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TRADE AND GEOGRAPHY IN THE ORIGINS AND SPREAD OF ISLAM

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ABSTRACT

This study examines the spatial distribution of Muslim societies shedding light on its geographic origins. The empirical analysis conducted across countries, virtual countries, and ethnicities establishes that geographic inequality and proximity to pre-Islamic trade routes are fundamental determinants of contemporary Muslim adherence. We provide anthropological evidence from historical societies suggesting that geographic inequality (i) increased the importance of trade for subsistence, and (ii) exacerbated social inequality nurturing a predatory environment. We conjecture that Islam with its moral and economic principles was instrumental in providing a centralized authority addressing the underlying economic inequalities and promoting trade.

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" O you who believe! Eat not up your property among yourselves unjustly
except it be a trade amongst you, by mutual consent.
And do not kill yourselves (nor kill one another).
Surely, Allah is Most Merciful to you."
The Noble Qur'an (Hilali-Khan translation), Surah An-Nisa', 4:29 [1]

1 Introduction

Religion is widely viewed in the realm of social sciences as instrumental for the understanding of socioeconomic processes. In economics there is a growing body of work that links religious affiliation and religiosity to differences in economic and political development across countries. Similarly, within sociology, anthropology, political science, psychology and history, the volume of research investigating the causes and effects of religion attests to its paramount importance. Despite the prominence of religion as a focal research topic across disciplines, its origins within economics are not properly identified.

This study focuses on Islam and provides a systematic exploration of the determinants of Muslim representation within as well as across countries shedding light on its geographic origins. The empirical analysis establishes that geographic inequality and proximity to pre-Islamic trade routes are fundamental determinants of contemporary Muslim adherence. These findings provide a justification to the growing empirical literature that treats Muslim representation as predetermined with respect to contemporary economic and political outcomes. However, the uncovered deeply rooted determinants are likely to interact with contemporary development beyond their effect on Islam.

To conduct the empirical investigation we construct new data on (i) the regional potential for farming and on (ii) the pre-Islamic and preindustrial trade routes and ports in the Old World. Combining these sources with information on Muslim representation we establish the following empirical regularities. First, countries with unequal endowments of regional agricultural potential and those located closer to historical trade routes are more likely to be Muslim. Second, we focus on ethnic groups. Exploiting within-country variation mitigates concerns related to the endogeneity of contemporary political boundaries. Modern states, arguably, have differentially affected religious affiliation via state-sponsored religion, for example. As such it is crucial to account for these state-specific histories. Unlike a cross-country setting, this is feasible in the within-country-across-ethnic-groups analysis where we show that groups whose traditional homelands are characterized by unequal land endowments located closer to pre-Islamic trade routes have higher Muslim adherence. Third, we obtain similar findings when we

[1] Traslation by Dr. Muhammad Taqi-ud-Din Al-Hilali and Dr. Muhammad Muhsin Khan in 1999.

divide the world into geographical entities of a fixed size called virtual countries. This suggests that the uncovered geographical pattern is not an artefact of the underlying unit of analysis (country or ethnicity).

Islam spread both via conquests and via the peaceful adoption of the doctrine. Within the Muslim empires the process of conversion has been linked to coercion, Arab migration, and differential taxation. Hence, we repeated the analysis focusing on regions inside and outside the Muslim empires separately finding similar results. Moreover, we replicated the main pattern for groups and territories within Muslim-majority countries. Focusing on this subset mitigates concerns that the observed relationship between Islam and geographic inequality is driven by Muslim communities being geographically marginalized where they constitute a minority.

The robust empirical association between Islam and proximity to trade routes is not surprising. The role of long-distance trade has been extensively analyzed by prominent Islamicists, like Lapidus (2002), Berkey (2003) and Lewis (1993), noting both the diffusion of Muslims along trade routes (see Geertz (1968), Lewis (1980) and Trimingham (1962)), and the importance that Islamic scriptures confer on trade-related issues (see Cohen (1971), Hiskett (1984) and Last (1979)). Merchants converting to Islam enjoyed substantial externalities like access to the Muslim trade network, steady trade flows and a reduction in transaction costs.[2] The acceptance of Islam in most of Inner Asia, Southeast Asia, and Sub-Saharan Africa, for example, is known to have occurred primarily through contacts with Muslim merchants, Levzion (1979), Lapidus (2002) and Insoll (2003). A prominent example includes the case of Indonesia whose location along highly lucrative commercial routes precipitated the spread of Islam since the 11th century, Ricklefs (1991).

What is perhaps less well known is the uncovered tight relationship between geographic inequality and Muslim adherence. Though the major contribution of this paper is to empirically document this so-far neglected aspect, we also discuss the possible channels linking geographic inequality to the rise and diffusion of Islam and exploit anthropological information on pre-colonial traits of African ethnicities to better understand the economic and social arrangements of Muslim groups.

The starting point of our hypothesis lies in the observation that geography shapes the underlying production structure of a region. Specifically, a geography characterized by unequal agricultural potential implies that there are few pockets of fertile land where farming is feasible and a large share of arid regions where pastoralism is the most likely economic activity. These differences in the underlying productive endowments may generate gains from specialization

[2] Ensminger (1997) offers case studies comparing trade within Muslim and non-Muslim indigenous African societies, stressing how the institutional guarantee of Islam provided an additional impetus for trade by facilitating the flow of credit.

and provide the basis for intra-regional trade.[3] The latter is likely to flourish when the parties involved adhere to a common code of exchange. Hence, Islam's trade-promoting institutional framework imposing rules to its adherents and penalties to those deviating would find likely converts across such territories.

Consistent with the view that Islam was a state-building force we show that Muslim groups are more politically centralized and more likely to believe in a "moralizing God", i.e., in a God supportive of human morality dictating principles of behavior and sanctions. These findings are in line with Insoll (2003) and Lewis (1993) who describe how the highly developed Islamic legal framework with a single source of authority offered a strong commitment device suitable to handle desert issues across heterogeneous communities engaged in trade and lacking a concentrated authority necessary to impose duties or inflict penalties.[4] The role of Islam as a commitment mechanism is also stressed by Greif (2006) who sees Islam as a bundle of religious, political and economic rules regulating most aspects of life.

An alternative interpretation links geographic inequality to social inequality and predation within a region. History abounds in instances of nomads posing a threat to neighboring farming communities. In fact, Khaldun (1377), one the greatest philosophers of the Muslim world, observed that a crucial factor for understanding Muslim history is the central social conflict between the primitive Bedouin and the urban society ("town" versus "desert"). Along the same lines, contemporary scholars have noted that when farmers and herders coexisted in absence of an institutional framework coordinating their actions, their interactions were often conflictual (due to incompatible ambitions for the use of land and water, for example) disrupting trade flows across these regions, see Richerson (1996).

Similar geographically polarizing conditions were present in the origins of Islam. The 7^{th} century Arabian peninsula featured few fertile places amidst vast swaths of arid lands and the presence of lucrative trade routes. As a result, when dwellers from the oases were attempting to cross the surrounding deserts in pursuit of long-distance trade, they were facing the constant threat of nomadic groups. These encounters had the potential to bring trade flows to a halt setting the stage for the emergence of a centralizing force featuring redistributive principles. We argue that Islam was such a movement and, thus, its economic tenets had to address the inherent economic inequities across clans *(see section 3.2.1 for a detailed discussion on Islam's redistributive principles)*. Ethnographic evidence from pre-colonial societies is consistent with this hypothesis. In particular, we show that groups residing along geographically unequal territories are more likely to be economically unequal. However, this association is driven by

[3] Below we provide evidence from historical societies consistent with the proposed building blocks.

[4] Muslim merchants brought the additional benefit of restraining the Bedouins whose adherence to Islam was induced by the promise of booty, Turner (1978).

non-Muslim societies with Muslim groups exhibiting no systematic link between geographic and social inequality. Moreover, Muslims are more likely to follow equitable inheritance rules.

Finally, the conjecture that Islamic economic principles arose from the interplay between geographic inequality and long distance trade opportunities generates an auxiliary prediction. Namely, the intensity of adoption of Islam within unequally endowed groups should be higher for groups closer to trade routes. This prediction is borne out by the data at all levels of aggregation.

Related Literature

The cross–country growth literature has seen an increased interest on the relationship between religion and politico-economic outcomes (see Barro and McCleary (2006a, 2006b) for an overview). Nevertheless, the evidence regarding the impact of Islam on economic and political indicators is controversial. Some studies identify a negative effect, see La Porta et al. (1997) and Barro and McCleary (2003), whereas others conclude that the effect is positive or insignificant, see Pryor (2007) and Martin, Doppelhofer, and Miller (2004). Thus, identifying the forces behind the formation of religious adherence will greatly enhance our understanding of the phenomenon and its implications for comparative development.

The present study belongs to the literature in economics starting with Greif (1994), Platteau (2008, 2009), Becker and Woessmann (2009), Botticini and Eckstein (2005, 2007), Cervellati, Jansen, and Sunde (2008), Rubin (2009), Nunn (2010) and Augenblick, Cunha, Dal-Bo, and Rao (2012) that explores the role of the economic environment in determining religious rules and beliefs and vice versa.

The uncovered evidence makes also contact with the studies by Engerman and Sokoloff (1997, 2002) and Acemoglu et al. (2001, 2002) among others, that stress the role of geography in shaping the type of institutions that Europeans established during the colonial period. Our findings complement this literature by empirically demonstrating that the Muslim world follows a consistent geographic pattern. We argue that Islamic economic principles were devised as a means of centralizing the divergent interests of tribal populations, residing along geographically unequal territories in the beginning of 7^{th} century Arabia, triggered by new trade opportunities. Islam, consequently, expanded and eventually persisted across territories featuring similarly unequal agricultural endowments close to pre-industrial trade routes.

The role of trade in Islam and state formation more generally has received attention lately also among economists. Jha (2008), for example, explores the importance of the Pilgrimage to Mecca (Hajj) and argues that the latter mitigated economic inequalities by easing the entry of Muslim immigrants and converts into trade, see also Chaudhuri (1995). Similarly, Kuran

and Lustig (2012) note that the highly personal practice of exchange created preference for Muslims to conduct trade with coreligionists. Moreover, our finding that geographic inequality positively correlates with state centralization is consistent with Fenske (2013) who provides empirical support to Bates' (1983) explanation of pre-colonial African states showing that African societies in ecologically diverse environments had more centralized states.

The rest of the paper is organized as follows. In Section 2 we discuss the data and present the empirical analysis conducted across countries, ethnic groups and virtual countries. In Section 3 we outline the conceptual framework highlighting the role of trade and social conflict in Islam and present complementary evidence. We then describe the economic principles of the Islamic institutional complex and present a narrative of the events surrounding the birth of Islam in the Arabian peninsula. Section 4 summarizes and concludes.

2 Empirical section

2.1 The Data Sources

Given that Islam surfaced at a point in time when land was the single most important input in the production process and in absence of historical data, we use contemporary disaggregated data on the suitability of land for agriculture, to proxy for regional productive endowments. Naturally, fertile areas would engage in farming whereas in poorly endowed ones pastoralism would be the norm (see Section 3.1).

The global data on current land quality for agriculture were assembled by Ramankutty, Foley, Norman, and McSweeney (2002) to investigate the effect of future climate change on contemporary agricultural suitability and have been used by Michalopoulos (2012). This data set provides information on land quality characteristics at a resolution of 0.5 degrees latitude by 0.5 degrees longitude. In total there are $64,004$ observations. Each observation takes a value between 0 and 1 and represents the probability that a particular grid cell may be cultivated. In the online Appendix we discuss in detail the components of the land quality index and present the sources of the data used in the empirical analysis. These global data, presented in Appendix Figure 1, provide the basis for constructing the distribution of land quality at the desired level of aggregation.

Using contemporary geographic data to proxy for historical inequality in agricultural endowments presents its own potential pitfalls which merit further discussion. For example, a potential concern is how representative is land quality of the period under investigation. This is because precipitation, temperature and soil properties, which are the basis of this index, may have changed regionally over the last $1,400$ years. Hence, observed land quality may be a noisy measure of the historical distribution of agricultural quality. On the one hand,

this measurement error may make it harder to detect a relationship between inequality in agricultural suitability and Muslim adherence. On the other hand, it could be systematic; the same forces that engineer religious affiliation (modern statehood) may also be associated with human interventions that affect the landscape, generating a spurious relationship. This possibility underscores the need for the analysis to be conducted at a level of aggregation where country fixed effects can be explicitly incorporated. This is the case in our ethnic-group and virtual-country analysis. Another concern is the possibility of reverse causation with Muslims systematically affecting regional land quality. To alleviate concerns related to the possible endogeneity of the soil characteristics and to the extent that climate is less prone to human interventions, we show that results are similar when we use the climatic component of agricultural suitability to construct our geographic indexes.

In the cross-country analysis the dependent variable employed is the fraction of Muslims in the population as early as 1900 *AD* reported by Barrett, Kurian, and Johnson (2001). For the ethnic group analysis the dependent variable is the fraction of Muslims and of other religious denominations in 2005 from the World Religion Database (WRD).[5] These estimates are extracted from the World Christian Database and are subsequently adjusted based on three sources of religious affiliation: census data, demographic and health surveys and population survey data.[6] In absence of historical estimates of Muslim representation at an ethnic group level, we are constrained in using contemporary data. Reassuringly, country-level estimates of Muslim representation derived from the WRD estimates of Muslim adherence across ethnic groups within a country exhibit a correlation of 0.93 with the cross-country estimates of Muslim adherence in 1900 AD.

