THE INFLUENCE OF ANCESTRAL LIFEWAYS ON INDIVIDUAL ECONOMIC OUTCOMES IN SUB-SAHARAN AFRICA

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Abstract
Does a person's historical lineage influence his or her current economic status? Motivated by a large literature in the social sciences stressing the effect of an early transition to agriculture on current economic performance at the country level, we examine the relative contemporary status of individuals as a function of how much their ancestors relied on agriculture during the preindustrial era. We focus on Africa, where—by combining anthropological records of groups with individual-level survey data—we can explore the effect of the historical lifeways of one's forefathers. Within enumeration areas (typically a single village or group of villages in the countryside and a city block in urban areas) as well as occupational groups, we find that individuals from ethnicities that derived a larger share of subsistence from agriculture in the precolonial era are today more educated and wealthy. A tentative exploration of channels suggests that differences in attitudes and beliefs as well as differential treatment by others, including differential political power, may contribute to these divergent outcomes. (JEL: O15, N37, N97, J6, Z1)

1. Introduction

Economists generally agree that history matters in explaining variations in the standards of living among people. But what aspects of history should we be looking at? Two

The editor in charge of this paper was Dirk Krueger.

Acknowledgments: We would like to thank the editor and two anonymous referees for their very useful comments. Daniel Prinz, Devin Streur, Young Min Kim, Philip Trammell, Nick Reynolds, Anna Croley, and especially Yunan Ji provided superlative research assistance. We are also grateful to Bill Easterly, Filipe Campante, Nico Voigtlaender, and seminar participants at Cambridge University, Oxford University, and the University of Copenhagen and to participants at the conference "Deep-Rooted Factors in Comparative Economic Development" at Brown University, the CESifo workshop on Demographic Change and Long Run Development, the BCEP conference at Berkeley, the NYU DRI 2015 Annual Conference, and the NBER Political Economy group for helpful comments. Michalopoulos is a Research Affiliate at CEPR and a Research Associate at NBER. Weil is a Research Associate at NBER.

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Journal of the European Economic Association 2018 0(0):1–59 DOI: 10.1093/jeea/jvy029
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of the most important are the history of the place where the individual lives and the history of his or her own lineage.

Of these two branches, the study of how historical events in a given place shape economic outcomes is the better developed. In large part, this is because it is relatively easy to map the locations of historical events to modern-day territories. If we know that something happened in one place and not another—for example, on one side of a border but not the other—we can compare contemporary outcomes of these two places, and thus learn about the role of whatever it was that differed. This strategy has been particularly fruitful in examining the role of institutions, which have the helpful property of tending to stay put in physical locations.[1] A slight variation on this literature on persistence in places allows for movements of large groups of people from one place to another, recognizing that when these large-scale migrations take place, people may bring with them much of whatever it is—culture, institutions, and so forth—that was found in their place of origin.[2]

Among the various place-based determinants of comparative development, the transition to agriculture is often cited as being of paramount importance in fostering the development of modern urban civilizations. This idea is at the heart of a venerable line of research among anthropologists and historians embracing social evolutionary schema. Economists Hibbs and Olsson (2004), Putterman (2008), and Borcan, Olsson, and Putterman (2018) establish empirically a positive influence of early agricultural transition on state formation and contemporary incomes across countries. This place-centered perspective on history points naturally toward thinking about aggregate or average incomes in a particular country or region in the modern world.

The other approach to quantifying the role of history looks at heterogeneity in outcomes within a population. The focus here is on the lineage of an individual and how this contributes to his or her relative economic standing and cultural attributes today (Fenske 2013; Alesina, Giuliano, and Nunn 2013). Over periods of a few generations, the effects of one's lineage on current outcomes are addressed under the heading of intergenerational mobility. However, economists are increasingly realizing that there are elements of lineage that are important beyond what can be understood from, say, a one generational transition matrix. Recent attempts to lengthen the intergenerational horizon include work by Clark (2015) and Guell et al. (2015) who use surnames to track family-level economic performance over several generations, finding that intergenerational mobility is rather low.

In this paper, our goal is to apply this second, lineage-based approach, in a context where we can link lineages all the way back to variation in ancestral "lifeways", that is, forms of economic support before the advent of the modern industrial era. In particular, the question we ask is whether tracing one's lineage to predominantly farming communities in the preindustrial period is beneficial in the modern era,

1. Acemoglu, Johnson, and Robinson (2001, 2002), Banerjee and Iyer (2005), Iyer (2010), Dell (2012), and Michalopoulos and Papaioannou (2013, 2014).

2. Putterman and Weil (2010) and Abramitzky, Boustan, and Eriksson (2014).

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specifically the world of urban and rural sub-Saharan Africa. Notably, since we are looking at variation in individual economic outcomes *within specific locations*, the stories about how agricultural history shapes place-based differences in economic performance, discussed previously, are less applicable in our framework.

A well-known social evolutionary approach holds that human societies progressed from hunter-gatherer origins to industrial modernity via the development of sedentary agriculture and its maturation into state-level, partially urban societies. Although there is no evidence that pastoralism predated agriculture chronologically, its less sedentary character often leads to its characterization as if reflecting a regression backward from settled society. As Krätli (2001) writes, "At the core of the public representation of pastoralism is the idea that "pastoralism" and "modern life" are mutually exclusive, as two successive stages of human development in a unique line that goes from nature to civilization, passing from sedentary life and agriculture. This frame offers no ground on which pastoralism and [the] modern world could meet: one being thought to begin where the other is supposed to end". This view of herders as less civilized than agriculturalists, or as a dead end branch line off the main path from agriculture to civilization, echoes millennia-old Chinese, Persian, and Egyptian views of steppe and desert nomads. Motivated by this sweeping narrative, our paper explores whether a similar evolutionary approach can also be traced in the current economic outcomes of descendants of groups that practiced different subsistence patterns during the preindustrial era. Our study is the first of which we are aware that explores the impact of *economic* culture, as identified by the primary source of subsistence, at the *individual* level.[3]

We study Africa for several reasons. First, it is a place where the transition away from historical lifeways took place only recently. On the eve of the "Scramble for Africa" in the late 19th century, the continent was replete with examples of almost every kind of preindustrial subsistence economy, from hunter-gatherers, to nomadic pastoralists, to shifting and intensive agriculturalists. Second, Africa presents a setting in which it is relatively easy to match individuals with the economic lifeway of their preindustrial ancestors. In brief, lifeways can be associated with ethnic groups, and given the rather limited mating across ethnic lines, modern individuals can usually be identified with a single tribe, and thus a particular historical lifeway.[4] Finally, in the modern African setting, we can identify individuals with different ancestral lifeways living in the same location, thus allowing us to study lineage-based historical effects in isolation, that is, purged from the effects of the place-based history.

3. For the role of economic culture (as reflected in the dependence on fishing) on regional economic performance, see Dalgaard et al. (2015).

4. The limited degree of interethnic marriages is evident in our sample of households surveyed at the turn of the 21st century. Within an average household in the Demographic and Health Surveys, there is a 71% probability that the ethnic identity of the wife is identical to that of her husband, despite the considerable ethnic heterogeneity of many of today's urban centers. In absence of historical data, we believe that intermarriage rates were far lower in previous generations.

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The channels by which lineage—and in particular the premodern economic lifeways of an individual's ancestors—can affect modern outcomes are not the same as those channels that would be operative at the level of locations. Most significantly, institutions are generally associated with places, and thus are unlikely to explain heterogeneity of outcomes within a region. Hence, culture is a natural suspect, as it is something that can vary among individuals in a given location based on their lineage. As we discuss in what follows, there are particular cultural traits associated with increased dependence on agriculture that one would expect to yield differential benefits in a modern economic setting. Our approach of identifying the effect of culture on outcomes at the individual level by focusing on people with different origins living in the same place follows what Fernandez (2011) calls the "epidemiological approach" to studying culture. This has been implemented using international migrants to study culture's effect on fertility (Fernandez and Fogli 2009) and saving rates (Carroll, Rhee, and Rhee 1994), among other things.

Pursuing our inquiry requires being able to associate individuals in a modern data set with historical characteristics of the groups from which they are descended. The Demographic and Health Surveys on which we mostly rely contain data on the ethnicity of individuals. We match this data with information from Murdock's (1967) *Ethnographic Atlas* on historical characteristics of ethnic groups as well as information from Murdock (1959) on the geographical regions historically inhabited by these ethnicities. Matching these two data sets required the construction of a concordance of ethnicities, the details of which are discussed in what follows. We expect that this concordance will have great usefulness beyond the current study.

Our main finding is that the higher the share of their subsistence a person's ancestors obtained from agriculture, the higher are his or her education and wealth levels today. This result holds not only when comparing the descendants of pastoralists to the descendants of agriculturalists, but also when comparing the descendants of nonpastoralist groups that varied in the degree to which they relied on agriculture. Importantly, this pattern continues to hold even when we restrict our attention to individuals living outside their group's ancestral homelands, to residents within urban places, and to individuals engaged in occupations other than agriculture and animal husbandry.

The rest of this paper is structured as follows. Section 2 discusses the related literature on the historical determinants of modern economic and political outcomes, with an emphasis on Africa. In Section 3, we introduce the ethnicity data from the DHS that we use, and discuss the matching of modern ethnicity to historical groups, their ancestral locations, and precolonial characteristics. In Section 4, we describe the data on the historical means of subsistence of African groups and estimate empirical models linking education and wealth to the ancestral lifeway characteristics of an individual's group, controlling for the current location of residence. We experiment with splitting the sample by occupation and urban/rural location, with the inclusion of location fixed effects, and also assess the role of selection into migration. In Section 5, we explore the determinants of ancestral lifeways themselves, in particular, the degree to which dependence on agriculture is a function of land's agricultural quality. We then use land

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quality as an instrument for ancestral agricultural dependence in our basic regression setting, finding broadly similar estimates. In Section 6, we investigate whether the identified pattern is robust to exploiting variation in the mode of subsistence within linguistic or ethnic families. In Section 7, we examine the potential channels at work, investigating how the inclusion of precolonial and colonial-era variables influences our basic results. We also report exercises exploring the roles of differential treatment by the central government, as well as whether personality traits related to proclivity to violence, impatience, and cooperation might help explain the less favorable outcomes of descendants of communities relying less on agriculture in the precolonial era. We bring to bear data from the Afrobarometer surveys, to supplement the DHS. Although these exercises yield some suggestive results, we emphasize their provisional nature and secondary importance relative to our core finding that premodern lifeway is a robust correlate of economic outcomes generations later. Section 8 concludes.

2. Related Literature

A growing body of work examines the historical origins and political economy of African development. Broadly speaking the main arguments that have been proposed in this literature refer to three different periods in African history. In reverse chronological order, the first category includes an influential body of research that stresses how the institutions established by European powers during colonization persisted after independence and continue to shape contemporary economic performance (e.g., La Porta et al. 1997, 1998; Acemoglu, Johnson, and Robinson 2001, 2002; Michalopoulos and Papaioannou 2014). The second set of studies focuses on events that took place during the colonial period itself. Huillery (2009), for example, quantifies the long-run effects of colonial investments whereas recent works shed light on the negative effects of the improper colonial border design during the Scramble for Africa.[5] Finally, several recent studies highlight the persistent legacy of the precolonial era. Nunn (2008) and Nunn and Wantchekon (2011), for example, stress the role of slave trades whereas Michalopoulos and Papaioannou (2013) demonstrate the beneficial role of ethnic political centralization on regional African development.

Our study belongs to the latter strand by establishing that descendants of predominantly agricultural groups today outperform economically individuals from groups of different precolonial occupational backgrounds. This finding contributes to our understanding of the legacy of ethnicity in Africa and sheds light on the sources of ethnic inequality, a feature that has been linked to underdevelopment (see Alesina, Michalopoulos, and Papaioannou 2016).

More generally, our work relates to the literature on the cultural origins of comparative development, adding to a vibrant body of research that examines the within-country impact of various historical legacies on economic performance. By

5. Englebert, Tarango, and Carter (2002) and Michalopoulos and Papaioannou (2016).

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utilizing individual-level variation, we overcome some of the identification problems inherent in cross-country or cross-regional analyses. First, it allows us to quantify how much of the individual-level variation in economic outcomes may be attributed to one's ethnic identity. Second, we can account for location-specific traits. This is feasible because we observe people from different ethnic groups residing in the same enumeration areas. (Enumeration areas as used by the DHS are counting units created for national population censuses. They are typically a single village or group of villages in the countryside and a city block or apartment building in urban areas, and contain 100–300 households, of which 20–30 are randomly selected for survey participation See Burgert et al. 2013).

The introduction of location fixed effects is crucial, since it allows us to absorb characteristics related to the geographic, ecological, and institutional environment of a given region that recent studies have highlighted as important determinants of regional African development.[6] Moreover, it allows us to uncover the importance of *portable* ethnic-specific traits whose influence is not limited to the ancestral homeland of a given group. This methodology is similar to Nunn and Wantchekon (2011), who investigate the impact of slavery on individual trust among respondents residing outside their ethnic enclaves.

Our finding that descendants of groups that in the precolonial era derived a larger share of subsistence from agriculture are today more educated and more wealthy brings to the foreground the persistent role of traits vertically transmitted within groups over time. In this respect, our study contributes to an emerging body of work that emphasizes the importance of cultural norms, historical persistence, and human and geographic traits for comparative development.[7]

3. Ethnicity and Modern Outcomes

3.1. Ethnicity Data

Our starting point is data from the Demographic and Health Surveys (DHS) for 26 countries in which an ethnicity variable was collected as part of the survey. We use the most recent DHS wave for which *both* ethnicity information and location coordinates are available. This reduces the sample to 21 countries since for 5 out of 26 countries we do not have coordinate information from the DHS. The sample size with information on both ethnicity and enumeration area coordinates ranges from 3040 individuals for the Ivory Coast to 48,871 for Nigeria, totaling 337,382 respondents. In our final DHS

6. Alsan (2015) and Fenske (2013).

7. See Diamond (1997), Easterly and Levine (1997, 2012), Spolaore and Wacziarg (2013), Putterman and Weil (2010), Ashraf and Galor (2013), and Michalopoulos, Naghavi, and Prarolo (2016, 2017) among others.

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sample, there are 492 ethnicity-country groups, where the same ethnicity appearing in two different countries is counted as two different groups.[8]

3.1.1. Matching Modern Ethnicities to Ancestral Groups, Historical Locations, and Group-Specific Precolonial Traits. The information on tribal precolonial traits comes from Gray's (1999) compilation of Murdock's (1967) *Ethnographic Atlas* whereas the spatial information on the homeland of a group in the beginning of the colonial era comes from Murdock's (1959) Map. The Atlas is based on a distillation by Murdock from almost the full corpus of ethnographic materials on 1167 societies, in a series of installments appearing in the journal *Ethnology* between 1962 and 1980. Following further editing and coding by anthropologists Herbert Barry, Douglas R. White, Gregory F. Truex, and Michael Fischer, it was compiled in 1999 by anthropologist Patrick Gray into the version used here and by economists beginning with Gennaioli and Rainer (2007).

The map, separately published by Murdock (1959), does not always fully coincide with the Atlas from the standpoint of ethnicity names, and it suffers from potential problems of precision, which we address, along with additional information about the Atlas, in Appendix A. In brief, we linked the ethnicity as reported by each respondent in the DHS to both Murdock's (1967) list and Murdock's (1959) Map. Whenever possible we used the concordance constructed by Fenske (2013) and Michalopoulos and Papaioannou (2013) to associate the groups in Murdock's Map (1959) to the groups in Murdock's Atlas (1967). See Appendix A for further details.

A total of 287,433 individuals were matched to a Murdock Atlas group and assigned characteristics of the corresponding ethnic group in the Ethnographic Atlas. A slightly larger number, 292,942, were matched to groups included in the Murdock map.

Our matching procedure was as follows. We constructed a series of ten possible methods for matching ethnicities in the DHS to ethnicities in one of the Murdock datasets. These methods were ordered from best to worst in terms of our assessment of their likely accuracy. We then proceeded down the list, using for each DHS ethnicity the first method for which we were able to achieve a match. Matching was done separately for the ethnicities included in the Atlas and Map, respectively. In the text in what follows, we describe the most important methods. In Panel A, we describe all ten methods and give the fractions of cases matched using each one.

The method at the top of our list was "direct match", in which the same name was used in the DHS and the Murdock source. We were able to directly match 58.7% of observations to Atlas ethnicities and 67.0% to the ethnicities on the Murdock map. The second method on our list was "Afrobarometer match", in which we applied to the ethnicity names that appear in the DHS the concordance constructed by Nunn and

8. The survey rounds in the respective countries are: BF6 (Burkina Faso), BJ4 (Benin), CD5 (Congo Democratic Republic), CF3 (Central African Republic), CM4 (Cameroon), ET6 (Ethiopia), GH5 (Ghana), GN4 (Guinea), (CI3) Ivory Coast, KE5 (Kenya), ML5 (Mali), MW5 (Malawi), MZ6 (Mozambique), NG5 (Nigeria), NI3 (Niger), NM4 (Namibia), SL5 (Sierra Leone), SN6 (Senegal), TG4 (Togo), UG6 (Uganda), and ZM5 (Zambia).

