An Historic Horse Race: The Impact of History on Modern Outcomes

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Abstract:

While incomes and institutions are persistent over the span of several years, evidence is mounting that events even centuries old play major roles. I compare a set of ten historical variables to determine their relative predictive ability on modern outcomes. I find that initial population density, malaria incidence, and time since the Neolithic revolution in a country are the most consistently significant historical predictors of modern outcomes. My findings agree with the "reversal of fortune" of Acemoglu et al. (2002), whereby past population density is positively correlated with present income, with this effect weakened outside of Europe due to colonization. (JEL-O1,O3,O4)

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1. Introduction

Over the past several years, economists have proposed a number of different theories as to how history affects modern day outcomes. Looming large among these is the role of European colonization on the long term development in many parts of the world. While incomes and institutions are persistent over the span of several years, evidence is mounting that past events have impacts that last even centuries, and that the world of today was in large part determined by the conditions of the world prior to the industrial revolution.[1] Such papers find that a number of factors, such as government age or population density, when evaluated separately, have a statistically and economically significant effect on the modern day outcomes. The outcome of interest is usually income, as measured by real GDP per capita, but the quality of laws and institutions in a country as well as their level of democracy also attract attention.

However, while economists can always create new theories, the number of historical cases available to test these remains static and there is thus limited statistical ability to test them all. As many of these historical factors are correlated, choosing to study the impact of one variable, while omitting others, is likely to lead to omitted variable bias. These theories are best tested in tandem with one another to see which predictors are significant. A more comprehensive framework is thus needed to properly answer the question "How much does ancient history matter?"

In this paper, I propose addressing these problems by simultaneously testing several historical variables' impacts on modern day outcomes in one OLS regression. I utilize the following variables: time since Neolithic Revolution, when agriculture became the primary source of calories in a society (Putterman 2008); technological adoption (Comin et al. 2010);

[1] Studies include, but are not limited to: Acemoglu et al. (2002), Ang (2013), Bockstette et al (2002), Comin et al (2010), Engerman and Sokoloff (2000), Gennaioli and Rainer (2007), Hibbs and Olsson (2004), Michalopoulos and Papaioannou (2011B), Michalopoulos and Papaioannou (2013), Putterman (2008), Spolaore and Wacziarg (2009), Voightlander and Voth (2013), Wantchekon and Garcia-Ponce (2011), and Borcan et al (2014).

state antiquity (Bockstette et al. 2002); state centralization in 1500, (Robinson and Osafo-Kwaako 2013); malaria conditions (Kiszewski et al 2004); ethno-linguistic fractionalization (Roeder 2001); natural log of population density in 1500, both by itself and with an interaction term (Acemoglu et al. 2002); and the number of wars fought by a given state (Voightlander and Voth 2013.) I also include dummies for landlockedness, island status, tropics, and colonization.

I test four related questions. First, which historical factors are statistically significant determinants of the modern outcomes of log real GDP per capita, general institutional quality, and democratic institutions? Second, what historical factors have the largest quantitative impact on these outcomes? Third, how much overall variation in modern outcomes are these historical variables able to explain? Fourth, do these results change when I account for the migrations around the globe in the past 500 years? This process also finds if there are historical factors that consistently have no predictive power. This paper will help to identify which long-lived variables have the biggest impact at present and thus should be the targets of further research.

I find that population density in 1500, malaria conditions, and time since the Neolithic Revolution are the most statistically significant determinants of modern outcomes, with population density and the time since the discovery of agriculture having the largest economic impact on incomes, institutions and democracy. These findings are consistent with the results of Acemoglu et al. (2002) and their reversal of fortune hypothesis, in which population density in the past leads to higher present incomes only in Europe due to the impact of colonization destroying much of the higher incomes accompanying population density in the rest of the world. It is also consistent with newer findings such as Olsson and Paik (2013) and Borcan et al. (2014) that find societies that discovered agriculture first have lower incomes in the modern day.

Further, I find that these historical factors together explain the majority of total variation in modern incomes, government types, and institutional quality.

While it is impressive that this simple model, measuring geography as well as a handful of measures of general age and historical development of a state, has high predictive power, it is also troubling. This result indicates that path dependence in incomes, democracy, and institutions is quite strong. If the distribution of countries' incomes today is still affected by centuries-old conditions and institutions, convergence in incomes and institutions must be glacially slow or completely non-existent, and this has dire implications for the possibility of development in historically poor countries. When poverty today is explained by events in the distant past, then currently disadvantaged regions either have a great deal of historical inertia to overcome, previously prescribed policies have been ineffective in changing the root problems in these countries, or both.

This paper is arranged as follows. Section II reviews the relevant literature, section III discusses the data and mode, and section IV discusses the results. Section V concludes.

2. Literature Review

While there are countless historical variables in the literature, the following literature review discusses some of the most studied historical variables and groups them into several categories. Each paper provides a novel explanation of how history influences future outcomes, and by considering these factors together I hope to provide more insight on the economic development over time.

A. Political Economy Variables

One of the most commonly studied determinants of present income and institutional quality is the organizational level of states in the past centuries. Bockstette et al. (2002) argue that the antiquity of a state has long lasting effects, with states that have more governance experience having better current outcomes. The authors use an inventory method to create a stock of state experience based on the organizational level of a state at regular intervals over the past 2000 years. The assumption is that states build up the ability to govern slowly over many centuries, giving an advantage to states with many generations of self-governance. Borcan et al (2014) extend this framework to 3500 BC and use a nonlinear model to show that while states of moderate age fare best in the current day, very old and very new states both do poorly. New states lack experience to govern, and old states tend to retain older, less efficient and more autocratic institutions.

Another commonly studied governance factor is the centralization of the state and its governance, specifically the centralization of pre-colonial Africa states. The Standard Cross-Cultural Survey, SCCS, and Murdock's *Ethnographic Atlas* both provide a measure of the historical centralization of ethnic groups, with groups going from being organized only at the village level up to groups that had large sprawling empires. Michalopoulos and Papaioannou (2013) employ light data captured by satellites to match up land subdivided into plots only a few square kilometers in size with ancient ethnic group boundaries in Africa. They find that areas populated by peoples from groups with more centralized governments in the pre-colonial era also tend to have more light today. As light is a proxy for income, these areas are therefore likely richer. Gennaioli and Rainer (2007) aggregate the ethnic group data from Murdock and combine it with data from the *Atlas Nardov Mira* in order to create a national-level measure of historical centralization. They find that areas with more centralized governments before the colonial era

provided more public goods and had better health outcomes in the present era. However, Osafo-Kwaako and Robinson (2013) find that past government centralization in Africa is not correlated with positive outcomes in the modern day, while it is in the rest of the world. While historical centralization in the past is correlated with good institutions today in the rest of the world, in Africa it likely enabled easier European exploitation. European governments would have been able to co-opt existing governments to further their extractive ends, leading to negative long run institutional consequences.

Other authors have considered the number of wars as a major determinant of both a country's present day number for wars as well as its institutional quality. Using the locations of historical conflicts, Besley and Reynal-Querol (2012) found that areas in Sub-Saharan Africa that experienced more warfare in the past are more likely to experience them in the present. Past wars are also associated with worse economic, health and human rights outcomes. Alternatively, Voightlander and Voth (2013) considered warfare a primary driver of European success, as it relieved Malthusian population pressures and allowed for the development of more advanced governments as well as raised per capita GDPs. The effect of past wars on present development is thus unclear.

B. Technological Variables

The timing of adopting specific technologies may also generate durable differences between nations. Comin et al. (2010) studies the impact of past technological adoption on present conditions. The authors select a large set of technologies that could impact incomes- ranging from the use of paper to the concept of fielding professional armies- as well as classify the countries that used them in 0BC, 1000AD and 1500AD. The researchers use this database to

create an aggregate technology adoption index for each period studied to identify the relative advancement of a given region compared to its peers at that point in time. They find that technological leaders in the past are often the technological leaders of the present, which suggests a learning-by-doing mechanism in which the more technology one adopts, the easier it becomes to adopt additional technologies.

Arguably the most historically important technological innovation, agriculture, may also prove to be an important determinant of long run performance. Putterman (2008) considers the long run impact of the timing of the Neolithic Revolution. Putterman defines the Neolithic revolution, or official adoption of agriculture, as when the majority of calories consumed in a society come from cultivated sources rather than hunted sources. He finds that the time since the transition from hunter-gathering to agriculture as the primary means of subsistence is positively correlated with incomes in both 1500 and in the present day. Similarly, Hibbs and Olsson (2004) consider measures of how climactically suited an area was to agriculture as well as the number of domesticable plants and animals in a region, summarized by indices of biogeography and geography. They find that areas with more domesticable plants and animals tended to complete the Neolithic Revolution earlier, going from a low-growth pre-modern era to a high-growth modern era and thus being wealthier in the long run. This in turn meant more time in a high modern growth period compared to societies that transitioned later.

As income is persistent over time in the modern era, pre-industrial incomes could very well be correlated with present incomes. Lacking good measures of past incomes, authors such as Acemoglu et al (2002) and Ang (2013) have used measures of population intensity- population density, historical city sizes, and urbanization rates- as proxies, as only wealthy societies could afford to support the high cost of transporting food to densely populated areas,

and in turn these more densely populated areas were more likely to develop better institutions. Ang (2013) finds that population density is indeed correlated with higher present day incomes, while Acemoglu et al (2002) find that this correlation generally only holds in Europe. In other parts of the world, these rich urbanized and densely populated areas tended to be colonized by Europeans who set up institutions meant to extract resources rather than encourage settlement. These poor institutions carried over to bad outcomes today: likewise, less populated areas tended to attract settlers who set up better institutions which fare better to this day.

C. Geographic Variables

Geographic factors not directly related to agriculture, such as distance from one's regional historical technological frontier (Ashraf and Gaylor 2011) may play a role in determining incomes.[2] The physical distance of one's country from the regional leader in 1500 affects the ability to exchange ideas, adopt new technologies or trade products, with countries closer to the regional leader thus having higher incomes. Spolaore and Wacziarg (2009) employ a related idea, genetic distance as defined by latest common ancestor. Areas that are genetically isolated are also likely physically and thus economically isolated, making it harder to share ideas. They find that countries which are genetically similar to global leaders at that point in history tend to have higher incomes.[3]

Tied to the climate conditions and geography of an area, malaria is often studied as a potential contributor to poor institutions as well as lower incomes throughout history (Acemoglu et al 2000, Sachs 2003, and Weil 2010.) While malarial conditions have changed in the world due to various eradication efforts, it remains relevant to the development of many societies even

[2] A regional leader is defined as one of the two countries with the highest population density on a continent.
[3] While Spolaore and Wacziarg (2009) choose the United States as the leader in 2000, Ang (2013) chooses the United Kingdom as the leader in 1500 and finds similar results.

to this day. To better define the long run impact of malaria, Kiszewski et al. (2004) created a global index representing malaria transmission conditions that is based on more permanent climate and biological factors, not accounting for human efforts at eradication. Results are still unclear as to whether malaria is a major determinant of outcomes, past and especially present (Acemoglu et al 2000.)

