Kinship Tightness and Financial Development

Abstract

Based on 1,265 pre-industrial ethnic communities globally, we investigate whether the interconnectedness of people in extended family structure ("kinship tightness") determines financial development. First, tighter kinship is associated with lower trust people have in each other and in financial institutions and weaker property-rights and contract-enforcement institutions. Kinship tightness is also negatively related to country indicators of financial development, greater finance constraints by firms, and a lower access to credit by households. The negative effect is stronger for firms with greater external finance dependence and is mitigated by country-level trade openness. Overall, our evidence indicates that tight kinship impedes financial development.

Keywords: Kinship; Financial development; Trust; Property rights; Access to credit; Openness.

1. Introduction

A growing literature documents that culture is an important determinant for the development of financial markets and economic growth. Earlier studies, focusing on broad proxies of culture, such as language and religion, show that differences in culture can explain the variation in investor protection and household financing decisions across countries (e.g., Stulz and Williamson, 2003; Renneboog and Spaenjers, 2012). More recent studies examine other dimensions of culture, such as those based on Hofstede's (1997) model and a culture of trust based on data from the World Values Survey (WVS), similarly confirming a significant role of culture in financial development across countries (e.g., Kwok and Tadesse, 2006; Huang, 2008; Pierce and Snyde, 2018; D'Acunto et al., 2019; An et al., 2022).

Despite this extensive literature, the cultural proxies used in this line of research are often measured at the country level and thus cannot readily capture the often-substantial heterogeneity in deep-rooted cultural traits and norms that exists across individuals of different groups within countries. For instance, prior to industrialization, the number of ethnic communities were as many as 24 in India and 14 in China, to name a few. Some of these pre-industrial ethnic groups have had rather distinct traits, customs, and/or family structure, which have persisted even until today, such as between the Tibetan and Manchu people of China and between the Pahari and Tamil people of India.

Additionally, cultural traits of people are often more specific to the ethnic groups to which they belong than to where they live. In other words, people living in different countries but are members of the same ethnic community are likely to exhibit similar cultural traits. An example is the French Basque people in France and the Spanish Basque people in Spain, both sharing the same cultural heritage and a number of other kinship characteristics. In light of the above observations, country-level cultures are likely to mask important variation in cultures across ethnic groups within countries. Hence, in this study, we extend this line of research by collecting detailed information of pre-industrial ethnic communities and examining their role in financial development.

The ethnic-group characteristic we focus on is the extent to which people are interconnected in their extended families, i.e., the closeness in kinship ties between people within groups (henceforth "kinship tightness"). Undeniably, the family is one of the most basic organizational structures in human

societies that can determine social capital, political participation, and economic outcomes (Alesina and Giuliano 2014). Family organization is often viewed as falling along a spectrum of "tightness," ranging from those in which members are very closely connected with each other (tight) to those characterized by a more liberal or individualistic structure (loose). Anthropologists have long been interested in the notion of kinship tightness and document a substantial variation in kinship tightness across ethnic groups and its significant role for the fostering of collaboration among people and the subsequent development of systems and institutions (e.g., Alesina and Giuliano 2014; Moscona, Nunn, and Robinson 2017; Enke, 2019).

Our main hypothesis asserts that societies with more tightly knit kinship relationships are associated with lower financial development due to at least two reasons. First, close kinship ties discourage the fostering of trustful relationships between people inside the group and those outside (Banfield, 1958; Alesina and Giuliano, 2014). The resulting lower coordination, collaboration, and interaction among economic agents between groups hinder the development of financial markets (Guiso et al., 2008). Second, in kinship-tight societies, the protection of private property rights is often provided by informal systems, such as a descent property-rights structure, the use of kin leaders to mediate disputes, and the use of middlemen to protect and enforce contracts. While such informal systems encourage cooperation within groups, they discourage trade with people outside of the group, which reduces the economic incentives to establish formal institutions. As formal institutions enable people to transact with lower costs and greater confidence, kinship tightness impedes financial development.

To test our hypotheses, we collect detailed information of 1,265 pre-industrial ethnic communities from the Ethnographic Atlas (EA) database compiled by Murdock (1967). The EA database is one of the most comprehensive collections of anthropological knowledge on historical ethnic groups and has been widely used in applied anthropology, sociology, and economics research. Following Enke (2019), an ethnic group is defined as having tight kinship ties based on four aspects: (1) the presence of extended families, (2) the joining of newlyweds into the spouse's residential ties, (3) a unilateral descent system, and (4) the presence of clan systems. For each ethnic group, we construct an overall kinship-tightness index by equal-averaging the four characteristics. To facilitate country- and

household-level analysis, we compute and use migration-adjusted country-average kinship tightness measures. In firm- and individual-level tests, we apply both the Thiessen polygons and buffer zone approaches and assign the ethnic-group level kinship measures to our sample firms and individuals based on geographical locations.

Our first set of tests examines the role of kinship tightness in two types of trust. The first is general trust people have in other people based on individual survey responses from the WVS. The second is trust people place on financial institutions based on household survey data from the World Bank's Global Financial Inclusion (GFI) database. Our analysis shows that tighter kinship is associated with a higher propensity of individuals stating that most people can be trusted and of households not owning a bank account due to a lack of trust in banks. The evidence is consistent with lower trust in societies with closer kinship ties.

Next, we examine the link between kinship tightness and the development outcomes of institutions. We measure countries' institutional quality with a property right protection index from the Heritage Foundation, a rule of law index from the World Bank's Worldwide Governance Indicators (WGI) database, and a law enforcement index compiled by Djankov et al., (2007). Our country-level regressions show that kinship tightness is negatively associated with all three measures of institutional development outcomes.

After establishing a negative role of kinship ties in trust and institutional development, we examine its implications for financial development. First, in country-level regressions, kinship tightness is negatively related to two country proxies of financial development. Second, using data from the World Enterprise Survey (WES), our firm-level tests show that tighter kinship is associated with more severe self-reported finance constraints. In addition, tighter firms are less likely to apply for bank credit, not because of little need for credit but because of more stringent requirements by the banks, such as complex application procedures, unfavorable collateral requirements and interest rates, insufficient loan size, informal payment needed, etc. Third, using household survey data from the World Bank's GFI database, our tests show that kinship tightness is associated with a lower likelihood of households in having account(s) with a financial institution, debit card(s), credit card(s), and mortgage loan(s). Overall,

all three sets of tests consistently show that tighter kinship is associated with more severe finance constraints and lower credit availability, consistent with less developed financial markets.

We explore the two heterogeneous effects of kinship tightness on financial development in our firm-level sample. First, to the extent that tight kinship slows the development of external capital markets, the negative effect of kinship tightness on finance constraint should be stronger among firms operating in industries where external capital is more important for funding necessary expenditure. Second, because an open stance in international trade makes countries more vulnerable to foreign influences and weakens the influence of local cultures, the influence of kinship relationships is likely to be weaker for firms in countries with greater trade openness. Our data support both conjectures.