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Wantchekon (2011) relating ethnicity names that appear in the Afrobarometer Round 3 dataset to ethnicities that appear in the Murdock dataset. This matched a further 4.5% of observations to Atlas ethnicities and 10.0% of observations to the Map's ethnicities. The next three methods used data on alternate ethnicity names from the Ethnologue or the Joshua Project. The third method applied to cases where the DHS and Murdock names were listed as alternates; the fourth where a name that appeared in the Murdock source is listed as a superset of the ethnicity that appears in the DHS; and the fifth where the name that appears in the DHS is listed as a subset of the ethnicity in the Murdock data. Together, these three methods matched 19.1% of observations to Atlas ethnicities and 13.2% to Map ethnicities.

3.1.2. Movers and Average Distance Moved. As described previously, much of our interest in this paper is with the aspects of human capital (broadly defined) that persist over generations and are portable across locations. Further, we are interested in aspects of culture that have their origins in the conditions of particular geographic locations. To the extent that people live in the regions traditionally associated with their kin, it would not be possible to separately identify the effect of tribal characteristics from geographical characteristics. Thus we have a particular interest in individuals who live outside the territory associated with their group of origin. We follow Nunn and Wantchekon (2011) in calling such individuals "movers", even though they may not have moved in their own lifetimes.[9]

The DHS reports coordinate information for a person's current residence. We can thus classify individuals as living inside or outside their ancestral homeland. For those living outside of their homeland, we generated a variable measuring distance to their homeland. Specifically, this is the distance from the coordinates of an individual's current residence reported in the DHS survey to the nearest border of his/her ancestral homeland (Murdock's map).[10]

In the DHS data, 40% of individuals currently live within the boundaries of their ancestral homelands. Of those who do not, 12% live more than 500 km, 36% between 100 and 500 km, 43% between 10 and 100 km, and 9% within 10 km of the border. Given the imprecise nature of the borders in the Murdock map, the fact that ethnic group locations may have some overlap and that DHS coordinates in rural areas are perturbed by 5 or 10 km, we are reluctant to assume that members of this last group are in fact living away from their ancestral lands. Hence, we treat them as nonmovers in the empirical exercises in what follows. Panel B gives summary statistics for our DHS sample as a whole.

9. The DHS reports whether an individual has moved in his/her lifetime for a subset of respondents. This question does not distinguish between people that moved out of their homeland or from some other location within their homeland.

10. Out of the 285,155 respondents, we have distance to ancestral homeland for 258,284. In the remaining cases, we have matched directly the DHS ethnicity of the respondent to an Atlas group so we have information on its precolonial traits but we could not match this Atlas group to an ethnic group on the Murdock map. For cases where an individual is matched to more than one ancestral homeland, the nearest homeland was picked to compute this distance.

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3.2. Ethnicity and Modern Outcomes

We focus on two outcomes from the DHS: education and wealth. Our primary measure of education is a variable (mv149—educational attainment) that takes six distinct values (0–5) corresponding to no education, some primary, exactly primary completed, incomplete secondary, exactly secondary completed, and higher than secondary. Figure 1 shows a histogram of the distribution of this measure in our sample. A second measure of education, years of school completed (mv133—education in single years), is available for a subsample of observations. We use this measure for robustness checks in what follows. The median years of schooling completed within the six categories of mv149 are 0, 4, 6, 9, 12, and 15 years, respectively.

Wealth is coded on a 1–5 scale that divides the sampled households within a country into quintiles. The DHS wealth index is composed taking into account consumer durables, electricity, toilet facilities, source of drinking water, dwelling characteristics, and some country-specific attributes such as whether there is a domestic servant. Some of these components are closer to being measures of consumption flow than wealth stock. In practice, we use this as a general measure of the standard of living, but follow DHS usage in calling it wealth. The measure is derived by the DHS using principal component analysis to assign indicator weights resulting in a composite standardized index for each country. Since our empirical analysis is at the individual level, each member of a household is assigned the same level of wealth. Rutstein and Johnson (2004) provide a detailed description of the construction of this index. The raw correlation between education and wealth in the full sample is 0.45 and the correlations of these variables with an urban indicator are 0.36 and 0.60, respectively.

Before turning to the role played by ancestral ethnic characteristics, we explore the predictive power of ethnicity more generally in our data. Table 1 reports R^2s from regressions of our education and wealth measures on different sets of dummy variables; namely, country fixed effects, current ethnic homeland fixed effects, and ethnic identity fixed effects. The ethnic homeland fixed effects are dummy variables corresponding to the current tribal location of the individual according to the Murdock map. We also report the R^2 from combining different groups of dummy variables to gauge the additional explanatory power of different sets of dummies.

The regressions show, first of all, the role of ethnicity in determining outcomes. For example, once country fixed effects are included in the regression, adding country-ethnicity constants raises the R^2 for education from 0.159 to 0.281, and for wealth from 0.013 to 0.159 (results for movers are slightly larger).[11] Current country-ethnic homeland has more predictive power than does ethnic affiliation: for education, the difference is about 2 percentage points, whereas for wealth the difference is almost 9 percentage points. However, what is more important for our analysis is that even when dummies for current country-ethnic location are included in the regression, there is

11. Note that the R^2 for the country-fixed-effects regression on wealth is almost zero because wealth is standardized by country.

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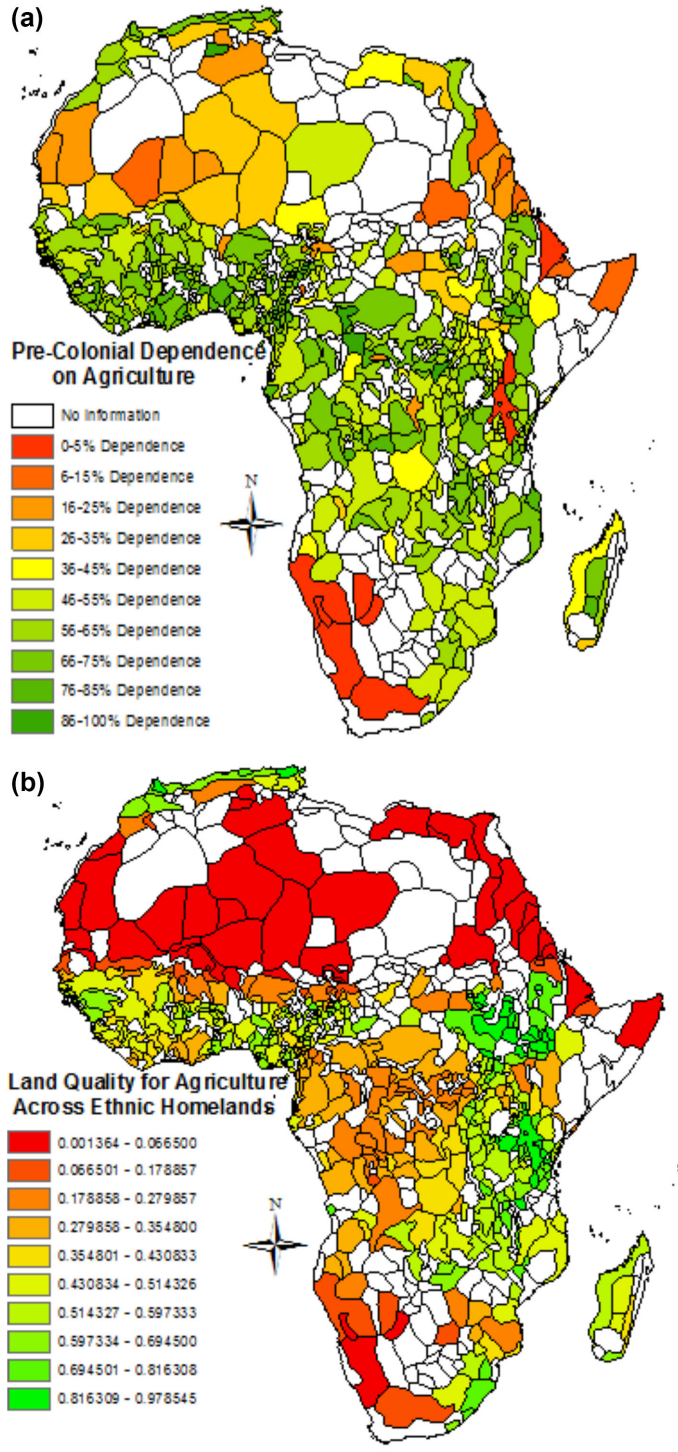

FIGURE 1. Population distribution across educational categories.

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TABLE 1. Explanatory power of various fixed effects models.

R^2 from FE regressions	All education	All wealth	Movers education	Movers wealth
Country FE	0.159	0.013	0.147	0.038
Homeland FE	0.291	0.231	0.290	0.295
Ethnicity FE	0.265	0.138	0.257	0.182
Country-ethnicity FE	0.281	0.159	0.282	0.209
Country-homeland FE	0.301	0.248	0.304	0.319
Country-homeland FE and country-ethnicity FE	0.325	0.283	0.337	0.362
Observations	285,255	285,263	154,744	154,747

Notes: Ethnicity: ethnic identity of the respondent as matched to Murdock's (1967) classification. Ethnic homeland: current ethnic location of each respondent based on Murdock's (1959) location of groups.

still an improvement in fit (of about 2.4–4.3 percentage points in all the specifications) when adding dummies for the ethnic identity of the respondent.

3.3. Historical Mode of Subsistence

Having established a match between current ethnic identity and historical ethnicity, we can now examine how characteristics of the latter affect modern outcomes. The central historical characteristic on which we focus is an ethnic group's precolonial mode of subsistence.

As mentioned in our introduction, proponents of a social evolutionary framework see rough continua of complexity, scale, technological sophistication, and political centralization running from "band-level" societies subsisting on hunting and gathering to "state-level" societies subsisting on agriculture and ultimately supporting the emergence of urban centers with more complex divisions of labor.[12] In this schema there is a natural progression via steps such as shifting cultivation, horticulture, and use of the plough. Steps can be skipped, if at all, only when there are nearby models being copied or imposed. Further, one might expect that ability of a culture to take advantage of opportunities for modernization offered by contact with industrial societies would depend on the receiving culture's place along the continuum from hunting and gathering to settled agriculture.[13]

Richerson et al. (2001) note the challenge of situating pastoralism within evolutionary frameworks of the kind discussed here. Herding is a specialization that, like agriculture, emerged after the domestication of plants and animals. It is not an independent and early branching from foraging, and thus does not lie between foraging

12. See Sahlins and Service (1960), Service (1971), and Johnson and Earle (2000).

13. Putterman (2000). Reasons for this differential might include the longer and more intensive work hours associated with agriculture, compared to hunter-gatherers (Sahlins 1972), and cultural norms associated with large-scale, hierarchical, and extra-familial organizations. Differential transmission of literacy and other European technologies might also reflect the biases of colonizers rather than the receptivity of natives.

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and agriculture on a temporal continuum. Pastoralists nonetheless resemble foragers in their less settled way of life. Richerson et al. (2001) highlight the more exaggerated sexual division of labor, tighter bonds to immediate family, frequently observed propensity toward violence, and more contested nature of property as features that might make adoption of modern norms and practices more challenging for members of pastoral than of agrarian societies. Based on these considerations, it seems reasonable to treat pastoral societies as occupying an intermediate place between agrarian and foraging societies in terms of proximity of lifeway to that of the populous agrarian civilizations.

Notwithstanding the narrative among anthropologists regarding the relationship between state centralization and agricultural intensification worldwide, this pattern is largely absent in Africa. Among African groups in Murdock's Atlas, the correlations between dependence on agriculture and pastoralism, on the one hand, and political centralization, on the other, are quite small (0.05 and 0.12, respectively). This pattern is also noted by Osafo-Kwaako and Robinson (2013).

The Ethnographic Atlas lists five activities—gathering, hunting, fishing, animal husbandry, and agriculture—and classifies the share of subsistence obtained from each into 9 broad bands: 0–5%, 6–15%, 16–25%, . . . , 85–100%. With the exception of 17 individuals belonging to a single ethnic group, the Mbuti, in D.R.C. and located in the same enumeration area, our sample contains no respondents from groups that precolonially relied primarily on hunting and gathering. Instead, these appear mainly in our data as supplementary activities among groups engaged in agriculture. The Atlas also distinguishes between "extensive agriculture" and "intensive agriculture" with descendants of the former outnumbering the latter in our sample by a ratio of almost four to one. However, explorations making use of that division found no clear distinctions between these two kinds of groups (see Table A.3). To focus on potential differences in outcomes attributable to differences in the extent of ancestral groups' reliance on agriculture, we count reported subsistence shares from both extensive and intensive agriculture as belonging to a single activity, farming.

Of the 285,155 individuals in our sample for which Murdock includes information on precolonial subsistence, 84.2% are members of ethnic groups for which agriculture was the most important source of subsistence precolonially. According to the Atlas, 7.4% come from groups for which animal husbandry was most important (pastoralists), 8.4% from groups for which agriculture and animal husbandry (7.5%) or agriculture and fishing (0.9%) were equally important, and none other than the seventeen Mbuti from a group for which hunting and gathering were leading activities in their own right. Assigning the Atlas's subsistence share bands the consecutive integer values 1 (for 0–5%), 2 (for 6–15%), and so forth, we find that individuals from groups in which agriculture was most important according to the Ethnographic Atlas score an average of 6.3 (standard deviation of 1.0), implying that agriculture provided about 60% of overall subsistence. Animal husbandry, hunting, gathering, and fishing together account for the remaining roughly 40% of the traditional subsistence of agricultural groups, with each of the last three categories providing less than 5% of subsistence on

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average, although fishing, in particular, accounts for up to 35% of subsistence for a few small groups.

Individuals from groups for which pastoralism was the most important activity according to the Ethnographic Atlas have virtually the same average band score for their leading activity (6.3, with a standard deviation of 1.6). Among these groups, the mean of the agriculture variable is 2.3 (standard deviation of 1.6). In our regression analysis, we treat the share of subsistence derived from pastoralism as the default activity and use as our focal independent variable the integer indicator for the degree of traditional reliance on agriculture, with the summed integer scores for reliance on hunting, gathering, and fishing by the individual's ethnic group among our controls. In interpreting our regression coefficients, a convenient standard is to consider the difference in reliance on agriculture between groups reporting agriculture as their most important means of subsistence and those reporting that pastoralism plays this role. The difference is 4 points on the scale described previously.

4. The Influence of Ancestral Characteristics on Individual Outcomes Today

Having discussed our main historical measure of interest (the group's mode of precolonial subsistence), we now turn to our main line of inquiry. First, we relate contemporary individual economic status to the historical mode of subsistence of one's ancestors, and then discuss the robustness of our findings.

4.1. Main Results

We will explore variants of the following OLS empirical specification:

$$y_{i,e,h,c,v} = \alpha_o + \beta Agriculture_e + \gamma Hunt/Gather/Fish_e + \delta \boldsymbol{X}_{\boldsymbol{i,e,h,c,v}} + \alpha_{\boldsymbol{c}} \left(\alpha_{\boldsymbol{h,c}}\right) \left(\alpha_{\boldsymbol{v}}\right) + \varepsilon_{i,e,h,c,v}, \quad (1)$$

where $y_{i,e,h,c,v}$ is the outcome of interest for individual i, belonging to ethnicity e, residing in homeland h, in country c, and in enumeration area v. $Agriculture_e$ and $Hunt/Gather/Fish_e$ denote the subsistence shares from agriculture and hunting, gathering, and fishing of an individual's ancestral group, respectively. The omitted category is the share of precolonial subsistence derived from pastoralism. $\boldsymbol{X}_{\boldsymbol{i,e,h,c,v}}$ is a vector of individual-level controls including linear and quadratic terms for age, a female indicator, and a dummy that reflects whether an individual currently resides in her ancestral homeland. In the various specifications in what follows, we will exploit variation within different locations, namely countries, α_c, homelands within countries, α_{hc}, and finally enumeration areas, α_v. Standard errors are clustered at the ethnicity level.

The first panel of Table 2 shows our basic results where the dependent variables are the education and wealth measures. In all specifications we include controls for age and age-squared, a female dummy, and an indicator of whether the respondent resides

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TABLE 2. Benchmark—DHS regressions within ethnic homelands.

