# Folklore*

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**Abstract**

Folklore is the collection of traditional beliefs, customs, and stories of a community, passed through the generations by word of mouth. This vast expressive body, studied by the corresponding discipline of folklore, has evaded the attention of economists. In this study we do four things that reveal the tremendous potential of this corpus for understanding comparative development, culture, and its transmission. First, we introduce a unique dataset of folklore that codes the presence of thousands of motifs for roughly 1,000 pre-industrial societies. Second, we use a dictionary-based approach to elicit the group-specific intensity of various traits related to its natural environment, institutional framework, and mode of subsistence. We establish that such measures are in accordance with the ethnographic record, suggesting the usefulness of folklore in quantifying currently nonextant characteristics of preindustrial societies including the role of trade. Third, we use oral traditions to shed light on the historical cultural values of these ethnographic societies. Doing so allows us to test various influential hypotheses among anthropologists including the original affluent society, the culture of honor among pastoralists, the role of women in plough-using groups, and the intensity of rule-following norms in centralized societies. Finally, we explore how cultural norms inferred via text analysis of oral traditions predict contemporary attitudes and beliefs.

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# 1 Introduction

Over the last two decades, a burgeoning body of work has emerged, shedding light on the deep roots of comparative development.[1] This investigation has been greatly aided by moving the empirical explorations at the subnational level and recognizing the crucial importance of groups (ethnic, linguistic, and religious) for understanding the process of development. The combination of geographic information systems with the ethnographic record has allowed researchers to test at a large scale long-standing conjectures among historians, anthropologists, geographers, and evolutionary biologists regarding preference formation, institutional and societal traits, beliefs and attitudes, and their consequences for contemporary economic performance (see Diamond and Robinson (2010), Nunn (2012), Spolaore and Wacziarg (2013), Ashraf and Galor (2017), Michalopoulos and Papaioannou (2017*b*)).

This renaissance of the new economic history has naturally given rise to a set of critiques. The first one starts from the observation that in order to convincingly invoke persistence (or change) of cultural traits as an explanation of current outcomes, one would like to obtain a measure of these characteristics from the same societies during the preindustrial era in order to be able to make meaningful comparisons. Attempts to address this issue have been made in the context of specific traits and regions, but a comprehensive answer is missing.[2] Another closely related criticism centers on the fact that although many of the conjectures regard the historical formation of cultural and societal traits, they are being tested against current data only. A third critique stresses the weaknesses of the ethnographic work of George Peter Murdock (1967), reflected in the *Ethnographic Atlas*, including the incomplete coverage of certain economic and social aspects.

In this study we show how integrating folklore in our analysis can greatly expand the scope of the questions asked, open a window into a better understanding of the historical heritage across societies, and improve upon existing approaches. But what is folklore? Folklore is the collection of traditional beliefs, customs, myths, legends, and stories of a community, passed through the generations by word of mouth. This vast expressive body of culture, studied by the corresponding discipline of folklore, has evaded the attention of economists. In this study we do four things that reveal the tremendous potential of this corpus for economists and political scientists interested in comparative development and culture.

First, we introduce a unique dataset of folklore that codes the presence of thousands of motifs for hundreds of preindustrial societies. This is the lifetime work of the eminent anthro-

[1] See Michalopoulos and Papaioannou (2017*a*) for a compilation of many of these seminal studies.

[2] Algan and Cahuc (2010) provide an nice attempt to uncover trust values for most of the 20th century, and a case of persistence of traits has been convincingly shown by Voigtlander and Voth (2012) in the context of anti-Semitism in Germany.

pologist and folklorist Yuri Berezkin. The underlying texts are sampled from more than 12,000 books and articles. The resulting database contains approximately 50,000 abstracts of oral texts from all over the world, with information on the distributions of more than 2,000 motifs from almost 1,000 societies. Berezkin uses the expressions "folklore," "mythology," and "folklore and mythology" indiscriminately to refer to all kinds of traditional stories and tales, long and short, sacred and profane. His catalogue is described in Berezkin (2015*a*) and Berezkin (2016) where he analyzes the thematic classification and areal distribution of folklore-mythological motifs. But what is a motif? For folklorists a motif is the main analytical unit in a tale. This is any episode or image related to, or described in, narratives in the oral tradition. Here are some examples of motif titles: "impossible riddles," "male sun and female moon," "alive being turns into many objects," "eclipses: relations between the sun and the moon," "primeval tree," "the profitable exchange: from a pea to a horse," "mosquitoes let loose," "task-giver is a king or a chief," and so on. In section 3 we discuss the relationship between tales and motifs and why folklorists have converged into using motifs in classifying a society's oral tradition. Moreover, we provide details of the structure of Berezkin's corpus.

Second, we link the groups in Berezkin's dataset to those in Murdock's *Ethnographic Atlas* (EA), effectively adding the oral traditions to the ethnographic record of preindustrial societies. We then employ a dictionary-based approach to elicit the group-specific intensity of various traits related to the natural environment, the institutional framework, and the mode of subsistence. Groups whose folklore has a higher intensity of earthquake-related motifs live closer to earthquake-prone regions, groups closer to the coast have more motifs reflecting subsistence on aquatic sources, groups on fertile homelands exhibit more motifs related to agriculture, and finally those residing closer to pre-AD 600 trade routes are more likely to have an abundance of exchange-related motifs. Besides establishing that salient elements of the natural environment are manifested in the oral tradition of the group, we also show that folklore-based measures of political complexity and subsistence pattern robustly correspond to the analogous traits in the EA, suggesting the usefulness of folklore in quantifying currently nonextant characteristics of preindustrial societies including the importance of trade.

Third, we attempt to uncover the historical cultural attitudes of these ethnographic societies. Specifically, we use two psychosocial dictionaries to obtain a host of different folklore-based measures of values. Namely, the Harvard dictionary and the associated General Inquirer categories for textual content analysis as well as the Linguistic Inquiry and Word Count (LIWC). The former dictionary dates back to the 1960s and has been widely used in linguistics, psychology, sociology, and anthropology. The latter was developed by psychologists in the 90s and was last updated in 2015 which is the version we use. Reconstructing the historical cultural

landscape across groups allows us to test various influential conjectures among anthropologists including the affluent society among foragers, the culture of honor among pastoralists, the role of women in plough-using groups, the interplay between political complexity and trade, and the intensity of rule-following norms in centralized societies. We find robust evidence that centralized societies are significantly more likely to have oral traditions espousing rule following, submission to authorities and dependence on others, and motifs where the trickster (a common type of motifs) is punished for his deviant behavior.

In the last part of the paper we explore how cultural norms inferred via text analysis of oral traditions predict contemporary attitudes and beliefs. We demonstrate the predictive power of folklore-based measures of culture on current norms as reflected in modern surveys, concluding that folklore itself may be one of the vehicles via which culture is vertically transmitted across generations.

The rest of the paper is organized as follows. In Section 2 we relate our study to existing works in folklore, culture, historical development, and text analysis. In Section 3 we provide a brief history of the field of folkloristics and introduce the work of Yuri Berezkin. We offer a detailed description of his catalogue, its advantages and potential biases, and how it compares with other existing works in comparative mythology, commenting on the timing of folklore. We also introduce and discuss the Harvard dictionary along with the General Inquirer categories. In Section 4 we detail our empirical approach and present our results in four parts. In Section 5 we conclude by offering some thoughts on future work.

## 2 The Added Value of Folklore for Comparative Development

Linking pre-WWII economic conditions to current economic performance across countries has been greatly aided by the reconstruction of income per capita series for the currently developed world over the last couple of hundred years (Maddison (2007)). For longer time spans, cross-country population density estimates by McEvedy and Jones (1978) have been invariably used. Similarly, information on institutional variation reflected in the degree of democracy across independent modern states extends back to 1800, thanks to the Polity IV database, greatly facilitating comparisons.

However, group-level historical data are more scarce, particularly outside Europe. The only systematic effort to recover the institutional, economic, and societal makeup for a large cross section of preindustrial societies is the *Ethnographic Atlas*. Synthesizing a large body of anthropological research, George Peter Murdock (1967) and subsequent authors have put together an impressive dataset for a large cross section of ethnic groups around the world. Using a plethora of sources, Murdock (1967) documents a wealth of characteristics mostly for

groups in Africa, Asia, Oceania, and the New World, prior to contact with Europeans. The results of this major effort are recorded in the *Ethnographic Atlas* (published in 29 installments in the anthropological journal *Ethnology*), reflecting societal, institutional, and economic traits of 1,265 ethnicities.

Thanks to this body of work, the research on the cultural, institutional, and social correlates of growth has moved beyond country boundaries combining Murdock's EA and the mapping of the spatial distribution of ethnicities (Murdock (1959)) with the underlying geographic or location-specific traits to shed light on the origins and consequences of a variety of economic, institutional and cultural traits.[3] Recently, cultural explanations have been thrust into the spotlight (Landes (1998)). For example, a recent addition to the list of candidates on the origins of comparative development is a 2015 best seller by Harari (2015), who makes the bold claim that the success and failure of human societies are deeply rooted in the common myths that exist in people's collective imagination. Such an intriguing conjecture is currently hard to assess quantitatively. Along with cultural explanations as drivers of the observed differences in comparative development, a lively debate has emerged regarding the historical interplay between institutions and culture. Nevertheless, progress in these areas has been hindered by the mere fact that value surveys are not available for preindustrial societies. Hence, invoking the persistence of or change in cultural traits is hard to verify in the absence of historical proxies.

This paper proposes a way to recover these traits by showing that folklore can shed important light on a group's historical heritage, including proxies of beliefs and attitudes of ancestral populations conspicuously absent from the historical record. According to the Oxford English Dictionary, folklore is "The traditional beliefs, customs, and stories of a community, passed through the generations by word of mouth."This very definition of folklore is akin to how economists define culture (Alesina and Giuliano, 2015). Incidentally but importantly for our purposes, folklore is also an academic discipline whose subject matter (also called folklore) comprises the sum total of traditionally derived and orally or imitatively transmitted literature, material culture, and customs. The insights from this discipline have been so far neglected.

To the best of our knowledge, there are no papers in economics that utilize some aspect of folklore. In other social sciences, folklore is gradually being integrated. For example, in a recent paper, Ross, Greenhill and Atkinson (2013) study the diffusion of a specific folktale and its spatial variation within Europe. The researchers draw insights from population genetics to analyze 700 variants of a folktale ("The Kind and the Unkind Girls ") from 31 ethnolinguistic

[3]See, among others, Nunn and Wantchekon (2011), Michalopoulos (2012), Fenske (2013), Giuliano and Nunn (2013), Osafo-Kwaako and Robinson (2013), Michalopoulos and Papaioannou (2014), Fenske (2014), Alsan (2015), Bentzen, Hariri and Robinson (2015), Mayshar et al. (2015), Michalopoulos, Putterman and Weil (2016), Cervellati, Chiovelli and Esposito (2017), and Michalopoulos, Naghavi and Prarolo (2017).

populations with an average of 23 variants each. They find that geographical distance and ethnolinguistic affiliation exert significant independent effects on folktale diversity.

But how do we analyze folklore? In Section 3 we provide a detailed discussion of the dataset we use. Broadly speaking, what we have for each society is a set of motifs (out of a total of $2,320$ motifs) indicating the presence of a particular image, an episode in the group's oral tradition. A motif comes with a title and a short (usually two-line) description, for example title: "Kind and unkind girls"; Description: "a girl or a woman meets powerful person, behaves herself in a right way and is successful. Another (or two others) behaves in a wrong way and suffers the opposite (is punished or not rewarded)." Note that this motif is precisely the one whose diversity within Europe (700 variants) is analyzed by Ross, Greenhill and Atkinson (2013), and it is deliberately chosen to illustrate the usefulness of motifs as an aggregator of folktales across multiple variants of a given theme.

This means that text comprises our underlying data. In the social sciences, where the interest in culture is perhaps most pronounced, the most common type of text analysis examining culture has been, one form or another of, content analysis (Berelson (1952); North (1963); Gebner (1969); Holsti (1969); and Gottschalk and Gleser (1969)). Other related textual analysis techniques that have also been used include proximity and concordance analysis. Within this research tradition, the focus has been on concepts and their distribution within and across texts. Over the last few years, text analysis has seen great advances and taken a center stage thanks to the abundance of text (from millions of digitized written sources and online content). For reviews of studies in text analysis in political science and sociology, see Grimmer and Stewart (2013) and Evans and Aceves (2016), respectively. Gentzkow, Kelly and Taddy (2017) provide an excellent entry into the available text-analysis methods along with their corresponding weaknesses and drawbacks.

The approach we currently employ to quantify folklore is the dictionary-based method which connects counts of specific words to latent, unobserved attributes we wish to quantify. This is the simplest and most commonly used. Besides its simplicity, we also think that it is appropriate for our setting. In dictionary-based methods, one specifies a mapping between the counts of specific words and the latent outcomes. For example, Gentzkow and Shapiro (2010) count the number of newspaper articles containing partisan phrases, whereas Saiz and Simonsohn (2013) enter search queries in Google to obtain document-frequency measures of corruption by country, US states and cities, counting the number of web pages measuring combinations of city names and terms related to corruption.[4]

Our analysis is closely related to the works of Tetlock (2007), Baker, Bloom and Davis

[4]Gentzkow, Shapiro and Taddy (2016) apply a structural choice model and methods from machine learning to study trends in the partisanship of congressional speech from 1873 to 2016.

(2016) and Enke (2017), who use a prespecified dictionary of terms capturing particular categories of text to obtain an estimate of the outcome of interest. For example, Tetlock (2007) uses the bag of words specified in the General Inquirer (GI) dictionary to get the sum of the counts of words in each category.[5] In Baker, Bloom and Davis (2016), the authors use the count of articles in a given newspaper-month containing a set of prespecified terms such as "policy," "uncertainty," and "Federal Reserve," with the outcome of interest being the degree of "policy uncertainty" in the economy. The mapping between the two is the raw count of the prespecified terms divided by the total number of articles in the newspaper-month, averaged across newspapers. Similarly, Enke (2017) in order to quantify the extent to which US presidential candidates emphasize universal moral principles relative to "tribalistic" values he applies the bag-of-words from "Moral Foundations Dictionary" on presidential speeches.

Inspired by these three papers, we follow a similar approach. For example, in order to get an estimate of the salience of earthquakes in the folklore of the group, we construct the raw count of motifs that mention the word "earthquake." When we want to obtain a measure of the extent to which an oral tradition focuses on respect, status and honor, we use the corresponding bag of words from the GI to obtain the count of the respective motifs. In our analysis we always account for the total number of motifs recorded in a given society as well as the average word count per motif of a given oral tradition. It is important to note that while it has only recently been used in economics and finance, the Harvard dictionary and its associated General Inquirer categories dates back to the 1960s and has been widely used in linguistics, psychology, sociology, and anthropology. Thanks to its intellectual origins firmly rooted in the social sciences and the humanities, the resulting bag-of-words classifications by the Harvard dictionary and LIWC are likely to be appropriate for the classification of oral traditions.[6] We return to the issue of cross-validating the dictionary-based categories below.

An alternative route toward uncovering the cultural background of a given society may utilize information from the corpus of books published during the preindustrial era. Such an approach, however, would have to take into account that book writers during this period and their audience were both very different from the median illiterate person whose beliefs and attitudes we wish to uncover.

