# THE RISE OF INCLUSIVE POLITICAL INSTITUTIONS AND STRONGER PROPERTY RIGHTS: TIME INCONSISTENCY VS. OPACITY.\*

Giacomo Benati, Carmine Guerriero, and Federico Zaina

(University of Bologna)

May 24, 2019

#### Abstract

Despite the relevance of inclusive political institutions and strong property rights, we still lack an unified framework that identifies their origins and interaction. We study a model in which the elite can elicit the citizens' cooperation in investment by either granting a more inclusive political process, which allows them to select the tax rate and produce their preferred public good, and by punishing suspected shirking through the restriction of property rights. When the investment return is small, cooperation can only be attained under the more inclusive political process. When instead investment is sufficiently profitable, the elite does not need to empower the citizens and can substitute maximum taxation and *de facto* property rights with partial redistribution and, possibly, no private rights. Yet, embracing the stick is optimal only when production is sufficiently transparent, and, thus, punishment effectively disciplines a shirking citizen. These predictions are consistent with the evolution of the geographic conditions shifting the expected return and opacity of the farming process, the inclusiveness of political institutions, the strength of property rights and the public good provision in a panel of the 44 major Mesopotamian polities spanning each half-century between 3050 and 1750 BCE. Crucially, our estimates are very similar when we control for proxies for trade potential, severity of external and internal conflicts and urbanization. Keywords: Geography; Opacity; Time Inconsistency; Democracy; Property Rights. JEL classification: O13; H10; D23.

<sup>\*</sup>We wish to thanks for the insightful comments Mark Altaweel, Federica Carugati, Francesca Chelazzi, Mark Dincecco, Andy Hanssen, Omer Moav, Nicoló Marchetti, Jacopo Monastero, Francesco Moro, Massimiliano Onorato, Alessio Palmisano, Luigi Pascali, Laura Righi, David Stasavage, Davide Ticchi, Barry Weingast and seminar attendees at University of Bologna and Parthenope University. Corresponding author: Carmine Guerriero. Address: Strada Maggiore 45, 40125 Bologna, Italy. E-mail: c.guerriero@unibo.it

## 1 Introduction

Despite the overwhelming empirical evidence pointing at the relevance of inclusive political institutions and strong property rights (Besley and Persson, 2009), our understanding of their origins is still limited. Inspired by a growing literature on the economic incentives behind institutional discontinuities (North and Weingast, 1989; Mayshar et al., 2017; Boranbay and Guerriero, 2019), we lay out a model to shed more light on this issue, and we test its implications by exploiting a novel data set on the vast institutional revolution that shook Grater Mesopotamia during the Early and Middle Bronze Ages. Initially dominated by similar states of nature lacking institutionalized decision-making, protection of private property and public spending, this region developed the first recorded forms of stable state institutions, which given the simplicity of the prevailing farming and trade activities can be credibly linked to geography. To begin with, the worsening of the climatic conditions between the end of the Early Bronze Age (3350-3100 BCE) and the beginning of the Early Dynastic period (3100-2550 BCE) reduced the farming returns forcing the religious elites to share their political power with rising military ranks, which started to propose the peasants allotting, leasing and sharecropping contracts requiring rents and very appreciated corvée, such as the involvement in civil engineering projects and a conscripted army. Second, the Pre-Sargonic period witnessed a milder climate, which slowed down the expansion of political rights. Finally, an extended period of harsher climate, and the consequent rise of long-distance trades as an alternative economic activity, allowed the town elites to establish themselves as the third decision-maker during the Mesopotamian empires period (2350-1750 BCE). Crucially, rises in the inclusiveness of political institutions were accompanied by a shift from direct to indirect land exploitation under stronger farmers' rights and a larger provision of public goods, especially those more valued by the citizens, i.e., conscripted army.

To elucidate the economic incentives behind these stylized facts and to shed more light on similar historical episodes, we consider the interaction between an elite owning the land and its product and citizens able to deliver, by incurring a costly investment, an harvest, provided that the imperfectly observable farming conditions are "favorable," i.e., in the presence of both a more suitable land and a higher temperature. The exogenous geographic factors that might instead impede the observability of the farming conditions are, for instance, the adoption of a less transparent farming process as, for instance, the vineyard (Fleck and Hanssen, 2006). To incentivize investment, the elite cannot commit to direct transfers (North and Weingast, 1989), but she can lean on two other instruments. First, she can grant the citizens a more inclusive political process, which allows them to select the tax rate and produce their preferred public good. Second, she can punish them for suspected shirking by throwing them out of the land. This "stick" is also costly for the elite, who needs to substitute the citizen (Mayshar et al., 2017). Overall, the citizens strictly prefer the more inclusive political institution allowing them to tax the most the output and produce a public good they value more. Only under such an arrangement indeed, investment prevails when the expected harvest value is just barely greater than the investment cost. When instead investment produces a quite valuable expected harvest, the elite does not need to politically empower the citizens and can substitute maximum taxation and *de facto* property rights with partial redistribution and, possibly, no private rights, i.e., punishment. Embracing the stick, however, is optimal only when production is sufficiently transparent, and, thus, punishment effectively disciplines a shirking citizen (Mayshar et al., 2017). All in all, our model entails three implications. First, the inclusiveness of political institutions falls with the expected farming return, and it is unrelated to the opacity of the farming process. Second, the strength of property rights falls with the expected harvest value and has a positive link with the opacity of the farming process. Finally, the citizens' expected utility from public good provision rises with both the inclusiveness of political institutions and the strength of property rights. Notably, the links between the latter and the opacity of the farming process and between the strength of property rights and the citizens' expected utility from public goods are second order, being nonzero only when production is sufficiently transparent.

To test these predictions, we analyze a panel of the 44 major Mesopotamian polities spanning each half-century between 3050 and 1750 BCE. Starting with the expected farming return, we proxy it with the profitability from both cereals and olive breeding, averaged—as any other non-institutional variable—over the previous 50 years. Turning to the opacity of the farming process, we consider the exogenous introduction of viticulture in our sample. Regarding the provision of public goods, we gather information on whether the polity built fortifications and/or organized a conscripted army, interpreting the second choice as the provision of a public good that economically and politically empowered the citizens and which, thus, was preferred by this group to defensive walls (Kyriazis et al., 2015). For what concerns the inclusiveness of the political process and the protection of private rights, we construct a 5-point score rising in the division of the elite's political power and a 7-point score increasing when the land exploitation was indirect rather than direct and/or property rights were *de jure* and not only *de facto* in nature. Both these variables build on the historical events in a 40-year window around each time period. Conditional on polity and half-century fixed effects, Ordinary Least Squares—OLS thereafter—estimates imply that the inclusiveness of political institutions and the strength of property rights are significantly and inversely related to the expected farming return, whereas only the extent of protection of property is significantly driven by the opacity of the farming process. Finally, the provision of public goods is unrelated to property rights protection but linked to the inclusiveness of the political process, and more so when the public good is organizing a conscripted army.

While the accuracy in the measurement and the independence from human effort of the proxies for the expected return and the opacity of the farming process exclude that our estimates are driven by either measurement error or reverse causation, our focus on ancient Mesopotamia rules out that they are spuriously produced by region-specific features of the European colonization, i.e., the colonizers' strategy (Acemoglu et al., 2001) and the intensity of missionary activities and slavery (Nunn, 2010; Nunn and Wantchekon, 2011). We cannot however leave out the possibility that other unobservable factors are biasing our results. To evaluate this issue, we follow a two-step strategy. First, we control for the other key drivers of political institutions and property rights identified by the extant literature and, in particular, the trade potential (Acemoglu et al., 2005), the severity of external and internal conflicts (Besley and Persson, 2009; Acemoglu and Robinson, 2000), and the extent of urbanization (Inglehart and Welzel, 2005). Considering these observables either stepwise or together leaves our results almost intact. In the Internet Appendix moreover, we document that similar patterns arise when we incorporate in the analysis the severity of climate volatility (Boranbay and Guerriero, 2019), merchant institutions regulating longdistance trades (Greif, 1992), the political instability due to the rise to power of a young king (Cassidy et al., 2015), and the importance of long-distance trades (Palmisano, 2018). Second, we calculate how much greater the influence of unobservables would need to be, relative to that of all observables, to explain away the links among geography, institutions and public good provision. We find that it would have to be on average more than 18 times greater than the influence of observables, which seems unlikely. Overall, these robustness checks make difficult to envision that our estimates are driven by mechanisms different from those we model. Therefore, we take them as consistent with, if not proving, causality running from geography to institutions and from the latter to public goods.

Our paper is closely related to three main strands of the vast literature on the origins of inclusive political institutions and forceful property rights. First, we share with North and Weingast (1989) and Fleck and Hanssen (2006) the idea that the elite introduces democracy to convince the citizens that a sufficient part of the returns on joint investments will not be expropriated.<sup>1</sup> Differently from these contributions and similarly to Boranbay and Guerriero (2019), we pinpoint public spending as the main commitment device in the hands of the elite, documenting for the first time its empirical relevance. Second, we also incorporate in our model the Mayshar et al.'s (2017) intuition that the inability of the elite members to elicit cooperation through punishment because of the opacity of the farming process would force them to grant stronger private rights to the citizenry.<sup>2</sup> Differently from the implications of this paper, we document that the opacity of the farming process is unrelated to the inclusiveness of political institutions and that it does not lead to limited public spending. These striking dissimilarities are driven by the fact that these Authors overlook the relevance of time inconsistency by assuming that the citizenry's individual rationality constraint is always met. Finally, we compare the explanatory power of our time inconsistency theory of democratization to that of a legacy of empirical research suggesting that the elite expands the citizens' political power when intimidated by the possibility of unrest (Acemoglu and Robinson, 2000), when the economic power of minorities is strengthened by their access to new technologies (Acemoglu et al., 2005), and when the population is richer (Inglehart

<sup>&</sup>lt;sup>1</sup>While Bentzen et al. (2016) document that the elite lacks this incentive when she controls the access to water resources, Ciccone (2018) reports a positive link between democratization and rainfall shocks.

<sup>&</sup>lt;sup>2</sup>Mayshar et al. (2018) relate state centralization to the opacity of the farming process. While the former is measured by the hierarchical complexity of pre-colonial societies, the contemporaneous presence of a state and the location of archaeological sites, the latter is proxied with the land suitability for cereals.

and Welzel, 2005). Overall, our paper delivers three main contributions. First, we develop a theory of endogenous political institutions and property rights grounded on the tradeoff between the mix of the elite's inability to commit and her limited punishment capacity and rent-seeking incentives. Our model not only does highlight the primacy of the time inconsistency issues, but it also provides a formal justification to the empirical regularity that democratization is preceded by a temporary dip in income and, thus, of the importance of assessing the endogeneity of institutions (Acemoglu et al., 2019). Second, we confirm the model implications by devising a novel data set, which displays huge variation across time and space. This exercise draws the attention of social scientists interested in the origins of institutions to ancient societies and that of archaeologists to social science theories of institutional formation. By allowing the two groups of scholars to work together, projects similar to ours will not only produce otherwise unfeasible data sets, but they will also enable insights otherwise unattainable. Finally, the fact that taxation strategically links inclusive political institutions to time inconsistency issues not only does validate our reasoning, but it also identifies a key and understudied driver of state capacity (Guerriero et al., 2019).

The paper proceeds as follows. In section 2, we review the stylized facts about the Mesopotamian institutional revolution to motivate our model that we illustrate in section 3. Next, we state the model predictions in section 4, and we discuss their test in section 5. Finally, we conclude in section 6, and we report proofs, figures, and tables in the appendix.

## 2 The Rise of the State in Ancient Mesopotamia

The Dawn of the Early Bronze Age (3350-3100 BCE).—The drying up of the first half of the 4th millennium induced the collapse of the early urban sites in Upper Mesopotamia and the reclamation of the marshy alluvium in Lower Mesopotamia,<sup>3</sup> where the landholder elites established themselves as an institutionalized decision-maker through the creation of the "temple households" [Liverani 2014, p. 51-61; Riehl et al., 2014]. The temple not only did provide risk-sharing activities,<sup>4</sup> but also gathered taxes, administered the law and managed

<sup>&</sup>lt;sup>3</sup>Following Liverani (2014), "Lower" ("Upper") Mesopotamia covered the present-day regions of Southern Iraq and Southwestern Iran (Northern Iraq, Northern Israel, Northeastern Syria and Southeastern Turkey). <sup>4</sup>They took care of orphans, stored goods and merchandise, supplied grain in time of famine, regulated interest charges, made loans to those in need and provided ransom for people captured in battle (Bentley et al., 2015).

irrigation, short-distance trades and the urbanization process [Liverani 2014, p. 61-68].