Variables	(1) Education	(2) Education	(3) Education	(4) Education	(5) Wealth	(6) Wealth	(7) Wealth	(8) Wealth
Agriculture	0.2337***	0.1498***	0.1034***	0.1011***	0.2233***	0.1797***	0.0970***	0.0972***
	(0.0432)	(0.0259)	(0.0212)	(0.0191)	(0.044)	(0.0324)	(0.0221)	(0.0219)
Gather/hunt/fish	0.2095***	0.1026***	0.0918***	0.0911***	0.1574***	0.0681***	0.0488***	0.0524***
	(0.0547)	(0.0214)	(0.0200)	(0.0185)	(0.0457)	(0.0249)	(0.0152)	(0.0146)
Urban			0.9199***	0.7079***			1.6401***	1.4330***
			(0.0357)	(0.0292)			(0.0460)	(0.0468)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	No	No	Yes	No	No	No
Country-ethnic homeland FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Occupation FE	No	No	No	Yes	No	No	No	Yes
Observations	285,192	285,192	285,192	285,192	285,200	285,200	285,200	285,200
R^2	0.239	0.350	0.418	0.493	0.052	0.266	0.491	0.518

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{***}p < 0.01$.

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outside her ancestral homeland (referred to as "simple controls"). In columns (1) (for education) and (5) (for wealth), we include country fixed effects. The coefficient on agriculture is positive and significant, implying that the more of its subsistence an individual's ancestral group obtained from working the land, as opposed to herding animals, the more educated and the wealthier he or she is today. This accords with the conjecture that agriculturalists and their descendants have on average obtained more education, adopted more advanced technologies, and entered more modern sectors of their economies than pastoralists and their lineages.

In this regression, as well as most of the specifications in this table, the coefficient on the hunt/gather/fish measure is also positive and significant. If this were an indication that descendants of hunter-gatherers such as the Twa of Rwanda, the Kung-San of Botswana and Namibia, or the Mbuti of the Congo, have also modernized more rapidly than their pastoralist counterparts, it would severely challenge the social evolutionist logic discussed previously. Recall, however, that hunting and gathering are primary sources of subsistence for the ancestors of only a handful of individuals in our sample. It is common to see hunting and gathering account for a minor share of traditional subsistence in primarily agricultural groups, according to our sources, but only fishing is ever assigned parity with the lead subsistence source, and only in a few small groups accounting for under 2,500 observations. Given the supplemental rather than primary role of these activities, positive effects of a larger subsistence share from hunting, gathering and fishing are thus more plausibly interpreted as suggesting lasting benefits of an ancestral group's occupation of an enriched environment, rather than signaling that the lifeway of true hunter-gatherers conferred long-run advantages in its own right.

To make this point more precise, in Panel A we use as explanatory variables indicator variables reflecting whether a respondent's ancestral group was mostly agricultural (distinguishing between mostly intensive, mostly extensive, and mostly unknown agriculture), had two equally important subsistence sources, or was mostly dependent on gather/hunt/fish (the omitted category being mostly pastoral). There are no individuals in our dataset who belong to groups that in the past had either fishing or gathering as their primary subsistence mode and only 17 individuals of Mbuti ancestry, a precolonially hunting group. Using these "mostly" categories indicates that descendants of hunters clearly underperform *vis a vis* descendants of pastoralists.[14,15]

14. For completeness, we note that there are two groups, the Herero and the Nam, both of Namibia, for whom hunting and gathering are listed as important sources secondary to animal husbandry rather than to farming. These exceptions to the rule that hunting and gathering appear as supplements to agriculture, in our data, account for about a thousand observations. Moreover, in Table A.4, Panel A, we show alternate versions of our main regressions in which the subsistence shares from hunting, gathering, and fishing are entered separately. In these specifications fishing and hunting each obtain positive and significant coefficients, whereas gathering alternates sign and is insignificant. The positive role of ancestral dependence on fishing is in line with the findings of Dalgaard et al. (2015).

15. Scholars who embrace social evolutionary schema such as those of Boserup, Service, Johnson, and Earl might also wonder whether our data are supportive of the proposition that past practice of forms of agriculture that permit higher population density and longer-term food storage and that require more intensive work effort, are associated with better modern outcomes than are more "horticultural"

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Using the distinction between intensive and extensive agriculture, we may also explore whether the beneficial legacy of agriculture (vis-á-vis pastoralism) differs by the type of agriculture historically undertaken. For example, consider the possibility that pastoralism and agriculture coevolved to some extent, which could be the case for extensive agriculturalists and pastoralists, who, compared to intensive agriculturalists, share the common feature of a less settled way of life. If this was the case, then among individuals whose ancestral subsistence needs were mostly derived from extensive agriculture, further increases in agricultural dependence at the expense of pastoralism may not translate into increased wellbeing today. We check for this possibility in Panel B of Table A.3, but find no evidence for it. Although the coefficients on the share of subsistence derived from agriculture are slightly larger and more precisely estimated among extensive agriculturalists (columns (1) and (3)) than among intensive agriculturalists (columns (2) and (4)), the coefficient estimates are not significantly different from each other.

In the rest of the columns in Table 2, we replace the country fixed effect with a fixed effect for the country-ethnic homeland in which the individual currently resides. To the extent that ancestral lifeways predict current outcomes only because lifeways predict the current state of development of different ethnic regions in a country, these fixed effects will capture such a channel. However, in practice, the coefficient on agriculture in the regressions for education and wealth is reduced by a third or less. This finding highlights that the importance of differences in ancestral lifeways in shaping individual economic outcomes is not confined to the homeland of origin of the specific group but is portable across different locations within the country.

In the third and seventh columns, we control for urban residence. Not surprisingly, this is strongly predictive of both education and wealth levels. The coefficient on agriculture falls by 31% in the case of education and 46% in the case of wealth, but remains significant in both cases. The fact that the coefficient declines suggests that one channel by which agricultural heritage improves modern outcomes is by raising the probability of having moved to a city. However, agricultural heritage evidently has an impact on current outcomes through other channels as well.

Finally, in the fourth and eighth columns, we control for a set of occupation fixed effects.[16] This accounts for the possibility that the primary channel via which ancestral lifeway affects current outcomes is through an individual's choice of

practices. The Ethnographic Atlas data distinguish whether the main crops grown were tubers, cereals, or tree crops. Entering dummy variables for each main crop in our benchmark regressions, the respective estimated coefficients are not significant. However, an interesting observation that lends some support to the evolutionists' expectations is that when only those agricultural groups whose main crops were cereals and tree crops are included, the agriculture share coefficient remains highly significant, whereas when parallel versions of the benchmark regression are estimated using only observations for groups whose main crop was tubers (albeit in a much reduced sample), the coefficient on agriculture is positive but statistically insignificant (results available upon request).

16. Occupational categories are: not working, professional/technical/managerial, clerical, sales, agriculture self-employed, agriculture employee, household and domestic services, skilled manual, unskilled manual, and other. In addition, there is a category for agriculture/breeding/fishing/forestry that

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occupation. This allows us to rule out the possibility that our estimates simply reflect descendants of farmers still being farmers and descendants of pastoralists still being herders. Surprisingly, although the occupation dummies significantly improve the R^2 of our education and wealth regressions, they only slightly change the coefficient on agriculture, implying that within broadly defined occupations today, precolonial dependence on agriculture influences positively individual outcomes.

Another way of evaluating the contribution of ancestral lifeways in explaining economic outcomes across individuals today is the following. As we have seen in Table 1 accounting for the ethnicity of the respondent on top of country-homeland specific constants improves the fit of the model on education by 2.4 percentage points (0.325–0.301) whereas the respective increase in R^2 when the dependent variable is wealth, is 3.5 percentage points (0.283–0.248). How much of this improvement can be explained by differences in how much one's lineage relied on agriculture during the preindustrial era? In column (2) of Table 2 accounting for agriculture in addition to country-homeland fixed effects increases the adjusted R^2 by 0.64 percentage points. The corresponding increase in the model fit in column (6) of the same table is 0.96 percentage points. This implies that differences in ancestral lifeways can explain roughly 30% of the individual variation in education and wealth today that is due to the ethnic identity of the respondent.

4.1.1. Including Enumeration Area Fixed Effects. The regressions presented previously include location fixed effects at the level of the Murdock map region within a country in which an individual *currently* lives. The justification for this approach is that these tribal regions may have characteristics that directly influence modern outcomes—indeed, these may be the same characteristics that determine traditional lifeways. We now go further in controlling for location-specific traits. In particular, we use the location information in the DHS, creating a dummy for every set of coordinates. This leads to a very large number of geographic fixed effects: 8,236. Correspondingly, the units within which we are exploiting variation have just a handful of households: on average around 35 respondents. The DHS sampling clusters are sufficiently small that there is no doubt that these fixed effects represent a perfect control for the economic environment that individuals face such as labor market opportunities and ethnic diversity, as well as geographic influences.

Table 3 reports the results. Compared to our regression with country-ethnic homeland fixed effects (shown in columns (1) and (4) of the table), the coefficient on agriculture falls by about one-third in the education regression and by three-fifths in the wealth regression (these fine-scale location effects subsume the urban dummy, which is thus dropped). However, the coefficient remains statistically significant in both cases. There is some danger that the inclusion of location fixed effects represents over-controlling. The most important reason is that there is a good deal of endogeneity

is found in two countries (Guinea and Mali). We create a separate dummy variable for this combination category in these two countries.

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TABLE 3. Benchmark: DHS regressions within villages/towns.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Agriculture	0.1034***	0.0731***	0.0694***	0.0970***	0.0389***	0.0379***
	(0.0212)	(0.0147)	(0.0128)	(0.0221)	(0.0070)	(0.0068)
Gather/hunt/fish	0.0918***	0.0708***	0.0681***	0.0488***	0.0176**	0.0190***
	(0.0200)	(0.0155)	(0.0140)	(0.0152)	(0.0068)	(0.0065)
Urban	0.9199***			1.6401***		
	(0.0357)			(0.0460)		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-ethnic Homeland FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,192	285,192	285,192	285,200	285,200	285,200
R^2	0.418	0.506	0.559	0.491	0.677	0.682

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{**}p < 0.05$; $^{***}p < 0.01$.

in the exact location of the respondents, particularly in cities where there are several sampling clusters. This sorting seems particularly salient in the case of wealth. Adding these detailed location-fixed effects raises the R^2 of the wealth regression from 0.491 to 0.677, whereas in the case of education the rise in the R^2 is from 0.418 to 0.506. Despite this potential concern, in the rest of the paper we take these regressions with enumeration-area fixed effects as our benchmark, although in some cases we also look at the regression with country-ethnic homeland constants.

In Panel B, we report a total of 4 sets of standard errors associated with different types of clustering. Specifically, we report standard errors clustered (i) at the ethnicity level; (ii) at the cultural province level; (iii) at the cultural province and country level; and (iv) corrected for spatial correlation using Conley's method using 500 km as the cutoff distance beyond which observations are assumed not to be spatially correlated. Experimenting with different distance cut-offs, the standard errors tend to decrease. Across these different clustering dimensions, the coefficient on agricultural dependence remains significant at the 1% level whereas the coefficient on the residual shares of subsistence related to hunting, gathering, and fishing become less precisely estimated.

The magnitude of the key coefficients can be interpreted as follows. As mentioned previously, for ethnic groups for which agriculture is the primary form of subsistence according to the Murdock Atlas, the mean of our agriculture variable is 6.3 (on a scale of 0–9). For groups that have pastoralism as their primary source of subsistence, the mean for the agriculture variable is 2.3. Thus moving between these two groups, agriculture rises by 4 points. The coefficient in column (2), 0.073, thus implies that shifting from pastoralism to agriculture as the primary form of subsistence would raise education by 0.28 points. Since, as described previously, education is measured on a scale where each point corresponds to roughly 3 years, this would be 0.8 years

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of education.[17] The estimated magnitude is almost identical to the one we get when we use actual years of schooling (available for a subsample of observations) as the dependent variable. This is done in columns (7)–(9) of Panel A, where according to the estimated coefficients a four-point-increase in the ancestral dependence on agriculture increases years of schooling by $0.2119 \times 4 = 0.848$ years.

The wealth coefficient in column (5), 0.039, implies that a shift from agriculture to pastoralism as the primary form of subsistence (of one's ancestors) raises the wealth index by 0.16 points. Since the wealth index corresponds to quintiles, this would be roughly equivalent to raising an individual's rank by three percentiles. Is this a small or large effect? The within-enumeration-areas standard deviation of wealth is 0.80 quintiles, that is, 16 percentiles of the wealth distribution. So, a 3-percentile increase in wealth of an individual belonging to a predominantly agricultural group compared to an individual with a pastoral ancestral background corresponds to 20% of the within-enumeration areas standard deviation of wealth. An alternative way to put the respective magnitude in context is the following: Within enumeration areas, a one-year increase in schooling increases by 1 percentile the ranking in the wealth distribution of an individual (regression not shown). So, quantitatively, the influence of agricultural legacy is comparable to 3 years of schooling within a typical village of sub-Saharan Africa.

To get a better sense of how large an impact agricultural heritage has on absolute (rather than relative) standards of living, in Appendix A we present a set of regressions where each dependent variable is an indicator reflecting household ownership of specific assets like radios, cars, motorcycles, refrigerators, bikes, and TVs, as well as the presence of utilities like electricity and telephone land lines. Individuals whose ancestry can be traced to groups that were more dependent on agriculture in the precolonial era live in households today that are more likely to have electricity and a telephone land line as well as assets like a radio, a motorcycle, and a refrigerator. The magnitude of the coefficient in column (8) of Panel B, for example, suggests that having a predominantly agricultural legacy compared to a pastoral one increases the likelihood of having a telephone landline in the household by 2.4 percentage points, which is large compared to the mean of this variable, 4.5%.

One question raised by these results is whether the coefficient on agriculture in our regressions simply reflects the numerical dominance of agriculturally descended people in modern societies. Specifically, we might expect that based on their numbers, such groups would be politically dominant, and that there would be discrimination against groups whose ancestors were not agriculturalists. In what follows we show

17. Given the skewness of educational attainment (see Figure 1), in Table A.2, Panel A we replicate columns (1)–(3) of Table 3 using binary transformations of education. In columns (1)–(3) the dependent variable is an indicator that takes the value of 1 for those individuals with at least some schooling, and in columns (4)–(6) the dependent variable is a dummy that takes the value 1 for those with at least primary schooling completed. The pattern remains unchanged. Individuals tracing their ancestry to agricultural groups in the precolonial period are more likely to have some education, and more likely to have at least primary schooling completed.

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that this political discrimination story may indeed partly explain some of the observed association. However, two auxiliary pieces of evidence suggest that political discrimination is not the only mechanism at work.

The first piece of evidence comes from looking at how individuals tracing their ancestry to predominantly pastoral groups fare in countries where they are the absolute majority. In our sample it is only Ethiopia where this is the case. The precolonially pastoral groups Tigre, Afar, Arusi, Hamar, Nuer, Shebelle, Suri, and Reshiat today constitute 52% of the sampled DHS individuals in Ethiopia. Despite pastoralists being in the majority, however, the coefficient on agriculture in our basic regression remains positive, although only statistically significant in the case of wealth (see Table A.5, column (7)).

As an alternative way to see that our evidence is not only driven by comparing descendants of pastoralists to descendants of agriculturalists, we may focus on countries where *none* of the sampled individuals belongs to a precolonially predominantly pastoral group. In fact, this is true for 14 countries. Table A.6, Panel A, replicates the specifications of Table 3 over these 14 countries. Even when there are no descendants of pastoralists present in a given country, the coefficient on agricultural dependence remains positive, significant, and indeed larger than in our baseline specification.

Even in this case, one might conceivably worry that among nonpastoral groups, those more dependent on agriculture precolonially may still be over-represented in the modern population, and thus hold political power, which may help explain the superior economic performance of their members. To address this concern, we look at a subset of countries in which not only are there no descendants of pastoralists, but also among the descendants of agriculturalists, it is those whose ancestors were *less* dependent on agriculture who are the majority today. For example, in Benin, 70% of the sampled individuals belong to either the Fon, the Futajalonke, or the Songhai. These ethnicities derived roughly 50% of their subsistence from farming according to Murdock (1967). The other three sampled groups, which are the minority, namely the Gurma, the Yoruba, and the Somba derived on average 70% of their livelihood from agriculture. This pattern is true for six countries in our sample.[18] In Table A.6, Panel B, we show that our benchmark pattern established in Table 3 remains intact for these six countries. The results suggest that irrespective of their current representation in the population, members of groups that precolonially practiced more agriculture are more wealthy and more educated.[19]

18. The six countries in this latter group are Benin, Burkina Faso, Togo, Malawi, Guinea, and Central African Republic. The other eight countries in which none of the sampled individuals were descendants of pastoralists are Cote D'Ivoire, Democratic Republic of Congo, Ghana, Mozambique, Nigeria, Senegal, Sierra Leone, and Zambia.