[5] See Antweiler and Frank (2004) for an early text analysis on how messages posted on Internet stock message boards may reflect the views of day traders. Similarly, Bollen and Mao (2011) document a significant link between Twitter messages and the stock market using other dictionary-based tools such as OpinionFinder. Finally, Wisniewski and Lambe (2013) utilize predefined word lists to construct an index of negative media attention toward the banking sector and find that the former Granger-causes bank stock returns during the 2007–2009 financial crisis.

[6] For example, Loughran and McDonald (2011) show that Tetlock's (2007) approach of using word lists from the Harvard dictionary is imperfect because it misclassifies common words in financial text, and they propose an alternative finance-specific dictionary of positive and negative terms.

## 3 A Short History of Folklore

Folklore studies began in the early 19th century. In 1846, William Thoms invented the word "folklore"to replace existing terms including "popular antiquities." The terms "folk" and "lore" simply refer to "ordinary people" and "knowledge," respectively.[7] The first generation of folklorists focused exclusively on illiterate peasants, and on groups such the Romani vagabonds, who would be more or less unaffected by the sweeping social changes of the era, and attempted to document their archaic customs and beliefs preserved in the oral traditions. The understanding was that folklore reflected the cultural beliefs of ordinary people in opposition to those of the elite. With increasing industrialization, urbanization, and the rise of literacy throughout Europe in the 19th century, folklorists were concerned that the oral knowledge and beliefs, the lore of the rural folk, would be lost. It was thought that the stories, beliefs, and customs were surviving fragments of a cultural mythology of the region, often predating the spread of Christianity. We return to the issue of the timing of folklore below.

From an anthropological perspective, folklore is one of the most important components that make up the culture of a given people (Bascom (1953)). Importantly, folklore is considered a key mechanism for preserving a group's tradition. According to Bascom, there are four functions of folklore: informally teaching cultural attitude, escaping accepted limitations of a culture, maintaining cultural identity, and validating existing cultural norms.

For over 150 years from the early 19th to the mid-20th centuries, a vast body of work accumulated from collectors in all parts of the world as they listened to story-tellers and, with better and better techniques, recorded and published what they heard. Hence, the very nature of folklore, that is, its transmission via oral storytelling, might appear to be a source of idiosyncratic variability. According to Barre Toelken, however, this was held in check by the forces of orthodoxy and tradition, which were the "twin laws of folklore performance" (Toelken (1996)). Audiences expected storytellers to retell familiar stories, and this expectation reined in tendencies to innovate or adapt folklore traditions. To rationalize the stability of the narrative, a famous early 20th-century folklorist, Walter Anderson, posited a double redundancy, that is, a feedback loop between performing and hearing the performance multiple times, in order to retain the essential elements of the tale (Dorst (2016), Fine (1979)).

The natural next step was the development of techniques to categorize this wealth of information for comparative analysis. This was a critical advance in the discipline of folklore, and the indexing of tale types and motifs lies at the heart of its comparative framework. The concept of tale type was first well delineated by Hungarian folklorist Jànos Honti in 1939.

[7] A more contemporary definition of "folk" is a social group that includes two or more persons with common traits who express their shared identity through distinctive traditions.

Honti proposed three different ways of considering a tale type as a unit of analysis of folklore: first, a tale type consists of a specific set of motifs; second, a tale type does not duplicate with other tale types; third, a tale type manifests itself through multiple existence (termed variants). The motif is defined as "the smallest element in a tale having a power to persist in tradition" (Thompson (1946)). Both are hypothetical archetypes established by comparing a large number of texts that share a common core. The methodology most closely associated with the use of tale types and motifs in comparative mythology is the historic-geographic approach that began in the late 19th century. It focused on establishing a folkloric tradition, identifying its geographic origin and its spread. The method was questioned and criticized in the wake of postmodernism, alongside large paradigm shifts in the discipline. However, it has remained popular as a methodological package for classifying textual sources in comparative analysis, and as a tool for organizing the data according to degree of similarity. In 1982, Richard Dorson Dorson (1982)declared the historic-geographic method the dominant force in folklore science.

Folklorists working in the historic-geographic tradition often follow the Aarne-Thompson (AT) classification systems. The latter include the AT motif-index, and the AT tale type index which was updated by Uther and is now known as the Aarne-Thompson-Uther classification system (ATU). The ATU classifies $2,404$ tale types (Uther (2004)). The AT motif-index refers to the motif-index of folklore literature created by Stith Thompson in 1955. The AT/ATU system was originally developed to study European oral traditions, limiting its usefulness for classifying folklore from other parts of the world (see the criticism of the classical historic-geographic method by Goldberg (1984)). For example, ethnic attribution is rarely available for folklore found in the non-Western world, even in several of the major regional indices that followed the ATU index. Although Thompson's motif index partially overcomes the lack of non-European coverage, the distribution of motifs remain skewed towards Europe and obscene-type motifs are intentionally left out, see Dundes (1997).

Yuri Berezkin's Folklore and Mythology Catalogue is a pioneering effort in modifying and extending the ATU classification system, enabling a global comparative perspective of oral traditions. It is important to keep in mind that there is also the Encyclopedia of the Folktale (Enzyklopädie des Märchens) an impressive compilation of almost two centuries of international research in the field of folk narrative tradition. However, it focuses on the oral and literary narrative traditions of Europe, and of countries influenced by European culture. Moreover, there are motif indexes compiled for specific regions that may be more relevant for those who have a regional focus in their research. See El-Shamy (2004), for example, for a classification of the folktale in the Arab world.

### Berezkin's Folklore and Mythology Catalogue

A critical dimension of the Folklore and Mythology Catalogue is that Berezkin does not limit himself to the European-based ATU tale type classification, or S. Thompson's Motif-index of folklore-literature. To accommodate the richness of non-European folklore, he defines a motif as "any image, structure, element of the plot or any combination of such elements which could be found in at least two (practically, in many) texts including sacred and profane ones." Starting with indigenous societies in the Americas and extending his classification to groups in the Old World over the course of 30 years, Berezkin has compiled a unique database of folklore and mythology for 940 groups worldwide (see Figure 1), categorizing more than $50,000$ texts into $2,320$ motifs. The fruit of his intellectual labor is a unique dataset on oral traditions with an unprecedented global coverage (see Appendix Figure 1 for the spatial distribution of groups in Berezkin's catalogue).

Berezkin builds on the historic-geographic method, but with a different goal from its early pioneers since he is primarily interested in understanding the historical spread of motifs across societies and is influenced in terms of methods and theory by Boas (1898, 2002) and his students.[8] By not restricting himself to the extant ATU tale types and S. Thompson's Motif-index of folklore-literature, he is able to accommodate and classify non-European oral traditions. This ensures that what is being explored are potential dissimilarities among oral traditions themselves, rather than dissimilarities between European and non-European folklore.[9] In addition, Berezkin summarizes and makes available the textual sources underlying the motifs, which allows other researchers to verify and interpret the original sources, or to even analyze this wealth of oral traditions independently.

To encode his motifs, he has consulted an impressive list of roughly $8,000$ books and journal articles. The bulk of the materials in the textual catalogue were published in the 20th century (see Table 2, Panel $A$, for a detailed breakdown by the date of publication as well as some of the sources themselves).

The median group in Berezkin has 58 motifs (see Figure 2). The group with the largest number of motifs are the Russians, and only one group has a single recorded motif: the Yeyi in northwestern Botswana. In Table 2, Panel $B$, we report the top 10 groups in terms of the number of motifs, and in Panel $C$ we report the top 10 motifs in terms of the number of groups in which they are present. The most popular motifs present in 346 out of the 936 societies in

[8] An advantage of this approach is that Berezkin retains the historic-geographic method's focus on the formal characteristic of folkloric traditions rather than on subjective attitudes of the narrator.

[9] To get an idea of the differential non-European coverage between Berezkin's and Thompson's motif index, consider two groups the Irish and Guarani. In the Thompson (Berezkin) index there are approximately 8.000 (236) motifs in the Irish oral tradition compared to 36 (204) recorded for the Guarani.

Berezkin's catalogue is the following: "In episodes related to deception, absurd, obscene, or anti-social behavior the protagonist is fox, jackal, or coyote". In Appendix Figure 2 we portray the number of motifs per society in Berezkin's dataset.

Among the 2,320 motifs, several motif groups emerge: (a.) Sun and Moon. (b.) Moon spots, stars, constellations. (c.) Cosmogony, the earth and the sky, etiology of the elements, natural and biological phenomena (fire, water, soil, thunderstorms, dream, etc.), cataclysms and cosmic threats, spirits of nature. (d.) Origin of death, diseases, and hard life (e.) Origin of human beings, ethnic groups, etiology of human anatomy, strange body configuration, ways of behavior, marriages before the establishment of the present norms. (f.) Origin and interpretation of culture elements, in particular related to agriculture, inadequate forms of subsistence and economic activity before the establishment of the present norms. (g.) Etiology of plants and animals and of their peculiar features, particular animals as protagonists of cosmological stories, metamorphoses, weather, and calendar. (h.) Queer and monstrous beings, creatures, objects and loci, folk beliefs related to particular phenomena and object. (i.) Identification of protagonists of the stories with particular animals or persons with particular qualities. (j.) Adventures (k.) Tricks and competitions won thanks to deception, absurd, and obscene behavior (l.) Proper names. (m.) Formulae. Large motif groups such as "Adventures" and "Tricks and Competition" have up to 826 motifs (420 motifs in "Tricks and Competition").

**Caveats**

For the analysis that follows, it is important to keep in mind the following issues. First, what is the corresponding time period for motifs and underlying myths and tales? The motifs provide a snapshot of folk life from the preindustrial times, since folklorists were mainly interested in collecting oral traditions from the groups relatively untouched by the waves of modernization of the 19th and 20th centuries. These data are therefore likely to be a depository of the beliefs and attitudes of the preindustrial societies. But how far back in history do these motifs go? There is no simple answer to this question. The traditional historic-geographic approach to the tale-type was originally understood as a narrative plot with a more or less precise origin in space and time. However, this idea has been severely criticized by Jason (1970) and Goldberg (1984) and eventually abandoned, recognizing the inherent uncertainty in coming up with convincing estimates.

Nevertheless, it is commonly understood that some motifs are likely to predate others. For example, cosmological motifs are thought to be significantly older than those regarding adventures and tricks, and Berezkin himself has published a series of papers looking at the areal distribution of individual motifs in relationship to large-scale population movements, migrations, cultural contacts and interactions in history and prehistory (see Berezkin and

Duvakin (2016), Berezkin (2015*b*) among others). Hence in the comparisons below with the Ethnographic Atlas, it is useful to keep in mind that although folklorists and ethnographers surveyed these societies roughly around the same time period, the information coded in folklore is potentially mapping into a longer historical horizon.

Second, in his coding of folklore, Berezkin ignores motifs which are universal or only found in a single oral tradition. This is also the case for the ATU classification, which is not surprising since the focus of comparative mythology is on motifs that can be found in different societies and hence are not culture specific. To the extent that both the observed and the unobserved motifs (i.e., those that are unique to a given society) are drawn from the same distribution of the themes and images present in the oral tradition, our quantification of group-specific traits is defensible.

Third, we do not have a count of how often a given tale or motif is repeated in the folklore of a society; that is, we do not know the popularity of a motif nor the number of variants of particular tale (which can be numerous, as the study by Ross, Greenhill and Atkinson (2013) reviewed above suggests). Hence, our folklore values reflect the extensive margin of elements in the oral tradition.[10] Similarly, we do not know the number of tales and legends in a given oral tradition since there is no one-to-one mapping between tales and motifs. One tale may map into multiple motifs and vice versa.

Fourth, the definition of a group in Berezkin's catalogue is usually along linguistic lines, but sometimes he groups related societies together when he cannot find enough information on the oral tradition of each individual language. For example, he puts together the neighboring groups of the Fulbe, the Wolof, and the Serer located in western Africa.

Fifth, as will become apparent in the empirical specifications we often control for country-specific constants. Why are we doing this given the historical nature of most of our exercises? Besides the obvious benefit of accounting for the broad differences in geography and ecology as well as the preindustrial historical legacies across modern-day countries, the inclusion of country fixed effects is primarily motivated by concerns about Berezkin's sampling of folklore from societies in different parts of the globe. One may worry, for example, that the coverage is systematically poorer in certain parts of Asia or Melanesia compared to parts of Europe or the Americas. Hence, by including country-specific constants, we mitigate concerns about potentially unbalanced coverage across countries and also in the quality and breadth of the underlying recorded oral traditions (assuming that groups within the same country are likely to be sampled by folklorists during the same time period and presumably with similar bi-

[10] How much a given oral tradition is studied will naturally shape the number of variants recorded per tale. So, focusing on whether a given motif is present may help mitigate concerns regarding differential sampling across traditions.

ases and available technology). Hence, exploiting within-country cross-group variation in oral traditions increases our confidence that the uncovered patterns are not an artifact of cross-modern-day country variation in the intensity at which oral traditions were originally recorded and subsequently surveyed by Berezkin himself.

### Interpretation of Folklore

In the early years of folklore, the main task of folklorists has been to collect and classify different folklore materials, paying relatively little attention to its interpretation. Indeed, the primary focus has been on the "lore" per se. For our purpose, however, it is important to understand the relationship between the "folk" and the "lore"; that is, it is not enough to say that folklore is a mirror of a culture. To understand the meaning of folklore, we need an approach (or several) to operationalize the process of information extraction. There are three dominant approaches: the humanistic, the anthropological, and the psychological. The latter two are particularly relevant in our context.

According to the pattern theory of culture (see anthropologist Benedict (1934)), all parts of culture are related and reflect the same values and beliefs. Based on her theory, folklore can be seen as a window into culture. Anthropologists have taken an ethnographic approach, a structuralist approach, and more recently, a symbolic anthropology approach to shed light on the function and meaning of folklore (Green (1997)). Within psychology, depth psychology, or psychoanalytic approaches, is the dominant method in interpreting folklore. Freud and Jung were pioneers in applying this approach to folklore. Jung approached myths as essentially static symbolism (Jung (1968)). They consider the distant past as "hidden in the unconscious and reflected in folkloric symbols" (Green (1997)).

Because we work with motifs and summaries of myths, legends, and tales - both of which are intentionally deprived of details - the humanistic approach, which mainly emphasizes the role of the narrator, offers few insights. Between the anthropological and psychological approach, we do not discriminate between the two. We take a combined approach to maximize the amount of information we may extract from the body of folklore materials. Specifically, we employ both the Harvard General Inquirer and the LIWC, which are known to be a useful tools for both psychoanalysts and cultural anthropologists.[11]

### Harvard General Inquirer and LIWC

Both the LIWC and the Harvard General Inquirer are lexicons attaching syntactic, semantic, and pragmatic information to part-of-speech tagged words, see Stone et al. (1966) and Tausczik

[11] See http://www.wjh.harvard.edu/~inquirer/3JMoreInfo.html and http://liwc.wpengine.com/compare-dictionaries/, respectively.

and Pennebaker (2010), respectively.