Information on the location of ethnic groups' homelands is available from the World Language Mapping System (WLMS) database. This data set maps the locations of the language groups covered in the $15th$ edition of the Ethnologue (2005) database. The location of each ethnic group is identified by a polygon. Each of these polygons delineates the traditional homeland of an ethnic group; populations away from their homelands (e.g., in cities, refugee populations, etc.) are not mapped. Also, the WLMS (2006) does not attempt to map immigrant languages. Finally, ethnic groups of unknown location, widespread ethnicities (i.e., ethnic

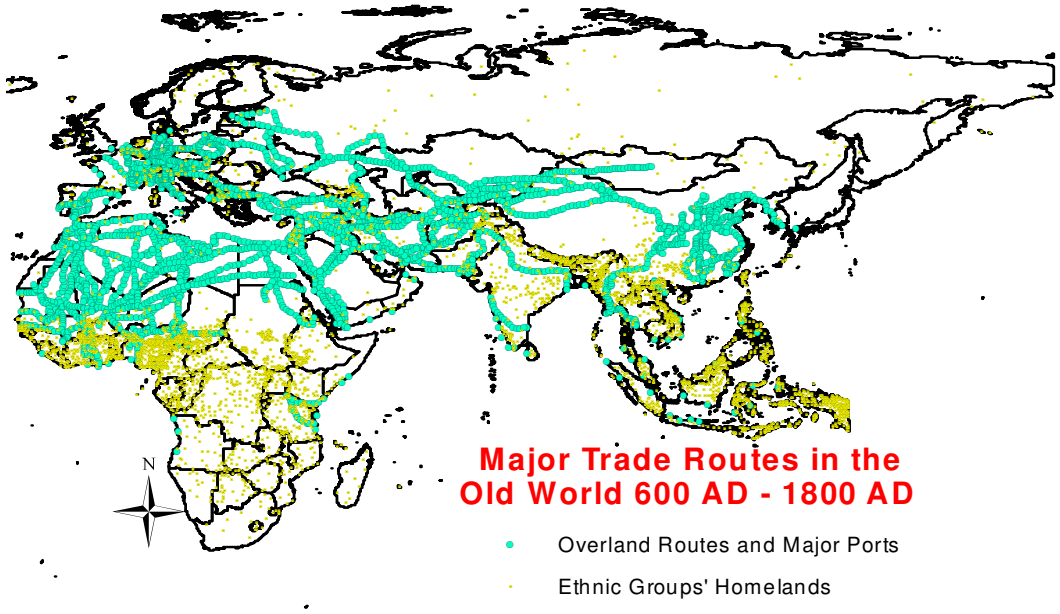
[5] WRD classifies as Muslims the followers of Islam in its 2 main branches (with schools of law, rites or sects): Sunnis or Sunnites (Hanafite, Hanbalite, Malikite, Shafiite), and Shias or Shiites (Ithna- Ashari, Ismaili, Alawite and Zaydi versions); also Kharijite and other orthodox sects; reform movements (Wahhabi, Sanusi, Mahdiya), also heterodox sects (Ahmadiya, Druzes, Yazidis), but excluding syncretistic religions with Muslim elements, and partially-islamized tribal religionists.

[6] Hsu, Gibbon, Hackett, and Reynolds (2008) show that the country level estimates for Muslim representation in WRD are highly correlated (above 0.97) with similar statistics available from World Values Survey, Pew Global Assessment Project, CIA World Factbook, and the U.S. Department of State. At the ethnic group level there are no comparable statistics.

groups whose boundaries coincide with a country's boundaries) and extinct languages are not mapped and, thus, not considered in the empirical analysis. The matching between the WLMS (2006) and the WRD is done using the unique Ethnologue identifier for each ethnic group within a country.[7] Distance to trade routes is calculated between the centroid of the relevant unit of analysis (a country or an ethnic group) and the closest historical trade route or port in 600 AD or 1800 AD. The location of trade routes is outlined in Brice and Kennedy (2001), see Figure 1. We further combine grid-level information on land suitability and ethnic groups' location to construct virtual countries, so to perform our empirical analysis at a level that is largely immune to the potential endogenous location of countries and ethnic groups.

Finally, we combine anthropological information on African ethnic groups from Murdock (1967) with the Ethnologue (2005) enabling us to examine the pre-colonial societal and economic traits of Muslim groups.

Figure **1**: Pre-industrial Trade Routes in the Old World



2.2 Cross-Country Analysis

We start by investigating the relationship between geographic inequality, distance to trade routes and Muslim adherence across modern-day countries. Using current countries as the unit of analysis has the advantage that we can employ data on Muslim representation that dates back to 1900 AD. We use the global data on the suitability of land for agriculture to construct

[7] For some language groups in WLMS (2006) the WRD offers information at the subgroup level. In this case the religious affiliation is the average across the subgroups.

the Gini coefficient of regional productivity across countries.

Figure **2**: Inequality in Regional Suitability for Agriculture Across Countries

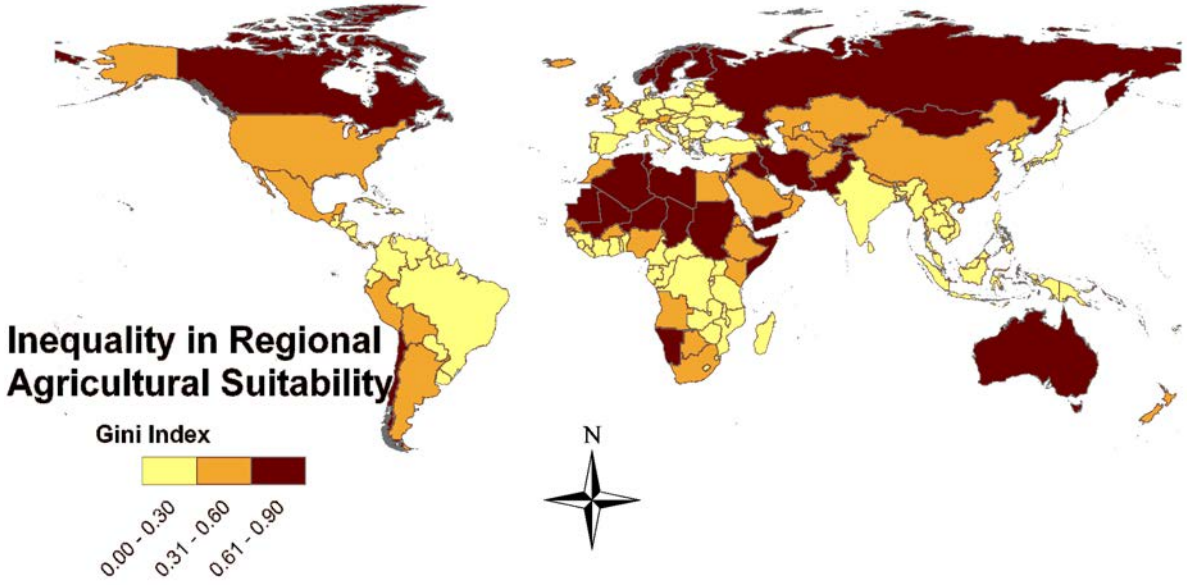
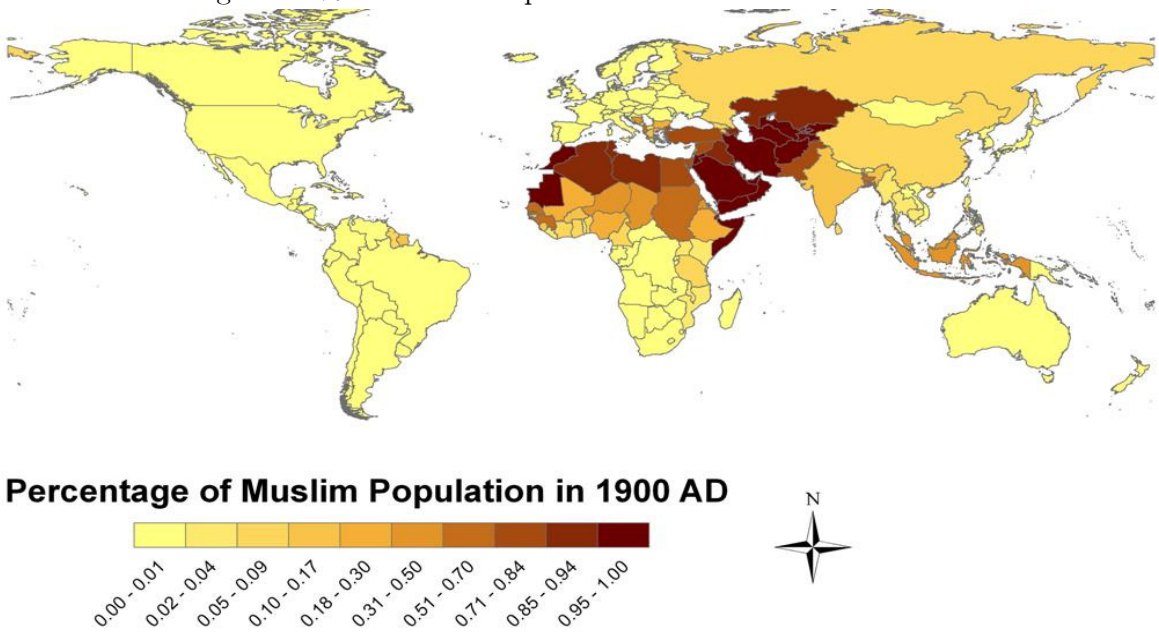


Figure **3**: % of Muslim Population in 1900 Across Countries



Observations on regional suitability for agriculture within a country extend from a single observation for Monaco to 12,279 for Russia. The median is 82. Figure 2 shows the variation in the Gini coefficient of regional agricultural suitability across countries. The descriptive statistics and the raw correlations between the variables of interest are presented in Tables 1

and 2, respectively.[8] A typical country has a log Gini index of land inequality of -1.29 whereas in 1900 AD an average country had about 27% of Muslims (see Figure 3). These two variables have a raw correlation of 0.49.

Our focus is on the Old World.[9] To estimate the role of geographic inequality and proximity to trade routes on Muslim adherence we adopt the following specification, estimated by OLS:

$$\%\text{ Muslim } 1900_i = \gamma_0 + \gamma_1 \text{Land Inequality}_i + \gamma_2 \text{Distance to Trade Routes}_i + \boldsymbol{\gamma}_3 \mathbf{X}_i + \nu_i \quad (1)$$

where $\%$ Muslim 1900_i is the fraction of the population adhering to Islam in 1900 AD.[10] In column 1 of Table 3 we only include the inequality in land endowments. It enters with a positive coefficient wielding significant explanatory power. Variation in country-level land inequality captures 24% of the variation in Muslim representation as of 1900 AD. A one-standard-deviation increase in the log Gini index of land quality increases the fraction of Muslims by a sizeable 19%. In column 2 we add the distance of a country's centroid from the closest pre-Islamic (600 AD) trade routes. The latter enters with the expected negative coefficient. The estimate suggests that a country 1,000 kilometers further from pre-Islamic trade routes will have 8% fewer Muslims. In column 3 we add continental dummies and control for a series of geographical characteristics to assuage concerns related to omitted variables bias. In particular, we control for log average land quality, distance to Mecca, absolute latitude, distance to the coast, average elevation and regional fixed effects.[11] Adding these controls decreases the estimated coefficient on geographic inequality which remains highly significant, but it renders the distance to 600 AD trade routes insignificant. This is partly due to an increase in the standard errors and the fact that distance from the equator strongly correlates with distance to trade routes across countries.

2.3 Cross-Ethnic Group Analysis

The evidence so far points to a strong cross-country correlation between Muslim representation and geographic inequality and a weaker one with long-distance trade opportunities. However,

[8] The Gini index of land quality is skewed. Thus, we use its natural logarithm throughout.

[9] Including the New World shows that geography plays virtually no role in shaping Muslim adherence across groups in the New World. At any rate Muslim adherence in the latter is negligible.

[10] We focus on countries with at least 20 regional observations of land quality to ensure that our findings are not driven by countries with limited regional coverage. Using as dependent variable the Muslim representation in 2000 the coefficients of interest are larger and more precisely estimated. Presumably this is because earlier estimates of religious affiliation are bound to be measured with noise.

[11] We follow the World Bank regional classification and assign indicators for countries in Sub-Saharan Africa, East Asia and the Pacific, South Asia, Western Europe, North Africa, and Middle East and Eastern Europe and Central Asia.

the spread of Islam is a historical process that took place mainly before the formation of modern states. Consequently, using current countries as the unit of analysis is subject to the criticism that what we may identify is not a causal link between geography and the adoption of Islam but the fact that modern political boundaries, for example those imposed by European colonizers after the fall of the Ottoman empire, shaped the observed unequal distribution of land endowments across Muslim countries. Also, the very individual histories of modern-day countries have largely engineered both their current borders as well as the composition of religious shares by promoting or demoting religious uniformity.

In order to overcome these issues we investigate empirically the role of geography and proximity to trade routes in shaping Muslim representation across ethnic groups within countries. Establishing a similar pattern conditional on country-specific characteristics will alleviate concerns related to the border and country formation process, inherent to any cross-country analysis.

Figure **4**: Location and Muslim Representation in Ethiopia
The Case of the Amharic and Somali Ethnicities

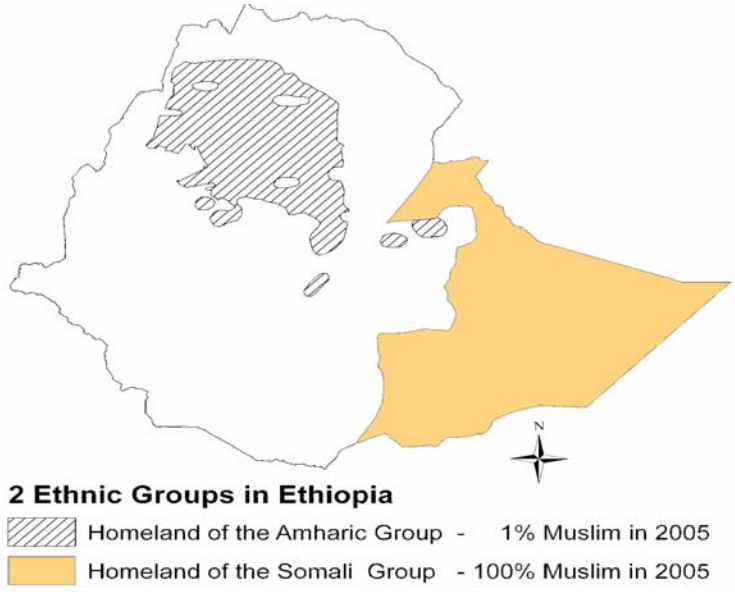


Figure 4 shows the traditional homelands of two ethnic groups in Ethiopia. The Amhara occupy the northern part whereas in the southwestern part of current day Ethiopia the Somali people are located. Figure 5 illustrates the regional land quality within each of these two ethnic groups. The green colored regions are those with at least 10% of agricultural potential whereas the yellow colored ones are below this threshold. On the one hand, Amharic areas are characterized by uniformly fertile lands with an estimated Gini index of land quality $\text{Gini}_{Amhara} = 0.13$. On the other hand, 72% of the Somali homeland is dominated by agriculturally poor regions dotted with few pockets of fertile land, $\text{Gini}_{Somali} = 0.62$. According to the WRD,

the Somali group is 100% Muslim in 2005 whereas within the Amhara only 1% is adhering to Islam.