While our regressions have included a wide array of control variables at the country, ethnic-group, firm, household, and/or individual levels throughout our analysis, our estimation may still subject to endogeneity concerns if omitted variables exist that codetermine the development of kinship structure and financial markets. To address this concern, we perform an instrumental variable (IV) estimation at the firm level, using the month-specific variances of precipitation from 500 CE to 1,500 CE, i.e., an ethnic-group level measure of climate risk exposure during the pre-industrial period, to extract any plausibly exogenous variation in kinship tightness for identification. Prior to industrialization, societies tend to increase their insurance capacity to climate-related risk by widening their social networks and connecting more with individuals living in different locations, implying a looser kinship structure in regions with greater climate risk exposure. Results from our IV estimation at the country, firm, and household levels continue to hold.

Our study contributes to the law and finance literature on the determinants of financial development and economic growth (e.g., Schumpeter, 1912; Rajan & Zingales, 1996; La Porta et al., 1997; Djankov et al., 2007). While many studies focus on the role of formal institutions, such as government control (Chen et al., 2022), property right protection (Beck et al., 2008), and legal systems (Maksimovic, 2001), a growing body of studies show that informal institutions, such as culture, religion, language, gender, race, etc., are important for the development and well-functioning of financial markets (e.g., Fafchamps, 1997; Stulz and Williamson, 2003; EI Ghoul and Zheng, 2016). Another

stream of studies shows that financial development is often influenced by major historical events that changed the trajectory of institutional and cultural development, such as slave trade (Pierce & Snyder, 2018; Levine et al., 2020), colonization (Beck et al., 2003), antisemitism (D'Acunto et al., 2019), and epidemic disease (An et al., 2022). In our study, we extend this line of research by analyzing culture at the ethnic-group level and documenting new evidence of a significant role of kinship tightness in financial development.

Our findings add to a growing body of research on the financial market implications of kinship relationships. Existing studies in this literature tend to focus on a single country. For instance, Kinnan and Townsend (2012) analyze data from rural Thai households, documenting an important role of both kinship networks and financial institutions in smoothing consumption and investment when income is unstable. Lamoreaux (1986) finds that early banks in New England served as financial arms of extensive kinship networks and benefitted the overall economy by making it easier to mobilize money for industrial development. Complementing the above studies, we collect data of kinship networks around the world and document new, international evidence that kinship tightness is negatively related to financial development.

Our study is closely related to a recent, seminal study by Enke (2019) who analyzes the relation between kinship, cooperation, and the evolution of the moral system in detail. An important insight from his study is that there exists substantial heterogeneity in how kinship systems are structured and how people are interconnected in such systems, which explains why kin people behave in a certain way towards other people outside of their groups. According to the author, people from loose-kinship societies in general (1) have a less emphasis on the concept of in-group, (2) are more likely to respect moral gods, (3) have a less emphasis on communal morality values, (4) a less emphasis on disgusting emotions and moral requirements for purity, and (5) have more incentives to develop stronger global institutions. Our findings that kinship tightness is negatively related to general and financial trust and institutional development lend further support to his predictions.

The remainder of this paper is organized as follows: Section 2 reviews the relevant literature and develops our main hypotheses. Section 3 explains our data sources, sample selection, and variable

construction. Section 4 reports and discusses the empirical results from our main and additional tests. Section 5 concludes.

2. Literature Review and Hypothesis Development

2.1 Kinship

The concept of kinship extension was pioneered by Radcliffe-Brown (1952) who observed that there was a tendency of the Bantu and the Nama Hootundu tribe people of South Africa to develop a pattern of mother's brothers and father's sisters, with the former viewed as taking on a role of a male mother and the latter as a female father. According to the author, because in primitive societies individuals are typically merged with the groups to which they belong, certain types of behaviors are often extended to all members of the group. According to Schulz et al. (2019), tight kinship networks are prevalent in various parts of the world, characterized by extended family cohabitation, a community organization based on blood such as clan and lineage, and norms that favor the custom of cousin marriage. These networks may have become more important during the Neolithic period as people began to invest in land and domesticated animals. In contrast to hunter-gatherers, whose extroverted kin networks allow for risk mitigation, tight kin networks promote property and inheritance protection (Bahrami-Rad, 2021). As a result of strong economic and social interdependence, kin groups play an important role in survival and create strong loyalty needs, which may manifest as voting based on group identity (rather than individual preference), shielding family members from prosecution, encouraging nepotism, or any other activity that undermines cooperation across kin group boundaries (Fukuyama, 1996; Cox and Fafchamps, 2008; Tabellini, 2008; Hillman et al., 2015).

Existing research on kinship in general adopts two approaches, one that focuses on what happens within the realm of kinship and the other what happens outside of it. Under the first approach, studies investigate how child-rearing practices unrelated to the forms of kinship, such as swaddling, permissiveness, sibling rivalry, the timing of breastfeeding, and supposed or real sudden changes in parental attitudes when a child reaches a certain age, may be linked to the personality and/or the culture of the people and society (Hsu, 2017). The second approach focuses on the societal development

facilitated by kinship. For example, Enke (2019) links kinship with cooperation and the evolution of the moral system. The author documents that tight kinship societies regulate behaviors through shared moral values, emotions of vengeance, external shame, and notions of purity and disgust, whereas cooperation appears to be reinforced in loose kinship societies through universal moral values, internalized guilt, altruistic punishment, and the apparent rise and fall of moralized religion.

An emerging literature examines the economic implications of kinship networks and most studies are single-country focused. For instance, Kinnan and Townsend (2012) examine data of rural Thai households and find that kinship networks can smooth consumption and promote investment in times of income instability. Lamoreaux (1986) investigate the early Bank of New England as a financial institution with an extensive kinship network and document that it benefited the economy as a whole by encouraging industrial development through easier mobilization of capital. Focusing on the Chinese culture, Chen et al. (2022) show that Confucian families hinder modern financial development through their role in institutional mechanisms. In our study, we extend this line of inquiry by gathering information of kinship networks from a large number of countries and examine their implications for modern financial development in an international setting.

2.2 Kinship and Trust

It has been widely documented that trust has an important role in determining the decision making of economic agents, including, for example, financing decisions by households, personal portfolio choice by investors (Guiso et al., 2008; D'Acounto et al., 2015), credit rationing by suppliers (Fisman, 2001; Biggs et al., 2002), the demand for financial services (Gennaioli et al., 2013; Guiso et al., 2009), among others. Given its important economic role, we argue that trust is a viable channel through which deep-root kinship characteristics may shape the development of financial markets.

According to Banfield (1958), trust can be viewed as having two aspects, i.e., generalized and limited morality, which may shape financial development in opposing ways. First of all, generalized morality comprises of qualities including the respect for individuals and their rights, a generalized trust towards each other, and an adherence to laws, all of which facilitates collaboration and interaction

between economic agents and thus are conducive to the development of financial markets. By contrast, limited morality is the extreme dependence on a narrow circle of family, friends, and/or relatives, which promotes and legitimizes in-group trust and/or out-group cheating. Limited morality impedes cooperation and exchange with other economic agents and outsides as it fosters distrust among people outside of the circle, which hinders financial development. Several studies show that cultural values such as collectivism and individualism as well as the strength of family ties are associated with the society's adoption of limited morality.[1] Most relevant to our research is Alesina and Giuliano (2014) who find that people in tight kinship networks tend to cooperate less effectively with other people from outside the group because of distrust. Accordingly, we hypothesize that societies with tighter kinship networks are more characterized by limited morality and in-group trust, which impedes cooperation.