In 1962, the General Inquirer was first developed to research problems in the behavioral sciences. It was part of an attempt to develop more formalized procedures involving non-numerical data. Its aim was to produce a method for automatic theme analysis. The current version of the General Inquirer comprises (a) the Harvard IV-4 dictionary, (b) the Lasswell value dictionary, (c) several categories recently constructed, and (d) "marker" categories. Altogether, the General Inquirer has 182 categories with each category having a range of 6 to 2,045 words. Taking the Lasswell dictionary as an example,[12] the dictionary's entries were developed by Namenwirth and Weber (2016). Their book *Dynamics of Culture*, originally published in 1987, is "a landmark contribution to macrosociology that extends the tradition of Sorokin, Durkheim, Marx, Weber and other founders of the discipline." In the book, they discuss their research on culture indicators over two decades' time. The Lasswell dictionary provides a list of words in four reference domains: power, rectitude, respect, and affiliation, and four welfare domains: wealth, well-being, enlightenment, and skill. Within each domain, there are subcategories reflecting gains, losses, participants, ends, and arenas. Thus, there are words associated with power increasing (*power gain*) and words associated with power loss, rectitude gain and rectitude loss, as well as religion and ethics. Similarly, because the LIWC was developed by researchers with interests in social, clinical, health, and cognitive psychology, the language categories were created to capture people's social and psychological states. There are 73 categories in LIWC.

From a practical point of view, both the General Inquirer and the LIWC are mapping tools. They map a given text to dictionary-supplied categories. Many of these categories may potentially capture meaningful cultural indicators (e.g. "submission," "family," "status and prestige," "risk"). To use these tools, we first break down each motif title and description into words. Then we look up all the words appearing in the description and tag the motif to the appropriate category(ies). Hence, for each motif description we have a binary variable of 1 or 0 per motif, per tag. As a last step and to arrive at our group-specific estimates, we add up all motifs within each dictionary category to quantify the intensity of a particular cultural indicator within that oral tradition.

Our dictionary-based approach provides an initial examination of the cultural context of folklore. And although we understand that this method may misclassify individual motifs we hope that these idiosyncrasies viewed from the aggregate level of the oral tradition will not prevent us from obtaining a set of cultural proxies. Despite its limitations the dictionary-based method offers several advantages including the minimization of subjective interpretation of ad

[12] Harold Lasswell was a leading American political scientist and communications theorist famous among other contributions for applying psychoanalytic principles to political behavior.

hoc bag of words (which as will become evident, we also use in some parts of the analysis). By focusing on the title and short description of each motif rather than the tales themselves, we only make use of the essential plot of a story. This largely removes subjective influences imposed by the narrator. Our analysis is completed by the application of a dictionary-based approach, which imposes discipline on the interpretative process. However, the objective nature of this approach also entails its limitations. The General Inquirer categories "have proven to supply useful information about a wide variety of texts. But it remains up to the researchers, not the computer, to create knowledge and insight from this mapped information." In addition, both the General Inquirer and the LIWC were developed over the last few decades. Hence, a certain proportion of classified words applies to the modern context. Given the historical context which folklore corresponds to, it is possible that aspects of oral tradition remain unexplored when viewed through the lenses of these contemporary psychosocial dictionaries.[13]

We recognize that the dictionary-based method is one of the many alternatives available for text analysis. There are two reasons we employ this one. First, the former is the most commonly used in the social sciences and is simple, transparent to implement, and easy to replicate. Second, Baker et al. (2016), who are interested in measuring the degree of policy uncertainty, use a prespecified dictionary because there is no ground truth on the actual level of policy uncertainty to develop training data for a supervised model, and fitting a model would be unlikely to endogenously detect policy uncertainty as a topic. This reasoning largely applies to our setting. Obtaining reliable training data from the motifs on "moral imperative" or the "exchange economy", for example, is not straightforward. Moreover, topic modelling is unlikely to pick such themes independently. Having said that we hope that subsequent research moving beyond dictionary-based methods will enrich our understanding of oral traditions.

# 4 Empirical Analysis

The empirical analysis is presented in two steps, In the first step we assess the predictive power of oral tradition vis a vis an array of observable pre-industrial, group-specific traits regarding a society's physical environment and its ethnographic record. To extract such information from the oral tradition we construct bag-of-words that we think clearly reflect the underlying aspect we wish to capture.[14] We show that folklore-based measures of the economy and the society complement our understanding of a group's historical account, improving and extending the

[13] For example the sources of text used in LIWC come from: blog entries, expressive writing, novels, natural Speech, NY Times articles and Twitter.

[14] To increase out confidence in these folklore-based measures we plan to verify the accuracy of the classification based on our own bag of words, by having students read over the motifs and manually assign them to the categories of interest.

set of societal historical traits. In the second step we employ the psychological dictionaries discussed above to uncover the historical beliefs and attitudes of the ethnographic societies. We then use these historical beliefs and attitudes to shed light on famous conjectures among anthropologists regarding preference formation and exchange, and finally explore how the former relate to contemporary beliefs and attitudes.

### 4.1 Folklore and the Natural Environment

This first step serves the purpose of checking the extent to which the natural environment leaves an imprint on the folklore images and episodes of a group. The answer to this question is not trivial, at least among folklorists. Berezkin's view of folklore, for example, as a depository of a group's migration history suggests that folklore elements can be preserved even if the landscapes, climates, and social configurations in which they are told have changed, Berezkin (2015*a*). Moreover, by documenting that a group's physical environment is reflected in its folklore, then this increases our confidence that we could use the oral tradition to surmise other aspects of the group for which less is currently known.

With this in mind, we check the following five traits that we think can be reliably measured both in the folklore and in the physical environment of a group. Specifically, we look at features of the landscape that presumably have not changed dramatically over the course of modernization. These include proximity to the coast, proximity to earthquake zones, intensity of lightning strikes, malaria ecology, and caloric suitability for agriculture for the crops available in pre-1500 CE. See Table 1, Panel *A*, for the respective summary statistics and correlation matrix. Are these natural phenomena salient or important enough to manifest themselves in the oral tradition of a society? This is what we explore below.

The dependent variable in Panels *A* and *B* of Table 3 is a count variable, so we adopt the following specification and run Poisson regressions:[15]

$$Topic\text{-}Specific\ Motifs_{i,c} = a_c + \beta GEO_i + \gamma \ln(\#\ of\ Motif_i) + \delta \ln(Word\ Count\ per\ Motif_i) + \varepsilon_i$$

The dependent variable $Topic\text{-}Specific\ Motifs_i$ is the number of motifs reflecting a particular characteristic of group $i$, located in country $c$, and $GEO_i$ is a vector of geographic traits. We use the group's centroid (recorded by Berezkin) to compute the distance terms and a radius of 250 kilometers around each group to get the values of the respective geographic and ecological trait. We also always control for the number of motifs per group, $\ln(\#\ of\ Motif)$, and the word-count length of an average motif, $\ln(Word\ Count\ per\ Motif)$. The number of motifs is in principle a very interesting variable itself, partially reflecting the underlying breadth of

[15] Results are similar using ordinary least squares or the logged versions of the respective motif categories.

themes, images, and episodes present in the oral tradition of a given society. However, the same variable also naturally reflects the intensity with which a given society has been sampled by both folklorists and eventually Berezkin himself. Since we cannot distinguish between the two, we will always control for the log number of motifs per group.[16] Controlling for the average number of words per motif description is important given that longer titles/descriptions mechanically increase the pool of potential words to be assigned to a given category. We cluster the standard errors at the level of the language family as recorded by Berezkin himself. The term $a_c$ reflects continental or country-specific constants.

**Images and Episodes in Folklore Reflecting the Physical Environment** In columns 1 and 2 of Table 3, Panel *A*, the dependent variable is the count of motifs that mention the word "earthquake." There is a total of 6 motifs. Invariably these motifs offer a rationale for why earthquakes occur, such as: "The earthquakes are produced by the dead who are in the underworld or during the earthquakes the inhabitants of the lower world try to come out," or "Big game animals disappear under the earth and produce earthquakes". Are groups closer to earthquake-prone regions more likely to have such motifs? We construct the distance from the centroid of each group to the nearest high-intensity earthquake region (and follow Bentzen (2015) to define the latter as those located in zones 3 and 4). An average group in Berezkin's dataset has 0.10 earthquake-related motifs. However, those located within an earthquake zone (that is, those that have a distance of 0) have on average 0.20 such motifs, twice as many compared to groups located outside these areas (mean 0.09). In columns 1 and 2 we show that this pattern is robust to accounting for continental and country fixed effects.

In columns 3 and 4 we count motifs that mention the words "thunder," "lightning," "storm," "cloud," "rainbow," "deluge," "flood," "cataclysm," and "rain". To measure the intensity of these phenomena, we use the gridded climatologies of the mean lightning flash rates observed by the spaceborne Optical Transient Detector (OTD) and Lightning Imaging Sensor (LIS) instruments from 1995 to 2010 (see Cecil, Buechler and Blakeslee (2014)). Preindustrial societies located in regions experiencing intense thunder strikes systematically feature images and episodes in their oral tradition mentioning instances of these meteorological phenomena.

Finally, in the last two columns we ask whether the disease environment reflected in the intensity of malaria transmission influences the presence of motifs mentioning one of the following words: "mosquito," "insect," and "worm." The data on malaria stability come from Kiszewski et al. (2004). Groups in high-malaria regions are significantly more likely to feature tales and legends where mosquitoes and worms play a prominent role. Here is a representative

[16] We have also experimented with flexibly controlling for the number of motifs per group adding decile-fixed effects. The patterns are unchanged.

motif present in 30 societies: "The right way to dispose of a container with stinging insects would be to throw it into the river or sea or bury in a far away place, but it was not done."[17]

**Mode of Subsistence Inferred from Folklore and the Physical Environment** It is well understood that the environment exerts a significant influence on the mode of subsistence a group will undertake. For example, groups residing on more fertile lands are on average more likely to depend on agriculture for subsistence, whereas those located closer to the coast may naturally incorporate in their diet a wide set of aquatic sources. In Panel $B$ of Table 3 we ask whether this relationship is also evident in the oral tradition of a group. Coastal proximity is measured from the centroid of each group, whereas we use the caloric suitability of agriculture in a given region for crops available before the Columbian exchange, that is, before AD 1500 using the data from Galor and Ozak (2015). But how do we get a proxy of the importance of agricultural and fishing activities from a society's folklore?

We constructed two ad hoc bag of words, focusing on those elements that we believe are clearly related to the respective mode of subsistence. For the agricultural activities these are the words we take into account: "bread," "grain," "cereal," "agriculture," "farm," "seed," "field," "harvest," "cultivate," "manioc," "wheat," "crop," "plow," and "rice." An average group in Berezkin has 1.52 motifs with at least one word from the list above. In the first two columns, the dependent variable is the number of agriculture-related motifs and the dependent variable of interest is the log(mean caloric suitability pre-AD 1500). Among groups that have 0 farming-related motifs, the average regional caloric suitability for agriculture is $1,087$, whereas the caloric suitability jumps 30% among groups with at least one farming-related motif reaching $1,416$. This pattern is the same when we exploit within-continent variation and within-country variation.

To capture the intensity of fishing in the oral tradition of a group we counted the motifs that had at least one word from the following list: "fish," "canoe," "boat," "harpoon," "hook,", "net," "sea/water mammal." In the oral tradition of an average group, there are 2.59 fishing-related motifs, (see Figure 3). The median group in Berezkin is within 201 kilometers from the coast. Among these groups, the number of fishing-related motifs is 2.83 about 20% more than the respective number (2.36) among groups located far from the coast. In columns 3 and 4 of Table 3, we show that this link is strong both within continents and within modern-day countries (see Figure 3 for the spatial distribution of fishing-related motifs normalized by the total number of motifs). Overall, the results in Panels $B$ and $C$ of Table 3 provide strong evidence of influences of geography and ecology on the folklore-based measures of subsistence and of images in the oral tradition reflecting distinct features of the geographic landscape.

[17] D (1989) describes a folk belief for malaria and malaria-like conditions in Malawi which mentions the mosquitoes among other causes.

But are these folklore-based measures of subsistence consistent with the traits recorded by ethnographers? We answer this question in the next section.

### 4.2 Folklore and the Ethnographic Record

Our goal in this part of the paper is to provide sufficient evidence that folklore-based measures of the economy and the polity are in accordance with their observed counterparts from the EA. Our hope is that by doing so, we can then use folklore to deduce other aspects of a group that are plainly absent from the EA, such as the degree of the market or exchange economy.[18] Hence, we view oral tradition and the ethnographic record as providing (noisy, but as shown below, correlated) information for the same underlying social, economic and institutional structure.

To construct a correspondence between the oral tradition of a group and its ethnographic record, we linked the societies in the Berezkin database to those in the EA. Specifically, out of the $1,265$ groups in the EA, we found a corresponding group in the Berezkin database for $1,233$ of these societies, resulting in a match rate of roughly 98%. From the 940 groups in Berezkin, we matched 613 to these $1,233$ societies in the EA, implying no ethnographic coverage for approximately one-third of societies for which Berezkin has systematized its folklore. For these 300 societies after establishing the link between oral traditions and ethnographic traits we can use the empirical relationship to reconstruct the missing ethnographic record of these groups. Generally, we run OLS specifications of the following type:

$$EA\ trait_{i,c} = a_c + \beta \ln(Topic\ Specific\ Motifs_i) + \gamma \ln(\#\ of\ Motif_i) + \delta \ln(Word\ Count\ per\ Motif_i) + \varepsilon_i$$

where $EAtrait_{i,c}$ is the trait of interest from the EA and $\ln(Topic\text{-}Specific\ Motifs_i)$ is the log number of motifs belonging to a given category. The term $a_c$ represents continent and country fixed effects. See Table 1, Panel $B$, for summary statistics and the correlation for this sample.

**Mode of Subsistence in the Oral Tradition and in Ethnographic Record**

Table 4, Panel $A$, aims at showing that the folklore-based measures of the specific subsistence modes are in accordance with actual measures of economic activity recorded in the EA. Needless to say, we interpret these regressions as conditional correlations.

Our main regressors in the first four columns of Table 4, Panel $A$, are the ln(1 + number of farming-related motifs), the ln(1 + number of hunting, gathering, and fishing (hgf)-related motifs) and the ln(1 + number of herding-related motifs). This classification of motifs boils down to determining a bag-of-words representative of the activity considered. Above we already

[18] To obtain missing characteristics from the EA, the Standard Cross Cultural Sample (SCCS) is an immensely detailed ethnographic dataset. Its drawback is its limited coverage across societies.

discussed how we classify the agriculture-based motifs. Regarding the hgf motifs, the words we use are: "hunt," "ungulate," "sledge," "sleigh," "boat," "stag," "opossum," "elk," "buffalo," "deer," "gazelle," "antelope," "bow," "game," "mammoth," "harpoon," "hook," "arrow," "net," "mammal." With respect to the pastoral motifs, this is the list of words we consider: "cattle," "goat," "cow," "camel," "horse," "graze," "lamb," "herd," "shepherd," and "pasture." In columns $5-8$ we further break down the hgf motifs into fishing-specific ones as defined above, and hunting-specific ones focusing on the following subset of words: "hunt," "ungulate," "sledge," "sleigh," "stag," "opossum," "elk," "buffalo," "deer," "gazelle," "antelope," "bow," "game," "mammoth," "arrow," and "mammal."