Figure **5**: Regional Land Quality across Groups in Ethiopia
The Case of the Amharic and Somali Ethnicities

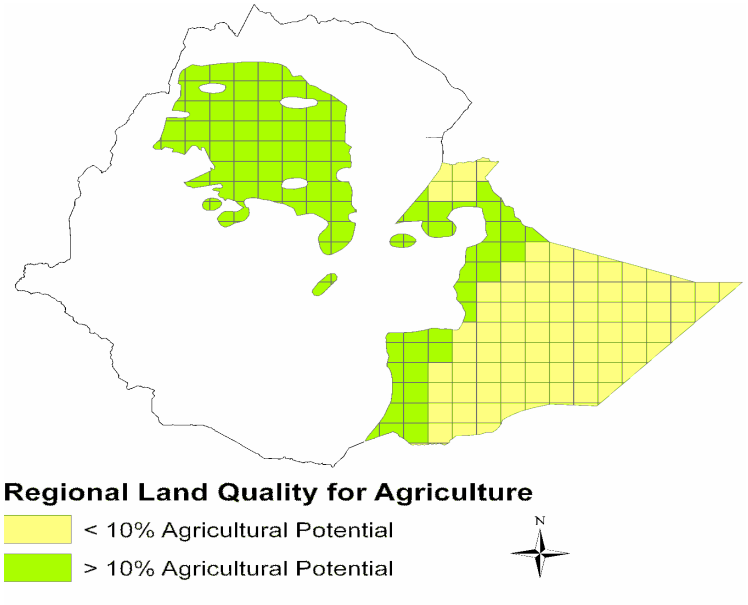


Table 4 presents the summary statistics of the main variables employed in the cross-ethnic-group analysis.[12] An average ethnic group in the Old World has 25% of its population adhering to Islam in 2005 and a Gini coefficient of land quality of 0.19. Similar to the cross-country analysis we have constructed different distance measures to account for the spatial diffusion of Islam. An average ethnic group is 4,630 kilometers from Mecca and 1,230 kilometers from trade routes in the 600 AD. Table 5 shows the raw correlations among the main variables of interest. Ethnic-specific Muslim representation is positively related to the degree of inequality in the regional suitability for farming (0.30), negatively related to distance to Mecca (-0.25), and distance to trade routes in 600 AD (-0.10). The two main differences between the cross-country and the cross-ethnicity analysis is that in the latter we use Muslim representation as of 2005 AD (instead of 1900 AD) and that we include country fixed effects. This allows to take into account any systematic time-invariant elements related to the state histories of existing countries and, thus, produce reliable estimates of the effect of geographic inequality and distance to trade routes on Muslim adherence. Hence, the following specification is adopted:

[12] We focus on ethnic groups with at least 5 regional land quality observations. Using all ethnic groups does not change the results

$$\%\ \text{Muslim in } 2005_i = \beta_0 + \beta_1 \text{Land Inequality}_i + \beta_2 \text{Distance Trade Routes}_i + \beta_3 \delta_c + \boldsymbol{\beta}_4 \mathbf{X}_i + v_i, \tag{2}$$

where δ_c represents the country-specific constants.[13]

The pattern uncovered in the cross-country analysis resurfaces in the cross-ethnicity one. Exploiting within-country variation in column 1 of Table 6 shows that ethnic groups with higher levels of inequality in agricultural endowments consistently exhibit larger Muslim adherence. A one-standard-deviation increase in the log Gini coefficient increases the fraction of Muslims within a group by 6%.

In column 2 the coefficient on the distance to pre-Islamic trade routes is negative and highly significant suggesting that within countries today, groups that are closer to pre-Islamic routes experience a significant boost in their Muslim populations. Namely, a one-thousand-kilometers increase in the latter is associated with a decline of Muslim population of 18%. This finding is in line with the narrative among historians regarding the diffusion of Islam along pre-Islamic trade routes. In column 3 we add a series of controls to account for alternative hypotheses that have been proposed in the literature. The coefficients on land inequality and distance to 600 AD trade routes decline but both remain economically and statistically significant. Distance from Mecca and average land quality are the only other significant correlates of Muslim representation.

Groups of people coming under the direct rule of a Muslim empire might face other incentives for converting to Islam such as social mobility (Bulliet (1979)), career within a Muslim bureaucracy (Eaton (1996)), or lower tax rates (Chaney (2008)). For example, the lower tax rates granted to Muslims over non-Muslims within Muslim Empires or the status achieved by switching to the ruler's religion might differentially affect conversion rates. Likewise, instances of forced conversion, religious persecution during the Muslim expansion, or Arab migration movements within the Muslim empires might have shaped the observed religious affiliation. For example, since early Muslims in the Arabian peninsula were in their majority pastoralists then to the extent that their skills (military and productive) were specific to such environments one would expect to observe Muslims migrating and populating regions similar to their ancestral homelands, see Bulliet (1975), Chaney (2012) and Michalopoulos (2012).

To mitigate such plausible concerns, in columns 4 and 5 we split the sample into ethnic group that were (not) under the rule of a Muslim empire using the classification of Muslim empires by Iyigun (2010). We categorize an ethnic group to be within a Muslim empire if

[13] The results presented here are OLS estimates with the standard errors clustered at the country level. Adjusting for spatial autocorrelation following Conley (1999) delivers more conservative standard errors.

the country to which it belongs today was at some point part of a Muslim empire. Our results hold both within and outside the Muslim empires. In columns 6 and 7 we repeat the main specification, splitting the sample between ethnic groups that belong to a Muslim-majority country and otherwise. The coefficient on land inequality continues to be positive and significant in countries where Muslims represent a majority of the population, assuaging concerns that the uncovered pattern may be driven by minorities being marginalized in the hinterland. Interestingly, proximity to long-distance trade routes tends to be relatively more important for the conversion to Islam across groups within Muslim-minority countries.

One might argue that the identified relationship between geography and Muslim adherence is not particular to Islam but it is either a characteristic of all monotheistic religions or an outcome of some other major religion following the opposite geographic pattern. We tackle this issue by asking whether the identified "Islamic" geography is systematically associated with other major religions. To facilitate comparisons in column 1 of Table 7 we use as a dependent variable the fraction of Muslims (essentially replicating column 3 of Table 6). In columns 2, 3 and 4 we use as a dependent variable the percentage of people within an ethnic group adhering to 3 other major religions i.e., Christianity, Hinduism and Buddhism, respectively. Lastly in column 5 we use the fraction of people adhering to local animistic, or shamanistic religions, called Ethnoreligionists. Neither Christians nor Hindus are systematically found along unequal land endowments whereas Buddhists, like Muslims, are slightly more likely to be found along agriculturally unequal territories, though the distance from pre-Islamic trade routes plays no role. Note that the local tribal denominations follow the opposite geographic pattern compared to Muslims. Our interpretation is that when Islam spread, the ethnic groups that maintained their local tribal religions had exactly the type of geographic endowments (relatively uniform distribution of agricultural potential) that were not conducive to the adoption of the Islamic principles, whereas those residing along more unequally endowed regions were more eager to adopt the Islam with its trade-promoting, redistributive doctrine.

These findings uncover the so far neglected crucial role of geographical inequality and trade routes proximity in shaping the differential adherence to Islam across ethnic groups and shed new light on the geographical origins and spatial distribution of Muslims within modern day countries. Below we show that the pattern established is robust to alternative measures of Muslim representation, indexes of geographic inequality and measures of land fertility.

The columns of Table 8 replicate column 3 of Table 6 using alternative dependent and independent variables. Specifically, in column 1 we use as a dependent variable a dummy equal to one for ethnic groups with a Muslim majority. The remaining four columns instead address the sensitivity of our results to the choice of the land inequality index. In columns 2 and 3 we

use the log Mean Logarithmic Deviation and the log Theil index.

We further test the robustness of our results by constructing two additional land inequality measures separating the climatic and soil components of land productivity. The former being less amenable to human intervention than the latter. One concern could, in fact, be that land productivity, in particular its distribution, may be affected by the specific civilization living in the area, therefore introducing a problem of reverse causality regarding the link between land inequality and Muslim representation. Also, the mere fact that human action can alter land productivity could lead to measurement error and therefore to imprecise estimates of the effect of land inequality on Muslim adherence. To this end, in columns 4 and 5 we use as inequality measures the Gini index of climate productivity and the Gini index of soil productivity, respectively, together with the average land quality constructed using the relevant component. Across all specifications the inequality measures as well as the distance to pre-Islamic trade routes enter with the expected sign and are highly significant highlighting the robustness of the uncovered pattern. Distance to Mecca is the only other robust correlate of Islam throughout all the specifications.

2.4 Cross-Virtual Country Analysis

So far, the empirical analysis has focused on the role of geography in shaping Islamic representation across countries and ethnic groups. Nevertheless, the decision to become Muslim may depend not only on the distribution of land quality within a group's homeland but also on the overall distribution of land quality in the larger area to which a group of people belongs. Moreover, the current boundaries of a group or a country may be endogenous to the religious history of this place. To partially address these concerns we arbitrarily divide the world into polygons, called virtual countries, and we ask how the distribution of land quality and proximity to historical trade routes of these territories shape local Muslim adherence.

The virtual countries are constructed in the following way: we generate a global grid of 2.5 by 2.5 decimal degrees that extends from -180 to 180 degrees longitude and from 85 degrees latitude to -65 degrees latitude. This global grid is intersected with the territories that are covered linguistically by the WLMS (2006) database. Since no linguistic groups are mapped for oceans, large lakes and seas, the virtual countries falling entirely in such places vanish. Each and every part of a virtual country that remains after the spatial intersection has complete linguistic coverage, and it is across these territories that geographic statistics and religious affiliation are constructed.[14] We focus on territories in the Old World.

For each artificial country, we construct the distribution of land quality using information

[14] Appendix Figure **2** illustrates the resulting virtual countries, while a specific example is shown in Appendix Figure **3**.

on land agricultural suitability at the regional level of 0.5 by 0.5 decimal degrees. In order to derive an estimate of Muslim adherence we weigh the Muslim population of each ethnicity found within a virtual country by the fraction of the area each group occupies in the grid (see online Appendix Section 2 for a detailed example). In the regression analysis virtual countries of at least 15,000 square kilometers are included yielding an average virtual country of 49,000 square kilometers. The resulting sample size is 1359 observations and in our sample a virtual country comprises on average 7 groups and is roughly 30% Muslim. Descriptive statistics and pairwise correlations of the virtual country dataset are reported in Tables 9 and 10, respectively.

In Table 11 we replicate Table 6 using cross-virtual-country data.[15] By taking advantage of the arbitrarily drawn borders of these geographical entities, we control for country fixed effects in all specifications. The virtual countries that fall into more than one country are assigned to the country where their centroid belongs to. Echoing the findings of the cross-ethnic-group specifications, columns 1 to 3 reveal that unequally endowed territories, closer to pre-Islamic trade routes and overall less fertile host larger Muslim communities today. Distance to Mecca enters negative but is statistically insignificant whereas virtual countries with more ethnic groups or those located entirely within a modern-day country sustain smaller Muslim populations. In specifications 4 to 7 we focus on different subsets of the data. In particular, in columns 4 and 5 we look at virtual countries within and outside Muslim empires, respectively. Likewise, in the columns 6 and 7 we split the sample into virtual countries belonging to modern-day countries where Muslims constitute the majority and minority, respectively. Similar to the ethnic-group evidence, we find that Islam successfully diffused across regions with poor and unequal productive endowments, close to pre-Islamic trade routes and ports.

3 The Conceptual Framework

This section offers two potential explanations rationalizing the relationship between geographic inequality and Islam. First, an unequal geography via a Ricardian view of trade generates possibilities for exchange *within* the region. Hence, to the extent that Islam offered an institutional framework promoting trade[16] as well as access to a larger exchange network then geographically unequal groups would be more inclined to become Muslim. A second explanation stems from the observation that an unequal geography in presence of long-distance trade opportunities precipitates social conflict leading to the collapse of trade. We discuss the plausibility of each hypothesis and utilize anthropological information on pre-colonial African ethnic groups from

[15] The results presented here are OLS estimates with the standard errors clustered at the country level.

[16] Note that the majority of those who contributed to the crystallization of the Muslim law over time had a merchant or craftsman background, Cohen (1970).

Murdock (1967) to provide complementary evidence on each channel.[17] We close the section providing a narrative of the historical events at the origins of Islam.

Limiting the analysis to African groups allows us to focus on a region where trade is known to have played a critical role in the voluntary spread of Islam and because recent research shows that ethnicity is the relevant unit of analysis for understanding African institutional and economic development, see Michalopoulos and Papaioannou (2013a, 2013b).[18] Murdock (1967) produced an Ethnographic Atlas (published in twenty nine installments in the anthropological journal Ethnology) that coded around 60 variables, capturing cultural, societal and economic characteristics of 1,270 ethnicities around the world. We linked Murdock's Ethnographic Atlas African groups to the Ethnologue's linguistic homelands.[19] The summary statistics and correlations between the variables used are presented in Tables 12 and 13.

Subsistence Pattern of Geographically Unequal Societies The link between the structure of production and institutional formation has been proposed by Marx (1833 [1970]). According to Marx (1833 [1970]), religion, like any other social institution, is a by-product of the society's productive forces. Likewise, Ibn Khaldun (1377) notes that "... it is the physical environment-habitat, climate, soil, and food, that explain the different ways in which people, nomadic or sedentary, satisfy their needs, and form their customs and institutions".

As a first step towards understanding Islam's institutional content we need to uncover the productive structure of geographically unequal societies. A Gini coefficient in terms of land quality is 0 when all regions are equally endowed, and 1 if a single region is very fertile and the rest completely arid. Naturally, agriculturalists produce in fertile lands, whereas pastoralists herd animals in the arid ones. Hence, a geographically unequal group is likely to give rise to a particular productive structure. We investigate the latter in Table 14 asking how the type of geography associated with Muslim representation shapes the subsistence economy within an ethnic group.

In column 1 the dependent variable reflects the percentage of dependence on animal husbandry. Groups located in poor-land-quality territories characterized by unequal geographic endowments derive a larger share of their livelihood from pastoralism. Column 2 shows the opposite to be the case for groups featuring a relatively uniform distribution of high farming

[17] Since we do not have data on the institutional and societal traits of a group before its Islamization one cannot rule out the possibility that groups that became Muslim already had societal characteristics similar to the ones prescribed by the Muslim doctrine.

[18] Nevertheless, it is useful to keep in mind that the patterns shown below are not specific to African ethnicities. Regressions including all groups in the Old World deliver similar results (available upon request).