> *Hypothesis 1 (H1). Ceteris paribus, a society with tighter kinship is characterized by more limited morality and in-group trust.*

2.3 Kinship and Institutions

In addition to informal institutions such as trust as discussed in previous sections, another important factor driving financial development is institutional quality. Financial contracts are often complex and risky, and they require third parties to enforce the contract to limit opportunism, negation, and deception (North, 1989). However, as it is nearly impossible to predict all possible contingencies and types of opportunistic behaviors parties engage in, institutions are instrumental to clarifying property rights, protecting vulnerable groups, and enforcing previously agreed contractual terms, primarily through the use of legal rules and impartial arbitrators. Consistent with this, Fernández and Tamayo (2017) show that financial markets tend to develop more quickly in countries where legal systems can better enforce private property rights, support private contractual arrangements and protect shareholder rights. Besides, Schuz (2022) found the negative relationship between kin networks and institutional development. Therefore, we posit that kinship may affect financial development through its influence over property right protection and contract enforcement.

[1] See, e.g.,, Yamagishi and Yamagishi (1994), Yamagishi et al. (1998), Greif (2006), Ermisch and Gambetta (2010), Alesina and Giuliano (2011), and Greif and Tabellini (2017).

2.3.1 Property Right Protection

Property right institutions are defined as rules and regulations that safeguard citizens against the government's and elites' power in political and state-society interactions (Acemoglu & Johnson, 2005). In economies with good property rights protection, lenders often can apply a variety of tools to prevent default and to deal with weak contracting institutions, including increase in interest rates, the modification of contractual forms, and the substitution of reputation-based arrangements (e.g., long-term loan agreements) for formal debt contracts (Greif, 1989; Ellickson, 1991; McMillan & Woodruff, 1999). In the stock markets, property right institutions protect minority shareholders from the private benefits of control by large and better-informed shareholders and managers, such as by complying with international accounting standards and increasing the analyst coverage, thus reducing the cost of capital and improving the liquidity of stock markets and the growth potential of firms (Easley & O'Hara, 2004). Consistent with this, private property right protection is found to be conducive to corporate investment, financial development, and economic development (Acemoglu & Johnson, 2005; Beck et al., 2003).

Although the term "descent" has been criticized for its formalistic and legal connotations (Guyer, 1981), Bates (1990) contends that the legal element of kinship is important because the relation between kinship and risk is in fact a debate about property rights. Essentially, the term "descent" refers to a property-right structure that protects the right of common access to "descent property" (Bates, 1990). In other words, descent provides access to a portfolio of assets, and clan groups establish common norms and informal institutions that influence group behavior (Mattingly, 2016). When disputes arise among group members, the clan leader steps in to mediate and protect the group's property, and when outsiders encroach on lineage property, clan leaders rally the troops to protest and jointly defend property rights (Yan, 2017). This informal system replaces the formal system of private property protection, which facilitates intra-ethnic cooperation and harms inter-ethnic trade. Besides, the ownership of a tight-kinship society is at the "communal-family" level rather than at the individual level (Chen et al., 2022), i.e., the sharing of income, land, and other valuable resources is the obligation of the clan members. This weak consciousness of private rights is assumed to discourage the development

of formal property right institutions. Therefore, we hypothesize that the weak consciousness and substitute features of tight kinship impede the development of formal property rights institutions.

> *Hypothesis (H2). Ceteris paribus, a society with tighter kinship has weaker property right institutions.*

2.3.2 Contract Enforcement

In addition to clarifying property rights and protecting vulnerable contracting parties, institutional arrangements prevent individuals from violating pre-determined contractual terms through commitment mechanisms and/or third-party (usually state-run) arbitrators (Fernández and Tamayo, 2017). However, on the one hand, due to the complexity of financial contracts and/or the inefficient operation of courts and regulators, the costs of enforcing contractual terms can be high, and such costs increase with the complexity of the contractual terms (Williamson, 1979), the specificity of the assets involved (Riordan and Williamson, 1985), and the scope of the contract. On the other hand, if the contract is too simple or general, certain contingencies may necessitate legal interpretation, and there may be an incentive to renegotiate (Schwartz and Watson, 2004). Therefore, a sound legal infrastructure with courts and regulatory bodies that work efficiently can reduce enforcement and transaction costs and thus facilitate transactions and cooperation.

In the presence of transaction costs and contractual uncertainty, rational traders would not indiscriminately enter into an impersonal exchange relationship with an anonymous trader (Landa, 1981). They will form special exchange relationships with institutionally bound traders that are trustworthy and dependable to fulfil their contracts. Rational traders arm themselves with "relationship calculations" in order to select a specific network of trading partners and minimize out-of-pocket costs of contract protection. They form an ethnically homogeneous group of middlemen (EHMG) through a complex network of special exchange relationships, and kinship/ethnicity is an important input to the middleman trading technique (Landa, 1981). In tight-kinship societies, where EHMGs replace contract law and vertically integrated companies, people are encouraged to remain loyal to their own trading partners and their kin/race, excluding "outsiders." In this case, as the cost of contract enforcement and information development is reduced by the EHMGs, the incentive to improve their legal infrastructure

also decreases, implying a negative relation between kinship and the quality of contract enforcement institutions.

> *Hypothesis (H3). Ceteris paribus, a society with tighter kinship has weaker contract enforcement institutions*.

2.4 Kinship and Financial Development

Our previous discussions have shown that tight-kinship societies favor in-group trust and out-group distrust, and they are associated with low incentives to improve legal infrastructure and thus weak institutions in general, both of which hinder collaboration and interaction among economic agents.

A related strand of literature shows that social capital, especially trust, is conducive to greater access to finance, higher economic growth, and better functioning institutions (Guiso et al., 2004). Another stream of law and finance studies also show that secure property rights and efficient contract enforcement enable private property owners to transact confidently and with lower costs, thereby encouraging investment, economic growth and financial development (North and Weingast, 1989; Acemoglu & Johnson, 2005; Beck et al., 2003). Therefore, we argue that kinship tightness has a negative role in financial development through the two channels according to H1, H2, and H3.

> *Hypothesis (H4). Kinship tightness is negatively associated with the availability of financing.*

3. Data Source and Variable Measurement

Our samples are constructed using various databases. First, to measure kinship tightness, we obtain detailed information on the living environment and social structure of 1,265 pre-industrial ethnic communities from the Ethnographic Atlas (EA) database, including their geographical locations, family structure, religious beliefs, community organization, subsistence patterns, and language and institutional information. The EA was created by Murdock (1967), published in 29 successive instalments in the journal, *Ethnology*, over the period 1962 to 1980, and is by far the most comprehensive collection of anthropological knowledge on historical ethnic groups.

Second, we download country characteristics, including GDP, private credit, deposits, income groups, etc., over the period from 1960 to 2021 from the World Banks' Global Financial Development

(GFD) database. Data of country legal origin and religion are sourced from La Porta et al. (1998) and Djankov et al. (2007), respectively.

Third, firm-level survey data are collected from the World Bank's Enterprise Survey (WES) over the period from 2010 to 2022, including information of demographics and financing conditions. The WES database provides economic data for over 86,000 companies in 93 countries over the period 2010 to 2022.

Fourth, we collect household-level survey data from the World Bank's GFI database, including households' responses to questions about trust in financial institutions and financing decisions. The GFI database contains survey data for 145,927 households in 144 countries on their saving, borrowing, and risk management decisions. Fifth, we download data of individual responses to the World Values Survey (WVS) from 2017 to 2020, including their trust attitudes, income, education, gender, age, etc.

