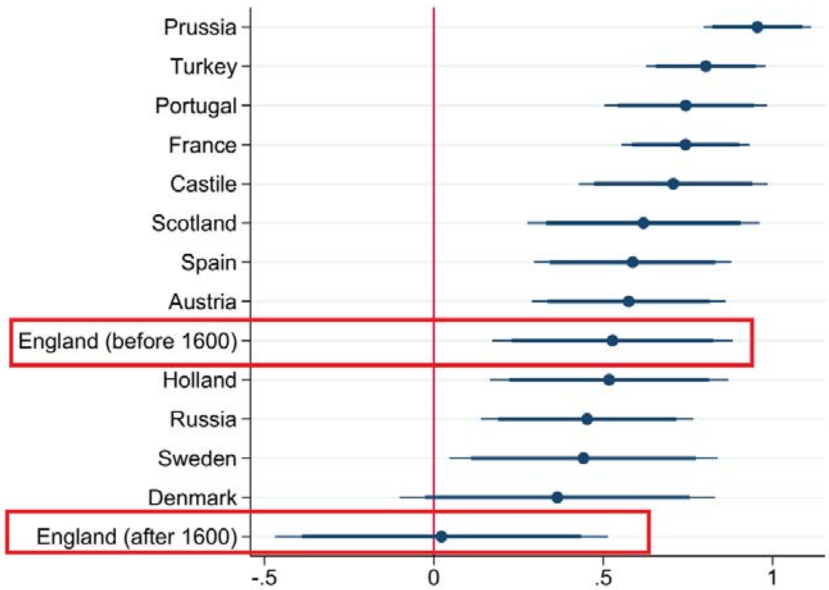

Figure 6: Association of Monarch Ability and Country Performance by Country - England Before and After 1600

Note: The figure shows coefficient of each country and 90% confidence intervals from a joint OLS estimation including country fixed effects and using robust standard errors. England is split into two separate observations, one including all reigns before 1600, and a second one including all those after 1600.

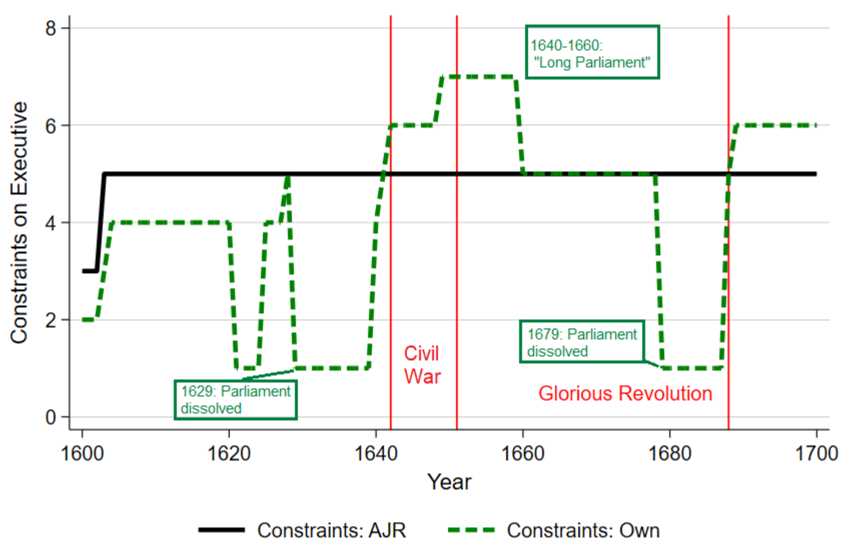

Figure 7: Constraints on Executive: Year-by-year, 17th Century England

Note: The figure shows changes in constraints on the executive for England in the 17th century.The black solid lines depicts the data in Acemoglu et al. (2005), while the green dashed line depicts our yearly measure.

TABLES

Table 1: Monarchs and State Performance – OLS Results

Dependent Variable as Indicated in Table Header

Dep. Var.	Performance of State			$\Delta log(Area)$		
	(1)	(2)	(3)	(4)	(5)	(6)
Ruler Ability	0.604***	0.603***	0.604***	0.120***	0.119***	0.106***
	(0.042)	(0.043)	(0.046)	(0.029)	(0.028)	(0.024)
State FE		✓	✓		✓	✓
Century FE			✓			✓
Mean Dep. Var.	0.15	0.15	0.15	0.08	0.08	0.08
R^2	0.38	0.41	0.42	0.07	0.10	0.13
Observations	331	331	331	285	285	285

Note: This tables documents a strong relationship between ruler ability and state performance. The latter is based on the coding by Woods (1913) in columns 1-3; in columns 4-6, it is the change in a state's land area during a monarch's reign. All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 2: Robustness: Different Samples

Dep. Var.: Performance of State During Reign of Monarch

	(1)	(2)	(3)	(4)	(5)	(6)
Note:	Baseline	Only Dynasty Members	Exclude Regencies	Exclude Foreign Rule	Exclude Same Rulers	All Restrictions
Ruler Ability	0.603***	0.640***	0.646***	0.613***	0.596***	0.657***
	(0.043)	(0.045)	(0.046)	(0.042)	(0.044)	(0.047)
State FE	✓	✓	✓	✓	✓	✓
Mean Dep. Var.	0.15	0.21	0.23		0.16	0.27
R^2	0.41	0.46	0.47	0.43	0.41	0.51
Observations	331	289	262	321	314	236

Note: This table documents the robustness of our baseline regression (col 2 in Table 1) to using different samples. See Section 4.2 for a detailed description of the sample restrictions. All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 3: Baseline Heterogeneity