[19] The two datasets do not always use the same name to identify a group. Utilizing several sources and the updated version of Murdock's Atlas produced by Gray (1999), we matched 522 ethnicities from the Ethnographic Atlas to 968 linguistic homelands in the Ethnologue (2005). Similar to the cross-ethnic group analysis above we focus on groups with at least 5 regional land quality observations.

potential. These ethnicities, perhaps not surprisingly, derive a considerable share of subsistence from agriculture. Finally, in column 3 we take the ratio of pastoral vis-a-vis agricultural dependence confirming the pattern shown in the first two columns (the introduction of country fixed effects in column 4 does not alter the results). These findings reveal the fundamental role of an unequal geography in producing a distribution of activities skewed towards pastoralism featuring few pockets of surplus-producing agricultural regions. Finally, in columns 5 and 6 we show that indeed African Muslim communities exhibit this lopsided productive pattern.

3.1 Islam and Trade

Unequal Geography and Within-Region Trade The evidence above suggests that an unequal geography shapes the proportion of pastoral versus agricultural dependence in a given area. While farming dominates fertile regions, herding is the main subsistence pattern in the relatively arid ones. This was indeed the case for a large part of Central Asia as well as the Middle East and North Africa where grasslands exist interspersed with arable lands. The interface between the steppe and the sown has been among the long-standing themes in the environmental history of Islamic Eurasia and North Africa, Mikhail (2012). In this environment where each area specializes in its comparative advantage a larger geographical Gini may correspond to larger potential gains from *intra-regional* trade.[20] Along the same lines, Richerson (1996) notes that "despite the emphasis on animals, most herders are dependent on crop staples for part of their caloric intake ... procured by client agricultural families that are often part of the society and the presence of specialized tradesmen that organize the exchange of agricultural products for animal products." Hence, a more unequal geography within a group reflects this interdependence between farmers and herders.

Is there evidence that trade was part of the subsistence for groups with such asymmetrical productive structure? Unfortunately, the Ethnographic Atlas does not provide any information on trade for the underlying ethnicities. Nevertheless, the Standard Cross Cultural Sample (SCCS) reports such information for 186 societies worldwide (only 28 of these are located in Africa).[21] In the SCCS the ratio of pastoral to agricultural dependence is strongly correlated with the importance of trade for subsistence (the correlation coefficient is 0.30 with a p-value of 0.0002). Moreover, in a univariate regression the ratio of pastoral to agricultural subsistence explains 9% of the variation in the importance of trade across groups. This evidence points out that geographically unequal groups may need to rely on trade more than others. Hence,

[20] Such Ricardian view of trade motivates also Fenske's (2013b) study where a climatically polarized environment gives rise to trade and a concomitant need for centralized authorities.

[21] Note that the *SCCS* does not provide information on a group's religious affiliation nor on its traditional homeland.

the trade-conducive framework of Islam would find eager followers across territories where intra-regional exchange was an integral part of subsistence.

Islam is particularly known to have conferred economic benefits to individuals through the institutional advantages it created by facilitating trade, Ensminger (1997). According to Cohen (1971) "[Islam is a] blue-print of a politico-economic organization which has overcome the many basic technical problems of trade." Trade called for new types of economic organization that required stronger authority, Davidson (1969). An important advantage of Islam with respect to previous agreements was the fact that it was a religion offering a powerful ideology with built-in sanctions which contributed to contract enforcement. Believers had a non-material interest in holding to the terms of contracts even when presented with the opportunity to deviate. This contributed to the reduction in transaction costs while doing business with fellow Muslims.

Islam as a Moral State-Building Force The narrative suggests that Islam by offering an institutional framework facilitating trade integrated the underlying clans into larger political entities. But was it successful in doing so, i.e., is there evidence that Muslim groups are more politically centralized than non-Muslim ones? The first two columns of Table 15 suggest this to be the case. The dependent variable is the number of jurisdictional levels beyond the local community, an index that has been used to capture pre-colonial state capacity at the ethnic level, see Michalopoulos and Papaioannou (2013b) and Fenske (2009). Comparing a group without any Muslim representation to a fully Islamic one increases the jurisdictional levels within the group by half a standard deviation. This correlation is suggestive of Islam's state-building capacity providing evidence consistent with the idea that Islam was successful in gaining a hearing across tribal populations politically integrating them into more centralized units.

One may wonder why a group needs to adopt a religion rather than just the appropriate economic principles. Such question is vast in its scope and a comprehensive answer cannot be provided within the confines of the present study. Nonetheless, among the pre-colonial traits recorded by Murdock (1967) there is an entry describing whether a group believes in gods that are supportive of human morality. Anthropologists and evolutionary biologists (Swanson (1960), Alexander (1987)) argue that the belief in moralizing gods, that is, gods who tell people what they should (not) do, was necessary to keep societies together by condemning infringements on other group members. Subsequent studies (Peoples and Marlowe (2012); Roes and Raymond (2003)) have shown that the presence of moral gods in historical societies is associated with intensive competition for resources, high threat of free-riding, and collective action

problems. Similarly, we argue that for trade to flourish across geographically unequal territories cooperation across the underlying tribal clans was necessary. Islam's religious ideology with built-in penalties offered such a platform.

With this in mind in Table 15, columns 3−6, we regress Muslim representation on whether a group believes in moral gods. The coefficient in column 3 suggests that a 50% increase in Muslim adherence within a group (close to one standard deviation) increases the likelihood that the group believes in gods that dictate what should (not) be done by 40% uncovering the importance of Islam as a commitment device. In column 4 adding country fixed effects the coefficient declines somewhat but remains economically and statistically significant. In columns 5 and 6 we use as explanatory variable the share of Christians and Ethnoreligionists within a group, respectively. The negative coefficients suggest that groups characterized by higher representation of either of these two creeds are less likely to have harbored beliefs in a moralizing god in the pre-colonial era.

3.2 Islam and Social Conflict

Unequal Geography and Long-Distance Trade Despite any gains from *intra-regional* trade when grasslands and fertile regions form a mosaic, the coexistence of farmers and herders often resulted in predatory behavior due to incompatible ambitions for the use of land and water. A simple model of predation versus production presented in the online Appendix Section 3 shows that a more unequal distribution of land quality in presence of external trade opportunities (namely, *long-distance* trade) may lead to predation. This is due to the fact that the appearance of trade routes creates divergent economic gains across territories. Fertile regions can greatly benefit from trade by selling their output at higher prices whereas poorly endowed ones cannot. However, the latter may threaten the trade activities of the former, rendering any type of trade risky and uncertain. So, the interaction between pastoralists and farmers may lead to predation rather than cooperation.[22] Hence, we argue that the Islamic institutional complex had to offer a set of redistributive principles as part of the religious ideology in order to mitigate the geographically driven inequality and social tensions allowing sedentary people to safely enter the mobile networks of the desert and gain from exchanges and trade.

But which are Islam's redistributive economic traits? Below we discuss the most important ones and comment on their implementation and effectiveness in mitigating inequality historically.

[22] The role of trading and raiding for pastoral communities is also stressed by Richerson (1996) who argues that trade and war are in the heart of pastoral groups due to the efficient transportation technology in the form of carts, and caravans that facilitate commercial trade as well as raiding and conquests.

3.2.1 The Islamic Institutional Complex[23]

Poverty alleviation and redistribution feature prominently among the economic traits of Islam. To start with, Zakat, a tax on income and wealth, is a religious obligation and is one of the Five Pillars of Islam. It dates to the very beginning of the religion and the Qur'an states that a believer of sufficient economic means is required to give a fraction of her accumulated income for alms. Nevertheless, despite the doctrinal prominence of Zakat it was only uniformly collected during the first decades of Islam. Later its centralized collection was infrequently enforced, and it was substituted by several other taxes, none stated in the Qur'an. Zakat itself became an instrument of voluntary charity, Kuran (2008b). For example, the third Caliph Uthman turned the obligation to pay Zakat essentially into a tax on agricultural output, Kuran (2001).

Another institution geared towards redistribution is the waqf, a religious endowment made by a Muslim for a religious, educational, or charitable cause. Practically all urban services were financed through waqfs promoting intra-urban redistribution, but it mostly benefited people one would now categorize as middle class. Also, waqfs were used extensively to provide services to merchants (i.e., the caravanserai), promoting trade and helping Islam spread along trade routes. Another egalitarian component of the Islamic institutional complex is the ban on interest, riba. Here the purpose was to protect the poorest from enduring harsh consequences for default. Although the ban was not always enforced and often circumvented, insofar as the formal ban on interest discouraged long-term financial contracts, it negatively affected the return to capital and hence the wealthy.

Perhaps, the most significant wealth-fragmenting principle of Islam is its partible, and thus egalitarian, inheritance system. It was implemented to prevent capital accumulation and spread wealth. The Qur'an specifies that two-thirds of one's wealth be allocated to various family members, including very distant relatives making it a rather egalitarian distribution system, Kuran (2008a). Islam's partnership law also kept enterprises small and short-lived by allowing members to withdraw any time and preventing credible commitments to keep resources together. So it ended up keeping the entrepreneurial ventures ephemeral and blocked the emergence of more complex organizational forms restricting the mobilization and pooling of resources. The inheritance law and Islam's marriage law, which allows multiple wives, would have worked together with the partnership law to keep the private economy fragmented, promoting equality among the masses (see Kuran (2010) for a discussion on how these three institutions reinforced one another).

We argue that the Islamic institutional complex described above worked as a force weak-

[23] In the Supplementary Appendix Section 4 we summarize the economically relevant doctrinal similarities and differences between Islam and other monotheistic religions.

ening the link between an unequal geography and an economically unequal society. Thanks to Murdock's (1967) Atlas we can test this prediction. Column 1 in Table 16 shows that land inequality harbors heterogeneous economic opportunities leading to the emergence of economically stratified societies. One-standard-deviation increase in geographic inequality increases the probability that a group will be stratified by 12%. Unlike non-Muslim groups, for which the link between geographic and social inequality is strong (column 2), the tendency of an unequal geography to breed social inequality within a group is muted for Muslim-majority ethnicities (column 3). This result confirms the building block of our hypothesis that the Islamic institutional complex limited social inequality in areas most prone to it. Columns 4, 5 and 6 replicate the first 3 columns adding country fixed effects without affecting the pattern.

But what type of economic traits characterize Muslim communities? Unfortunately data on the extent of charity or usury laws within a group are not available; however, there is evidence on the type of the pre-colonial inheritance system that Kuran (2003, 2004) among others have stressed as a key aspect of Islam. The dependent variable in columns 1 and 2 of Table 17 is a dummy that takes the value 1 when the inheritance of movable property is "equal or relatively equal" or when there is "absence of inheritance", whereas in columns 3 and 4 the dependent variable is the presence of equal inheritance with respect to land property. The estimates in columns 1 and 3 suggest that groups whose majority adheres to Islam are 34% and 24% more likely to have equal inheritance rules regarding movable and land property, respectively. Again the introduction of country fixed effects in columns 2 and 4 does decrease the magnitude of the coefficients which remain statistically and economically significant.

3.3 Lessons from the Origins of Islam

So far our exploration has focused on the role of geographic inequality and trade in the diffusion of Islam in the Old World. Naturally, one may wonder whether similar forces have played a role in the origins of Islam. In this section we describe the historical events surrounding the birth of Islam highlighting the interplay between long-distance trade opportunities and geographic inequality.

Arabia has a distinct geography with few places in Yemen, Bahrain, Central Arabia and several scattered oases in the interior producing agricultural goods, such as frankincense, myrrh, vine, dyes and dates in the eve of Islam. The rest of the peninsula features deserts and semi-arid regions where nomadic life-style was the norm, Ibrahim (1990). Across these infertile swaths of land, tribes were directly involved in the collection of booty by conducting raids, known as ghazw, on commercial caravans trading local produce as well as spices, gold, ivory, pearls, precious stones, and textiles - arriving at the local ports from Africa, India, and

the Far East, Berkey (2003). Scholars have argued that this distinctive geography shielded the local populations from any form of urbanization allowing them to maintain their tribal culture, preventing the formation of a unifying social structure, Haber and Menaldo (2010). At the same time, the infrequent urban commercial economies in a limited number of oases exacerbated social and economic inequities between clans, Berkey (2003). In the pre-Islamic era, trade was maintained in the Peninsula as long as peripheral kingdoms along the edges of Arabia, namely Himyarites, Ghassanids and Lakhmids, guarded the routes and policed the Bedouin tribes. These kingdoms all disintegrated in the course of the 6th century. As a result, political and commercial control over the Bedouin communities could no longer be exerted and the Arabian economy got in decline, Lapidus (2002). In parallel, the Persian and Byzantine empires had been fighting a series of long and exhausting wars since the start of the $6th$ century.

By the early $7th$ century the conflicts had disrupted long-distance trade crossing the two empires, Lewis (1993). Piracy in the Red Sea was also on the rise due to the declining sea power of the Byzantines, Winder (2008). These events caused long-distance trade diversion through the peninsula giving profound commercial value to overland trade routes in Arabia. The resulting traffic created new potential economic benefits for the scattered oases. First, by selling to the merchants they could take advantage of markets outside Arabia, and second, the increased caravan traffic was equivalent to higher demand for local produce.[24]

However, caravans were constantly exposed to raids by the Bedouins, who made up a considerable fraction of the population in the Arabian peninsula at that time, Berkey (2003). This situation prompted early attempts to mitigate conflict in pre-Islamic Arabia. For example, in search for security the Meccan merchants offered the arrangement of ilaf according to which they would carry commodities produced by other tribes to be sold in markets and fairs. In exchange, these tribes would provide security and protection (khafara) for Meccan caravans passing through their territories. Also, within Mecca rich merchants were engaging in alms provision to alleviate poverty. Such attempts coupled with the formation of tribal alliances partially decreased tensions, nevertheless, these measures were short-lived since many tribes were not bound by the institution of ilaf and alliances were constantly switching, Ibrahim (1990). These elements produced a conflictual environment featuring the merchants and oasis cultivators, on one side, and the Bedouins, on the other. Ibrahim (1990) succinctly summarizes the economic conditions prevailing in the eve of Islam: "An unequal distribution of wealth and resources already existed in and around Mecca. This unequal distribution had the potential to disrupt its network of alliances and trade routes".[25]

[24] Crone (2007) discusses the possibility that Meccans benefited directly from the Persian and Byzantine wars supplying leather and hides to the Roman army.