Early Dynastic period (3100-2550 BCE).—These regional divides were further stretched by the 3200 BCE droughts, which made prohibitively costly market-oriented farming in the rain-fed North, while obstructing, without impeding, cereal growing in the Southern irrigated alluvium [Ristvet 2017, p. 38-40]. Here, the fall in the returns of the temple's estates pushed the religious elites to share an increasing part of their economic and political power with a rising class of officials, who had left the temple to establish the "palace" as a second institutionalized decision-maker and, thus, involve a larger part of the population in the farming activities [Steinkeller 2018, p. 156; Marchesi and Marchetti 2011, p. 90-100]. The palatial military ranks, in fact, went beyond the direct exploitation of the land—through waged labor—by signing with the peasants allotting, leasing or sharecropping contracts always requiring rents and corvée [Cripps 2007, p. 12-15, 19-20]. Forced labor, in particular, became greatly appreciated by the citizenry, who could be involved in valuable civil engineering projects, like irrigation infrastructures and fortifications, and could gain the benefits of a conscripted army [Richardson 2011, p. 17-36]. These perks were initially represented by the access to irrigation facilities, food in times of famine and celebratory feasts [Steinkeller 2018, p. 10-11], but, then, slowly extended to the sharing of draft animal power in times of peace and sumptuous war booty after victorious wars [Richardson 2011, p. 17-36].

*Pre-Sargonic period (2550-2350 BCE).*—The improved climatic conditions delivered two main patterns. In Lower Mesopotamia, thanks to the very large estates' returns, the palatial institutions slowly acquired a political supremacy over the temple households, who maintained, however, some of their original prerogatives [Liverani 2014, p. 99]. In Upper Mesopotamia instead, the unprecedented farming feasibility brought about territorial state formation, first, and the rise to power of the extended royal families, then [Ristvet 2017, p. 40; Liverani 2014, p. 117-123]. Such power was shared with the landholders, elders, and the temple [Archi 2015, p. 570-591], and it also strengthened property rights, which became heritable, alienable and partially exempted by taxes and creditors' expropriation [Cripps 2007, p. 70-77; Liverani 2014, p. 113-115; Wilcke 2003, p. 21-25]. This legislation was part of a general trend towards a larger provision of public goods, such as public buildings, irrigation facilities, fortifications and a conscripted army [Stone 2013, p. 162-165]. Mesopotamian empires period (2350-1750 BCE).—After having consolidated their control on Lower Mesopotamia, the Akkadian kings carried out yearly expansionary campaigns, incorporating large portions of the North [Sallaberger and Schrakamp 2015, p. 105-112]. While the administration of the formerly independent Southern city-states was generally left in the hands of the local rulers in exchange for tributes [Liverani 2014, p. 138], the other territorial states were administered by governors appointed by the king and assisted, especially in the administration of justice, by temple elites, military officials and councils of elders [Liverani 2014, p. 138; Wilcke 2003, p. 35-41]. Despite this virtual power however, the dry spell that hit the entire region between 2200 and 1900 BCE, first, forced the Akkadian kings to concede strong property rights even to the farmers occupying the land directly acquired by the crown and, then, induced three major changes [Wilcke 2003, p. 155].

First, the Akkadian state collapsed and, only after a phase of political fragmentation, the Ur III kings (2112-2000 BCE) were able to reunify the alluvium [Liverani 2014, p. 155-160]. The new dynasty divided the empire into core provinces administered by appointed governors and peripheral ones controlled by military officials and specialized families of functionaries, who gained large estates thanks to the royal grants [Liverani 2014, p. 155-170, 196-197; Taylor 2010, p. 220-221]. More generally, the king would distribute lands to the peasantry in exchange of corvée and, even if the farmers could not sell the plot they cultivated, they could rely on local courts and codes of law to protect their private rights [Liverani 2014, p. 163]. Second, Upper Mesopotamia witnessed major population decline and political instability [Ristvet 2017, p. 49]. This uncertainty was soon exploited by the semi-nomadic Amorite populations, which, over the 1950-1900 BCE period, extended their control over competing kingdoms and city-states (Ristvet, 2017). To control this variegated group of polities, the Amorite kings had to negotiate with both the tribal leaders of the kingdoms and city-based councils of elders [Liverani 2014, p. 224]. Finally, the falling farming returns, together with the change of status of bronze from elite item to a common household resource. greatly incentivized, around 2000 BCE, long-distance trades, leading to the formation of two major trade networks (see figure 1), i.e., the Old Assyrian network carrying textiles and the Iranian tin from Ashur to Kanesh and bringing back copper, gold, silver and wool and the Old Babylonian network exchanging tin, copper and textiles between Shush and Hazor [Liverani 2014, p. 213-217; Barjamovic 2018, p. 121-125]. Attracted by the prospect of sharing the returns from these exchanges, the elite of the polities facing the largest potential from participating in both networks empowered the merchants willing to professionally incur the traveling risk [Barjamovic 2018, p. 123-124]. To illustrate, while the Ur III dynasty directly provided agents of the temple with goods to be exchanged on behalf of the state [Liverani 2014, p. 163], the Ashur's rulers exploited their centrality in the Assyrian network to build a colonial system managed through agreements with the local assemblies of the most powerful merchant families [Barjamovic 2018, p. 128; Liverani 2014, p. 212-218].<sup>5</sup> Such a trade revolution was completed under the reign of Hammurapi, who unified Lower Mesopotamia from 1755 BCE on [Liverani 2014, p. 173-241]. To illustrate, economic enterprises and especially "trade became an entirely private activity, with contracts and disputes between lenders and traveling merchants, and the temple and palace playing a minimal role" [Liverani 2014, p. 190]. Town-based entrepreneurs and notables replaced the provincial administration of the Ur III era establishing themselves as the third institutionalized decision-maker through the organization of business organizations [Seri 2005, p. 187]. The Karum, for instance, was a merchant association, present in Babylon, Larsa and Sippar, which regulated long-distance trades and cooperated with the palace and the temple to collect taxes and manage granaries [Postgate 1992, p. 218-221]. The increased political competition was accompanied by stronger tenants' rights, frequent edicts condoning debts and forbidding debt-based slavery, and renewed provision of public goods even in the periphery [Westbrook 2003, p. 362-407].

## 3 Theory

We draw inspiration from the historical facts to devise a general model of how political institutions and property rights are determined by the trade-off between the mix of the elite's inability to commit and her limited punishment capacity and rent-seeking incentives.

### 3.1 Model Setup

The economy.—We consider a representative elite interested in maximizing the farming output Y by cooperating with a representative citizen. To elaborate, Y is a function of

<sup>&</sup>lt;sup>5</sup>Emar, Tuttul and Sippar organized trade in a similar manner [Barjamovic 2018, p. 128].

the unobservable state of nature  $\theta$  and the unobservable citizen's effort e, and it equals V > 0 if the state of nature is good and the citizen exerts the high effort and zero otherwise. The state of nature  $\theta \in \{G, B\}$  is good with probability  $p \in (0, 1)$  and bad otherwise, and  $e \in \{l, h\}$  entails a cost 0 if low and  $\gamma > 0$  if high. After the selection of effort, the elite observes a signal  $\sigma \in \{g, b\}$  about the state of nature whose accuracy  $q \in [0.5, 1]$  is such that  $Pr(g \mid G) = Pr(b \mid B) = q$  and  $Pr(g \mid B) = Pr(b \mid G) = 1 - q$ . The parameter q, then, represents the degree of transparency of production, whereby q = 1 implies that the signal perfectly reveals the state of the world, and q = 0.5 implies that the signal is uninformative. The elite can incentivize the citizen by granting a more inclusive political institution, allowing him to guide taxation and public good provision, and by punishing suspected shirking through the restriction of property rights as further discussed below.

For what concerns the public good production technology, it is linear in the tax revenues  $pV\delta_{r,d}$ , and the tax rate  $\delta_{r,d}$  is selected by the elite under the autocratic regime r = A and by the citizen under the more inclusive political institution r = I. Furthermore, it depends on the punishment regime d. As in Boranbay and Guerriero (2019), we maintain that a supply  $g_r$  of public good delivers a sub-utility  $\rho g_r$  to the agent selecting it and directing public good production and a sub-utility  $\beta g_r$  to the other agent with  $0 < \beta < \rho < 1$ . While  $\beta < \rho$  captures the heterogeneity in the groups' preferences—e.g., the fact that the citizen (elite) prefers empowerment through conscription to build defensive wars (the way around),  $\rho < 1$  entails that the public good production is less efficient than the private one.

Turning to the stick, it can take the form of dismissal or, more generally, violence. While the first interpretation resembles the Mayshar et al.'s (2017) view, the second one is consistent with the reasoning behind the comparison between limited access and open access societies in North et al. (2009). To ease the illustration of our results, we maintain that the elite employs a non-probabilistic punishment strategy, i.e.,  $d \in \{0, 1\}$ . This restriction can be relaxed at the cost of a more cumbersome algebra (see Mayshar et al., [2017]). Finally, we assume that punishment is costly for both the citizen and the elite, who respectively bear the costs  $\alpha > 0$  and  $x > \hat{x} = max\{\frac{p}{1-p}\frac{\alpha}{\beta}(1-\rho)\frac{(1-p)\alpha-(p\beta V-\gamma)}{p\beta V-\gamma}, \frac{p}{1-p}\frac{\alpha}{\beta}(1-\rho)q\}$  (see also Mayshar et al. [2017]). While, indeed, a dismissed citizen might be forced out of farming and into serfdom, being subject to violence entails personal injuries. Similarly, not only does the elite need to substitute a dismissed citizen, but throwing a citizen out exposes the elite to a more crowded urban sector and abusing him might bring about unrest. On top of these remarks, we interpret the d = 0 regime as a scenario of *de facto* property rights, and the d = 1 regime as a case of no property rights. The  $x > \hat{x}$  inequality is satisfied in the most likely  $\rho \to 1$ case, and it simplifies the analysis in two key ways. First, it assures that the elite prefers punishing the citizen only if output is low and the signal indicates a good state of nature over using a stick whenever the output is low (see footnote 6), i.e., the odds of punishment are, thus, (1 - p)(1 - q)d. Second, it entails that when the elite prefers to punish, also the citizen's individual rationality constraint holds (see section 3.2).

Both the citizen and the elite are risk neutral and have a zero outside option. To illustrate, the expected utility of the former—i.e.,  $U_{r,d}$ —equals the expected payoff from public good consumption net of both the expected punishment cost and the cost of effort, whereas the expected payoff of the latter—i.e.,  $\pi_{r,d}$ —equals the sum of the untaxed output and the expected payoff from public good consumption net of the expected punishment cost. As a result, we are implicitly embracing the following two assumptions. First and differently from Mayshar et al. (2017), we assume that the elite lacks the ability to commit to ex post payments to the citizen. This is consistent with a long literature emphasizing the credibility issues inherent to politics (North and Weingast, 1989; Fleck and Hanssen, 2006). Second, we maintain that the elite always keeps full property rights on the untaxed output and, therefore, that production requires group-specific inputs and involves components that cannot be expropriated ex post (see Boranbay and Guerriero [2019]). Even if both assumptions add credibility to our setup (see section 2), our analysis will be unchanged should we allow the elite to commit to transfers or offer the citizen a sharecropping contract (see footnote 7).

Timing of events.—At time  $t_0$ , the elite decides whether to introduce the more inclusive political institution. At time  $t_1$ , the citizen selects  $\delta_{I,d}$  under regime I, and the elite picks  $\delta_{A,d}$  under regime A. At time  $t_2$ , the elite decides whether to entrust the land in the hands of the citizen and the level of d, whereas the citizen chooses whether joining the urban sector or participating in the production process. In the last case, he also picks a level of effort. At time  $t_3$  and under the tenancy agreement, everybody observes the public signal. Next, private and public goods are possibly produced and all the payoff realized.

