Biogeographical Origins of Risk Preference*

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Abstract

This paper explores the biogeographical origins of differences in risk preference across regions and individuals. The theory shows that individuals whose ancestors lived in regions with abundant hunting resources tend to be more risk averse. Such regions attracted even risk-averse individuals, and thus the population became more risk averse. To test the hypothesis, I construct a novel measure of megaherbivore biomass. This measure is a strong predictor of hunting dependency in traditional societies. I show that consistent with the theory, descendants of inhabitants of regions characterized by larger megaherbivore biomass have higher risk aversion.

Keywords: Risk aversion, evolution, biomass, biogeography, geography, culture, hunting, gathering

JEL Codes:

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1 Introduction

Risk preference has been viewed as a fundamental factor determining human behavior because almost every economic decision involves uncertainty. Indeed, risk preference has been shown theoretically and empirically to impact a wide range of essential behaviors.[1] In light of the importance of risk preference for economic development, it has been widely regarded as a crucial factor in the formation of the wealth of nations. Matranga (2017) suggests that risk-averse traits led to the rejection of risky lifestyles and the invention of storage technology, which fostered the Neolithic Revolution. Acemoglu and Zilibotti (1997) argue that at the stage of industrialization, attitudes toward avoiding high risk slowed down capital formation. Moreover, Galor and Michalopoulos (2012) show that the evolution of risk preference has a crucial role in the entire growth process. Its origins have remained obscure despite the central role of risk preference in human behavior and economic development.

This research explores the origins of risk preference and the variation in its prevalence across regions and individuals. It advances and empirically establishes the hypothesis that, in the course of human history, the evolution of risk preference can be traced back to the adaptation of individuals to the biogeographical environment in prehistory.

I present the analysis in four steps. First, I develop an evolutionary model of risk preference. In prehistoric times, there were two subsistence production modes. Gathering is a safe production mode, while hunting is a risky mode whose output depends on available prey mammals. A region with more abundant biological resources possesses a higher hunting potential and thus attracts even risk-averse individuals. The population, hence, is composed of more risk-averse individuals. As a result, the average level of risk aversion becomes higher. Since risk preference is culturally and genetically transmitted, individuals whose ancestors resided in regions with abundant biological resources have higher risk aversion in the long

[1] In particular, the followings are economically important: occupational choice, entrepreneurship, portfolio choice, insurance demand, investment, saving, education attainment, moving decisions, job change, and health. Regarding the literature on these topics, see, for example, Cramer et al. (2002), DeLeire and Levy (2004), Guiso and Paiella (2004) , Dohmen et al. (2012), among others.

run.

Large mammals are economically more valuable than small ones. Their meat provides higher calories and nutrition for humans. Non-herbivores were likely too dangerous as prey mammals for early hunters, so they were out of food sources. Hence, megaherbivores were hunters' main targets in the distant past. This observation implies that a measure of hunting potential should be calculated based on megaherbivores rather than carnivores, omnivores, and small herbivores.

As a second step, I construct the measure of hunting potential, introducing the PHYLACINE 1.2. This database provides maps of ranges representing estimates of where all the known mammal species would live today without human pressures. The data covers the period over the last interglacial ($\sim$130,000 years ago until present), and it presents rich information on species' characteristics. To calculate the abundance of each species, I also utilize the allometric relationship between body mass and the population density of species. Combining these allows me to construct predicted biomass of megaherbivores in the case of no human influences. Notably, the proposed measure is a predicted value of actual biomass, thus alleviating reverse causality concerns.

In the third part of the analysis, I explore the explanatory power of the measure of megaherbivore biomass. I find that ethnic groups with abundant biomass depend more on hunting as a subsistence production mode. This result is robust to an extensive set of controls such as continent-fixed effects, geographic features, climatic characteristics, and ethnographic traits. I also find that biomass of non-megaherbivore is not associated with hunting dependency. Furthermore, the measure of biomass is not statistically related to other production modes such as gathering, fishing, animal husbandry, and agriculture, conditional on continent-fixed effects, geo-climatic features, ethnographic traits, and hunting dependency.

Finally, I examine the relationship between risk preference and megaherbivore biomass in two different layers. First, I use the measure of risk preference reported by the *World Values Survey* (WVS). One concern of identification is historical migration. Based on historical

migration data by Putterman and Weil (2010), I re-calculate the megaherbivore biomass. In particular, I construct a measure of megaherbivore biomass derived from the location of the ancestors of current populations. Using this ancestor-adjusted biomass, I find that megaherbivore biomass is positively associated with contemporary risk aversion. This result is robust to accounting for a large set of controls such as continent-fixed effects, geo-climatic characteristics, individual traits, and wave-fixed effects. Including historical factors such as development and institutions does not alter the primary result, lending further credence to the proposed evolutionary mechanism.

Then, I conduct an epidemiological approach using the measure of risk preference reported by the *European Social Survey* (ESS). This approach allows me to identify better an evolutionary mechanism through which megaherbivore biomass affects current risk preference. Consistent with the proposed theory, megaherbivore biomass of parents' country of origin is positively related to the risk aversion of second immigrants. This result is robust to controlling for the birth of country fixed effects, geo-climatic features of parents' country of origin, individual characteristics, and round fixed effects. Including historical factors such as development and institutions does not alter the primary result, lending further credence to the proposed evolutionary mechanism. Finally, the placebo test shows that other cultural dimensions are not associated with megaherbivore biomass.

This research is the first attempt to decipher the prehistorical biogeographical origins of risk preference. There is a growing body of literature on the evolution of preferences in the course of human history (e.g., Galor and Moav (2002); Doepke and Zilibotti (2008); Galor and Michalopoulos (2012); Galor and Özak (2016); Galor and Savitskiy (2018)), geographical origins of cultural traits (e.g., Durante (2009); Alesina et al. (2013); Galor and Özak (2016); Galor and Savitskiy (2018)), and the biogeographical roots of economic development (e.g., Diamond (2017); Ashraf and Galor (2013)). Previous literature on the origins of preferences and cultural traits typically look at the effects of deep rooted factors *after* the Neolithic Revolution. This study is, however, distinct from the literature in the sense that it shows

that the origins of preferences and cultural traits can be traced back to deep-rooted factors even *before* the Neolithic Revolution.

I proceed as follows. In Section II, I provide an evolutionary model to derive the testable predictions. In Section III, I describe the data used to construct measures of megaherbivore biomass and also explain how to calculate it. In Section IV, I present the empirical results of associations between megaherbivore biomass and food dependency of hunter-gatherer societies. In Section V, I provide the results of the association between megaherbivore biomass and risk aversion using the WVS. In Section VI, I show the results exploiting variation in second-generation migrants in Europe. Section VII concludes.

2 The Model

This section develops a dynamic model that captures the evolution of risk preference in prehistoric times characterized by a Malthusian environment, in which subsistence constraint is binding.

2.1 The Basic Structure

Consider an overlapping-generation economy. In every time period the economy is populated by a continuum of two-period lived individuals who are identical in all respects except for their degree of risk aversion. In the first period of life (childhood) agents are economically passive and their consumption is provided by their parents. In the second period of life, individuals choose their occupation and allocate their disposable income between consumption and fertility. Risk preference is culturally and/or genetically transmitted to children without alteration. Due to the Malthusian mechanism, richer individuals have larger reproductive success, which affects the composition of risk preference in society.

2.2 Production

In every time period, two production modes are feasible in the economy: hunting and gathering. Hunting is highly stochastic because game are highly mobile and thus easily elude hunters and because there is unpredictability of the location, ripeness and behavior, while gathering is more reliable because of its higher predictability in these terms.[2] Hence, I assume that hunting is a risky mode and gathering is a safe mode.

Large mammals are economically more valuable. Their meat provides higher calories and nutrition for humans. Non-herbivores were likely too dangerous as prey mammals for primitive hunters and reasonably they were out of food sources. Hence, megaherbivores were main targets for hunters in the very distant past.[3]

The output generated by individual i of generation t engaging in hunting is

$$y_{it}^{H} = \begin{cases} y^{h} & \textit{with probability } \alpha(B)\beta_i \\ y^{l} & \textit{with probability } 1-\alpha(B)\beta_i, \end{cases} \tag{1}$$

where B is megaherbivore biomass, and β_i is an idiosyncratic shock that takes a value between 0 and 1, independently of B.

The probability of success in hunting positively depends on available biological resource :

$$\frac{\partial \alpha(B)}{\partial B} > 0. \tag{2}$$

[2]See, for example, Woodburn (2017), Tanaka (2013), Hayden (1981), and Smith (1988).

[3]Hart and Sussman (2008) provides lots of examples that non-herbivores like lions, tigers and bears hunt humans. Although these cases are of today, they indicate that in prehistoric times, humans were exposed to much higher risk of being hunted and killed by these mammals. The number of dangerous mammals are much smaller today and people are equipped with much more sophisticated weapons and shelters to protect themselves than those who lived in the past.

The output generated by individual i of generation t engaging in gathering is

$$y_{it}^G = y^G. \tag{3}$$

In particular, these potential outputs satisfy

$$y^h > y^G > y^l > 0.$$

2.3 Individuals

Optimal individual behavior is decided based on two stages. In the first stage, individuals choose which occupation they engage in. In the second stage, they decide optimal levels of consumption and fertility subject to the budget constraint and subsistence constraint. The model is solved backwardly.

Individual i in period t derives utility from consumption, c_{it}, and fertility, n_{it}. The preference of an adult individual i in period t is represented by the standard CRRA utility function,

$$u_{it} = \frac{c_{it}^{1-\theta_i}}{1-\theta_i} + \gamma n_{it}, \tag{4}$$

where $\theta_i \in [0, \infty)$ is the degree of risk aversion with respect to consumption. The higher θ_i is, the more risk averse the individual is.[4]

Individuals allocate their resources, y_{it}, between consumption, c_{it}, and fertility, n_{it}. Hence the individual's budget constraint is

$$c_{it} + \tau y_{it} n_{it} \leq y_{it}, \tag{5}$$

[4]In this specification, individuals are risk neutral with respect to children. Galor and Michalopoulos (2012) show that in the long run, individuals characterized by risk neutrality with respect to children are evolutionary winners, and thus this utility function is the appropriate one.

where τ is the fraction of parental resource that is devoted for raising a child.

Moreover, the individuals face the subsistence consumption constraints, $\tilde{c}$, below which individuals are not able to reproduce. Regarding the value of $\tilde{c}$, it is assumed that $y^G > \tilde{c} > y^l$.[5] Denoting by $\tilde{y}_i$ the income level for individuals i below which their subsistence constraints bind, one can derive

$$\tilde{y}_i = \tilde{y}(\theta_i) \equiv \frac{\gamma}{\tau}\tilde{c}^{\theta_i}. \tag{6}$$

The first derivative of $\tilde{y}(\theta_i)$ with respect to θ_i is

$$\frac{\partial \tilde{y}(\theta_i)}{\partial \theta_i} = \frac{\gamma}{\tau}\tilde{c}^{\theta_i} \log \tilde{c}. \tag{7}$$

Since $\tilde{y}_i$ can be interpreted as a biological restriction, it should not depend on the level of risk preference. Hence I assume $\tilde{c} = 1$ so that $\partial \tilde{y}(\theta_i)/\partial \theta_i = 0$.[6]

The period of analysis is governed by the Malthusian mechanism, in which the subsistence constraint is binding (Ashraf and Galor, 2011). Therefore, I assume

$$\tilde{y}_i = \frac{\gamma}{\tau} > y^h. \tag{8}$$

[5] $\tilde{c} > y^l$ is a technical assumption. Without this, one cannot derive a value of θ that equalizes expected indirect utilities under hunting and gathering. However this assumption is plausible since in hunter-gather societies if individuals are unsuccessful in hunting, they find it more difficult to get married, or, once married, to keep their partners (Woodburn, 2017). This assumption means that if individuals fail to hunt, they cannot reproduce. Without idiosyncratic risk, β_i, all individuals who engage in hunting face the common risk, $1 - \alpha(B)$. If it realizes, the population of hunting type goes extinct and thus β_i is introduced to avoid this situation.

[6] The following argument exactly holds if $\tilde{c} \in (0, 1)$ is assumed. Even if $\tilde{\in}(1, \infty)$ is assumed, one can derive the same predictions with further assumptions, but it makes argument a bit messier.

An adult i in period t solves the following optimization problem:

$$\begin{aligned} \underset{c_{it},n_{it}}{max} \quad & \frac{c_{it}^{1-\theta_i}}{1-\theta_i} + \gamma n_{it} \\ subject\ to \quad & c_{it} + \tau y_{it} n_{it} \leq y_{it} \\ & c_{it} \geq 0 \\ & n_{it} \geq 0 \\ & n_{it} = 0 \quad if \ \ y_{it} < 1. \end{aligned} \tag{9}$$

Optimal levels of consumption and fertility of individual i in period t are

$$c_{it} = c(y_{it}) = \begin{cases} 1 & if \ \ y_{it} = y^h \ \ or \ \ y^G \\ y^l & if \ \ y_{it} = y^l \end{cases} \tag{10}$$

and

$$n_{it} = n(y_{it}) = \begin{cases} \frac{1}{\tau}\left(1 - \frac{1}{y^h}\right) & if \ \ y_{it} = y^h \\ \frac{1}{\tau}\left(1 - \frac{1}{y^G}\right) & if \ \ y_{it} = y^G \\ 0 & if \ \ y_{it} = y^l. \end{cases} \tag{11}$$

Therefore, successful hunters and gathers consume the subsistence consumption level, $\tilde{c}$ $(= 1)$, and the rests of their income are allocated into fertility, n_{it}. On the other hand, hunters who fail to hunt just consume their income, y^l, and they cannot reproduce anymore.

2.4 Occupational Choice

Each adult i of generation t chooses the desirable occupation before the realization of idiosyncratic shocks so as to maximize their expected utility. It is different across individuals, reflecting their different levels of risk preference.