Ethnic divisions are also a possible persistent factor in state outcomes. Numerous authors have considered ethno-linguistic fractionalization, derived from the Atlas Nardov Mira (1967) and compiled by modern authors (e.g. Roeder (2001)) as a measure of the intensity of ethnic and linguistic divisions within a nation. Other authors have proposed different measures of fractionalization, such as Posner's (2004) politically relevant ethnic groups (PREG) and numerous other dimensions representing intra-national divisions such as religious fractionalization in Alesina et al (2003.) Currently, fractionalization literature believes it causes the most harm in slowing the delivery of public goods within a state. Fractionalization is slow to move over time, so it can be reasonably argued to be a long lived historical component that affects current conditions. Looking beyond these more peaceful frictions caused by fractionalization, Michalopoulos and Papaioannou (2011B) look more specifically at how past events generate modern ethnic conflicts, considering the impact of the scramble for Africa which split ethnic groups. Using Murdock's *Ethnographic Atlas* and detailed geographic information, the authors are able to identify the historical boundaries of African ethnic groups and confirm that not only were colonial boundaries drawn arbitrarily with respect to ethnic groups, but also that ethnic groups split by national borders are more likely to have experienced conflict in the present.

D. Migration

While not applicable to all countries, several colonial era factors have been proposed as being significant determinants of modern institutions. Engerman and Sokoloff (2000) proposed that the initial endowments of specific regions in the new world affected the institutions that would develop there, and Bruhn and Gallego (2012) found that colonial era economic activities had a strong impact on future development. Areas conducive to smallholder farming tended to develop systems that protected property rights and promoted democracy, while areas that were better suited for large scale farming or other activities tended to exploit their citizens and set up laws to protect the landed classes. These institutions have carried forward to the present day in the form of persistent laws and legal traditions that impact the functioning of a market-based society. Similarly, Acemoglu et al (2002) argue that while population density is generally a sign of high incomes in the past, it also attracted European colonizers that set up extractive states which had long run negative impacts on the development of the settled regions. Further, Wantchekon and Garcia-Ponce (2011) explore the impact of the collapse of European rule in their colonies. They studied colonial rebellions in Africa and found that nations which experienced an urban uprising in the past were significantly more democratic today than states that experienced a rural uprising. They argue that states experiencing urban uprisings against colonial overlords were more likely to develop broad bases of public support with pluralistic governments later on, and less likely to be as violent in nature. On the other hand, states that experienced a rural uprising often became military led dictatorships where only former veterans of the bush wars have full rights.

Finally, while not a determinant of present outcomes in itself, migration in the past half millennia likely affected the distribution of peoples and with them historical experiences. Most

notable of these movements is the death of many of the original inhabitants from the new world and their replacement with Europeans. To account for this movement, Putterman and Weil (2010) create a migration index in order to weight what share of a modern nation's peoples comes from different historical nations. This matrix can be used to create a migration weighted set of historical factors that often has better predictive ability than non-migration weighted set of factors, as is employed by Ang (2013) and Putterman (2006.)

The above papers demonstrate that long-passed events are surprisingly effective at explaining current incomes, institutions, and government forms to this day.[4] As stated earlier, the ultimate goal of this paper is to discover which of these many variables are most important in determining current outcomes, and how much these historical variables explain as a whole. To this end, the next section will discuss the data being employed to test many of the above hypothesis about what variables in the past affect outcomes in the present.

3. Discussion of Data

Historical factors that can affect modern day outcomes are generally aggregated in three ways- at a local level (such as a 10 square mile block in northwestern Spain), on a societal/ethnic group level (such as the Jula people of West Africa) and at a national level (such as the country of Yemen.) I predominantly use national level data, though some authors have used local or societal level data from databases such as the *Standard Cross Cultural Survey* (SCCS) or Murdock's *Ethnographic Atlas* to aggregate up to a national level (Gennaioli and Rainer 2007.) However, I still consider literature using data drawn from a societal or grid level that may point to other relevant national level variables.

[4] Ang (2013) also provides a discussion of many variables listed here, and Nunn (2009) also surveys the literature of long run impacts of historical factors.

A. Independent Variables

I consider the following hypotheses:

I. **Time since Neolithic Revolution:** This is defined as how many thousand years have passed since agriculture was the primary source of calories for the inhabitants of a given state, usually referred to as the Neolithic Revolution, as measured from the year 2000, collected by Putterman (2008.)

II. **Malaria:** To capture the effect of malaria, I use Kiszewski's (2004) measure of malaria ecology, an index composed of climate and terrain factors as well as the propensity of local mosquito species to feed on humans and the virulence of local malaria strains. The index is aggregated to a national level, and more accurately represents malaria conditions in the past better than alternative measures such as the World Bank's measure of malaria risk that account for modern eradication efforts.

III. **Technology adoption index:** This index consists of how many technologies a country has adopted relative to the highest technological adopter in 1500 as recorded by the archaeological record, as defined by Comin et al (2010.)

IV. **Centralization:** Lacking a national level measure of centralization, as such measures used by other authors tend to come from smaller sub-national ethnic groups and are often focused on Africa, I instead choose to evaluate centralization in 1500 by using Bockstette et al's (2002) state antiquity index in 1500. This will give a measure of how developed the state would have been in 1500, right before the era when European contact with the rest of the world began in earnest, a distinct concept from the total stock of experience as a state from 1 AD until 1950. Using this variable allows me to explore Robinson and Osafo-Kwaako's (2013) theory that

centralization had different benefits in Africa by adding an interaction term with an Africa dummy.

V. **State History:** This index is a stock of state experience as defined by Bockstette et al (2002.) The organizational level of a state is measured every 50 years from 1 AD until 1950. The state antiquity index at a given point in time is equal to the organizational level of the state in that period, O_i, plus a discounted sum of past state experience. Each single period- 50 years- the the previous experience is discounted at a rate of 5%. Thus, the total state experience for a given state E_i in 1950 AD (i=0) all the way back to 1 AD (i=39) is expressed by the following equation:

$$\sum_{i=1}^{39} \frac{O_i}{(1+.05)^i} = E_i$$

VI. **Ethno-Linguistic Fractionalization:** The ELF index as recorded by Roeder (2001) represents the probability that a randomly selected person in a country would be of a different ethno-linguistic group from another randomly selected person. The reference year is 1985. This captures the level of ethnic diversity within a country, even if one cannot explicitly control for the specific ethnic groups that were split between countries as Michalopoulos and Papaioannou (2011A,B) did.

VII. **Wars:** The data on wars come from Brecke's Conflict Catalog (1999) for all armed conflicts from 1400-1700. However, this data set lists only the existence of an ongoing physical armed conflict between two entities, and does not systematically link wars back to their modern-day state analogs. Therefore, a major contribution of this work is identifying the actors in each of the nearly 2000 wars during this period and matching them up to modern nations. I employ the

natural log of the number of wars, plus one, fought during this time span, as the numbers of wars spans many orders of magnitude.[5]

VIII. **Population density:** The data on population in 1500 comes from McEvedy and Jones (1978), with country size (land area in square kilometers) coming from the World Bank. Some countries are not covered by McEvedy and Jones as they did not exist in 1978. For these, and I use Ang's (2013) estimation of population for these countries, with some of my own updates from the Angus Maddison historical data. To evaluate Acemoglu et al's (2002) hypothesis, I also include a term interacting population density with a Europe dummy variable, as the effect of population density in Europe should be different from all other continents.[6] Population density spans many orders of magnitude, and so I use the natural log of population density instead of its level.[7]

B. Dependent Variables

I am interested in several modern day outcomes determined by these historical factors: income, level of democracy, and quality of institutions.

I. **Income:** Income here is expressed as the natural log of real GDP per capita in 2005 dollars from the World Bank, a commonly accepted measure of the generally available goods and services in a country.

II. **Government Form:** The government form, or level of democracy in a country, comes from the Polity IV project. It uses the Polity2 series from the Polity IV data set, which classes a countries' government as being between -10, fully autocratic and 10 fully democratic, in a given

[5] Results are generally the same if one uses the linear form instead.
[6] As population density is meant to proxy for past incomes, one could consider it to be more of a past outcome variable rather than an input for future outcomes, which this paper intends to study. However, omitting it does not significantly change my other results, other than lowering the R^2.
[7] Results are generally the same if one uses the linear form instead.

year. The polity series is a commonly employed measured of democracy in a country and used in several other papers in this literature, both to directly measure the level of democracy in a government as well as a proxy of institutional quality.[8] As the Polity IV project also includes a cutoff for being a democracy, a country having a score of 6 or more, I also employ a linear probability model to see if results from this binary model are consistent with using the continuous polity score as a robustness check later on.

III. **Institutional Quality:** I measure the quality of institutions here by the World Governance Indicators. Produced by the World Bank, these indicators include six measures of institutional quality[9], with negative values implying poor institutions and positive values implying good institutions in each category. I sum all six categories to produce an overall measure of governance quality ranging from -15 to 15. Several other authors also use this measure of government quality, including Michalopoulos and Papaionnou (2011A,B), Michalopoulos Papaionnou (2013), Auer (2008), and Ang (2013.)[10] As a robustness check, I also employ a binary measure of institutional quality drawn from this database. There is a discrete gap in measured institutional qualities for the reference year, 2005, with no countries having a combined institution score between .5 and 2.5. I use this as a cutoff for countries with good and bad institutions and use a linear probability model to see if results are consistent with using the continuous world governance indicator score.

Michalopoulos and Papaionnou (2011A) and Ang (2013) use structural models, showing that institutions are one major determinant of present day incomes, while using historical

[8] Examples using polity IV as a measure of governance effectiveness in general or as a measure of democracy specifically include: Nunn and Giuliano (2013) and Wantchekon and Garcia-Ponce (2011) using it as a dependent variable to measure the level of democracy, Michalopoulos and Papaionnou (2012), Ang (2013) and Huillery (2011) using it as the independent variable of interest to proxy for institutional quality, treating it as exogenous and using historical variables as instruments, and Gennaioli and Rainer (2007) as a control variable for the level of democracy in a country.