### **3.2** Endogenous Political Institutions and Property Rights

Since the outside options are zero, the citizen will participate in production only to exert the high effort, and the elite will embrace the stick only when sure of the citizen's participation and if, by doing so, she can decrease taxation and raise private consumption.

At time  $t_1$  and for r = I, the citizen selects the tax rate  $\delta_{I,d}$  to maximize his utility from redistributing production through public spending subject to assuring the elite's participation, and the elite decides the punishment regime d to maximize her payoff subject to providing the citizen with the incentive to select e = h. When the citizen exerts the high effort level, the elite's payoff is  $p[(1 - \delta_{I,d})V + \beta\delta_{I,d}V] - (1 - p)(1 - q)dx$  and citizen's utility equals  $p\rho\delta_{I,d}V - \gamma - (1 - p)(1 - q)d\alpha$ , which is maximized under no punishment and full taxation and is positive for  $pV \ge \frac{\gamma}{\rho} \equiv \tilde{\Omega}$ . At this levels of the expected farming return indeed, by selecting  $\delta_{I,0} = 1$ , the citizen maximizes the part of expected output that he can appropriate through public good provision and her individual rationality constraint is met for e = h. Furthermore, the elite will participate since she gains  $p\beta V > 0$ , and she will have no incentive to use a stick, since punishment is unnecessary to induce the high effort level, might destroy the citizen's incentives to participate and decreases the elite's payoff by both creating a positive cost and not affecting the extent of taxation. Overall, when  $pV \ge \tilde{\Omega}$  and the elite has selected at time  $t_0$  the more inclusive political institution, she will also avoid punishment, and the citizen will choose  $\delta_{I,0}^* = 1$  and e = h.

At time time  $t_1$  and for r = A, the elite chooses  $\delta_{A,d}$  and d to maximize her payoff subject to satisfying her individual rationality constraint, assuring the citizen's participation and pushing him to pick e = h. Formally, the elite solves the strictly concave problem

$$\max_{\delta_{A,d} \in [0,1],d} \quad p\left[ (1 - \delta_{A,d}) V + \rho \delta_{A,d} V \right] - (1 - p) (1 - q) \, dx \quad s.t. : \tag{1}$$

$$(IC) \quad p\beta\delta_{A,d}V - \gamma - (1-p)\left(1-q\right)d\alpha \ge -pqd\alpha - (1-p)\left(1-q\right)d\alpha,$$

$$(IR) \quad p\beta\delta_{A,d}V - \gamma - (1-p)\left(1-q\right)d\alpha \ge 0.$$

While the (IR) constraint holds for e = l and d = 0, it fails for e = l and d = 1, for e = h and d = 0 when  $pV < \frac{\gamma}{\beta} \equiv \hat{\Omega}$  and for e = h and d = 1 when  $pV < \frac{\gamma+(1-p)(1-q)\alpha}{\beta} = \overline{\Omega}$  with  $\tilde{\Omega} < \hat{\Omega} < \overline{\Omega}$ . Provided that the (IR) constraint is satisfied, the elite will set  $\delta_{A,d}$  at

the lowest possible level  $\delta_{A,d}^* = \frac{\gamma - pqd\alpha}{p\beta V}$  determined by the binding (IC) constraint, since she prefers private to public good consumption. For  $\hat{\Omega} < (=) pV < \overline{\Omega}$ , the elite will pick d = 0 and  $\delta_{A,0}^* = \frac{\gamma}{p\beta V} = (<)1$  and will gain  $\pi_{A,0} = pV - \frac{\gamma(1-\rho)}{\beta} = p\left[\left(1 - \delta_{A,0}^*\right)V + \rho\delta_{A,0}^*V\right]$ , which is always larger than  $p\rho V$  and, a fortiori, of the elite's payoff under the more inclusive political institution  $p\beta v$ . For  $pV \ge \overline{\Omega}$ , the elite will pick d = 0 and  $\delta_{A,0}^*$  (d = 1 and  $\delta_{A,1}^* = \frac{\gamma - pq\alpha}{p\beta V} < 1$ ) and will gain  $\pi_{A,0}$   $(\pi_{A,1} = pV - \frac{\gamma(1-\rho)}{\beta} + \frac{pq\alpha(1-\rho)}{\beta} - (1-p)(1-q)x)$  when  $\pi_{A,1} < (\ge) \pi_{A,0}$ . Then, punishment prevails if  $q > \hat{q} \equiv \frac{(1-p)\beta x}{(1-p)\alpha}$ , which also entails that the (IR) constraint holds since  $pV \ge \overline{\Omega}$  if  $q \ge \tilde{q} \equiv \frac{\gamma + (1-p)\alpha - p\beta V}{(1-\rho)\alpha}$ , with  $\tilde{q} < \hat{q}$  because of the first inequality in the  $x > \hat{x}$  assumption.<sup>6</sup> For  $q \le \hat{q}$ , de facto property rights are preserved.

All in all, the institutional design at  $t_0$  will depend on both the expected output pVand the degree of transparency q. For  $pV < \tilde{\Omega}$  production is not feasible and the autocratic regime will be maintained. For  $\tilde{\Omega} \leq pV < \hat{\Omega}$ , granting the more inclusive political institution is the only way to push the citizen to exert the high level of effort. When finally pV exceeds the threshold  $\hat{\Omega}$ , the elite will always keep the autocratic regime embracing moreover a stick whenever  $q > \hat{q}$ . To elaborate on this last point, a rise in q increases  $\pi_{A,1}$  both directly, by lowering the expected cost of punishment (1 - p)(1 - q)x, and indirectly, by decreasing the incentive compatible tax rate  $\delta^*_{A,1}$  necessary to push the citizen to exert high effort. Being  $\pi_{A,0}$  independent of q, a sufficiently large transparency will push the elite to embrace the stick and limit property rights. The following proposition summarizes our analysis:<sup>7</sup>

**Proposition 1:** For  $x > \hat{x}$  and  $0 < \beta < \rho < 1$ , institutional design is such that: 1. If  $pV < \frac{\gamma}{\rho}$  and, thus, the expected farming return is small, production is not feasible and the autocratic regime is maintained; 2. If  $\frac{\gamma}{\rho} \leq pV < \frac{\gamma}{\beta}$ , the elite grants the more inclusive political institution and avoids punishment, whereas the citizen picks both the maximum tax rate  $\delta_{I,0}^* = 1$  and the high effort level e = h; 3. If  $\frac{\gamma}{\beta} < (=) pV < \frac{\gamma+(1-p)(1-q)\alpha}{\beta}$ , the elite keeps the autocratic regime, avoids punishment and fixes a tax rate  $\delta_{A,0}^* = \frac{\gamma}{p\beta V} = (<)1$ , whereas the citizen selects e = h; 4. If  $pV \geq \frac{\gamma+(1-p)(1-q)\alpha}{\beta}$  and  $q \leq \hat{q}$ , the elite keeps the autocratic

<sup>&</sup>lt;sup>6</sup>The second inequality part of the  $x > \hat{x}$  assumption implies that  $\pi_{A,0}$  is larger than the payoff the elite would obtain by always punishing the citizen for  $\theta = B$ , i.e.,  $pV - \frac{\gamma(1-\rho)}{\beta} + \frac{pq\alpha(1-\rho)}{\beta} - (1-p)x$ . <sup>7</sup>Could the elite credibly offer the citizen  $\epsilon pV$  as a transfer or as an incentive within a sharecropping contract,

<sup>&</sup>lt;sup>7</sup>Could the elite credibly offer the citizen  $\epsilon pV$  as a transfer or as an incentive within a sharecropping contract, she will only do it for  $\frac{\gamma}{\epsilon+(1-\epsilon)\rho} < pV \leq \tilde{\Omega}$  in the attempt to elicit production under the more inclusive political institution since funding public good provision is always preferred to transferring resources.

regime, avoids punishment and fixes a tax rate equal to  $\delta^*_{A,0}$ , whereas the citizen selects e = h; 5. If  $pV \geq \frac{\gamma+(1-p)(1-q)\alpha}{\beta}$  and  $q > \hat{q}$ , the elite keeps the autocratic regime, embraces the stick, and fixes a tax rate  $\delta^*_{A,1} = \frac{\gamma-pq\alpha}{p\beta V} < 1$ , whereas the citizen chooses e = h; 6. For  $pV \geq \frac{\gamma}{\rho}$ , the citizen's expected subutility from public good provision rises with both the inclusiveness of political institutions and the strength of property rights, i.e., it goes from  $p\rho V \geq \gamma$  for r = Ito  $\gamma (\gamma - pq\alpha)$  for r = A,  $q \leq (>)\hat{q}$ , and  $pV \geq \frac{\gamma}{\beta} (pV \geq \frac{\gamma+(1-p)(1-q)\alpha}{\beta})$ .

As in Boranbay and Guerriero (2019), a rise in the inclusiveness of political institutions makes possible investment activities otherwise impossible given the prevailing preferences and technology. When instead such impediments can be circumvented because of the sufficiently large expected farming return, the elite always prefers organizing directly public good production, decreasing taxation under autocracy and embracing the stick at a sufficiently high level of transparency making the punishment costs acceptable.

## 4 Empirical Implications

In the most plausible scenario of  $x > \hat{x}$ ,  $0 < \beta < \rho < 1$  and  $pV \ge \frac{\gamma}{\rho}$ , the model implications can be restated as testable predictions in the following manner:

**Testable Predictions**: 1. The inclusiveness of political institutions decreases with the expected farming return, and it is unrelated to the opacity of the farming process. 2. The strength of property rights falls with the expected farming return and increases with the opacity of the farming process 3. The citizens' expected utility from public good provision rises with both the inclusiveness of political institutions and the strength of property rights.

## 5 Evidence

To evaluate these testable predictions, we need proxies for the independent and dependent variables and a suitable empirical strategy. To select them, we build on section 2.

### 5.1 Sample Construction

We focus on those 44 polities, which are best documented for each half-century between the Early Bronze Ages I-IV and the Middle Bronze Age I (Liverani, 2014), i.e., 3050-1750 BCE. The logic underlying this approach is twofold. First, we have selected as cross-section identifiers those polities displaying a settlement continuity, steady political importance as implied by their experience with the first recorded forms of stable political institutions and property rights protection, and an extension strictly greater than 5 hectares for the whole period (Barjamovic, 2013; Garfinkle, 2013). While the historical and present-day names of these polities are reported in table 1, their locations are displayed in figure 1.<sup>8</sup> Second, the political decision-making and private rights of the period 3400-3100 BCE are still illunderstood (the 1750-1600 BCE era witnessed a reduction in the written sources due to the Hittite incursions and the consequent shift of the political core towards the Anatolian and Levantine regions) [Liverani 2014, p. 79-80, 252-253, 278-279], whereas it is possible to document in detail three major political transitions over our sample. As discussed in section 2, we can observe the rise of the city-states,first, their consequent transformation into petty kingdoms and, finally, the rise and fall of the Mesopotamian empires (Liverani, 2014).

#### 5.2 Measurement

A vast archaeological literature reports that the maximum distance between the cultivated fields and the settled center was 10 Km (Widell et al., 2013). Accordingly, for each half-century between 3050 and 1750 BCE, we average geographic variables over a 10 km radius around the coordinates reported for each polity by the Ancient Near East Placemarks.<sup>9</sup>.

#### 5.2.1 Expected Farming Return and the Opacity of the Production Process

We employ as a measure of the expected farming return the normalized—to range between zero and one—first principal component extracted from the maximum among the land suitability for wheat, barley, and olive breeding, each ranging between 1 and 100, the (winter-spring season) growing season temperature (of the source of the nearest between the Tigris and Euphrates) in Celsius for polities employing irrigation (rain-fed) farming and a dummy for whether the annual rainfall is more than 200 mm and thus rain-fed farming was the preferred technology, i.e., *Farming-Return.*<sup>10</sup> As for the other non-institutional variables, the climatic measures are averaged over the 50 years preceding each time period (Guerriero,

<sup>&</sup>lt;sup>8</sup>The sample spans the historical regions of Anatolia, Levant and Mesopotamia, i.e., present-day Iraq, Southwestern Iran, Northern Israel, Northeastern Syria and Southeastern Turkey (Massa and Palmisano, 2018). <sup>9</sup>This data set is available from https://www.lingfil.uu.se/research/assyriology/earth

<sup>&</sup>lt;sup>10</sup>The first three measures (last proxy) are (is) in grid format, cover the entire planet at a 0.5 (3.75) degree spatial resolution (for the last 22,000 years), and are (is) collected from the GAEZ (TRACE) data set.