As follows from (4), (10) and (11), the expected indirect utility of individual i in period

t engaging in hunting, V_{it}^H, is

$$V_{it}^H = \alpha(B)\beta_i \left[\frac{1}{1-\theta_i} + \frac{\gamma}{\tau}\left(1 - \frac{1}{y^h}\right)\right] + [1-\alpha(B)\beta_i]\frac{(y^l)^{1-\theta_i}}{1-\theta_i} \equiv V^H(\theta_i, B). \tag{12}$$

Likewise, the expected indirect utility of individual i in period t engaging in gathering, V_{it}^G, is

$$V_{it}^G = \frac{1}{1-\theta_i} + \frac{\gamma}{\tau}\left(1 - \frac{1}{y^G}\right) \equiv V^G(\theta_i). \tag{13}$$

It is assumed that hunting is sufficiently attractive to at least the risk-neutral individuals so that they prefer hunting (i.e., $V^H(0, B) > V^G(0)\ \forall B$). Then define a function $G(\theta_i, B)$ as

$$G(\theta_i, B) = V^H(\theta_i, B) - V^G(\theta_i). \tag{14}$$

The derivative of $G(\theta_i, B)$ with respect to θ_i is

$$\frac{\partial G(\theta_i, B)}{\partial \theta_i} = \frac{1-\alpha(B)\beta_i}{(1-\theta_i)^2}\left\{-1 + (y^l)^{1-\theta_i}\left[-(1-\theta_i)\log y^l + 1\right]\right\}. \tag{15}$$

The sign of (15) is necessarily negative since the term in the curly bracket is negative, given $1 = \tilde{c} > y^l > 0$. Therefore, by the *Intermediate Value Theorem*, it follows that there exists a unique level of the parameter of risk aversion, $\hat{\theta}(B) \in (0, \infty)$, such that

$$V^H(\theta_i, B) \begin{cases} > V^G(\theta_i) & \forall \theta_i \in [0, \hat{\theta}(B)) \\ = V^G(\theta_i) & \textit{if } \theta_i = \hat{\theta}(B) \\ < V^G(\theta_i) & \forall \theta_i \in (\hat{\theta}(B), \infty]. \end{cases} \tag{16}$$

Thus individuals whose risk aversion is below the threshold level, $\hat{\theta}$, choose hunting, while individuals who have risk aversion higher than $\hat{\theta}$ choose gathering.

Given the occupational choice by individuals, output and fertility of an adult i in period

t are expressed as

$$y_{it} = \begin{cases} y^h & \textit{with probability } \alpha(B)\beta_i \textit{ if } \theta_i \in [0, \hat{\theta}) \\ y^l & \textit{with probability } 1 - \alpha(B)\beta_i \textit{ if } \theta_i \in [0, \hat{\theta}) \\ y^G & \textit{if } \theta_i \in (\hat{\theta}(B), \infty] \end{cases} \tag{17}$$

and

$$n_{it} = \begin{cases} \frac{1}{\tau}\left(1 - \frac{1}{y^h}\right) & \textit{if } \theta_i \in [0, \hat{\theta}(B)) \textit{ and } y_{it} = y^h \\ 0 & \textit{if } \theta_i \in [0, \hat{\theta}(B)) \textit{ and } y_{it} = y^l \\ \frac{1}{\tau}\left(1 - \frac{1}{\bar{y}}\right) & \textit{if } \theta_i \in (\hat{\theta}(B), \infty]. \end{cases} \tag{18}$$

Furthermore the derivatives of $G(\theta_i, B)$ with respect to B and s is positive. Hence, by the *Implicit Function Theorem*, it follows that

$$\frac{\partial \hat{\theta}(B)}{\partial B} > 0. \tag{19}$$

Namely, comparing two regions characterized by different levels of megaherbivore biomass, the region with larger biomass has the higher level of threshold than the region with lower biomass. Therefore in the former region more individuals are engaged in hunting than gathering.

Proposition 1 *If an economy is characterized by larger biomass of megaherbivore, then the economy more depends on hunting as a subsistence production mode.*

2.5 The Evolution of Risk Preference across Generations

The evolution of the composition of risk preference is governed by the effect of it on the differential reproductive success across individuals. Risk preference is culturally and/or genetically

transmitted intergenerationally without alteration. Hence the degree of risk aversion that enables individuals to earn higher income gives larger reproductive success to them, and thus this level of risk aversion will asymptotically become more prevalent in the population.

Suppose that the risk aversion of individuals in period 0 is characterized by a continuous distribution function with support $[0, \bar{\theta}]$ and density $v_0(\theta_i)$. Given the threshold level of the parameter of risk aversion, $\hat{\theta}(B)$, the size of the population of generation 0 that is engaging in hunting, N_0^H, and the size of the population of generation 0 that is engaging in gathering, N_0^G, are

$$N_0^H = \int_0^{\hat{\theta}(B)} v_0(\theta_i) d\theta_i, \tag{20}$$

and

$$N_0^G = \int_{\hat{\theta}(B)}^{\bar{\theta}} v_0(\theta_i) d\theta_i. \tag{21}$$

Since the critical level, $\hat{\theta}(B)$, is stationary over time and, as established in (18), the fertility rates of individuals are constant regardless of their occupation, the distribution of risk preference within each of the two groups has no effect on the aggregate fertility within each of the groups.

Differential fertility rates, however, in the two groups affects the evolution of distribution of risk preference in the population, as it has effects on the relative size of the two groups and hence their representation in the population.

The size of the population of each group in generation t is determined by its initial level and fertility rate. Noting that the evolution of risk preference of individuals engaged in hunting is determined by the expected fertility rate, the size of the population of the hunting type in generation t is given by

$$N_t^H = \frac{\alpha(B)\bar{\beta}}{\tau}\left(1 - \frac{1}{y^h}\right) N_{t-1}^H = \left[\frac{\alpha(B)\bar{\beta}}{\tau}\left(1 - \frac{1}{y^h}\right)\right]^t N_0^H \equiv (n^H)^t N_0^H, \tag{22}$$

where $\bar{\beta}$ is the mean of idiosyncratic shock β_i across its realization. Likewise, the size of the population of the gathering type in generation t is

$$N_t^G = \frac{1}{\tau}\left(1 - \frac{1}{y^G}\right) N_{t-1}^G = \left[\frac{1}{\tau}\left(1 - \frac{1}{\bar{y}}\right)\right]^t N_0^G \equiv (n^G)^t N_0^G. \tag{23}$$

The total population in the economy in period t is, furthermore, decomposed into the populations of the two groups, i.e.,

$$N_t = N_t^H + N_t^G. \tag{24}$$

Denote by q_t the fraction of offspring in generation t who are descendants from individuals engaged in gathering in generation t, i.e.,

$$q_t = \frac{N_t^G}{N_t^G + N_t^H} = \frac{1}{1 + \frac{N_0^H}{N_0^G}\left(\frac{n^H}{n^G}\right)^t}. \tag{25}$$

Therefore, the limit of the fraction of offspring in generation t who are engaged in gathering, q, is

$$q \equiv \lim_{t\to\infty} q_t = \begin{cases} 0 & \text{if } \ n^H > n^G \\ \frac{N_0^G}{N_0^G + N_0^H} & \text{if } \ n^H = n^G \\ 1 & \text{if } \ n^H < n^G. \end{cases} \tag{26}$$

The average risk aversion of generation t, $\theta_t^*(B)$, is the weighted average of risk aversion of the two types:

$$\theta_t^*(B) = (1 - q_t) E\left[\theta_t \mid \theta_t \in [0, \hat{\theta}(B))\right] + q_t E\left[\theta_t \mid \theta_t \in [\hat{\theta}(B), \bar{\theta}]\right]. \tag{27}$$

Then we have the following testable prediction.

Proposition 2 *For any initial distribution of risk aversion, an economy characterized by larger biomass of megaherbivore has the higher average level of risk aversion in the long run.*

Proof. See Appendix A. ■

To simplify the explanation, assume that the initial distribution of risk aversion follows the uniform distribution over $[0, \bar{\theta}]$. Under this assumption, (27) becomes

$$\theta_t^*(B) = \frac{\bar{\theta} q_t + \hat{\theta}(B)}{2}. \tag{28}$$

From (26) and (28), the limit of the average level of risk aversion, θ^*(B), is

$$\theta^*(B) \equiv \lim_{t\to\infty} \theta_t^*(B) = \begin{cases} \frac{\hat{\theta}(B)}{2} & if \;\; n^H > n^G \\ \frac{N_0^G \bar{\theta} + (N_0^G + N_0^H)\hat{\theta}(B)}{2(N_0^G + N_0^H)} & if \;\; n^H = n^G \\ \frac{\bar{\theta} + \hat{\theta}(B)}{2} & if \;\; n^H < n^G. \end{cases} \tag{29}$$

Taking a derivative of $\theta^*(B)$ with respect to megaherbivore biomass, it follows

$$\frac{\partial \theta^*(B)}{\partial B} > 0. \tag{30}$$

Therefore, an economy characterized by the larger biomass of megaherbivore has the higher average level of risk aversion in the long run.

2.6 Interpretation of the Testable Predictions of the Model

This section gives intuition of the Proposition 1 and 2. Consider two economies, a and b that are identical except for the levels of megaherbivore biomass. Let's assume economy a has lower biomass than economy b. Therefore by Proposition 1, the economy b has the higher threshold than the economy a, i.e., $\hat{\theta}^b > \hat{\theta}^a$. Given that the initial distribution of individuals is uniform, individuals at period 0 are distributed evenly in the both regions (the

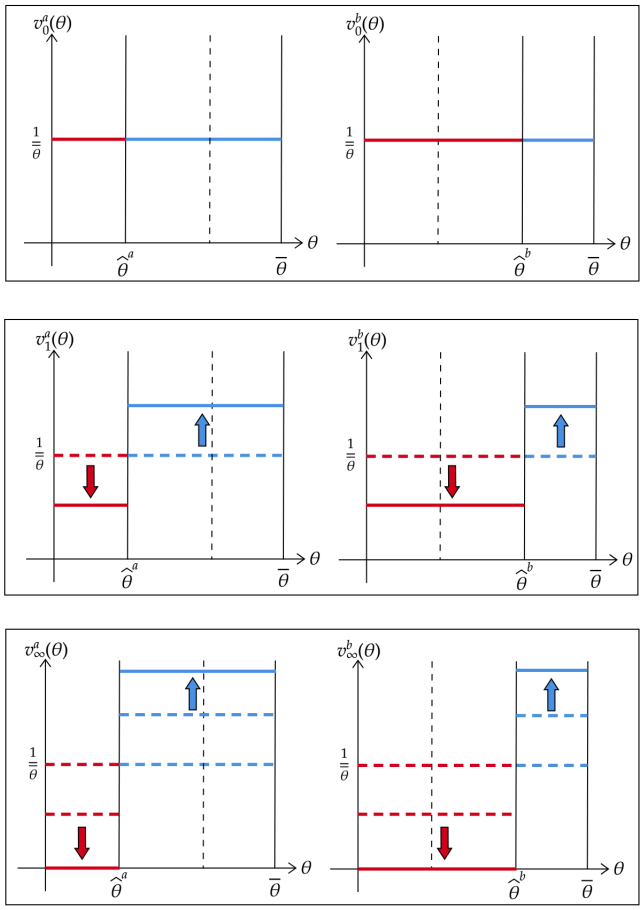

Figure 1: Effect of increase in mammal richness and/or size on the average level of risk preference in the long run in the case where $n^G > n^H$. The left panel shows the transition of region a and the right panel shows the transition of region b.

upper panel of Figure 1). By Proposition 1, individuals below $\hat{\theta}$ are engaged in hunting (red color), while individuals above $\hat{\theta}$ are engaged in gathering.

Consider, for example, the case where $n^G > n^H$, i.e., gathering potentially gives larger fertility than hunting.[7] Then in the next period, the fraction of the hunting type decreases while that of the gathering type increases (the middle panel of Figure 1). This process continues and eventually the gathering type will dominate the whole population in both regions (the lower panel of Figure 1).

The economy b is characterized by the higher threshold, $\hat{\theta}^b$, reflecting higher B. In both

[7]The similar argument follows in the cases in which $n^H > n^G$ or $n^H = n^G$.

economies, marginally less risk-averse individuals choose hunting and they lose evolutionary advantage. Since the population of gathering type in the economy b consists of more risk averse individuals than the economy a, its long-run population is also composed of individuals with higher risk aversion than the economy a (the lower panel of Figure 1).

Therefore, the long-run average of risk aversion in the population is characterized by only individuals who are engaged in gathering[8], which implies that the economy b has the higher average level of risk aversion in the long run than in the region a, i.e., $\hat{\theta^b}^* > \hat{\theta^a}^*$.

3 Data and Variable Construction

In this section, I explain a measure of megaherbivore biomass, which is central in the empirical analysis. First, I introduce novel data sets from the filed of ecology that are used to construct the biomass measure.

3.1 Data

The Phylogenetic Atlas of Mammal Macroecology (PHYLACINE) database compiled by Faurby et al. (2018) provides information on spatial distribution for all the 5,831 known mammal species that lived since the beginning of the Late Pleistocene, which roughly corresponds to a period between 130,000 years ago until present. This atlas also includes rich characteristics of each species such as the mean body mass of adult species, diet composition and habitat information. One of the advantages of the atlas is that it provides global maps of present natural ranges at 110 km $\times$ 110 km grid size, which are estimates of where species would live without human influences. This predicted maps are generated, utilizing several methods. For example, for species for which historical distribution is known, the natural range is modified to fit it and for species for which such a distribution is not available, the natural range is estimated based on climatic variables. For extinct and nearly extinct species,

[8]From (26) and (27), mathematically this corresponds to $\lim_{t\to\infty} \theta_t^* = \lim_{t\to\infty} E\left[\theta_t \mid \theta_t \in [\hat{\theta}, \bar{\theta})\right]$.

the natural range is estimated based on information on extant species which co-occurred with a target species in fossil assemblages. Importantly, exploiting predicted distribution of mammalian species rather than current distribution allows me to overcome the potential concern about reverse causality from risk-related behaviors to mammalian distribution.

3.2 Independent Variable: Megaherbivore Biomass

Biomass for a given species is defined by the product of the average body mass and the number of individuals of that species. To calculate biomass, I utilize an well-known fact that body mass is a powerful predictor of population density and there is a strong negative log-log relationship between them (Peters and Raelson, 1984; Damuth, 1987; Currie and Fritz, 1993; Silva and Downing, 1995; Silva et al., 2001; Byers and Ugan, 2005).[9] I borrow estimates from these studies to predict abundance of each species, following a procedure that is often used in the field of paleoecology to predict abundance of species in prehistory (Byers and Ugan, 2005; Barnosky, 2008; Dusseldorp, 2009; Dusseldorp, 2012). Particularly I use a regression from Silva and Downing (1995) as Barnosky (2008) does[10]: $\log_{10}(\textit{Population Density}) = -0.44 \log_{10}(\textit{Body Mass}) + 1.01$. Silva and Downing (1995) provides an estimate for large herbivore, which is the focus of my research, while other studies that examine the relationship between body mass and population density do not provide an estimate for this category of interest.[11]

Exploiting the present natural range, the average body mass and predicted abundance,

[9] Larger mammals tend to have longer periods of gestation and maternal care, older age at sexual maturity and the first parturition and lower birth rate. These factors reduces reproductive success and thus larger mammals tend to have lower population density.

[10] Among the studies that uses the similar technique to predict abundance, Barnosky (2008) is the closest to my study. He predicts abundance in order to calculate megafauna biomass for both extant and extinct mammalian species during the period between 100,000 years before present until the recent past.

[11] Since predicted abundance may be sensitive to a particular study from which I borrow an estimate, I check robustness to using estimates from different independent studies. As is shown in the robustness sections, the result does not change if I use different studies to predict abundance.

I construct the measure of megaherbivore biomass as follows:

$$Biomass_i = \frac{\sum_{j \in MH_i} \widehat{Abundance}_j \times BodyMass_j}{Area_i}, \tag{31}$$

where MH_i is a set of megaherbivore species in region i; $\widehat{Abundance}_j$ is a prediction of the number of individuals of species j; $BodyMass_j$ is the average body mass of species j; and $Area_i$ is total area in square kilometer of region i.