3.1 Measuring Kinship Tightness

Based on the data from the EA database, we follow Enke (2019) and capture the tightness in kinship networks in four components. The first is family organization. Because nuclear families are organized around married couples and their children (Henrich, 2020), the kinship ties are rather loose in ethnic groups with such family type. On the contrary, extended families represent large interconnected networks, and, hence, people living in such networks likely have closer kinship ties. Using the ethnical information provided by the EA database (question 8 of the EA database), we construct a dummy variable, *Extended family,* which equals 0 for ethnicity groups with *loose* kinship ties characterized by nuclear families, including monogamous independent nuclear families and occasional or limited polygamous independent nuclear families, and it equals 1 for all other types of families.

The second is post-marital residence, that is, the common pattern of residence transfer during marriage. According to anthropologists, kinship ties are strong if social standards indicate that the newlyweds must join the husband's (or wife's) residential ties, whereas the opposite is true if the newlyweds live independently or flexibly. We construct *Co-residence,* which is a dummy variable equal

to 1 for ethnicity groups where individuals must enter their spouse's group, and 0 otherwise (based on question 11 of the EA database).

The third is the mode of pedigree tracing and lineage. A pedigree system consists of either monophyletic or bilineal descent. In the former, since descent is traced back to a commonly known ancestor, groups tends to be more cohesive and people would feel closer to the particular part of the family (Enke, 2019). By contrast, in the latter bilateral pedigree system where kinship structure is traced through both parents, each person is connected to a unique family. For instance, in unilineal male lineage systems, children of two brothers belong to the same lineage, whereas in bilateral systems, they have different families due to their connection to their respective mothers. Hence, kinship ties are likely to be stronger in the case of unilateral descent than in bilateral descent. *Unilineal descent* is a dummy variable equal to 1 if the lineage is unilineal and 0 otherwise (based on question 43 of the EA database).

The fourth is the presence of clan systems. When a descent system becomes too large to track and store, it is divided into new, smaller descent lines. In such cases, people across lineages often recognise their "'broad relevance" to each other, despite being unable to describe the specific paths of connection (Enke, 2019). Clans are one of such systems, which are important in the development of large extended family networks and strong kinship ties because they allow distant relatives to feel connected. *Clan* is a dummy variable for kinship tightness equal to 1 if individuals are members of localized clans dividing community life, and 0 otherwise (based on question 15 of the EA database).

We construct an overall index of kinship tightness (*Kinship tightness*) for each ethnicity group by taking the equal-weighted average of the four components discussed above (subscript *j* for ethnicity groups omitted for brevity):

$$Kinship\ tightness = \frac{(Extended\ family + Co-residence + Unilineal\ descent + Clans)}{4}. \quad (1)$$

Kinship tightness ranges from 0 to 1, with higher values indicating stronger kinship ties among individuals within the ethnic group. To increase sample size, in cases where there are missing values in the four components, we require at least three non-missing components for the computation.

We construct two subindexes capturing the degree of tightness in kinship ties *within generations*, that is, due to family structure, and *across generations*, that is, due to lineage and the clan

systems. Specifically, kinship tightness within generations is measured by *Family structure*, a dummy variable equal to 1 if either *Extended family* or *Co-residence* takes on the value of 1, and it is 0 if both are 0. Likewise, across-generations kinship tightness is measured by *Descent system*, a dummy variable equal to 1 if either *Unilineal descent* or *Clans* takes on a value of 1, and it is 0 if both are 0. Throughout our paper, we report the results for the overall index as well as the two generational indexes of kinship tightness.

The summary statistics of our kinship-tightness measures at the ethnicity group-level are reported Panel B of Table 1. About 70.0%, 76.0%, 72.0%, and 46.0% of the ethnic groups in the EA database have extended families, co-residence, unilineal descent, and the clan systems, respectively. The means of *Family structure*, *Descent system*, and *Kinship tightness* are 88.0%, 75.0%, and 65.0%, respectively. These statistics suggest that ethnic groups in general have rather tight kinship ties on average.

Figure 1 shows the geographical distribution of the ethnic groups and their kinship tightness across the globe. Ethnic groups are shown to be clustered and concentrated in the following areas: The west part of North America, the north and middle regions of South America, the middle and southern parts of Africa, East and Southeast Asia, as well as the Pacific Islands. While kinship tightness is in general high among the ethnic groups in these areas, there is considerable variation in kinship tightness across ethnic groups in different geographical locations.

Insert Figure 1 about here

Using the ethnic group-level measures, we aggregate the kinship-tightness measures to the country, firm, and individual levels for our analysis. To construct country-level measures, we first compute the averages of the kinship-tightness measures across all ethnic groups inside the boundaries of each country. Because a country's history of its ancestors may diverge from the history of its people who currently live there (Putterman and Weil, 2010), we adjust our country-level measures of kinship tightness for population flows and migration. To this end, we obtain the migration matrix from Putterman and Weil (2010) that contains the proportion of the country's population descended from people in different countries in the year 1500. Using the proportions as weights, for each country, we

compute weighted averages of the kinship-tightness measures.[2] For clarity, we add the suffix "*adj.*" to the variable names of these migration-adjusted measures (i.e., *Kinship tightness adj.*, *Family structure adj.,* and *Descent system adj.*). In addition to the country-level analysis, we use these adjusted measures in the household-level analysis because the World Bank's GFI database only provides the country information of the households.

To construct firm- and individual-level measures, we rely on the historical geographical coordinates of the centroid of each ethnic group provided by the EA database and match firms and individuals to ethnicity groups by geographical proximity. There are two main approaches of matching by proximity. The first is the "buffer zone" approach that involves drawing a circular buffer zone around the centroid to estimate the coverage of each ethnic group. However, buffers set too large will overlap, making it difficult to allocate areas to mutually exclusive ethnic groups, whereas if buffers are set too small, they will not accurately represent the actual boundaries. While a commonly used size for buffer zones is a 200 km radius around the centroid due to the fact that land within such a radius is suitable for crop cultivation (Alesina et al., 2013), buffer zones for our ethnic groups overlap considerably under such a radius (see Figure 2A).

Insert Figures 2A, 2B, and 2C about here

The second is a geometric approach that involves estimating Thiessen polygons to capture the coverage of ethnic groups. Unlike the circular buffer zones above, a Thiessen polygon encloses all spaces that are closer to the centre of interest than any other point outside because its boundary are geometric points where the distance from the centre of interest is the same as that from other centres. Figure 2B shows graphically the division of the ethnic groups using the Thiessen polygon method.

While the second method helps to resolve the overlapping problem under the buffer zone method, Thiessen polygons still contain far-away regions from the centroid that are less representative of the ethnical communities at the centre. Hence, we combine both approaches, match firms/individuals

[2] To illustrate, suppose 80% of country A's population is local and 20% was descended from people in country B. If country's A ethnic-group average *Kinship tightness* is 0.6 and that for country B is 0.4. *Kinship tightness* adjusted for migration is 0.44 (= 0.2 × 0.6 + 0.8 × 0.4).

to the ethnic groups using Thiessen polygons, and at the same time require the distance between the firms/individuals and corresponding ethnic centroid to be smaller than 200 km. Figure 2C shows the divisions of ethnic groups under our preferred approach.