2018). The following two remarks further elucidate our choices.

First, cereals were the dominant crop in Greater Mesopotamia, whereas olive oil became over the second millennium the most widely exchanged farming product being employed for cooking, perfume-making and, even, as a currency [Paulette 2013, p. 102-103]. These patterns justify our choice of land suitability. Second, both wheat and barley (olive) breeding needs a temperature ranging between 5 and 38 (higher than 4) degrees Celsius, suffers from water scarcity, and requires an altitude between 0 and 3050 meters (Serna-Saldivar, 2010; Oteros et al., 2013). Being the maximum altitude in our sample the one of Kanesh—i.e., 1106 m, the roughness of the terrain is irrelevant in our sample and, in fact, it is unrelated to Farming-Return. Similarly, both the level of rainfall and the historical distribution of artificial canals are uncorrelated with our measure of farming returns, which, in turn, is mainly driven by the temperature level. These patterns are essentially determined by the strikingly diversified regional organization of agriculture. While Upper Mesopotamia was marked by above-average rainfall and relied on rain-fed farming operated over flat tablelands around each settlement, Lower Mesopotamia enjoyed significantly less rain and adopted irrigation based farming operated on the outer slopes of the levees of the great rivers (see figure 2; Widell et al., [2013]; Wilkinson et al., [2015]). To further elaborate, an extended canal system directed the winter rains and the spring snow coming from the Iranian and Turkish mountains towards the Southern fields, pouring the water in excess in the marshy flood plain (figure 2; Wilkinson et al., 2015). Exactly because of this mismatch between the great rivers' flooding and the harvest season, it was not too difficult for the Southern elite observing the canal maintenance and agriculture was more heavily shaped by the winterspring season temperature prevailing at the sources of the great rivers than it was affected by rainfall and local temperature (Liverani, 2014). To further support these conclusions, we document in the Internet appendix that the gist of our empirical analysis remains almost intact when we control for both a measure of climate volatility and the average rainfall.

Turning to the opacity of the farming process, we rely on a dummy turning on if the Ademnes data set reports that the polity cultivated grapevine—i.e., *vitis vinifera*—for the production of wine, i.e., *Vine*. Differently from both cerealiculture and olive breeding, viticulture better handles dryness and requires very opaque activities such as controlling pests and diseases, canopy management, pruning vine during the winter months and monitoring fruit development (Miller, 2008). Although attested since the Late Neolithic period in the Zagros, Caucasus and Taurus mountainous regions, the domesticated grapevine was introduced through trade, first in Upper and then in Lower Mesopotamia, when the droughts of the mid of the third and second millennium BCE made it a more appealing crop determining its exogenous spread over the sample (see figure 3; Miller, [2008]).

#### 5.2.2 Inclusiveness of the Political Process and Property Rights

Regarding the inclusiveness of political institutions, we follow a long literature on the relevance of the constraints on the elite's power for the success of democracies (Guerriero, 2018), and we construct an indicator equal to one for polities mostly dominated by another political entity and to values between two and five otherwise, i.e., *Inclusive-Institutions.*<sup>11</sup> To elaborate, *Inclusive-Institutions* equals two in the absence of any of the three possible institutionalized decision-makers—i.e., extended royal family, temple, and town elites, three when only one was active, four when two were sharing the policy-making responsibility, and five when the political power was contested among all three decision-makers. As any other institutional variable, *Inclusive-Institutions* builds on the main events in a 40-year window around each time period (Guerriero, 2018). The Internet appendix details the sources employed to obtain both *Inclusive-Institutions* and the other variables we introduce below.

Turning to the strength of private rights, we build on a growing literature on the determinants of the degree of protection of property (Guerriero, 2016a), and we rely on an indicator equal to one for mostly dominated polities and to values between two and six otherwise, i.e., *Property-Rights*. To elaborate, *Property-Rights* equals two in the absence of any property rights, three if farming was directly organized by the elite through waged labors and farmers had *de facto* property rights, four if the land exploitation was direct and the peasants had *de jure*—i.e., stated in legal codes and enforced by courts of law—property rights, five if land exploitation was indirect—i.e., organized through either allotting, leasing, and sharecropping contracts—and the farmers had *de facto* property rights, six if the land exploitation was indirect and the peasants had *de jure* property rights.

<sup>&</sup>lt;sup>11</sup>We consider as dominated a polity that lost the control over policy-making in favor of a neighboring reign or empire, but not a politically independent one forced to pay a tribute to a foreign power.

#### 5.2.3 Provision of Public Goods

Regarding public good provision, we code whether, for each half-century preceding an observation, the polity erected fortifications—i.e., *Fortifications*—and whether it organized a conscripted army, i.e., *Army*. As discussed in section 2, the second choice identifies the provision of a public good that empowered the citizens and that was preferred by this group.<sup>12</sup>

### 5.3 Estimating Equation

A glance at figures 3 and 4 reveals that the model testable predictions are confirmed by the data and, in particular, three patterns are evident. First, the worsening of the climatic conditions between the end of the Early Bronze Age and the beginning of the Early Dynastic period and during the Mesopotamian empires periods reduced the farming returns forcing the elites to release some of their political power to the rising classes. Second, the improved climate conditions of the Pre-Sargonic period corresponded to a fall in the inclusiveness of the political institutions and in the strength of private rights. Third, the diffusion of the cultivated grapevine is only weakly correlated to the expansion of political and property rights. Finally, reforms towards more inclusive political institutions and stronger property rights were accompanied by a more intense provision of public goods and, especially, to a fast rise of conscripted armies. Next, we verify these intuitions through multivariate analysis.

To illustrate, we assess the model predictions by running panel regressions of the form

$$Y_{p,t} = \alpha_p + \beta_t + \gamma' \mathbf{X}_{p,t} + \delta' \mathbf{Z}_{p,t} + \varepsilon_{p,t}, \qquad (2)$$

where  $Y_{p,t}$  is either *Inclusive-Institutions*, *Property-Rights*, *Fortifications* and *Army*.  $\alpha_p$  are polity fixed effects controlling for time-independent determinants of  $Y_{p,t}$  like other geographic traits, such as the land suitability for agriculture and pasture (Litina, 2016), and predetermined shocks, e.g., the out of Africa exodus of humankind and the agricultural revolution.<sup>13</sup>

<sup>&</sup>lt;sup>12</sup>This assumption is also consistent with the classical Athens shift from an "elite democracy" of the relative wealthier citizens to an "all-encompassing one" (Kyriazis et al., 2015). The eight century BCE introduction of the hoplites, first, and the 482 BCE "Naval Law," then, conscripted the richest 20%, first, and the remainder of Athenian population, then. Both innovations forced the landholder elite to raise the military wage and extend the franchise of all the citizens actively defending the polity (Kyriazis et al., 2015)

<sup>&</sup>lt;sup>13</sup>While Ashraf and Galor (2013) document that prehistoric migratory distance from East Africa is related to both genetic diversity and present-day trust, Olsson and Paik (2016) suggest that an early Neolithic

 $\beta_t$  are half-century dummies picking up regional macro-shocks like epidemics, which might have modulated the incentives to escape the Malthusian trap (Voigtländer and Voth, 2009).  $\mathbf{X}_{p,t}$  gathers Farming-Return and Vine (Farming-Return, Vine, Inclusive-Institutions, and Property-Rights) if  $Y_{p,t}$  is either Inclusive-Institutions (Fortifications) or Property-Rights (Army). Finally,  $\mathbf{Z}_{p,t}$  possibly includes the extra controls discussed in section 5.5.1.

To reckon with the within-polity correlation in  $\varepsilon_{r,t}$  possibly driven by institutional persistence, we cluster the standard errors at the polity level. Similarly, we document that our main conclusions will stand should we deal with the spatial dependence in  $\varepsilon_{r,t}$  possibly produced by the relative coarse resolution of the geographic data by relying on either the Driscoll-Kraay or the Conley (1999) standard errors (see the Internet appendix).

#### 5.4 Basic Empirical Results

Columns (1) to (4) of table 3 display the estimates of the basic specifications, which are all consistent with the first-order model predictions stated in section 4. To illustrate, a onestandard-deviation rise in *Farming-Return* is associated with a 14.95-standard-deviation fall in *Inclusive-Institutions* and a 14.28-standard-deviation decrease in *Property-Rights*. On the contrary, *Vine* is not a strong predictor of either the inclusiveness of political institutions or the strength of property rights. Finally, *Property-Rights* is, in general, not significantly linked to public good provision, whereas *Inclusive-Institutions* is always positively and significantly related to the supply of public goods and, as expected, more to *Army* than to *Fortifications*. To elaborate, a one-standard-deviation rise in *Inclusive-Institutions* is accompanied by a 0.14-standard-deviation rise in *Fortifications* and a 0.20-standard-deviation increase in *Army*.

### 5.5 Evaluating the Role of Unobserved Heterogeneity

While the accuracy in the measurement and the independence from human effort of both *Farming-Return* and *Vine* exclude that our estimates are driven by either measurement error or reverse causation, we cannot exclude that our estimates are biased by unobserved heterogeneity. To assess the relevance of this issue, we follow a two-step strategy. First, we evaluate the impact on the coefficients testing the key model predictions of including in the specifications the other key drivers of inclusive political institutions and stronger property

transition to agriculture is correlated to patriarchal values and a less inclusive political process.

rights identified by the extant literature. Second, we calculate how much greater the influence of unobservables, relative to that of all the observables put forward by the literature, would need to be to explain away the links among geography, institutions and public goods.

#### 5.5.1 Controlling for Observables

Three are the main theories of institutional evolution alternative to our approach.

First, Acemoglu et al. (2005) provide evidence that the 14th century opening of the Atlantic routes strengthened the political power of the merchant groups in England and the Provinces, allowing them to constrain the power of the monarchy. In a vein more similar to our model, Boranbay and Guerriero (2019) document that stronger incentives to encourage the citizenry's investment in joint long-distance trades induced the medieval lords to expand the political rights of the population. In the context of medieval Europe, these incentives can be captured with either the availability of a direct access to the sea or the average distance from the commercial hubs, which, in turn, increases the opacity of the merchants' investment (Boranbay and Guerriero, 2019). Building on this intuition, we include in our analysis a variable capturing the potential for each polity's participation in the Old Assyrian and/or the Old Babylonian trade networks, i.e., Trade-Potential. Although significant interregional trade is attested in Greater Mesopotamia since the 4th millennium BCE (Massa and Palmisano 2018), the domestic adoption of metals induced, at the turn of the 2nd millennium BCE, the creation of the Old Assyrian and Old Babylonian trade networks (see section 2). Three were their key aspects. First, the vast majority of the polities were involved in a single network by law (Massa and Palmisano 2018). Second, they were connected through knots inputing in the system the goods produced by the nearest polities not laying on the routes [Liverani 2014, p. 216-217; Barjamovic 2018, p. 120-125]. Third, these knots, in turn, were divided in simple transit points and hubs in which professional merchants would organize the inter-hub exchange, i.e., Ashur, Kanesh, Babylon, Larsa, Sippar Barjamovic 2018, p. 122-128]. The hubs were usually characterized by the presence of merchant institutions, often a Karum, settling trade-related disputes, contracting sworn agreements with each knots and offering financial services [Liverani 2014, p. 216]. In the light of these stylized facts, Trade-*Potential* refers to the half-century preceding each observation and equals: 1. zero if the polity did not have any access to the Babylonian and/or the Assyrian trade networks; 2. the distance between the polity and the nearest knot of the networks to which it belonged if it was part of at least one trade network but not a knot itself; 3. the distance between the polity and the nearest hub.<sup>14</sup> Again, *Trade-Potential* Crucially, *Trade-Potential* assumes higher values when long-distance trades where more difficult to observe and distinguishes among polities organizing the exchange and whose natural trade partner was the closest hub and those not directing it and whose natural counterpart was the closest knot. We expect to observe a positive and significant coefficient attached to *Trade-Potential*. As discussed in section 2, as soon as the prospect of taxing the returns from valuable long-distance trades became appealing, the farming elites began to share their political power with the rising merchant families and to exempt them from the tools necessary to access local markets.