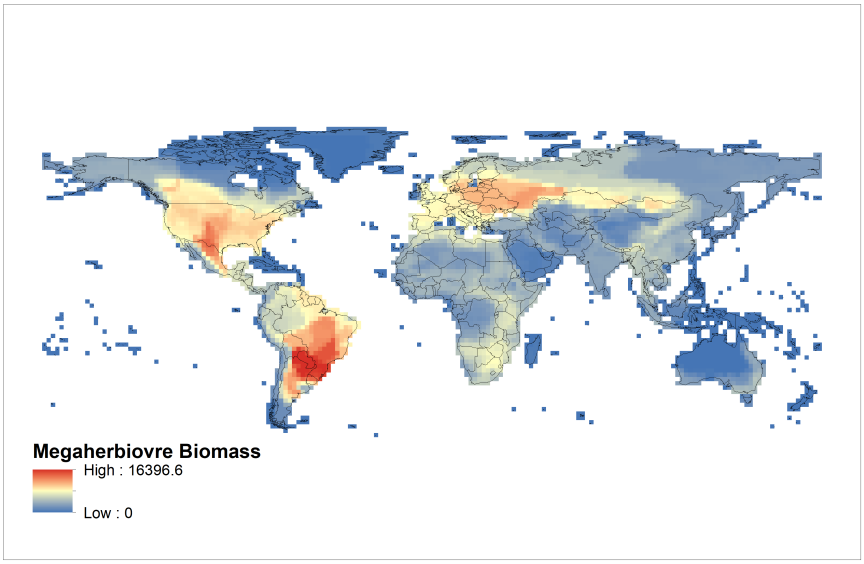

Figure 2: Megaherbivore Biomass

The global distribution of megaherbivore biomass is depicted in Figure 2. As is evident, there is large variation in megaherbivore biomass across the globe. The figure suggests that higher biomass is observed in South America, south parts of North America and Eastern Europe. On the other hand, the Middle East, South Asia, Eastern Asia and Oceania have lower biomass. However, the variation is seen not only across continents but also within a continent, which is utilized to estimate the association with risk preference.

Overall, the proposed measure captures diversity of mammalian species, their energy and abundance, focusing on mammals that were particularly important as prey species in prehistoric times. Importantly, the measure is a prediction of actual megaherbivore biomass

and hence it alleviates a concern about reverse causality.

4 Empirical Evidence: Association with Hunting Dependency

In this section, I test Proposition 1 in the theoretical section and show that megaherbivore biomass is positively associated with hunting dependency at the ethnic group level. As will be shown, the proposed measure is a good predictor of hunting dependency. Megaherbivore is the only category positively and statistically associated with hunting dependency. Other mammalian categories are not consistently related with hunting dependency. Moreover, megaherbivore biomass is not related with other subsistence modes such as gathering, fishing, animal husbandry and agriculture once accounting for continent fixed effects, geo-climatic features, ethnographic traits and hunting dependency.

I examine the explanatory power of megaherbivore biomass for hunting dependency, using two different preindustrial traditional society data sets that are complementary with each other. The association is estimated via the following least ordinary square regression:

$$Hunt_i = \alpha_0 + \alpha_1 Biomass_i + Geo_i\beta^{'} + Clim_i\gamma^{'} + Ethnic_i\lambda^{'} + Continent_i\delta^{'} + \epsilon_i, \quad (32)$$

where $Hunt_i$ is the measure of hunting dependency of ethnic group i; $Biomass_i$ is megaherbivore biomass in a homeland of ethnic group i; Geo_i is a vector of geographical controls in a homeland of ethnic group i; $Clim_i$ is a vector of climatic controls in a homeland of ethnic group i; $Ethnic_i$ is a vector of ethnographic controls of ethnic group i; $Continent_i$ is a vector of continent fixed effects; and ϵ_i is an error term. The theory predicts a positive effect of megaherbivore biomass on hunting dependency; i.e., $\alpha_1 > 0$.

4.1 Cross-Ethnic Group Level Analysis: The Ethnographic Atlas

I first show the positive association between megaherbivore biomass and hunting dependency, which is reported in the *Ethnographic Atlas*. This atlas is the most comprehensive ethnographic data collection based on ethnographic observations from 1,267 traditional societies scattered around the globe. All societies outside Europe are measured before any significant European influence.

To calculate the measures of megaherbivore biomass and geo-climate features, I follow Alesina et al. (2013) and thus these measures are averages of cells within a 200 km radius of the coordinates reported in the atlas. Summary statistics is in Table C1.

4.1.1 Mutually Disjoint Sets of Mammals

Table 1: Mutually Disjoint Sets

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.589***			0.673***	0.393***
	(0.181)			(0.142)	(0.100)
Biomass (Non-Mega Herbivore)		-0.343*		-0.443***	-0.237**
		(0.204)		(0.169)	(0.098)
Biomass (Other Mammals)			-0.141	-0.024	0.157
			(0.120)	(0.114)	(0.110)
Continent FE					✓
Adjusted R^2	0.144	0.048	0.007	0.227	0.342
Observations	1252	1252	1252	1252	1252

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Continent dummies are Africa, Europe, Asia and Americas and Oceania. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

I first divide all the mammals into mutually disjoint sets: megaherbivore, non-mega her-

bivore and other mammals (carnivore and omnivore). Table 1 shows that megaherbivore biomass is positively and statistically significantly associated with hunting dependency and that biomass of non-mega herbivore and other mammals are not. Column 1-3 show bivariate regressions using megaherbivore, non-mega herbivore and other mammals as independent variables, respectively. Among these, only megaherbivore is positively and statistically significantly related with hunting dependency. Column 4 adds these independent variables together and the coefficient of megaherbivore biomass is more precisely estimated with larger magnitude than column 1. The coefficients of non-mega herbivore biomass and that of other mammals are negative. On column 5, I account for continent fixed effects and megaherbivore biomass remains positive and statistically significant at the 1% level. Biomass of other categories of mammals are either negative or statistically insignificant. A one standard deviation increase in megaherbivore biomass is associated with a 0.39 units increase in hunting dependency.

Then I turn to the analysis which more carefully examines the relationship between megaherbivore biomass and hunting dependency. Table 2 establishes that the result is robust to accounting for geo-climatic features and ethnographic controls. I show estimated results in columns 1 of Table 1.[12] Columns 1 and 2 shows that a bivariate relationship between megaherbivore biomass and hunting is positive and it is statistically and economically significant at the 1% level and that it is robust to including continent fixed effects. Column 3 controls for confounding geographic features. Accounting for these possibly important confounding geographical features does not alter the estimated coefficient of megaherbivore biomass. Column 4 controls for confounding climatic factors such as average temperature and precipitation. Reassuringly, the coefficient of lost biomass does not change and remains statistically significant at the 1% level. Column 5 accounts for ethnographic controls. Although this slightly reduce the magnitude of estimated coefficient, it remains statistically and economically significant at the 1% level. A one standard deviation increase in meage-

[12]Because of availability of geo-climatic and ethnographic control variables, in Table 2 the number of observations smaller than in Table 1.

Table 2: Association between Megaherbivore Biomass and Hunting Dependency

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.623***	0.207**	0.203**	0.276***	0.172***
	(0.193)	(0.099)	(0.082)	(0.088)	(0.052)
Absolute Latitude			0.465***	-0.517***	-0.208
			(0.125)	(0.183)	(0.127)
Longitude			0.071	0.014	-0.039
			(0.166)	(0.168)	(0.063)
Elevation (Mean)			-0.059	-0.346***	-0.189***
			(0.062)	(0.068)	(0.060)
Land Suitability (Mean)			-0.038	-0.063	0.017
			(0.061)	(0.050)	(0.038)
Dist. to the Nearest Waterway			-0.005	0.052*	0.032
			(0.044)	(0.027)	(0.023)
Island			-0.559	-0.401	-0.416**
			(0.355)	(0.330)	(0.180)
Temperature (Mean)				-0.977***	-0.549***
				(0.154)	(0.128)
Precipitation (Mean)				-0.121	0.049
				(0.111)	(0.060)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Adjusted R^2	0.135	0.391	0.440	0.482	0.715
Observations	995	995	995	995	995

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

herbivore biomass increases hunting dependency by 0.17 units.

4.1.2 Other Subsistence Production Modes

Table 3: Other Subsistence Production Modes

	Gathering		Fishing		Animal Husbandry		Agriculture	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Biomass (Megaherbivore)	0.026	0.033	-0.111	-0.048	0.035	0.080	-0.123*	-0.067
	(0.080)	(0.066)	(0.067)	(0.063)	(0.066)	(0.053)	(0.069)	(0.062)
Absolute Latitude	0.649***	0.578***	-0.082	-0.212	-0.188	-0.226	-0.184	-0.154
	(0.138)	(0.127)	(0.158)	(0.140)	(0.161)	(0.151)	(0.170)	(0.171)
Longitude	0.018	0.038	-0.011	-0.037	0.059	0.038	-0.028	-0.040
	(0.150)	(0.130)	(0.094)	(0.093)	(0.112)	(0.101)	(0.097)	(0.097)
Elevation (Mean)	0.474***	0.435***	-0.431***	-0.545***	0.085	0.040	0.058	0.067
	(0.109)	(0.095)	(0.074)	(0.066)	(0.067)	(0.063)	(0.061)	(0.052)
Land Suitability (Mean)	0.050	0.032	-0.103*	-0.093*	-0.106	-0.095	0.140**	0.153***
	(0.062)	(0.065)	(0.053)	(0.051)	(0.077)	(0.075)	(0.056)	(0.057)
Dist. to the Nearest Waterway	0.052	0.038	-0.186***	-0.166***	0.042	0.059	0.062*	0.070*
	(0.045)	(0.040)	(0.047)	(0.047)	(0.057)	(0.055)	(0.035)	(0.036)
Island	-0.600**	-0.557**	0.746	0.622	-0.031	-0.167	0.306	0.110
	(0.264)	(0.248)	(0.553)	(0.487)	(0.161)	(0.187)	(0.271)	(0.268)
Temperature (Mean)	1.294***	1.226***	-0.607***	-0.904***	-0.102	-0.248**	-0.044	-0.082
	(0.205)	(0.175)	(0.135)	(0.120)	(0.123)	(0.125)	(0.152)	(0.146)
Precipitation (Mean)	-0.206	-0.215	0.362**	0.368***	-0.195***	-0.180***	-0.011	0.026
	(0.131)	(0.135)	(0.150)	(0.138)	(0.065)	(0.063)	(0.077)	(0.075)
Continent FE	✓	✓	✓	✓	✓	✓	✓	✓
Ethnographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
Hunting Dependency		✓		✓		✓		✓
Adjusted R^2	0.659	0.678	0.553	0.613	0.711	0.735	0.842	0.855
Observations	995	995	995	995	995	995	995	995

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

In this subsection, I show that megaherbivore biomass does not have explanatory power for other subsistence production modes such as gathering, fishing, animal husbandry and agriculture. Table 3 establishes that megaherbivore biomass is not statistically associated with dependency on these subsistence production modes. Dependence on gathering, fishing, animal husbandry and agriculture are on columns 1-2, 3-4, 5-6, and 7-8, respectively.

Even columns show regression accounting for geographic, climatic and ethnographic controls as well as continent fixed effects. Odd columns add hunting dependency on these control variables. Gathering, fishing and animal husbandry are not associated with megaherbivore biomass with or without controlling for dependence on hunting. Agriculure is marginally related with megaherbivore biomass at the 10% level without hunting dependency (column 7). However, this relationship vanishes once hunting dependency is controlled for (column 8). Hence the measure of megaherbivore biomass is related with only dependency of hunting in preindustrial traditional society. This result lends further credence to the validity of the proposed measure as hunting potential.

4.1.3 Robustness Tests

The measure of megaherbivore biomass, (31), is constructed utilizing an estimate from Silva and Downing (1995). Therefore, one may think that the result is driven by this particular study from which I borrow the estimate. Thus, I reconstruct the measure of lost biomass, exploiting different estimates of the relationship between body mass and population density from five other independent studies. Table C5 shows that the result is robust to using these different estimates. For comparison, I also show the result using estimate from Silva and Downing (1995) in column 1.

Next I conduct the ordered logistic regression instead of the ordinary least squares regression. Table C6 establishes the basic result is robust to this alternative method.

Then I check the robustness to spatially robust standard errors. Particularly, I use robust standard errors using the spatial correlation proposed by Conley (1999). As shown in Table C7 and C8, megaherbivore biomass is statistically and economically significantly associated with dependency on hunting.

4.2 Cross-Ethnic Group Level Analysis: Binford

Then I show the explanatory power of megaherbivore biomass for hunting dependency, which is reported by Binford (2019). The number of observations is 339 and thus much smaller than the *Ethnographic Atlas*. Furthermore this data lacks observations in Europe. However, unlike the *Ethnographic Atlas*, this data focuses on traditional foraging societies, which is more consistent with the proposed theory.

To calculate the measures of megaherbivore biomass and geo-climate features, I also generate 200 km buffers with geolocation of ethnic groups being centroids of the buffers. Therefore, calculated measures are averages of cells within a generated 200 km radius. Summary statistics is in Table C2.

4.2.1 Mutually Disjoint Sets of Mammals

Table 4: Mutually Disjoint Sets

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.052***			0.088***	0.109***
	(0.008)			(0.016)	(0.021)
Biomass (Non-Mega Herbivore)		-0.037*		-0.018	-0.031**
		(0.019)		(0.017)	(0.012)
Biomass (Other Mammals)			-0.022	-0.063***	-0.106***
			(0.022)	(0.023)	(0.019)
Continent FE					✓
Adjusted R^2	0.062	0.029	0.008	0.151	0.171
Observations	320	320	320	320	268

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Continent dummies are Africa, Asia and Americas and Oceania. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

I first divide all the mammals into mutually disjoint sets: megaherbivore, non-mega herbivore and other mammals (carnivore and omnivore). Table 4 shows that megaherbivore biomass is positively and statistically significantly associated with hunting dependency and that biomass of non-mega herbivore and other mammals are not. Column 1-3 show bivariate regressions using megaherbivore, non-mega herbivore and other mammals as independent variables, respectively. Among these, only megaherbivore is positively and statistically significantly related with hunting dependency. Column 4 adds these independent variables together and the coefficient of megaherbivore is larger than column 1. The coefficients of non-mega herbivore biomass and that of other mammals are negative. There are some ethnic groups that are suspected to be not pure foragers in the dataset. Therefore I exclude these suspected societies from the analysis in column 6. The estimated coefficient of megaherbivore biomass remains positive and highly significant while coefficients of non-mega herbivore and other mammals are negative. A one standard deviation increase in megaherbivore biomass is associated with a 0.11 units increase in hunting dependency.