[25] Aswad (1963) notes that Muhammad's message was first accepted in Medina as a result of Medina's oasis

It was in this cross-section of historical events that Muhammad was born. To gain a hearing from Arabians beyond the small circles attracted to him (Ummah), a doctrine with a political base was necessary. The Islamic economic principles were forged to align these clashing interests nurtured by the underlying unequal geography. The existence of informal and formal punishments in Islam, such as those related to ridda (apostasy), gave Islam an edge over similar pre-existing, short-lived attempts.[26] Islam emerged aiming at creating a strong sense of community effectively acting as a state-building force. It offered a means by which tribes could be unified through a common identity under one god that transcended clan and class divisions (Stearns, Adas, Schwarz, and Gilbert (2010)).[27] Motivated by this narrative we explore whether groups close to trade routes *and* also characterized by unequal geographies had an increased incentive to adopt a centralized institution like that of Islam. This is done by adding the interaction term between inequality in land endowments and distance to trade routes to our main empirical specification.

In Table 18, we present the interacted specification at all levels of aggregation.[28] The interaction enters negative and significant in all specifications. The point estimates in specifications 1 and 4 suggest that the effect of land inequality on Muslim adherence becomes insignificant once distance to trade routes exceeds $1,200$ kilometers pointing to the differential incentives to convert to Islam among the geographically unequal regions in the vicinity of historical trade routes. In the Supplementary Appendix Section 5 we present qualitative evidence from two cases studies pointing out the similarities in the process of Islamization of the Mali empire and the Malay Archipelago, respectively.

4 Conclusion

This study examines the determinants of Muslim adherence within as well as across countries, shedding light on its geographic origins. Constructing detailed data on the distribution of land

cultivators facing increased conflict from nomads in the periphery.

[26] Alexander (1987) notes that the effective way to impose moral rules on society members is to have these rules prescribed by gods. This is because divine moral rules convincingly portrayed as imposed by impartial gods without material interests are superior to those imposed by humans since the latter invite the suspicion that some members of the group will profit disproportionately. Additionally, gods are often considered immortal, so their rules may last for many generations.

[27] Within economics, religious affiliation has been invariably linked to the formation of a common identity. For example, Levy and Razin (2012) argue that religious organizations arise endogenously to foster social cooperation and social behavior by instilling beliefs on the connection between rewards and punishments. Similarly, Iannaccone (1992) considers religion as a club good featuring positive congestion externalities and shows how people choose rationally to participate in a religion that involves voluntary limitations.

[28] Since no major trade routes passed through Africa on the eve of Islam (600 AD), we use historical trade routes created up to 1800 AD. It is worth pointing out that using the latter the direct effect of trade-routes proximity on Muslim representation may reflect reverse causality. Nevertheless, irrespective of who set up these trade routes unequally endowed places closer to trade routes would be differentially impacted.

quality and distance to trade routes the empirical analysis uncovers that Muslim societies are located closer to pre-Islamic trade routes and are characterized by high inequality in the regional suitability for agriculture. These findings offer empirical support to claims, that prominent Islamic scholars including Lapidus (2002), Berkey (2003) and Lewis (1993) have made, regarding the role of long-distance trade as well as the distinctive geography of regions associated with the birth and the expansion of Islam.

The analysis is conducted across countries, ethnic groups, and virtual countries. Exploring within-country variation in Muslim adherence mitigates a host of concerns related to cross-country regressions. Such issues are particularly pressing in our context given the intimate relationship between country formation and religious denomination. Across all levels of aggregation, the link between geographic inequality, proximity to trade routes and Muslim representation is robust to employing different measures of Muslim adherence, constructing alternative indexes of land inequality as well as distance measures to pre-Islamic and preindustrial trade routes. The identified pattern is unique to the Muslim denomination and it obtains for regions that historically have not been part of a Muslim empire. Overall, the empirical analysis highlights the prominent role of geography in shaping the spatial distribution of Muslim groups.

On the one hand, the role of long-distance trade in the diffusion of Islam is a mainstay among Islamicists. Thus, our findings regarding the importance of historical trade routes and ports provides large-scale formal econometric support to this literature, mainly consisting of case studies. On the other hand, the uncovered robust association between geographic inequality and Muslim representation is less well studied. To rationalize the latter we offer two complementary explanations. The first derives from the observation that within geographically unequal places trade is likely to play an important role for subsistence. This is shown to be the case for a cross-section of historical societies. Hence, to the extent that Islam offered an institutional framework promoting exchange, groups across geographically unequal territories would have an added incentive to convert to Islam.

An alternative interpretation links geographic inequality to social inequality and predation within a region. The argument is that long-distance trade opportunities confer differential gains across regions benefiting the more fertile ones, fostering predatory behavior from those which are poorly endowed. These conditions were present in the origins of Islam in the Arabian peninsula. We conjecture that Islam emerged as a centralizing force advocating redistributive economic principles aiming at reining in the underlying inequality in exchange of security for the trading caravans of the richer clans. The hypothesis that Islamic economic traits arose from the interaction between geographic inequality and long-distance trade implies that Islam

would spread more successfully among unequally endowed regions close to trade routes. The latter holds true in the data.

A final noteworthy feature of this study is a tentative exploration of the pre-colonial economic and societal arrangements of African Muslim groups. We show that ethnicities characterized by unequal land endowments are more likely to be socially stratified. Nevertheless, the link between geographic and social inequality is weakened considerably among Muslim groups. Moreover, Muslim societies are more likely to have equitable inheritance rules, as the Islamic doctrine would dictate. These findings suggest that geography is a key determinant of a society's productive and social structure and that Islam, with its wealth-fragmenting principles aiming at limiting the social inequalities, found eager followers across such territories.

The spread of Islam took place between the $7th$ and the $20th$ century, with different regions of the Old World converting at different points in time, some at a quicker pace than others. Unfortunately, due to data limitations, i.e., the absence of historical time-series in religious adherence both across and within countries our analysis is cross sectional. Hence, our exploration by focusing on the steady state spatial distribution of Muslim societies in the $20th$ century does not shed light on this inherently dynamic process. Nevertheless, we view these findings as a stepping stone for further research. For example, focusing on specific regions where historical data may be available one may investigate the speed at which Islam made inroads to the respective communities. Moreover, having identified some of the forces behind the formation and spread of Islam one might examine the economic consequences in the short-run and the long-run development of the Muslim world. We plan on tackling some of these issues in subsequent research.

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TABLE 1 - Cross-country analysis, summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
% Muslim (1900)	114	0.270	0.380	0.000	1.000
Ln Gini Index of Land Quality	114	-1.287	0.715	-3.449	-0.126
Distance to 600 AD Trade Routes	114	0.892	0.955	0.021	3.395
Ln Average Land Quality	114	-1.325	1.348	-5.854	-0.047
Mean Elevation	114	0.635	0.593	0.010	3.077
Distance to Mecca	114	4.127	1.822	0.569	9.247
Distance to the Coast	114	0.387	0.485	0.023	2.386
Absolute Latitude	114	30.065	17.742	0.534	64.989

See Appendix for variables' definitions.

TABLE 2 - Cross-country analysis, pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) % Muslim (1900)	1.000						
(2) Ln Gini Index of Land Quality	0.490	1.000					
(3) Distance to 600 AD Trade Routes	-0.200	0.024	1.000				
(4) Ln Average Land Quality	-0.486	-0.597	-0.099	1.000			
(5) Mean Elevation	0.100	0.265	-0.147	0.040	1.000		
(6) Distance to Mecca	-0.463	-0.282	0.304	0.278	-0.082	1.000	
(7) Distance to the Coast	0.310	0.437	0.100	-0.141	0.315	-0.132	1.000
(8) Absolute Latitude	-0.096	0.050	-0.470	0.009	-0.041	-0.006	-0.066

See Appendix for variables' definitions.

TABLE 3 - Cross-country analysis, results

	(1)	(2)	(3)
DEPENDENT VARIABLE	% Muslim	% Muslim	% Muslim
Ln Gini Index of Land Quality	0.260***	0.263***	0.185***
	[0.043]	[0.041]	[0.051]
Distance to 600 AD Trade Routes		-0.084***	-0.036
		[0.028]	[0.058]
Ln Average Land Quality			-0.051**
			[0.024]
Mean Elevation			-0.045
			[0.058]
Distance to Mecca			0.002
			[0.040]
Distance to the Coast			0.119
			[0.088]
Absolute Latitude			-0.012***
			[0.003]
Continental FE	NO	NO	YES
Observations	114	114	114
R-squared	0.240	0.285	0.648

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is the share of Muslim population in 1900. See Appendix for variables' definitions.

TABLE 4 - Cross-ethnic group analysis, summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
% Muslim (2005)	1714	0.254	0.392	0.000	1.000
Ln Gini Index of Land Quality	1714	-1.915	0.816	-4.605	-0.017
Distance to 600 AD Trade Routes	1714	1.231	1.062	0.001	4.781
Ln Average Land Quality	1714	-1.277	1.361	-11.831	-0.023
Mean Elevation	1714	0.717	0.748	-0.069	5.541
Dummy Empire	1714	0.172	0.378	0.000	1.000
Distance to Mecca	1714	4.635	2.157	0.443	11.458
Distance to the Coast	1714	0.561	0.489	0.014	2.527
Absolute Latitude	1714	18.351	15.764	0.037	72.444
Ln Mean Logarithmic Deviation of Land Quality	1714	-2.804	1.310	-4.605	0.957
Ln Theil index of Land Quality	1714	-2.898	1.189	-4.605	0.709
Ln Gini Index of Land Quality (Soil Component)	1714	-2.169	0.706	-4.605	-0.017
Ln Gini Index of Land Quality (Climate Component)	1714	-3.374	1.430	-4.605	-0.017
Ln Average Land Quality (Climate Component)	1714	-0.573	1.188	-11.831	0.000
Ln Average Land Quality (Soil Component)	1714	-0.734	0.521	-11.831	-0.010

See Appendix for variables' definitions.

TABLE 5 - Cross-ethnic group analysis, pairwise correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	% Muslim (2005)	1.000													
(2)	Ln Gini Index of Land Quality	0.301	1.000												
(3)	Distance to 600 AD Trade Routes	-0.094	-0.051	1.000											
(4)	Ln Average Land Quality	-0.300	-0.394	-0.079	1.000										
(5)	Mean Elevation	-0.028	0.251	-0.320	-0.073	1.000									
(6)	Dummy Empire	0.356	0.158	-0.409	-0.171	0.119	1.000								
(7)	Distance to Mecca	-0.241	-0.129	0.290	0.084	-0.118	-0.330	1.000							
(8)	Distance to the Coast	-0.003	0.106	-0.090	-0.111	0.377	-0.081	-0.374	1.000						
(9)	Absolute Latitude	0.044	0.376	-0.323	-0.332	0.170	0.381	-0.022	0.005	1.000					
(10)	Ln Mean Logarithmic Deviation of Land Quality	0.306	0.930	-0.118	-0.383	0.332	0.198	-0.177	0.188	0.419	1.000				
(11)	Ln Theil index of Land Quality	0.322	0.947	-0.097	-0.435	0.300	0.196	-0.177	0.182	0.405	0.991	1.000			
(12)	Ln Gini Index of Land Quality (Soil Component)	0.194	0.790	0.085	-0.195	-0.043	-0.037	-0.067	-0.012	0.103	0.636	0.672	1.000		
(13)	Ln Gini Index of Land Quality (Climate Component)	0.366	0.703	-0.149	-0.518	0.329	0.355	-0.242	0.229	0.604	0.791	0.783	0.291	1.000	
(14)	Ln Average Land Quality (Climate Component)	-0.324	-0.454	0.003	0.948	-0.154	-0.248	0.098	-0.123	-0.472	-0.451	-0.492	-0.187	-0.646	1.000
(15)	Ln Average Land Quality (Soil Component)	-0.075	-0.055	-0.233	0.569	0.177	0.097	-0.032	0.018	0.165	-0.027	-0.068	-0.143	0.033	0.353

See Appendix for variables' definitions.

TABLE 6 - Cross-ethnic group analysis, main results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DEPENDENT VARIABLE	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim
SAMPLE	Full	Full	Full	Within Muslim Empires	Outside Muslim Empires	In countries with Muslim Majority	In countries with Muslim Minority
Ln Gini Index of Land Quality	0.071***	0.067***	0.054***	0.039*	0.062***	0.138***	0.044***
	[0.022]	[0.020]	[0.015]	[0.020]	[0.018]	[0.037]	[0.013]
Distance to 600 AD Trade Routes		-0.181***	-0.113***	-0.144***	-0.113**	0.096	-0.112***
		[0.014]	[0.028]	[0.027]	[0.055]	[0.181]	[0.031]
Ln Average Land Quality			-0.029*	-0.012	-0.064***	-0.026	-0.040**
			[0.017]	[0.013]	[0.022]	[0.025]	[0.019]
Mean Elevation			-0.036	-0.031	-0.078**	-0.043*	-0.047
			[0.027]	[0.030]	[0.035]	[0.025]	[0.033]
Distance to Mecca			-0.085***	-0.049*	-0.110***	-0.087	-0.087***
			[0.016]	[0.024]	[0.019]	[0.093]	[0.019]
Distance to the Coast			-0.034	-0.023	-0.039	0.017	-0.033
			[0.053]	[0.158]	[0.055]	[0.099]	[0.059]
Absolute Latitude			0.008	0.021	0.001	0.033**	0.006
			[0.006]	[0.014]	[0.007]	[0.015]	[0.007]
Country FE	YES	YES	YES	YES	YES	YES	YES
Observations	1,714	1,714	1,714	611	1,103	243	1,471
R-squared	0.538	0.586	0.609	0.606	0.470	0.628	0.461

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is the share of Muslim population in 2005. See Appendix for variables' definitions.