19. The estimates in Table 3 are purely cross sectional. In an attempt to explore whether the legacy of agricultural ancestry has been evolving over time, we estimated versions of the education and wealth regressions similar to the ones reported in this table, separately for each five-year birth cohort group between 1935 and 1996. Figures A.1(a) and (b) plot the estimates. The coefficients remain positive and

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4.2. Heterogeneity by Occupation, Urban Status, and Country

To assess the sensitivity of our results as well as provide some evidence on the possible channels via which ancestral lifeways affect current outcomes, we split the sample along various dimensions.

We start by splitting the sample by occupation into two broad categories: farming-related and nonfarming related.[20] This allows us to assess the extent to which the effect of ancestral lifeways operate in the traditional and modern sectors of the economy. The results are presented in Table 4. For education, agriculture remains significantly positive in both subsamples. The coefficient on agriculture in the nonfarming group (0.0727) is larger than the coefficient in the farming-related group (0.0515). This implies that agricultural ancestry has more import outside of agriculture than within it. In the case of wealth, the coefficient on agriculture also remains significant when the sample is split, with the coefficient being higher in the farming related group, although the difference is very small.

Splitting the sample into urban versus rural residence, we find an interesting difference in the results for education compared to wealth. For education, the coefficients in the two subsamples are very similar to each other and to the corresponding coefficient in Table 3. In the wealth regression, the coefficients are again significant in the subsamples, but in this case, the coefficient on agriculture for individuals living in rural areas is three times as large as that in urban areas. (Some part of the difference is explained by the fact that the variance of wealth in rural areas is 30% larger than in urban whereas the variances of the agriculture measure are almost equal in the two areas.)

Finally, we rerun our benchmark regressions separately for each country in our sample. These results are shown in Table A.5 (Panels A and B). Depending on the specification, the coefficient on agriculture is positive and significant at the 10% level in between 10 and 14 countries. It is only negative and significant in one country. This suggests that the benchmark pattern is not driven by a handful of countries but reflects a more generalized phenomenon of the African landscape. Agricultural descent is a reliable positive predictor of contemporary individual well-being.

4.3. Selection into Migration

As discussed previously, we are able to identify the portable component of ancestral influence on current outcomes only because we have in our sample a substantial number

statistically significant except for when the dependent variable is the level of wealth among the very oldest birth cohorts, which have very few members. Moreover, there is no clear evidence of a trend in the coefficients by age, as would be consistent, for example, with convergence over time between groups with different ancestral lifeways. However, the standard errors are large enough that we cannot be sure that such a trend is not present.

20. Farming-related includes: agriculture self-employed, agriculture employee, and animal breeding, fishing, and forestry. Nonfarming related includes all the rest (except for not working).

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TABLE 4. Heterogeneity by occupation and location.

Variables	(1) Education Farming-related	(2) Education Nonfarming related	(3) Education Urban	(4) Education Rural	(5) Wealth Farming-related	(6) Wealth Nonfarming related	(7) Wealth Urban	(8) Wealth Rural
Agriculture	0.0515***	0.0727***	0.0764***	0.0703***	0.0421***	0.0391***	0.0203***	0.0637***
	(0.0106)	(0.0233)	(0.0196)	(0.0114)	(0.0099)	(0.0074)	(0.0052)	(0.0107)
Gather/hunt/fish	0.0416***	0.0791***	0.0849***	0.0550***	0.0208**	0.0213***	0.0090	0.0277***
	(0.0113)	(0.0224)	(0.0208)	(0.0116)	(0.0102)	(0.0071)	(0.0062)	(0.0091)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	97,617	101,576	97,711	187,481	97,621	101,576	97,713	187,487
R^2	0.460	0.463	0.370	0.486	0.441	0.693	0.597	0.458

Notes: Standard errors in parentheses, clustered at the ethnicity level. Simple controls include age, age squared, a female dummy, and a mover dummy; farming-related industries include self-employed agriculture, agricultural employee, forestry, breeding, hunting, and fishing. Nonfarming related industries include professional, technical, managerial positions, clerical positions, sales, household and domestic, services, skilled manual, and unskilled manual. Non-working individuals are excluded. The omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE 5. Determinants of migration.

Variables	(1) Mover	(2) Mover	(3) Moved in life	(4) Moved in life
Agriculture	−0.0465**	−0.0464**	0.0052	0.0048
	(0.0212)	(0.0211)	(0.0052)	(0.0050)
Gather/hunt/fish	−0.1179***	−0.1177***	−0.0062	−0.0061
	(0.0254)	(0.0253)	(0.0053)	(0.0051)
Simple controls	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes
Observations	285,200	285,200	188,304	188,304
R^2	0.768	0.768	0.206	0.210

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy in columns (3) and (4); the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{**}p < 0.05$; $^{***}p < 0.01$.

of people who live outside of their ancestral homelands. Using our criterion of calling someone a "mover" if they live more than 10 kilometers outside of the homeland associated with their ethnic group, this comes to 54% of our sample. A natural worry with our inference strategy is that people who live outside their ancestral homelands are not randomly selected, and in particular, that the manner in which selection operates may differ according to the ancestral lifeway associated with his/her group.

As a first step in assessing whether selection into migration biases our results, we look at the extent to which ancestral lifeway itself predicts migration. We use two different measures of migration: first, the "mover" definition used previously, and second, a variable from the DHS that indicates whether an individual has moved during his/her life (this latter measure is only available for a subset of respondents). The results are shown in Table 5. The first two columns show that within enumeration areas, individuals from ethnicities that historically depended more on agriculture are less likely to be classified as "movers". A person descending from a mostly agricultural group is roughly 19 percentage points less likely to be a mover than someone from a group that relied mostly on pastoralism (recalling that these groups differ by 4 in their average values of the "agriculture" variable), and this result is robust to the inclusion of occupation fixed effects. The probable explanation is that areas in which agriculture was practiced were more likely to develop cities, which in turn attracted migrants, although another possibility is that the locations of the ethnic homelands of pastoral people are not as precisely measured as that of agriculturalists, mechanically producing the observed correlations. In columns (3) and (4) of Table 5, the dependent variable is our other migration measure. Having an agricultural background is positively but insignificantly associated with the probability of having moved in one's own lifetime.[21]

21. In Table A.7, we show that flexibly controlling for how long the respondent has been in his current residence (information which is available for roughly half the sample) in the benchmark specification does

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TABLE 6. Differential selection into migration by mode of precolonial subsistence.

Variables	(1) Education	(2) Education	(3) Wealth	(4) Wealth
Agriculture	0.2808***	0.2710***	0.2431***	0.2368***
	(0.0607)	(0.0543)	(0.0559)	(0.0483)
Gather/hunt/fish	0.2816***	0.2747***	0.1826***	0.1879***
	(0.0683)	(0.0638)	(0.0594)	(0.0499)
Mover	0.7459**	0.7805**	0.5330	0.5994*
	(0.3505)	(0.3280)	(0.3417)	(0.3029)
Mover × agriculture	−0.0570	−0.0731	−0.0251	−0.0462
	(0.0515)	(0.0482)	(0.0441)	(0.0393)
Mover × gather/hunt/fish	−0.1085**	−0.1155***	−0.0372	−0.0529
	(0.0482)	(0.0441)	(0.0562)	(0.0472)
Simple controls	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	285,192	285,192	285,200	285,200
R^2	0.241	0.38	0.053	0.222

Notes: Standard errors in parentheses are clustered at the ethnicity level; Simple controls include age, age squared, and a female dummy. Mover is a dummy variable that equals one if an individual is at least 10 km away from her ancestral homeland; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Similarly, the correlations between having moved in life and wealth and education levels are 0.17 and 0.12, respectively.

The finding that there is strong predictive power of ancestral lifeway for being a "mover" suggests that there could also be differential selection into migration across lifeway groups. To assess the potential effect of this selection, we repeat our benchmark regression, where besides including a "mover" dummy we also interact it with our two ancestral lifeway categories: agriculture and hunting/fishing/gathering. A finding that there is a differential impact of being a mover for people with different ancestral lifeways has two possible interpretations. One is that there is indeed differential selection into migration—that is, that migrants from, say, homelands with agricultural lifeways differ more from those who remain behind than do migrants from homelands with pastoral lifeways. The alternative interpretation is that there is differential portability of lifeway-specific skills outside of one's own homeland (and in particular in cities, where we expect a good fraction of movers to be located). This second channel would still be consistent with the idea that ancestral lifeway is an important determinant of modern outcomes, although via a slightly different channel than the one that we have stressed previously.

The results shown in Table 6 suggest that bias from differential selection into migration is not driving our main results. When education or wealth is used as the

not alter the results. This suggests that differences in the length of integration in the current communities are unlikely to be driving the observed pattern.

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dependent variable, the interaction of agriculture (the variable of greatest interest to us) and the "mover" dummy is insignificant, whereas the coefficient on agriculture itself remains significant. This suggests that movers from agricultural areas are not systematically different than movers from historically pastoral areas.

The last split of the sample we attempted is motivated by the destination of the "movers". Naturally, for those of agricultural ancestry, currently residing in some other ethnic homeland that also used to be mostly agricultural in the precolonial times may not entail a significant loss in the ethnic-specific knowledge set compared to a "mover" of pastoral background. What would be more surprising is finding that descendants of agricultural groups perform better than those of pastoral descent even within enumeration areas in ethnic homelands that used to be mostly pastoral historically, where, if anything, those of pastoral background would have a natural advantage. Table A.8 presents the results. Overall, respondents of groups that historically derived a larger share of subsistence from pastoralism are performing worse in both historically agricultural *and* historically pastoral regions, suggesting that differential portability of ethnic-specific skills across different ecological areas is unlikely to be the main driver of the uncovered relationship.

5. Origins of Historical Lifeways

So far we have focused our attention on the question of how ancestral lifeways are related to individual outcomes today. A natural question is how ancestral lifeways themselves were determined. This is potentially important for several reasons. Most significantly, one might worry that the same factors that determine lifeways also determine individual outcomes. For example, certain cultures might be more inclined to undertake long-term investments that would be required in farming, and so members of these groups would be more likely to farm and to be economically successful, but farming itself would not be relevant. A second reason for studying the determinants of lifeways is to put more flesh on the social evolutionary narrative presented previously.

The most natural determinant of whether a group has historically practiced agriculture is the quality of the land itself. It would not be surprising if agriculture were more common in areas where it was more feasible (Michalopoulos 2012). Figure 2(a) portrays the degree of precolonial dependence on agriculture (from the Murdock Atlas), and Figure 2(b) maps the underlying suitability of land for agriculture across tribal regions (constructed by Ramankutty et al. 2002).[22] Table 7 shows regressions of ancestral subsistence on agriculture, pastoralism, and hunt/gather/fish, respectively, on

22. Ideally, we would like to have data on land quality for the precolonial times. However, this turns out not to be a limiting factor. This is because of the following observation. In the Ethnographic Atlas we have information on the year at which each society was observed. The overwhelming majority of groups in sub-Saharan Africa were recorded by ethnographers between 1860 and 1960 with the median group being recorded around 1920. Hence, the data on the subsistence economy we use are representative of a time period only few decades before our land quality for agriculture is constructed using the climatic and soil characteristics between 1960 and 1990.

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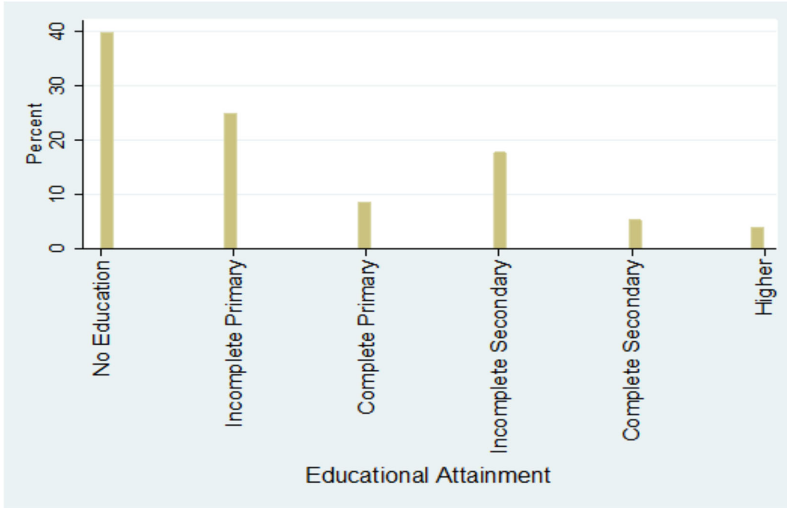

FIGURE 2. (a and b) Precolonial dependence on agriculture and land suitability for agriculture across ethnic groups.

TABLE 7. Land quality for agriculture and modes of precolonial subsistence across ethnic homelands.

Variables	(1) Agriculture	(2) Pastoralism	(3) Gather/hunt/fish
ln (land suitability for agriculture)	0.6566***	−0.7207***	0.0582
	(0.1579)	(0.1724)	(0.1018)
Observations	187	187	187
R^2	0.137	0.147	−0.004

Notes: Robust standard errors in parentheses. $^{***}p < 0.01$.

land quality. As expected, the coefficient on land quality is significantly positive in the regression for agriculture and significantly negative in the regression for pastoralism. It is insignificant in the regression for gather/hunt/fish. The size of the coefficients in Table 7, columns (1) and (2) imply that a one-standard-deviation increase in the log suitability of land for agriculture is associated with a 0.38 (−0.39) standard-deviations increase in the dependence of a group on agriculture (animal husbandry). These "beta" coefficients are quantitatively large, underscoring the geographical origins of ancestral lifeways.

5.1. Instrumental Variables Approach

The previous discussion suggests that the problem of the potential endogeneity of historical lifeways can be mitigated by using land quality as an instrument. Specifically,

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we estimate versions of equation (1), in which either education or wealth is the dependent variable and the precolonial subsistence share of agriculture is on the left hand side, modeling the latter as

$$Agriculture_{i,e} = \alpha_o + \beta \ln\left(Land\ Suitability_{i,e}\right) + \gamma Hunt/Gather/Fish_{i,e} + \delta \boldsymbol{X}_{\boldsymbol{i,e,h,c,v}} + \alpha_{\boldsymbol{hc}}\ \left(\alpha_{\boldsymbol{v}}\right) + \varepsilon_{i,e,h,c,v}, \quad (2)$$

where $Land\ Suitability_{i,e}$ is the suitability of land for agriculture of the ancestral homeland of individual i of ethnicity e. For the exclusion restriction to be satisfied, we need for this variable to not appear in (1). In particular, a violation of the exclusion restriction would result if our measure of land quality was correlated with some unobserved factor that led people in some regions to practice agriculture rather than pastoralism. A problematic case with regards to the exercise we conduct would be, for example, if the change in land quality that took place between the precolonial period and the time when land quality was measured is systematically related to the way in which the land was being used. An example would be if the use of land for agriculture led to an improvement in its quality. Further, for this to be a problem, it would have to be the case that the variance in this systematic part of the change in land quality (i.e., the part of the measurement error that was correlated with unobservables) was large relative to the variance of land quality in the precolonial period. Although we cannot test this directly, we believe that the bulk of variation in land quality (as measured by Ramankutty et al., whose model incorporates remote-sensed data on climate and soil characteristics such as carbon content and pH) is driven by climatic characteristics, geography, and the soil geology, rather than by human activity. There are two observations that make us more confident about this claim. First, among African groups with some dependence on farming in the precolonial period, the majority (77%) were extensive agriculturalists. Although intensive agriculture, with its large inputs of manual labor, manures, fertilizers, a low fallow ratio, and irrigation, could conceivably affect measured land quality, such an effect seems less likely for extensive agriculture. Second, the relatively coarse resolution of Ramankutty's land quality index (0.5 by 0.5 decimal degrees translate into an area of roughly 2500 km^2 at the equator) implies that any localized human-induced change in the landscape is unlikely to be an important driving force of variation in land quality at the spatial scale our index is constructed.

In addition to dealing with the possible endogeneity of agricultural dependence discussed previously, the IV procedure also corrects for measurement error in agriculture as a share of precolonial subsistence, which is presumably nonnegligible.[23]

The results are presented in Table 8. Columns (1) and (4) include country-ethnic-homeland fixed effects, $\alpha_{\boldsymbol{hc}}$, whereas the rest of the columns include enumeration area

23. The peculiar geography of Africa in terms of its suitability for the tsetse fly also circumscribed the use of animals in specific parts of the continent and shaped the locations where pastoralism was a viable mode of production (see Alsan 2015). It turns out that in our sample of ethnicities, tsetse suitability does not have sufficient predictive power to be used as an alternative instrument for the degree of dependence on pastoralism.