4.2.2 Basic Result

Then I turn to the analysis which more carefully examines the relationship between megaherbivore biomass and hunting dependency. Table 5 establishes that the result is robust to accounting for geo-climatic features and ethnographic controls. I show estimated results in columns 1 of Table 4.[13] Columns 1 and 2 shows that a bivariate relationship between megaherbivore biomass and hunting is positive and it is statistically and economically significant at the 1% level and that it is robust to including continent fixed effects. Column 3 controls for confounding geographic features. Accounting for these possibly important confounding geographical features does not alter the estimated coefficient of megaherbivore biomass. Column 4 controls for confounding climatic factors such as average temperature and precipitation. Reassuringly, the coefficient of lost biomass does not change and remains

[13]Because of availability of geo-climatic and ethnographic control variables, in Table 5 the number of observations smaller than in Table 4.

Table 5: Association between Megaherbivore Biomass and Hunting Dependency

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.052***	0.049***	0.088***	0.095***	0.067**
	(0.008)	(0.009)	(0.025)	(0.029)	(0.031)
Absolute Latitude			0.115***	-0.158**	-0.002
			(0.035)	(0.072)	(0.060)
Longitude			0.086*	0.065*	0.002
			(0.051)	(0.038)	(0.041)
Elevation (Mean)			0.017	-0.009	0.002
			(0.026)	(0.013)	(0.012)
Land Suitability (Mean)			-0.007	0.006	0.045***
			(0.013)	(0.014)	(0.014)
Dist. to the Nearest Waterway			0.032***	0.035***	0.028***
			(0.010)	(0.012)	(0.008)
Temperature (Mean)				-0.251***	-0.132*
				(0.081)	(0.065)
Precipitation (Mean)				-0.053**	-0.030
				(0.024)	(0.036)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Adjusted R^2	0.060	0.056	0.243	0.355	0.549
Observations	316	316	316	316	264

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are community organization, degree of sedentism, type of social class distinction and dependence of storage. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

statistically significant at the 1% level. Column 5 accounts for ethnographic controls. the estimated coefficient remains statistically and economically significant at the 1% level. I exclude ethnic groups that are suspected not to be pure foragers in column 6, but this does not alter the estimated coefficient of megaherbivore biomass. A one standard deviation increase

in meageherbivore biomass increases hunting dependency by 0.05-0.1 units.

4.2.3 Other Subsistence Production Modes

In this subsection, I show that megaherbivore biomass does not have explanatory power for other subsistence production modes such as gathering and fishing.[14] Table 6 establishes that megaherbivore biomass is not statistically associated with dependency on these subsistence production modes. Dependence on gathering and fishing are on columns 1-2 and 3-4, respectively. Even columns show regression accounting for geographic, climatic and ethnographic controls as well as continent fixed effects. Odd columns add hunting dependency on these control variables. Gathering is not associated with megaherbivore biomass with or without controlling for dependence on hunting. Fishing is statistically significantly related with megaherbivore biomass without hunting dependency (column 3). However, this relationship vanishes once hunting dependency is controlled for (column 4). Hence the measure of megaherbivore biomass is related with only dependency of hunting in preindustrial traditional society. This result lends further credence to the validity of the proposed measure as hunting potential.

4.2.4 Robustness Tests

The measure of megaherbivore biomass, (31), is constructed utilizing an estimate from Silva and Downing (1995). Therefore, one may think that the result is driven by this particular study from which I borrow the estimate. Thus, I reconstruct the measure of lost biomass, exploiting different estimates of the relationship between body mass and population density from five other independent studies. Table C9 shows that the result is robust to using these different estimates. For comparison, I also show the result using estimate from Silva and Downing (1995) in column 1.

Then I check the robustness to spatially robust standard errors. Particularly, I use

[14] Unlike the *Ethnographic Atlas*, Binford (2019) does not have information on animal husbandry and agriculture.

Table 6: Other Subsistence Production Modes

	Gathering		Fishing	
	(1)	(2)	(3)	(4)
Biomass (Megaherbivore)	-0.021	-0.004	-0.055***	0.004
	(0.021)	(0.020)	(0.019)	(0.020)
Absolute Latitude	-0.132**	-0.140***	0.172***	0.142***
	(0.050)	(0.046)	(0.060)	(0.046)
Longitude	-0.057**	-0.053**	0.038	0.053**
	(0.022)	(0.022)	(0.031)	(0.022)
Elevation (Mean)	0.016**	0.017***	-0.022*	-0.017**
	(0.007)	(0.006)	(0.011)	(0.006)
Land Suitability (Mean)	-0.031	-0.025	0.006	0.025
	(0.020)	(0.019)	(0.023)	(0.019)
Dist. to the Nearest Waterway	0.025***	0.031***	-0.052***	-0.030***
	(0.005)	(0.006)	(0.013)	(0.006)
Temperature (Mean)	0.156***	0.119***	0.011	-0.119***
	(0.044)	(0.036)	(0.042)	(0.036)
Precipitation (Mean)	-0.057***	-0.059***	0.068***	0.060***
	(0.014)	(0.012)	(0.022)	(0.012)
Continent FE	✓	✓	✓	✓
Ethnographic Controls	✓	✓	✓	✓
Hunting Dependency		✓		✓
Adjusted R^2	0.802	0.816	0.678	0.838
Observations	316	316	316	316

Note: The unit of analysis is a ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are community organization, degree of sedentism, type of social class distinction and dependence of storage. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

robust standard errors using the spatial correlation proposed by Conley (1999). As shown in Table C10 and C11, megaherbivore biomass is statistically and economically significantly associated with dependency on hunting.

5 Empirical Evidence: Association with Risk Preference

In this section, I test Proposition 2 in the theoretical section and show that megaherbivore biomass is positively associated with contemporary risk preference. As will be shown, megaherbivore is the only category posotively and statistically related with risk preference and other mammalian categories are not. Moreover, this association is estimated, taking large migration after 1,500 into account by re-calculating ancestor-adjusted measures of biomass. The analysis also suggests that as is proposed by the theory, the relationship between megaherbivore biomass and risk preference is via an evolutionary mechanism rather than non-evolutionary paths such as historical development and institutions. Finally, other cultural dimensions that are plausibly orthogonal to risk preference are not associated with megaherbivore biomass.

5.1 Cross-Individual Level Analysis: The World Values Survey

First I explore the association between megaherbivore biomass and risk preference at the individual level, using the *World Values Survey* longitudinal data from 1981 to 2020. The measure of risk preference is taken from the following question: *"How much each person is or is not like you. S/he looks for adventures and likes to take risk. S/he wants to have an exciting life."* The answer is coded so that a higher number means one is more risk averse.

A concern of identification is migration in the course of human history. I deal with this possible issue by re-calculating the megaherbivore biomass using Putterman and Weil (2010) historical migration data. This allows me to construct a measure of megaherbivore biomass

derived from the location of the ancestors of current populations, rather than the location of the respondents. Summary statistics is in Table C3.

The relationship between megaherbivore biomass and risk preference is estimated via the following specification:

$$\begin{aligned} RiskAversion_{i,c,t} &= \alpha_0 + \alpha_1 BiomassAA_c + Geo_c\beta^{'} + Clim_c\gamma^{'} \\ &+ Ind_{i,c,t}\lambda^{'} + Continent_i\delta^{'} + Wave_i\xi^{'} + \epsilon_i, \end{aligned} \tag{33}$$

where $RiskAversion_{i,c,t}$ is the measure of risk aversion of an individual i in a country c at wave t; $BiomassAA_c$ is ancestor-adjusted megaherbivore biomass in a country c; Geo_c is a vector of geographical controls of a country c; $Clim_c$ is a vector of climatic controls of a country c; $Ind_{i,c,t}$ is a vector of individual characteristics of an individual i in a country c at wave t; $Continent_i$ is a vector of continent fixed effects; $Wave_i$ is a vector of wave fixed effects; and ϵ_i is an error term. The theory predicts a positive effect of ancestor adjusted megaherbivore biomass on risk aversion; i.e., $\alpha_1 > 0$.

5.1.1 Mutually Disjoint Sets of Mammals

I first divide all the mammals into mutually disjoint sets: megaherbivore, non-mega herbivore and other mammals (carnivore and omnivore). Table 7 shows that megaherbivore biomass is positively and statistically significantly associated with risk aversion and that biomass of non-mega herbivore and other mammals are not. Column 1-3 show bivariate regressions using megaherbivore, non-mega herbivore and other mammals as independent variables, respectively. Among these, only megaherbivore is positively and statistically significantly related with risk aversion. Column 4 adds these independent variables together and the coefficient of megaherbivore biomass is larger than column 1. The coefficients of non-mega herbivore biomass and that of other mammals are negative. On column 5, I account for continent fixed effects and megaherbivore biomass remains positive and statistically

Table 7: Mutually Disjoint Sets

	Risk Aversion				
	(1)	(2)	(3)	(4)	(5)
Ancestor Adjusted Biomass (Megaherbivore)	0.157***			0.235***	0.196***
	(0.020)			(0.023)	(0.023)
Ancestor Adjusted Biomass (Non-Mega Herbivore)		-0.061**		-0.024	-0.072
		(0.025)		(0.055)	(0.062)
Ancestor Adjusted Biomass (Other Mammals)			-0.074***	-0.162***	-0.097*
			(0.024)	(0.053)	(0.056)
Continent FE					✓
Adjusted R^2	0.009	0.001	0.002	0.019	0.032
Observations	146345	146345	146345	146345	146345

Note: The unit of analysis is an individual. Dependent variable is risk aversion. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Continent dummies are Africa, Europe, Asia, Americas and Oceania. All the variables are standardized. Robust standard errors clustered at the interview region and wave level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

significant at the 1% level. Biomass of other categories of mammals are either negative or statistically insignificant. A one standard deviation increase in megaherbivore biomass is associated with a 0.20 units increase in risk aversion.

5.1.2 Basic Result

Then I turn to the analysis which more carefully examines the relationship between megaherbivore biomass and risk aversion. Table 8 establishes that the result is robust to accounting for geo-climatic features, individual characteristics and wave fixed effects. I show estimated results in columns 1 of Table 7.[15] Columns 1 and 2 shows that a bivariate relationship between megaherbivore biomass and risk aversion is positive and it is statistically and economically significant at the 1% level and that it is robust to including continent fixed effects. Column 3 controls for individual controls and the estimated coefficient of ancestor-adjusted

[15]Because of availability of geo-climatic and individual control variables, in Table 8 the number of observations smaller than in Table 7.

Table 8: Association between Megaherbivore Biomass and Risk Aversion

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestor Adjusted Biomass (Megaherbivore)	0.158***	0.070***	0.062***	0.110***	0.110***	0.110***
	(0.021)	(0.022)	(0.020)	(0.017)	(0.017)	(0.017)
Absolute Latitude				0.051**	0.353***	0.353***
				(0.025)	(0.091)	(0.085)
Longitude				0.363***	0.459***	0.452***
				(0.056)	(0.070)	(0.068)
Elevation (Mean)				-0.071***	0.007	0.003
				(0.018)	(0.031)	(0.029)
Land Suitability (Mean)				-0.060***	-0.087***	-0.086***
				(0.021)	(0.022)	(0.021)
Island				0.083***	0.054*	0.057*
				(0.030)	(0.031)	(0.031)
Landlock				0.034**	0.056***	0.055***
				(0.016)	(0.015)	(0.015)
Dist. to the Nearest Waterway				-0.148***	-0.140***	-0.145***
				(0.025)	(0.027)	(0.026)
Temperature (Mean)					0.258***	0.261***
					(0.077)	(0.072)
Precipitation (Mean)					0.103***	0.094***
					(0.037)	(0.036)
Continent FE		✓	✓	✓	✓	✓
Individual Controls			✓	✓	✓	✓
Wave FE						✓
Adjusted R^2	0.009	0.034	0.099	0.111	0.113	0.115
Observations	125235	125235	125235	125235	125235	125235

Note: The unit of analysis is an individual. Dependent variable is risk aversion. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia, Americas and Oceania. Individual controls are sex, age, income and education. All the variables are standardized. Robust standard errors clustered at the interview region and wave level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

biomass remains positive and significant. Column 4 controls for confounding geographic factors. The magnitude of the coefficient of ancestor-adjusted biomass increases and it is more precisely estimated. Column 5 accounts for climatic controls. Reassuringly, the estimated coefficient remains stable. On column 6, I add wave fixed effects and this inclusion does not alter the coefficient of ancestor-adjusted biomass. A one standard deviation increase in

ancestor-adjusted meageherbivore biomass increases risk aversion by 0.06-0.16 units.

5.1.3 The Insignificant Role of Preindustrial Development, Institutions and Societal Characteristics

It is possible that preindustrial development, institutions and societal characteristics has affected contemporary economic, institutional and cultural characteristics and thus they have directly affected the observed risk preference rather than via the proposed evolutionary mechanism. However, as is established in Table 9, this possibility seems invalid. It shows megaherbivore biomass is positively and statistically highly significantly associated with contemporary risk aversion after controlling for a large set of historical development, institutions and societal characteristics. Column 1 shows as a benchmark the estimate of ancestor adjusted megaherbivore biomass without historical development, institutions and societal characteristics. Columns 2 and 3 add population density in 1,500 CE and urbanization in 1,800 CE, respectively. These are proxies for historical development and the ancestor adjusted megaherbivore biomass remains stable with these additional variables. Columns 3 and 4 account for time since the Neolithic Revolution and state history. These factors are important contributors for the succeeding development and institutions (Diamond (2017)). Reassuringly, the coefficient of ancestor adjusted biomass remains stable and statistically significant. Then I account for historical institutional and ethnographic variables that ancestors had experienced (Giuliano and Nunn (2018)). Columns 6-11 sequentially control for ancestral agricultural intensity, settlement patterns, jurisdictional hierarchy beyond local communities, belief in gods, class stratification and slavery type. Accounting for these historical institutional and ethnographic variables does not alter the estimated coefficient of ancestor adjusted megaherbivore biomass. This result lends further credence to the evolutionary path as a mechanism.

Table 9: Preindustrial Development, Institutions and Societal Characteristics

	Risk Aversion									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ancestor Adjusted Biomass (Megaherbivore)	0.105***	0.112***	0.103***	0.105***	0.132***	0.107***	0.080***	0.110***	0.111***	0.141***
	(0.018)	(0.023)	(0.018)	(0.020)	(0.019)	(0.017)	(0.019)	(0.017)	(0.018)	(0.019)
Log of Population Density (1,500 CE)	0.066***									
	(0.017)									
Log of Urbanization (1,800 CE)		0.034								
		(0.024)								
Time since the Neolithic Revolution			0.099**							
			(0.045)							
State History				0.188***						
				(0.029)						
Ancestral Intensity of agriculture					0.141***					
					(0.022)					
Ancestral Settlement Patterns						-0.024				
						(0.016)				
Ancestral Jurisdictional Hierarchy							0.103***			
							(0.028)			
Ancestral Belief in Gods								0.095***		
								(0.026)		
Ancestral Class Stratification									0.098***	
									(0.021)	
Ancestral Slavery Status										0.102***
										(0.019)
Continent FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wave FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.117	0.113	0.116	0.122	0.120	0.115	0.117	0.117	0.117	0.118
Observations	125235	101239	125235	123183	125235	125235	125235	125235	125235	125235

Note: The unit of analysis is an individual. Dependent variable is risk aversion. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia, Americas and Oceania. Individual controls are sex, age, income and education. Geographic controls are absolute latitude, longitude, mean elevation, mean land suitability, island dummy, landlocked dummy, distance to the nearest waterway. Climatic controls are mean temperature and mean precipitation. All the variables are standardized. Robust standard errors clustered at the interview region and wave level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

5.1.4 Robustness Tests

The measure of megaherbivore biomass, (31), is constructed utilizing an estimate from Silva and Downing (1995). Therefore, one may think that the result is driven by this particular study from which I borrow the estimate. Thus, I reconstruct the measure of lost biomass, exploiting different estimates of the relationship between body mass and population density from five other independent studies. Table C12 shows that the result is robust to using these different estimates. For comparison, I also show the result using estimate from Silva and Downing (1995) in column 1.