TABLE 7 - Cross-ethnic group analysis, other religions

DEPENDENT VARIABLE	(1) % Muslim	(2) % Christian	(3) % Hindu	(4) % Buddists	(5) % Ethnoreligious
Ln Gini Index of Land Quality	0.054***	-0.013	0.007	0.023**	-0.078***
	[0.015]	[0.015]	[0.012]	[0.010]	[0.016]
Distance to 600 AD Trade Routes	-0.113***	0.139***	0.026	0.014	-0.028
	[0.028]	[0.050]	[0.023]	[0.015]	[0.041]
Ln Average Land Quality	-0.029*	0.026***	0.002	-0.010**	0.003
	[0.017]	[0.009]	[0.007]	[0.004]	[0.016]
Mean Elevation	-0.036	0.043**	-0.044**	0.078**	-0.010
	[0.027]	[0.022]	[0.020]	[0.030]	[0.016]
Distance to Mecca	-0.085***	0.001	-0.025	-0.004	0.086***
	[0.016]	[0.039]	[0.020]	[0.007]	[0.029]
Distance to the Coast	-0.034	-0.022	0.027	-0.012	0.060*
	[0.053]	[0.042]	[0.025]	[0.025]	[0.035]
Absolute Latitude	0.008	-0.003	-0.001	-0.003**	-0.002
	[0.006]	[0.005]	[0.001]	[0.001]	[0.004]
Country FE	YES	YES	YES	YES	YES
Observations	1,714	1,714	1,714	1,714	1,714
R-squared	0.609	0.649	0.543	0.431	0.372

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is the share of Muslim (1), Christian (2), Hindu (3), Buddist (4) and Ethnoreligious (5) population in 2005. See Appendix for variables' definitions.

TABLE 8 - Cross-ethnic group analysis, robustness

DEPENDENT VARIABLE	(1) Muslim Majority	(2) % Muslim	(3) % Muslim	(4) % Muslim	(5) % Muslim
Ln Gini Index of Land Quality	0.059***				
	[0.018]				
Ln Mean Logarithmic Deviation of Land Quality		0.044***			
		[0.011]			
Ln Theil index of Land Quality			0.047***		
			[0.011]		
Ln Gini Index of Land Quality (Climate Component)				0.069***	
				[0.021]	
Ln Gini Index of Land Quality (Soil Component)					0.027*
					[0.014]
Ln Average Land Quality	-0.029	-0.030*	-0.028*		
	[0.019]	[0.017]	[0.017]		
Ln Average Land Quality (Climate Component)				-0.035**	
				[0.017]	
Ln Average Land Quality (Soil Component)					0.008
					[0.056]
Distance to 600 AD Trade Routes	-0.116***	-0.117***	-0.116***	-0.131***	-0.099***
	[0.030]	[0.028]	[0.028]	[0.031]	[0.028]
Mean Elevation	-0.043	-0.044*	-0.041	-0.052*	-0.018
	[0.029]	[0.026]	[0.027]	[0.029]	[0.023]
Distance to Mecca	-0.085***	-0.080***	-0.081***	-0.072***	-0.093***
	[0.018]	[0.016]	[0.016]	[0.021]	[0.019]
Distance to the Coast	-0.041	-0.040	-0.040	-0.062	-0.043
	[0.060]	[0.052]	[0.053]	[0.054]	[0.056]
Absolute Latitude	0.010	0.008	0.008	0.004	0.012*
	[0.007]	[0.006]	[0.006]	[0.006]	[0.006]
Country FE	YES	YES	YES	YES	YES
Observations	1,714	1,714	1,714	1,714	1,714
R-squared	0.556	0.612	0.611	0.620	0.598

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is a dummy for Muslim majority (1) and the share of Muslim population in 2005 (2)-(5). See Appendix for variables' definitions.

TABLE 9 - Cross-virtual country analysis, summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
% Muslim (2005)	1359	0.300	0.413	0.000	1.000
Ln Gini Index of Land Quality	1359	-1.631	0.739	-4.605	-0.130
Distance to 600 AD Trade Routes	1359	1.040	0.922	0.002	4.137
Ln Average Land Quality	1359	-2.333	2.097	-8.466	-0.026
Mean Elevation	1359	0.685	0.791	-0.023	5.231
Distance to Mecca	1359	4.749	2.083	0.207	11.350
Distance to the Coast	1359	0.679	0.595	0.004	2.659
Absolute Latitude	1359	34.776	19.419	0.682	70.818
Ln Number of Ethnicities in Virtual Country	1359	1.391	1.022	0.000	5.106
Virtual Country Fully Contained in Country	1359	0.693	0.461	0.000	1.000

See Appendix for variables' definitions.

TABLE 10 - Cross-virtual country analysis, pairwise correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	% Muslim (2005)	1.000								
(2)	Ln Gini Index of Land Quality	0.122	1.000							
(3)	Distance to 600 AD Trade Routes	-0.211	0.082	1.000						
(4)	Ln Average Land Quality	-0.324	-0.321	-0.248	1.000					
(5)	Mean Elevation	0.013	0.341	-0.199	-0.173	1.000				
(6)	Distance to Mecca	-0.537	-0.032	0.412	0.067	-0.035	1.000			
(7)	Distance to the Coast	-0.052	0.216	-0.004	-0.173	0.373	0.024	1.000		
(8)	Absolute Latitude	-0.338	0.165	0.040	-0.201	-0.098	0.279	0.166	1.000	
(9)	Ln Number of Ethnicities in Virtual Country	-0.020	-0.067	0.030	0.405	0.087	-0.080	-0.112	-0.595	1.000
(10)	Virtual Country Fully Contained in Country	-0.057	-0.067	0.048	-0.171	-0.057	0.149	-0.014	0.152	-0.438

See Appendix for variables' definitions.

TABLE 11 - Cross-virtual country analysis, results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DEPENDENT VARIABLE	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim	% Muslim
SAMPLE	Full	Full	Full	Within Muslim Empires	Outside Muslim Empires	In countries with Muslim Majority	In countries with Muslim Minority
Ln Gini Index of Land Quality	0.048**	0.052***	0.045***	0.036**	0.045*	0.064*	0.033**
	[0.020]	[0.019]	[0.016]	[0.015]	[0.025]	[0.035]	[0.016]
Distance to 600 AD Trade Routes		-0.092**	-0.098**	-0.177***	-0.051	-0.099	-0.087*
		[0.042]	[0.039]	[0.033]	[0.046]	[0.131]	[0.050]
Ln Average Land Quality			-0.023***	-0.008	-0.027**	-0.031*	-0.025***
			[0.005]	[0.007]	[0.010]	[0.017]	[0.007]
Mean Elevation			-0.027	0.039	-0.049*	0.073*	-0.038
			[0.026]	[0.028]	[0.027]	[0.038]	[0.024]
Distance to Mecca			-0.021	-0.005	-0.032	-0.029	-0.024
			[0.020]	[0.023]	[0.022]	[0.044]	[0.023]
Distance to the Coast			0.018	0.036	0.026	-0.005	0.030
			[0.033]	[0.023]	[0.035]	[0.033]	[0.036]
Absolute Latitude			0.002	-0.004	0.001	0.003	0.002
			[0.002]	[0.004]	[0.003]	[0.012]	[0.002]
Ln Number of Ethnicities in Virtual Country			-0.038**	-0.069**	-0.023	-0.069**	-0.028
			[0.018]	[0.032]	[0.019]	[0.028]	[0.019]
Virtual Country Fully Contained in Country			-0.037*	-0.029	-0.046**	-0.003	-0.049**
			[0.019]	[0.032]	[0.020]	[0.023]	[0.020]
Country FE	YES	YES	YES	YES	YES	YES	YES
Observations	1,359	1,359	1,359	446	913	310	1,046
R-squared	0.860	0.872	0.888	0.898	0.681	0.736	0.744

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is the share of Muslim population in 2005. See Appendix for variables' definitions.

TABLE 12 - Cross-African ethnic group analysis, summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
% Muslim (2005)	549	0.288	0.393	0.000	1.000
Muslim Majority Dummy	549	0.268	0.443	0.000	1.000
Ln Gini Index of Land Quality	549	-1.805	0.737	-4.605	-0.137
Distance to 1800 AD Trade Routes	549	0.501	0.499	0.005	2.494
Ln Average Land Quality	549	-1.310	1.271	-6.630	-0.023
Class Stratification	482	0.654	0.476	0.000	1.000
Pastoral Index	549	2.563	2.064	0.000	9.000
Agricultural Index	549	5.740	1.719	0.000	9.000
Pastoral-Agricultural Ratio	543	0.293	0.204	0.000	1.000
Egalitarian Inheritance Rule (Movable)	488	0.457	0.499	0.000	1.000
Egalitarian Inheritance Rule (Land)	445	0.391	0.489	0.000	1.000
Belief in Moral God	338	0.349	0.477	0.000	1.000
Jurisdictional Hierarchy	520	2.442	1.005	1.000	5.000

See Appendix for variables' definitions.

TABLE 13 - Cross-African ethnic group analysis, pairwise correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	% Muslim (2005)	1.000											
(2)	Muslim Majority Dummy	0.970	1.000										
(3)	Ln Gini Index of Land Quality	0.464	0.458	1.000									
(4)	Distance to 1800 AD Trade Routes	-0.564	-0.519	-0.122	1.000								
(5)	Ln Average Land Quality	-0.605	-0.589	-0.470	0.262	1.000							
(6)	Class Stratification	0.188	0.179	0.159	0.053	-0.174	1.000						
(7)	Pastoral Index	0.442	0.447	0.384	-0.171	-0.394	0.094	1.000					
(8)	Agricultural Index	-0.277	-0.288	-0.307	-0.003	0.333	0.050	-0.583	1.000				
(9)	Pastoral-Agricultural Ratio	0.418	0.430	0.416	-0.089	-0.415	0.096	0.922	-0.796	1.000			
(10)	Egalitarian Inheritance Rule (Movable)	0.510	0.484	0.257	-0.333	-0.389	0.126	0.363	-0.116	0.295	1.000		
(11)	Egalitarian Inheritance Rule (Land)	0.352	0.347	0.288	-0.155	-0.363	0.107	0.346	-0.215	0.342	0.620	1.000	
(12)	Belief in Moral God	0.762	0.736	0.410	-0.402	-0.550	0.253	0.605	-0.288	0.542	0.615	0.457	1.000
(13)	Jurisdictional Hierarchy	0.209	0.198	0.205	0.116	-0.170	0.560	0.120	0.171	0.040	0.094	0.052	0.213

See Appendix for variables' definitions.

TABLE 14 - African ethnic group analysis, Pastoralism vs Agriculture

DEPENDENT VARIABLE	(1) Pastoral	(2) Agricultural	(3) Past-Agri Ratio	(4) Past-Agri Ratio	(5) Past-Agri Ratio	(6) Past-Agri Ratio
Ln Gini Index of Land Quality	0.746***	-0.411***	0.078***	0.051***		
	[0.148]	[0.088]	[0.014]	[0.012]		
Ln Average Land Quality	-0.380***	0.294**	-0.040***	-0.048***		
	[0.086]	[0.113]	[0.009]	[0.013]		
Muslim Majority Dummy					0.154***	0.113**
					[0.034]	[0.042]
Country FE	NO	NO	NO	YES	YES	YES
Observations	549	549	543	543	543	543
R-squared	0.178	0.111	0.200	0.473	0.112	0.429

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is Pastoral Index (1), Agricultural Index (2) and the ration between the two indexes (3) - (6). See Appendix for variables' definitions.

TABLE 15 - African ethnic group analysis, Believe in Moral God - Pre-colonial Centralization

DEPENDENT VARIABLE	(1) Jurisdictional Hierarchy	(2) Jurisdictional Hierarchy	(3) Believe in Moral God	(4) Believe in Moral God	(5) Believe in Moral God	(6) Believe in Moral God
% Muslim	0.541***	0.682*	0.810***	0.604***		
	[0.177]	[0.343]	[0.057]	[0.136]		
% Christian					-0.414**	
					[0.179]	
% Ethnoreligious						-0.437***
						[0.128]
Country FE	NO	YES	YES	YES	NO	YES
Observations	520	520	338	338	338	338
R-squared	0.044	0.273	0.529	0.643	0.578	0.571

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is Jurisdictional Hierarchy (1)- (2) and Believe in Moral God (3) - (6). See Appendix for variables' definitions.

TABLE 16 - African ethnic group analysis, Class stratification

DEPENDENT VARIABLE	(1) Class stratification	(2) Class stratification	(3) Class stratification	(4) Class stratification	(5) Class stratification	(6) Class stratification
SAMPLE	Full	Muslim Majority	Muslim Minority	Full	Muslim Majority	Muslim Minority
Ln Gini Index of Land Quality	0.142***	0.070	0.181***	0.146**	0.054	0.169**
	[0.050]	[0.043]	[0.057]	[0.061]	[0.062]	[0.081]
Ln Average Land Quality	-0.050***	-0.068***	0.005	-0.057**	-0.061***	0.028
	[0.018]	[0.018]	[0.045]	[0.024]	[0.016]	[0.085]
Country FE	NO	NO	NO	YES	YES	YES
Observations	482	138	344	482	138	344
R-squared	0.094	0.134	0.057	0.199	0.435	0.228

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is Class stratification. See Appendix for variables' definitions.

TABLE 17 - African ethnic group analysis, Egalitarian Inheritance Rules

DEPENDENT VARIABLE	(1) Egalitarian Inheritance Rule (Movable)	(2) Egalitarian Inheritance Rule (Movable)	(3) Egalitarian Inheritance Rule (Land)	(4) Egalitarian Inheritance Rule (Land)
Muslim Majority Dummy	0.338***	0.161**	0.240***	0.134**
	[0.072]	[0.075]	[0.072]	[0.058]
Country FE	NO	YES	NO	YES
Observations	488	488	445	445
R-squared	0.089	0.268	0.048	0.267

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is Egalitarian Inheritance Rule (Movable) (1)- (2) and Egalitarian Inheritance Rule (Land) (3) - (4). See Appendix for variables' definitions.

TABLE 18 - Interacted model, different samples

DEPENDENT VARIABLE	(1) % Muslim	(2) % Muslim	(3) % Muslim	(4) % Muslim
(a) Ln Gini Index of Land Quality	0.252***	0.073***	0.055***	0.161***
	[0.054]	[0.024]	[0.015]	[0.046]
(b) Distance to 1800 AD Trade Routes	-0.349***	-0.201**	-0.075	-0.448***
	[0.124]	[0.097]	[0.052]	[0.123]
(a) * (b)	-0.211***	-0.048**	-0.024**	-0.133***
	[0.068]	[0.020]	[0.009]	[0.049]
Controls	YES	YES	YES	YES
Observations	114	1,714	1,359	549
R-squared	0.680	0.606	0.883	0.676

OLS results, robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is Share of Muslim in 1900 (1) and Share of Muslim in 2005 (2) - (4). Sample used is country level (1), ethnic group level (2), virtual country level (3) and African ethnic group level (4). For the list of the controls see the main text. See Appendix for variables' definitions.

Online Supplementary Appendix for "Trade and Geography in the Origins and Spread of Islam"

1 Data Appendix

1.1 Geographical Variables

Absolute Latitude: Absolute latitudinal distance from the equator from the centroid of the respective unit of analysis, i.e. country or ethnic group.