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TABLE 8. IV for full sample.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Agriculture	0.1215**	0.0567*	0.0513*	0.1191**	0.0274**	0.0283**
	(0.0551)	(0.0335)	(0.0297)	(0.0604)	(0.0119)	(0.0115)
Gather/hunt/fish	0.0883**	0.0629***	0.0593***	0.0374	0.0120	0.0122
	(0.0349)	(0.0209)	(0.0185)	(0.0354)	(0.0079)	(0.0072)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-ethnic homeland FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,176	285,109	285,109	285,184	285,117	285,117
R^2	0.0698	0.0681	0.1679	0.0232	0.0020	0.0189
First stage F-statistic	22.45	32.34	32.37	22.45	32.34	32.37
First stage instrument log land suitability	0.7649***	0.6659***	0.6656***	0.7648***	0.6659***	0.6656***
	(0.1614)	(0.1171)	(0.1171)	(0.1614)	(0.1171)	(0.1170)

Notes: Standard errors in parentheses are clustered at the ethnicity level. Simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

constants, α_v. It is useful to keep in mind that looking within the latter absorbs a significant fraction of variation of both the instrument and the instrumented variable. Across all specifications the coefficient on agriculture is positive and statistically significant at the five or ten percent level, and the IV coefficients are similar in magnitude to the respective OLS coefficients reported in Table 3.

The uncovered evidence supports a story in which ethnic groups that found themselves on land that was suitable for agriculture were more likely to take this up as a means of subsistence, and that engaging in agriculture then conferred portable characteristics on individuals from these ethnic groups that made them more prone to succeed after they migrated away from their homelands.

6. Ethnic and Linguistic Families

A threat to our identification of a channel whereby participating in agriculture endows ethnic groups with characteristics that lead to success in the modern economy would be if preexisting ethnic characteristics drove both the likelihood that a group took up agriculture and economic outcomes in the modern world. An example would be if some groups were naturally more acquisitive and were able to push less acquisitive

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groups onto marginal land.[24] Unfortunately, we do not have direct measures of these potential characteristics (although some of these are likely to be reflected in the other precolonial traits recorded in the Ethnographic Atlas, whose variation, as we show in what follows, does not seem to explain away our findings). As a partial fix for this concern, we repeat our benchmark regressions including fixed effects for linguistic families and subfamilies as well as ethnic clusters. Groups in the same family will, we presume, have broadly comparable cultural origins, and thus it seems more likely that variation in agriculture as a source of livelihood within an ethnic/linguistic category will be more likely due to variation in opportunity to practice agriculture than to variation in broad cultural characteristics.

We consider three different levels of linguistic and ethnic aggregation. In particular, the 187 groups in our dataset correspond to six language phylums as defined in the Murdock Atlas entry (v98), 13 linguistic subfamilies (entry v99 in Murdock Atlas), and 36 ethnic clusters that correspond to Murdock's (1959) heading of the respective chapters. It is important to keep in mind that for the construction of ethnic clusters Murdock relied on agricultural features, among other things (Murdock, pp. 42–43 "common cultigens"). This implies that the latter classification absorbs most of the variation in our explanatory variable imposing a rather stringent test for our thesis.

To give some examples of the various groupings, in Kenya, the Kikuyu, Meru, and Kamba are all part of the Kenya Highland Bantu ethnic family, the Niger-Congo language phylum, and the Niger-Congo: Bantoid or Central language subfamily, whereas the Luo and Kipsigi are part of the Nilotes ethnic family, the Chari-Nile language family, and the Eastern Nilotic or Sudanic language subfamily. However, ethnic and linguistic categories do not always line up so neatly. For example, the Kissi, Kpelle, and Bete in Guinea are all in the ethnic cluster Kru and Peripheral Mande, but this ethnic cluster spans three linguistic subfamilies, namely: Niger-Congo: Atlantic or West Atlantic (Kissi), Niger-Congo: Kwa (Bete), and Niger-Congo: Mande (Kpelle). Similarly, ethnicities in different ethnic clusters may be linguistically related. In Burkina Faso, the Bisa, Bobo, Gurma, Lobi, and Senufo all belong to the Niger-Congo: Gur or Voltaic language subfamily, but the first of these groups belongs to the Central Bantu ethnic cluster whereas the other four groups belong to the Voltaic ethnic cluster.

As one would expect, these groupings by themselves explain a good deal of the variation in agriculture as a source of livelihood. The R^2 from regressing agricultural

24. There is a large literature in linguistics and anthropology arguing that the spread zones of agriculturalists and pastoralists and their languages following the Neolithic Revolution trace closely land endowments that were amenable to agricultural and herding activities, respectively. Hence, pastoralism is viewed as an adaptation to ecological niches unable to support much agricultural production (Richerson et al. 2001). This observation might raise the possibility that pastoralists attain lower outcomes today due to some characteristic that consigned their ancestors to marginal environments centuries or even millennia ago. We think it unlikely that any differences predating ancestral sorting into lifeways has strong effects on capabilities today, given that both cultural and genetic forces have been at work for many intervening centuries. For example, even if it had been the case that pastoralists are descended from lineages that lost the struggle for good agricultural land due to lack of physical strength or toughness, casual empiricism casts doubt on the proposition that the pastoralists of recent times are lacking in those respects—consider the repeated historical conquests of agrarians by pastoralist armies.

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TABLE 9. Variation from within linguistic and ethnic families.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
	Panel A: Exploiting within-linguistic-family variation					
Agriculture	0.0735***	0.0768***	0.0734***	0.0388***	0.0376***	0.0368***
	(0.0148)	(0.0164)	(0.0147)	(0.0070)	(0.0073)	(0.0070)
Gather/hunt/fish	0.0711***	0.0683***	0.0658***	0.0175**	0.0179**	0.0193***
	(0.0156)	(0.0148)	(0.0135)	(0.0069)	(0.0067)	(0.0064)
Linguistic Family(v98) FE	No	Yes	Yes	No	Yes	Yes
Observations	280,594	280,594	280,594	280,602	280,602	280,602
R^2	0.508	0.509	0.561	0.672	0.672	0.678
	Panel B: Exploiting within-linguistic-subfamily variation					
Agriculture	0.0731***	0.0414**	0.0407**	0.0394***	0.0328***	0.0313***
	(0.0147)	(0.0203)	(0.0174)	(0.0073)	(0.0092)	(0.0085)
Gather/hunt/fish	0.0708***	0.0295	0.0277	0.0173**	0.0223***	0.0216***
	(0.0155)	(0.0220)	(0.0193)	(0.0072)	(0.0075)	(0.0069)
Linguistic Subfamily(v99) FE	No	Yes	Yes	No	Yes	Yes
Observations	285,192	271,802	271,802	271,810	271,810	271,810
R^2	0.506	0.511	0.563	0.671	0.671	0.677
	Panel C: Exploiting within-ethnic-cluster variation					
Agriculture	0.0731***	0.0711***	0.0645***	0.0389***	0.0367**	0.0373**
	(0.0147)	(0.0146)	(0.0125)	(0.0070)	(0.0152)	(0.0165)
Gather/hunt/fish	0.0708***	0.0732***	0.0669***	0.0176**	0.0264*	0.0287*
	(0.0155)	(0.0147)	(0.0131)	(0.0068)	(0.0141)	(0.0157)
Ethnic cluster FE	No	Yes	Yes	No	Yes	Yes
Observations	285,192	285,192	285,192	285,200	285,200	285,200
R^2	0.506	0.509	0.561	0.677	0.678	0.683

Notes: Standard errors in parentheses are clustered at the ethnicity level. All specifications include age, age squared, a female dummy, and a mover dummy (simple controls) as well as enumeration area fixed effects. Columns (3) and (6) also include a vector of occupational dummies; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

dependence on the set of linguistic subfamily dummies is 0.37, and from regressing it on the set of ethnic dummies, the R-squared is 0.67.

Table 9 shows the effect of including these dummies in our benchmark regressions. Adding the six linguistic family dummies has no effect on either the size or significance of the coefficient on agriculture in either the education or the wealth regressions. By contrast, when we use the 13 linguistic subfamily dummies, the coefficient on agriculture in the education regression falls by a little less than half and remains significant at the 5% level, whereas in the case of the wealth regression, the coefficient does not change much and remains highly significant. Surprisingly, when we use 36 dummies for the respective ethnic clusters, there is, once again, very little change in the coefficients on agriculture in either the education or wealth regressions, and

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they remain highly significant. Hence, even within ethnic families, whose constituent groups are presumably broadly comparable along several dimensions, tracing one's ancestry to an ethnicity that practiced more agriculture historically translates robustly into better economic outcomes today. Overall, the evidence suggests that unobserved heterogeneity across large groupings is unlikely to be driving the bulk of our results.

7. Possible Channels: Why is An Agricultural Past Advantageous?

We finally turn to investigating the possible channels through which ancestral lifeway affects present-day individual outcomes. Our exploration starts by looking at other precolonial traits and continues by investigating possible influences on agricultural ethnic groups that might have taken place during the colonial era. We also explore whether the observed pattern is driven by the unequal treatment of descendants of pastoral groups by the central government. Finally, using alternative survey data, we find differences in attitudes and demeanor between descendants of pastoralists and agriculturalists that help account for differences in wealth and educational outcomes.

7.1. Precolonial Characteristics

The Murdock Atlas provides a wealth of information on ethnic-group traits, beyond means of subsistence. In this section, we experiment by adding a number of these to the right-hand side of our benchmark regressions for education and wealth. This is in part an attempt to identify the channels of causation from ancestral lifeways to modern outcomes, since lifeway might influence these other characteristics, which in turn affect modern outcomes.[25] It can also be seen as an additional test of the robustness of the previous findings. Ethnic groups that took up agriculture might have already had certain characteristics that, in turn, influence outcomes today.

The precolonial characteristics that we examine are the following: *polygyny* is a dichotomous indicator for the practice of men marrying multiple wives; *clans* is a dichotomous variable assigned a value of 1 if community marriage organization is coded as characterized by clan communities or clan barrios and not segmented communities, exogamous communities, or segmented communities without local exogamy; *settlements* refers to position on a spectrum ranging from 1 for fully migratory and nomadic to 8 for complex settlements, with permanence and density of settlement increasing with the value assigned; *local jurisdiction* indicates the degree of jurisdictional hierarchy (existence of governance structures) at the local level (e.g., village); *political centralization* indicates jurisdictional hierarchy above the level of the local community, coded 1 (no supracommunity hierarchy) to 5 (four levels of hierarchy above the local community); *class stratification* is a dichotomous indicator equal to 0 if no class stratification exists "among freemen", and 1 if the Atlas records

25. The notion that culture is a "superstructure" determined by a society's "mode of production" or material base, was famously proposed by Karl Marx and championed in the field of anthropology by Harris (1997), among others.

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class stratification, wealth distinctions, elite class, dual classes, or "complex" class structure; the logarithm of precolonial population density, recovered from Murdock (1959); *slavery* refers to presence of an internal institution of slave ownership (as opposed to the external slave trade, which is considered in the subsequent exercise);[26] and *property*, set to 0 if "inheritance rule for real property (land)" is coded "absence of individual property rights", and to 1 if response code is "matrilineal", "patrilineal" or "other heirs". We refer to these characteristics as "precolonial", since we believe that they are measuring aspects of a tribal society that predate European interference. In addition to assessing how these characteristics affect the coefficient on agriculture, it is also of interest to look at their own effects.

The results are shown in Table 10 (Panels A and B). Each column shows results from two regressions that use the same sample. The top line shows the coefficient on the agriculture share in a regression in which the only right hand side variables are the agriculture and hunt/gather/fish shares as well as our "simple controls" and coordinate fixed effects. The remainder of the table shows coefficients from a regression that adds to these one or more of the precolonial control variables. We follow this procedure because missing observations in the Atlas differ across precolonial variables that means that the sample varies significantly across specifications (and, as seen in the last column, is greatly reduced when we use all of the precolonial characteristics together).

The first finding in this table is that controlling for precolonial characteristics, either one at a time or all together, has little effect on the coefficient on agriculture when looking at the effect on education in Panel A. The coefficient always remains statistically significant and does not change in magnitude much when characteristics are entered one at a time. Even when all of the precolonial characteristics are entered in the regression together, the drop in the coefficient is moderate (from 0.0751 to 0.0579), and it remains significant at the 10% level.

In the regressions with wealth as the dependent variable in Panel B, it is once again the case that entering precolonial characteristics one at a time has little bearing on the magnitude of the coefficient on agriculture, which is always highly significant. The pattern is similar when we add all other precolonial traits in the same regression in column (10). Thus accounting for precolonial characteristics does not weaken the estimated effect of agriculture on modern outcomes, nor does it suggest a particular channel by which historical lifeway operates.[27]

7.2. Colonial Roots

In Table 11, we account for variables reflecting factors from the colonial and early

26. It is not clear the degree to which the practice of indigenous slavery in the precolonial period was shaped by the incidence of slave raids in the context of the European slave trades.

27. When we add the precolonial characteristics one at a time into the wealth regressions, political centralization, and class stratification are positive and significant. This result echoes Michalopoulos and Papaioannou's (2013) finding that regional development is higher in ethnic homelands of politically complex societies in the precolonial era.

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TABLE 10. Panel A: Precolonial characteristics (Education).

Variables	(1) Education	(2) Education	(3) Education	(4) Education	(5) Education	(6) Education	(7) Education	(8) Education	(9) Education	(10) Education
Agriculture	0.0734***	0.0871***	0.0741***	0.0746***	0.0746***	0.0760***	0.0958***	0.0748***	0.0710***	0.0750**
	(0.0147)	(0.0165)	(0.0155)	(0.0155)	(0.0155)	(0.0143)	(0.0311)	(0.0135)	(0.0158)	(0.0294)
Agriculture	0.0821***	0.0862***	0.0782***	0.0760***	0.0743***	0.0760***	0.0802**	0.0674***	0.0735***	0.0579*
	(0.0171)	(0.0165)	(0.0146)	(0.0156)	(0.0154)	(0.0143)	(0.0316)	(0.0126)	(0.0161)	(0.0300)
Gather/hunt/fish	0.0784***	0.0607***	0.0672***	0.0781***	0.0717***	0.0651***	0.0811**	0.0643***	0.0607***	−0.0075
	(0.0163)	(0.0160)	(0.0174)	(0.0170)	(0.0163)	(0.0161)	(0.0380)	(0.0143)	(0.0157)	(0.0306)
Polygyny	0.0537*									−0.0044
	(0.0322)									(0.0725)
Clans		−0.0415								−0.0779
		(0.0445)								(0.0817)
Settlement pattern			−0.0181*							0.0113
			(0.0108)							(0.0186)
Local jurisdictional hierarchy				0.0513*						0.0644
				(0.0275)						(0.0407)
Political centralization					0.0109					0.0185
					(0.0204)					(0.0288)
Class stratification						0.012				0.0177
						(0.0394)				(0.0501)
Log (precolonial population density)							0.0304*			0.0074
							(0.0168)			(0.0202)
Slavery								−0.1885***		−0.0839*
								(0.0363)		(0.0455)
Property									−0.1633**	−0.3052**
									(0.0699)	(0.1028)
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	281,042	260,835	268,686	269,480	269,480	258,268	193,239	269,960	256,579	144,227
R^2	0.508	0.514	0.511	0.511	0.511	0.513	0.517	0.512	0.508	0.532

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TABLE 10. Panel B: Precolonial characteristics (Wealth).

Variables	(1) Wealth	(2) Wealth	(3) Wealth	(4) Wealth	(5) Wealth	(6) Wealth	(7) Wealth	(8) Wealth	(9) Wealth	(10) Wealth
Agriculture	0.0390***	0.0404***	0.0401***	0.0402***	0.0402***	0.0418***	0.0593***	0.0380***	0.0329***	0.0572***
	(0.0070)	(0.0073)	(0.0074)	(0.0074)	(0.0074)	(0.0073)	(0.0164)	(0.0070)	(0.0068)	(0.0155)
Agriculture	0.0380***	0.0400***	0.0408***	0.0402***	0.0395***	0.0418***	0.0528***	0.0373***	0.0333***	0.0496***
	(0.0081)	(0.0074)	(0.0071)	(0.0075)	(0.0073)	(0.0070)	(0.0155)	(0.0068)	(0.0068)	(0.0141)
Gather/hunt/fish	0.0169**	0.0150*	0.0158**	0.0163**	0.0190**	0.0210***	0.0389**	0.0191**	0.0148*	0.0209
	(0.0081)	(0.0077)	(0.0074)	(0.0075)	(0.0069)	(0.0076)	(0.0155)	(0.0072)	(0.0074)	(0.0141)
Polygyny	−0.0059									−0.0457
	(0.0176)									(0.0372)
Clans		−0.02								−0.0795
		(0.0261)								(0.0528)
Settlement pattern			−0.003							0.0138*
			(0.0055)							(0.0074)
Local jurisdictional hierarchy				−0.0019						0.0031
				(0.0132)						(0.0226)
Political centralization					0.0318**					0.0181
					(0.0111)					(0.0156)
Class stratification						0.0654***				0.0592**
						(0.0199)				(0.0277)
Log (precolonial population density)							0.0021			−0.0124
							(0.0079)			(0.0107)
Slavery								−0.0203		0.0088
								(0.0212)		(0.0226)
Property									−0.0259	−0.2132***
									(0.0380)	(0.0638)
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	281,050	260,834	268,694	269,488	269,488	258,276	193,246	269,998	256,568	144,233
R^2	0.673	0.676	0.679	0.678	0.679	0.671	0.671	0.671	0.674	0.662

Notes: Standard errors in parentheses, clustered at the ethnicity level. Simple controls always included. These are age, age squared, a female dummy, and a mover dummy. In each column there are two estimates of agriculture. The first estimate (first line labeled Agriculture) corresponds to a regression where we do not control for the other precolonial characteristic focusing on the same sample. The second estimate (second line labeled Agriculture) corresponds to the estimate of the regression when we add the precolonial trait under consideration; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE 11. Colonial roots.