The dependent variable is the share of subsistence from agriculture in columns 1 and 2, the reliance on herding in columns 3 and 4, and the share of subsistence from fishing and hunting (see Figure 4) in columns 5-6 and 7-8, respectively. Each measure of subsistence ranges from 0 to 9, roughly mapping into the deciles of the share of subsistence needs covered by the corresponding activity. The folklore-based measures enter with the expected signs across all specifications when we exploit variation both between and within countries. For example, groups with more farming motifs in their oral traditions are systematically more likely to be farmers, and those with motifs that describe hgf activities less likely so. Interestingly, for pastoral societies both herding- and farming-related motifs are predictive of their dependence on herding, with the beta coefficients estimates in column 3 being three times as large for pastoral motifs (0.33) compared to farming ones (0.11). Finally, hunting-specific motifs are robust features of hunting societies, and fishing-only motifs are key elements of the oral tradition among societies characterized by a greater reliance on aquatic resources. An alternative way to gauge the predictive power of folklore-based measures of subsistence and observed modes of subsistence is to look at the partial $R^2$. This is between 0.20 and 0.35 in these regressions, suggesting that a significant fraction of observed variation in a given mode of subsistence can be accounted for by variation in the intensity of the respective motifs.

**Recovering the Exchange Economy from the Oral Tradition** The first two columns of Table 4, Panel $B$, follow a strategy similar to Panel $A$. Specifically, we ask whether folklore-based measures of political complexity predict the strength of observed political complexity in the EA. So, we are building the following bag of words to capture the presence of hierarchy in the society: "leader," "hierarchy," "chief," "prince," "queen," "king," "sovereign," "noble," "elite," "ruler," classifying motifs accordingly. An average society in the EA (with an oral tradition matched) has 1.71 motifs reflecting some presence of institutional complexity. This number,

nevertheless, is 3.84 for centralized societies and 0.98 for noncentralized ones.[19] Columns 1 and 2 in Table 4 highlight that the pattern found in the simple summary statistics is present within continents and countries. More hierarchical groups in the precolonial era as recorded in the EA are systematically more likely to have hierarchy-related motifs. See Figure 5 for the residual scatterplot of column 2 specification.

In the last three columns of Table 4, Panel $B$, we ask a different question. Motivated by the finding that folklore does seem to reflect features of the observed economic and institutional structure of a group, we use folklore to obtain a measure of the intensity of the exchange economy in that society. To do this, we construct a bag of words that aims at capturing the presence of trade and exchange. Specifically, we categorize a motif as belonging to the trade category if it contains at least one of the following words: "exchange," "buy," "creditor," "lender," "sell," "sold," "bazaar," "trade," "caravan," "price," "money," "coin,"and "market." The average group in the EA group has 1.56 motifs related to exchange (see Figure 6 for the global distribution of such motifs). Is there a way to verify whether the observed variation in exchange-related motifs reflects the true underlying trade intensity? Data on the extent of the market economy are not available from the EA, and such estimates are largely missing from the historical record. An indirect way to get at this question is to compare historical trade routes to the observed intensity of exchange-related motifs.

In other words, is it the case that groups closer to the preindustrial trade routes are likely to have trade-related motifs in their oral tradition? To shed light on this question, we used data from Michalopoulos, Naghavi and Prarolo (2017) that put together for the Old World a comprehensive set of pre-AD 600 trade routes, along with historical harbors and ports before the $5th$ century AD as well as the network of Roman roads, and constructed the distance of each group in the EA to the nearest pre-AD 600 route. The summary statistics are telling of a robust, broad pattern. Among the 774 societies in the EA located in the Old World, those within 100 kilometers of ancient trade routes have an average of 6.23 exchange-related motifs, a number three times as large compared to groups located farther away (which have only 1.28 of such motifs). Columns 3 and 4 of Table 4 show that this pattern is not driven by broad differences across continents or modern-day countries, highlighting the usefulness of folklore in quantifying missing important aspects of preindustrial societies (see Figure $7a$). In column 5 we add a control for distance to trade routes as of AD 1800. Interestingly, the latter is insignificant, whereas the pre-AD 600 coefficient remains precisely estimated. This pattern suggests that although we only have a snapshot of the oral traditions across societies around the

[19] We follow Michalopoulos and Papaioannou (2013) and classify noncentralized groups as those with 0 or 1 layers of jurisdictional hierarchy above the local community level (variable $v33$ in the EA). See Fortes and Evans-Pritchard (1940) for an original exposition.

turn of the 20th century, elements of folklore are likely to encode information on the economy and the society harking back several hundreds of years.

**Political Centralization and the Exchange Economy: An Assessment** Having established that information distilled from folklore can complement the ethnographic record, we now venture into exploring whether historical states are more likely to engage in trade. The latter has been elevated to an article of faith among economic historians, but evidence on the extent of the exchange economy is sparse for preindustrial societies, particularly outside Europe. Armed with the measure we constructed above on the intensity of exchange in the oral tradition, in the last 3 columns Panel *B* of Table 4 we explore its relationship to the degree of political centralization. Again, we make no attempt to get at the question of what causes what; our goal is to simply offer illustrative correlations of a pattern that has been much theorized upon with few empirical counterparts.[20]

On the one end, the median society with no mention of exchange in its oral tradition is a stateless society, that is, it has no levels of jurisdictional hierarchy above the local village level. On the other end, groups with at least three motifs on exchange have a median of two layers of political complexity in their group. Columns 6 and 7 of Table 4-Panel *B* suggest that this pattern is strong both across and within countries (see Figure 7*b*). In column 8 we add two variables to account for the share of subsistence that comes from agriculture and pastoralism, respectively. Two patterns are worth pointing out. First, political centralization remains a robust correlate of exchange beyond the relationship between the mode of subsidence and exchange itself. Second, the intensity of exchange-related motifs for agricultural groups is no different compared to hgf groups, whereas pastoral groups are systematically more likely to feature exchange-related themes in their oral tradition.

This pattern is consistent with the observation that farming communities in the preindustrial era are not necessarily more likely to engage in trade to the extent that they can satisfy a large part of their subsistence needs from agricultural products, whereas pastoral ones, given the limited set of resources they produce, would have to systematically rely more on trade and exchange for their survival. Richerson, Mulder and Vila (2001), for example, observe that "despite the emphasis on animals, most herders are dependent on crop staples for part of their caloric intake ... procured by client agricultural families that are often part of the society and the presence of specialized tradesmen that organize the exchange of agricultural products for animal products."

[20] We plan on leveraging variation in the geographic or historical background of a group to get at the issue of causality. See Fenske (2014) and Lowes et al. (2017) for corresponding examples.

## 4.3 Folklore and Historical Norms

So far, we have shown how the oral tradition of a given pre-industrial society may complement our reliance on the EA, both deepening and broadening our understanding of a group's economic, social and institutional background. Besides the value of having two (noisy) sources to reconstruct societal historical attributes, and motivated by Bascom's (1953) view of folklore as a key mechanism for preserving a group's tradition, below we uncover the historical beliefs, attitudes, and norms inferred via by text analysis of a given oral tradition. In absence of alternative proxies of cultural norms we cannot directly check how accurate are the values elicited from a group's oral tradition. Nevertheless by establishing that the content of folklore is broadly consistent with the known ethnographic material (see above) it increases our confidence that the historical values inferred from the oral tradition may be useful proxies of the unobserved historical cultural norms.

The set of values that one may extract from folklore is potentially very large. We discipline our choice of attitudes by using specific entries from the two psychosocial dictionaries that seem to map clearly into well-defined cultural aspects. Then, we confront these new measures with an array of famous hypotheses put forward by anthropologists and social scientists. Specifically, through the lens of folklore we investigate the role of women in plough-using societies, the original affluent society hypothesis, the culture of honor among pastoralists and the relationship between statehood and rule-following norms.

### 4.3.1 The Role of Women and the Plough

Boserup (1970) puts forward an interesting hypothesis attributing contemporary differences in gender norms to the type of agriculture practiced in the preindustrial era. The specific hypothesis links the use of the plough to women specializing in home production. The idea is that unlike shifting cultivation, the plough requires significant upper body strength favoring male labor. Alesina, Giuliano and Nunn (2013) marshal impressive evidence in favor of this conjecture showing that groups of people originating from regions where the plough was historically used have less equal gender norms today.

One could use the oral tradition to shed further light on this issue. For example, one may attempt to extract from the folklore of a group the number of motifs in which women are depicted favorably to obtain a measure of historical gender bias. We are not pursuing this further here, but instead we do something simpler but we hope equally illuminating. Going over Berezkin's catalogue, we noticed a particular motif entitled "The epoch of women" with the following description: "The women dominated over the men in the past or in a far away land, were the active part in marriage relations, practiced activities which now are reserved

for men only." This motif is present in 64 preindustrial societies scattered around the globe. To the extent that the adoption of the plough was consequential for the role of women in the society, one might expect such groups to feature this image in their oral tradition.

According to the EA, among the 1,129 groups, 134 were already using the plough when surveyed by the ethnographers. Among these plough-using groups, the probability of having the above-mentioned motif, reflecting a decline in the status of women, is 17%, whereas the corresponding number among non-plough societies is three times smaller, namely 6%. Columns 1 and 2 in Table 5, Panel *A*, show that this pattern is robust when we exploit within-continent variation but becomes less precisely estimated but of similar magnitude when comparing groups within countries. Note that we do account for the share of subsistence that comes from animal husbandry and agriculture, so the pattern found is not due to broad differences between farming, pastoral and foraging societies. We plan to further assess the stability of this pattern by exploiting geographic variation in agricultural suitability similar to Alesina, Giuliano and Nunn (2013).

#### 4.3.2 Culture of Honor in Pastoral Societies

Nisbett and Cohen (1996) conjecture that the high prevalence of homicides in the South in the United States was due to the culture of honor that originates from the settlement by herders from the fringes of Britain in the 18th century. Grosjean (2014) provides robust evidence along these lines. The idea behind this link is that pastoral societies are likely to rely heavily on aggression and male honor as a way to avoid having their herd stolen. In such environments of imperfect property rights and easily movable property, creating a reputation of honor and status may deter instances of theft. To increase the plausibility of this argument, one would like to see whether pastoral societies in the past indeed valued honor and status more. How can one deduce whether a group's oral tradition places a disproportionate emphasis on this?

To extract such information from the oral tradition of the group, we rely on the entry in the Harvard dictionary that puts together words on "respect". "Respect is the valuing of status, honor, recognition and prestige." Examples of such words are: "dignity," "insult," "shame," "disapprove," "disgrace," "coward," "abuse," "honor,"and "courage." Predominantly pastoral groups have on average 53.5 motifs reflecting concern with honor and status, whereas the corresponding number among nonpastoral societies is 37. Columns 3 and 4 in Table 5, Panel *B*, show that this relationship is robust to continent and country fixed effects. This finding is important for two reasons. First, it provides large-scale evidence in favor of an influential (and intensely debated) conjecture about the culture of honor among pastoral societies, showing that the latter feature more prominently in their oral traditions episodes and images that stress honor and

shame. Second, this finding also helps us to understand how a particular attitude may survive across generations even when the original conditions that made this type of cultural adaptation optimal no longer apply. A group's collective memory enshrined in its oral tradition may be this vehicle of cultural transmission.

### 4.3.3 The Original Affluent Society Hypothesis

Before Sahlins (1972) the forager's lifestyle among anthropologists was portrayed as an indigent one. Day-long toiling to obtain the necessary means to survive and coping with a marginal environment; leaving little if any time for leisure. In 1972 Marshall Sahlins offered a drastically different take on this. Drawing on data from a variety of foraging societies, he argued that hunter-gatherers were able to meet their needs by working roughly $15 - 20$ hours per week, significantly less than the corresponding time among industrial workers, concluding that contrary to what was thought up to that point, with economic development, the amount of work actually increases and the amount of leisure decreases. This radically different view espoused by Sahlins has become popular in anthropology but has also generated criticism, see Kaplan (2000).

The LIWC offers an entry that can speak directly to this. Specifically, we use the terms related to "leisure" to classify the motifs of a given society accordingly. Examples of such words include: "celebrate," "dance," "entertain," "dream," "fun," "game," "joke," "sing," "play,"and "relax." Here are a couple of motifs prevalent among foraging societies in North America that belong to this category: "Person joins dancers but then understands that these are trees or reeds moved by the wind." "Person plays throwing his eyes or his tooth up or away. Eyes or tooth first come back to eye sockets or mouth but eventually are lost". There are 175 societies in the EA that derive their livelihood predominantly from either hunting or gathering. The median hunter-gatherer society has 17 motifs that are classified as related to leisure whereas non-foraging ones have only 9 such motifs. The regression results presented in columns 5 and 6 of Table 5 Panel *A* suggest that this simple tabulation is present when comparing groups both across and within countries. Farming societies are systematically less likely to feature images and episodes in their folklore related to leisure activities. The reverse pattern obtains when we focus on motifs that are "work"-related according to the LIWC. Farming groups again are more likely to have such motifs whereas pastoral and hunter-gatherer ones less so. Although further analysis of the underlying bag-of-words is needed and one needs to keep in mind that leisure and work-related words are classified using a contemporary dictionary, these preliminary associations offer large-scale evidence in support of Sahlins (1972) thesis. Comparing oral traditions across societies at different stages of development, there is a gradient in the intensity of

leisure (work)-related images; the latter decrease (increasing) as societies transit from hunting and gathering on the one end and agriculture on the other.

#### 4.3.4 Rule Following and Political Complexity

Are strong states associated with rule-following norms? From a theoretical standpoint, the answer is exante ambiguous, and it boils down to whether institutions crowd in or crowd out rule-following. From an empirical point of view, the existing findings go in both directions. For example, Lowes et al. (2017) compare descendants of a centralized group, the Kuba, to those of stateless groups in Congo DRC and find in field experiments that the former are less likely to follow the rules and more likely to cheat, suggesting a substitutability between the strength of the state and rule-following norms. On the contrary, Dell, Lane and Querubin (2017) focus on the Dai Viet-Khmer boundary within Vietnam and find that a strong historical state crowded in village-level collective action and local governance. Can the oral tradition of a group help to shed light on this question?

We construct 3 alternative measures of rule following in the folklore of each society and show that groups that were politically centralized during the preindustrial era would be systematically more likely to (i) feature motifs that indicate moral imperative, (ii) have motifs with a higher frequency of words suggesting submission to authority and dependence on others, and (iii) have a greater frequency of motifs in which anti-social behavior is punished. Although this relationship is not intended to be interpreted as causal it suggests that historically, rule-following norms and state centralization on average have been going hand in hand.

The Harvard dictionary has 27 words that indicate moral imperative. Among those, the most common in the motifs are words such as: "have to," "must," "ought to," "should." Here is a description of such a motif present in 9 societies: "Person *must* quickly clean a stable or cattle-shed from dung accumulated there for a long time." Another one reads: "Somebody suggests to guess what sort of material a certain object is made of. Another person (usually a monster) gets to know the secret and the hero or the heroine *must* do what they have promised." This motif is present in 59 societies in Berezkin's dataset.

Another category in the Harvard dictionary is the one connoting submission to authority or power, dependence on others, vulnerability to others, or withdrawal and it comprises of a set of 284 words. These include words like: "admit," "assist," "accept," "belong," "depend," "follow," "serve," "submit," "respect," "suffer" and so on. Here is a motif, present in 18 societies, classified in this category: "Hero *receives* a difficult task (usually to bring an object or creature that have no particular indications and properties) and comes across an invisible person who is a powerful and well-disposed *servant* to anybody who becomes his master. The

hero is kind with him and the person *assists* him". Another motif present in 114 groups reads: "A man gives his last money for simple advice. Each piece of advice saves his life or helps to achieve success or he does not *follow* the advice and gets into trouble". Another one reads: "One girl goes to the other world, acts correctly and brings back an animal or a box with a handsome man inside. Another girl acts wrongly and *suffers* a reverse"

A simple cross-tabulation of the intensity of these categories and state centralization as reflected in the EA is telling of the underlying pattern. On the one hand, stateless groups have on average just 1.29 motifs that indicate moral imperative, whereas the respective number for large (complex) centralized states (v33=4 or v33=5) is almost four times larger with an average of 4.76 such motifs. The gap is also evident regarding the number of motifs that suggest submission to authority and dependence on others, with politically acephalous societies having half the number of such motifs compared to centralized ones (4.91 versus 11.87). In Table 5, Panel $B$, we show that these patterns are robust to adding continental fixed effects in columns 1 and 3, and perhaps more interestingly, even comparing groups within the same modern-day-country boundaries, political complexity and rule-following motifs go in tandem.[21] See Figures 8$a$ and 8$b$ for the residual scatterplots.