Next I conduct the ordered logistic regression instead of the ordinary least squares regression. Table C13 establishes the basic result is robust to this alternative method.

5.2 The Second Generation Migrant Analysis: The European Social Survey

Then I turn to an epidemiological approach to explore the association between megaherbivore biomass and contemporary risk preference, using the *European Social Survey*. The measure of risk preference is taken from the following question: *'How much each person is or is not like you. S/he looks for adventures and likes to take risk. S/he wants to have an exciting life.'* The answer is coded so that a higher number means one is more risk averse.

It is possible that long-run effect of megaherbivore biomass reflects persistent cultural/genetic mechanism, but it is also possible that historical megaherbivore biomass lead to the development of institutions, policies and societies that has made individuals more risk averse. To further distinguish these different mechanisms, I utilize the fact that risk preference is internal to the individual while institutions, policies and societal characteristics are not. I exploit variation in this internal cultural/genetic heritage among children of immigrants living in Europe. Particularly I accounts for country of birth fixed effects, which allows me to compare individuals whose institutional and/or cultural backgroungs are similar but historical

megaherbivore biomass is different. Summary statistics is in Table C4.

The relationship between megaherbivore biomass and risk preference is estimated via the following specification:

$$\begin{aligned} RiskAversion_{i,c,t} &= \alpha_0 + \alpha_1 Biomass_{i,p} + Geo_{i,p}\beta^{'} + Clim_{i,p}\gamma^{'} \\ &+ Ind_{i,c,t}\lambda^{'} + Country_i\delta^{'} + Round_i\xi^{'} + \epsilon_i, \end{aligned} \tag{34}$$

where $RiskAversion_{i,c,t}$ is the measure of risk aversion of an individual i in a country c at round t; $Biomass_{i,p}$ is megaherbivore biomass in the country of origin of parent p of an individual i; $Geo_{i,p}$ is a vector of geographical controls of the country of origin of parent p of an individual i; $Clim_{i,p}$ is a vector of climatic controls of the country of origin of parent p of an individual i; $Ind_{i,c,t}$ is a vector of individual characteristics of individual i in a country c at round t; $Country_i$ is a vector of country of birth fixed effects; $Round_i$ is a vector of round fixed effects; and ϵ_i is an error term. The theory predicts a positive effect of megaherbivore biomass in the country of origin of parent on risk aversion; i.e., $\alpha_1 > 0$.

5.2.1 Mutually Disjoint Sets of Mammals

I first divide all the mammals into mutually disjoint sets: megaherbivore, non-mega herbivore and other mammals (carnivore and omnivore). Table 10 shows that megaherbivore biomass is positively and statistically significantly associated with risk aversion and that biomass of non-mega herbivore and other mammals are not. Column 1-3 show bivariate regressions using megaherbivore, non-mega herbivore and other mammals as independent variables, respectively. Not only megaherbivore but also non-mega herbivore and other mammals are positively and statistically significantly related with risk aversion. Column 4 adds these independent variables together. Then megaherbivore biomass and non-megaherbivore biomass lose its statistical significance although other mammals remain its statistical significance. In column 5, I account for country of birth fixed effects. Once adding these fixed effects,

Table 10: Mutually Disjoint Sets

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.025**			0.010	0.028**	0.023**
	(0.011)			(0.011)	(0.014)	(0.012)
Biomass (Non-Mega Herbivore)		0.091***		-0.083	-0.104	-0.068
		(0.021)		(0.064)	(0.072)	(0.059)
Biomass (Other Mammals)			0.111***	0.190***	0.154*	0.105
			(0.024)	(0.071)	(0.078)	(0.066)
Country of Birth FE						
Individual Controls						
Adjusted R^2	0.001	0.006	0.008	0.009	0.048	0.079
Observations	7372	7372	7372	7372	7372	7372

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

biomass of megaherbivore recovers its statistical significance. Column 6 controls for individual characteristics.[16] Megaherbivore biomass remain positively and significantly associated with risk aversion, but other two categories are not. A one standard deviation increase in megaherbivore biomass is associated with a 0.02 units increase in risk aversion.

5.2.2 Basic Result

Then I turn to the analysis which more carefully examines the relationship between megaherbivore biomass and risk aversion. Table 11 establishes that the result is robust to accounting

[16]Unlike the analysis using the *World Values Survey*, I am not controlling for income, because including this variable drops samples significantly from 7,372 to 5,303. Once restricting the sample on these 5,303 individuals without controlling for income, megaherbivore biomass loses its statistical association with risk aversion. Accounting for income does not alter the magnitude and precision of the estimated coefficient of megaherbiovre biomass, remaining statistically insignificant. Thus the loss of statistical significance is purely because of the loss of observations for whom income are not available, but not because of accounting for income.

Table 11: Association between Megaherbivore Biomass and Risk Aversion

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.025**	0.025***	0.018***	0.026***	0.034***	0.033***
	(0.011)	(0.008)	(0.006)	(0.006)	(0.008)	(0.008)
Absolute Latitude				-0.053	-0.374	-0.405
				(0.044)	(0.323)	(0.322)
Longitude				0.093**	0.124***	0.123***
				(0.036)	(0.038)	(0.039)
Elevation (Mean)				-0.102	-0.916	-0.993
				(0.117)	(0.782)	(0.780)
Land Suitability (Mean)				-0.160	-0.365*	-0.383**
				(0.106)	(0.187)	(0.186)
Island				-0.029*	-0.054**	-0.058**
				(0.015)	(0.023)	(0.023)
Landlock				-0.145	-0.118	-0.112
				(0.114)	(0.110)	(0.111)
Dist. to the Nearest Waterway				-0.054***	-0.035	-0.030
				(0.021)	(0.039)	(0.039)
Temperature (Mean)					-0.363	-0.400
					(0.394)	(0.392)
Precipitation (Mean)					0.123	0.130
					(0.091)	(0.092)
Country of Birth FE		✓	✓	✓	✓	✓
Individual Controls			✓	✓	✓	✓
Adjusted R^2	0.001	0.046	0.117	0.118	0.118	0.119
Observations	7366	7366	7366	7366	7366	7366

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

for geo-climatic features, individual characteristics and wave fixed effects. I show estimated results in columns 1 of Table 10. Columns 1 and 2 shows that a bivariate relationship

between megaherbivore biomass and risk aversion is positive and it is statistically and economically significant and that it is robust to including country of birth fixed effects. Column 3 controls for individual controls and the estimated coefficient of megaherbivore biomass remains positive and significant. Column 4 controls for confounding geographic factors. The magnitude of the coefficient of megaherbivore biomass increases. Column 5 accounts for climatic controls. Reassuringly, the estimated coefficient remains stable and statistically highly significant. On column 6, I add round fixed effects and this inclusion does not alter the coefficient of megaherbivore biomass. A one standard deviation increase in meageherbivore biomass increases risk aversion by 0.02-0.03 units.

5.2.3 The Insignificant Role of Preindustrial Development, Institutions and Societal Characteristics

Although the second generation migrant analysis better identifies the proposed evolutionary path as a mechanism, it is possible that preindustrial development, institutions and societal characteristics has affected contemporary economic, institutional and cultural characteristics and thus they have directly affected the observed risk preference. However, as is established in Table 12, this possibility seems invalid. The table shows megaherbivore biomass is positively and statistically highly significantly associated with contemporary risk aversion after controlling for a large set of historical development, institutions and societal characteristics. Column 1 shows as a benchmark the estimates of megaherbivore biomass without historical development, institutions and societal characteristics. Columns 2 and 3 add population density in 1,500 CE and urbanization in 1,800 CE, respectively. These are proxies for historical development and megaherbivore biomass remains stable with these additional variables. Columns 3 and 4 account for time since the Neolithic Revolution and state history. These factors are important contributors for the succeeding development and institutions (Diamond (2017)). Megaherbivore biomass remains statistically significant with these additional variables. Then I account for historical institutional and ethnographic variables that an-

cestors had experienced (Giuliano and Nunn (2018)). Columns 6-11 sequentially control for ancestral agricultural intensity, settlement patterns, jurisdictional hierarchy beyond local communities, belief in gods, class stratification and slavery type. Accounting for these historical institutional and ethnographic variables does not alter the estimated coefficient of megaherbivore biomass. This result lends further credence to the evolutionary path as a mechanism.

Table 12: Preindustrial Development, Institutions and Societal Characteristics

	Risk Aversion									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Biomass (Megaherbivore)	0.032***	0.033***	0.031*	0.039***	0.018*	0.045***	0.043***	0.032***	0.044***	0.031***
	(0.008)	(0.008)	(0.017)	(0.011)	(0.010)	(0.011)	(0.011)	(0.008)	(0.011)	(0.008)
Log of Population Density (1,500 CE)	-0.176									
	(0.211)									
Log of Urbanization (1,800 CE)		-0.068								
		(0.216)								
Time since the Neolithic Revolution			0.011							
			(0.146)							
State History				-0.038						
				(0.054)						
Ancestral Intensity of agriculture					-0.875***					
					(0.320)					
Ancestral Settlement Patterns						-0.401*				
						(0.232)				
Ancestral Jurisdictional Hierarchy							-0.353			
							(0.236)			
Ancestral Belief in Gods								0.015		
								(0.059)		
Ancestral Class Stratification									-0.363	
									(0.239)	
Ancestral Slavery Status										-0.042
										(0.156)
Country of Birth FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.119
Observations	7366	7366	7366	7366	7366	7366	7366	7366	7366	7366

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

5.2.4 Orthogonality to Other Cultural Dimensions

Table 13: Orthogonality to Other Cultural Dimensions

	Redistribution	Gender Role	Time Orientation	Trust	Rule Following	Modesity	Altrusim
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Biomass (Megaherbivore)	-0.019	-0.123	0.122	-0.024	0.026*	0.008	-0.008
	(0.013)	(0.177)	(0.183)	(0.015)	(0.014)	(0.013)	(0.005)
Absolute Latitude	-0.072	4.043	-0.160	0.517	-0.900***	0.073	-0.418**
	(0.226)	(6.551)	(0.109)	(0.577)	(0.276)	(0.289)	(0.179)
Longitude	-0.013	-0.322	0.159	-0.130***	0.156***	0.090**	-0.089***
	(0.047)	(0.603)	(0.232)	(0.042)	(0.045)	(0.040)	(0.020)
Elevation (Mean)	-0.254	9.156	0.000	1.662	-2.289***	-0.123	-0.970**
	(0.531)	(15.833)	(.)	(1.371)	(0.640)	(0.658)	(0.430)
Land Suitability (Mean)	-0.119	3.072	0.000	0.480	-0.745***	-0.292**	-0.265**
	(0.138)	(4.878)	(.)	(0.353)	(0.162)	(0.141)	(0.114)
Island	-0.031*	0.315	0.144	0.046	-0.114***	-0.086***	-0.040***
	(0.018)	(0.597)	(0.200)	(0.043)	(0.027)	(0.022)	(0.014)
Landlock	0.077	0.792*	-0.508	-0.175*	-0.123	0.116	0.134***
	(0.067)	(0.416)	(0.534)	(0.099)	(0.080)	(0.091)	(0.046)
Dist. to the Nearest Waterway	0.067*	-0.341	-0.262	-0.128**	0.076**	-0.009	0.120***
	(0.040)	(0.549)	(0.313)	(0.062)	(0.035)	(0.036)	(0.022)
Temperature (Mean)	-0.069	5.080	0.000	0.473	-0.987***	0.394	-0.479**
	(0.286)	(7.701)	(.)	(0.691)	(0.328)	(0.342)	(0.216)
Precipitation (Mean)	-0.021	-0.658	0.301	-0.347**	0.358***	0.090	0.062
	(0.073)	(1.705)	(0.321)	(0.151)	(0.087)	(0.088)	(0.050)
Country of Birth FE	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓
Georaphic Controls	✓	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.077	0.091	0.041	0.088	0.074	0.076	0.073
Observations	7242	2800	542	6642	6589	6625	6629

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg, non-mega herbivore is herbivore smaller than 44 kg, and other mammals are defined as a complement set of megaherbivore and non-mega herbivore. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

This subsection establishes that other cultural traits that are plausibly orthogonal to risk preference are not associated with megaherbivore biomass. As is shown in Table 13, megaherbivore biomass is not statistically related with preference for redistribution, values on gender roles, time orientation[17] , trust, modesity and altruism. Although rule following is

[17]As for time orientation, mean elevation and mean land suitability are dropped because of multicollinearity.

statistically significantly associated with megaherbivore biomass, it is marginal at the 10% level.

5.2.5 Robustness Tests

The measure of megaherbivore biomass, (31), is constructed utilizing an estimate from Silva and Downing (1995). Therefore, one may think that the result is driven by this particular study from which I borrow the estimate. Thus, I reconstruct the measure of lost biomass, exploiting different estimates of the relationship between body mass and population density from five other independent studies. Table C14 shows that the result is robust to using these different estimates. For comparison, I also show the result using estimate from Silva and Downing (1995) in column 1.

Next I conduct the ordered logistic regression instead of the ordinary least squares regression. Table C15 establishes the basic result is robust to this alternative method.

6 Conclusion

This research explores the biogeographical origins of risk preference and its variation across regions and individuals. The proposed theory predicts that a region with higher hunting potential depends on hunting more as a subsistence production mode and that via cultural and/or genetic intergenerational transmission, offspring whose ancestors resided in regions with higher hunting potential are more risk averse today.

I introduce a novel measure of hunting potential by constructing megaherbivore biomass, which captures diversity of mammalian species, their energy and abundance. This measure is a good predictor of hunting dependency of traditional societies in the preindustrial era. Exploiting the measure of hunting potential, I show that consistent with the theory, historical megaherbivore biomass is positively associated with contemporary risk aversion.

By showing the prehisorical origins of risk preference for the first time in economics, this

study also demonstrates that preferences and cultural values can be traced back to deep-rooted factors even *before* the Neolithic Revolution. To the extent that economic development and human behavior are associated with uncertainty and thus risk preference, this paper also suggests the importance of exploring fundamental factors even in prehistoric times.