Variables	(1) Education	(2) Education	(3) Education	(4) Education	(5) Education	(6) Wealth	(7) Wealth	(8) Wealth	(9) Wealth	(10) Wealth
Agriculture	0.0731***	0.0745***	0.0738***	0.0575***	0.0565***	0.0389***	0.0355***	0.0351***	0.0356***	0.0357***
	(0.0147)	(0.0152)	(0.0148)	(0.0127)	(0.0118)	(0.007)	(0.0076)	(0.0076)	(0.0077)	(0.0077)
Gather/hunt/fish	0.0708***	0.0711***	0.0676***	0.0493***	0.0482***	0.0176**	0.0161**	0.0142**	0.0151**	0.0136**
	(0.0155)	(0.0156)	(0.0151)	(0.0122)	(0.0119)	(0.0068)	(0.007)	(0.007)	(0.007)	(0.0068)
ln(1+slaves per km^2)		−0.00258	−0.00426	−0.000876	−0.00320		0.0055	0.0046	0.0048	0.0037
		(0.00512)	(0.00515)	(0.00403)	(0.00379)		(0.0038)	(0.0037)	(0.0037)	(0.0037)
ln(1+Christian missions per km^2)			0.212**	0.145	0.0903			0.1123**	0.1094**	0.0799***
			(0.103)	(0.0896)	(0.0910)			(0.0393)	(0.0394)	(0.0373)
Muslim				−0.418***	−0.410***				0.0035	0.0064
				(0.0278)	(0.0279)				(0.023)	(0.0228)
Other religions				−0.416***	−0.413***				−0.176***	−0.1762***
				(0.0388)	(0.0391)				(0.0186)	(0.0188)
Distance to the capital city					−0.0963*					−0.1026***
					(0.0577)					(0.0321)
Distance to the coast					−0.000163**					−0.0000291
					(0.0000707)					(0.0000384)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	285,191	284,691	284,691	284,245	283,301	285,200	284,699	284,699	284,253	283,309
R^2	0.506	0.507	0.507	0.513	0.514	0.677	0.677	0.677	0.677	0.677

Notes: Standard errors in parentheses, clustered at the ethnicity level. Simple controls include age, age squared, a female dummy, and a mover dummy. The default group in columns (4) and (9) are Christians. Distance to capital is the distance from one's ancestral homeland to the capital of the country, distance to coast is the distance from one's ancestral homeland to the nearest coast, ln(1+slaves per km^2) is calculated using the total number of slaves per square kilometer in one's ancestral homeland, and similarly ln(1+missions per km^2) is computed using the total number of missions per square kilometer in one's ancestral homeland; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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postcolonial period that might influence economic outcomes of descendants today. We include two measures intended to capture the impact of the slave trade: slaves taken per square kilometer of the ancestral ethnic homeland and distance from the centroid of the ancestral homeland to the sea. We also include two variables that are intended to measure other influences of Europeans: missions per square kilometer of the ancestral ethnic homeland, and distance of the homeland's centroid to the capital city. Finally, we include measures of religion at the individual level. The reference group in this case is Christian, with the two other categories being Muslim and other/no religion.[28]

Unlike the precolonial measures, inclusion of the new variables in Table 11 has relatively little effect on the size of our sample, and in no case does their inclusion alter the significance of the coefficient on agriculture. Including all of them together, the coefficient on agriculture in the education regression falls by one fifth, and that in the wealth regression hardly changes. Of the additional variables, the most notable effects are from religion. Non-Christians have lower levels of educational attainment, whereas for wealth, being other/no religion has a negative effect, but this is not the case for Muslims. There are also indications that presence of Christian missions (established during the colonial era in the ancestral group's homeland) improves descendants' current outcomes. In contrast, contact with Europeans engendered by proximity to the capital city shows a negative effect, if any. We find little sign of an effect of the slave trade in these specifications. We return to the impact of missions in Section 7.4.

7.3. Cultural Roots: Attitudes toward Violence, Perceptions of Survey Enumerators

A natural theory explaining persistent effect of ancestral lifeways on modern outcomes is that there is cultural transmission of traits related to lifeways that impact behavior today. The range of potentially relevant traits is enormous, and measurement of any particular cultural trait is difficult.

Data availability leads us to focus our exploratory exercises on two features sometimes attributed to pastoralist cultures and seeming at first blush to have the potential to reduce the success of individuals in modernizing societies. They are, first, a reputed proclivity to violence in men (Nisbett and Cohen 1996; Pinker 2011; Grosjean 2014), and second, alleged low status of women (Krätli 2001; Bodley 2011).[29] The

28. The DHS religion variable (v130) is coded differently for each country. For some countries, we collapsed several groups to form the "Christian" category. All the countries provided enough information for us to put individuals into one of our three categories, except for Namibia, which does not have a unique category for "Muslim". But considering that Namibia is overwhelmingly Christian (only 25 observations are non-Christian), this should not be a big problem.

29. In a laboratory experiment involving university student subjects in five culturally and institutionally distinct countries on three continents, Ahn et al. (2016) find subjects in Mongolia substantially less successful than those in Austria, the United States, Mexico, and South Korea at foregoing theft from fellow group members to foster socially efficient production. Unlike the other countries, the ancestors of the Mongolian students were overwhelmingly practitioners of pastoralism a few generations ago. However, it lies beyond the scope of our investigation to draw conclusions regarding the claims concerning either

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TABLE 12. Violence toward women.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	First principal component of whether it is justified to beat one's wife			First principal component of whether it is justified to beat one's wife		
	Male respondents			Female respondents		
Agriculture	−0.0273**	−0.0255**	−0.0219*	−0.0246**	−0.0248**	−0.0181*
	(0.0129)	(0.0119)	(0.0112)	(0.0103)	(0.0101)	(0.0092)
Gather/hunt/fish	−0.0153	−0.0129	−0.0083	−0.0278***	−0.0291***	−0.0224***
	(0.0120)	(0.0117)	(0.0115)	(0.0080)	(0.0081)	(0.0075)
Muslim			0.1071***			0.1968***
			(0.0209)			(0.0241)
Other religions			0.1345***			0.1100***
			(0.0341)			(0.0343)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61,495	61,495	61,433	161,606	161,606	161,316
R^2	0.251	0.254	0.255	0.361	0.363	0.363

Notes: Standard errors in parentheses are clustered at the ethnicity level; in columns 1–3 (4–6) we focus on males (females). Simple controls include age, age squared, and a mover indicator; the dep. var. is the first principal component on a series of questions on whether it is justified to beat one's wife; the omitted subsistence category is the share of subsistence from pastoralism of the individual's ancestral ethnic group; the omitted religious category are Christians. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

first trait might disadvantage men as candidates for occupations requiring cooperative interaction with those from other cultures, and the second might, among other things, cause greater gender disparities, lower investment in education and health of women, and lead to lower female participation in the labor force.

In the DHS there is a set of attitudinal measures that reflect some combination of men's attitudes toward both violence and women. Specifically, five questions in the DHS ask respondents about the circumstances under which it would be acceptable for a man to beat his wife.[30] As our dependent variable, we use the first principal component of these five measures, which on average explains 59.9% of the variation in each of them. The standard deviation of the dependent variable is 1.73.

Table 12 shows the results. We include our standard set of controls, and also experiment with including a control for being Muslim, since Muslims are somewhat overrepresented among pastoralists and reduced freedom or lower status for women is sometimes attributed to Muslim cultures. Being from an ethnicity that was traditionally dependent on agriculture has a negative and significant effect on the reported acceptability of violence toward women when the Muslim control is not included,

proclivity to violence or low status of women; among the sources referenced, both Bodley and Krätli view the claim of low status of women as being oversimplified.

30. The variables are MV744A–MV744E. The circumstances are: wife goes out without telling him; wife neglects the children; wife argues with him; wife refuses to have sex with him; wife burns the food.

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and is significant at the 10% level when the control is included. The pattern is similar for both male and female respondents.

We also checked whether the likelihood of sending a girl to school relative to that of sending a boy differed in households according to the DHS data depending on the degree of ancestral reliance of agriculture of the household head. We found no significant difference here. This suggests that variation in the acceptability of violence toward women discussed previously may be more informative about differences in attitudes toward violence than about differences in attitudes toward women, but strong conclusions are probably unwarranted in the absence of further evidence.

In addition to this result from our DHS data, we also find evidence suggestive of difference in interpersonal interaction style from a set of questions that enumerators of the Afrobarometer 4 survey are asked to complete following each interview. The enumerator codes (a) whether the respondent seemed hostile, (b) whether the respondent appeared bored, (c) whether the respondent was uncooperative, (d) whether the respondent appeared impatient, (e) whether the respondent seemed suspicious, and (f) whether the respondent struck the enumerator as dishonest in his or her responses. The Afrobarometer survey includes information on the ethnicity of each respondent, so we are able to link the coded data of more than 25,500 surveyed individuals in 19 countries to ancestral ethnicity and thus to the same Ethnographic Atlas lifeway shares used in the rest of our analysis. See the summary statistics in Table A.9.

Columns (2)–(7) of Table 13 show the results of OLS regressions of the enumerator codings for respondent characteristics (a)–(f) on our agriculture and hunting/fishing/gathering share variables plus age, age squared, a female dummy, location fixed effects, and a mover dummy, with errors clustered at the ethnic identity of each respondent. These regressions, as well as those in Table 14, also include fixed effects for both individual interviewers and the language of the interview, which is feasible because individual interviewers conducted interviews in several languages. The estimated coefficients indicate that relative to the omitted ancestral lifeway of animal husbandry, greater ancestral reliance on agriculture significantly reduces impressions of boredom, impatience, and dishonesty, and reduces with marginal significance impressions that the respondent is uncooperative and suspicious. This suggests a difference in disposition to which the ancestral lifeway may originally have contributed, and that may potentially affect the economic success of these descendants even in quite different modern environments. Although we cannot rule out the possibility that this result derives from bias on the part of enumerators who are themselves descended from agriculturalists, the inclusion of both interviewer and language of interview fixed effects somewhat mitigates this concern.

To get a sense of how much of the effect of lifeway on education and wealth might be explained by the differences documented in Table 13, we estimate regressions paralleling our benchmark regressions (Table 3) using observations from the Afrobarometer Round 4 Surveys rather than the DHS. The first column of Table 14 presents this baseline specification that reassuringly confirms our finding about the significant positive impact of ancestral reliance on agriculture on education (there is not a wealth variable in the Afrobarometer comparable to the DHS measure).

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TABLE 13. Political perceptions and attitudes.

Variables	(1) Group's political influence	(2) Respondent is hostile	(3) Respondent is bored	(4) Respondent is noncooperative	(5) Respondent is impatient	(6) Respondent is suspicious	(7) Respondent is dishonest
Agriculture	−0.0886***	−0.005	−0.0161**	−0.0128	−0.0174**	−0.0087	−0.0133**
	(0.0280)	(0.0044)	(0.0064)	(0.0077)	(0.0086)	(0.0071)	(0.0055)
Gather/hunt/fish	0.0174	−0.0016	−0.0109*	−0.0015	−0.0131*	0.005	−0.0004
	(0.0265)	(0.0039)	(0.0056)	(0.0059)	(0.0076)	(0.0063)	(0.0042)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Language of the interview FE	No	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.339	0.373	0.371	0.357	0.361	0.405	0.438
Observations	19,480	20,851	20,863	20,867	20,865	20,869	20,867

Notes: Standard errors in parentheses are clustered at the Atlas level. Simple controls include age, age squared, a female dummy, and a mover indicator. Group's political influence variable captures the respondents perception whether his/her own group has more influence politically compared to other groups. Higher values indicate lesser influence; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE 14. Ancestral lifeways education, political representation and attitudes.

Variables	(1) Education	(2) Education	(3) Education	(4) Education	(5) Education
Agriculture	0.0164**	0.0180**	0.0159**	0.0165**	0.0145*
	(0.0077)	(0.0078)	(0.0077)	(0.0076)	(0.0076)
Gather/hunt/fish	0.0101	0.0099	0.0097	0.0101	0.01
	(0.0076)	(0.0073)	(0.0072)	(0.0071)	(0.0070)
Simple controls	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes
Interviewer FE	No	Yes	Yes	Yes	Yes
Personality traits	No	No	Yes	No	Yes
Group's political influence	No	No	No	Yes	Yes
R^2	0.55	0.576	0.582	0.576	0.582
Observations	19,422	19,422	19,422	19,422	19,422

Notes: Standard errors in parentheses are clustered at the Atlas level. Simple controls include age, age squared, a female dummy, and a mover dummy; In columns (2)–(5) we add interviewer fixed effects; in column (3) we control for the respondent's perception of own ethnic influence in politics as well as the attitudes of each respondent as recorded by the interviewer regarding whether the respondent is bored, noncooperative, suspicious, impatient, and dishonest. In column (4) we control for the respondent's perception of own ethnic influence in politics. In column (5) we control for both political influence and personality traits. The education variable is the log(1+educational category). The latter takes 10 values corresponding to: 0 = no formal schooling, 1 = informal schooling (including Koranic schooling), 2 = some primary schooling, 3 = primary school completed, 4 = some secondary school/high school, 5 = secondary school completed/high school, 6 = post-secondary qualifications, other than university, for example, a diploma or degree from a technical/polytechnic/college, 7 = some university, 8 = university completed, 9 = post-graduate; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$.

Exploiting variation within the 3748 enumeration areas in the Afrobarometer 4, effectively comparing the education outcomes across roughly six respondents per village, those of agricultural ancestry are more educated. In columns (2)–(5) we introduce interviewer-specific constants whereas in column (3) we add controls for the enumerators' judgments of the surveyed individuals. We find that adding the enumerator scores on the respondent's personality characteristics modestly reduces the coefficient on agriculture by a little under 12%, from 0.018 to 0.0159, which suggests that a moderate share of the influence of agricultural ancestry may operate through the channel of such personality traits.[31]

7.4. Institutional Roots: Treatment by Europeans and Political Influence

Although the findings in Section 7.3 suggest that culture, personality traits, and/or attitudes that members of pastoralist groups have handed down over the generations may negatively affect their economic outcomes today, we cannot rule out that the treatment that they and their ancestors received at the hands of colonizers and post-colonial political elites also plays a part in explaining their outcomes.

31. Compared to the DHS education estimates, the difference in the coefficient magnitude is driven by the fact that in the Afrobarometer Surveys the education variable is more detailed and takes 10 distinct values corresponding to different educational levels. We take the log to reduce the skewness in the distribution.

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A first hint of such differential treatment of pastoralists and agriculturalists builds on the finding in Table 11 that past presence of Christian missions has been economically advantageous to groups in whose midst they were situated. If there were fewer missions in pastoralist homelands, this could have proven disadvantageous. The correlations between the extent of reliance on animal husbandry by an Atlas ethnic group and number of missions in the homeland, the number of missions per square kilometer of homeland area, and a dummy variable for presence of any mission in the homeland are all negative and significant. Since there were fewer missions among pastoralists and past mission presence predicts better contemporary outcomes, we see one possible pathway for pastoralism to have disadvantaged groups' descendants via an influence on treatment by Europeans. Although statistically significant, however, the economically insubstantial change in the estimated coefficient on agriculture when the control for missions is added in Table 11 implies that this specific factor is not quantitatively important in its own right.

We also find evidence that those of pastoralist descent have, or at least perceive themselves to have, less political influence than those of agricultural background in contemporary Africa. The literature on African political economy provides abundant evidence of the role played by ethnic favoritism in determining access to employment and government services; see, for example, Franck and Rainer (2012) and Kudamatsu (2009). Hence, a natural candidate for explaining the observed differences in the socioeconomic status between pastoral and agricultural groups is their difference in political power. We attempted to shed light on this issue by performing the following three tests.