In the last columns of Table 5, we move away from the Harvard dictionary categories and do the following. As discussed in Section 3, motifs that relate to trickster stories are a common type. Closer examination of these motifs reveals that trickster-related stories can roughly be broken down into motifs where (i) the trickster is punished for his antisocial behavior; (ii) the trickster is successful and gets away with his actions; and (iii) motifs where we cannot tell what happens to the trickster after all. An example of the first case is the following motif present in 67 societies: "A stranger tells a woman that he comes from the other world and had seen there her dead relative. The woman gives him money and goods for the latter. The husband goes after the trickster to retrieve the money, the trickster steals his horse."An instance of a motif where the cheater or trickster is punished (present in 20 groups) is the following: "Rock chases or otherwise punishes person who has offended it."Finally, motifs like this one (present in 100 groups): "In episodes related to deception, absurd, obscene or anti-social behavior the protagonist is a turtle (or tortoise), a toad or a frog"cannot be classified in either category. It stands to reason that an oral tradition featuring many motifs where the trickster is punished instead of being rewarded is a society with strong rule-following norms.

In order to systematically classify trickster stories into these three groups, we recruited three undergraduates from Brown University who read over each motif description and manually classified a motif as belonging to into one of the said categories (if any). For each group we

[21] In results available upon request, we show that this correlation is not driven by the presence of high gods in the group.

aggregated the students' responses into the three categories and extracted the first principal component of each. The results are shown in columns 5, 6, and 7 of Table 5. In the first column, where we do not distinguish between the different types of trickster motifs we find no systematic relationship between statehood and the frequency of trickster motifs. The pattern changes in column 6, where we distinguish between these three categories. Among centralized societies there is systematically higher frequency of motifs where the trickster is punished. The same pattern is found exploiting within-country variation in column 7. All in all, the results in Table 5, Panel *B*, offer large-scale support in favor of arguments put forth that predict a complementarity between statehood and rule-following behavior, see (Weber (1976) and Foucault (1995) among others).[22]

### 4.4 Historical Norms and Contemporary Beliefs and Attitudes

Do historical norms correspond to contemporary attitudes? Folklore is believed to be the " intellectual remains of earlier cultures surfing in the traditions of peasant class". If so, to what degree, do cultural values encapsulated in the oral tradition predict values and beliefs today?

To answer this question, we turn to the World Value Surveys (and its European equivalent—the European Value Surveys). The first step is to assign an oral tradition to each respondent based on information regarding ethnicity, language spoken at home, and language spoken at interview. Out of the 417,347 respondents, for which at least one of the three characteristics are present, we have recovered an oral tradition for 368,951 individuals. The procedure we followed is the following: whenever information on ethnicity is available, a respondent is matched to the folklore tradition(s) of his ethnic identity.[23] If ethnicity is missing or unknown, we look at the variable indicating the language the respondent speaks at home and assign the corresponding oral tradition. When both ethnicity and "language spoken at home" are not available or when no matching folklore tradition(s) along these lines could be found, we use the language a respondent speaks at the interview.[24] This accounts for about 25%, or 86,246 respondents, of the sample. For regions in Europe with a well-known regional identity, we institute an overriding rule: we assign all respondents sampled in that specific region to the regional folklore tradition. This happens for the following regions: Scotland, Ireland, Wales,

[22] To increase our confidence in the Harvard dictionary-based results, we plan to manually audit the resulting classifications. An illustrative example of this is Baker, Bloom and Davis (2016), who perform a careful manual audit to validate their dictionary-based method for identifying articles that discuss policy uncertainty.

[23] It is possible for one ethnicity to correspond to several oral traditions. For example, when the ethnicity is vaguely defined, as is the case for the "indigenous" in Guatemala, we search for all indigenous folklore traditions present in Guatemala (in Berezkin's corpus) and match the respondent to them.

[24] When a respondent speaks English in the interview in a former British colony but he speaks a different language at home which we cannot match to an oral tradition. In these cases we err on the conservative side and do not assign the English oral tradition.

Aragon, Sicily, Sardinia, Eastern Sami, Western Sami, Gagauzia and Kashubia. Behind the link we have constructed lies a deeper question, i.e., what is the vehicle via which an oral tradition is passed from one generation to another? Is it one's ethnicity? Is it the language one speaks at home, the language one uses in his communications outside home, his region or a combination of all of the above? Our matching sequencing prioritizes ethnicity over home language over language of the interview.[25]

Having constructed a link between a respondent and her oral tradition(s), we attach to these individuals their historical values based on their folklore. The process of value extraction from a group's oral tradition is identical to the one we have already described. The only difference here is that there are a few instances in which an individual is linked to more than one folklore tradition. Our current approach is to group those folklore traditions into a "super" tradition. This "super" tradition contains all motifs that are present in the constituent ones and is now included in the analysis as a distinct oral tradition.

The empirical specifications we use in this part of the paper have the following form:

$$Belief_{i,g,c} = a_c + \beta Historic\ Values_g + \gamma \ln(\#\ of\ Motif_g) + \delta \ln(Word\ Count\ per\ Motif_g) + \zeta \mathbf{X}_{i,g,c} + \varepsilon_{i,g,c},$$

where $Belief_{i,g,c}$ is the answer given by individual $i$, with oral tradition $g$, residing in country $c$. $\mathbf{X}_{i,g,c}$ is a vector of individual characteristics including age, age squared, sex, 9 educational attainment fixed effects and 91 religious denomination fixed effects. Standard errors are clustered at the oral tradition level and $a_c$ reflect country-of-residence specific constants. All regressions control for the ln(total number of motifs) and the ln(average number of words per motif).

We use both the Harvard General Inquirer and the LIWC to recover historic values from folklore text, $Historic\,Values_g$. We first examine the two categories constructed in the previous sections on "submission"[26] and "ought to". The reason we look at these values is because there is a vibrant literature that attempts to understand the variation in contemporary rule-following norms across countries. Starting with the well-identified study by Fisman and Miguel (2007) who show that cultural norms towards corruption are systematic determinants of rule-following behavior, many studies try to shed light on how these rule-abiding norms rise in the first place and get transmitted over time.

[25] An alternative route to reconstructing an individual's oral tradition would be to use some kind of maximum likelihood minimizing the distance between folklore-based values (of one's ethnicity, language and region) and current attitudes. Doing so one could uncover the closest oral tradition. We are not aware of this having been done in the literature but it strikes as a fruitful way forward.

[26] Note that we are agnostic about the nature, type or source of authority in question, but rather, focus on the mentality of submission and compliance.

Given the interest of the academic and policy making community in this aspect of culture it is not surprising that the WVS-EVS has several questions that get at different instances of acceptance of deviant behavior. In Table 6 we use 3 of these questions. Specifically, in columns 1 and 2 the dependent variable reflects how justifiable it is to avoid paying the fare on public transport. In columns 3 and 4 the variable of interest is the extent to which a respondent finds justifiable that someone is cheating on taxes and finally in columns 5 and 6 the question gauges how comfortable is the individual with someone accepting a bribe. All these 3 questions are on the same scale and range from 1 to 10 where 1 implies that the respondent finds this specific action "never justifiable" and 10 finds the same action "always justifiable". So. higher values indicate higher tolerance for rule-breaking behavior.

The first 6 columns of Table 6 paint a clear picture. Respondents belonging to groups whose oral traditions have more images and episodes on submission and dependence on others or of moral imperative are systematically more likely to condone instances of rule-breaking behavior, like not paying one's taxes, avoid transport fare or accepting a bribe. The beta coefficients estimated in Panel A are also sizeable (see Figures $9a - 9c$ for the corresponding scatterplots). A one-standard-deviation increase in the intensity of "ought to" motifs decreases tolerance for socially deviant behavior by around 0.6 standard deviations. The same pattern obtain at the folklore tradition level (Panel A), at the individual level (Panel A), as well as within a sample of immigrants (Panel C).[27] The individual specifications are interesting because they show (i) the pattern uncovered is not driven by oral traditions in a particular country and (ii) that our results are not driven by differences in the religious denomination across the globe. Within Muslim, within Catholics etc. variation in the submission and moral imperative of the oral tradition influences contemporary attitudes of their members.

Next, we branch out to a few more categories, looking at patterns of risk-taking and importance of family. The choice of these two features is motivated by their importance in cultural studies and by the fact that we can clearly map questions from the WVS-EVS to entries in the LIWC on "risk" and family, respectively. An individual with an oral tradition rich in risk images is more likely to display risk-tolerant attitudes today (column 7). Specifically, the corresponding question reads: "It is important to this person: adventure and taking risks" with higher values indicating that this attribute is less important in the person's life. The "risk" category in LIWC features words such as "crisis, danger, escape, flee, lose, risk, safe, hide, unsafe and warn". A motif that is tagged in this category is: "The girl who remains alone in a house or gets into the house of dangerous creatures hides turning into a needle." Exposure to episodes depicting a risky environment seems to increase tolerance for risks later

[27] We classify immigrants as those with both parents not from the country the individual is surveyed. This information is only available for the WVS sample.

in life. Likewise, exposure to stories at an impressionable age where family members are the main characters increases one's agreement that family is important in one's life (column 8). The question in the WVS-EVS asks the respondent to identify how important is family in his life. Higher values indicate lower importance. Here is a rather common motif, present in 74 societies, classified as having to do with family. "Many brothers marry or have to marry in such a way that all their wives are (were) sisters."

Our initial examination of the WVS-EVS with the Harvard General Inquirer and LIWC has indicated a striking consistency between past values documented in folklore, and contemporary values recorded in WVS-EVS regarding rule-following, risk seeking and importance of family. Images and episodes encapsulated in folklore related to these features appear to have a lasting life and more suggestively, but quite possibly, are still shaping the way individuals perceive the world. This reveals the potential for folklore to be used as an anchor for past values and to serve an important benchmark in the research of cultural persistence.

# 5 Concluding Remarks

The economics on the cultural determinants of growth starting with Landes (1998) have placed a great emphasis on the importance of culture for determining contemporary economic and political outcomes. To overcome the issue of endogeneity, very promising instrumental variable strategies have been devised linking historical accidents and geographic endowments to contemporary beliefs and attitudes, often looking at individuals no longer living in their ancestral homelands (following the epidemiological approach of Fernandez (2011)). Nevertheless, there has been a missing element in this literature. Namely, the absence of historical proxies of beliefs has severely hindered the debate about the persistence of cultural traits.[28] In this study we propose a way to close this gap by integrating folklore into our toolset.

Specifically, we do four things. First, we introduce and describe a novel dataset of oral tradition across approximately $1,000$ preindustrial societies assembled by the eminent anthropologist and folklorist Yuri Berezkin. Second, following a dictionary-based method, we quantify several aspects of folklore related to the physical environment, the mode of subsistence, and its institutional complexity. We show that these folklore-based measures are predictive of the observed natural landscape, and the economic and societal features as recorded in the *Ethnographic Atlas*. This suggests that a society's oral tradition may complement and expand our current understanding of a group's historical traits, deducing for example aspects that are plainly absent from the EA, including the extent of the exchange economy.

[28] See Chen (2013) and Galor, Ozak and Sarid (2016) for attempts to link linguistic features regarding, for example, the structure of the future tense to cultural attributes today.

Third, motivated by Bascom's (1953) view of folklore as a depository of a group's beliefs and attitudes, we make a first attempt to uncover these norms applying a dictionary-based method on the motifs of the recorded oral traditions. For the latter, we use the Harvard dictionary and the LIWC, which have been widely used in linguistics, psychology, sociology, and anthropology to analyze text. Although we cannot directly check the representativeness of these reconstructed values, documenting that aspects of folklore are in accordance with the known ethnographic material, increases our confidence that the former may be useful proxies of the underlying historical norms. Armed with these historical values we proceed in two steps. First, we use them to assess the empirical content of an array of influential conjectures among anthropologists regarding the role of women in plough-using societies, the original affluent society hypothesis, the culture of honor among pastoralists and the relationship between statehood and rule-following norms. Finally, we explore how norms deduced from a group's oral tradition are associated with the contemporary beliefs and attitudes of its members.

We view this study as a springboard for further research. For example, one can utilize the wealth of folklore to derive bilateral measures of historical cultural proximity across groups and countries. This is likely to complement the existing bilateral distance measures based on languages, and genes (Spolaore and Wacziarg (2009)). Moreover, to the extent that some beliefs and attitudes are more likely to persist than others, folklore can shed light on which values are largely stable and which ones are subject to change. An alternative dimension along which folklore can be employed is related to Berezkin's work, that is, using it to trace the historical migration paths of preindustrial societies. Finally, although obtaining time variation in folklore is challenging granted the inherent uncertainty with timing the origin of a given motif, one may extend this analysis to obtain relatively high-frequency measures of oral traditions using text from contemporary popular culture. Given the versatility of folklore as a vehicle of obtaining a unique view of our ancestral cultural heritage, we expect it to be widely used among scholars interested in the historical origins of comparative development and culture.

## References


**Alesina, Alberto F., and Paola Giuliano.** 2015. "Culture and Institutions." *Journal of Economic Literature*, 53(4): 898–944.

**Alesina, Alberto, Paola Giuliano, and Nathan Nunn.** 2013. "On the Origins of Gender Roles: Women and the Plough." *Quarterly Journal of Economics*, 128(2): 469–530.

**Algan, Yann, and Pierre Cahuc.** 2010. "Inherited Trust and Growth." *American Economic Review*, 100: 2060–2092.

**Alsan, Marcella.** 2015. "The Effect of the TseTse Fly on African Development." *American Economic Review*, 105(1): 382–410.

**Antweiler, Werner, and Murray Z. Frank.** 2004. "Is All That Talk Just Noise? The Information Content of Internet Stock Message Boards." *Journal of Finance*, 59(3): 1259–1294.

**Ashraf, Quamrul, and Oded Galor.** 2017. "The Macrogenoeconomics of Comparative Development." Journal of Economic Literature, forthcoming.

**Baker, Scott R., Nicholas Bloom, and Steven J. Davis.** 2016. "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics*, 131(4): 1593–1636.

**Bascom, William R.** 1953. "Folklore and Anthropology." *Journal of American Folklore*, 66(262): 283–290.

**Benedict, Ruth.** 1934. *Patterns of Culture.* New York:Houghton Mifflin Harcourt.

**Bentzen, Jeanet, Jacob Gerner Hariri, and James A. Robinson.** 2015. "The Indigenous Roots of Representative Democracy." NBER Working Paper 21193.

**Bentzen, Jeanet Sinding.** 2015. "Acts of God: Religiosity and Natural Disasters Across Subnational World Districts." University of Copenhagen Working Paper.