3.2 Measuring Financial Development

Following prior studies (e.g., Stulz and Williamson, 2003), we download two country indexes capturing financial development from the World Bank GFD Database. The first is the ratio of total credit extended to the private sector to GDP (*Private credit/GDP*). The second is ratio of total demand, time, and savings deposits in banks and other financial institutions to GDP (*Deposit/GDP*).

At the firm level, we make use of data from the WES database to construct 9 variables capturing the degree of firms' credit availability based on their responses to questions asking whether (1) they think that finance is an obstacle (*Finance obstacle*), (2) they have a line of credit (*Line of credit*), (3) they have an overdraft facility (*Overdraft*), and (4) they have a checking and/or savings account (*Checking*), as well as (5) the proportion of inputs purchased with trade credit (*% inputs paid after*), (6) the proportion of working capital financed by internal funds (*% internal credit*), (7) the proportion of working capital financed by bank credit (*% of bank credit*), (8) the proportion of working capital financed by trade credit (*% supply chain credit*), and (9) the proportion of working capital financed by other sources such as relatives and friends (*% other source*). An answer of yes (i.e., a value of 1) to or a higher value in the above variables is indicative of greater financing capacity or lower capital constraints.

To better understand why firms have limited access to finance, we focus on bank credit and construct 8 additional dummy variables based on whether (1) firms have applied for new loans (*Apply for any loan last year?*) and on their stated reasons for not applying for a loan. These stated reasons include (2) no such demand (*Reasons: did not need a loan*), (3) complex application procedures (*Reasons: application procedure*), (4) unfavorable collateral requirement (*Reasons: collateral requirement*), (5) unfavorable interest rate (*Reasons: interest rate*), (6) insufficient loan size (*Reasons:*

insufficient size), (7) additional informal payment (*Reasons: informal payment*), and (8) the expectation that the application will be rejected (*Reasons: would not be approved*).

At the household level, we make use of data from the World Bank's GFI database and construct 5 dummy variables to capture households' access to bank credit based on their responses to survey asking whether (1) they had borrowed from banks or other financial institutions (*Financial institutional account*), (2) they had a saving card (*Debit card ownership*), (3) they had a credit card (*Credit card ownership*), (4) they took out a residential mortgage from a financial institution (*Mortgage loan*), and (5) they had a mobile money account in the previous year (*Fintech adoption*). The detailed definitions of the above variables at the different levels are provided in Appendix A.1.

3.3 Measuring Trust and Institutional Quality

Two types of trust are considered in our study. The first is general trust people have in each other. Based on the responses to the question "*How much do you trust most people*?" in the WVS (Wave 7) database, we construct a general trust dummy variable (*General trust*) that equals 1 if the *individual* respondent agrees that most people can be trusted and 0 otherwise. The second is financial trust, which is defined as the trust people have in financial institutions. Financial trust can be broadly interpreted as the extent to which people believe that banks and financial institutions are honest in dealings, do not intend to take advantage of their clients, and manage clients' money in a responsible and diligent way. We use the response to a question in the World Bank's GFI database asking whether *household* does not have a bank account due to a lack of trust in banks and construct a dummy variable (*Trust in financial institution*).

Following prior studies (e.g., Acemoglu et al., 2001; La Porta et al., 1998), we measure institutional quality using two country indexes. The first is the property rights index (*Property rights*) from the Heritage Foundation database, capturing the extent to which a country's laws protect private property rights and these laws are enforced. *Property rights* ranges from 0 to 100, with higher values indicating greater protection. The second is the rule of law index (*Rule of law*) from the World Bank's Worldwide Governance Indicators (WGI) database, measuring economic agents' trust in and

compliance with social rules, the quality of contract enforcement, property rights, police and courts, and the likelihood of crime and violence. A higher value in *Rule of Law* indicates stronger protection of property rights. Finally, contract enforcement is catpured by a law enforcement index (*Contract enforcement*) from Djankov et al., (2007), defined as the log number of days required to resolve a payment dispute through the courts. *Contract enforcement* ranges from 3.3 to 7.3, with higher values indicating more robust enforcement.

3.4 Control Variables

We control for a number of country characteristics known to have shaped modern financial development, including four legal origin dummy variables (La Porta et al., 1997, 1998), two religion-related dummy variables for Buddhist and Muslim (La Porta et al., 1999; Levine et al., 2020), GDP per capita, GDP growth, and an income group variable. We follow Enke (2019) and consider since a number of ethnic-group characteristics that may affect the cooperation and development of finance, including the log number of years since observation in the EA, historical dependence on hunting and gathering, historical ethnic population, longitude, latitude, distance from the coast, slope, elevation, mean annual temperature, variance of annual temperature, mean monthly rainfall, and variance of annual rainfall. Firm-level control variables include firms' size and age (Miller et al., 2008), CEOs' experience and education level, ownership status, financial leverage (Mitchell et al., 2002), ownership concentration (Wright et al., 2002), and the education level of their family members. Finally, in our household- and individual-level analysis, we control for the gender, education, age, squared age, and income of the respondents. The detailed definitions of the variables are provided in Appendix A.1.

4. Empirical Results

4.1 Kinship Tightness and Trust

To examine the relation between kinship tightness and the level of trust people have, we estimate the following regression at the individual and household levels:

$$Trust_i = \alpha + \beta\ Kinship\ tightness_i + \delta \cdot X_i + Fixed\ effects + \varepsilon_{it}, \qquad (2)$$

where $Trust_i$ is either general trust (*General trust*) of individual *i* or financial trust (*Trust in financial institution*) of household *i*, defined in Section 3.3. $Kinship\ tightness_i$ denotes the kinship tightness indexes (merged by ethnic groups' locations) for individual *i* and it denotes the migration-adjusted kinship tightness indexes (merged by countries) for household *i*, defined in Section 3.1. The vector X_i contains country-, ethnic group-[3], and individual-level (household-level) control variables when *General trust* (*Trust in financial institutions*) is the dependent variable. Year fixed effects are included to account for time trends. Standard errors are clustered at the ethnic-group level for the individual-level analysis and at the country level for the household-level analysis.

Insert Table 2 about here

Table 2 reports the estimation results of equation (2). In columns (1) to (3) where *General trust* is the dependent variable, we find that both *Family structure* and *Descent system* enter the model negatively and significantly (at the 5% level or better). A one-standard-deviation increase in *Kinship tightness* (= 0.331) is associated with reduction in general trust by 0.46 percentage points, or a reduction by 2.6% relative to sample mean (= (0.331 × -0.014)/0.177). This suggests tighter kinship networks are associated with a lower level of general trust people have.

In columns (4) to (6), we report results for our household-level regressions with *Trust in financial institutions* as the dependent variable. The estimates on the three adjusted kinship tightness indexes are all negative and are significant (at the 1% level) for *Family structure adj.* and *Kinship tightness adj.* A one-standard-deviation increase in *Kinship tightness adj.* (= 0.211) is associated with reduction in financial trust by 0.86 percentage points, or a reduction by 5.6% relative to the sample mean (= (0.211 × -0.041)/0.155).

Overall, our evidence suggests that kinship tightness is negatively related to general and financial trust.

[3] The ethnic group-level control variables are aggregated to the country level and adjusted for migration in the household-level analysis.