First, in an attempt to gauge the political representation of a group, we followed Michalopoulos and Papaioannou (2016) and linked the groups in the Ethnic Power Relationship dataset (EPR) to the Murdock Atlas groups. The former dataset created by Wimmer, Cederman, and Min (2009) records periods/years of ethnic-based discrimination. Using this direct measure as the outcome of interest (more precisely using a dummy indicating whether a group has ever been discriminated against between 1960 and 2010), we find that groups more dependent on pastoralism precolonially have experienced during the postcolonial era a 4% increase in the likelihood of discrimination (with a sample mean of 16%). This association, albeit marginally insignificant ($p < 0.15$), is suggestive of the disadvantage that descendants of pastoral groups face in the political sphere (table is available upon request).

Second, motivated by the finding of Francois, Rainer, and Trebbi (2015) that across roughly 15 democratic African countries ruling coalitions are surprisingly large and that political power is allocated proportionally to population shares across ethnic groups, we added as a control in the benchmark regressions the log of the number of individuals belonging to the respondent's ethnic group within country (we also tried the share of the group in the country's sampled population, finding similar results). This variable is meant to capture the de facto influence of that group in the political arena. We find that adding the population size (share) of the ethnic group in the main Table 3 specification does not affect the quantitative significance of our estimates.

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Third, data from the Afrobarometer indicate that those whose ancestors relied more on animal husbandry than agriculture perceive their ethnic group to be less politically influential. This is shown in column (1) of Table 13 where the dependent variable is the respondent's perception of his group's political influence. Because the dependent variable's coding assigns a smaller value for greater perceived influence, the negative significant coefficient on agriculture means that the more the respondent's ancestral group relied on agriculture, the greater the perceived political influence of her group.

Although it is possible that the reported self-perception of less influence on the parts of respondents having pastoralist ethnic backgrounds simply reflects some personality trait that perhaps correlates with impatience, suspicion, and other characteristics judged present by the enumerators, it is also possible that the groups in question are in fact less influential (on average) in their nations' political scenes, and that this is indeed one of the pathways explaining the inferior economic outcomes of current members of those groups. With respect to magnitudes, comparison of regressions (2) and (4) of Table 14 indicate that controlling for differences in perceived political influence lowers the magnitude of the coefficient on agriculture by 8%, suggesting that the factor has nonnegligible importance, but is relatively less important than the personality traits that the same table's exercises suggest can account for about 12% of the estimated coefficient on agriculture. In column (5) of Table 14, accounting for both differences in perceived personality traits as well as perceived political influence of the group reduces the coefficient on ancestral dependence on agriculture by 19%, leaving it marginally significant at the 10% level.

8. Conclusion

On the eve of the "Scramble for Africa", the continent was replete with examples of almost every kind of preindustrial subsistence economy, from hunter-gatherers to nomadic pastoralists to shifting and intensive agriculturalists. Today, five generations later, the descendants of these groups are often intermingled within urban settings. Does one's lineage in terms of precolonial lifeways matter for today's individual outcomes?

In this paper, we have looked at agriculture and pastoralism not as current occupations but as ancestral ones, investigating whether the precolonial lifeways of contemporary Africans' ethnic groups predict the current economic outcomes of their members. In survey data from 21 sub-Saharan countries, we find that the greater was one's ancestral group's reliance on agriculture, the better one's outcomes are today, even when controlling for a large number of potentially relevant factors and when focusing on those living at some remove from the ancestral homeland, those in cities, and those engaged in nonagriculture and nonanimal raising occupations. We confirmed our main result also in a second substantial data set, reproduced it using land suitability to instrument for reliance on agriculture, determined that it is not attributable to the shared heritages of linguistic or ethnic family groupings, and identified possible channels through which an ancestry reliant on animal husbandry contributes to inferior contemporary outcomes. Among the traits in question, we found provisional evidence

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relating to violence and impatience, but dimensions of culture for which we presently lack measures, such as attitudes toward work, might be equally or more important. Possibly, economic lifeway in past centuries encouraged the development of cultural and attitudinal traits that served useful functions under the conditions then extant but that, transmitted to more recent generations in the course of their upbringing and socialization, confer a handicap on those of one background relative to those of the other.

These findings leave open the question of whether what accounts for the outcomes observed is disadvantageous traits that those of pastoral ethnicity have carried with them into agrarian and urban environments, or whether instead the prejudices and unfavorable treatment of pastoral ethnicities, first by European missionaries and colonial officials and subsequently by African elites, are to blame. We find some evidence consistent with a prejudicial or at least differential treatment pathway in the facts that presence of missions is found to be economically helpful and that missions were significantly less common among pastoralists. Additional evidence comes from pastoralist descendants' self-reported perception that their groups have less influence than others in their countries' politics today. Although we controlled for enumerator effects, the survey enumerators' reports of impatience and uncooperativeness on the parts of respondents of pastoralist background might still partly reflect prejudices against pastoralists, if the vast majority of enumerators have agriculturalist roots.

Although we are unable to fully separate the "inherent trait" from the "treatment by others" type explanations, it seems likely that at least part of the disadvantage exhibited by those of nonagricultural ancestry does reflect deep cultural factors, and that our results therefore stand as evidence of the persistent impact of history on current economic outcomes. Our findings bear comparison with cross-country evidence that earlier and more extended agrarian state development confers economic advantages today at the national level, but they may constitute the first of this kind that document the influence of historical way of life at the individual level. It suggests an arrow of causality running from environmental factors through economic adaptation and thence to culture and persistent traits, with those traits exerting an influence for some generations past removal of the culture-bearers from the originating environment. It joins in this respect a growing literature on culture and the economy, a literature whose relevance to future policy-making begins with offering a better understanding of the factors that lie behind the challenges facing economically disadvantaged groups.

Appendix A: Discussion on the Ethnographic Atlas and Murdock's (1959) Map

Murdock's Ethnographic Atlas attempts to compare the earliest ethnographic and other accounts of societies to compile descriptions of their economic, social, political, and cultural characteristics prior to sustained contact with Europeans. For sub-Saharan Africa, the vast majority of these observations were recorded between the onset and the consolidation of the European "scramble for Africa", between the 1870s and the 1960s. For many societies, there were multiple accounts to compare and these included

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published descriptions by trained ethnographers. Murdock's aim was to assemble cross-cultural data encoding information by the most uniform possible criteria and standards so as to permit scientific testing of hypotheses regarding correlations between matters as diverse as property rights, religious beliefs, marriage, political institutions, and mode of subsistence. The version compiled by Gray (1999) in World Cultures, which we currently use, has been employed by Gennaioli and Rainer (2007), Michalopoulos and Papaioannou (2013, 2014), Nunn and Wantchekon (2011), Fenske (2013), Alsan (2015), and other economists as described at

devecondata.blogspot.com/2007/10/ethnographic-atlas.html

and in Section 1.2 of Fenske (2013). An account of the Atlas's history is also provided at

eclectic.ss.uci.edu/∼drwhite/worldcul/atlas.htm.

It is crucial to stress that the Ethnographic Atlas data were published over an 18-year period between 1962 and 1980 that opened the door to corrections that could be incorporated in succeeding editions. Up to 15% of entries for African ethnic groups, only slightly less than the 17% share for other ethnicities, had changes recorded in

TABLE A.1. Panel A: Matching ethnicities in the DHS to Murdock Map and Atlas.

Method	Atlas percent	Atlas cum. percent	Map percent	Map cum. percent
Direct match	58.41	58.41	66.7	66.7
Afrobarometer	4.43	62.84	10.92	77.61
Ethnologue/Joshua alternate name	11.44	74.28	6.33	83.95
Ethnologue/Joshua superset	2.53	76.81	2.27	86.21
Ethnologue/Joshua subset	5.05	81.86	4.49	90.7
Other source (e.g., Wikipedia)	0.53	82.4	0.82	91.53
Other source, not sure	5.47	87.87	0.28	91.8
Ethnologue/Joshua related	0.08	87.95	0.08	91.88
Nunn and Wantchekon (2011)	2.55	90.5	0.78	92.66
Michalopoulos and Papaioannou (2013)	0.81	91.31	0.95	93.61
Not matched	8.69	100	6.39	100

Notes: Description of the Matching Methodologies: (1) Direct match: the DHS ethnicity name is the same as the name used in the Murdock source (Atlas or Map). (2) Afrobarometer match: Nunn and Wantchekon (2011) create matches between the Afrobarometer. Round 3 ethnicities (http://www.afrobarometer.org) and the Murdock names. Using the Nunn and Wantchekon (2011) data, we were able to match more DHS ethnicities to Murdock names through Afrobarometer names. (3) Ethnologue/Joshua Alternate Name: the DHS ethnicity name and the Atlas name are "alternative names" according to either Ethnologue (http://www.ethnologue.com/) or Joshua Project (http://joshuaproject.net/). (4) Ethnologue/Joshua superset: In Joshua or Ethnologue, we find a matching Atlas or Map name that appears as a superset (i.e., containing set) of our target DHS ethnicity. For example, if the group "American English" appears in the DHS and Ethnologue describes this group as a subset of "English", which appears in the Murdock data. (5) Ethnologue/Joshua subset: In Joshua or Ethnologue we find a matching Atlas or Map name that appears as a subset of the DHS ethnicity that we want to match. For example, if "Chinese" appeared in the DHS and "Mandarin" appeared in the Murdock data, and if Ethnologue informed us the latter was a subset of the former. (6) Other source (e.g., Wikipedia). (7) Other source (e.g., Wikipedia) not sure: used in cases where the information from other sources left questions about the quality of the match. (8) Ethnologue/Joshua related: we find a group that is related to our target ethnic group, according to either Ethnologue or Joshua Project. (9) Nunn and Wantchekon (2011): we referred to a do file used in this paper that resolves the discrepancies in the Map and Atlas names of the same ethnicity. (10) Michalopoulos and Papaioannou (2013).

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TABLE A.1. Panel B: Summary statistics for DHS sample—all individuals.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Agriculture	285,200	5.861	1.511	0	9
Pastoralism	285,200	2.338	1.718	0	9
Fishing	285,200	0.764	0.814	0	4
Hunting	285,200	0.707	0.733	0	7
Gathering	285,200	0.324	0.543	0	3
Gather/hunt/fish	285,200	1.796	1.329	0	10
Education	285,255	1.356	1.472	0	5
Wealth	285,263	3.119	1.437	1	5
Christian	284,817	0.527	0.499	0	1
Muslim	284,817	0.412	0.492	0	1
ln(1+slaves per km^2)	284,762	4.339	3.457	0	10.540
ln(1+missions per km^2)	284,762	0.105	0.182	0	1.287
Polygyny	281,050	0.488	0.500	0	1
Clans	260,843	0.213	0.409	0	1
ln(population density in the historical homeland)	193,246	2.383	1.419	−5.717	4.761558
Jurisdictional hierarchy at the local level	269,488	3.158	0.638	2	4
Jurisdictional hierarchy above the local level	269,488	2.719	0.903	1	5
Class stratification dummy	258,276	0.685	0.464	0	1
Slavery	269,998	0.812	0.390	0	1
Property	256,586	0.947	0.224	0	1

Table A.1 (one of the total of four tables in the initially published dataset), which includes the lifeways variables, during the 1967–1980 period, according to Gray. This and the considerable subsequent editing efforts in 1986, 1990, and (the current one) 1999 that caught numerous errors of data entry gives reason to assume that quality standards are reasonably high. As with any data set, nevertheless, recorded observations may represent the underlying phenomena with error for a variety of reasons, including the (implicit or explicit) bias that ethnographers themselves may have. However, the fact that the more recently compiled scientific data on land suitability for agriculture predicts historical dependence on agriculture, as reported in Section 5.1 of our paper, provides evidence that the accounts of relative reliance on the different sources of subsistence on which Murdock relied were not entirely arbitrary.

What about the quality of Murdock's (1959) map? Some ethnographers find it conceptually difficult to assign a group to a well-defined historical homeland particularly for those with mobile lifestyles. Moreover, Murdock's map does not allow for regions where groups overlap, which was likely common along the boundaries of ethnic homelands. Nevertheless, this ethnic mapping provides a unique, albeit imperfect, glimpse of the ethnic landscape at the turn of the 20th century in Africa. An indirect way to infer whether the depicted homelands are broadly consistent with the precolonial ones is to check whether the underlying geography of these homelands maps into the historical characteristics of these groups as recorded in

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TABLE A.2. Panel A: Alternative transformations of educational attainment.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	At least some primary education			At least primary education completed			Years of schooling		
Agriculture	0.0357***	0.0239***	0.0234***	0.0268***	0.0203***	0.0199***	0.3347***	0.2238***	0.2119***
	(0.0065)	(0.0034)	(0.0033)	(0.0057)	(0.0043)	(0.0040)	(0.0670)	(0.0429)	(0.0377)
Gather/hunt/fish	0.0361***	0.0284***	0.0282***	0.0261***	0.0212***	0.0209***	0.2936***	0.2297***	0.2212***
	(0.0058)	(0.0041)	(0.0040)	(0.0056)	(0.0046)	(0.0043)	(0.0625)	(0.0476)	(0.0435)
Urban	0.2216***			0.2638***			2.8006***		
	(0.0182)			(0.0112)			(0.1160)		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-ethnic homeland FE	Yes	No	No	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	285,192	285,192	285,192	285,192	285,192	285,192	284,994	285,944	285,944
R^2	0.43	0.50	0.51	0.35	0.42	0.44	0.45	0.54	0.59

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{***}p < 0.01$.

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TABLE A.2. Panel B: Looking at individual components of wealth.

Variables	(1) Electricity	(2) Bike	(3) Car	(4) TV	(5) Radio	(6) Motorcycle	(7) Refrigerator	(8) Telephone Land Line
Agriculture	0.0054***	−0.0021	0.0008	0.0041	0.0076***	0.0046***	0.0047*	0.0061***
	(0.0018)	(0.0017)	(0.0014)	(0.0027)	(0.0020)	(0.0017)	(0.0026)	(0.0016)
Gather/hunt/fish	0.0008	−0.0025	−0.0021	0.0033	0.0041**	0.0012	0.0029	0.0026*
	(0.0017)	(0.0016)	(0.0013)	(0.0023)	(0.0020)	(0.0021)	(0.0019)	(0.0011)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	283,461	283,426	283,290	283,441	283,560	283,368	283,390	272,311
R^2	0.68	0.41	0.21	0.49	0.19	0.29	0.38	0.27

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; in each column the dependent variable is an indicator that takes the value 1 if the household owns this specific asset and 0 otherwise; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{***}p < 0.01$.

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TABLE A.3. Panel A: Benchmark: DHS regressions within villages/towns with mostly categories disaggregated.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Mostly intensive agriculture	0.3163***	0.1647**	0.1552***	0.2975**	0.1111***	0.1048***
	(0.1157)	(0.0729)	(0.0585)	(0.1206)	(0.0408)	(0.0379)
Mostly extensive agriculture	0.2905**	0.1433**	0.1445**	0.3439***	0.1318***	0.1281***
	(0.1150)	(0.0708)	(0.0583)	(0.1169)	(0.0412)	(0.0387)
Mostly agriculture unknown source	0.3227***	0.1456*	0.1527**	0.4366***	0.1192**	0.1125**
	(0.1208)	(0.0794)	(0.0660)	(0.1202)	(0.0535)	(0.0497)
Mixed dependence	0.0483	(0.0284)	(0.0239)	0.1123	0.0423	0.0352
	(0.1126)	(0.0706)	(0.0584)	(0.1180)	(0.0420)	(0.0395)
Mostly hunting	−1.5625			−1.7635		
	(0.1186)			(0.1163)		
Urban	0.9231***			1.6447***		
	(0.0346)			(0.0457)		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic homeland-country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,192	285,192	285,192	285,200	285,200	285,200
R^2	0.42	0.51	0.56	0.49	0.68	0.68

Notes: Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared, a female dummy, and a mover dummy. The omitted categories are the individuals whose ancestral groups derived most of their subsistence needs from pastoralism. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

TABLE A.3. Panel B: DHS regressions within villages/towns allowing the coefficient to vary by the type of agriculture (intensive vs. extensive).

Variables	(1) Mostly extensive agriculture	(2) Mostly intensive agriculture	(4) Mostly extensive agriculture	(5) Mostly intensive agriculture
	Education		Wealth	
Agriculture	0.1786***	0.1285*	0.0368**	0.0261
	(0.0518)	(0.0747)	(0.0147)	(0.0217)
Gather/hunt/fish	0.1541***	0.156	0.0072	0.0363*
	(0.0496)	(0.0972)	(0.0184)	(0.0200)
Simple controls	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes
Observations	178,316	47,607	178,323	47,608
R^2	0.52	0.49	0.65	0.71

Notes: Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared, a female dummy and a mover dummy. Columns 1 (2) and 3 (4) focus on individuals that belong to groups that precolonially derived most of their subsistence needs from extensive (intensive) agriculture. The omitted category are the individuals whose ancestral groups derived most of their subsistence needs from pastoralism. $^{*}p < 0.1$; $^{***}p < 0.01$.