**Berelson, Bernard.** 1952. "Content Analysis in Communications Research."

**Berezkin, Yuri.** 2015*a*. "Folklore and Mythology Catalogue: its Lay-out and Potential for Research." In *The Retrospective Methods Network Newsletter*. Vol. 10, , ed. Frog, Helen F. Leslie-Jacobsen and Joseph S. Hopkins, Chapter Between Text and Practice: Mythology, Religion and Research, 58–70. Helsinki:Folklore Studies / Dept. of Philosophy, History, Culture and Art Studies University of Helsinki, Helsinki.

**Berezkin, Yuri.** 2015*b*. "Spread of Folklore Motifs as a Proxy for Information Exchange: Contact Zones and Borderlines in Eurasia." *Trames: Journal of Humanities and Social Sciences*, 19(1): 3–13.

**Berezkin, Yuri.** 2016. "Peopling of the New World in Light of the Data on Distribution of Folklore Motifs." In *Maths Meets Myths: Quantitative Approaches to Ancient Narratives (Understanding Complex Systems)*. Vol. 10, , ed. MairÃŋn Mac Carron Ralph Kenna and Padraig Mac Carron, 71–89. Springer Verlag.

**Berezkin, Yuri, and Evgeny Duvakin.** 2016. "Buried in a Head: African and Asian Parallels to Aesop's Fable." *Folklore*, 127(1): 91–102.

**Boas, Franz.** 2002. In *Indian Myths and Legends from the North Pacific Coast of America: A Translation of Franz Boas' 1895 Edition of Indianische Sagen von der Nordpazifischen Kuste Amerikas, trans. Dietrich Bertz.* , ed. Randy Bouchard and Dorothy Kennedy. Vancouver, Canada:Talonbooks.

**Bollen, Johan, and Huina Mao.** 2011. "Twitter Mood Predicts the Stock Market." *Journal of Computational Science*, 2(1): 1–8.

**Boserup, Ester.** 1970. *Woman's Role in Economic Development.* London:Allen and Unwin.

**Cecil, Daniel J., Dennis E. Buechler, and Richard J. Blakeslee.** 2014. "Gridded Lightning Climatology from TRMM-LIS and OTD: Dataset Description." *Atmospheric Research*, 135-136: 404–414.

**Cervellati, Matteo, Giorgio Chiovelli, and Elena Esposito.** 2017. "Bite and Divide: Ancestral Exposure to Malaria and the Emergence and Persistence of Ethnic Diversity in Africa." Working paper, London Business School.

**Chen, Keith.** 2013. "The Effect of Language on Economic Behavior: Evidence from Savings Rates, Health Behaviors, and Retirement Assets." *American Economic Review*, 103(2): 690–731.

**Dell, Melissa, Nathan Lane, and Pablo Querubin.** 2017. "The Historical State, Local Collective Action, and Economic Development in Vietnam." working paper, Harvard University, Department of Economics.

**D, Helitzer-Allen.** 1989. "Examination of the Factors Influencing the Utilization of the Antenatal Malaria Chemoprophylaxis Program, Malawi, Central Africa." Doctoral dissertation. Johns Hopkins University School of Hygiene and Public Health.

**Diamond, Jared, and James A. Robinson.** 2010. *Natural Experiments of History.* Cambridge, MA:Harvard University Press.

**Dorson, Richard M.** 1982. *Folklore and folklife: An introduction.* University of Chicago Press.

**Dorst, John D.** 2016. "Folklore's Cybernetic Imaginary, or, Unpacking the Obvious." *Journal of American Folklore*, 129(512): 127–145.

**Dundes, Alan.** 1997. "The Motif-Index and the Tale Type Index: A Critique." *Journal of Folklore Research*, 34(3): 195–202.

**El-Shamy, Hasan M.** 2004. *Types of the Folktale in the Arab World: A Demographically Oriented Tale-Type Index.* Bloomington:Indiana University Press.

**Enke, Benjamin.** 2017. "Moral Values and Trump Voting." working paper, Harvard University.

**Evans, James A., and Pedro Aceves.** 2016. "Machine Translation: Mining Text for Social Theory." *Annual Review of Sociology*, 42: 21–50.

**Fenske, James.** 2013. "Does Land Abundance Explain African Institutions?" *Economic Journal*, 123(573): 1363–1390.

**Fenske, James.** 2014. "Ecology, Trade, and States in Pre-colonial Africa." *Journal of the European Economic Association*, 12(3): 612–640.

**Fernandez, Raquel.** 2011. "Does Culture Matter?" In *Handbook of Social Economics.* Vol. 1A, , ed. Jess Benhabib, Matthew O. Jackson and Alberto Bisin, 481–510. Amsterdam:North-Holland.

**Fine, Gary Alan.** 1979. "Folklore Diffusion Through Interactive Social Networks: Conduits in a Preadolescent Community." *New York Folklore Society*, 5(1-2).

**Fisman, Raymond, and Edward Miguel.** 2007. "Corruption, Norms, and Legal Enforcement: Evidence from Diplomatic Parking Tickets." *Journal of Political Economy*, 115(6): 1020–1048.

**Fortes, M., and E. Evans-Pritchard.** 1940. *African Political Systems.* New York:Oxford University Press.

**Foucault, Michel.** 1995. *Discipline and Punish: The Birth of the Prison.* New York:Vintage Books.

**Galor, Oded, and Omer Ozak.** 2015. "Land Productivity and Economic Development: Caloric Suitability vs. Agricultural Suitability." mimeo, Brown University.

**Galor, Oded, Omer Ozak, and Assaf Sarid.** 2016. "Geographical Origins and Economic Consequences of Language Structures." Brown University Working Paper.

**Gebner, George.** 1969. "The Analysis of Communication Content; Developments in Scientific Theories and Computer Techniques."

**Gentzkow, Matthew, Bryan T. Kelly, and Matt Taddy.** 2017. "Text as Data." NBER Working Paper 23276.

**Gentzkow, Matthew, Jesse M. Shapiro, and Matt Taddy.** 2016. "Measuring Polarization in High-Dimensional Data: Method and Application to Congressional Speech." NBER Working Paper 22423.

**Giuliano, Paola, and Nathan Nunn.** 2013. "The Transmission of Democracy: From the Village to the Nation State." *American Economic Review, Papers and Proceedings*, 103(3): 86–92.

**Goldberg, Christine.** 1984. "The Historic-Geographic Method: Past and Future." *Journal of Folklore Research*, 21(1): 1–18.

**Gottschalk, Louis A., and Goldine C. Gleser.** 1969. *The Measurement of Psychological States through the Content Analysis of Verbal Behavior.* University of California Press.

**Green, Thomas A.** 1997. *Folklore: An Encyclopedia of Beliefs, Customs, Tales, Music, and Art.* Vol. 1, Santa Barbara, CA:ABC-CLIO.

**Grimmer, Justin, and Brandon Stewart.** 2013. "Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts." *Political Analysis*, 21(3): 267–297.

**Grosjean, Pauline.** 2014. "A History of Violence: The Culture of Honor and Homicide in the US South." *Journal of the European Economic Association*, 12(5): 1285–1316.

**Harari, Yuval Noah.** 2015. *Sapiens: A Brief History of Humankind.* New York:HarperCollins.

**Holsti, Ole R.** 1969. "Content Analysis for the Social Sciences and Humanities."

**Honti, Jànos.** 1939. "Marchenmorphologie und Marchen typologie." *Folk-Liv*, 3: 307–318.

**Jason, Heda.** 1970. "The Russian Criticism of the Finnish School in Folktale Scholarship." *Norveg*, 14: 285–294.

**Jung, Gustav Carl.** 1968. "The Archetypes and the Collective Unconscious." In *Collected Works of CG Jung*. Vol. 9. Princeton, NJ:Princeton University Press.

**Kaplan, David.** 2000. "The Darker Side of the "Original Affluent Society"." *Journal of Anthropological Research*, 56(3): 301–324.

**Kiszewski, Anthony, Andrew Mellinger, Andrew Spielman, Pia Malaney, Sonia Ehrlich Sachs, and Jeffrey Sachs.** 2004. "A Global Index of the Stability of Malaria Transmission." *American Journal of Tropical Medicine and Hygiene*, 70(5): 486–498.

**Landes, David S.** 1998. *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor.* New York:W.W. Norton.

**Loughran, Tim, and Bill McDonald.** 2011. "When Is a Liability Not a Liability? Textual Analysis, Dictionaries, and 10-Ks." *Journal of Finance*, 66(1): 35–65.

**Lowes, Sara, Nathan Nunn, James A. Robinson, and Jonathan L. Weigel.** 2017. "The Evolution of Culture and Institutions: Evidence from the Kuba Kingdom." *Econometrica*, 85(4): 1065–1091.

**Maddison, Angus.** 2007. *Contours of the World Economy, 1-2030 AD: Essays in Macroeconomic History.* Oxford, UK:Oxford University Press.

**Mayshar, Joram, Omer Moav, Zvika Neeman, and Luigi Pascali.** 2015. "Cereals, Appropriability and Hierarchy." CEPR Discussion Paper 10742.

**McEvedy, Colin, and Richard M. Jones.** 1978. *Atlas of World Population History.* Harmondsworth:Penguin.

**Michalopoulos, Stelios.** 2012. "The Origins of Ethnolinguistic Diversity." *American Economic Review*, 102(4): 1508–1539.

**Michalopoulos, Stelios, Alireza Naghavi, and Giovanni Prarolo.** 2017. "Trade and Geography in the Spread of Islam." Economic Journal, forthcoming.

**Michalopoulos, Stelios, and Elias Papaioannou.** 2013. "Pre-colonial Ethnic Institutions and Contemporary African Development." *Econometrica*, 81(1): 113–152.

**Michalopoulos, Stelios, and Elias Papaioannou.** 2014. "National Institutions and Subnational Development in Africa." *Quarterly Journal of Economics*, 129(1): 151–213.

**Michalopoulos, Stelios, and Elias Papaioannou.** 2017*a*. "The Long Economic and Political Shadow of History: Vol. 1: A Global View." , ed. Stelios Michalopoulos and Elias Papaioannou, Chapter Introduction: Historical Legacies and Contemporary Development, viii–xxix. VoxEU. PDF e-book.

**Michalopoulos, Stelios, and Elias Papaioannou.** 2017*b*. "Spatial Patterns of Development: A Meso Approach." Annual Review of Economics, forthcoming.

**Michalopoulos, Stelios, Louis Putterman, and David N. Weil.** 2016. "The Influence of Ancestral Lifeways on Individual Economic Outcomes in Sub-Saharan Africa." NBER Working Paper 21907.

**Murdock, George Peter.** 1959. *Africa: Its Peoples and their Culture History.* New York:McGraw-Hill.

**Murdock, George Peter.** 1967. *Ethnographic Atlas: A Summary.* Pittsburgh, PA:University of Pittsburgh Press.

**Namenwirth, Zvi, and Robert Philip Weber.** 2016. *Dynamics of Culture.* Vol. 2, London:Routledge.

**Nisbett, Richard E., and Dov Cohen.** 1996. *Culture of Honor: The Psychology of Violence in the South.* Boulder, CO:Westview Press.

**North, Robert Carver.** 1963. *Content Analysis: A Handbook with Applications for the Study of international Crisis.* Northwestern University Press.

**Nunn, Nathan.** 2012. "Culture and the Historical Process." *Economic History of Developing Regions*, 27(S1): 108–126.

**Nunn, Nathan, and Leonard Wantchekon.** 2011. "The Slave Trade and the Origins of Mistrust in Africa." *American Economic Review*, 101(7): 3221–3252.

**Osafo-Kwaako, Philip, and James A. Robinson.** 2013. "Political Centralization in Precolonial Africa." *Journal of Comparative Economics*, 41(1): 6–21.

**Richerson, Peter J., Monique Borgerhoff Mulder, and Bryan J. Vila.** 2001. *Principles of Human Ecology.* PDF e-book:University of California, Davis.

**Ross, Robert M., Simon J. Greenhill, and Quentin D. Atkinson.** 2013. "Population Structure and Cultural Geography of a Folktale in Europe." *Proceedings of the Royal Society B*, 280(1756).

**Sahlins, Marshall.** 1972. *Stone Age Economics.* Chicago:Aldine Publishing.

**Saiz, Albert, and Uri Simonsohn.** 2013. "Proxying for Unobservable Variables with Internet Document-Frequency." *Journal of the European Economic Association*, 11(1): 137–165.

**Spolaore, Enico, and Romain Wacziarg.** 2009. "The Diffusion of Development." *Quarterly Journal of Economics*, 124(2): 469–529.

**Spolaore, Enrico, and Romain Wacziarg.** 2013. "How Deep Are the Roots of Economic Development?" *Journal of Economic Literature*, 51(2): 325–369.

**Stone, Phillip J., Dexter C. Dunphy, Marshall S. Smith, and Daniel M. Ogilvie.** 1966. "The General Inquirer: A Computer Approach to Content Analysis."

**Tausczik, Yla R., and James W. Pennebaker.** 2010. "The Psychological Meaning of Words: LIWC and Computerized Text Analysis Methods." *Journal of Language and Social Psychology*, 29: 24–54.

**Tetlock, Paul C.** 2007. "Giving Content to Investor Sentiment: The Role of Media in the Stock Market." *Journal of Finance*, 62(3): 1139–1168.

**Thompson, Stith.** 1946. *The Folktale.* New York, NY:The Dryden Press.

**Thompson, Stith.** 1955. *Motif-Index of Folk-Literature: a Classification of Narrative Elements in Folktales, Ballads, Myths, Fables, Medieval Romances, Exempla, Fabliaux, Jest-Books and Local Legends.* Indiana University Press.

**Toelken, Barre.** 1996. *Dynamics of Folklore.* Boulder, CO:University Press of Colorado.

**Uther, Hans-Jorg.** 2004. *The Types of International Folktales: a Classification and Bibliography, Based on the System of Antti Aarne and Stith Thompson.* Helsinki, Finland:Suomalainen Tiedeakatemia.

**Voigtlander, Nico, and Hans-Joachim Voth.** 2012. "Persecution Perpetuated: The Medieval Origins of Anti-Semitic Violence in Nazi Germany." *Quarterly Journal of Economics*, 127(1): 1339–1392.

**Weber, Eugen.** 1976. *Peasants into Frenchmen: The Modernization of Rural France, 1870-1914.* Redwood City, CA:Stanford University Press.

**Wisniewski, Tomasz Piotr, and Brendan Lambe.** 2013. "The Role of Media in the Credit Crunch: The Case of the Banking Sector." *Journal of Economic Behavior and Organization*, 85(1): 163–175.