[9] The six measures are control of corruption, government effectiveness, political stability and freedom from violence, regulatory quality, rule or law, and voice and accountability.

[10] They argue that historical factors, such as long-lived states, may indicated more competent bureaucrats that produce better laws, which are often long lasting. Similarly, societies with an early start in agriculture could support specialists developing legal codes for longer that would build better institutions (Diamond 1997.)

variables as an instrument for institutions. The approach I use is a reduced form, considering income, democracy and institutions as separate outcomes and the historical variables as exogenous inputs.[11] These three variables should all be related outcomes- richer countries also tend to be democratic and have good institutions- so the marginal effects of the independent variables are likely to be similar in direction.

4. Model, Estimation, and Results

A. Unweighted Model

I use OLS to estimate the reduced form models in this paper. In addition to the above historical factors, I also include controls for being landlocked, in the tropics, or being an island in some specifications. As these variables are geographic, they are time invariant and would have impacts both in the modern day and in the past.[12] As several of these factors described in the literature review are connected to being a colony, I also include a dummy for colonization status, (Nunn 2009.) Table 1 presents summary statistics and Table 2 presents raw correlations of the historical variables being considered. Table 1 demonstrates there is a good deal of variation for each variable, and so it is plausible they could explain modern distributions in incomes, institutions and government forms. Table 2 confirms that many of these variables are indeed correlated, and studying historical variables one at a time is thus likely to lead to inaccurate results due to omitted variable bias.

[11] By using other author's measures, I also inherit their shortcomings. As these are indexes meant to summarize past conditions it is possible there is some measurement error. This would bias results of these regressions towards zero, but many variables have effects that are positive and the models overall quite significant. Similarly, while it is possible that there are omitted variables, the goal of this paper was to accumulate as many different historical measures as possible, and if one important measure has been missed by previous authors, it is also missing here. All right hand side variables, the historical measures, are correlated with one another, with the ultimate purpose of this paper being to tease out which is the most important predictor.

[12] Bolivia disagrees with landlocked status being time invariant.

The regression model employed here is as follows:

$$Y_i = A_0 + A_1 X_i + A_2 Z_i + E_i$$

Where for country i, Y_i is the outcome of interest, X_i is a vector of historical components affecting present outcomes, and Z_i is the vector of geographic control variables and the colonization dummy. The cross section of choice for outcomes is 2005, and 105 countries have complete enough data on the right hand side variables to be included in this regression.[13] Coefficients are shown with standardized betas. This allows one to interpret not only direction and significance of the variables, but also their relative magnitude and practical significance. If the coefficients on historical factors are significant but have small standardized betas, then while their predictive ability is accurate they simply will not explain much of modern outcomes.

Table 3 presents OLS regression results. Even numbered columns present the results using all variables, while odd numbered columns present results that omit the two colonial related interaction variables, centralization in Africa and population density in Europe. I find that several variables are significant in the direction as predicted by previous literature. First, time since the Neolithic revolution is strongly negatively correlated with modern income, institutions and democracy. This would argue against any gains from an early Neolithic transition. It is also quite large in magnitude, with a one standard deviation increase in time since transition leading to a one third of a standard deviation decrease in incomes or democracy, and close to one half for institutional quality. These results are consistent with Borcan et al. (2014). Very old states would have discovered agriculture earliest, and very old states fared poorly in that paper, which agrees with the negative coefficient on agriculture here. [14]

[13] 1996 is used as a robustness check in the appendix and generally yields similar results.
[14] This paper does not include a quadratic government term like their paper, however.

Malaria incidence, ethno-linguistic fractionalization and the tropics dummy show expected negative impacts on the dependent variables. However, the magnitude of the effect of malaria is much smaller than that of the time since the discovery of agriculture, with no statistically significant impact on institutions. Ethnolinguistic fractionalization and the tropics have an insignificant effect on democracy, while the coefficient of ethnolinguistic fractionalization is around one sixth and tropics one third of a standard deviation for income as well as institutions. Landlockedness only seems to have a negative impact on income. Island status, state centralization, state experience, technological adoption, and total number of wars, while significant in a few cases, generally do not have predictive power on modern outcomes.[15]

Notable also is the impact of population density, and how it changes with the introduction of the two interaction variables. When the two interaction terms are omitted, the effects of colonization are negative and the effect of population density is positive or zero, depending on the outcome. This is an unsurprising finding: past population density, a function of past income, is correlated positive with present outcomes, and colonization lead to worse outcomes. When the interaction terms are included, the effects of population density themselves become either negative or zero, and the effects of colonization become insignificant. The population density term interacted with Europe is now positive, implying that higher population density is better only in Europe. The government centralization term interacted with Africa is negative, indicating that more historically organized African governments had worse modern day institutions and incomes. The effect of population density in Europe is quite large, with a standardized beta close to one half, while the standardized beta for government centralization in Africa is smaller at one

[15] Note that the betas are standardized so one standard deviation change in X means a B standard deviation change in Y, so the magnitudes of dummy variables – 0 or 1 – are not comparable to each other or the other Xs, with merely their direction being interpretable. One would need to divide the figure given here by the standard deviation for that variable given on table 1 to get comparable magnitudes of the effect of a 1 unit change in the dummy variable. Non-standardized results are available upon request from the author.

sixth. This evidence is strongly in favor of Acemoglu et al's (2002) theory that European colonization caused population density to go from an asset to a liability.

Table 9 presents the impact of historical factors on the democracy and institutional quality using alternative specifications. Columns (3) and (4) use binary measures of democracy, whether the polity score is 6 or above as defined by the makers of the index. Results are similar compared to column (1) and (2) using the continuous polity scores, except the impact of the discovering of agriculture and population density is about half the size and now statistically insignificant, and malaria's impact is larger. Similarly, columns (7) and (8) use binary specifications of institutions, with the cutoff being a combined world governance indicator of 2. Results here are similar to the continuous specifications in columns (5) and (6), except the impact of Ethnolinguistic fractionalization is smaller and now insignificant.

The R^2 values for these regressions are particularly interesting, as they are quite large. Forty-five percent in variation of government forms and two thirds of variation in institutions is explained by these geographical and historical variables alone. Even more impressive, seventy five percent of variation in per capita incomes is explained by these factors. This would imply a great deal of predictability in income ranking over time, with factors several hundred years old, and in some cases even older, determining a large amount in the variation of current incomes. These findings present a significant challenge to any development economist: what can we hope to do if incomes are so persistent and determined largely by long-passed events?

B. Weighted Model

The prior regressions assume that historical factors operate on a country level, considering how the historical variables of a nation in the past impact the nation in the present.

This assumption may not be accurate, as the impacts of these historical variables are likely to follow the inhabitants of such nations rather than just their geographic location. This is a problematic assumption, as the past several hundred years have seen a great deal of population movement that would make this assumption invalid. Places like the United States, where the ancestors of most of the current inhabitants came from places outside the United States, should be using the historical values of their countries of origin (such as countries in Europe and West Africa) rather than their current location. To correct for this movement of people, I will consider an alternative specification using migration weighted data from Putterman and Weil's (2010) migration index.[16] This index accounts for the movements of people over the past 500 years between 172 countries that should help alleviate the prior problem that the impact of historical factors generally follows peoples rather than locations through affecting their laws, culture, and shared history.

Migration between N countries is summarized by an NxN matrix, with each of N rows being a modern countries in 2000 and each of N columns being the origin countries in 1500. Each entry E_{ij} is modern day country i's share of total population originating from historical country j, and each row sums to 1. One thus multiplies this NxN matrix by an NxP matrix of independent variables to yield a migration weighted NxP set of independent variables.

This migration matrix is applied only to some of the variables included in these regressions- time since the Neolithic revolution, technological adoption, centralization, state history, wars, and population density as well as the two interaction terms on centralization and centralization.[17] Malaria is not migration weighted as it is tied to geography and thus not affected

[16] Other authors also employ this migration matrix in this manner including Borcan et al (2014), Ang (2013), Comin et al. (2010) and Voightlander and Voth (2013.)

[17] As the weighting matrix is much more demanding, requiring balanced variables, I extrapolated data from some countries based on their geographical neighbors in order to complete their migration weighted totals. For example, modern-day Serbia contains a nontrivial share of

by the movements of people, and ELF is not migration weighted as the values are already from the 20th century and reflect the migration of peoples.[18] Table 4 presents summary statistics for this weighted data, and Table 5 presents correlations. These results are similar to the un-weighted data in Tables 1 and 2.

Table 6 shows the results for the overall sample using the migration weighted data. R^2 values fall slightly for incomes and institutions, dropping 5 percentage points, while they rise 5 percentage points for democracy. Years since the Neolithic revolution and tropics still show a strong negative coefficient, albeit now slightly smaller in magnitude. However, malaria, ethnolinguistic fractionalization, and landlockedness are now insignificant in their impacts on dependent variables except for income, with standardized coefficients around 1/6 for each of the two independent variables. The impact of technological adoption, state centralization, and island status also remain insignificant.

However, two variables previously insignificant are now statistically significant determinants of democracy- older states are less democratic, and more wars in the past generally lead to a more democratic state in the future, both with standardized betas of around one third. This former effect could indicate that longer lived states may exhibit government inertia and hold onto older, more autocratic institutions, as states tend to have become more democratic over time. The latter effect is consistent with Voightlander and Voth (2013), with wars leading to more advanced governments, or at least being a sign of such developments.

The effect of colonization, population density, and the two interaction terms also change some in magnitude and significance. The effects of colonization are still only negative when the interaction terms are omitted, and while the effect of population density is now almost

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Albanians, which would require using a certain portion of data from Albania to calculate Serbia's true historical values. As some data is missing from Albania, values from Greece are used instead.

[18] Ideally one would like a 16th century version of ethnolinguistic fractionalization, before the era of migration, to use in the unweighted model, but this data is not available as far as the author is aware.

universally positive, with standardized betas ranging from zero to one half, it is larger in magnitude in the specifications that omit the interaction terms. Consistent with the reversal of fortune hypothesis, the interaction term of population density with Europe is also generally positive. Population density is generally good for the outcomes being studied here; however, colonization and the extractive institutions it brought with it that were attracted to such high density areas significantly reduced its benefits below the levels it would see in Europe, but apparently not enough to make the general effects of population density negative. Therefore, while population density generally is positive for all countries' institutions and democracy, the effects in Europe are much stronger. The interaction between Africa and centralization only remains significant, and negative around one sixth of a standard deviation, for income, so the story of colonial collusion with more organized governments is weakened slightly.