Second, common interest public goods, such as fighting external wars, are conducive to a stronger state's capacity to protect private rights (Besley and Persson, 2009) and, as aforementioned, they politically empower the citizens actively defending the polity (Richardson, 2011; Kyriazis et al., 2015). Hence, we consider the total number of war campaigns conducted by the polity over the previous 50 years, i.e., *External-Conflicts*. Similarly, inter-groups conflicts are related to both insecure private rights (Ashraf and Galor, 2013) and a higher elite's willingness to expand the political and private rights (Acemoglu and Robinson, 2000). To capture both links, we consider a dummy turning on whenever the polity experienced, over the previous 50 years, either an uprising of the citizenry against the institutional powers or a rebellion of the polity against an external ruler, i.e., *Internal-Conflicts*.

Finally, to consider the modernization effect of economic development on political and private rights (Inglehart and Welzel, 2005), we consider the polity dimension in hectares, i.e., *Polity-Size*. This figure is estimated through pottery sherd, extension of the settlement area and distribution of the fortification walls, and it is strongly correlated to a larger population, whereby a comparison with modern mudbrick building implies that our polities accommodated between one and two hundred people per hectare [Algaze 2017, p. 29].

As clarified by the estimates listed in columns (1) to (5) of panels A and B of table 4,

<sup>&</sup>lt;sup>14</sup>An alternative measure can be estimated through a gravity trade model exploiting the complementarities among the goods exchanged and both the distances among polities and their sizes (Barjamovic et al., 2019).

controlling for the aforementioned confounding variables either alone or all together leaves unchanged the gist of our analysis. Conditional on all observables, in particular, five are the key patterns. First, the magnitude and the statistical significance of the coefficients on Farming-Return and the links between both Inclusive-Institutions and Property-Rights, on the one hand, and both *Fortifications* and *Army*, on the other hand, remain almost unchanged. Second, the impact of *Vine* on the protection of private rights tends to become more significant. Third, our data support the idea that the prospect of gaining from lucrative long-distance trades pushed the elite to incentivize them by expanding both the citizenry's rights and the provision of public goods. This evidence is inconsistent with Acemoglu et al. (2005) but in line with Boranbay and Guerriero (2019) and our model. Fourth, neither external nor internal conflicts are significant predictors of either institutional evolution or the provision of public goods, which is at odds with Besley and Persson's (2009) and Acemoglu and Robinson's (2000) intuitions, respectively.<sup>15</sup> Finally, the coefficient on *Polity-Size* confirms that institutions easing the elite-citizenry cooperation are conducive to a larger economic development (Boranbay and Guerriero, 2019; North et al., 2009). The opposite explanation of a modernization effect of economic development on institutional evolution is, instead, rejected by the fact that forward values of *Polity-Size* are never significant when added as extra control variables (results available upon request).<sup>16</sup>

In the Internet Appendix, we obtain similar results when we consider the main factors modulating the impact of both inclusive political institutions and the strength of property rights and, in particular, the severity of climate volatility,<sup>17</sup> merchant institutions regulating long-distance trade,<sup>18</sup> the political instability due to the rise to power of a young king,<sup>19</sup> and the importance of long-distance trades (see the Internet appendix for the exact definitions

<sup>&</sup>lt;sup>15</sup>Differently from several successful palace conspiracies [Foster 2016, p. 8-10], all the major popular revolts ended up in mass murder, deportation and subjugation (Yoffee and Seri, 2019).

<sup>&</sup>lt;sup>16</sup>If indeed the contemporaneous link between institutional evolution and *Polity-Size* was driven by the fact that the latter causes the former, then one will expect even stronger correlations between institutions and forward values of the proxy for economic development (Angrist and Pischke, 2009).

<sup>&</sup>lt;sup>17</sup>For 90 European regions observed between 1000 and 1600, Boranbay and Guerriero (2019) show that climate volatility determined a culture of cooperation, which, in turn, is linked to a more inclusive political process.
<sup>18</sup>Greif (1992) documents how merchants institutions that surmounted commitment problems also crucially

supported the expansion of both trade and state capacity during the medieval "commercial revolution." <sup>19</sup>As emphasized by Cassidy, Dincecco and Onorato (2015), an inexpert ruler is more likely to initiate conflicts and more vulnerable to attack and/or the requests of the rising economic and political groups.

and sources of these variables).<sup>20</sup> This evidence further corroborates our conclusions that unobserved heterogeneity should not be considered an issue for our empirical exercise.

#### 5.5.2 Using Selection on Observables to Assess the Bias from Unobservables

Despite our attempts to control for the key drivers of inclusive political institutions and stronger property rights, the estimates presented so far may still be biased by unobservable factors. To evaluate this issue, we calculate the index proposed by Altonji et al. (2005) and Bellows and Miguel (2009) to measure how much stronger selection on unobservables, relative to selection on observables, must be to explain away the entire estimated effects. To see how the index is calculated, consider a regression with a restricted set of control variables and one with a full set of controls. Next, denote the estimate of the coefficient attached to the variable of interest from the first regression  $\gamma^R$ , where R stands for "restricted," and that from the second regression  $\gamma^F$ , where F stands for "full." Then, the index is the absolute value of  $\gamma^F/(\gamma^R - \gamma^F)$ . The intuition behind the formula is as follows. The lower the absolute value of  $(\gamma^R - \gamma^F)$  is, the less the estimate of the coefficient attached to the variable of interest is affected by selection on observables, and the stronger selection on unobservables needs to be to explain away the entire effect. Similarly, the higher the absolute value of  $\gamma^F$  is, the greater is the effect that needs to be explained away by selection on unobservables.

We consider the specifications without control variables  $\mathbf{z}_{r,t}$  and reported in table 3 as the restricted regressions and those incorporating all the extra controls in columns (5) to (8) in panel B of table 4 as the full regression. Moreover, we report the indexes calculated from the specifications with dependent variables *Inclusive-Institutions*, *Property-Rights*, *Fortifications* and *Army* in columns (1) to (4) of table 5, respectively. Finally, we focus on those variables that test the key model predictions. The median and average indexes are 6.8 and 18.4. Hence, to attribute the entire estimates to selection effects, selection on unobservables would have to be on average more than 18 times greater than selection on all observables, which seems unlikely given the fit of the estimates of equation (2) in tables 3 and 4.

<sup>&</sup>lt;sup>20</sup>To elaborate, we employ the number—ranging between 1 and 7—of costly-to-obtain items imported over the previous 50 years, i.e., soft, chipped and precious stones, metals, ivory, weights, shells (Palmisano, 2018).

## 6 Concluding Comments

We have developed a theory of endogenous political and property institutions grounded on the trade-off between the mix of the elite's inability to commit and her limited punishment capacity and rent-seeking incentives. Moreover, we have tested our model implications exploiting a novel data set on the vast institutional revolution that gave rise to the first recorded forms of stable state institutions in Greater Mesopotamia during the Bronze Age.

Rather than reviewing our results, we close by highlighting avenues for further research. First, a key issue unanswered by our empirical test is whether moves towards more inclusive political institutions and stronger protection of property rights fostered, thanks to the larger provision of public goods, economic development. Differently from the extant literature (Besley and Persson, 2009), we will employ the geographic drivers of institutions to isolate their exogenous variation (see also Guerriero et al., [2019]). Second, Grafe (2012) maintains that the extent of political autonomy of the medieval polities acted as obstacle to political centralization and market integration in Europe (see for preliminary evidence Guerriero, [2019]). A more detailed test of this strategic dynamics is to evaluate whether the same incentives encouraged the Akkadian, Ur III and Babylonian empires to develop a complex bureaucracy managing the periphery and to impose extractive policies on the ruled polities less politically relevant and/or endowed with more inclusive political institutions (Altaweel and Squitieri, 2018; de Oliveira and Guerriero, 2018). Finally, economic success also depends on the ability of the legal system to implement the socially optimal level of punishment for deviant behaviors and to protect property rights (North et al., 2009; Guerriero 2016b). Guerriero (2016a, c) analyze cross-sectional data to document that reforms from a decentralized legal order, characterized by judicial precedents, procedural discretion and rules strongly protecting the original owners' property, to a centralized one, marked instead by legislation, bright-line procedural rules and rules strongly protecting the buyers' contracts, are related to a more inclusive political process. Given the variety of observed legal solutions developed over our sample (Roth, 1997), ancient Mesopotamia constitutes a superb panel environment where these ideas can be more precisely tested.

## References

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review*, 91: 1369-1401.

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2005. "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth." *American Economic Review*, 95: 546-579.

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A. Robinson. 2019. "Democracy Does Cause Growth." *Journal of Political Economy*, 127: 47-100.

Acemoglu, Daron, and James A. Robinson. 2000. "Why Did the West Extend the Franchise? Democracy, Inequality and Growth in Historical Perspective." *Quarterly Journal* of Economics, 115: 1167-1199.

Algaze, Guillermo. 2017. "Demographic Trends in Early Mesopotamian Urbanism." In Overturning Certainties in Near Eastern Archaeology. A Festschrift in Honor of K. Aslihan Yener. Çidem Maner, Mara T. Horowitz, and Allan S. Gilbert (eds.). Leiden, BE: Brill.

Altaweel Mark, and Andrea Squitieri. 2018. *Revolutionizing a World: From Small States* to Universalism in the Pre-Islamic Near East. London, UK: UCL Press.

Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber. 2005. "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools." *Journal* of *Political Economy*, 113: 151-184.

Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics*. Princeton, NJ: Princeton University Press.

Archi, Alfonso. 2015. *Ebla and Its Archives. Texts, History, and Society.* Berlin, GE: De Gruyter.

Ashraf Quamrul, and Oded Galor. 2013. "Genetic Diversity and the Origins of Cultural Fragmentation." *American Economic Review*, 103: 528-533.

Barjamovic, Gojko. 2013. "Mesopotamian Empires." In Oxford Handbook of the State in the Ancient Near East and the Mediterranean, Peter F. Bang and Walter Scheidel (eds.). Oxford, UK: Oxford University Press.

Barjamovic, Gojko. 2018. "Interlocking Commercial Networks and the Infrastructure of Trade in Western Asia during the Bronze Age." In *Trade and Civilisation: Economic Networks and Cultural Ties from Prehistory to the Early Modern Era*, Kristian Kristiansen, Thomas Lindkvist and Janken Myrdal (eds.). Cambridge, UK: Cambridge University Press.

Barjamovic, Gojko, Thomas Chaney, Kerem Coşar, and Ali Hortaçsu. 2019. "Trade, Merchants and Lost Cities of the Bronze Age." Forthcoming, *Quarterly Journal of Economics*.

Bellows, John, and Edward Miguel. 2009. "War and Local Collective Action in Sierra Leone." *Journal of Public Economics*, 93: 1144-1157.

Bentley, Jerry, Herbert Ziegler, and Heather Streets Salter. 2015. Traditions and Encounters: A Brief Global History, 4th edition. New York: McGraw-Hill Education.

Bentzen, Jeanet Sinding, Nicolai Kaarsen, and Asger Moll Wingender. 2016. "Irrigation and Autocracy." *Journal of the European Economic Association*, 15: 1-53.

Besley, Timothy, and Torsten Persson. 2009. "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review*, 99: 1218-1244.

Boranbay, Serra, and Carmine Guerriero. 2019. "Endogenous (In)Formal Institutions." Unpublished.

Cassidy, Traviss, Mark Dincecco, and Massimiliano Onorato. 2015. "The Economic Legacy of Warfare. Evidence from European Regions." Unpublished.

Ciccone, Antonio. 2018. "Democratic Tipping Points." Unpublished.

Cripps, Eric. 2007. Land Tenure and Social Stratification in Ancient Mesopotamia: Third Millennium Sumer Before the UR III Dynasty (BAR S1676). Oxford, UK: Archaeopress. de Oliveira, Guilherme, and Carmine Guerriero. 2018. "Extractive States: The Case of the Italian Unification." *International Review of Law and Economics*, 56: 142-159.