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Appendix A. Mathematical Appendix

A.1 Proof of Proposition 2

Define by $V_t(\theta)$ and $v_t(\theta)$ the cumulative and probability distribution of θ in period t over $[0, \bar{\theta}]$, respectively. Assume there is a unique threshold level $\hat{\theta}$, below which individuals choose hunting and above which individuals choose gathering. I first show the following lemma.

Lemma 1 *For any initial distribution of θ and any positive values of n^H and n^G,*

$$\lim_{t\to\infty} V_t(\theta) = V(\theta).$$

Proof.

Assume $n^H, n^G \in R_{++}$. There are three cases: (I) $n^H > n^G$; (II) $n^H < n^G$; (III) $n^H = n^G$. I show the case (I) here, but the similar argument also proves (II) and (III).

(I-i) $\theta \in [0, \hat{\theta}]$: Notice that the cumulative distribution function in period $t+1$ is written as

$$\begin{aligned} V_{t+1}(\theta) &= \frac{n^H N_t \int_0^\theta v_t(\delta)d\delta}{n^H N_t^H + n^G N_t^G} \\ &= \frac{n^H \int_0^\theta v_t(\delta)d\delta}{n^H \int_0^{\hat{\theta}} v_t(\delta)d\delta + n^G \int_{\hat{\theta}}^{\bar{\theta}} v_t(\delta)d\delta} \\ &= \frac{n^H V_t(\theta)}{(n^H - n^G)\int_0^{\hat{\theta}} v_t(\delta)d\delta + n^G}. \end{aligned}$$

Since $n^H > n^G$ and $\int_0^{\hat{\theta}} \in [0, 1]$, we have

$$V_{t+1}(\theta) \geq V_t(\theta).$$

Therefore, the sequence $\{V_t(\theta)\}$ is increasing. Since cumulative function is bounded from above, $\{V_t(\theta)\}$ converges.

(I-ii) $\theta \in (\hat{\theta}, \bar{\theta}]$: Notice that the cumulative distribution function in period $t+1$ is written as

$$\begin{aligned} V_{t+1}(\theta) &= \frac{N_{t+1}^H + n^G N_t \int_{\hat{\theta}}^{\theta} v_t(\delta) d\delta}{N_{t+1}^H + N_{t+1}^G} \\ &= \frac{1 + \frac{n^G}{n^H} \frac{N_t}{N_t^H} \int_{\hat{\theta}}^{\theta} v_t(\delta) d\delta}{1 + \frac{N_0^G}{N_0^H} \left(\frac{n^G}{n^H}\right)^{t+1}}. \end{aligned}$$

Since $n^H > n^G$, by taking limit, we have

$$\lim_{t\to\infty} V_{t+1}(\theta) = 1 + \frac{n^G}{n^H} \left(\lim_{t\to\infty} \frac{N_t}{N_t^H}\right) \left(\lim_{t\to\infty} \int_{\hat{\theta}}^{\theta} v_t(\delta) d\delta\right). \tag{35}$$

Next, we show the first parentheses is finite and the second one is zero.

Regarding the first parentheses,

$$\begin{aligned} \lim_{t\to\infty} \frac{N_t}{N_t^H} &= \lim_{t\to\infty} \frac{N_t^H + N_t^G}{N_t^H} \\ &= 1 + \frac{N_0^G}{N_0^H} \lim_{t\to\infty} \left(\frac{n^G}{n^H}\right)^{t-1} \\ &= 1, \end{aligned}$$

where the last equality follows from $n^H > n^G$.

As for the second parentheses in (35), consider the limit of the fraction of N_t^H to N_t^G.

$$\begin{aligned} \lim_{t\to\infty} \frac{N_t^H}{N_t^G} &= \lim_{t\to\infty} \frac{N_0^H}{N_0^G} \left(\frac{n^H}{n^G}\right)^{t-1} \\ &= \infty, \end{aligned}$$

where the last equality follows from $n^H > n^G$. This is equivalent to

$$\begin{aligned} & \lim_{t\to\infty} \quad \frac{n^H N_{t-1} \int_0^{\hat{\theta}} v_{t-1}(\delta)d\delta}{n^G N_{t-1} \int_{\hat{\theta}}^{\theta} v_{t-1}(\delta)d\delta} = \infty \\ \Leftrightarrow \quad & \lim_{t\to\infty} \quad \frac{\int_0^{\hat{\theta}} v_{t-1}(\delta)d\delta}{\int_{\hat{\theta}}^{\theta} v_{t-1}(\delta)d\delta} = \infty. \end{aligned}$$

Since $\int_0^{\hat{\theta}} v_{t-1}(\delta)d\delta,\ \int_{\hat{\theta}}^{\bar{\theta}} v_{t-1}(\delta)d\delta \in [0,1]$, it must be that

$$\lim_{t\to\infty} \int_{\hat{\theta}}^{\bar{\theta}} v_{t-1}(\delta)d\delta = 0.$$

Therefore,

$$0 \leq \lim_{t\to\infty} \int_{\hat{\theta}}^{\theta} v_t(\delta)d\delta \leq \lim_{t\to\infty} \int_{\hat{\theta}}^{\bar{\theta}} v_t(\delta)d\delta = 0.$$

This inequality means

$$\lim_{t\to\infty} \int_{\hat{\theta}}^{\theta} v_t(\delta)d\delta = 0. \tag{36}$$

Hence, from (35), (36) and (36), we have

$$\lim_{t\to\infty} V_{t+1}(\theta) = 1 \quad \forall\theta \in (\hat{\theta}, \bar{\theta}].$$

From (I-i) and (I-ii), we obtain

$$\lim_{t\to\infty} V_t(\theta) = V(\theta),$$

where $V(\theta) = 1\ \forall\theta \in (\hat{\theta}, \bar{\theta}]$.

The similar calculation proves (II) and (III). Hence for any initial distribution of θ and any positive values of n^H and n^G, the statement holds.

■

Next, I prove the limit and integral are exchangeable.

Lemma 2 *For any initial distribution of θ and any positive values of n^H and n^G, the followings hold:*

(a) $\lim_{t\to\infty} \int_0^{\hat{\theta}} \theta dV_t(\theta) = \int_0^{\hat{\theta}} \theta dV(\theta)$;

(b) $\lim_{t\to\infty} \int_0^{\hat{\theta}} dV_t(\theta) = \int_0^{\hat{\theta}} dV(\theta)$;

(c) $\lim_{t\to\infty} \int_{\hat{\theta}}^{\bar{\theta}} \theta dV_t(\theta) = \int_{\hat{\theta}}^{\bar{\theta}} \theta dV(\theta)$;

(d) $\lim_{t\to\infty} \int_{\hat{\theta}}^{\theta} dV_t(\theta) = \int_{\hat{\theta}}^{\bar{\theta}} dV(\theta)$.

Proof.

Assume $n^H, n^G \in R_{++}$. I prove (a) here, but the similar argument also proves $(b)-(d)$. We want to show

$$\left| \int_0^{\hat{\theta}} \theta dV_t(\theta) - \int_0^{\hat{\theta}} \theta dV(\theta) \right| \leq \epsilon. \tag{37}$$

Denote by M the supremum of the absolute value of θ. Then,

$$M \equiv \sup_{\theta\in[0,\bar{\theta}]} |\theta| = \bar{\theta}. \tag{38}$$

Since V is non-decreasing, it has at most a countable number of discontinuity point. Thus, choose two points of continuity A and B, for which the followings hold:

$$V(A) \leq \frac{\epsilon}{10\bar{\theta}} \quad and \quad V(B) \geq 1 - \frac{\epsilon}{10\bar{\theta}}. \tag{39}$$

By Lemma 1, $\lim_{t\to\infty} V_t(\theta) = V(\theta)$, and hence it must be that, for large t, $V(\theta) = V_t(\theta) + \epsilon'$ and $V(\theta) = V_t(\theta) - \epsilon'$. Since $V(A) \leq \epsilon/10\bar{\theta} < \epsilon/5\bar{\theta}$, one can take ϵ such that $V(A) \leq \epsilon/10\bar{\theta}$

and $V_t(A) \leq \epsilon/5\bar{\theta}$. The same argument holds for B, and thus we have

$$V_t(A) \leq \frac{\epsilon}{5\bar{\theta}} \quad and \quad V_t(B) \geq 1 - \frac{\epsilon}{5\bar{\theta}}. \tag{40}$$

Since θ is continuous, it is uniformly continuous on $[A, B]$. Therefore, one can partition $(A, B]$ into subsets, i.e.,

$$(A, B] = (\theta_0, \theta_1] \cup (\theta_1, \theta_2] \cup ... \cup (\theta_{k-1}, \theta_k]$$

such that $|\theta - \theta_i| \leq \epsilon/10$ for any $\theta \in I_i \equiv (\theta_{i-1}, \theta_i]$. Moreover, the endpoint, θ_i, can be chosen to be continuity point of V. Define $f(\theta)$ on $(A, B]$ as

$$f(\theta) \equiv \theta_i \quad for \quad \theta \in I_i.$$

Then,

$$\begin{aligned} \left| \int_0^{\hat{\theta}} \theta dV_t(\theta) - \int_0^{\hat{\theta}} \theta dV(\theta) \right| &\leq \int_0^A |\theta| dV_t(\theta) + \int_B^{\hat{\theta}} |\theta| dV_t(\theta) \\ &+ \int_0^A |\theta| dV(\theta) + \int_B^{\hat{\theta}} dV(\theta) \\ &+ \left| \int_A^B \theta dV_t(\theta) - \int_A^B \theta dV(\theta) \right|. \end{aligned}$$

Regarding the first term of the RHS of (41),

$$\begin{aligned} \int_0^A |\theta| dV_t(\theta) &\leq \bar{\theta} \int_0^A dV_t(\theta) \\ &= \bar{\theta} \int_{-\infty}^A dV_t(\theta) \\ &= \bar{\theta} V_t(A) \\ &= \frac{\epsilon}{5}, \end{aligned}$$

where the first inequality follows from (38), the first equality is from the support of θ is $[0, \bar{\theta}]$ and the last inequality comes from (40). As for the second, third and fourth terms of the RHS of (41), the similar calculation gives

$$\int_B^{\bar{\theta}} |\theta| dV_t(\theta) \leq \frac{\epsilon}{5}, \tag{41}$$

$$\int_0^{\bar{A}} |\theta| dV(\theta) \leq \frac{\epsilon}{10}, \tag{42}$$

and

$$\int_B^{\hat{\theta}} |\theta| dV(\theta) \leq \frac{\epsilon}{10}. \tag{43}$$

Regarding the last term of the RHS of (41),

$$\begin{aligned}
\left| \int_A^B \theta dV_t(\theta) - \int_A^B \theta dV(\theta) \right| &= \left| \int_A^B [\theta - f(\theta) + f(\theta)] dV_t(\theta) - \int_A^B [\theta - f(\theta) + f(\theta)] dV(\theta) \right| \\
&\leq \left| \int_A^B \frac{\epsilon}{10} dV_t(\theta) + \int_A^B f(\theta) dV_t(\theta) + \frac{\epsilon}{10} \int_A^B dV(\theta) - \int_A^B f(\theta) dV(\theta) \right| \\
&\leq \frac{\epsilon}{5} + \left| \int_A^B f(\theta) dV_t(\theta) - \int_A^B f(\theta) dV(\theta) \right|.
\end{aligned}$$

I used $|\theta - \theta_i| \leq \epsilon/10 \ \ \forall \theta \in I_i$ in order to derive the first inequality. Take the limit for the second term of the RHS of (44).

$$\begin{aligned}
\lim_{t \to \infty} \left| \int_{I_i} f(\theta) dV_t(\theta) - \int_{I_i} f(\theta) dV(\theta) \right| &= \lim_{t \to \infty} \left| \int_{I_i} \theta_i dV_t(\theta) - \int_{I_i} \theta_i dV(\theta) \right| \\
&\leq |\theta_i| \left[\lim_{t \to \infty} |V_t(\theta_i) - V(\theta_i)| + \lim_{t \to \infty} |V_t(\theta_{i-1}) - V(\theta_{i-1})| \right] \\
&= 0,
\end{aligned}$$

where the inequality follows since $V_t(\theta) \to V(\theta)$ at the endpoint of I_i. From (44) and (44),

for large t,

$$\left| \int_A^B \theta dV_t(\theta) - \int_A^B \theta dV(\theta) \right| \leq \frac{\epsilon}{5}. \tag{44}$$

Therefore, from (41), (41), (42), (43) and (44), it follows that

$$\left| \int_0^{\hat{\theta}} \theta dV_t(\theta) - \int_0^{\hat{\theta}} \theta dV(\theta) \right| \leq \epsilon, \tag{45}$$

which is exactly equivalent to (37). Regarding (b)-(d), the similar arguments hold.

■

Then, we show that the derivative of the average level of risk preference asymptotically observed in the population is always positive.

Define by θ_t^* the average level of risk preference in period t. Then,

$$\theta_t^*(B) \equiv q_t E[\theta_t \mid \theta_t \in [\hat{\theta}(B), \bar{\theta}]] + (1 - q_t) E[\theta_t \mid \theta_t \in [0, \hat{\theta}(B))], \tag{46}$$

where

$$q_t \equiv \frac{N_t^G}{N_t^G + N_t^H} = \frac{1}{1 + \frac{N_0^H}{N_0^G} \left(\frac{n^H}{n^G} \right)^{t-1}}. \tag{47}$$

Consider the case where $\lim_{t \to \infty} q_t = 1$, i.e., $n^G > n^H$. By expanding conditional expectation terms of (46), it is expressed as

$$\theta_t^*(B) = \int_0^{\hat{\theta}(B)} \theta v_t(\theta) d\theta + q_t \frac{\int_{\hat{\theta}(B)}^{\bar{\theta}} \theta v_t(\theta) d\theta}{\int_{\hat{\theta}(B)}^{\bar{\theta}} v_t(\theta) d\theta}. \tag{48}$$

Then, by Lemma 2 and the fact that $v(\theta) = \lim_{t \to \infty} v_t(\theta) = 0$ for $\theta \in [0, \hat{\theta}]$, it follows

that

$$\theta^*(B) \equiv \lim_{t\to\infty} \theta_t^*(B) = \frac{\int_{\hat{\theta}(B)}^{\bar{\theta}} \theta v(\theta) d\theta}{\int_{\hat{\theta}(B)}^{\bar{\theta}} v(\theta) d\theta}. \tag{49}$$

Using the *Leibnitz's Integral Rule*, the derivative of (49) with respect to B is

$$\frac{\partial \theta^*(B)}{\partial B} = \frac{v(\hat{\theta}(B))}{\left[\int_{\hat{\theta}(B)}^{\bar{\theta}} v(\theta) d\theta\right]^2} \frac{\partial \hat{\theta}(B)}{\partial B} \left[-\hat{\theta}(B) \int_{\hat{\theta}(B)}^{\bar{\theta}} v(\theta) d\theta + \int_{\hat{\theta}(B)}^{\bar{\theta}} \theta v(\theta) d\theta\right]. \tag{50}$$

This is necessarily positive since the content of the brackets is positive. In the similar way, one can show that the derivative is positive in the case where $n^H > n^G$ and $n^H = n^G$. Therefore, the derivatives of the long-run average of risk aversion in the population with respect to megaherbivore biomass is positive.