Table 10 presents the impact of historical factors on the democracy and institutional quality using alternative specifications. As in table 9, results are generally similar to specifications that use continuous measures. Date since the discovery of agriculture is a less significant determinant for the binary specification of democracy, and malaria ecology is a more significant determinant, but the impact of wars and population density are the same. The results using continuous measures of institutional quality are approximately the same as a binary measure.

However, there is an open question as to which model, unweighted or weighted, is superior in predicting present outcomes from past events. Both models show different results, especially with respect to democracy. While the migration weighted model seems to make a more accurate assumption about the distribution of peoples over time and thus impact of historical factors on modern outcomes, this model did require the use of migration matrices

constructed based on imperfect observations of peoples movements. The inaccuracy introduced by using an imperfectly constructed migration matrix may out-weigh the benefits of correcting for movements.

C. Comparison of models

The migration weighted data tends to be a better predictor of outcomes such as income and institutions than the un-weighted data in previous papers (Ang 2013, Putterman and Weil 2010) but these papers generally are generally comparing fewer historical measures at a time. Any gains in explanatory power from migration weighting may be difficult to identify when comparing a large number of variables in a relatively small sample. In order to better compare these models, I employ a non-nested hypothesis test to evaluate which model – those with variables weighted by migration or un-weighted- better explains the variation in the data. MacKinnon (1983) covers a number of approaches, but I employ a J test here, summarized as below.

Consider the two competing models, the migration-weighted data subscript *w* and un-weighted data *u*:

$$Y_i = A_{u0} + A_1 X_{ui} + A_2 Z_i + E_{ui}$$

$$Y_i = A_{w0} + A_1 X_{wi} + A_2 Z_i + E_{wi}$$

One can take the fitted values from their respective models, $\widehat{y_u}$ and $\widehat{y_w}$, and use them as independent variables in the competing model.

$$Y_i = A_{u0} + A_1 X_{ui} + A_2 Z_i + A_3 \widehat{y_w} + E_{ui}$$

$$Y_i = A_{w0} + A_1 X_{wi} + A_2 Z_i + A_3 \widehat{y_u} + E_{wi}$$

If the fitted values of the migration weighted model, $\widehat{y_w}$, is significant, and the other covariates, X_{ui}, are not, the migration weighted data explains the variation observed in the models better. This test may sometimes yield inconclusive results, where both models contribute useful information, but it should give a general idea of which model is a better predictor of outcomes.

Table 7 shows the results of using the fitted values of the un-weighted model along with the independent variables of the weighted model. With respect to income and institutions, the results favor the un-weighted model, with the fitted values being the only significant values. With respect to democracy, the fitted values are insignificant, and many of the other independent variables are significant. Evidence from this table is thus in favor of the un-weighted model in explaining income and institutions, but strongly in favor of the weighted model on democracy.[19]

Table 8, using the fitted values of the weighted model along with un-weighted independent variables, produces results that favor the weighted model, but also reveals new information about the variables. First, for all three variables, the fitted values from the weighted regressions are statistically significant predictors of the dependent variables, and the un-weighted independent variables are generally insignificant save for number of wars and population density. Number of wars is negative with a standardized beta around one fifth, and Population density here is negative with a standardized beta around one quarter, which is inconsistent with many of the previous regressions. The fact that the test is not conclusive in all cases indicates there is likely some predictive power from both the weighted as well as un-weighted variables, although the evidence favors the weighted model for democracy. However, the independent

[19] Table 11 uses binary measures of democracy and institutional quality and finds similar results.

variables that are statistically significant in Table 8 are interestingly consistent with the reversal of fortune hypothesis. [20]

Countries in 1500 that had more wars and high population density thus had worse outcomes. Areas that saw a great deal of conflict, potentially indicative of foreign conquest, may have had worse outcomes in the future. This would certainly be consistent with the findings of Besley and Reynal-Querol (2012), who found locations experiencing conflict in the past would experience them in the future, which would have negative on incomes and quality of life in the area. The sparsely populated United States would have ended up with good institutions from European incursions, and more densely populated Mexico worse ones, agreeing with Engerman and Sokoloff (2000.) The regressions in Tables 7 and 8 thus control for not only the histories of the people within a modern day nation, which is reflected by the migration weighted data, but also the history of the location itself, which is captured by the un-weighted data.

It is possible that both the histories of a geographic location as well as the histories of its peoples both contribute to a state's modern outcomes. Using just one data set to draw conclusions may mean discarding valuable information contained by the different weighting of the variables. The results of this test should also be approached with caution. While the migration weighted data may appear to explain more of the variation than the un-weighted data, this relationship may be spurious. The migration matrix requires adding another estimated historical variable on top of a number of other estimated historical variables. However, as the models largely do not differ from one another, the models using the migration weighted data are unlikely to be generating entirely incorrect results.[21]

[20] Table 12 uses binary measures of democracy and institutional quality and finds similar results
[21] Or at least, they do not lead to conclusions that are more incorrect than the un-weighted data.

Each factor studied generally affects outcomes in the same direction, either improving modern day income, democracy, and institutions, or making all three worse. On the negative side years since the Neolithic revolution and historical malaria environment are all correlated with worse outcomes, along with the geographic factors of being in the tropics or landlocked. Historically organized governments in Africa also appear to generally be a liability. Positively, higher population densities are correlated with better outcomes generally, although the effect is stronger in Europe, supporting the reversal of fortune hypothesis. State experience, number of wars, and ethnolinguistic fractionalization appear to have some specific channels by which they operate, but are not as sweeping in their impacts as other variables, and colonization itself does not have an impact once all other variables are considered. Generally, technological advancement, state centralization, and island status have no predictive ability on modern outcomes.

5. Conclusion

This paper seeks to build upon the current development literature on how history impacts modern day outcomes such as government form, legal institutions and income. While many authors are only able to focus on the impact of one potential determinant of modern outcomes- such as how long a state has been organized, or the prevalence of wars in the early modern era- I chose instead to focus on the combined impact of these covariates to determine which is the most robust determinant of modern outcomes and better understand the persistence of economic and political outcomes over time. The analysis shows that time since the Neolithic Revolution, malaria conditions, and population density are the most robustly significant determinants of modern outcomes. The inclusion of interaction terms supports the reversal of fortune hypothesis,

with wealthy societies outside of Europe not seeing as large a benefit from past population density, as Europeans would have been more likely to set up extractive institutions in those states. These finding also lend some credence to the idea organized governments in Africa specifically would have led to more collusion during colonization, worse institutions, and thus worse outcomes in the post-colonial era. An equally important finding is the very high R-squared, reaching as high as 75% for income, in explaining present day incomes using past factors. This would imply exceptionally high path dependence in per capita incomes and provide a significant challenge to any expert attempting to create policy to improve conditions in poor countries today.

Works Cited

Acemoglu, Daron, Simon Johnson, and James A. Robinson. "Reversal of fortune: Geography and institutions in the making of the modern world income distribution." *The Quarterly Journal of Economics* 117.4 (2002): 1231-1294.

Acemoglu, Daron, Simon Johnson, and James A. Robinson. "The colonial origins of comparative development: an empirical investigation." No. w7771. National Bureau of Economic Research, 2000.

Alesina, Alberto, et al. "Fractionalization." *Journal of Economic growth* 8.2 (2003): 155-194.

Ang, James B. "Institutions and the long-run impact of early development." *Journal of Development Economics* 105 (2013): 1-18.

Ashraf, Quamrul, and Oded Galor. 2011. "Dynamics and Stagnation in the Malthusian Epoch" *American Economic Review*, 101(5): 2003-41.

Auer, Raphael. "The colonial and geographic origins of comparative development." No. 2008-08. Swiss National Bank, 2008.

Besley, Timothy, and Marta Reynal-Querol. "The Legacy of Historical Conflict: Evidence from Africa." Working paper (2012).

Bockstette , Valerie, Areendam Chanda and Louis Putterman “States and Markets: The Advantage of an Early Start,” with Valerie and Areendam Chanda. *Journal of Economic Growth* 7: 347-69, 2002.

Borcan, Oana; Olsson, Ola; Putterman, Louis. “State history and Economic Development: Evidence from Size Millenia.” SSRN Working paper 2464285 (2014)

Brecke, Peter. "Violent conflicts 1400 AD to the present in different regions of the world." *1999 Meeting of the Peace Science Society, unpublished manusrcipt*. 1999.

Bruhn, Miriam, and Francisco A. Gallego. "Good, Bad, and Ugly Colonial Activities: Do They Matter for Economic Development?." *Review of Economics and Statistics* 94.2 (2012): 433-461.

Comin, Diego, William Easterly, and Erick Gong. "Was the Wealth of Nations Determined in 1000 BC?." *American Economic Journal: Macroeconomics* (2010): 65-97.

Depetris-Chauvin, Emilio. “Local State History and Contemporary Conflict: Evidence from Sub-Saharan Africa.” Working paper, 2013.

Diamond, Jared. "Guns, Germs and Steel” WW Norton, 1997.

Engerman ,Stanley L. and Sokoloff, Kenneth L., "History lessons: Institutions, factors endowments, and paths of development in the new world." *The Journal of Economic Perspectives* 14.3 (2000): 217-232.

Gennaioli, Nicola, and Ilia Rainer. "The Modern Impact of Precolonial Centralization in Africa." *Journal of Economic Growth* 12.3 (2007): 185-234.

Giuliano, Paola, and Nathan Nunn. “The transmission of democracy: from the village to the nation-state.” No. w18722. National Bureau of Economic Research, 2013.

Hibbs, Douglas A., and Ola Olsson. "Geography, biogeography, and why some countries are rich and others are poor." *Proceedings of the national academy of sciences of the United States of America* 101.10 (2004): 3715-3720.

Huillery, Elise. "The Impact of European Settlement within French West Africa: Did pre-colonial prosperous areas fall behind?" *Journal of African Economies* 20.2 (2011): 263-311.

Kiszewski, Anthony, et al. "A global index representing the stability of malaria transmission." *American Journal of Tropical Medicine and Hygiene* 70.5 (2004): 486-498.

MacKinnon, James G. "Model specification tests against non-nested alternatives." *Econometric Reviews* 2.1 (1983): 85-110.

Mayer, Thierry, and Soledad Zignano. "CEPII Distance Measurements." 2006

McEvedy, Colin, and Richard Jones. *Atlas of world population history.* Penguin Books Ltd, Harmondsworth, Middlesex, England., 1978.