4.2 Kinship Tightness and Institutional Quality

In this section, we examine the role of kinship tightness in three aspects of institution quality: (1) Property rights protection, (2) rule of law, and (3) the robustness in contract enforcement. We estimate the following regression on a country-year panel:

$$Institutions_{ct} = \alpha + \beta\ Kinship\ tightness_c + \delta \cdot X_c + fixed\ effects + \varepsilon_{ct}, \quad (3)$$

where *c* and *t* denote a country and a year, respectively; $Institutions_{ct}$ is either the country-level property rights index (*Property rights*), the rule of law index (*Rule of law*), and a contract enforcement index (*Contract enforcement*) (see Section 3.3) for country *c* in year *t*. $Kinship\ tightness_c$ is one of the three migration-adjusted kinship tightness indexes. The vector X_c contains the country and ethnic group-level control variables (aggregated to the country level) defined in Section 3.4. Year fixed effects are included to control for time trend. Standard errors are clustered at the country level.

Insert Table 3 about here

Table 3 reports the estimation results for equation (3). In Panel A, we present the regressions for *Property rights* (columns 1 to 3) and *Rule of law* (columns 4 to 6). Across the columns, we find that the estimates on the three kinship tightness indexes are all negative and significant (except for *Family structure adj.* of column 1). The results suggest that tighter kinship networks are associated with weaker protection of property rights and legal systems.

In Panel B, we report results from regressions examining the relation between kinship tightness and contract enforcement. We find that the estimates on the adjusted kinship tightness indexes are all positive and significant (at the 1% level) for *Family structure adj.* and *Kinship tightness adj.* The evidence suggests that in countries with tighter kinship networks, it takes longer to resolve a payment dispute through the courts, suggestive of weaker institutional quality.

4.3 Kinship Tightness and Financial Development

Our results thus far have shown that kinship tightness has a positive role in fostering trust and enhancing institutional development. In this subsection, we investigate whether kinship tightness has significant implications for modern financial development. Our analysis begins at the country level, seeking to

establish a link between the migration-adjusted kinship tightness indexes and two country variables of financial development. We then proceed to examine the role of kinship tightness in access to finance by firms and households using survey data. Further tests examine the heterogeneity in the relation in question across firms with differing degree of external finance dependence and exposure to trade openness.

4.3.1 Kinship Tightness and Country Financial Development

To examine the link between kinship tightness and financial development, we estimate the country-level regression of equation (3) using *Private credit/GDP* and *Deposit/GDP* as the dependent variables instead.

Insert Table 4 about here

Table 4 reports these results. Columns (1) to (3) and (4) to (6) report results for *Private credit/GDP* and *Deposit/GDP*, respectively. As the columns show, the estimates on the kinship tightness indexes are all negative and significant (at the 5% level or better) for *Descent system adj.* and *Kinship tightness adj.* Based on the estimates from columns (3) and (6), a one-standard-deviation increase in *Kinship tightness adj.* (= 0.211) results in a decrease in the ratio of private credit to GDP and the ratio of deposits to GDP by 3.2 (= -14.987 × 0.211) and 4.0 (= -19.003 × 0.211) percentage points, or a decrease by 13.0% and 12.6% relative to the sample mean, respectively. The evidence is consistent with our hypothesis H4 that kinship tightness hinders financial development.

4.3.2 Kinship Tightness and Firms' Access to Finance

Using firm-level survey data from World Bank's WES consisting of 45,213 firm-year observations from 71 countries over the period from 2010 to 2020, we examine the relation between kinskip tightness and firm-level variables of credit availability using the following regression:

$$Access\ to\ finance_{it} = \alpha + \beta\ Kinship\ tightness_i + \delta \cdot X_{it} + Fixed\ effects + \varepsilon_{it}, \quad (4)$$

where *Access to finance*$_{it}$ denotes *Finance obstacle* (an index ranging from 0 to 4) and the other 8 variables of firms' credit availability defined in Section 3.2. In models where the dependent variable is

binary, equation (4) represents a linear probability model. *Kinship tightness*$_i$ is one of the 3 kinship tightness indexes of firm *i*, merged with the firms using geographical information of the ethnic groups and the firms under the proximity approach described in Section 3.1. We include the country-, ethnic group-, and firm-level control variables defined in Section 3.4 (X_{it}) in the model. In the firm-level analysis, industry, country, income group, and year fixed effects are included to account for unobserved heterogeneity at the industry, country, and income-group levels, and time trend. Standard errors are clustered at the ethnic group levels.

Insert Table 5 about here

Panel A of Table 5 reports results of equation (4) using *Finance obstacle* as the dependent variable. In columns (1) to (3), we find that all three indexes of kinship tightness load negatively and significantly (at the 1% level) in the models. A one-standard-deviation increase in *Kinship tightness* (= 0.331) is associated with an increase of 5.4 percentage points (= 0.331 × 0.164) in *Finance obstacle*, or 28.4% from the sample mean.

Panel B reports the results for the other 8 dummy variables of firms' credit availability. Each cell in the panel represents an individual regression. For brevity, we report only the estimates on the kinship tightness indexes. In rows (1) to (3), we examine firms' access to line of credits, overdraft facilities, and checking accounts. Our results show that *Kinship tightness* is negatively and significantly associated with the probability of a firm having lines of credits (see row (1)). There is also a negative and marginally significant (at the 10% level) relation between within-generation kinship tightness, i.e., *Family structure*, and the availability of overdraft facilities (row (2)). We find little evidence that kinship tightness is related to firms' access to checking and/or saving accounts.

In rows (4) to (8), we analyze firms' access to other types of finance, including trade credit, internal capital, and bank credit. Row (4) shows that firms with higher *Family structure* are significantly less likely to purchase inputs on credit. Row (5) further shows that all three indexes of kinship tightness are negatively and significantly associated with the proportion of trade credit in working capital. In rows (6) and (7), firms with higher *Family structure* and *Kinship tightness* are shown to use significantly more internal capital and less bank credit. We find little evidence that kinship tightness is related to the

use of other credit not mentioned above. Together, the evidence is consistent with tighter kinship networks hindering firms' access to finance.

To glean more insights into the hurdles firms face when accessing finance, we perform further tests focusing on bank credit and examine the reasons why they are not applying for bank loans. The model specification follows equation (4) but the dependent variables are the 8 additional dummy variables based on bank credit defined in Section 3.2.

Insert Table 6 about here

Table 6 reports these results. Row (1) confirms that firms with tighter kinship networks are significantly (at the 1% level) less likely to apply for a bank loan, consistent with our results in Table 5. In row (2), the dependent variable is *Reasons: did not need a loan* as the dependent variable; we find that kinship-tighter firms are significantly less likely to state that an insufficient need for bank credit is the reason for not applying for loans. In rows (3) to (8), we analyze the other reasons for not applying for a bank loan. Our results show that firms with tighter kinship networks are significantly more likely to state the following reasons: Complex application procedures (row 3), unfavorable collateral requirements (row 4), unfavorable interest rates (row 5), insufficient loan size (row 6), and informal payment needed (row 7). Interestingly, row (8) shows that tighter firms (i.e., those with higher *Family structure*) do not apply for loans not because of an expectation that their loan applications will be disapproved by the banks. Overall, the evidence suggests that although tighter firms demand bank credit, they were less able to obtain it because of the more stringent requirements imposed by the banks on them, which partly explains why they have more limited access to finance.