Fleck, Robert K., and F. Andrew Hanssen. 2006. "The Origins of Democracy: a Model with Application to Ancient Greece." *Journal of Law and Economics*, 49: 115-146.

Foster, Benjamin R. 2016. The Age of Agade. Inventing Empire in Ancient Mesopotamia. London, UK: Routledge.

Garfinkle, Steven J. 2013. "Ancient Near Eastern City-States." In Oxford Handbook of the State in the Ancient Near East and the Mediterranean, Peter F. Bang and Walter Scheidel (eds.). Oxford, UK: Oxford University Press.

Grafe, Regina. 2012. Distant Tyranny: Markets, Power, and Backwardness in Spain, 1650-1800. Princeton, NJ: Princeton University Press.

Greif, Avner. 1992. "Institutions and International Trade: Lessons from the Commercial Revolution." *American Economic Review*, 82: 128-133.

Guerriero, Carmine. 2016a. "Endogenous Property Rights." Journal of Law and Economics, 59: 313-358.

Guerriero, Carmine. 2016b. "Endogenous Legal Traditions." International Review of Law and Economics, 46: 49-69.

Guerriero, Carmine. 2016c. "Endogenous Legal Traditions and Economic Outcomes." Journal of Comparative Economics, 44: 416-433.

Guerriero, Carmine. 2019. "Endogenous Institutions and Economic Outcomes." Forthcoming, *Economica*.

Guerriero, Carmine, Massimiliano Onorato, and Laura Righi. 2019. "Culture, Democracy, and the Rise of the Welfare State." Unpublished. Inglehart, Ronald, and Christian Welzel. 2005. Modernization, Cultural Change, and Democracy: The Human Development Sequence. Cambridge, UK: Cambridge University Press.

Kyriazis, Nicholas C., Xenophon Paparrigopoulos, and Emmanouil-Marios L. Economou.
2015. "The Glue of Democracy: Economics, Warfare and Values in Classical Greece." In: *Essays in Contemporary Economics*, George C. Bitros and Kyriazis Nicholas (eds). Berlin, GE: Springer.

Litina, Anastasia. 2016. "Natural Land Productivity, Cooperation and Comparative Development." *Journal of Economic Growth*, 21: 351-408.

Liverani, Mario. 2014. The Ancient Near East. History, Society, Economy. London, UK: Routledge.

Marchesi, Gianni, and Nicoló Marchetti. 2011. The Royal Statuary of Early Dynastic Mesopotamia. Winona Lake, IN: Eisenbrauns.

Massa, Michele, and Alessio Palmisano. 2018. "Change and Continuity in the Long-Distance Exchange Networks between Western/Central Anatolia, Northern Levant and Northern Mesopotamia, c. 3200-1600 BCE." *Journal of Anthropological Archaeology*, 49: 65-87.

Mayshar, Joram, Omer Moav, and Zvika Neeman. 2017. "Geography, Transparency, and Institutions." *American Political Science Review*, 111: 622-636.

Mayshar, Joram, Omer Moav, Zvika Neeman, and Luigi Pascali. 2018. "Appropriability and Hierarchy." Unpublished.

Miller, Naomi F. 2008. "Sweeter than Wine? The Use of the Grape in Early Western Asia." *Antiquity*, 82: 937-946.

North, Douglass C., and Barry R. Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England." *Journal of Economic History*, 49: 803-832. North, Douglass C., John Joseph Wallis, and Barry R. Weingast. 2009. Violence and Social Orders: A Conceptual Framework for Understanding Recorded Human History. Cambridge, UK: Cambridge University Press.

Nunn, Nathan. 2010. "Religious Conversion in Colonial Africa." *American Economic Review*, 100: 147-152.

Nunn, Nathan, and Leonard Wanchekon. 2011. "The Slave Trade and the Origins of Mistrust in Africa." *American Economic Review*, 101: 3221-3252.

Olsson, Ola, and Christopher Paik. 2016. "Long-Run Cultural Divergence: Evidence From the Neolithic Revolution." *Journal of Development Economics*, 122: 197-213.

Oteros, Jose, Herminia García-Mozo, Luis Vázquez, Antonio Mestre, Eugenio Domínguez-Vilches, and Carmen Galán. 2013. "Modelling Olive Phenological Response to Weather and Topography." Agriculture Ecosystems and Environment, 179: 62-68.

Palmisano, Alessio. 2018. The Geography of Trade. Landscapes of Competition and Long-distance contacts in Mesopotamia and Anatolia in the Old Assyrian Colony Period. Oxford, UK: Archaeopress.

Paulette, Tate. 2013. "Consumption and Storage in the Bronze Age." In *Models of Mesopotamian Landscapes. How Small-Scale Processes Contributed to the Growth of Early Civilizations*, Tony J. Wilkinson, McGuire Gibson, and Magnus Widell (eds.). Oxford, UK: Archaeopress.

Richardson, Seth. 2011. "Mesopotamia and the 'New' Military History." In *Recent Directions in the Military History of the Ancient World*, Lee L. Brice, and Jennifer T. Roberts (eds.). Claremont, CA: Regina Books.

Postgate, J. Nicholas 1992. Early Mesopotamia: Society and Economy at the Dawn of History. London, UK: Routledge.

Ristvet, Lauren. 2017. "Assyria in the Third Millennium BCE." In A Companion to Assyria, Eckart Frahm (eds.). New York, NY: Wiley-Blackwell.

Roth, Martha T. 1997. Law Collections from Mesopotamia and Asia Minor. Atlanta, Ga: Scholars Press.

Sallaberger, Walther, and Ingo Schrakamp. 2015. "Part 1: Philological Data for a Historical Chronology of Mesopotamia in the 3rd Millennium." In *ARCANE III. History And Philology*, Walther Sallaberger and Ingo Schrakamp (eds.). Turnhout, BE: Brepols.

Seri, Andrea. 2005. Local Power in Old Babylonian Mesopotamia. London, UK: Equinox.

Serna-Saldivar, Sergio O. 2010. Cereal Grains: Properties, Processing, and Nutritional Attributes. Boca Raton, FL: CRC Press.

Steinkeller, Piotr. 2018. "The Reluctant En of Inana or the Persona of Gilgameš in the Perspective of Babylonian Political Philosophy." *Journal of Ancient Near Eastern History*, 5: 149-177.

Stone, Elizabeth C. 2013. "The Organisation of a Sumerian Town: The Physical Remains of Ancient Social Systems." In *The Sumerian World*, Harriet Crawford (eds.). London, UK: Routledge.

Taylor, Jon. 2010. "Hazannu: The Forgotten Mayor." *Rivista Di Storia Economica*, 31: 79-96.

Voigtländer, Nico, and Hans-Joachim Voth. 2009. "Malthusian Dynamism and the Rise of Europe: Make War, Not Love." *American Economic Review*, 99: 248-254.

Westbrook, Raymond. 2003. A History of Ancient Near Eastern Law (2 Vols). Boston, MA: Brill.

Widell, Magnus, Carrie Hritz, Jason A. Ur, and Tony J. Wilkinson. 2013. "Land Use of the Model Communities." In *Models of Mesopotamian Landscapes. How Small-Scale Processes Contributed to the Growth of Early Civilizations*, Tony J. Wilkinson, McGuire Gibson and Magnus Widell (eds.). Oxford, UK: Archaeopress.

Wilcke, Claus. 2003. "Early Dynastic and Sargonic Periods." In A History of Ancient Near Eastern Law, Raymond Westbrook (eds.). Boston, MA: Brill. Wilkinson, Tony J., Louise Rayne, and Jaafar Jotheri. 2015. "Hydraulic Landscapes in Mesopotamia: The Role of Human Niche Construction." *Water History*, 7: 397-418.

Yoffee, Norman, and Andrea Seri. 2019. "Negotiating Fragility in Ancient Mesopotamia: Arenas of Contestation and Institutions of Resistance." In *The Evolution of Fragility: Setting the Terms*, Norman Yoffee (eds.). Cambridge, UK: Cambridge University Press.

## Tables and Figures

#### Table 1: The Sample — Major Ancient Mesopotamian Polities

RAIN-FED FARMING: Abarsal (Tell Khuera), Alalakh (Tell Atchana), Ashnakkum (Chagar Bazar), Ebla (Tell Mardikh), Gasur (Yorgan Tepe), Gubla (Byblos), Hama (Hama), Harran (Harran), Hazor (Hazor), Kahat (Tell Barri), Kanesh (Kultepe), Karkemish (Karkemish), Nabada (Tell Beydar), Nagar (Tell Brak), Qatna (Tell Mishrifeh), Qattara (Tell Rimah), Shashrum (Tell Shemshara), Shubat-Enlil (Tell Leilan), Tuba (Umm el-Marra), Ugarit (Ras Shamra), Urbilum (Erbil), Urkesh (Tell Mozan). IRRIGATION FARMING: Adab (Bismaya), Ashur (Qal'aat Sherqat), Emar (Tell Meskene), Eridu (Abu Shahrein), Eshnunna (Tell Asmar), Girsu (Tello), Hattam (Tell Agrab), Isin (Ishan Bahriyat), Kish (Tell Uhaimir), Lagash (Tell al-Hiba), Larsa (Tell Senkereh), Mari (Tell Hariri), Nineveh (Ninive), Nippur (Nuffar), Shuruppak (Fara), Shush (Susa), Sippar (Abu Habbah), Tuttul (Tell Bi'a), Tutub (Khafajah), Umma (Tell Jokha), Ur (Tell al-Muqayyar), Uruk (Tell al-Warka).

Note: 1. The historical names of the polities that constitute the cross-section identifiers are in regular lowercase type, and those of the present-day locations are in Italic lowercase font.



Figure 1: Location of the Major Ancient Mesopotamian Polities Part of the Sample

Note: 1. The shapes of the Old Assyrian and Old Babylonian trade networks are extrapolated from figure 12.4 of Liverani (2014).



Note: 1. While the left figure is taken from Widell et al. (2013), the right one is collected from Wilkinson et al. (2015).

		5	
	Variable	Definition and Sources	Statistics
	In alteriana In atitatiana a	See text. Sources: Authors' codification based on the references listed in the Internet	2.316
Tratitutiona	Inclusive-Institutions:	appendix.	(1.072)
institutions:	Proporta Pighta	See text. Sources: Authors' codification based on the references listed in the Internet	2.329
	1 topet ig-nights.	appendix.	(1.055)
	Farming Potum	See text. Sources: http://www.gaez.iiasa.ac.at/ and https://www.earthsystemgrid.org	0.557
Coography	running-nerun.	project/trace.html	(0.365)
Geography:	Vina	Dummy turning on if, in the previous 50 years, a polity imported from Syria grapevine	0.080
	vine:	for the production of wine. Source: http://www.ademnes.de	(0.271)
	The de Deterritiel	See text. Sources: Liverani (2014).	31.468
	1raae-Fotentiat:		(125.057)
	Enternal Cardiates	Number of war campaigns over the previous 50 years. Sources: Authors' codification	0.301
Extra	External-Conflicts:	based on the references listed in the Internet appendix.	(1.469)
Controls:	$Internal {-} Conflicts:$	Dummy for uprising and/or rebellion against an external ruler over the previous 50 years.	0.029
		Sources: Authors' codification based on the references listed in the Internet appendix.	(0.169)
	Polita Siros	Dimension of the polity in hectares over the previous 50 years. Sources: Authors'	50.621
	Polity-Size:	codification based on the references listed in the Internet appendix.	(79.871)
	E	Dummy turning on when, over the previous 50 years, the polity built fortifications.	0.327
Public good	Fortifications:	Sources: Authors' codification based on the references listed in the Internet appendix.	(0.480)
provision:	4	Dummy turning on if the polity set up, over the previous 50 years, a conscripted army.	0.406
	Army:	Sources: Authors' codification based on the references listed in the Internet appendix.	(0.491)
Note: 1.	The last column reports	the mean value and, in parentheses, the standard deviation of each variable. Both are compute	d building

Table 2: Summary of Variables

Note: 1. The last column reports the mean value and, in parentheses, the standard deviation of each variable. Both are computed building on the sample used in tables 3 to 5.



Note: See table 1 for the definition of the two groups of polities and table 2 for the definition and sources of each variable. 1.