Michalopoulos, Stelios, and Elias Papaioannou. “Divide and Rule or the Rule of the Divided? Evidence from Africa.” No. w17184. National Bureau of Economic Research, 2011. (A)

Michalopoulos, Stelios, and Elias Papaioannou. The Long-Run Effects of the Scramble for Africa. No. w17620. National Bureau of Economic Research, 2011. (B)

Michalopoulos, Stelios, and Elias Papaioannou. "Pre-Colonial Ethnic Institutions and Contemporary African Development." *Econometrica* 81.1 (2013): 113-152.

Murdock, George Peter. *Ethnographic atlas*. University of Pittsburgh Press, 1969.

Nunn, Nathan. “The Importance of History for Economic Development.” No. w14899. National Bureau of Economic Research, 2009.

Olsson, O. and C. Paik (2013). “A Western Reversal Since the Neolithic: The Long-Run Impact of Early Agriculture“ University of Gothenburg, mimeo.

Osafo-Kwaako, Philip, and James A. Robinson. "Political Centralization in Pre-Colonial Africa." *Journal of Comparative Economics* (2013).

Philip G. Roeder. 2001. "Ethnolinguistic Fractionalization (ELF) Indices, 1961 and 1985." February 16. <http//:weber.ucsd.edu\~proeder\elf.htm>.

Posner, Daniel N. "Measuring ethnic fractionalization in Africa." *American Journal of Political Science* 48.4 (2004): 849-863.

Putterman, Louis, and David N. Weil. "Post-1500 population flows and the long-run determinants of economic growth and inequality." *The Quarterly Journal of Economics* 125.4 (2010): 1627-1682.

Putterman, Louis. “Agriculture, Diffusion, and Development: Ripple Effects of the Neolithic Revolution,” *Economica* 75: 729-48, 2008.

Sachs, Jeffrey D. “Institutions don't rule: direct effects of geography on per capita income.” No. w9490. National Bureau of Economic Research, 2003.

Spolaore, Enrico, and Romain Wacziarg. "The diffusion of development." *The Quarterly Journal of Economics* 124.2 (2009): 469-529.

Voigtländer, Nico, and Joachim Voth. "Gifts of Mars: Warfare and Europe's early rise to riches." Working Paper (2013).

Wantchekon, Leonard, and Omar García-Ponce. "The Institutional Legacy of African Independence Movements." APSA 2011 Annual Meeting Paper. 2011.

Weil, David N. "The impact of malaria on African development over the longue durée." *Africa's Development in Historical Perspective, forthcoming* (2010).

Appendix A: Countries Included

Main Sample:

Afghanistan (Income and Institutional quality only); Algeria; Angola; Argentina; Australia; Austria; Bangladesh; Belgium; Benin; Bolivia; Bosnia and Herzegovina (Income and Institutional quality only); Botswana; Brazil; Burkina Faso; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Congo, Dem. Rep.; Congo, Rep.; Costa Rica; Cote d'Ivoire; Cuba; Czech Republic; Denmark; Ecuador; Egypt, Arab Rep.; El; Salvador; Ethiopia; Finland; France; Gabon; Germany; Ghana; Greece; Guatemala; Guinea; Guyana; Honduras; Hungary; India; Indonesia; Iran, Islamic Rep.; Iraq (Income and Institutional quality only); Ireland; Italy; Japan; Kenya; Korea,; Rep.; Lao PDR; Lesotho; Liberia; Libya; Lithuania; Madagascar; Malaysia; Mali; Mauritania; Mexico; Mongolia; Morocco; Myanmar (Institutional quality and Democracy only); Nepal; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; Norway; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Romania; Russian Federation; Saudi Arabia; Senegal; Sierra Leone; South Africa; Spain; Sudan; Sweden; Switzerland; Syrian Arab Republic; Thailand; Tunisia; Turkey; Uganda; Ukraine; United Kingdom; United States; Uruguay; Uzbekistan; Venezuela, RB; Vietnam; Zambia; Zimbabwe

Appendix B: Discussion of Warfare

I. City states in Germany and Italy: A number of conflicts occurred between various Italian states as well as German states, given that the countries were fractured during this period and did not form as modern states until the mid-19th century. Generally if a conflict involved a city-state whose borders lay within one of the modern states of Italy or Germany, it is counted as a conflict for those countries. Some city states also were historically at least partially contained within the regions of modern day France, Austria, The Czech republic, or Poland, so if such a city-state is involved in a conflict, the conflict is counted for all modern nations that contained the historical state. Related to city state conflicts, the Hanseatic league is present in several conflicts, and it is coded as the Baltic states (Latvia, Lithuania and Estonia) along with Germany, Sweden and the Netherlands.

II. Conflicts in West Africa: An opposite problem of the fractionalization of Europe, the Songhai empire covered a vast stretch of western sub Saharan Africa during the period being studied. As the national boundaries in this region are generally agreed to be the result of arbitrary borders following the scramble for Africa, the Songhai empire would consist of land from a number of modern day states. While geographical information is available for the location of each conflict, it is not clear how large is the area of conflict or where the soldiers would have been drawn from. A conflict that took place in modern day Mali could have drawn resources and people from neighbors such as Niger or Senegal. As such, conflicts occurring in the Songhai empire are coded as involving Mali, Niger, Burkina Faso, Senegal, The Gambia, Guinea, Benin, and Nigeria.

III. Ottoman Conflicts: Several conflicts took place involving the Ottoman empire outside of Turkey proper, and so these events are coded using the country of the location of the conflict as well as their principal actors, for example many conflicts took place between the Ottomans and several states in eastern Europe such as modern-day Moldova, Romania, and Bulgaria.

IV. The "Mongols": The greatest challenge in identifying combatants lay in identifying the various “Mongol” actors- listed in the catalog variably as the Mongols, The Timurids, The Golden Horde, the Tatars, Tartars and other Khanates. These actors were not monolithic as they represented various political forces throughout the covered period. Nor did they share the same homeland, with the homeland of many of these empires variably being Russia, Kazakhstan, Uzbekistan, and Mongolia. The participants were not even all Mongolian peoples, with many actually being Turkic peoples. The following rules were used to classify these peoples:

a. Timurids: The Timurid dynasty ruled Persia and much of Central Asia in the 15th century, so I have coded Uzbekistan, Iran, Afghanistan, Pakistan, Turkmenistan, Iraq, Turkey, Georgia, Armenia, and Azerbaijan as participants in combat when the Timurids appear.

b. Mughals/Moguls: The Mughals are descended from the Timurid dynasty and formed an empire that governed much of the Indian subcontinent from the 16th to 19th century. They are coded as including Afghanistan, Bangladesh, India, Pakistan and Tajikistan.

c. Golden Horde: While originally descended from Mongolia, the golden horde at this time would have occupied modern day Russia, Ukraine, Kazakhstan, and Uzbekistan. Thus I code conflicts involving the Golden Horde as using these

countries. Their engagements are primarily among these countries, with some involvement in Eastern Europe.

d. Tatars/Tartars: The Tatar people are a Turkic people who live in modern day Russian Siberia, though it is not clear the historical record kept naming conventions consistent and the name "Tartar" could be applied to peoples who originated in Mongolia. Wars involving the Tatars in China are classified as being wars involving Mongolia, as they usually took place in provinces in China that bordered modern day Mongolia. Wars involving the Tatars in other locations are classified as Russia.

e. Other Khanates: Several other Khanates are coded as being Russia, as many historical Khanates were located in modern day Siberia, and most of their conflicts are with Russia.

f. Mongols: If the term “mongol” is used without a modifier, such as Tatar, Timurid, or Golden horde, and cannot be easily identified as such, they are coded as being from Mongolia. The majority of these engagements are with China.

The fact any given pairing of countries experienced conflict is not important, simply the total number of conflicts experienced by a single country. This measure counts only how many conflicts a given country was involved in, not their intensity (which is often not available) or length (which is available for many conflicts). A potential alternative specification is to count how many total years of conflict a country was involved in. These two series- total number of wars and war-years- are correlated at .95, and there is not a qualitative difference between using either in the regression analysis.

The countries experiencing the most conflict during this period are thus China, due to many internal conflicts, and Russia, in part due to being coded for a number of "Mongol" or "Tatar" conflicts, but also due to the large number of engagements during this time between European Russian peoples and the natives of Russian Siberia. Europe has the most wars of any continent, and many parts of the world see little conflict at this time. I choose to use the log of the number of wars plus 1 in the analysis here, as the number of wars fought by countries spans many orders of magnitude and the marginal impact of a single war is larger among countries who had not fought many wars over this period.

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Table 1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max	Source
Independent						
Agriculture, thousand years before 2000	105	4.64	2.22	0.4	10.5	Putterman (2008)
Malaria Ecology	105	4.36	7.37	0	31.55	Weil (2010)
Technological Adoption in 1500	105	0.74	0.31	0	1	Comin et al (2006)
State Centralization in 1500	105	12.70	17.73	0	50	Bockstette et al (2002)
Total State Experience 0-2000	105	0.43	0.23	0.02	0.86	Bockstette et al (2002)
Ln Number of Wars 1400-1700	105	2.21	1.68	0	5.86	Brecke (1999)
Ethno-Linguistic Fractionalization	105	0.48	0.29	0.00	0.98	Roeder (2001)
Ln Population Density in 1500	105	1.46	1.03	0.01	3.86	Mcevedy and Jones (1978)
Europe*Ln Population Density	105	0.57	1.13	0	3.74	Mcevedy and Jones (1978)
Africa*State Centralization in 1500	105	1.49	7.00	0	50	Bockstette et al (2002)
Tropics	105	0.52	0.50	0	1	Author's Calculations
Island	105	0.10	0.29	0	1	Author's Calculations
Landlocked	105	0.21	0.41	0	1	CIA World Factbook
Colony	105	0.65	0.48	0	1	Nunn (2007)
Dependent						
Ln Real GDP Per Capita	104	7.94	1.67	4.89	11.09	World Bank
Polity2 Index	102	4.43	6.17	-10	10	Polity IV Project
Polity2 Binary	102	.63	.49	0	1	Polity IV Project
Institutions	105	-0.80	5.95	-10.52	11.44	World Bank
Institutions Binary	105	.30	.46	0	1	World Bank