4.3.3 Kinship Tightness and Households' Access to Finance

To offer more evidence on the relation between kinship tightness and the availability of credit, especially bank credits, we make use of household-level survey data from the World Bank's GFI database. We adapt equation (2) to the household sample setting, regressing the 5 variables of households' access to bank credit (defined in Section 3.2) on migration-adjusted kinship tightness

indexes (merged with the households by country), the country-, ethnic group-, and household-level control variables defined in Section 3.4, and fixed effects.

Insert Table 7 about here

Table 7 report results from these regressions at the household level. In rows (1) to (4), we find that the three adjusted kinship-tightness indexes are all negatively and significantly (at the 1% level) associated with the likelihood of households in having account(s) with a financial institution (row 1), debit card(s) (row 2), credit card(s) (row 3), and mortgage loan(s) (row 4). In row (5) where *Fintech adoption* is the dependent variable, we find that the estimate on *Family structure adj.* is negative and significant at the 5% level, suggesting tighter firms are less likely to have mobile money account(s). The results are consistent with our firm-level evidence of a negative relation between kinship tightness and access to finance.

4.3.4 Heterogeneity by Finance Dependence

In this section, we explore the heterogeneous effect of kinship tightness in financial development. To the extent that tight kinship networks hinder firms' access to external capital, its negative role should be more pronounced for firms that are more dependent on external finance. The analysis is performed on the firm-level sample and based on the model specification of equation (4). We collect information of the degree of finance dependence for each industry from Rajan and Zingales (1996) and divide firms into a high and low group based on its sample median. Specifically, we regress *Finance obstacle* on the kinship-tightness indexes, a dummy variable of high industry finance dependence, their interaction, control variables, and fixed effects.

Insert Table 8 about here

The heterogeneity test results are reported in Table 8. In columns (1) to (3), in line with our baseline test results, we find a positive and significant between the two subindexes of kinship tightness and *Finance obstacle* for firms in the low-dependence group. Importantly, the positive effect of *Descent system* and *Kinship tightness* is significantly more pronounced for firms that have high external finance dependence. Based on the estimates from column (3), a one-standard-deviation increase in

Kinship tightness is expected to raise *Finance obstacle* by 2.1 and 4.3 percentage points (10.9% and 22.4%), respectively, for firms with low and high dependence (relative to the sample mean).

4.3.5 Heterogeneity by Country Trade Openness

As pointed out by Stulz and Williamson (2003), countries with a more open stance to international trade are more vulnerable to foreign influences and less subject to the influence of local cultures. Hence, if tight kinship impedes financial development, its negative role is likely to be less pronounced in countries with greater openness. In other words, we conjecture that country openness mitigates the extent to which kinship tightness reduces the access to finance.

Following Rajan and Zingales (2003), we measure a country's actual openness to international trade by its ratio of imports and exports to GDP (*Actual openness*). However, since actual openness is closely related to the development of financial markets (Rajan and Zingales, 2003), we also consider a country's natural openness, which represents the exogenous component of its trade openness. Specifically, a country's natural openness is constructed using its estimated trade shares developed by Frankel and Romer (1999), estimated based on its distance from its trading partners (*Natural openness*). Using the two openness measures, we divide our firm-level sample based on their respective sample medians, construct dummy variables for the high-openness groups, and interact them with the kinship-tightness variables in the *Finance obstacle* model. The results are reported in Table 9.

Insert Table 9 about here

Columns (1) to (3) and (4) to (6) report results for *Actual openness* and *Natural openness*, respectively. In all columns, the estimates on the interaction between the kinship-tightness variables and the two measures of country trade openness are negative and significant (at the 5% level or better). The evidence is consistent with our conjecture that trade openness attenuates the negative relation between tight kinship networks and finance constraints.

4.4 Robustness Tests

4.4.1 Instrumental Variable (IV) Estimation

Although we account for a wide array of control variables and fixed effects, our estimation of the relation between kinship tightness and financial development may still subject to endogeneity concerns. Given that kinship networks were established long ago, the main source of endogeneity in our setting is likely to be the omission of variables that can simultaneously determine the development of kinship structure and financial markets, thereby biasing our OLS estimates. To alleviate such concern, we adopt the IV approach and use the plausibly exogenous extracted variation in kinship tightness for identification. A valid instrument should ideally be significantly correlated with kinship tightness (the relevance condition) and affect financial development through this relation (the exclusion condition).

The instrumental variable we consider is the exposure to pre-industrial climate risk. Prior to industrialization, because credit and insurance markets were undeveloped, in order to deal with climate-related risks, such as draughts, storms, hot waves, etc., subsistence farmers were forced to cooperate and connect with other members of the society, both inside and outside of their local communities (Kates et al., 1985; Halstead and O'Shea, 2004; McCloskey, 1976). Although family- and kin-related connections are in general effective in providing partial insurance against idiosyncratic shocks due to less costly agreement enforcement and monitoring, such networks are too small and too spatially concentrated to provide effective insurance against climate-related risk (Buggle and Durante, 2021). For regions that are often exposed to adverse climate and weather-related risk, societies increase their insurance capacity to such risk by widening their social networks and the radius of socioeconomic relations to individuals living in different locations (Nettle, 1998). As such, kinship networks tended to be looser in regions that were more exposed to climate- or weather-related risk.

To measure the exposure to climate-related risk in the pre-industrial periods, we download daily precipitation data at the grid level from the National Oceanic and Atmospheric Administration (NOAA) database. We first compute the average daily precipitation for each month over the period from 500 CE to 1,500 CE. For each of the 12 months, we then calculate the variance in average daily precipitation across the 1,000 years, obtaining 12 month-specific variances of precipitation, one for January, one for

February, and so on. We then average the 12 month-specific variances of precipitation to obtain our instrumental variable, *Var. precipitation*$_{500\text{-}1500}$. We average *Var. precipitation*$_{500\text{-}1500}$ across all grids within a country (ethnic group) and merge them to the country and households (firms).

Insert Table 10 about here

The IV estimation results are reported in Table 10. Panels A1 and A2 reports the second- and first-stage results for the country-level analysis where the dependent variable is *Private credit/GDP* and *Deposit/GDP*. The first-stage results show that the instrumental variable of pre-industrial climate-related risk is negatively and significantly associated with the tightness of kinship networks, consistent with our expectation and satisfying the relevance condition. The second-stage results confirm a negative and significant relation between kinship tightness and country-level financial development, consistent across the three tightness measures.

Panels B1 and B2 report the first- and second-stage results for the firm-level tests with *Finance obstacle* as the dependent variable. In the first stage, the instrumental variable is negatively and significantly associated with *Kinship tightness* but its association with the other two subindexes is insignificant. Since the relevance condition is only satisfied for *Kinship tightness*, we only interpret the second-stage results for it. In Panel B1, we find that the fitted *Kinship tightness* is positively and significantly associated with *Finance obstacle*, consistent with our kinship tightness impeding access to finance.

Panels C1 and C2 report the first- and second-stage results for the household-level tests. In the first stage, the instrumental variable has the expected negative sign and significant at the 1% level across the three kinship-tightness measures, thus satisfying the relevance condition. In the second stage, we find that the three fitted kinship-tightness measures are all negatively and significantly (at the 10% level) associated with *Financial institution account*. Overall, our IV estimation at the country, firm, and household levels confirms our baseline results, suggesting that the endogeneity concern may not be severe.