# 6 Appendix Figures and Tables

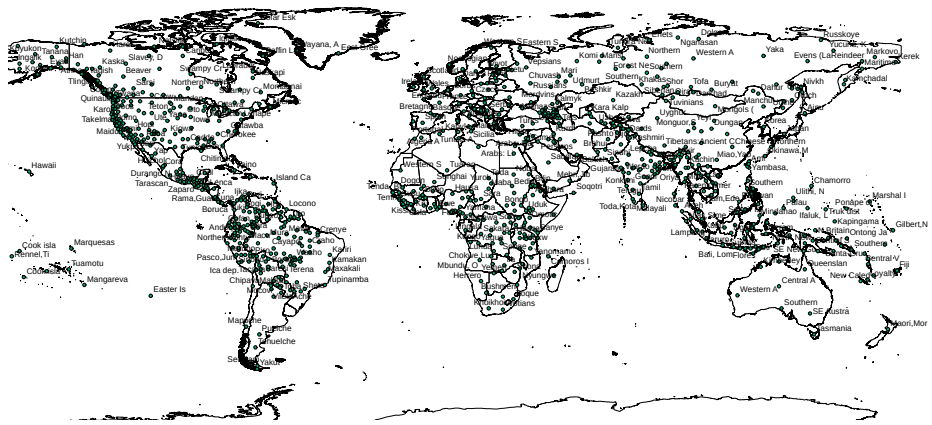

Figure 1: Societies in Berezkin

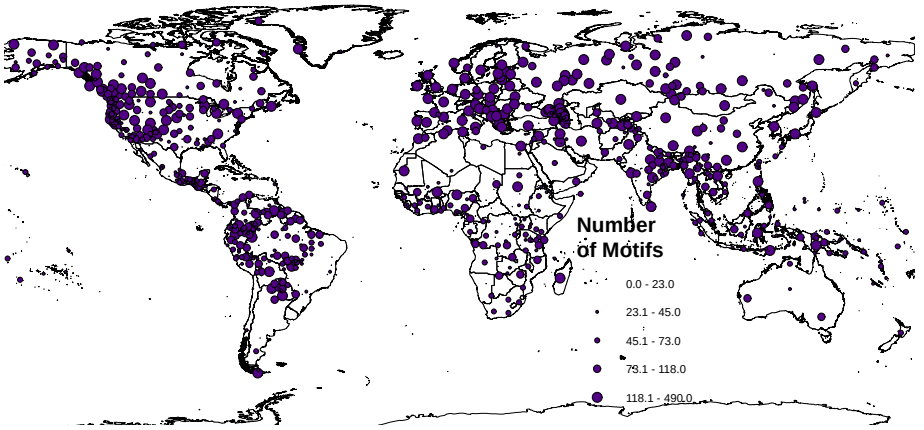


Figure 2: Number of Motifs Across Groups

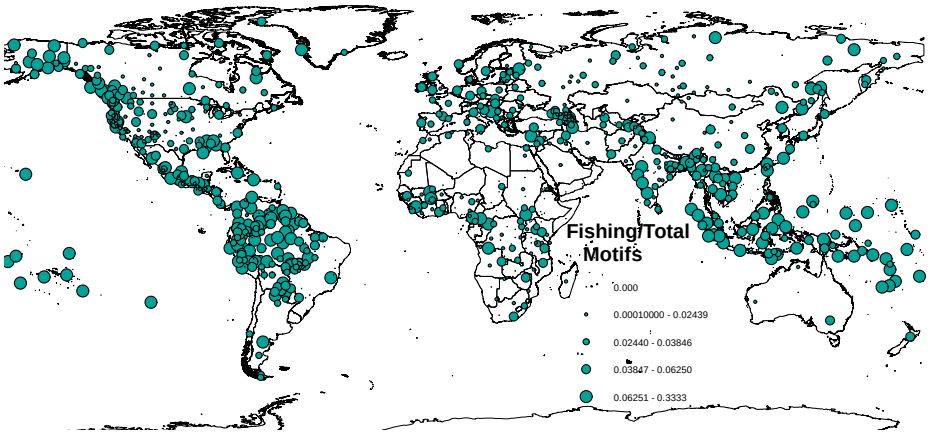


Figure 3: Fishing Motifs in the Oral Tradition

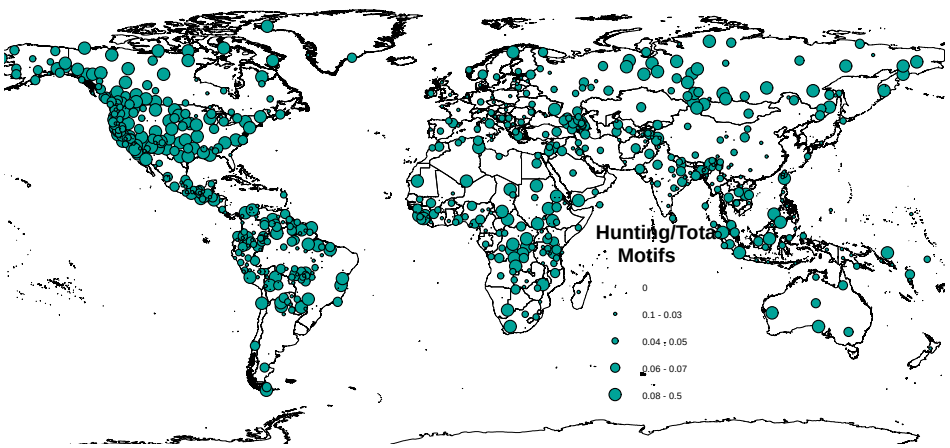


Figure 4: Hunting Motifs in the Oral Tradition

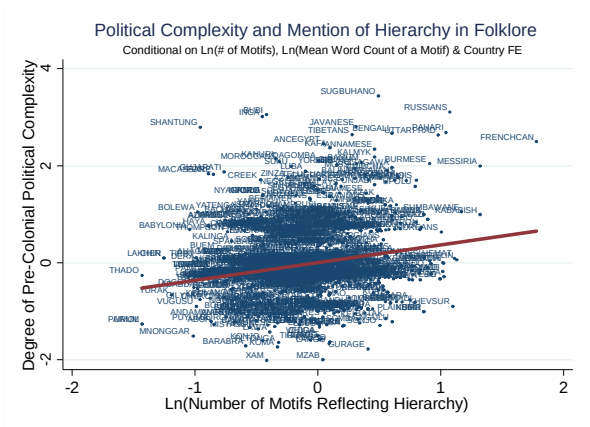


Figure 5: Statehood and Motifs on Hierarchy

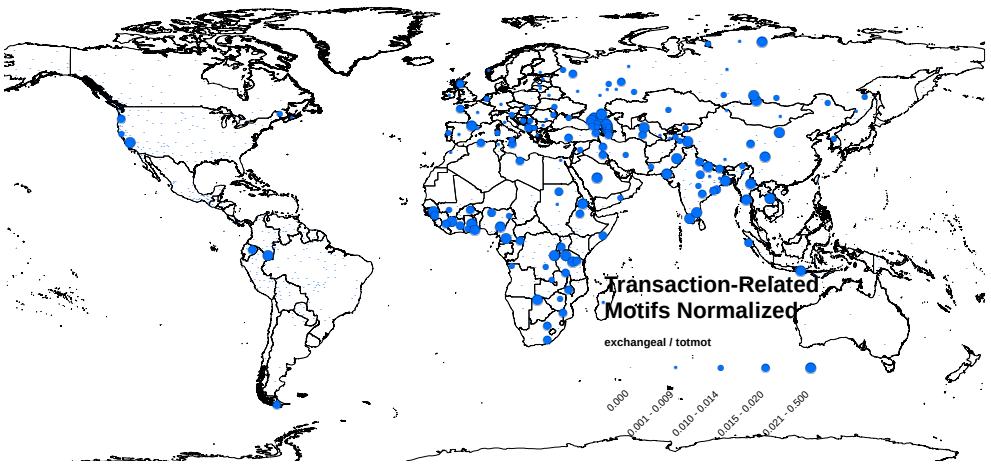


Figure 6: Exchange Economy in the Oral Tradition

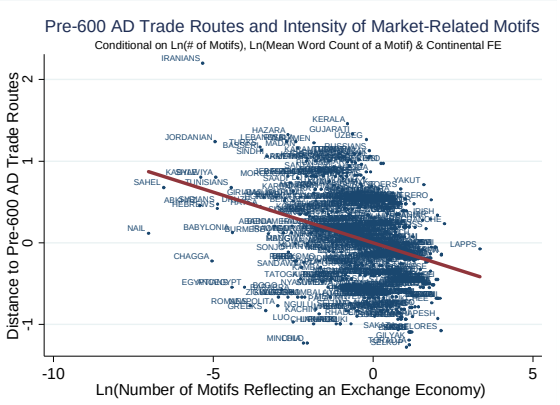


Fig. 7*a*: Trade Routes and Exchange Motifs

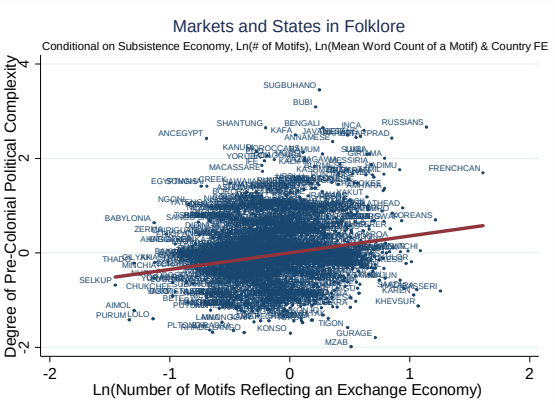


Fig. 7*b*: Statehood and Exchange Motifs

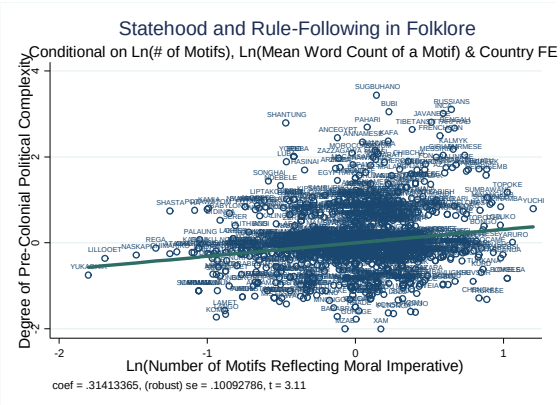


Fig. 8*a*: Statehood and Moral Imperative Motifs

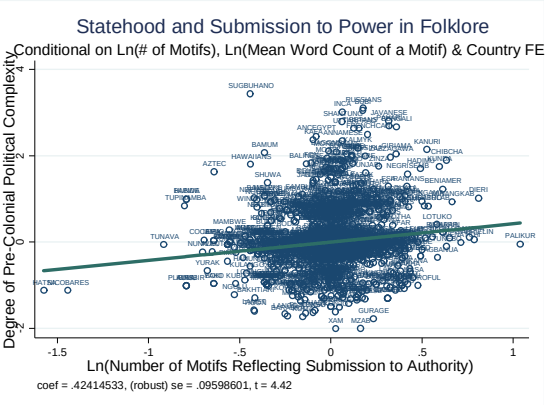


Fig. 8*b*: Statehood and Submission Motifs

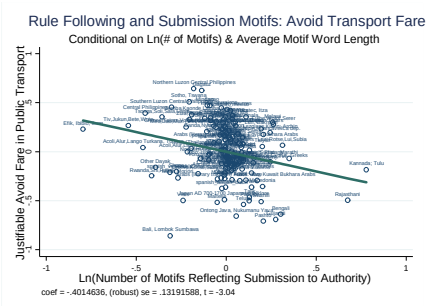


Fig. 9*a*: Rule Following and Justifying Not Paying Fare

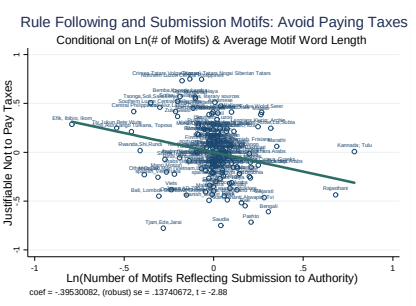


Fig. 9*b*: Rule Following and Justifying Tax Evasion

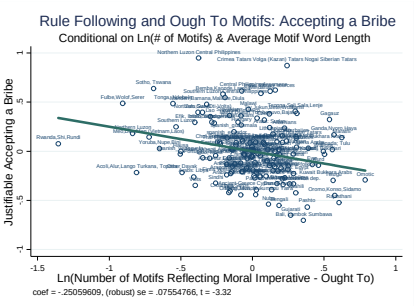


Fig. 9*c*: Rule Following and Justifying Accepting Bribe

Table 1 - Panel A: for Berezkin analysis

| Variable | Mean | Std. Dev. | Min. | Max. | N |
|---|---|---|---|---|---|
| # of Motifs | 79.791 | 75.538 | 1 | 516 | 936 |
| # of Motifs on Earthquakes | 0.103 | 0.34 | 0 | 3 | 936 |
| # of Motifs on Rain & Thunder | 3.022 | 2.932 | 0 | 17 | 936 |
| # of Motifs on Mosquitoes | 1.082 | 1.461 | 0 | 11 | 936 |
| # of Motifs on Agriculture | 1.53 | 2.27 | 0 | 16 | 936 |
| # of Motifs on Fishing | 2.595 | 3.112 | 0 | 17 | 936 |
| Dist. to Earthquake Zones | 576.92 | 716.882 | 0 | 4698.524 | 936 |
| Dist. to the Coast | 397.152 | 446.939 | 0.03 | 2293.282 | 936 |
| Mean Malaria Intensity | 2.789 | 5.686 | 0 | 31.317 | 935 |
| Average Lightning Flash Density | 10.182 | 10.561 | 0 | 71.543 | 933 |
| Pre-1500 Agricultural Suitability | 1361.404 | 1036.013 | 0 | 4888.25 | 923 |

Table 1: for Berezkin/EA analysis

| Variable | Mean | Std. Dev. | Min. | Max. | N |
|---|---|---|---|---|---|
| # of Motifs on Farming | 1.242 | 1.941 | 0 | 16 | 1233 |
| # of Herding-Related Motifs | 2.151 | 4.553 | 0 | 37 | 1233 |
| # of Motifs on Hunting/Gathering/Fishing | 7.084 | 6.772 | 0 | 41 | 1233 |
| # of Motifs on Fishing | 2.088 | 2.728 | 0 | 17 | 1233 |
| # of Motifs on Hunting | 3.334 | 3.551 | 0 | 21 | 1233 |
| # of Hierarchy-Related Motifs | 1.71 | 3.495 | 0 | 23 | 1233 |
| # of Exchange-Related Motifs | 1.564 | 3.234 | 0 | 26 | 1233 |
| # of Motifs on 'Ought to' | 1.906 | 2.77 | 0 | 19 | 1233 |
| # of Motifs on Submission | 5.725 | 6.544 | 0 | 50 | 1233 |
| # of Motifs on Hostility | 25.356 | 21.511 | 0 | 163 | 1233 |
| # of Motifs | 77.774 | 63.593 | 2 | 516 | 1233 |
| Log(1st PC of Motifs Trickster Successful) | 0 | 1.653 | -3.07 | 4.814 | 1232 |
| Log(1st PC of Motifs Trickster Unsuccessful) | 0 | 1.519 | -1.74 | 5.052 | 1232 |
| Log(1st PC of Motifs Trickster Neutral) | 0 | 1.618 | -3.133 | 3.84 | 1232 |
| Ln(1st PC of Trickster Motifs) | 0 | 1.689 | -3.954 | 4.322 | 1232 |
| Degree of Political Complexity | 1.889 | 1.036 | 1 | 5 | 1106 |
| Animal Husbandry | 1.549 | 1.801 | 0 | 9 | 1232 |
| Agriculture | 4.434 | 2.717 | 0 | 9 | 1232 |
| Gathering | 1.028 | 1.594 | 0 | 8 | 1232 |
| Hunting | 1.452 | 1.559 | 0 | 9 | 1232 |
| Fishing | 1.54 | 1.712 | 0 | 9 | 1232 |
| Presence of Plow | 0.119 | 0.324 | 0 | 1 | 1129 |
| Role of Women has Declined | 0.07 | 0.255 | 0 | 1 | 1233 |