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TABLE A.4. Panel A: Benchmark: DHS regressions within villages/towns.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Agriculture	0.1036***	0.0763***	0.0725***	0.0972***	0.0399***	0.0391***
	(0.0216)	(0.0157)	(0.0140)	(0.0225)	(0.0074)	(0.0073)
Gathering	0.0526*	0.0165	0.0167	-0.0088	-0.0068	-0.0041
	(0.0311)	(0.0227)	(0.0197)	(0.0277)	(0.0103)	(0.0098)
Hunting	0.1057***	0.0953***	0.0922***	0.0676**	0.0243*	0.0270**
	(0.0326)	(0.0263)	(0.0243)	(0.0310)	(0.0141)	(0.0137)
Fishing	0.1041***	0.0889***	0.0847***	0.0677***	0.0279***	0.0270***
	(0.0260)	(0.0215)	(0.0193)	(0.0213)	(0.0088)	(0.0083)
Urban	0.9200***			1.6404***		
	(0.0358)			0.0459		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic homeland-country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,192	285,192	285,192	285,200	285,200	285,200
R^2	0.418	0.507	0.559	0.49	0.676	0.681

Notes: Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

the Ethnographic Atlas. Several researchers have shown this to be the case. For example, Alsan (2015) shows that groups' homelands, drawn by Murdock (1959), that are geographically suitable for the tsetse fly depend less on pastoralism. Nunn and Wantchekon (2012) document that homelands that according to the map are further from the coast suffered less from the slave raids. Fenske (2014) shows that politically centralized groups are those located according to Murdock's map on more geographically diverse territories consistent with Bate's (1983) hypothesis about the origins of states. Showing in our study that land suitability for agriculture increases a group's precolonial dependence on agriculture complements these studies that have relied on the explanatory power of tribal geography as mapped by Murdock. Moreover, there is evidence that these homelands are persistent. In our dataset for roughly 50% of the respondents, their current location coincides with the ancestral homeland of the group they belong to (see our discussion in Section 3.1.2).

A.1. Matching of DHS ethnicities to the Ethnographic Atlas and Murdock's Map

A key challenge for our project was to reconcile differences in ethnic identification in the two sources associated with Murdock (the 1959 Map and the 1967 Atlas) and in the DHS. Panel A provides a summary of methods by which matching was achieved, with the earlier listed methods always relied upon when possible, and recourse being made to later listed methods only as necessary. Each matching method is further described in the list following the table.

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TABLE A.4. Panel B: Benchmark: DHS regressions within villages/towns.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Agriculture	0.1034	0.0731	0.0694	0.097	0.0389	0.0379
	(0.0212)***	(0.0147)***	(0.0128)***	(0.0230)***	(0.0073)***	(0.0071)***
	[0.0236]***	[0.0166]***	[0.0147]***	[0.0243]***	[0.0108]***	[0.0107]***
	{0.0259}***	{0.0196}***	{0.0193}***	{0.0194}***	{0.0124}***	{0.0121}***
	((0.0246))***	((0.0171))***	((0.0171))***	((0.0188))***	((0.0102))***	((0.0100))***
Gather/hunt/fish	0.0918	0.0708	0.0681	0.0488	0.0176	0.019
	(0.0200)***	(0.0155)***	(0.0140)***	(0.0159)***	(0.0073)**	(0.0070)***
	[0.0301]***	[0.0204]***	[0.0203]***	[0.0191]**	[0.0117]	[0.0119]
	{0.0295}***	{0.0216}***	{0.021}***	{0.0208}**	{0.014}	{0.0141}
	((0.0289))***	((0.0209))***	((0.0207))***	((0.0196))**	((0.0135))	((0.0132))
Urban	0.9199			1.6401		
	(0.0357)***			(0.0474)***		
	[0.0391]***			[0.0647]***		
	{0.0639}***			{0.0836}***		
	((0.0632))***			((0.0808))***		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-ethnic homeland FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	285,192	285,192	285,192	285,200	285,200	285,200
R^2	0.418	0.506	0.559	0.49	0.676	0.681

Notes: This table presents 4 different sets of standard errors. In parentheses clustering is done at the individual's ethnicity level; in brackets we cluster at the cultural province level; in squiggly brackets we cluster both at the country and cultural province level; in double parentheses the standard errors are corrected for spatial correlation using Conley's correction method and a distance cutoff of 500 km; simple controls include age, age squared, a female dummy, and a mover dummy. The omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE A.5. Panel A: Wealth.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Countries	Burkina Faso	Benin	Congo, DR	Central African Republic	Cote d'Ivoire	Cameroon	Ethiopia	Ghana	Guinea	Kenya	Mali
Agriculture	0.0961***	0.1250**	0.0382**	−0.1166		−0.0747***	0.0607***	0.0521***	−0.0579*	0.0299**	0.0290**
	(0.0283)	(0.0370)	(0.0067)	(0.0707)		(0.0200)	(0.0191)	(0.0119)	(0.0264)	(0.0124)	(0.0088)
Gather/hunt/fish	0.0882***	0.2629***		−0.1645**	0.1589**	−0.0576***	−0.1279**	0.0579***	0.0200*	−0.0278	0.0025
	(0.0231)	(0.0585)		(0.0688)	(0.0372)	(0.0165)	(0.0513)	(0.0090)	(0.0091)	(0.0153)	(0.0104)
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,770	8550	2186	7435	2343	13,672	27,327	8512	10,847	11,030	17,191
R^2	0.607	0.695	0.783	0.642	0.779	0.715	0.732	0.771	0.715	0.723	0.648
Countries	**12 Malawi**	**13 Mozambique**	**14 Nigeria**	**15 Niger**	**16 Namibia**	**17 Sierra Leone**	**18 Senegal**	**19 Togo**	**20 Uganda**	**21 Zambia**	
Agriculture	0.0265	0.0191	0.0936**	0.0229*	−0.0595	0.0556**	0.0808**	0.3810***	0.0805***	0.0373***	
	(0.0456)	(0.0209)	(0.0324)	(0.01)	(0.0774)	(0.0139)	(0.0306)	(0.0229)	(0.0240)	(0.0124)	
Gather/hunt/fish	−0.0059	0.0066	0.0718*	0.0339**	−0.0925	0.0849	−0.0011	0.3831***	0.0723*	0.0232*	
	(0.0364)	(0.0152)	(0.0332)	(0.0109)	(0.1333)	(0.0436)	(0.0167)	(0.0458)	(0.0373)	(0.0135)	
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	28,378	15,249	34,647	10,858	8011	7344	18,485	10,915	8492	12,958	
R^2	0.345	0.712	0.786	0.629	0.718	0.697	0.720	0.691	0.649	0.762	

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE A.5. Panel B: Education.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Countries	Burkina Faso	Benin	Congo, DRC	Central African Republic	Cote d'Ivoire	Cameroon	Ethiopia	Ghana	Guinea	Kenya	Mali
Agriculture	0.2267***	0.1005	−0.0902***	0.2255*		0.1679***	0.0356	0.3238***	0.1727***	0.1377**	0.0293
	(0.0481)	(0.0567)	(0.0344)	(0.1036)		(0.0452)	(0.0468)	(0.0501)	(0.0218)	(0.0566)	(0.0361)
Gather/hunt/fish	0.0448	0.1764*		0.1886*	0.2393	0.1847***	−0.0131	0.3900***	−0.0274	−0.0490	0.0304
	(0.0399)	(0.0807)		(0.0961)	(0.1963)	(0.0249)	(0.1400)	(0.0549)	(0.0185)	(0.0384)	(0.0229)
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,763	8550	2186	7435	2343	13,672	27,327	8512	10,847	11,030	17,191
R^2	0.361	0.366	0.432	0.412	0.274	0.510	0.442	0.402	0.357	0.367	0.303
Countries	**12 Malawi**	**13 Mozambique**	**14 Nigeria**	**15 Niger**	**16 Namibia**	**17 Sierra Leone**	**18 Senegal**	**19 Togo**	**20 Uganda**	**21 Zambia**	
Agriculture	−0.0053	0.0338	0.2578***	0.0376**	−0.0210	0.4686***	−0.0742	0.2219*	0.0654	0.0154	
	(0.0712)	(0.0336)	(0.0590)	(0.0116)	(0.0870)	(0.0643)	(0.0641)	(0.0878)	(0.0407)	(0.0492)	
Gather/hunt/fish	−0.0440	0.0796*	0.2210***	0.0605*	−0.0444	0.3953*	0.0846***	0.2913*	0.0334	−0.0213	
	(0.0678)	(0.0346)	(0.0655)	(0.0315)	(0.1679)	(0.1355)	(0.0162)	(0.0917)	(0.0727)	(0.0240)	
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	28,378	15,249	34,647	10,858	8011	7344	18,485	10,913	8492	12,958	
R^2	0.252	0.390	0.615	0.346	0.305	0.373	0.371	0.408	0.338	0.364	

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE A.6. Benchmark at various subsets.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Panel A: Countries without any predominantly pastoral ethnicity						
Agriculture	0.1562***	0.1066***	0.1009***	0.1374***	0.0637***	0.0625***
	(0.0268)	(0.0226)	(0.0208)	(0.0168)	(0.0095)	(0.0095)
Gather/hunt/fish	0.1292***	0.0945***	0.0908***	0.0913***	0.0320***	0.0340***
	(0.0306)	(0.0249)	(0.0232)	(0.0204)	(0.0111)	(0.0108)
Observations	189,611	189,611	189,611	189,619	189,619	189,619
R^2	0.421	0.510	0.558	0.475	0.666	0.672
Panel B: Focus on countries in which groups with larger precolonial dependence on agriculture are less populous today						
Agriculture	0.1199***	0.0993***	0.0897***	0.1034***	0.0676***	0.0680***
	(0.0202)	(0.0187)	(0.0162)	(0.0209)	(0.0152)	(0.0159)
Gather/hunt/fish	0.0731***	0.0686***	0.0655***	0.0772**	0.0345*	0.0406**
	(0.0213)	(0.0227)	(0.0209)	(0.0207)	(0.0191)	(0.0188)
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Country-ethnic homeland FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	86,887	86,887	86,887	86,895	86,895	86,895
R^2	0.299	0.381	0.453	0.390	0.559	0.568

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE A.7. DHS regressions within villages/towns controlling flexibly for how long each individual resides in her current location.

Variables	(1) Education	(2) Education	(3) Education	(4) Wealth	(5) Wealth	(6) Wealth
Agriculture	0.1306***	0.0898***	0.0888***	0.0777***	0.0223***	0.0217***
	(0.0199)	(0.0159)	(0.0145)	(0.0147)	(0.0075)	(0.0072)
Gather/hunt/fish	0.1139***	0.0779***	0.0784***	0.0527***	0.0075	0.0088
	(0.0212)	(0.0196)	(0.0185)	(0.0154)	(0.0086)	(0.0079)
Urban	0.8361***			1.5696***		
	(0.0322)			(0.0605)		
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic homeland-Country FE	Yes	No	No	Yes	No	No
Coordinates FE	No	Yes	Yes	No	Yes	Yes
Occupation FE	No	No	Yes	No	No	Yes
Observations	192,290	192,290	192,290	192,291	192,291	192,291
R^2	0.441	0.525	0.568	0.487	0.667	0.673

Notes: Standard errors in parentheses are clustered at the ethnicity level, simple controls include age, age squared, a female dummy, and a mover dummy. We add a dummy for each entry in the mv104 variable that reflects "The years lived in place of residence". It ranges from 0 years to having always lived in the same residence; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{***}p < 0.01$.

TABLE A.8. Heterogeneity by dominant lifeway of current homeland.

Dep. variables	(1)	(2)	(3)	(4)	(5)	(6)
Historical lifeway of the current homeland	Education Mostly agriculture	Education Mostly pastoral	Education Mixed	Wealth Mostly agriculture	Wealth Mostly pastoral	Wealth Mixed
Agriculture	0.0900***	0.0520	0.0116	0.0468***	0.0472**	0.0612**
	(0.0144)	(0.0335)	(0.0313)	0.0072	(0.0199)	0.0209
Gather/hunt/fish	0.0807***	0.1003	0.0255**	0.0239***	0.0758**	0.0081
	(0.0163)	(0.0621)	(0.0211)	0.0074	(0.0359)	0.0182
Simple controls	Yes	Yes	Yes	Yes	Yes	Yes
Coordinates FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	215,229	9727	7319	215,236	9727	7319
R^2	0.501	0.536	0.634	0.661	0.748	0.742

Notes: Standard errors in parentheses are clustered at the ethnicity level; simple controls include age, age squared, a female dummy, and a mover dummy; the omitted category is the share of subsistence from pastoralism of the individual's ancestral ethnic group. $^{**}p < 0.05$; $^{***}p < 0.01$.

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TABLE A.9. Summary statistics for the Afrobarometer round 4 variables.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Education	21,578	3.18	2.01	0	9
Group's political influence	20,139	3.11	1.05	1	5
Respondent hostile	21,570	1.12	0.34	1	3
Respondent bored	21,582	1.22	0.46	1	3
Respondent noncooperative	21,586	1.17	0.40	1	3
Respondent impatient	21,582	1.23	0.49	1	3
Respondent suspicious	21,588	1.29	0.55	1	3
Respondent dishonest	21,584	1.23	0.46	1	3
Agriculture	21,608	5.74	1.32	0	9
Hunt/gather/fish	21,608	1.96	1.21	0	10
Female	21,608	1.50	0.50	1	2
Rural	21,608	1.64	0.48	1	2
Age	21,608	36.27	14.41	18	99

Notes: The education variable takes 10 values corresponding to: 0 = no formal schooling, 1 = informal schooling (including Koranic schooling), 2 = some primary schooling, 3 = primary school completed, 4 = some secondary school/high school, 5 = secondary school completed/high school, 6 = post-secondary qualifications, other than university, for example, a diploma or degree from a technical/polytechnic/college, 7 = some university, 8 = university completed, 9 = post-graduate.

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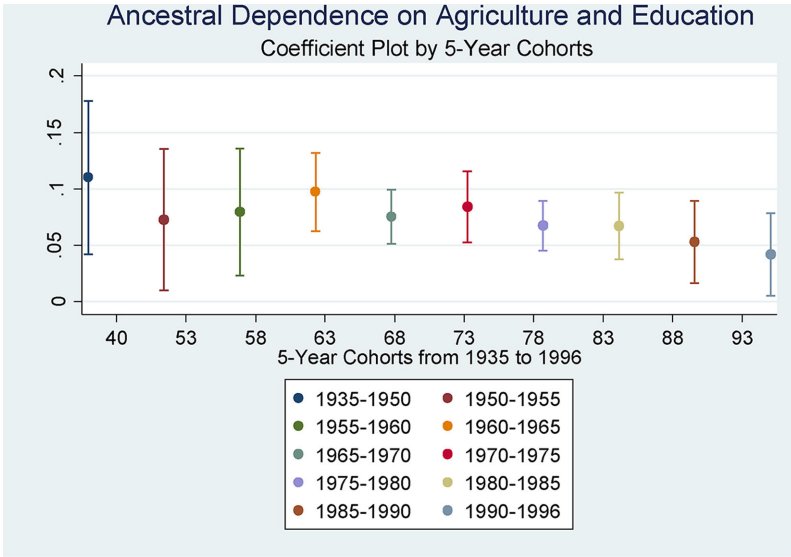

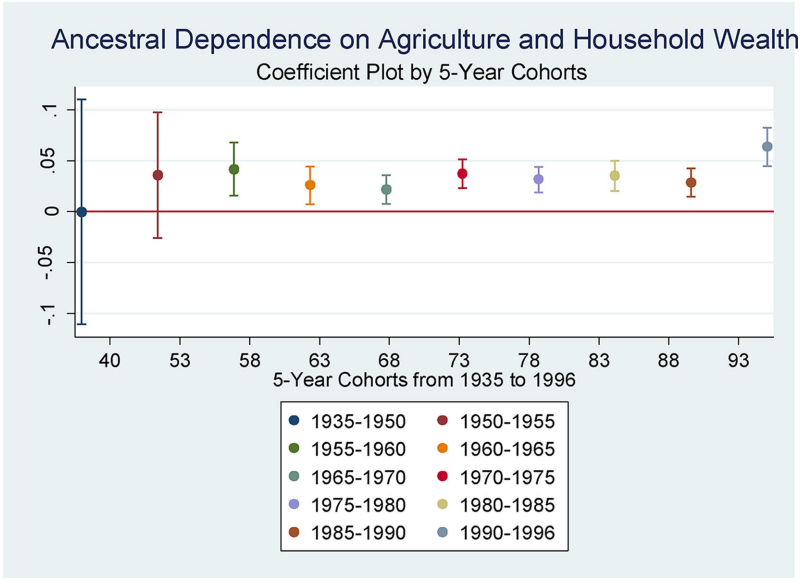

FIGURES A.1. (a and b) The role of precolonial agricultural dependence on education and wealth by 5-year birth cohorts.

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Supplementary Data

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