Figure 4: Expected Farming-Return and Opacity of the Production Process

See table 1 for the definition of the two groups of polities and table 2 for the definition and sources of each variable. Note: 1.

	(1)	(2)	(3)	(4)	
		The dep	endent variable is:		
	Inclusive-Institutions	Property-Rights	Fortifications	Army	
In alternitienen Instationenen			0.061	0.093	
Inclusive-Institutions			$(0.033)^*$	$(0.025)^{***}$	
D ( D' L)			0.003	- 0.019	
Property-Rights			(0.042)	(0.024)	
	- 43.922	- 41.287	17.670	22.650	
Farming-Keturn	(19.413)**	(20.854)**	(9.057)*	(6.554)***	
17.	0.379	0.474	0.075	0.161	
Vine	(0.296)	$(0.262)^*$	(0.130)	(0.097)*	
			OLS		
Within R <sup>2</sup>	0.09	0.10	0.25	0.53	
Number of Observations	1188	1188	1188	1188	

#### Table 3: Endogenous Institutions and Public Good Provision

Numbei Note:

Standard errors clustered at the country level in parentheses. \*\*\* denotes significant at the 1% confidence level; \*\*, 5%; \*, 10%.
 All specifications include polity and half-century fixed effects.

### Table 4: Endogenous Institutions and Public Good Provision — Controlling for Observables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A. The dependent variable is:							
	Inclusive-	Property-	Fortifications	Army	Inclusive-	Property-	Fortifications	Army
	Institutions	Rights			Institutions	Rights		
T 1 : T 1:1 1:			0.064	0.097			0.054	0.092
Inclusive-Institutions			$(0.034)^*$	$(0.024)^{***}$			$(0.032)^*$	$(0.025)^{***}$
D ( D) 1/			- 0.010	- 0.037			0.005	- 0.022
Property-Rights			(0.042)	(0.024)			(0.041)	(0.025)
	- 35.878	- 30.073	19.848	25.678	- 55.645	- 47.618	14.506	21.711
Farming-Return	$(18.242)^*$	(19.328)	(8.932)**	$(6.706)^{***}$	(21.045)**	$(21.188)^{**}$	(8.778)	$(6.696)^{***}$
	0.459	0.587	0.106	0.204	0.321	0.410	0.067	0.154
Vine	$(0.268)^*$	(0.236)**	(0.102)	(0.075)***	(0.291)	(0.251)	(0.131)	(0.097)
	0.0015	0.0021	0.0005	0.0007	(0.202)	(0.202)	(01202)	(0.001)
Trade-Potential	(0.0005)***	(0.00021)	(0,0003)	(0.0002)***				
	(0.0000)	(0.0004)	(0.0000)	(0.0002)	0.090	0.108	0.016	0.015
External-Conflicts					(0.055)	(0.057)*	(0.010)	(0.013)
					0.439	0.069	0.145	0.018
Internal-Conflicts					(0.907)	(0.266)	(0.079)**	(0.045)
				01	(0.301)	(0.200)	(0.012)	(0.040)
Within P <sup>2</sup>	0.11	0.14	0.27	0.55	0.11	0.12	0.26	0.53
Number of Observations	1188	1188	1188	1188	1188	1188	1188	1188
Number of Observations	1100	1100	1100	1100	1100	1100	1100	1100
			_					
		_	Pane	el B. The depe	endent variable	e is:		
	Inclusive-	Property-	Pane Fortifications	el B. The depe Army	endent variable Inclusive-	e is: Property-	Fortifications	Army
	Inclusive- Institutions	Property- Rights	Pane Fortifications	el B. The depe Army	endent variable Inclusive- Institutions	e is: Property- Rights	Fortifications	Army
Inclusive-Institutions	Inclusive- Institutions	Property- Rights	Pane Fortifications	el B. The depe Army 0.085	endent variable Inclusive- Institutions	e is: Property- Rights	Fortifications	Army 0.092
Inclusive-Institutions	Inclusive- Institutions	Property- Rights	Pane Fortifications 0.051 (0.034)	el B. The depe Army 0.085 (0.024)***	endent variable Inclusive- Institutions	e is: Property- Rights	Fortifications 0.051 (0.030)*	Army 0.092 (0.025)***
Inclusive-Institutions	Inclusive- Institutions	Property- Rights	Pane Fortifications 0.051 (0.034) 0.0007	el B. The depe Army 0.085 (0.024)*** - 0.022	endent variable Inclusive- Institutions	e is: Property- Rights	Fortifications 0.051 (0.030)* - 0.009	Army 0.092 (0.025)*** - 0.041
Inclusive-Institutions Property-Rights	Inclusive- Institutions	Property- Rights	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415)	0.085 0.024)*** 0.022 0.023)	endent variable Inclusive- Institutions	e is: Property- Rights	Fortifications 0.051 (0.030)* - 0.009 (0.041)	Army 0.092 (0.025)*** - 0.041 (0.025)
Inclusive-Institutions Property-Rights	Inclusive- Institutions	Property- Rights	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041	0.085 (0.024)*** - 0.022 (0.023) 21.265	endent variable Inclusive- Institutions	e is: Property- Rights - 36.930	Fortifications 0.051 (0.030)* - 0.009 (0.041) 15.762	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342
Inclusive-Institutions Property-Rights Farming-Return	Inclusive- Institutions - 47.516 (20.654)**	Property- Rights - 44.384 (22.031)**	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)*	B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)****	endent variable Inclusive- Institutions - 49.622 (20.911)**	• is: Property- Rights - 36.930 (20.647)*	Fortifications 0.051 (0.030)* - 0.009 (0.041) 15.762 (8.472)*	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)***
Inclusive-Institutions Property-Rights Farming-Return	Inclusive- Institutions - 47.516 (20.654)** 0.286	Property- Rights - 44.384 (22.031)** 0.394	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052	Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142	endent variable Inclusive- Institutions - 49.622 (20.911)** 0.313	<ul> <li>is: <i>Property-</i> <i>Rights</i> <ul> <li>- 36.930 (20.647)* 0.456         </li> </ul> </li> </ul>	Fortifications 0.051 (0.030)* - 0.009 (0.041) 15.762 (8.472)* 0.073	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178
Inclusive-Institutions Property-Rights Farming-Return Vine	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	ndent variable Inclusive- Institutions - 49.622 (20.911)** 0.313 (0.276)	<ul> <li>is: <i>Property-</i> <i>Rights</i> <ul> <li>- 36.930</li> <li>(20.647)*</li> <li>0.456</li> <li>(0.223)**</li> </ul> </li> </ul>	Fortifications 0.051 (0.030)* - 0.009 (0.041) 15.762 (8.472)* 0.073 (0.102)	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)**
Inclusive-Institutions Property-Rights Farming-Return Vine	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	$\begin{array}{c} \text{Pane}\\ \hline \\ Fortifications\\ \hline 0.051\\ (0.034)\\ 0.0007\\ (0.0415)\\ 16.041\\ (8.822)^*\\ 0.052\\ (0.121)\\ \end{array}$	Del B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	- 49.622 (20.911)** 0.313 (0.276) 0.0011	- 36.930 (20.647)* 0.456 (0.223)** 0.0018	$\begin{array}{c} \text{Fortifications} \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.0006
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	bl B. The dependence of the d	- 49.622 (20.911)** 0.313 (0.276) 0.0005)**	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)***	$\begin{array}{c} \hline & Fortifications \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.006 (0.0002)***
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	el B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	ndent variable Inclusive- Institutions - 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079	<ul> <li>is: <i>Property-Rights</i> <ul> <li>36.930</li> <li>(20.647)*</li> <li>0.456</li> <li>(0.223)**</li> <li>0.0018</li> <li>(0.0005)***</li> <li>0.098</li> </ul> </li> </ul>	$\begin{array}{c} \hline & Fortifications \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ 0.014 \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.0006 (0.0002)*** 0.014
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	el B. The dependence Army 0.085 (0.024)*** - 0.022 (0.023) 21.265 (6.741)*** 0.142 (0.093)	- 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055)	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)*	$\begin{array}{c} Fortifications\\ \hline 0.051\\ (0.030)^*\\ -\ 0.009\\ (0.041)\\ 15.762\\ (8.472)^*\\ 0.073\\ (0.102)\\ 0.0004\\ (0.0003)\\ 0.014\\ (0.011)\\ \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.0006 (0.0002)*** 0.014 (0.007)*
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	el B. The dependence $Army$ 0.085 (0.024)*** - 0.022 (0.023) 21.265 (6.741)*** 0.142 (0.093)	- 49.622 [nclusive- Institutions] (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)* - 0.269	$\begin{array}{c} \hline & Fortifications \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ 0.014 \\ (0.011) \\ 0.086 \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.006 (0.0002)*** 0.014 (0.007)* - 0.085
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290)	Property- Rights - 44.384 (22.031)** 0.394 (0.239)	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	el B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	ndent variable Inclusive- Institutions (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257 (0.321)	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)* - 0.269 (0.279)	$\begin{array}{c} 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ 0.014 \\ (0.011) \\ 0.086 \\ (0.072) \end{array}$	$\begin{array}{c} Army \\ \hline 0.092 \\ (0.025)^{***} \\ - 0.041 \\ (0.025) \\ 24.342 \\ (7.035)^{***} \\ 0.078)^{**} \\ 0.0006 \\ (0.0002)^{***} \\ 0.014 \\ (0.007)^{*} \\ - 0.085 \\ (0.046)^{*} \end{array}$
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290) 0.004	Property- Rights - 44.384 (22.031)** 0.394 (0.239) 0.003	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121)	el B. The dependence of the de	- 49.622 [nstitutions] - 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257 (0.321) 0.003	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)* - 0.269 (0.279) 0.002	$\begin{array}{c} Fortifications\\ \hline 0.051\\ (0.030)^*\\ -\ 0.009\\ (0.041)\\ 15.762\\ (8.472)^*\\ 0.073\\ (0.102)\\ 0.0004\\ (0.0003)\\ 0.014\\ (0.011)\\ 0.086\\ (0.072)\\ 0.0009 \end{array}$	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.006 (0.0002)*** 0.014 (0.007)* - 0.085 (0.046)* 0.0007
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts Polity-Size	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290) 0.004 (0.001)***	Property- Rights - 44.384 (22.031)** 0.394 (0.239) 0.003 (0.001)***	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121) 0.00011 (0.0005)**	el B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	- 49.622 [nstitutions] - 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257 (0.321) 0.003	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)* - 0.269 (0.279) 0.002 (0.001)**	$\begin{array}{c} \hline & Fortifications \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ 0.014 \\ (0.011) \\ 0.086 \\ (0.072) \\ 0.0009 \\ (0.0005)^{**} \end{array}$	$\begin{array}{c} Army \\ \hline 0.092 \\ (0.025)^{***} \\ - 0.041 \\ (0.025) \\ 24.342 \\ (7.035)^{***} \\ 0.178 \\ (0.078)^{**} \\ 0.0066 \\ (0.0002)^{***} \\ 0.014 \\ (0.007)^{*} \\ - 0.085 \\ (0.046)^{*} \\ 0.0007 \\ (0.0004)^{*} \end{array}$
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts Polity-Size	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290) 0.004 (0.001)***	Property- Rights - 44.384 (22.031)** (0.239) 0.003 (0.001)***	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121) 0.0011 (0.0005)**	el B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	- 49.622 Institutions - 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257 (0.321) 0.001)*** .5	- 36.930 (20.647)* (20.647)* (0.456 (0.223)** (0.0015)*** (0.005)*** (0.057)* - 0.269 ((0.279) 0.002 ((0.001)**	$\begin{array}{c} \text{Fortifications} \\ \hline 0.051 \\ (0.030)^* \\ - 0.009 \\ (0.041) \\ 15.762 \\ (8.472)^* \\ 0.073 \\ (0.102) \\ 0.0004 \\ (0.0003) \\ 0.014 \\ (0.0011) \\ 0.086 \\ (0.072) \\ 0.0009 \\ (0.0005)^{**} \end{array}$	$\begin{array}{c} Army \\ \hline 0.092 \\ (0.025)^{***} \\ - 0.041 \\ (0.025) \\ 24.342 \\ (7.035)^{***} \\ 0.078)^{**} \\ 0.0006 \\ (0.0002)^{***} \\ 0.014 \\ (0.007)^{*} \\ - 0.085 \\ (0.046)^{*} \\ 0.0007 \\ (0.0004)^{*} \end{array}$
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts Polity-Size	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290) 0.004 (0.001)*** 0.13	Property- Rights - 44.384 (22.031)** 0.394 (0.239) 0.003 (0.001)***	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121) 0.00011 (0.0005)**	all B. The dependence           Army           0.085           (0.024)***           - 0.022           (0.023)           21.265           (6.741)***           0.142           (0.093)	- 49.622 [nstitutions] - 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.0005)** 0.079 (0.055) 0.257 (0.321) 0.003 (0.001)*** <u>5</u> 0.15	- 36.930 (20.647)* 0.456 (0.223)** 0.0018 (0.0005)*** 0.098 (0.057)* - 0.269 (0.279) 0.002 (0.001)**	Fortifications 0.051 (0.030)* - 0.009 (0.041) 15.762 (8.472)* 0.073 (0.102) 0.0004 (0.0003) 0.014 (0.011) 0.086 (0.072) 0.0009 (0.0005)**	Army 0.092 (0.025)*** - 0.041 (0.025) 24.342 (7.035)*** 0.178 (0.078)** 0.006 (0.0002)*** 0.014 (0.007)* - 0.085 (0.046)* 0.0007 (0.0004)* 0.56
Inclusive-Institutions Property-Rights Farming-Return Vine Trade-Potential External-Conflicts Internal-Conflicts Polity-Size Within R <sup>2</sup> Number of Observations	Inclusive- Institutions - 47.516 (20.654)** 0.286 (0.290) 0.004 (0.001)*** 0.13 1188	Property- Rights - 44.384 (22.031)** 0.394 (0.239) 0.003 (0.001)*** 0.13 1188	Pane Fortifications 0.051 (0.034) 0.0007 (0.0415) 16.041 (8.822)* 0.052 (0.121) 0.0011 (0.0005)** 0.28 0.28	$\begin{array}{c} \text{0.085} \\ \hline 0.085 \\ \hline (0.024)^{***} \\ - 0.022 \\ \hline (0.023) \\ 21.265 \\ \hline (6.741)^{***} \\ 0.142 \\ \hline (0.093) \\ \hline \\ \hline \\ 0.0009 \\ \hline \\ (0.0004)^{**} \\ \hline \\ \hline \\ 0.54 \\ \hline \\ 1188 \\ \hline \end{array}$	- 49.622 (20.911)** 0.313 (0.276) 0.0011 (0.005)** 0.079 (0.055) 0.257 (0.321) 0.003 (0.001)*** .S 0.158 0.	<ul> <li>is: Property- Rights         <ul> <li>36.930</li> <li>(20.647)*</li> <li>0.456</li> <li>(0.223)**</li> <li>0.0018</li> <li>(0.0005)***</li> <li>0.098</li> <li>(0.057)*</li> <li>- 0.269</li> <li>(0.279)</li> <li>0.002</li> <li>(0.001)**</li> </ul> </li> <li>1188</li> </ul>	$\begin{array}{c} Fortifications\\ \hline 0.051\\ (0.030)^*\\ -\ 0.009\\ (0.041)\\ 15.762\\ (8.472)^*\\ 0.073\\ (0.102)\\ 0.0004\\ (0.0003)\\ 0.014\\ (0.011)\\ 0.086\\ (0.072)\\ 0.009\\ (0.0005)^{**}\\ \hline 0.29\\ \hline 1188\\ \end{array}$	$\begin{array}{c} Army \\ \hline 0.092 \\ (0.025)^{***} \\ - 0.041 \\ (0.025) \\ 24.342 \\ (7.035)^{***} \\ 0.178 \\ (0.078)^{**} \\ 0.0006 \\ (0.0002)^{***} \\ 0.014 \\ (0.007)^{*} \\ - 0.085 \\ (0.046)^{*} \\ 0.0007 \\ (0.0004)^{*} \\ \hline 0.56 \\ 1188 \end{array}$