Dep. Var.: Performance of State During Reign of Monarch				
	(1)	(2)	(3)	(4)
Dummy for:	Female	Young Ascension	Designated Heir	Primogeniture
Dummy × Ruler Ability	0.013	0.095	0.081	0.197**
	(0.109)	(0.093)	(0.255)	(0.097)
Ruler Ability	0.604***	0.544***	0.589***	0.485***
	(0.050)	(0.069)	(0.067)	(0.077)
Dummy	-0.179	-0.038	-0.110	0.071
	(0.112)	(0.079)	(0.248)	(0.090)
State FE	✓	✓	✓	✓
Mean Dep. Var.	0.19	0.22	0.17	0.22
R^2	0.42	0.40	0.46	0.41
Observations	308	298	140	271

Note: This table shows results of interacting the baseline regression with reign. In column 2, the interaction variable is a dummy for rulers ascending to the throne below median age of 28 years. In column 3, it indicate rulers who were being raised as designated heir, while in column 4 it indicates rulers ascending to power according to rules of primogeniture. All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Inbreeding and Monarch Ability - First Stage Results

Dependent Variable: Ruler Ability

	(1)	(2)	(3)	(4)	(5)
Note:			F < 25	F < 12.5	Documented PG†
Coefficient of Inbreeding	-0.057***	-0.067***	-0.067***	-0.073***	-0.047***
	(0.009)	(0.010)	(0.011)	(0.018)	(0.013)
State FE		✓	✓	✓	✓
Mean Dep. Var.	0.15	0.16	0.16	0.18	0.08
R^2	0.08	0.15	0.15	0.13	0.21
Observations	247	242	241	234	120

Note: This table shows results of first stage regressions of each monarch's coefficient of inbreeding on ability as assessed by Woods (1913). The coefficient of inbreeding measures the degree of similarity in the genes of offspring due to common ancestors, and the thus increased risk of genetic disorders resulting from the consanguinity of the monarch's parents. Column 3 excludes Carlos II. of Spain, whose parents shared as many genes as offspring of siblings do. Column 4 excludes all Monarchs whose parents share as many genes as offspring of half-siblings do. All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.
† Subsample includes only documented cases where rulers ascended to power due to primogeniture.

Table 5: Monarchs and Country Performance - IV Results

Dependent Variable as Indicated in Table Header

Dep. Var.	Performance of State						$\Delta log(Area)$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimation:	OLS	OLS	IV	IV	IV	IV	OLS	IV
Note:	Baseline	Only rulers with F		F < 25	F < 12.5	Primogeniture†	Only rulers with F	
Ruler Ability	0.603***	0.592***	0.758***	0.725***	0.591***	0.892***	0.114***	0.169**
	(0.043)	(0.054)	(0.145)	(0.160)	(0.225)	(0.244)	(0.031)	(0.082)
State FE	✓	✓	✓	✓	✓	✓	✓	✓
First Stage F-statistic			46.45	36.70	16.08	13.77		28.78
Mean Dep. Var.	0.15	0.21	0.21	0.22	0.24	0.20	0.09	0.09
R^2	0.41	0.39	0.36	0.37	0.37	0.51	0.15	0.14
Observations	331	242	242	241	234	120	201	201

Note: This table shows the results of IV regressions of ruler ability on country performance. The instrument, the coefficient of inbreeding, measures the increased risk of genetic disorders resulting from the consanguinity of the monarch's parents. Columns 1-6 use the assessment of political and economic conditions during each monarch's reign from Woods (1913) as measure of country performance, and column 7-8 use the change in land area during each monarchs reign, calculated from Abramson (2017). Except for column 1, all columns exclude rulers for which no coefficient of inbreeding is available. Column 4 excludes Carlos II. of Spain, whose parents shared as many genes as offspring of siblings do. Column 5 excludes all Monarchs whose parents share as many genes as offspring of half-siblings do. All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

† Subsample includes only documented cases where rulers ascended to power due to primogeniture.

Table 6: Constrained Monarchs Matter Less

Dependent Variable as Indicated in Table Header

Dep. Var.:	Performance of State				$\Delta Log(Area)$	
	(1)	(2)	(3)	(4)	(5)	(6)
Constraints coding:	Own	AJR	Van Zanden et al.	Own	Own	
Estimation:	OLS	OLS	OLS	IV	OLS	IV
Ruler Ability	0.619***	0.612***	0.600***	0.702***	0.070***	0.100***
	(0.051)	(0.056)	(0.049)	(0.081)	(0.023)	(0.029)
Constrained Ruler× Ruler Ability	-0.518**	-0.327**	-0.379*	-1.345*	-0.113	-0.137**
	(0.226)	(0.162)	(0.229)	(0.751)	(0.099)	(0.068)
Constrained Ruler	0.094	0.961***	-0.145	0.286	0.138	0.063
	(0.220)	(0.138)	(0.220)	(0.309)	(0.106)	(0.091)
Country FE	✓	✓	✓	✓	✓	✓
Mean Dep. Var.	0.09	0.12	0.14	0.13	0.05	0.05
R^2	0.42	0.47	0.38	0.36	0.06	0.05
Observations	242	189	286	188	221	169

Note: This table shows results of regressions of ruler ability on country performance, mediated by whether a monarch was constrained in his executive power. We define a monarch to be constrained if the "Constraints on the Executive" variable (from Acemoglu et al. (2005) in column 2 and recoded by us at the yearly level for all columns except 2 and 3, for details see section 5 and Appendix section F) indicates at least "substantial limitations" on the executive. In column 3, we define a monarch to be constrained if the country was above the 90th percentile of the measure of parliamentary activity from Van Zanden et al. (2012). All regressions are run at the reign level. Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.