Table 2: Raw Correlations, 10 historical variables

	Agriculture, thousand years before 2000	Malaria Ecology	Technological Adoption in 1500	State Centralization in 1500	Total State Experience 0-2000	Ln Number of Wars 1400-1700	Ethno-Linguistic Fractionalization	Ln Population Density in 1500	Europe*Ln Population Density	Africa*State Centralization in 1500
Agriculture, thousand years before 2000	1									
Malaria Ecology	-0.34	1								
Technological Adoption in 1500	0.62	-0.23	1							
State Centralization in 1500	0.61	-0.35	0.49	1						
Total State Experience 0-2000	0.68	-0.31	0.63	0.74	1					
Ln Number of Wars 1400-1700	0.54	-0.16	0.55	0.40	0.60	1				
Ethno-Linguistic Fractionalization	-0.38	0.53	-0.29	-0.28	-0.42	-0.35	1			
Ln Population Density in 1500	-0.48	0.56	-0.35	-0.36	-0.41	-0.46	0.56	1		
Europe*Ln Population Density	-0.21	-0.11	0.03	0.00	-0.13	-0.09	0.07	-0.02	1	
Africa*State Centralization in 1500	-0.07	0.19	-0.07	-0.07	0.00	-0.09	0.12	0.07	-0.17	1

Table 3: OLS Comparison of Historical Factors to 2005 Outcomes

	(1) GDPPC	(2) GDPPC	(3) Polity2	(4) Polity2	(5) Institutions	(6) Institutions
Agriculture, thousand years before 2000	-0.323***	-0.343***	-0.351**	-0.399***	-0.497***	-0.504***
	(-2.974)	(-3.802)	(-2.465)	(-2.945)	(-4.349)	(-4.830)
Malaria Ecology	-0.196**	-0.146*	-0.262**	-0.224**	-0.101	-0.059
	(-2.122)	(-1.963)	(-2.200)	(-2.007)	(-1.040)	(-0.678)
Technological Adoption in 1500	0.006	-0.002	0.024	0.024	0.024	0.013
	(0.067)	(-0.031)	(0.198)	(0.207)	(0.235)	(0.145)
State Centralization in 1500	-0.074	0.022	-0.299**	-0.212	-0.152	-0.078
	(-0.685)	(0.250)	(-2.152)	(-1.603)	(-1.329)	(-0.749)
Total State Experience 0-2000	0.089	0.262**	-0.274	-0.112	0.073	0.212*
	(0.700)	(2.464)	(-1.638)	(-0.692)	(0.536)	(1.703)
Ln of Number of Wars 1400-1700	-0.110	-0.135*	0.059	0.037	-0.110	-0.134
	(-1.148)	(-1.729)	(0.469)	(0.315)	(-1.081)	(-1.478)
Ethno-Linguistic Fractionalization	-0.209**	-0.183**	-0.044	-0.025	-0.169*	-0.145*
	(-2.348)	(-2.545)	(-0.372)	(-0.230)	(-1.800)	(-1.736)
Tropics	-0.352***	-0.291***	-0.069	-0.036	-0.432***	-0.379***
	(-3.504)	(-3.550)	(-0.534)	(-0.292)	(-4.079)	(-3.961)
Island	0.044	0.047	0.004	-0.003	0.072	0.077
	(0.604)	(0.787)	(0.046)	(-0.033)	(0.938)	(1.116)
Landlocked	-0.254***	-0.264***	-0.078	-0.092	-0.117	-0.126*
	(-3.627)	(-4.657)	(-0.858)	(-1.077)	(-1.579)	(-1.904)
Colony	-0.290***	-0.040	-0.299**	-0.105	-0.289***	-0.080
	(-2.885)	(-0.451)	(-2.289)	(-0.793)	(-2.732)	(-0.779)
Ln of Population Density in 1500	0.086	-0.253***	0.419***	0.155	0.276**	-0.009
	(0.860)	(-2.701)	(3.175)	(1.103)	(2.595)	(-0.082)
Europe* Ln of Population Density in 1500		0.566***		0.420***		0.488***
		(6.404)		(3.136)		(4.731)
Africa* State Centralization in 1500		-0.163***		-0.189**		-0.117
		(-2.671)		(-2.081)		(-1.658)
N	104	104	102	102	105	105
R^2	0.608	0.752	0.358	0.456	0.559	0.660

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 4: Summary Statistics, Migration Weighted
Migration weighting produced using migration data from Putterman and Weil (2010)

Variable	Observations	Mean	Std. Dev.	Min	Max	Source
Independent						
Agriculture, thousand years before 2000	105	5.22	1.96	1.36	10.37	Putterman (2008)
Malaria Ecology	105	4.36	7.37	0	31.55	Weil (2010)
Technological Adoption in 1500	105	0.80	0.25	0.24	1	Comin et al (2006)
State Centralization in 1500	105	17.37	16.84	0	50	Bockstette et al (2002)
Total State Experience 0-2000	105	0.49	0.19	0.02	0.86	Bockstette et al (2002)
Ln Number of Wars 1400-1700	105	3.31	1.37	0	5.86	Brecke (1999)
Ethno-Linguistic Fractionalization	105	0.48	0.29	0	0.98	Roeder (2001)
Ln Population Density in 1500	105	1.90	0.90	0.21	3.86	Mcevedy and Jones (1978)
Europe*Ln Population Density	105	0.57	1.13	0	3.72	Mcevedy and Jones (1978)
Africa*State Centralization in 1500	105	1.59	6.97	0	50	Bockstette et al (2002)
Tropics	105	0.52	0.50	0	1	Author's Calculations
Island	105	0.10	0.29	0	1	Author's Calculations
Landlocked	105	0.21	0.41	0	1	CIA World Factbook
Colony	105	0.65	0.48	0	1	Nunn (2007)
Dependent						
Ln Real GDP Per Capita	104	7.94	1.67	4.89	11.09	World Bank
Polity2 Index	102	4.43	6.17	-10	10	Polity IV Project
Polity2 Binary	102	.63	.49	0	1	Polity IV Project
Institutions	105	-0.80	5.95	-10.52	11.44	World Bank
Institutions Binary	105	.30	.46	0	1	World Bank

Table 5: Raw Correlations, Migration Weighted

	Agriculture, thousand years before 2000	Malaria Ecology	Technological Adoption in 1500	State Centralization in 1500	Total State Experience 0-2000	Total Number of Wars 1400-1700	Ethno-Linguistic Fractionalization	Ln Population Density in 1500	Europe*Ln Population Density	Africa*State Centralization in 1500
Agriculture, thousand years before 2000	1									
Malaria Ecology	-0.53	1								
Technological Adoption in 1500	0.64	-0.40	1							
State Centralization in 1500	0.60	-0.51	0.51	1						
Total State Experience 0-2000	0.64	-0.47	0.67	0.75	1					
Ln Number of Wars 1400-1700	0.44	-0.44	0.49	0.43	0.53	1				
Ethno-Linguistic Fractionalization	-0.41	0.53	-0.39	-0.29	-0.45	-0.35	1			
Ln Population Density in 1500	-0.52	0.56	-0.47	-0.38	-0.46	-0.29	0.56	1		
Europe*Ln Population Density	-0.10	-0.11	0.13	0.08	-0.03	-0.03	0.07	-0.02	1	
Africa*State Centralization in 1500	-0.18	0.19	-0.14	-0.17	-0.11	-0.24	0.12	0.07	-0.17	1

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 6: OLS Comparison of Historical Factors to 2005 Outcomes, Migration Weighted

	(1) GDPPC	(2) GDPPC	(3) Polity2	(4) Polity2	(5) Institutions	(6) Institutions
Agriculture, thousand years before 2000	-0.213**	-0.277***	-0.348***	-0.401***	-0.379***	-0.417***
	(-2.028)	(-2.805)	(-2.807)	(-3.167)	(-3.446)	(-3.796)
Malaria Ecology	-0.172*	-0.212**	-0.138	-0.165	-0.071	-0.100
	(-1.816)	(-2.487)	(-1.252)	(-1.514)	(-0.715)	(-1.052)
Technological Adoption in 1500	-0.087	-0.108	0.125	0.120	-0.027	-0.049
	(-0.853)	(-1.175)	(1.058)	(1.029)	(-0.256)	(-0.478)
State Centralization in 1500	-0.074	0.030	-0.223*	-0.161	-0.147	-0.075
	(-0.662)	(0.292)	(-1.706)	(-1.221)	(-1.246)	(-0.649)
Total State Experience 0-2000	0.080	0.238**	-0.413***	-0.314**	0.053	0.165
	(0.646)	(2.032)	(-2.827)	(-2.083)	(0.407)	(1.256)
Ln of Number of Wars 1400-1700	0.137	0.097	0.366***	0.334***	0.110	0.083
	(1.582)	(1.238)	(3.585)	(3.290)	(1.208)	(0.955)
Ethno-Linguistic Fractionalization	-0.169*	-0.136*	-0.007	0.010	-0.134	-0.107
	(-1.939)	(-1.738)	(-0.065)	(0.101)	(-1.465)	(-1.218)
Tropics	-0.307***	-0.287***	-0.058	-0.063	-0.375***	-0.359***
	(-3.107)	(-3.196)	(-0.510)	(-0.557)	(-3.628)	(-3.581)
Island	0.096	0.085	0.042	0.028	0.126	0.122*
	(1.323)	(1.299)	(0.496)	(0.337)	(1.657)	(1.663)
Landlocked	-0.188***	-0.204***	-0.001	-0.013	-0.052	-0.063
	(-2.674)	(-3.233)	(-0.011)	(-0.161)	(-0.705)	(-0.890)
Colony	-0.187**	0.073	-0.264**	-0.136	-0.198**	0.000
	(-2.145)	(0.768)	(-2.594)	(-1.107)	(-2.166)	(0.002)
Ln of Population Density in 1500	0.239***	-0.002	0.554***	0.425***	0.417***	0.238**
	(2.656)	(-0.022)	(5.181)	(3.510)	(4.415)	(2.273)
Europe* Ln of Population Density in 1500		0.407***		0.184		0.318***
		(4.264)		(1.500)		(2.972)
Africa* State Centralization in 1500		-0.181**		-0.144		-0.119
		(-2.597)		(-1.640)		(-1.545)
N	104	104	102	102	105	105
R^2	0.615	0.698	0.492	0.519	0.571	0.618

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 7: Non-Nested Hypothesis Test, Weighted Independent Variables with Fitted Values of Un-weighted Model.