Appendix B. Variable Definitions

B.1. Outcome Variables

- **Dependence upon Terrestrial Animal Foods (Binford, 2001)**: Taken from Binford (2001) "Percentage dependence upon terrestrial animal foods" (6.17). The measure is (6.17) in Binford (2001) devided by 100.

- **Risk Preference (World Values Survey, WVS)**: Based on the answer to the question "Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is very much like you, like you, somewhat like you, not like you, or not at all like you?: Adventure and taking risks are important to this person; to have an exciting life." Coded 1 if "Very much like me," 2 if "Like me," 3 "Somewhat like me," 4 if "A little like me," 5 if "Not like me," and 6 if "Not at all like me."

- **Risk Preference (European Social Survey, ESS)**: Based on the answer to the question "Now I will briefly describe some people. Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer: S/he looks for adventures and likes to take risks. S/he wants to have an exciting life." Coded 1 if "Very much like me," 2 if "Like me," 3 "Somewhat like me," 4 if "A little like me," 5 if "Not like me," and 6 if "Not at all like me."

- **Gender Role (European Social Survey, ESS)**: Based on the question "I am now going to read out some statements about men and women and their place in the family. Using this card, please tell me how much you agree or disagree with the following statements: A woman should be prepared to cut down on her paid work for the sake of her family." Coded 1 if "Disagree strongly," 2 if "Disagree," 3 if "Neither disagree nor agree," 4 if "Agree," and 5 if "Agree strongly."

- **Long-Term Orientation (European Social Survey, ESS)**: Based on the question

"Do you generally plan for your future or do you just take each day as it comes?" Coded 1 if the respondent just takes each day as it comes and 10 if the respondent plans for the future as much as possible. The respondent can choose any value in between.

- **Rule Following (European Social Survey, ESS)**: Based on the question "Now I will briefly describe some people. Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer: S/he believes that people should do what they're told. S/he thinks people should follow rules at all times, even when no one is watching." Coded 1 if "Not at all like me," 2 if "Not like me," 3 if "A little like me," 4 if "Somewhat like me," 5 if "Like me," and 6 if "Very much like me."

- **Generalized Trust (European Social Survey, ESS)**: Based on the question "Using this card, generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?" Coded 0 if the respondent can't be too careful and 10 if the most people can be trusted for the respondent. The respondent can choose any value in between.

- **Altruism (European Social Survey, ESS)**: Based on the question "Now I will briefly describe some people. Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer: It's very important to her/him to help the people around her/him. S/he wants to care for their well-being." Coded 1 if "Not at all like me," 2 if "Not like me," 3 if "A little like me," 4 if "Somewhat like me," 5 if "Like me," and 6 if "Very much like me."

- **Modesity (European Social Survey, ESS)**: Based on the question "Now I will briefly describe some people. Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer: It is important to him to be humble and modest. He tries not to draw attention to himself. " Coded 1 if

"Not at all like me," 2 if "Not like me," 3 if "A little like me," 4 if "Somewhat like me," 5 if "Like me," and 6 if "Very much like me."

- **Redistribution Preference (European Social Survey, ESS)**: Based on the question "The government should take measures to reduce differences in income levels." Coded 1 if "Disagree strongly," 2 if "Disagree," 3 if "Neither agree nor disagree," 4 if "Agree" and 5 "Agree strongly."

B.2. Main Independent Variables

Variables of biomass are constructed, using data sets from the PHYLACINE (Faurby et al., 2018). Biomass for a given species is defined by the product of the average body mass and the number of individuals of that species. Thus Biomass for a given area is calculated as sum of biomass of mammal species that reside in an area. The abundance of each species is predicted from the allometric relationship between body mass and population density. The estimate from Silva and Downing (1995) is used to construct the main variable. Then summation over all the related species is taken, normalized by area size.

- **Megaherbivore Biomass**: The variable is constructed following the above definition. Megaherbivore is terrestrial herbivore larger than 44 kg.

- **Non-Mega Herbivore Biomass**: The variable is constructed following the above definition. Non-mega herbivore is terrestrial herbivore smaller than 44 kg.

- **Other Mammal Biomass**: The variable is constructed following the above definition. Other mammal is composed of terrestrial carnivore and omnivore, which is a complement set of megaherbivore and non-mega herbivore.

B.3. Control Variables

- **Absolute Latitude/Latitude**: For a country, it is the absolute value of the latitude of that country's approximate geodesic centroid, as reported by the CIA's World Factbook. For an ethnic group, it is the value of the latitude, as reported by the *Ethnographic Atlas* or Binford (2019).

- **Total Land Area**: For a country, it is the total land area of a country, in millions of square kilometers, as reported for the year 2000 by the World Bank's World Development Indicators online. For an archaeological site, it is the total land area of an archaeological site, in square kilometers, as calculated using ArcGIS Pro 2.5.2.

- **Elevation (Mean)**: Average of elevation within an area. The data is taken from the Atlas of Bioshpere.

- **Land Suitability for Agriculture**: Caloric suitability post 1,500. The raster data is taken from Galor and Özak (2016).

- **Island Dummy**: It is an indicator for whether or not a country shares a land border with any other country, as reported by the CIA's World Factbook online.

- **Landlocked Dummy**: An indicator for whether or not a country is landlocked, as reported by the CIA's World Factbook online.

- **Distance to the Nearest Waterway**: For a country, it is the nearest distance to a coast, major rive or lake, as reported by G-ECON. For an ethnic group, it it the distance from the centroid of the group to the nearest coast or river which are reported in the 1:10m Natural Earth Coastline and 1:10m Natural Earth River + Lake Centerlines Datasets.

- **Temperature (Mean)** It is the average temperature within an area for the period 1901-2012, calculated based on the Climate Research Unit (CRU).

- **Precipitation (Mean)** It is the average precipitation within an area for the period 1901-2012, calculated based on the Climate Research Unit (CRU).

- **Time Elapsed since the Neolithic Transition**: It is the number of years elapsed as of the year 2,000 since the majority of the population residing within a country's modern national borders began practicing sedentary agriculture as the primary mode of subsistence. The data is taken from Borcan et al. (2018).

- **State History**: The aggregate state history score calculated for the period 3,500 BCE - 2,000 BCE. The data is taken from Borcan et al. (2018).

- **Population Density in 1,500 CE**: Population density (in persons per square km) in 1500CE, divided by total land area, as reported by the World Bank's World Development Indicators. The data is taken from Galor and Özak (2016).

- **Urbanization Rate in 1,500 CE**: Share of population living in cities. The data is taken from Galor and Özak (2016).

- **Ancestral Intensity of Agriculture**: The average level of agricultural intensity of a country's ancestors, constructed using ancestral population as weights. The data is taken from Giuliano and Nunn (2018).

- **Ancestral Settlement Patterns**: The average level of settlement patterns of a country's ancestors, constructed using ancestral population as weights. The data is taken from Giuliano and Nunn (2018).

- **Ancestral Jurisdictional Hierarchy**: The average level of jurisdictional hierarchy beyond the local communities of a country's ancestors, constructed using ancestral population as weights. The data is taken from Giuliano and Nunn (2018).

- **Ancestral Belief in Gods**: The average level of the degree of belief in gods of a country's ancestors, constructed using ancestral population as weights. The data is

taken from Giuliano and Nunn (2018).

- **Ancestral Class Stratification**: The average level of class stratification of a country's ancestors, constructed using ancestral population as weights. The data is taken from Giuliano and Nunn (2018).

- **Ancestral Slavery Type**: The average level of slavery type of a country's ancestors, constructed using ancestral population as weights. The data is taken from Giuliano and Nunn (2018).

C. Tables

Table C1: Summary Statistics: The Ethnographic Atlas

	Mean	SD	Min	Max	N
Subsistence Production Modes					
Dependency on Hunting	1.44	1.55	0.00	9.00	1264
Dependency on Gathering	1.02	1.59	0.00	8.00	1264
Dependency on Fishing	1.53	1.70	0.00	9.00	1264
Dependency on Animal Husbandry	1.56	1.80	0.00	9.00	1264
Dependency on Agriculture	4.45	2.71	0.00	9.00	1264
Independent Variables					
Biomass (Megaherbivore)	5095.56	3089.10	0.00	18251.70	1253
Biomass (Non-Mega Herbivore)	413.64	253.24	0.00	1147.77	1253
Biomass (Other Mammals)	2320.81	1377.61	0.00	6468.89	1253
Biomass (Damuth, 1987)	6408.86	3710.13	0.00	21011.43	1253
Biomass (Currie, 1993)	9449.08	5553.94	0.00	32651.80	1253
Biomass (Damuth, 1993)	520682.53	301119.81	0.00	1680329.00	1253
Biomass (Peters and Wassenberg, 1983)	32939.91	19273.67	0.00	112749.02	1253
Biomass (Silva et al., 2001)	2611.86	1516.59	0.00	8725.81	1253
Geographic Variables					
Absolute Latitude	20.66	16.87	0.00	77.53	1241
Longitude	1.47	84.69	-178.13	179.50	1265
Elevation (Mean)	681.31	588.62	-1732.00	4877.10	1246
Land Suitability (Mean)	8120.95	3919.18	0.00	18380.93	1245
Dist. to the Nearest Waterway	57.85	83.42	0.00	982.31	1265
Island	0.03	0.17	0.00	1.00	1265
Climatic Variables					
Temperature (Mean)	19.45	8.76	-16.39	29.34	1218
Precipitation (Mean)	102.07	67.64	1.06	391.17	1218
Ethnographic Variables					
Domestic Organization	5.10	2.44	1.00	8.00	1237
Intensity of Agriculture	3.31	1.57	1.00	6.00	1162
Settlement Patterns	5.10	2.22	1.00	8.00	1161
Predominant Type of Animal Husbandry	4.03	2.57	1.00	7.00	1156
Class Stratification	2.18	1.41	1.00	5.00	1083

Table C2: Summary Statistics: Binford

	Mean	SD	Min	Max	N
Subsistence Production Modes					
Hunting Dependency	0.33	0.20	0.00	0.90	339
Gathering Dependency	0.35	0.25	0.00	0.90	339
Fishing Dependency	0.32	0.27	0.00	0.95	339
Independent Variables					
Biomass (Megaherbivore)	5,457.62	3,328.94	0.00	15,946.27	338
Biomass (Non-Mega Herbivore)	288.04	187.29	0.00	1051.51	338
Biomass (Other Mammals)	1708.68	921.19	32.92	6083.30	338
Biomass (Damuth, 1987)	6842.66	3967.18	0.00	18558.33	338
Biomass (Currie, 1993)	10048.62	5965.51	0.00	28741.97	338
Biomass (Damuth, 1993)	557543.36	321639.45	0.00	1484054.00	338
Biomass (Peters and Wassenberg, 1983)	35025.10	20683.57	0.00	99357.66	338
Biomass (Silva et al., 2001)	2781.44	1624.05	0.00	7703.06	338
Geographic Variables					
Absolute Latitude	37.79	17.53	0.00	77.49	339
Longitude	-44.98	105.94	-170.31	170.08	339
Elevation (Mean)	700.90	514.69	3.70	2374.95	338
Land Suitability (Mean)	4988.96	4113.38	0.00	17683.64	338
Dist. to the Nearest Waterway	65510.22	116986.35	55.04	725798.19	339
Climatic Variables					
Temperature (Mean)	11.14	11.18	-16.39	27.69	337
Precipitation (Mean)	69.97	53.59	11.32	306.88	337
Ethnographic Variables					
Community Organization	2.61	1.37	1.00	5.00	335
Degree of Sedentism	2.22	0.88	1.00	4.00	339
Type of Social Class DIstinction	1.42	0.64	1.00	3.00	339
Dependence upon Storage	2.32	0.93	1.00	3.00	337

Table C3: Summary Statistics: The World Values Surver

	Mean	SD	Min	Max	N
Dependent Variable					
Risk Aversion	3.79	1.59	1.00	6.00	156989
Ancestor Adjusted Biomass (Megaherbivore)	7,862.71	3,008.17	226.40	16,267.53	406195
Ancestor Adjusted Biomass (Non-Mega Herbivore)	723.08	680.92	11.07	3,147.78	406195
Ancestor Adjusted Biomass (Other Mammals)	3,564.78	2,359.67	263.90	10,689.40	406195
Ancestor Adjusted Biomass (Damuth, 1987)	9283.12	3599.26	393.56	19408.81	406195
Ancestor Adjusted Biomass (Currie, 1993)	14143.17	5399.87	605.90	28975.50	406195
Ancestor Adjusted Biomass (Damuth, 1993)	747752.62	291699.18	31419.50	1578944.38	406195
Ancestor Adjcusted Biomass (Peters and Wassenberg, 1983)	48979.80	18735.22	2138.24	100013.41	406195
Ancestor Adjusted Biomass (Silva et al., 2001)	3824.55	1473.00	164.06	7886.26	406195
Geographic Variables					
Absolute Latitude	31.18	15.91	1.00	72.00	413730
Longitude	24.91	66.44	-176.17	179.19	420527
Elevation (Mean)	657.78	507.45	-2066.00	3059.91	419508
Land Suitability (Mean)	7078.09	3615.55	0.00	17993.70	419505
Island	0.14	0.35	0.00	1.00	413754
Landlock	0.11	0.31	0.00	1.00	413754
Dist. to the Nearest Waterway	455687.18	338117.94	32186.21	5029260.00	407639
Climatic Variables					
Temperature (Mean)	15.02	8.65	-17.85	28.31	409651
Precipitation (Mean)	79.40	59.10	2.86	275.39	409651
Historical Development, Institutions and Societal Variables					
Log of Population Density (1,500 CE)	0.82	1.81	-3.82	4.14	401891
Log of Urbanization (1,800 CE)	-2.57	0.98	-6.23	1.33	350186
Time since the Neolithic Revolution	5322.30	2547.33	244.00	10500.00	403196
State History	0.98	0.65	0.06	2.50	400823
Ancestral Intensity of agriculture	3.95	0.82	0.00	5.00	414167
Ancestral Settlement Patterns	5.63	1.12	0.09	7.00	414167
Ancestral Jurisdictional Hierarchy	2.87	0.65	0.00	4.00	414167
Ancestral Belief in Gods	2.31	1.02	0.00	3.00	414163
Ancestral Class Stratification	3.44	0.77	0.00	4.00	414167
Ancestral Slavery Status	0.78	1.06	0.00	3.00	414166