Source: Constructed using ArcGis.

Average Land Quality: Average suitability for farming based on climatic and soil characteristics within the respective unit of analysis.

Source: Michalopoulos (2012). The raw dataset is available at the Atlas of the Biosphere.[1]

In order to construct this index Ramankutty, Foley, Norman, and McSweeney (2002) empirically estimate the probability density function of the percentage of croplands around 1990 with respect to climate and soil characteristics. Then the authors combine the derived probability with data on climate and soil quality to predict regional suitability for agriculture at the resolution of 0.5 degrees latitude by 0.5 degrees longitude worldwide. The climatic characteristics are based on mean-monthly climate conditions for the 1961–1990 period and capture (i) monthly temperature (ii) precipitation and (iii) potential sunshine hours. All the climatic conditions weakly increase the suitability of land for agriculture. Regarding the soil suitability the traits considered are a measure of the total organic content (carbon density) and the nutrient availability (soil pH). The relationship of these indexes with agricultural suitability is non-monotonic. Low and high values of pH limit cultivation potential, since these values signal that soils are too acidic or too alkaline, respectively. Specifically, Average Land Quality, lq, is the product of two components capturing the climatic suitability for cultivation, lq_{clim}, and the soil suitability, lq_{soil}. Hence, $lq = lq_{clim} * lq_{soil}$. Each component is constructed in the following way: $lq_{clim} = f_1(GDD) * f_2(m)$, where GDD denotes growing degree days and m is a moisture index capturing the availability of water to plants. Regarding soil characteristics, $lq_{soil} = g_1(C_{soil}) * g_2(pH_{soil})$, where C_{soil} stands for soil carbon density and pH_{soil} captures the acidity or alkalinity of soil. Each functional form is derived from the probability density function of actual cropland area versus each component. For example, in the case of $f_1(GDD)$ and $f_2(m)$ according to Ramankutty, Foley, Norman, and McSweeney (2002) a sigmoidal function best fits the observed empirical relationship between the fraction of a cell that was cultivated in 1990 and the GDD and m respectively. Specifically, $f_1(GDD) = 1/(1 + \exp(a(b - GDD)))$

[1] It may be dowloaded from http://www.sage.wisc.edu/iamdata/grid_data_sel.php.

and $f_2(m) = 1/(1+\exp(c(d-m)))$ with $a = 0.0052$, $b = 1334$, $c = 14.705$ *and* $d = 0.3295$. The functional forms of $g_1(C_{soil})$ and $g_2(pH_{soil})$ are the following: $g_1(C_{soil}) = (a/(1+\exp(b(c - C_{soil})))) * (a/(1+\exp(d(e - C_{soil}))))$ with $a = 3.9157$, $b = 1.3766$, $c = 3.468$ *and* $d = -0.0791$ and $g_2(pH_{soil}) = \left\{ \begin{array}{ccc} -2.085 + 0.475pH_{soil} & if & pH_{soil} \leq 6.5 \\ 1.0 & if & 6.5 < pH_{soil} < 8 \\ 1.0 - 2.0pH_{soil} & if & pH_{soil} \geq 8 \end{array} \right\}$.

Distance to Muslim Empires: Great-circle distance from the borders of the Muslim empires of the centroid a country or ethnic group in thousand kilometers. Muslim empires include all empires, kingdoms, and Sultanates which were once Muslim according to Iyigun (2010).

Source: Calculated using the empire maps constructed by Jarle Grøhn based on Black (2005).

Distance to Mecca: Great-circle distance from Mecca of the centroid a country or ethnic group in thousand kilometers.

Source: Calculated using the Haversine Formula.

Distance to Trade Routes in 600 AD: Great-circle distance from the nearest trade route 1800 *AD* of the centroid a country or ethnic group in thousand kilometers.

Source: Calculated using the trade routes mapped in Brice and Kennedy (2001) in 600 AD.

Distance to Trade Routes in 1800 AD: Great-circle distance from the nearest trade route in 1800 *AD* of the centroid a country or an ethnic group in thousand kilometers.

Source: Calculated using the trade routes mapped in Brice and Kennedy (2001) between 600 AD and 1800 AD. This information is supplemented by maps from Brien (1999) which contain information on trade routes within Europe, SE Asia, West Africa and China during the same time period.

Mean Elevation: Average elevation in kilometers within the unit of analysis, i.e. country or ethnic group.

Source: The Atlas of Biosphere available at http://www.sage.wisc.edu:16080/atlas/.

Land Inequality: Inequality in the regional suitability for agriculture within the unit of analysis. Three separate measures are used namely the Gini index, the Theil index and the Mean Logarithmic Deviation.

Source: See **Average Land Quality**

Sea Distance: Distance from the nearest coastline (1000's of km.) of the centroid of a country or an ethnic group.

Source: Center for International Development for the country analysis. For ethnic groups

and virtual countries the distance is constructed using the coastlines of seas, oceans dataset. Publisher: Global Mapping International, Colorado Springs, Colorado, USA. Series name: Global Ministry Mapping System. Series issue: Version 3.0

1.2 Historical Variables

% **Muslim in 2005 AD**: Fraction of Muslim population in 2005 within an ethnic group.

Source: World Religion Database, available at: http://www.worldreligiondatabase.org/

% **Muslim in 1900 AD**: Fraction of Muslim population in 1900AD within country.

Source: Religion Adherence Data - McCleary and Barro (2005) available at http://ksghome.harvard.edu/~rmcclea/data.html

Muslim Majority: Dummy variable equals 1 if **% Muslim in 2005 AD** $> 50\%$

Source: See **% Muslim in 2005 AD.**

Animal Husbandry: $0-9$ scale index reflecting the intensity of pastoralism. The index equals 0 when there $0\% - 5\%$ dependence; 1 when there is $6\% - 15\%$ dependence; 2 when there is $16\% - 25\%$ dependence; 3 when there is $26\% - 35\%$ dependence; 4 when there is $36\% - 45\%$ dependence; 5 when there is $46\% - 55\%$ dependence; 6 when there is $56\% - 65\%$ dependence; 7 when there is $66\% - 75\%$ dependence; 8 when there is $76\% - 85\%$ dependence; and 9 when there is $86\% - 100\%$ dependence. *Source: Murdock (1967); variable code in the Ethnographic Atlas v4.*

Agriculture: $0 - 9$ scale index reflecting the intensity of agriculture. The index equals 0 when there $0\% - 5\%$ dependence; 1 when there is $6\% - 15\%$ dependence; 2 when there is $16\% - 25\%$ dependence; 3 when there is $26\% - 35\%$ dependence; 4 when there is $36\% - 45\%$ dependence; 5 when there is $46\% - 55\%$ dependence; 6 when there is $56\% - 65\%$ dependence; 7 when there is $66\% - 75\%$ dependence; 8 when there is $76\% - 85\%$ dependence; and 9 when there is $86\% - 100\%$ dependence. *Source: Murdock (1967); variable code in the Ethnographic Atlas v5.*

Class Stratification: Ordered variable ranging from 0 to 4 quantifying "*the degree of class differentiation, excluding purely political and religious statuses*". A zero score indicates "*absence of significant class distinctions among freemen, ignoring variations in individual repute achieved through skill, valor, piety, or wisdom.*" A score of 1 indicates "*the presence of wealth distinctions, based on possession or distribution of property, which however have not crystallized into distinct and hereditary social classes.*" A score of 2 indicates "*elite stratification in which an elite class derives its superior status from control over scarce resources, particularly land, and is thereby differentiated from a propertyless proletariat or serf class*". A score of 3 indicates a "*dual stratification into a hereditary aristocracy and a lower class of ordinary com-*

moners or freemen, where traditionally ascribed noble status is at least as decisive as control over scarce resources. A score of 4 indicates "*complex stratification into social classes correlated in large measure with extensive differentiation of occupational statuses.*" *Source: Murdock (1967); variable code in the Ethnographic Atlas v66.*

Class Stratification Indicator: Following Gennaioli and Rainer (2007) we define a dummy stratification index that equals zero when Murdock's variable equals zero indicating "*absence of significant class distinctions among freemen, ignoring variations in individual repute achieved through skill, valor, piety, or wisdom,*" and one when Murdock's class stratification measure equals 1, 2, 3, or 4. *Source: Murdock (1967); variable code in the Ethnographic Atlas v66.*

Inheritance Distribution for Movable Property: Non-Ordered variable that equals 1 when distribution is "equal or relatively equal", 2 when it is "exclusively", 3 when it is "ultimogeniture", 4 when it is "primogeniture" and 9 when there is "absence of inheritance of real property". *Source: Murdock (1967); variable code in the Ethnographic Atlas v77.*

Egalitarian Inheritance Distribution for Movable Property Indicator: takes on the value of 1 when the **Inheritance Distribution for Movable Property** is "equal or relatively equal" and when there is "absence of inheritance of real property" and zero otherwise. *Source: Murdock (1967); variable code in the Ethnographic Atlas v77.*

Egalitarian Inheritance Distribution for Land Property Indicator: takes on the value of 1 when the **Inheritance Distribution for Land Property** is "equal or relatively equal" and when there is "absence of inheritance of real property" and zero otherwise. *Source: Murdock (1967); variable code in the Ethnographic Atlas v76.*

High Gods: A "High God" is described as "a spiritual being who is believed to have created all reality and/or to be its ultimate governor, even though his/her sole act was to create other spirits who, in turn, created or control the natural world." The values of this variable are: (1) absent or not reported; (2) present but not active in human affairs; (3) present and active in human affairs but not supportive of human morality; and (4) present, active, and specifically supportive of human morality. We recoded values 1–3 into 0, thus, creating a variable "High Gods Supportive of Human Morality", with two values: either supportive of human morality,or not. *Source: Murdock (1967); variable code in the Ethnographic Atlas v34 ("High Gods").*

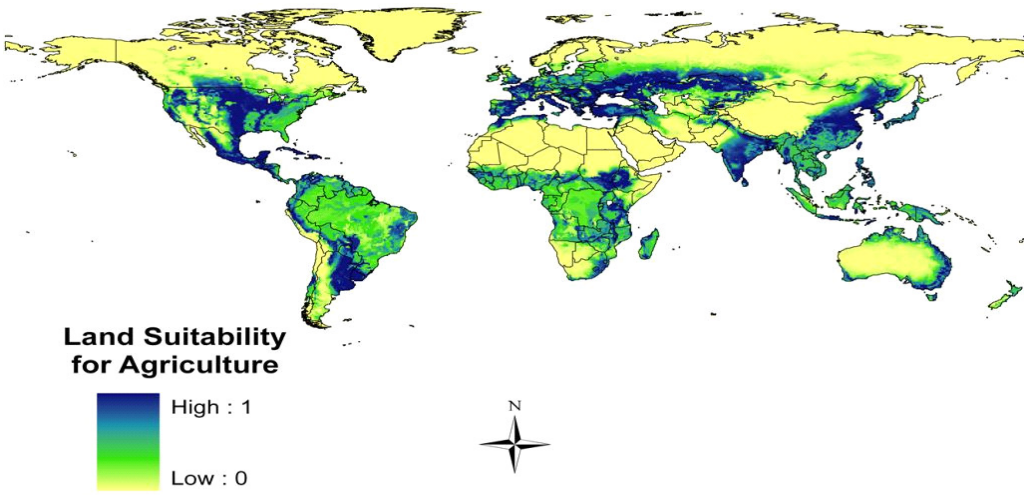
Jurisdictional Hierarchy beyond Local Community: Ordered variable ranging from 1 to 5 indicating the number of jurisdictional levels (political complexity) in each society above the local level**.** A 1 indicates stateless societies, 2 and 3 indicate petty and large paramount chiefdoms (or their equivalent), 4 and 5 indicate large states. *Source: Murdock (1967); variable code in the Ethnolinguistic Atlas v33; Murdock's Atlas is available at:*

http://eclectic.ss.uci.edu/~drwhite/worldcul/EthnographicAtlasWCRevisedByWorldCultures.sav.

2 Virtual-Country Data

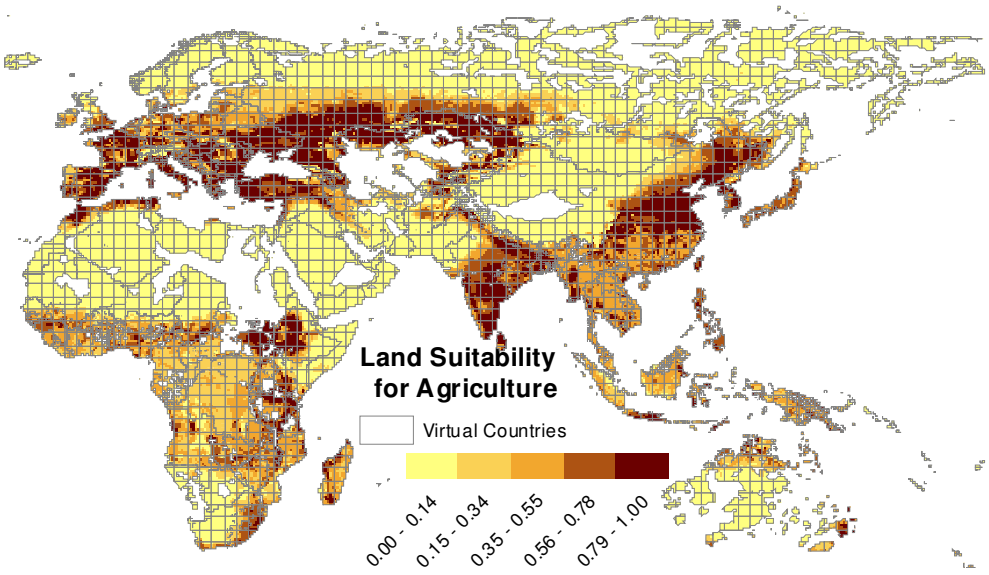
The global data on agricultural suitability are presented in Appendix Figure 1. They provide the basis for constructing the distribution of land quality at the desired level of aggregation.

Appendix Figure **1**: Regional Agricultural Suitability Across the Globe



Appendix Figure 2 shows data on agricultural suitability across virtual countries with religious coverage.