	(1) GDPPC	(2) GDPPC	(3) Polity2	(4) Polity2	(5) Institutions	(6) Institutions
Agriculture, thousand years before 2000	0.183	0.129	-0.454**	-0.196	0.111	0.163
	(1.098)	(1.111)	(-2.214)	(-0.956)	(0.489)	(0.966)
Malaria Ecology	0.173	0.103	-0.222	-0.018	0.095	0.095
	(1.177)	(1.078)	(-1.299)	(-0.114)	(0.801)	(0.962)
Technological Adoption in 1500	-0.071	-0.065	0.130	0.122	-0.035	-0.027
	(-0.723)	(-0.799)	(1.095)	(1.049)	(-0.338)	(-0.284)
State Centralization in 1500	0.002	-0.052	-0.328	-0.043	0.011	-0.017
	(0.018)	(-0.563)	(-1.573)	(-0.268)	(0.083)	(-0.162)
Total State Experience 0-2000	-0.013	-0.005	-0.494**	-0.244	-0.012	-0.036
	(-0.106)	(-0.046)	(-2.566)	(-1.523)	(-0.093)	(-0.276)
Ln of Number of Wars 1400-1700	0.154*	0.063	0.397***	0.261**	0.128	0.061
	(1.848)	(0.909)	(3.510)	(2.242)	(1.445)	(0.757)
Ethno-Linguistic Fractionalization	0.099	0.043	-0.019	0.010	0.044	0.040
	(0.807)	(0.554)	(-0.182)	(0.100)	(0.386)	(0.461)
Tropics	0.137	0.065	-0.093	-0.011	0.068	0.099
	(0.778)	(0.627)	(-0.736)	(-0.091)	(0.329)	(0.702)
Island	0.001	0.010	0.060	0.003	0.004	-0.011
	(0.015)	(0.168)	(0.674)	(0.032)	(0.049)	(-0.150)
Landlocked	0.137	0.074	-0.026	0.029	0.061	0.056
	(1.070)	(0.972)	(-0.290)	(0.335)	(0.714)	(0.801)
Colony	0.082	-0.041	-0.347**	-0.122	0.035	-0.042
	(0.665)	(-0.468)	(-2.114)	(-0.991)	(0.266)	(-0.422)
Ln of Population Density in 1500	0.080	0.142	0.694***	0.292*	0.105	0.130
	(0.791)	(1.634)	(2.871)	(1.838)	(0.671)	(1.310)
Europe* Ln of Population Density in 1500		-0.144		-0.008		-0.165
		(-1.075)		(-0.043)		(-1.105)
Africa* State Centralization in 1500		0.068		-0.030		0.069
		(0.887)		(-0.239)		(0.828)
Fitted Values from un-weighted Model	1.058***	1.028***	-0.203	0.384	0.822**	0.988***
	(2.980)	(5.262)	(-0.647)	(1.278)	(2.441)	(4.270)
N	104	104	102	102	105	105
R^2	0.615	0.698	0.492	0.519	0.571	0.618

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 8: Non-Nested Hypothesis Test, Un-weighted Independent Variables with Fitted Values of Migration Weighted Model.

	(1) GDPPC	(2) GDPPC	(3) Polity2	(4) Polity2	(5) Institutions	(6) Institutions
Agriculture, thousand years before 2000	0.106 (0.687)	-0.002 (-0.008)	0.215 (1.397)	0.304 (1.648)	0.094 (0.456)	0.029 (0.098)
Malaria Ecology	0.209 (1.493)	0.101 (0.618)	0.198 (1.551)	0.234* (1.740)	0.107 (0.961)	0.093 (0.798)
Technological Adoption in 1500	0.116 (1.225)	0.070 (0.796)	-0.089 (-0.840)	-0.114 (-1.083)	0.067 (0.692)	0.053 (0.578)
State Centralization in 1500	0.023 (0.220)	-0.025 (-0.267)	0.042 (0.323)	0.016 (0.128)	0.030 (0.249)	-0.012 (-0.111)
Total State Experience 0-2000	-0.013 (-0.102)	0.016 (0.087)	0.284* (1.669)	0.259 (1.613)	0.017 (0.132)	0.023 (0.148)
Ln of Number of Wars 1400-1700	-0.223** (-2.347)	-0.214** (-2.370)	-0.279** (-2.307)	-0.316** (-2.502)	-0.176* (-1.798)	-0.196** (-2.063)
Ethno-Linguistic Fractionalization	0.064 (0.569)	-0.023 (-0.195)	-0.009 (-0.092)	-0.010 (-0.107)	0.012 (0.115)	-0.018 (-0.169)
Tropics	0.127 (0.790)	-0.003 (-0.018)	-0.025 (-0.227)	-0.000 (-0.004)	0.092 (0.498)	0.031 (0.134)
Island	-0.056 (-0.753)	-0.018 (-0.258)	0.017 (0.215)	0.030 (0.386)	-0.051 (-0.620)	-0.028 (-0.319)
Landlocked	0.087 (0.761)	-0.031 (-0.207)	-0.019 (-0.238)	-0.026 (-0.336)	-0.011 (-0.138)	-0.038 (-0.481)
Colony	-0.046 (-0.397)	-0.118 (-1.198)	-0.020 (-0.164)	-0.044 (-0.373)	-0.076 (-0.638)	-0.108 (-1.058)
Ln of Population Density in 1500	-0.256* (-1.933)	-0.236** (-2.530)	-0.330* (-1.958)	-0.361** (-2.237)	-0.264 (-1.395)	-0.257 (-1.527)
Europe* Ln of Population Density in 1500		0.122 (0.440)		0.004 (0.027)		0.100 (0.444)
Africa* State Centralization in 1500		0.038 (0.286)		0.150 (1.424)		0.038 (0.357)
Fitted Values from Weighted Model	1.240*** (3.679)	0.914* (1.690)	1.018*** (5.941)	1.125*** (5.010)	1.021*** (3.370)	0.909* (1.918)
N	104	104	102	102	105	105
R^2	0.659	0.760	0.542	0.579	0.608	0.673

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 9: OLS Comparison of Historical Factors to 2005 Outcomes using Alternative Polity and WGI Measures

	(1) Polity2	(2) Polity2	(3) Polity2 Binary	(4) Polity2 Binary	(5) Institutions	(6) Institutions	(7) Institutions Binary	(8) Institutions Binary
Agriculture, thousand years before 2000	-0.351**	-0.399***	-0.174	-0.234	-0.497***	-0.504***	-0.495***	-0.519***
	(-2.465)	(-2.945)	(-1.174)	(-1.637)	(-4.349)	(-4.830)	(-4.170)	(-4.775)
Malaria Ecology	-0.262**	-0.224**	-0.362***	-0.330***	-0.101	-0.059	-0.080	-0.039
	(-2.200)	(-2.007)	(-2.912)	(-2.800)	(-1.040)	(-0.678)	(-0.793)	(-0.433)
Technological Adoption in 1500	0.024	0.024	-0.005	-0.001	0.024	0.013	0.046	0.040
	(0.198)	(0.207)	(-0.043)	(-0.005)	(0.235)	(0.145)	(0.438)	(0.424)
State Centralization in 1500	-0.299**	-0.212	-0.299**	-0.206	-0.152	-0.078	-0.045	0.042
	(-2.152)	(-1.603)	(-2.067)	(-1.474)	(-1.329)	(-0.749)	(-0.376)	(0.393)
Total State Experience 0-2000	-0.274	-0.112	-0.150	0.011	0.073	0.212*	-0.019	0.136
	(-1.638)	(-0.692)	(-0.862)	(0.067)	(0.536)	(1.703)	(-0.135)	(1.047)
Ln of Number of Wars 1400-1700	0.059	0.037	0.073	0.062	-0.110	-0.134	-0.131	-0.149
	(0.469)	(0.315)	(0.555)	(0.499)	(-1.081)	(-1.478)	(-1.242)	(-1.579)
Ethno-Linguistic Fractionalization	-0.044	-0.025	-0.148	-0.133	-0.169*	-0.145*	-0.114	-0.091
	(-0.372)	(-0.230)	(-1.204)	(-1.147)	(-1.800)	(-1.736)	(-1.169)	(-1.051)
Tropics	-0.069	-0.036	0.032	0.052	-0.432***	-0.379***	-0.490***	-0.445***
	(-0.534)	(-0.292)	(0.236)	(0.399)	(-4.079)	(-3.961)	(-4.451)	(-4.464)
Island	0.004	-0.003	0.040	0.029	0.072	0.077	0.009	0.009
	(0.046)	(-0.033)	(0.404)	(0.306)	(0.938)	(1.116)	(0.109)	(0.127)
Landlocked	-0.078	-0.092	-0.048	-0.056	-0.117	-0.126*	-0.066	-0.071
	(-0.858)	(-1.077)	(-0.508)	(-0.617)	(-1.579)	(-1.904)	(-0.854)	(-1.039)
Colony	-0.299**	-0.105	-0.231*	-0.054	-0.289***	-0.080	-0.275**	-0.062
	(-2.289)	(-0.793)	(-1.692)	(-0.385)	(-2.732)	(-0.779)	(-2.497)	(-0.577)
Ln of Population Density in 1500	0.419***	0.155	0.227	-0.017	0.276**	-0.009	0.308***	0.015
	(3.175)	(1.103)	(1.648)	(-0.115)	(2.595)	(-0.082)	(2.788)	(0.136)
Europe* Ln of Population Density in 1500		0.420***		0.354**		0.488***		0.474***
		(3.136)		(2.502)		(4.731)		(4.421)
Africa* State Centralization in 1500		-0.189**		-0.226**		-0.117		-0.163**
		(-2.081)		(-2.353)		(-1.658)		(-2.222)
N	102	102	102	102	105	105	105	105
R^2	0.358	0.456	0.302	0.393	0.559	0.660	0.523	0.631

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table 10: OLS Comparison of Historical Factors to 2005 Outcomes using Alternative Polity and WGI Measures, Migration Weighted