Table 2 - Panel A: Breakdown of Sources used by Yuri Berezkin by Language

| | |
|---|---|
| Afrikaans | 65 |
| Belarusian | 12 |
| Breton | 6 |
| Bosnian | 19 |
| Catalan/Valencian | 108 |
| Czech | 9 |
| Welsh | 14 |
| Danish | 151 |
| German | 912 |
| Greek (Modern) | 3 |
| English | 5,650 |
| Esperanto | 40 |
| Spanish | 1,287 |
| Estonian | 108 |
| Basque | 15 |
| Persian | 2 |
| Finnish | 32 |
| French | 723 |
| Western Frisian | 40 |
| Irish | 9 |
| Scottish Gaelic | 6 |
| Armenian | 17 |
| Hebrew (Modern) | 1 |
| Croatian | 11 |
| Hungarian | 93 |
| Armenian | 1 |
| Indonesian | 18 |
| Icelandic | 5 |
| Italian | 43 |
| Latin | 106 |
| Lithuanian | 12 |
| latvian | 2 |
| Nepali | 97 |
| Serbian | 111 |
| Norwegian | 2 |
| Polish | 73 |
| Portuguese | 178 |
| Quechua | 4 |
| Romanian | 137 |
| Russian | 1,886 |
| Sanskrit | 14 |
| Slovak | 24 |
| Slovenian | 60 |
| Albanian | 11 |
| Serbian | 31 |
| Swedish | 40 |
| Swahili | 4 |
| tagalog | 4 |
| Turkish | 1 |
| Vietnamese | 31 |

Table 2 - Panel B: Top 10 Groups with the Largest Number of Motifs

| Tradition | # of Motifs |
|---|---|
| Greek (modern) | 371 |
| Germans | 372 |
| Bashkir | 379 |
| Romanians | 383 |
| Kazakh | 396 |
| Lithuanians | 409 |
| Georgians | 432 |
| Bulgaria | 484 |
| Ukrainians | 501 |
| Russians | 516 |

Table 2 - Panel C: Top Ten 10 Motifs with the Largest Number of Presence Across Groups

| # of Traditions | ID | Description |
|---|---|---|
| 277 | a12 | Some creature or creatures regularly (sunrise and sunset, summer and winter, lunar phases) or irregularly (solar and lunar eclipses, eschatological events) attack the luminaries or shade their light |
| 279 | b3b | Original earth was small and later increased in size or the fertile soil grew from a small amount of original substance |
| 281 | d4a | Fire is stolen from its original owner or brought back to the people from somebody who had stolen it before |
| 290 | k25 | A man gets a woman connected with the upper world (bird-maiden, sky fairy, star-woman, etc.), she becomes his wife or (rare) adopted daughter |
| 294 | b3a | Water is the original element, the dry earth appears later |
| 306 | a5 | The Moon is male, the Sun is also male or (much more rare) asexual |
| 330 | a3 | The Moon is female or bisexual, the Sun is male |
| 341 | a32 | A figure or an imprint of some being or object are seen in the Moon |
| 343 | k27n | Father or other kinsmen of hero's wife or bride try to kill or test him and/or suggest him difficult tasks |
| 346 | m29b | In episodes related to deception, absurd, obscene or anti-social behavior the protagonist is fox, jackal or coyote |

Table 3 - Panel A: Folklore and the Physical Environment

| | # of Motifs on Earthquakes | | # of Motifs on Rain & Thunder | | # of Motifs on Mosquitoes | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Ln(Dist. to Earthquake Zones) | -0.236*** | -0.207*** | | | | |
| | (0.0370) | (0.0327) | | | | |
| Ln(Average Lightning Flash Density) | | | 0.228*** | 0.164*** | | |
| | | | (0.0394) | (0.0421) | | |
| Ln(Mean Malaria Intensity) | | | | | 0.190*** | 0.248* |
| | | | | | (0.0679) | (0.143) |
| Country FE | No | Yes | No | Yes | No | Yes |
| Continent FE | Yes | No | Yes | No | Yes | No |
| Log Likelihood | -291.4 | -229.1 | -1757.4 | -1589.7 | -1101.8 | -972.3 |
| Observations | 936 | 936 | 933 | 933 | 935 | 935 |

Notes: The table reports Poisson estimates. Odd-numbered columns include continent-specific constants, even-numbered columns include country fixed effects (constants not reported). All columns control for ln(number of motifs) and ln(word count). ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel A for summary statistics.

Table 3 - Panel B: Folklore, Subsistence and the Physical Environment

| | # of Motifs on Agriculture | | # of Motifs on Fishing | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Ln(Pre-1500 Agricultural Suitability) | 0.125*** | 0.111*** | | |
| | (0.0346) | (0.0239) | | |
| Ln(Dist. to the Coast) | | | -0.104*** | -0.0890*** |
| | | | (0.0158) | (0.0196) |
| Country FE | No | Yes | No | Yes |
| Continent FE | Yes | No | Yes | No |
| Log Likelihood | -1264.7 | -1086.3 | -1496.5 | -1396.5 |
| Observations | 923 | 923 | 936 | 936 |

Notes: The table reports Poisson estimates. Odd-numbered columns include continent-specific constants, even-numbered columns include country fixed effects (constants not reported). All columns control for ln(number of motifs) and ln(word count). ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel A for summary statistics.

Table 4 - Panel A: Folklore, Subsistence and the Ethnographic Record

| | Agriculture | | Animal Husbandry | | Fishing | | Hunting | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln(1 + # of Herding-Related Motifs) | -0.216 | -0.110 | 0.708*** | 0.463*** | -0.157 | -0.148 | -0.155** | -0.0760 |
| | (0.238) | (0.225) | (0.193) | (0.122) | (0.140) | (0.159) | (0.0719) | (0.0944) |
| Ln(1 + # of Farming-Related Motifs) | 0.999*** | 0.570** | 0.333*** | 0.287*** | -0.355** | -0.251* | -0.605*** | -0.395*** |
| | (0.343) | (0.217) | (0.103) | (0.0905) | (0.160) | (0.131) | (0.133) | (0.138) |
| Ln(1 + # of HGF-Related Motifs) | -0.908*** | -0.464*** | 0.240 | -0.0261 | | | | |
| | (0.280) | (0.171) | (0.169) | (0.0757) | | | | |
| Ln(1 + # of Fishing-Related Motifs) | | | | | 0.695*** | 0.599*** | | |
| | | | | | (0.213) | (0.200) | | |
| Ln(1 + # of Hunting-Related Motifs) | | | | | | | 0.505*** | 0.357*** |
| | | | | | | | (0.116) | (0.112) |
| Country FE | No | Yes | No | Yes | No | Yes | No | Yes |
| Continent FE | Yes | No | Yes | No | Yes | No | Yes | No |
| Adjusted $R^2$ | 0.357 | 0.537 | 0.387 | 0.572 | 0.268 | 0.352 | 0.456 | 0.521 |
| Observations | 1232 | 1232 | 1232 | 1232 | 1232 | 1232 | 1232 | 1232 |

Notes: The table reports OLS estimates. Odd-numbered columns include continent-specific constants, even-numbered columns include country fixed effects (constants not reported). All columns control for ln(number of motifs) and ln(word count). ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 4 - Panel B: Folklore, Institutions and Exchange

| | Degree of Political Complexity | | Ln(1 + # of Exchange-Related Motifs) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln(1 + # of Hierarchy-Related Motifs) | 0.4831*** | 0.3693*** | | | | | | |
| | (-0.1609) | (-0.1008) | | | | | | |
| Ln(1+Distance to the Trade Routes, 600 AD) | | | -0.1239*** | -0.1189*** | -0.1022*** | | | |
| | | | (-0.0232) | (-0.0456) | (-0.0467) | | | |
| Ln(1+Distance to the Trade Routes, 1700 AD) | | | | | -0.0283 | | | |
| | | | | | (-0.037) | | | |
| Degree of Political Complexity | | | | | | 0.1541*** | 0.1204*** | 0.1055*** |
| | | | | | | (-0.0342) | (-0.0319) | (-0.0281) |
| Agriculture | | | | | | | | 0.0132 |
| | | | | | | | | (-0.0091) |
| Animal Husbandry | | | | | | | | 0.0568*** |
| | | | | | | | | (-0.0157) |
| Country FE | No | Yes | No | Yes | Yes | No | Yes | Yes |
| Continent FE | Yes | No | Yes | No | No | Yes | No | No |
| Adjusted $R^2$ | 0.292 | 0.406 | 0.631 | 0.718 | 0.718 | 0.597 | 0.690 | 0.696 |
| Observations | 1106 | 1106 | 774 | 774 | 774 | 1106 | 1106 | 1106 |

Notes: The table reports OLS estimates. Column 1, 3 & 6 include continent-specific constants, column 2, 4, 5, 7 & 8 include country fixed effects (constants not reported). All columns control for ln(number of motifs) and ln(word count). ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 5 - Panel A: Folklore and Long-Standing Conjectures in Anthropology

| | Role of Women Has Declined | | Ln(1+# of Motifs on Honor and Status) | | Ln(1+# of Motifs Related to Leisure) | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Presence of Plough | 0.1090** | 0.0886 | | | | |
| | (-0.048) | (-0.0754) | | | | |
| Animal Husbandry | 0.008 | -0.0043 | 0.0178*** | 0.0106** | 0.0196** | 0.0073 |
| | (-0.0071) | (-0.0059) | (-0.0060) | (-0.005) | ( -0.0076) | ( -0.0115) |
| Agriculture | -0.0039 | -0.0004 | 0.0004 | 0.0048 | -0.0344*** | -0.0239*** |
| | ( -0.0045) | (-0.006) | (-0.0043) | ( -0.0041) | ( -0.007 ) | (-0.0068) |
| Country FE | No | Yes | No | Yes | No | Yes |
| Continent FE | Yes | No | Yes | No | Yes | No |
| Adjusted $R^2$ | 0.061 | 0.254 | 0.952 | 0.96 | 0.854 | 0.88 |
| Observations | 1129 | 1129 | 1232 | 1232 | 1232 | 1232 |

Notes: The table reports OLS estimates. Column 1, 3 & 5 include continent-specific constants, column 2, 4 & 6 include country fixed effects (constants not reported). All columns control for the total number of motifs and the average number of words per motif. ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 5 - Panel B: Rule-Following and the Historical State: Evidence from Folklore

| | Degree of Political Complexity | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Ln(1+ # of Motifs on "Ought to") | 0.4446*** | 0.3141*** | | | | | |
| | (-0.145) | (-0.1009) | | | | | |
| Ln(1+ # of Motifs on Submission) | | | 0.4726*** | 0.4241*** | | | |
| | | | (-0.115) | (-0.096) | | | |
| Ln(1st PC of Trickster Motifs) | | | | | 0.0245 | | |
| | | | | | (-0.059) | | |
| Log(1st PC of Motifs Trickster Successful) | | | | | | 0.0442 | 0.051 |
| | | | | | | (-0.0494) | (-0.0618) |
| Log(1st PC of Motifs Trickster Unsuccessful) | | | | | | 0.1994*** | 0.166*** |
| | | | | | | (-0.0575) | (-0.0575) |
| Log(1st PC of Motifs Trickster Neutral) | | | | | | -0.1173** | -0.1055** |
| | | | | | | (-0.0509) | (-0.0462) |
| Country FE | No | Yes | No | Yes | No | No | Yes |
| Continent FE | Yes | No | Yes | No | Yes | Yes | No |
| Adjusted $R^2$ | 0.28 | 0.399 | 0.255 | 0.393 | 0.236 | 0.277 | 0.404 |
| Observations | 1106 | 1106 | 1106 | 1106 | 1106 | 1106 | 1106 |

Notes: The table reports OLS estimates. Column 1, 3, 5 & 6 include continent-specific constants, column 2, 4 & 7 include country fixed effects (constants not reported). All columns control for the total number of motifs and the average number of words per motif. ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the language family level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 6 - Panel A: Folklore Tradition Level Regressions

| | Avoiding a fare | | Cheating on Taxes | | Accepting a Bribe | | Risk-Taking | Family Important |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ln(1+# Motifs on Submission) | -0.384*** | | -0.420*** | | -0.507*** | | | |
| | (0.131) | | (0.129) | | (0.150) | | | |
| ln(1+# Motifs on Moral Imperatives) | | -0.216** | | -0.186** | | -0.277*** | | |
| | | (0.0841) | | (0.0774) | | (0.0759) | | |
| ln(1+# Motifs on Risk-Taking) | | | | | | | -0.187*** | |
| | | | | | | | (0.0584) | |
| ln(1+# Motifs on Family) | | | | | | | | -0.0711** |
| | | | | | | | | (0.0320) |
| Observations | 145 | 145 | 143 | 143 | 147 | 147 | 108 | 145 |
| Adjusted $R^2$ | 0.0915 | 0.0879 | 0.0644 | 0.0337 | 0.128 | 0.114 | 0.274 | 0.0652 |

Notes: All columns control for ln(number of motifs) and ln(word count). ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are robust to heteroskedasticity. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 6 - Panel B: Individual Level Regressions

| | Avoiding a fare | | Cheating on Taxes | | Accepting a Bribe | | Risk-Taking | Family Important |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ln(1+# Motifs on Submission) | -0.738*** | | -0.975*** | | -1.005*** | | | |
| | (0.272) | | (0.247) | | (0.266) | | | |
| ln(1+# Motifs on Moral Imperatives) | | -0.414** | | -0.451*** | | -0.449** | | |
| | | (0.176) | | (0.165) | | (0.183) | | |
| ln(1+# Motifs on Risk-Taking) | | | | | | | -0.382** | |
| | | | | | | | (0.152) | |
| ln(1+# Motifs on Family) | | | | | | | | -0.106*** |
| | | | | | | | | (0.0367) |
| Individual-level controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.103 | 0.103 | 0.0854 | 0.0847 | 0.0898 | 0.0886 | 0.160 | 0.0497 |
| Observations | 305292 | 305292 | 302964 | 302964 | 316619 | 316619 | 147930 | 327171 |

Notes: All columns control for ln(number of motifs) and ln(word count). Individual-level controls include age, $age^2$, sex, educational FE and religious denomination FE. ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the oral tradition level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.

Table 6 - Panel C: Immigrant Sample

| | Avoiding a fare | | Cheating on Taxes | | Accepting a Bribe | | Risk-Taking | Family Important |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ln(1+# Motifs on Submission) | -0.806* | | -1.322*** | | -1.819*** | | | |
| | (0.414) | | (0.349) | | (0.435) | | | |
| ln(1+# Motifs on Moral Imperatives) | | -0.934*** | | -0.694** | | -0.954*** | | |
| | | (0.303) | | (0.301) | | (0.302) | | |
| ln(1+# Motifs on Risk-Taking) | | | | | | | -1.245** | |
| | | | | | | | (0.571) | |
| ln(1+# Motifs on Family) | | | | | | | | -0.180*** |
| | | | | | | | | (0.0611) |
| Individual-level controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.156 | 0.157 | 0.127 | 0.126 | 0.171 | 0.168 | 0.171 | 0.0676 |
| Observations | 7183 | 7183 | 6916 | 6916 | 7200 | 7200 | 7168 | 7297 |

Notes: All columns control for ln(number of motifs) and ln(word count). Individual-level controls include age, $age^2$, sex, educational FE and religious denomination FE. ***, **, * denote significance is 1%, 5%, and 10% level, respectively. Standard errors are clustered at the oral tradition level. See Data Appendix for variables definitions and Table 1 Panel B for summary statistics.