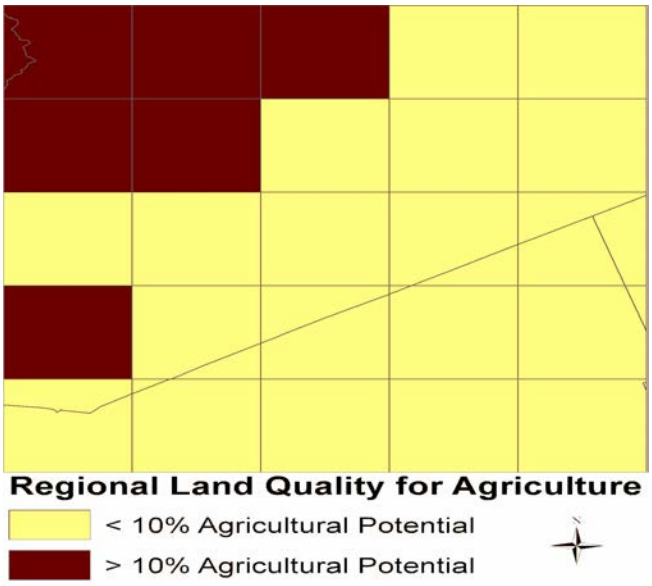
Appendix Figure **2**:
Land Quality Across Virtual Countries
with Religious Coverage



An example of a virtual country is shown in Appendix Figure 3. It has a Muslim representation of 99% and an estimated Gini index of land quality of 0.76. It belongs to 4 modern day countries. The northern part belongs to Syria, a tiny piece of land in the northwestern part is Lebanese, the southern part to Jordan and a small part in the East to Iraq. The Muslim adherence in 2005 for the virtual country depicted is as follows: There are in total 11 ethnic groups in this grid. The dominant one is the Najdi Spoken Arabic group in Syria which is found in 56% of this virtual country's area with 99% Muslims, the Najdi Spoken Arabic in Lebanon with 32% area coverage and 99% Muslims, the North Levantine Spoken Arabic in Syria with 7% area coverage and 93% Muslims, the Levantine Bedawi Spoken Arabic in Jordan found in 2.5% of this virtual county with 99% Muslims, the Najdi Spoken Arabic in Iraq with 1.3% area coverage and 99% Muslims, the North Levantine Spoken Arabic in Lebanon found in 0.69% of the virtual country with 58% Muslims, the Adyghe group in Syria with 0.4% of territorial coverage and 99% Muslims, the South Levantine Spoken Arabic group in Jordan covering 0.1% with 92% Muslims, the Western Neo-Aramaic group in Syria covering 0.01% with 92% Muslims. For two groups in Syria, i.e. the Mesopotamian Spoken Arabic group with a coverage of 2.2% and the Levantine Bedawi Spoken Arabic with a coverage of 4.7% we do not have data on the religious affiliation so are not included in the analysis. Using this information on land coverage and Muslim proportions we calculate for each artificial country the probability of picking a

Muslim adherent in 2005.

Appendix Figure **3**: Example of a
Virtual Country between Iraq, Jordan,
Lebanon and Syria. 99% Muslims



3 The Model

3.1 The Basics

This section builds a simple model to illustrate how an unequal geography exposed to long-distance trade opportunities makes the adoption of redistributive rules more likely. The appearance of trade routes creates divergent economic opportunities across groups characterized by unequal agricultural endowments. On the one hand, fertile, surplus-producing regions can greatly benefit from trade by selling their output at higher prices whereas regions with poor land endowments cannot. However, to the extent that the latter may threaten the trade activities of the former, a set of redistributive schemes may emerge. Hence, it is the juxtaposition of few fertile pockets of land with a sizeable share of agriculturally poor regions that enables the predatory behavior of the poorly endowed groups when trade opportunities arise. As in Anderson and Bandiera (2006) the interaction of predators, whose density in our model is shaped by the mass of infertile territories, and prey is crucial.

Consider a static model where each region produces a single homogeneous good. The good is produced linearly using land quality (i.e. a TFP parameter), which can take values T_R (rich land) or T_P (poor land), and labor by individuals supplied inelastically and normalized to one. There is one to one mapping between regions and individuals so regional and per capita quantities coincide. Without loss of generality we set $T_R = 1$ so relative land quality equals

$\frac{T_R}{T_P} = \frac{1}{T_P} > 1$. The size of the rich regions is normalized to 1 and the size of the poor ones is denoted by $\lambda > 0$, so that $\frac{1}{1+\lambda}$ and $\frac{\lambda}{1+\lambda}$ represent the proportion of the rich and the poor, respectively. We abstract from migration between regions.[2] The vector (T_P, λ) characterizes the economy-wide land quality distribution with geographic inequality decreasing in T_P and increasing in λ.

Agents are risk neutral and maximize utility by maximizing income. So, they may sell their regional output at foreign markets if profitable. The price at the foreign market is $p > 1$, where 1 is the normalized domestic price. Long-distance trade involves a fixed cost, $\mu < 1$, needed to set up a caravan reaching the foreign market. If an agent does not find it profitable to trade, he may challenge those who engage in trade by conducting a raid. Hence, merchants face a risk of losing a fraction of their goods in an organized ambush by the poor (the Bedouins in the context of the Arabian peninsula). The greater the density of the latter the more vulnerable are commercial activities. In the context of the theory this relative capacity to avoid predation, shaped by the underlying geographical inequality, is the ultimate determinant of the extent of income redistribution between the interested parties, the nomads and the agriculturalists.

3.2 Trade and Raids

In absence of long-distance trade production equals income and a region generates either $y_R = 1$ or $y_P = T_P < 1$.[3] Foreign prices p and the level of land quality determine whether a region trades. For high levels of inequality, i.e., low T_P, poor regions cannot overcome the fixed trade costs and cannot directly profit from long-distance trade. The divergent trade opportunities create a conflict of interests between the two groups.

The poor may raid the caravans of those engaging in trade and obtain part of the merchandise by incurring an exogenous cost δ required to organize an ambush and attack. We consider raids to be a collective action as one of the primary features of tribalism is that in a Bedouin society the social unit is the group not the individual, Lewis (1993). The outcome of the raid depends on the strength of the nomads determined by the size of the poorly endowed regions. In particular, the contest function is $f_i(\lambda) \in [0, 1]$, where $f_R(\lambda) = 1 - f_P(\lambda)$ and $\partial f_P / \partial \lambda > 0$, determines the share of traded goods for each side after a confrontation.

We model the trade and raid process as a two-stage sequential game where the rich evaluate the profitability of trade conditional on the poors' decision whether or not to raid.

[2] This is consistent with historical accounts suggesting that differences in skills specific to agricultural and pastoral activities were a strong barrier to mixing. Nevertheless, the theoretical predictions would remain intact if we were to allow for labor mobility and property rights over land. Doing so, wage income would be equalized across regions but land rents would be higher in the high land quality regions so income inequality between groups would persist.

[3] The abstraction from intra-regional trade is deliberately chosen to single out the role of long-distance trade across geographically unequal territories.

Given the possibility of a raid, the rich representative agent would trade if his post-raid income, y_R^T, exceeds his income with no trade, $y_R = 1$:

$$y_R^T \equiv f_R(\lambda)p(1-\mu) > 1. \tag{1}$$

Poor regions may plunder the goods being traded. We assume a raid may occur when caravans are on their way to the trade routes. After a raid the net income of the poor is equal to their residual income after incurring the raid cost, δ, plus the potential booty, both divided equally among them (divided by the size of poor regions, λ). Thus, poor regions will resort to attacking the trade routes if:

$$y_P^T \equiv T_P - \frac{\delta}{\lambda} + \frac{f_P(\lambda)(1-\mu)}{\lambda} > T_P. \tag{2}$$

Equation (1) suggests that trade is more likely to occur when gains from trade are large (higher prices p), and (2) implies that a raid is more probable when the ability of the poor to seize goods during a raid is high (larger λ). The former can be associated to proximity to trade routes and the latter to large proportions of infertile land.

3.3 Redistributive Institution

We now introduce the possibility of a redistributive mechanism, which in the context of Islamic economic rules can be thought of as *zakat*, the moral obligation of *waqf*, or the adoption of egalitarian inheritance rules. Consider a scheme where the rich redistribute a fraction z of their income to the poor. We assume that this transfer takes place prior to trade. The poor would prefer this transfer over the alternative of raiding if:

$$y_P^Z \equiv T_P + \frac{z(1-\mu)}{\lambda} > y_P^T. \tag{3}$$

This gives a minimum redistribution rate accepted by the poor equivalent to:

$$z_{\min} = \max\left\{0; f_P(\lambda) - \frac{\delta}{(1-\mu)}\right\}. \tag{4}$$

The merchants would be willing to pay a transfer if their post-trade income under the redistributive regime is higher than that after a raid:

$$y_R^Z = p(1-z)(1-\mu) \geq y_R^T. \tag{5}$$

This gives a maximum redistribution rate that merchants are willing to pay equivalent to:

$$z_{\max} = 1 - f_R(\lambda). \tag{6}$$

A redistribution scheme becomes feasible when $z_{\max} > z_{\min}$. Inspecting (4) and (6) shows that both $z_{\min}$ and $z_{\max}$ are increasing in λ; that is poor regions in order to refrain from raiding require a larger transfer when their representation increases, and in this case also the rich are willing to offer a larger share of their trade gains. Hence, the degree of redistribution increases as land inequality increases.

The discussion above suggests that the adoption of wealth fragmenting principles, like those in the Islamic economic doctrine, are more likely to be adopted in places with substantial inequality in land quality (small T_P), where the majority of the population is nomadic (large shares of low productive land, λ) and long-distance trade opportunities are present (large p). Both intuitively and under a broad class of inequality measures, a distribution characterized by parameters λ and T_P is more unequal the larger is λ and the smaller is T_P. Therefore, in the empirical section we use different indexes of geographic inequality as our main explanatory variable of Muslim representation. To capture access to long-distance trade we use proximity to historical trade routes.

4 Islam and Other Monotheistic Religions

We do not argue that the economic principles discussed above are unique to Islam. Indeed, similar principles on redistribution, limits on capital accumulation and donations to religious endowments may be found in the other Abrahamic religions. We do argue, though, that a movement aiming at centralizing the tribally diverse societies had to offer principles consistent with the needs of such heterogeneous populations. Moreover, we show that the empirical relationship between trade, geographic inequality and religious affiliation is unique to the Muslim religion. It is also important to keep in mind that Arab merchants dominated African and Eurasian trade routes from the $7th$ till the $15th$ century (see Labib (1969)). This implies that the indigenous populations in Asia and Africa were primarily exposed to the Islamic doctrine. So, even if one were to take the view that Christianity and Islam are doctrinal substitutes, historically the effective choice of tribal areas outside the Muslim empires was to either convert to Islam or keep their tribal religions. As it is shown in the empirical section, local tribal religions persisted in territories with equal productive endowments whereas it was Islam that was readily adopted in places close to trade routes featuring an unequal geography.

Moreover, there are differences between Islam and Christianity. For example, Lewis (2001) and Platteau (2008) argue that, unlike Islam which seeks to moderate most aspects of life, Christianity tends to draw boundaries because it initially flourished in regions with an already strong presence of state where laws and social codes were enforced by the Roman empire. Also, the fact that Christianity spread to regions with a radically different geography

compared to Islam, i.e., Western Europe and the Mediterranean, arguably influenced its economic predicaments. For instance, although Christianity did enforce rigorously the prohibition on interest primarily on consumption loans, over time and particularly with the Protestant Reformation attitudes towards usury were relaxed, Lewison (1999). There were also major differences between inheritance systems, tithing practices, and role of trust among the three Abrahamic religions, Rubin (2011). In Christianity inheritance laws were preserving economic inequality allowing in several instances such laws as that of primogeniture, see Bertocchi (2006), and there were no restrictions on the formation of the corporation effectively facilitating the mobilization of resources and the accumulation of wealth.

5 Case Studies

Conversion to Islam by groups through social and political action is most notable across Africa and Southeast Asia, Levtzion (1978). In this section we discuss the conversion to Islam in the Mali empire and in the Malay Archipelagos.

The Spread of Islam in the Mali empire The voluntary adoption of Islam in the birth and development of the Mali empire after the collapse of the Ghana empire kingdom is a historical example consistent with our hypothesis. The Mali empire thrived in the western part of the Sahel, the African biogeographic zone where Sahara desert and savannas meet. This region includes parts of today's Ghana, Mali, Mauritania and Senegal, featuring few pockets of arable land.

At the end of the first millennium AD, natural resources such as gold and salt helped the Ghana empire achieve a primal position in the area by satisfying the increasing demand from the northern African empires, in particular the Almoravids, Chu and Skinner (1965). The Ghana Empire started disintegrating in the 11^{th} century due to repeated attacks by the nomadic tribes located in the northern part of Ghana attempting to gain control of the lucrative trade routes linking North Africa with Ghana, Goucher, Leguin, and Walton (1998).

The socioeconomic conditions in the beginning of the Mali empire were similar to those prevailing in the 7^{th} century Arabian peninsula. It was under tribal feuding and trade opportunities that Islam started gaining a hearing across the diverse tribal populations residing along unequally endowed regions. Specifically, it was trade contact with the Almoravids and other Muslim tribes that introduced Islam to the indigenous. After more than a century of conflict around 1235 AD the Muslim king Sundiata founded the Mali Empire. Islamic adherence increased in the subsequent decades and in 1312 AD, at the apex of Mali Empire, Mansa Musa became the first truly devout Muslim Mali emperor. Mansa Musa gathered fame for his efforts

to make Islam the religion of the nobility, the establishment of several universities and mosques, and the further development of trade, Stride and Ifeca (1971). Contemporaneous chronicles associate the increasing spread of Islam in the Mali Empire with the successful unification of the indigenous tribes. Moreover, these chronicles refer to the population of the Mali Empire as "seldom unjust, with greater abhorrence of injustice than any other people", and also document the security that inhabitants and travelers felt, Battuta (1929).

The Spread of Islam in the Malay Archipelagos Historical accounts regarding the spread of Islam in the Malay and Indonesian Archipelagos paint a picture similar to the case of the Mali empire, see Hirth and Rockhill (1911). The strategic location of the Malay Archipelago, which sits in the middle of the China-India trade route, had helped in the development of trade in the region. The decline of the powerful Srivijaya kingdom in the 13^{th} century crippled the trade routes of the time. It was during this period of heightened local feuding and foregone trade opportunities that Islam made its way to Sumatra spreading through contacts with Arab and Indian traders. By the late 13^{th} century, the kingdom of Pasai in northern Sumatra converted to Islam whereas the history of Islam in Malacca began almost a century later when a prince of Srivijaya origin, Parameswara, converted to the religion by an Arab scholar from Mecca. Adoption of Islam was followed by a reinvigoration of the trade routes.

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