	(1) Polity2	(2) Polity2	(3) Polity2 Binary	(4) Polity2 Binary	(5) Institutions	(6) Institutions	(7) Institutions Binary	(8) Institutions Binary
Agriculture, thousand years before 2000	-0.348***	-0.401***	-0.174	-0.236*	-0.379***	-0.417***	-0.387***	-0.438***
	(-2.807)	(-3.167)	(-1.322)	(-1.749)	(-3.446)	(-3.796)	(-3.395)	(-3.872)
Malaria Ecology	-0.138	-0.165	-0.224*	-0.250**	-0.071	-0.100	-0.048	-0.081
	(-1.252)	(-1.514)	(-1.923)	(-2.154)	(-0.715)	(-1.052)	(-0.461)	(-0.827)
Technological Adoption in 1500	0.125	0.120	0.053	0.057	-0.027	-0.049	0.013	-0.007
	(1.058)	(1.029)	(0.427)	(0.459)	(-0.256)	(-0.478)	(0.119)	(-0.068)
State Centralization in 1500	-0.223*	-0.161	-0.217	-0.157	-0.147	-0.075	-0.043	0.040
	(-1.706)	(-1.221)	(-1.570)	(-1.119)	(-1.246)	(-0.649)	(-0.352)	(0.334)
Total State Experience 0-2000	-0.413***	-0.314**	-0.287*	-0.192	0.053	0.165	-0.047	0.081
	(-2.827)	(-2.083)	(-1.856)	(-1.199)	(0.407)	(1.256)	(-0.342)	(0.602)
Ln of Number of Wars 1400-1700	0.366***	0.334***	0.410***	0.379***	0.110	0.083	0.094	0.063
	(3.585)	(3.290)	(3.803)	(3.514)	(1.208)	(0.955)	(1.001)	(0.700)
Ethno-Linguistic Fractionalization	-0.007	0.010	-0.107	-0.095	-0.134	-0.107	-0.082	-0.054
	(-0.065)	(0.101)	(-0.974)	(-0.870)	(-1.465)	(-1.218)	(-0.867)	(-0.594)
Tropics	-0.058	-0.063	0.038	0.021	-0.375***	-0.359***	-0.426***	-0.415***
	(-0.510)	(-0.557)	(0.319)	(0.173)	(-3.628)	(-3.581)	(-3.980)	(-4.018)
Island	0.042	0.028	0.073	0.056	0.126	0.122*	0.058	0.051
	(0.496)	(0.337)	(0.820)	(0.623)	(1.657)	(1.663)	(0.738)	(0.670)
Landlocked	-0.001	-0.013	0.040	0.032	-0.052	-0.063	-0.005	-0.017
	(-0.011)	(-0.161)	(0.458)	(0.366)	(-0.705)	(-0.890)	(-0.070)	(-0.231)
Colony	-0.264**	-0.136	-0.194*	-0.102	-0.198**	0.000	-0.205**	0.006
	(-2.594)	(-1.107)	(-1.799)	(-0.777)	(-2.166)	(0.002)	(-2.161)	(0.057)
Ln of Population Density in 1500	0.554***	0.425***	0.393***	0.284**	0.417***	0.238**	0.419***	0.223**
	(5.181)	(3.510)	(3.479)	(2.208)	(4.415)	(2.273)	(4.278)	(2.063)
Europe* Ln of Population Density in 1500		0.184		0.115		0.318***		0.331***
		(1.500)		(0.882)		(2.972)		(3.010)
Africa* State Centralization in 1500		-0.144		-0.166*		-0.119		-0.151*
		(-1.640)		(-1.773)		(-1.545)		(-1.902)
N	102	102	102	102	105	105	105	105
R^2	0.492	0.519	0.432	0.456	0.571	0.618	0.539	0.595

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 11: Non-Nested Hypothesis Test, Weighted Independent Variables with Fitted Values of Un-weighted Model using Alternative Polity and WGI Measures.

	(1) Polity2	(2) Polity2	(3) Polity2 Binary	(4) Polity2 Binary	(5) Institutions	(6) Institutions	(7) Institutions Binary	(8) Institutions Binary
Agriculture, thousand years before 2000	-0.454**	-0.196	-0.188	-0.015	0.111	0.163	0.042	0.159
	(-2.214)	(-0.956)	(-1.074)	(-0.080)	(0.489)	(0.966)	(0.173)	(0.825)
Malaria Ecology	-0.222	-0.018	-0.258	0.126	0.095	0.095	0.070	0.081
	(-1.299)	(-0.114)	(-0.874)	(0.521)	(0.801)	(0.962)	(0.598)	(0.797)
Technological Adoption in 1500	0.130	0.122	0.052	0.083	-0.035	-0.027	-0.017	-0.017
	(1.095)	(1.049)	(0.412)	(0.674)	(-0.338)	(-0.284)	(-0.155)	(-0.169)
State Centralization in 1500	-0.328	-0.043	-0.246	0.048	0.011	-0.017	-0.006	-0.047
	(-1.573)	(-0.268)	(-0.912)	(0.268)	(0.083)	(-0.162)	(-0.047)	(-0.410)
Total State Experience 0-2000	-0.494**	-0.244	-0.300	-0.176	-0.012	-0.036	-0.028	-0.043
	(-2.566)	(-1.523)	(-1.613)	(-1.105)	(-0.093)	(-0.276)	(-0.210)	(-0.329)
Ln of Number of Wars 1400-1700	0.397***	0.261**	0.420***	0.241*	0.128	0.061	0.138	0.072
	(3.510)	(2.242)	(3.188)	(1.817)	(1.445)	(0.757)	(1.445)	(0.850)
Ethno-Linguistic Fractionalization	-0.019	0.010	-0.120	0.015	0.044	0.040	0.023	0.027
	(-0.182)	(0.100)	(-0.785)	(0.121)	(0.386)	(0.461)	(0.215)	(0.308)
Tropics	-0.093	-0.011	0.038	0.031	0.068	0.099	0.011	0.112
	(-0.736)	(-0.091)	(0.311)	(0.258)	(0.329)	(0.702)	(0.044)	(0.649)
Island	0.060	0.003	0.080	-0.006	0.004	-0.011	0.015	0.003
	(0.674)	(0.032)	(0.758)	(-0.061)	(0.049)	(-0.150)	(0.181)	(0.037)
Landlocked	-0.026	0.029	0.035	0.073	0.061	0.056	0.047	0.041
	(-0.290)	(0.335)	(0.379)	(0.825)	(0.714)	(0.801)	(0.589)	(0.591)
Colony	-0.347**	-0.122	-0.210	-0.119	0.035	-0.042	0.001	-0.043
	(-2.114)	(-0.991)	(-1.221)	(-0.915)	(0.266)	(-0.422)	(0.009)	(-0.418)
Ln of Population Density in 1500	0.694***	0.292*	0.416*	0.212	0.105	0.130	0.127	0.110
	(2.871)	(1.838)	(1.931)	(1.584)	(0.671)	(1.310)	(0.724)	(1.047)
Europe* Ln of Population Density in 1500		-0.008		-0.174		-0.165		-0.154
		(-0.043)		(-0.832)		(-1.105)		(-0.926)
Africa* State Centralization in 1500		-0.030		0.075		0.069		0.091
		(-0.239)		(0.456)		(0.828)		(0.919)
Fitted Values from unweighted Model	-0.203	0.384	-0.052	0.644*	0.822**	0.988***	0.699*	0.966***
	(-0.647)	(1.278)	(-0.125)	(1.763)	(2.441)	(4.270)	(1.976)	(3.703)
N	102	102	102	102	105	105	105	105
R^2	0.494	0.527	0.432	0.475	0.597	0.683	0.558	0.649

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)

Table 12: Non-Nested Hypothesis Test, Un-weighted Independent Variables with Fitted Values of Migration Weighted Model using Alternative Polity and WGI Measures.

	(1) Polity2	(2) Polity2	(3) Polity2 Binary	(4) Polity2 Binary	(5) Institutions	(6) Institutions	(7) Institutions Binary	(8) Institutions Binary
Agriculture, thousand years before 2000	0.215	0.304	0.149	0.192	0.094	0.029	0.065	-0.090
	(1.397)	(1.648)	(1.051)	(1.195)	(0.456)	(0.098)	(0.305)	(-0.270)
Malaria Ecology	0.198	0.234*	0.225	0.234	0.107	0.093	0.089	0.059
	(1.551)	(1.740)	(1.489)	(1.418)	(0.961)	(0.798)	(0.797)	(0.512)
Technological Adoption in 1500	-0.089	-0.114	-0.060	-0.078	0.067	0.053	0.057	0.047
	(-0.840)	(-1.083)	(-0.538)	(-0.703)	(0.692)	(0.578)	(0.566)	(0.504)
State Centralization in 1500	0.042	0.016	0.010	-0.019	0.030	-0.012	0.010	0.002
	(0.323)	(0.128)	(0.074)	(-0.143)	(0.249)	(-0.111)	(0.088)	(0.017)
Total State Experience 0-2000	0.284*	0.259	0.227	0.188	0.017	0.023	0.045	0.056
	(1.669)	(1.613)	(1.370)	(1.181)	(0.132)	(0.148)	(0.329)	(0.396)
Ln of Number of Wars 1400-1700	-0.279**	-0.316**	-0.279**	-0.279**	-0.176*	-0.196**	-0.176*	-0.183*
	(-2.307)	(-2.502)	(-2.146)	(-2.049)	(-1.798)	(-2.063)	(-1.728)	(-1.885)
Ethno-Linguistic Fractionalization	-0.009	-0.010	0.031	0.036	0.012	-0.018	-0.008	-0.037
	(-0.092)	(-0.107)	(0.278)	(0.324)	(0.115)	(-0.169)	(-0.077)	(-0.395)
Tropics	-0.025	-0.000	-0.067	-0.037	0.092	0.031	0.079	-0.067
	(-0.227)	(-0.004)	(-0.564)	(-0.315)	(0.498)	(0.134)	(0.374)	(-0.227)
Island	0.017	0.030	0.009	0.021	-0.051	-0.028	-0.027	-0.014
	(0.215)	(0.386)	(0.104)	(0.242)	(-0.620)	(-0.319)	(-0.347)	(-0.188)
Landlocked	-0.019	-0.026	-0.034	-0.043	-0.011	-0.038	-0.026	-0.047
	(-0.238)	(-0.336)	(-0.406)	(-0.522)	(-0.138)	(-0.481)	(-0.353)	(-0.661)
Colony	-0.020	-0.044	-0.060	-0.056	-0.076	-0.108	-0.068	-0.089
	(-0.164)	(-0.373)	(-0.487)	(-0.440)	(-0.638)	(-1.058)	(-0.549)	(-0.824)
Ln of Population Density in 1500	-0.330*	-0.361**	-0.253*	-0.261*	-0.264	-0.257	-0.208	-0.169
	(-1.958)	(-2.237)	(-1.715)	(-1.801)	(-1.395)	(-1.527)	(-1.053)	(-0.963)
Europe* Ln of Population Density in 1500		0.004		0.070		0.100		0.158
		(0.027)		(0.490)		(0.444)		(0.622)
Africa* State Centralization in 1500		0.150		0.118		0.038		-0.015
		(1.424)		(1.020)		(0.357)		(-0.116)
Fitted Values from unweighted Model	1.018***	1.125***	0.918***	0.954***	1.021***	0.909*	0.939***	0.703
	(5.941)	(5.010)	(5.534)	(4.487)	(3.370)	(1.918)	(3.094)	(1.372)
N	102	102	102	102	105	105	105	105
R^2	0.494	0.527	0.432	0.475	0.597	0.683	0.558	0.649

Standardized beta coefficients; *t* statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Migration weighting produced using migration data from Putterman and Weil (2010)