Standard errors clustered at the country level in parentheses. \*\*\* denotes significant at the 1% confidence level; \*\*, 5%; \*, 10%. Note: 1. 2. All specifications include polity and half-century fixed effects.

#### Table 5: Using Selection on Observables to Assess the Bias from Unobservables

	(1)	(2)	(3)	(4)
		The depend	ent variable is	
	Inclusive-Institutions	Property-Rights	Fortifications	Army
The index is calculated for				
$Inclusive\-Institutions$			5.1	92
Property-Rights			0.75	1.83
Farming-Return	8.71	8.48		
Vine	4.74	25.33		

The full set also control for:  $Trade-Potential,\ External-Conflicts,\ Internal-Conflicts,\ Polity-Size.$ 

Each index is constructed as explained in section 5.4.2 building on the coefficients attached to the relevant variable and obtained from two regressions. In one, the covariates are those included in the specifications reported in table 3. In the other, the "full set" of covariates are those used in the specifications listed in columns (5) to (8) of panel B of table 4. The sample size is 1188. Note: 1.

# APPENDIX (FOR ONLINE PUBLICATION)

### Table I: Summary of Variables

	Variable	Definition and Sources	Statistics
Geography	Climate-Volatility.	Normalized—to range between zero and one—first principal component extracted from the mean thermal excursion in Celsius between hottest and coldest—above 0—month of the vear and the ratio of the gap hetween large scale and convective precipitation of the	0.593 (0.216)
Geography.	contact country.	wettest and driest months to the mean one, both averaged over the previous 50 years. Sources: https://www.earthsystemgrid.org/project/trace.html	(01210)
	Rainfall:	Growing season large scale and convective precipitation in mm, averaged over the previous 50 years. Sources: https://www.earthsystemgrid.org/project/trace.html	5.091 (5.311)
		Dummy turning on if, over the previous 50 years, the polity had formal merchant	0.022
	Merchant-Institution:	institutions, i.e., Karum, port authority, and merchant courts. Sources: Authors'	(0.146)
		codification based on the references listed in the Internet appendix.	
Extra		Average of a dummy turning on when, over the previous $50$ years, a king was crowned $20$	0.154
controls:	Young-King: or younger weighted by the inverse distance among policies. Sources: Authors' co based on the references listed in the Internet appendix.	or younger weighted by the inverse distance among policies. Sources: Authors' codification	(0.409)
		based on the references listed in the Internet appendix.	
		Number—ranging between 1 and 7—of costly-to-obtain items imported over the previous	2.636
	Trade:	50 years, i.e., soft stones, chipped stones, precious stone, metals, ivory, weights, shells.	(2.299)
		Sources: Authors' codification based on the references listed in the Internet appendix.	
Note: 1.	The last column report	s the mean value and, in parentheses, the standard deviation of each variable. Both are compute	d building

Note: 1. The last column reports the mean value and, in parentheses, the standard deviation of each variable. Both are computed building on the sample used in tables II and III.

### Table II: Controlling for Alternative Observables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A. The dependent variable is:							
	Inclusive- Institutions	Property- Rights	Fortifications	Army	Inclusive- Institutions	Property- Rights	Fortifications	Army
Inclusive-Institutions			$0.062 \\ (0.033)^*$	$0.096 \\ (0.026)^{***}$			$0.061 \\ (0.034)^*$	$0.093 \\ (0.025)^{***}$
Property-Rights			$\begin{array}{c} 0.002 \\ (0.042) \end{array}$	- 0.020 (0.024)			- 0.008 (0.041)	-0.018 (0.023)
Farming-Return	- 44.353 (19.398)**	- 41.692 (20.616)**	$(9.157)^*$	22.707 (6.583)***	- 52.760 (19.461)***	- 51.857 (20.401)**	14.507 (9.053)	23.082 (6.622)***
Vine	$0.305 \\ (0.295)$	0.413 (0.268)	$\begin{array}{c} 0.079 \\ (0.130) \end{array}$	$0.170 \\ (0.096)^*$	$0.164 \\ (0.322)$	0.218 (0.284)	$\begin{array}{c} 0.016 \\ (0.123) \end{array}$	$0.169 \\ (0.099)^*$
$Climate ext{-} Volatility$	- 4.141 (1.433)***	- 4.021 (1.663)**	-0.555 (0.581)	-0.519 (0.473)				
Rainfall	$\begin{array}{c} 0.051 \\ (0.031) \end{array}$	$0.033 \\ (0.037)$	- 0.013 (0.010)	- 0.022 (0.007)***				
Merchant-Institution					$(0.478)^{***}$	1.667 (0.703)**	$0.420 \\ (0.140)^{***}$	-0.057 (0.091)
				0	LS			
Within $\mathbb{R}^2$	0.12	0.13	0.26	0.53	0.12	0.14	0.27	0.53
Number of Observations	1188	1188	1188	1188	1188	1188	1188	1188
			Pan	el B. The dep	endent variable	e is:		
	Inclusive- Institutions	Property- Rights	Fortifications	Army	Inclusive- Institutions	Property- Rights	Fortifications	Army
$\ Inclusive {-} Institutions$			$0.063 \\ (0.033)^*$	$0.095 (0.025)^{***}$			0.033 (0.028)	0.076 (0.024)***
Property-Rights			$\begin{array}{c} 0.009 \\ (0.042) \end{array}$	-0.014 (0.025)			$0.006 \\ (0.036)$	-0.018 (0.023)
Farming-Return	-19.730 (18.132)	-14.917 (19.679)	14.336 (8.434)*	$(6.266)^{***}$	- 46.105 (19.967)**	- 42.917 (21.107)**	$(7.977)^*$	21.017 (6.300)***
Vine	$\begin{array}{c} 0.347 \\ (0.292) \end{array}$	(0.440) $(0.263)^*$	$\begin{array}{c} 0.077 \\ (0.132) \end{array}$	$0.163 \\ (0.098)^*$	$\begin{array}{c} 0.323 \\ (0.273) \end{array}$	$0.433 \\ (0.251)^*$	$\begin{array}{c} 0.046 \\ (0.105) \end{array}$	$0.143 \\ (0.086)^*$
Young-King	-0.797 (0.174)***	- 0.868 (0.215)***	$0.120 \\ (0.056)^{**}$	$0.112 \\ (0.050)^{**}$				
Trade					0.117 (0.027)***	0.087 $(0.030)^{***}$	0.081 $(0.014)^{***}$	0.051 $(0.012)^{***}$
	OLS							
Within R <sup>2</sup>	0.13	0.15	0.26	0.53	0.12	0.12	0.36	0.56
Number of Observations	1188	1188	1188	1188	1188	1188	1188	1188

 Note:
 1.
 Standard errors clustered at the country level in parentheses. \*\*\* denotes significant at the 1% confidence level; \*\*, 5%; \*, 10%.

 2.
 All specifications include polity and half-century fixed effects.

Table III: Allowing for Spatial Correlation

			-	-				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				The depender	nt variable is:			
	Inclusive-	Property-	Fortifications	Army	Inclusive-	Property-	Fortifications	Army
	Institutions	Rights			Institutions	Rights		
Inclusive Institutions			0.051	0.092			0.051	0.092
Inclusive-Institutions			$(0.017)^{***}$	$(0.018)^{***}$			$(0.031)^*$	$(0.029)^{***}$
Proporta Piahta			- 0.009	- 0.042			- 0.009	- 0.042
1 topet ty-ttights			(0.016)	$(0.019)^{**}$			(0.035)	$(0.019^{**})$
Farming Potum	- 49.622	- 36.930	15.762	24.342	- 49.622	- 36.930	15.762	24.342
Farming-netarn	(31.799)	(26.031)	$(3.717)^{***}$	$(6.219)^{***}$	$(20.191)^{**}$	$(20.055)^*$	$(6.031)^{***}$	$(4.687)^{***}$
Vinc	0.120	0.456	0.073	0.178	0.313	0.456	0.073	0.178
vine	$(0.290)^{**}$	$(0.123)^{***}$	(0.087)	(0.067)**	(0.255)	$(0.238)^*$	(0.104)	$(0.076)^{**}$
				OI	LS			
Within R <sup>2</sup>	0.15	0.18	0.29	0.56				
Number of Observations	1188	1188	1188	1188	1188	1188	1188	1188

Note: 1.

 
 Asservation
 1100
 1100
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 1188
 2.