Table C4: Summary Statistics: The European Social Survey

	Mean	SD	Min	Max	N
Dependent Variable					
Risk Aversion	3.78	1.48	1.00	6.00	7366
Preference for Redistribution	3.98	1.03	1.00	5.00	7242
Gender Roles	3.29	1.18	1.00	5.00	2800
Time Orientation	5.01	3.02	0.00	10.00	542
Trust	4.92	2.38	0.00	10.00	6642
Rule Following	3.92	1.43	1.00	6.00	6589
Modesity	4.50	1.24	1.00	6.00	6625
Altruism	4.87	1.03	1.00	6.00	6629
Independent Variables					
Biomass (Megaherbivore)	7158.53	420.67	198.87	14959.64	7366
Biomass (Non-Mega Herbivore)	179.97	45.73	19.84	746.68	7366
Biomass (Other Mammals)	1582.72	352.47	307.30	3197.09	7366
Biomass (Damuth, 1987)	7490.76	509.68	381.31	17454.19	7366
Biomass (Currie, 1993)	12140.06	759.62	463.91	26750.68	7366
Biomass (Damuth, 1993)	593784.50	41419.97	32302.56	1404089.38	7366
Biomass (Peters and Wassenberg, 1983)	41519.50	2638.31	1688.11	92523.94	7366
Biomass (Silva et al., 2001)	3149.54	208.02	146.67	7204.19	7366
Geographic Variables					
Absolute Latitude	47.40	2.71	35.00	62.00	7366
Longitude	14.15	5.33	-6.25	33.36	7366
Elevation (Mean)	761.37	326.69	7.62	1321.08	7366
Land Suitability (Mean)	7505.87	1187.35	2443.51	10073.71	7366
Island	0.01	0.08	0.00	1.00	7366
Landlock	0.69	0.46	0.00	1.00	7366
Dist. to the Nearest Waterway	113939.56	77752.73	70275.98	354361.34	7366
Temperature (Mean)	7.54	1.99	1.85	18.15	7366
Precipitation (Mean)	92.96	13.21	38.48	134.89	7366
Historical Development, Institutions and Societal Variables					
Log of Population Density (1,500 CE)	3.12	0.43	0.67	3.56	7366
Log of Urbanization (1,800 CE)	-1.78	0.29	-2.91	-0.84	7366
Time since the Neolithic Revolution	6386.19	568.56	5000.00	8500.00	7366
State History	1.29	0.07	0.72	1.49	7366
Ancestral Intensity of agriculture	4.00	0.00	3.98	4.00	7366
Ancestral Settlement Patterns	5.83	0.60	4.02	6.04	7366
Ancestral Jurisdictional Hierarchy	2.90	0.30	2.01	3.01	7366
Ancestral Belief in Gods	3.00	0.00	2.97	3.00	7366
Ancestral Class Stratification	3.61	1.19	0.03	4.00	7366
Ancestral Slavery Status	0.00	0.00	0.00	0.03	7366

Table C5: Estimates from Different Studies

	Hunting Dependency					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.172***					
	(0.052)					
Biomass (Damuth, 1987)		0.172***				
		(0.053)				
Biomass (Currie, 1993)			0.173***			
			(0.052)			
Biomass (Damuth, 1993)				0.171***		
				(0.054)		
Biomass (Peters and Wassenberg, 1983)					0.173***	
					(0.052)	
Biomass (Silva et al., 2001)						0.172***
						(0.053)
Continent FE	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓
Ethnographic Controls	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.715	0.715	0.715	0.715	0.715	0.715
Observations	995	995	995	995	995	995

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Geographic controls are absolute latitude, longitude, mean elevation, mean land suitability, distance to the nearest waterway. Climatic controls are mean temperature and mean precipitation. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C6: Ordered Logistic Regression

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.728***	0.204	0.219	0.395**	0.395***
	(0.249)	(0.154)	(0.142)	(0.163)	(0.131)
Absolute Latitude			0.557***	-0.816***	-0.311
			(0.195)	(0.314)	(0.300)
Longitude			0.101	-0.025	-0.041
			(0.323)	(0.366)	(0.160)
Elevation (Mean)			-0.046	-0.454***	-0.216*
			(0.116)	(0.122)	(0.116)
Land Suitability (Mean)			-0.020	-0.065	0.087
			(0.116)	(0.096)	(0.104)
Dist. to the Nearest Waterway			0.002	0.115**	0.081
			(0.070)	(0.049)	(0.056)
Island			-1.039	-0.841	-0.965
			(0.915)	(0.867)	(0.617)
Temperature (Mean)				-1.474***	-0.969***
				(0.246)	(0.251)
Precipitation (Mean)				-0.041	0.162
				(0.198)	(0.163)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Observations	995	995	995	995	995

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C7: Spatial Correlation

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.623***	0.207**	0.203**	0.276***	0.172***
	(0.109)	(0.095)	(0.099)	(0.092)	(0.058)
Absolute Latitude			0.465***	-0.517***	-0.208
			(0.103)	(0.176)	(0.132)
Longitude			0.071	0.014	-0.039
			(0.134)	(0.116)	(0.080)
Elevation (Mean)			-0.059	-0.346***	-0.189***
			(0.067)	(0.076)	(0.049)
Land Suitability (Mean)			-0.038	-0.063	0.017
			(0.076)	(0.064)	(0.038)
Dist. to the Nearest Waterway			-0.005	0.052	0.032
			(0.039)	(0.034)	(0.026)
Island			-0.559	-0.401	-0.416**
			(0.365)	(0.340)	(0.194)
Temperature (Mean)				-0.977***	-0.549***
				(0.141)	(0.113)
Precipitation (Mean)				-0.121	0.049
				(0.088)	(0.069)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Observations	995	995	995	995	995

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors are in parentheses calculated using the spatial correlation proposed by Conley (1999) with a threshold of 500 kilometers. *** p<0.01, ** p<0.05, * p<0.10.

Table C8: Spatial Correlation (Bartlett)

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.623***	0.207**	0.203**	0.276***	0.172***
	(0.082)	(0.082)	(0.087)	(0.085)	(0.055)
Absolute Latitude			0.465***	-0.517***	-0.208*
			(0.085)	(0.149)	(0.116)
Longitude			0.071	0.014	-0.039
			(0.121)	(0.107)	(0.073)
Elevation (Mean)			-0.059	-0.346***	-0.189***
			(0.058)	(0.068)	(0.046)
Land Suitability (Mean)			-0.038	-0.063	0.017
			(0.066)	(0.059)	(0.040)
Dist. to the Nearest Waterway			-0.005	0.052	0.032
			(0.038)	(0.036)	(0.027)
Island			-0.559	-0.401	-0.416
			(0.364)	(0.335)	(0.300)
Temperature (Mean)				-0.977***	-0.549***
				(0.128)	(0.104)
Precipitation (Mean)				-0.121	0.049
				(0.075)	(0.062)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Observations	995	995	995	995	995

Note: The unit of analysis is a ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Europe, Asia and Americas and Oceania. Ethnographic controls are domestic organization, intensity of agriculture, settlement patterns, predominant type of animal husbandry and class stratification. All the variables are standardized. Robust standard errors are in parentheses calculated using the spatial correlation proposed by Conley (1999) with a threshold of 500 kilometers, allowing for weights that are close to one for near countries and almost zero for countries close to the distant cutoff. *** p<0.01, ** p<0.05, * p<0.10.

Table C9: Estimates from Different Studies

	Hunting Dependency					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.075***					
	(0.017)					
Biomass (Damuth, 1987)		0.070***				
		(0.017)				
Biomass (Currie, 1993)			0.073***			
			(0.017)			
Biomass (Damuth, 1993)				0.069***		
				(0.017)		
Biomass (Peters and Wassenberg, 1983)					0.073***	
					(0.017)	
Biomass (Silva et al., 2001)						0.072***
						(0.017)
Continent FE	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓
Ethnographic Controls	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.541	0.535	0.539	0.534	0.538	0.536
Observations	316	316	316	316	316	316

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Geographic controls are absolute latitude, longitude, mean elevation, mean land suitability, distance to the nearest waterway. Climatic controls are mean temperature and mean precipitation. Ethnographic controls are community organization, degree of sedentism, type of social class distinction and dependence upon storage. All the variables are standardized. Robust standard errors clustered at the country level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C10: Spatial Correlation

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.058***	0.056**	0.094***	0.101***	0.073***
	(0.022)	(0.022)	(0.025)	(0.023)	(0.026)
Absolute Latitude			0.101***	-0.149**	0.007
			(0.026)	(0.060)	(0.075)
Longitude			0.079***	0.058**	-0.011
			(0.029)	(0.028)	(0.034)
Elevation (Mean)			0.013	-0.011	0.002
			(0.016)	(0.014)	(0.015)
Land Suitability (Mean)			-0.015	-0.002	0.039**
			(0.025)	(0.021)	(0.020)
Dist. to the Nearest Waterway			0.033***	0.035***	0.029***
			(0.013)	(0.010)	(0.008)
Temperature (Mean)				-0.226***	-0.105
				(0.056)	(0.077)
Precipitation (Mean)				-0.052**	-0.029
				(0.020)	(0.025)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Observations	332	332	332	332	277

Note: The unit of analysis is a ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Ethnographic controls are community organization, degree of sedentism, type of social class distinction and dependence upon storage. All the variables are standardized. Robust standard errors are in parentheses calculated using the spatial correlation proposed by Conley (1999) with a threshold of 500 kilometers. *** p<0.01, ** p<0.05, * p<0.10.

Table C11: Spatial Correlation (Bartlett)

	Hunting Dependency				
	(1)	(2)	(3)	(4)	(5)
Biomass (Megaherbivore)	0.058***	0.056***	0.094***	0.101***	0.073***
	(0.016)	(0.016)	(0.021)	(0.020)	(0.023)
Absolute Latitude			0.101***	-0.149***	0.007
			(0.021)	(0.051)	(0.064)
Longitude			0.079***	0.058**	-0.011
			(0.025)	(0.025)	(0.032)
Elevation (Mean)			0.013	-0.011	0.002
			(0.014)	(0.013)	(0.014)
Land Suitability (Mean)			-0.015	-0.002	0.039**
			(0.020)	(0.018)	(0.020)
Dist. to the Nearest Waterway			0.033***	0.035***	0.029***
			(0.011)	(0.009)	(0.009)
Temperature (Mean)				-0.226***	-0.105
				(0.048)	(0.065)
Precipitation (Mean)				-0.052***	-0.029
				(0.017)	(0.022)
Continent FE		✓	✓	✓	✓
Ethnographic Controls					✓
Observations	332	332	332	332	277

Note: The unit of analysis is an ethnic group. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Ethnographic controls are community organization, degree of sedentism, type of social class distinction and dependence upon storage. All the variables are standardized. Robust standard errors are in parentheses calculated using the spatial correlation proposed by Conley (1999) with a threshold of 3,000 kilometers, allowing for weights that are close to one for near countries and almost zero for countries close to the distant cutoff. *** p<0.01, ** p<0.05, * p<0.10.

Table C12: Estimates from Different Studies

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Ancestor Adjusted Biomass (Megaherbivore)	0.110***					
	(0.017)					
Ancestor Adjusted Biomass (Damuth, 1987)		0.084***				
		(0.018)				
Ancestor Adjusted Biomass (Currie, 1993)			0.097***			
			(0.018)			
Ancestor Adjusted Biomass (Damuth, 1993)				0.082***		
				(0.019)		
Ancestor Adjcusted Biomass (Peters and Wassenberg, 1983)					0.094***	
					(0.018)	
Ancestor Adjusted Biomass (Silva et al., 2001)						0.088***
						(0.018)
Continent FE	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓
Wave FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.115	0.114	0.115	0.114	0.115	0.114
Observations	125235	125235	125235	125235	125235	125235

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Geographic controls are absolute latitude, longitude, mean elevation, mean land suitability, island dummy, landlocked dummy distance to the nearest waterway. Climatic controls are mean temperature and mean precipitation. Individual controls are sex, age, income and education. All the variables are standardized. Robust standard errors clustered at the interview region and wave level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C13: Ordered Logistic Regression

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Toward 1 as less risk averse, toward 6 as more risk averse						
Ancestor Adjusted Biomass (Megaherbivore)	0.167***	0.074***	0.070***	0.127***	0.129***	0.129***
	(0.024)	(0.024)	(0.023)	(0.020)	(0.020)	(0.020)
Absolute Latitude				0.057**	0.447***	0.445***
				(0.029)	(0.106)	(0.099)
Longitude				0.398***	0.528***	0.524***
				(0.066)	(0.083)	(0.081)
Elevation (Mean)				-0.081***	0.017	0.011
				(0.021)	(0.036)	(0.033)
Land Suitability (Mean)				-0.061**	-0.095***	-0.094***
				(0.026)	(0.026)	(0.026)
Island				0.099***	0.064*	0.068*
				(0.034)	(0.035)	(0.035)
Landlock				0.039**	0.068***	0.067***
				(0.018)	(0.018)	(0.018)
Dist. to the Nearest Waterway				-0.169***	-0.158***	-0.165***
				(0.030)	(0.032)	(0.030)
Temperature (Mean)					0.336***	0.335***
					(0.092)	(0.085)
Precipitation (Mean)					0.127***	0.115***
					(0.043)	(0.042)
Continent FE		✓	✓	✓	✓	✓
Individual Controls			✓	✓	✓	✓
Wave FE						✓
Adjusted R^2						
Observations	125235	125235	125235	125235	125235	125235

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Individual controls are sex, age, income and education. All the variables are standardized. Robust standard errors clustered at the interview region and wave level are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C14: Estimates from Different Studies

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.033***					
	(0.008)					
Biomass (Damuth, 1987)		0.034***				
		(0.008)				
Biomass (Currie, 1993)			0.033***			
			(0.008)			
Biomass (Damuth, 1993)				0.034***		
				(0.009)		
Biomass (Peters and Wassenberg, 1983)					0.033***	
					(0.008)	
Biomass (Silva et al., 2001)						0.033***
						(0.008)
Country of Birth FE	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.119	0.119	0.119	0.119	0.119	0.119
Observations	7366	7366	7366	7366	7366	7366

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Geographic controls are absolute latitude, longitude, mean elevation, mean land suitability, island dummy, landlocked dummy distance to the nearest waterway. Climatic controls are mean temperature and mean precipitation. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table C15: Ordered Logistic Regression

	Risk Aversion					
	(1)	(2)	(3)	(4)	(5)	(6)
Biomass (Megaherbivore)	0.033***					
	(0.008)					
Biomass (Damuth, 1987)		0.034***				
		(0.008)				
Biomass (Currie, 1993)			0.033***			
			(0.008)			
Biomass (Damuth, 1993)				0.034***		
				(0.009)		
Biomass (Peters and Wassenberg, 1983)					0.033***	
					(0.008)	
Biomass (Silva et al., 2001)						0.033***
						(0.008)
Country of Birth FE	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Climatic Controls	✓	✓	✓	✓	✓	✓
Round FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.119	0.119	0.119	0.119	0.119	0.119
Observations	7366	7366	7366	7366	7366	7366

Note: The unit of analysis is an individual. Dependent variable is hunting dependency. Megaherbivore is herbivore larger than 44 kg. Continent dummies are Africa, Asia and Americas and Oceania. Individual controls are sex, age and education. All the variables are standardized. Robust standard errors clustered at the parental country of origin are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.