4.4.2 Sensitivity Tests

As discussed in Section 3.1, in our firm-level analysis, the kinship-tightness indexes are constructed by matching firms to ethnic groups by proximity, using a combined matching method based on both buffer zones (with a radius of 200 km) and Thiessen polygons. In this section, we check the robustness of our tests to using single matching methods based on buffer zones or Thiessen polygons. The model specification follows equation (4) and the dependent variable is *Finance obstacle*.

Insert Table 11 about here

The results from these robustness tests are reported in Table 11. Columns (1) to (3) [(4) to (6)] report the results where kinship-tightness measures are constructed using buffer zones [Thiessen polygons]. As columns (1) to (3) show, the estimates on the three kinship-tightness indexes are positive and significant at the 5% level. In columns (4) to (6), we find that *Descent system* and *Kinship tightness* are both positively and significantly associated with *Finance obstacle*. The evidence similarly suggests that kinship tightness is associated with lower credit availability.

5. Conclusion

Although culture has been shown to be significant in determining financial development, the cultural proxies in existing studies are not granular enough to capture the often-rich heterogeneity in cultural traits across ethnic groups within the countries. To extend this literature, we study whether and how the interconnectedness of people in tightly structured, extended family systems, i.e., kinship tightness, may have a role in shaping the development of financial markets.

We hypothesize that tight kinship ties hinder the development of financial markets for two reasons. First, societies with tighter kinship networks promote within-group trust but distrust among people outside the group, implying lower extent of collaboration and interaction among economic agents between groups. Second, tight-kinship societies typically have relatively lower incentives to establish formal systems or institutions but rather rely on informal systems to regulate property rights and enforce contracts. Together, we expect kinship tightness to be negatively related to financial development.

We collect information of pre-industrial ethnic communities around the world from the EA database and quantify the degree of tightness in kinship ties for each ethnic group based on four family and descent characteristics (Enke, 2019): (1) the dominant form of family organizations, (2) the common pattern of residence transfer during the marriage, (3) the main descent tracking mode, and (4) presence of segmented communities and localized clans. We construct an overall kinship tightness measure by equal-averaging the four kinship characteristics.

Examining individuals' responses to the WVS, our first test shows that kinship tightness is associated with lower trust people have in each other and in financial institutions. We then perform country-level regressions, finding that tighter kinship is associated with weaker institutions in property rights protection and contract enforcement. Having established a negative role of kinship in trust and institutional development outcomes, we perform three sets of tests at the country, firms, and household levels, respectively, to examine its implication for financial development. Consistent with our hypothesis, our tests reveal that kinship tightness is negatively associated to two country indicators of financial development, more severe self-perceived finance constraints by firms, and a lower access to credit by households. Moreover, firms are also less likely to apply for bank loans, not because of an insufficient demand for credit but rather because of more stringent requirements imposed by the banks on them. In further tests, we find that the link between tighter kinship and more severe finance constraints is more evident among firms with higher external finance dependence and it is mitigated by country trade openness.

Our findings contribute to several strands of literature. First, we add to the extensive law and finance literature and document that historical cultural traits and norms at the ethnic-group level are important determinant of modern financial market development. Second, we extend the growing body of research on kinship that mostly has a single-country focus by presenting new, international evidence of the role of kinship on financial development. Finally, we provide further evidence that collaborates the predictions and findings by Enke (2019).

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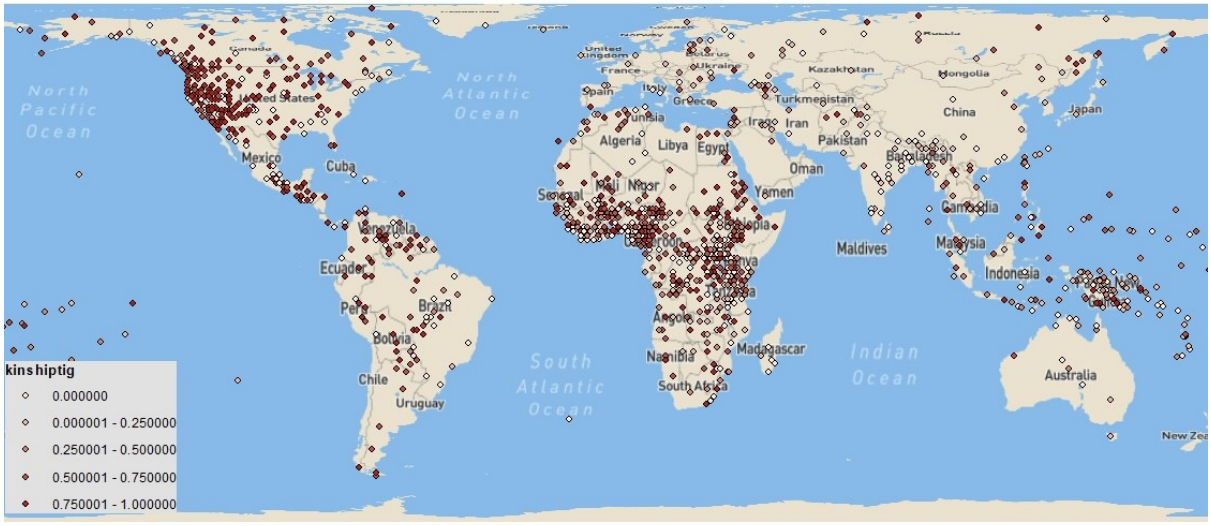
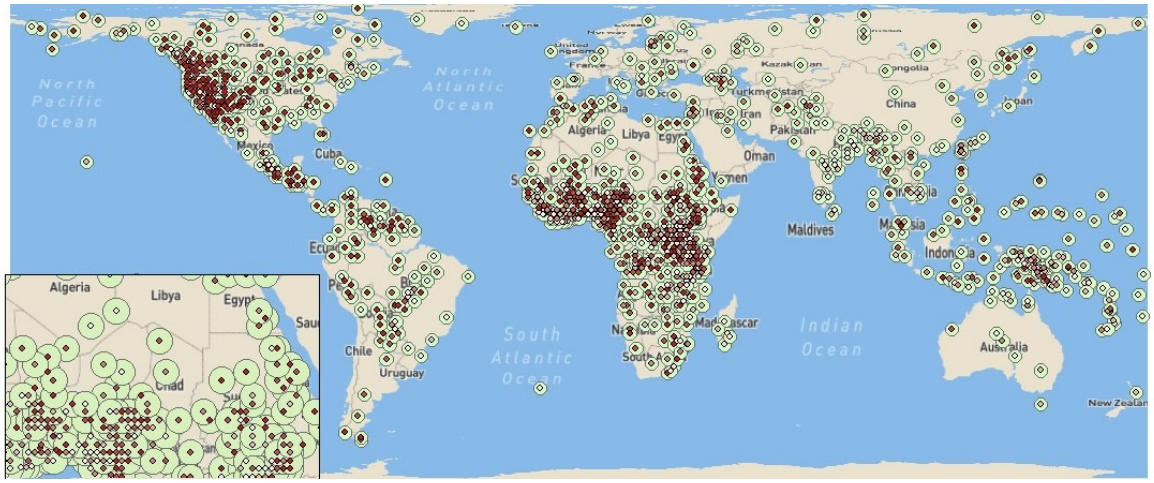
Figure 1
Distribution of Kinship in the Ethnographic Atlas



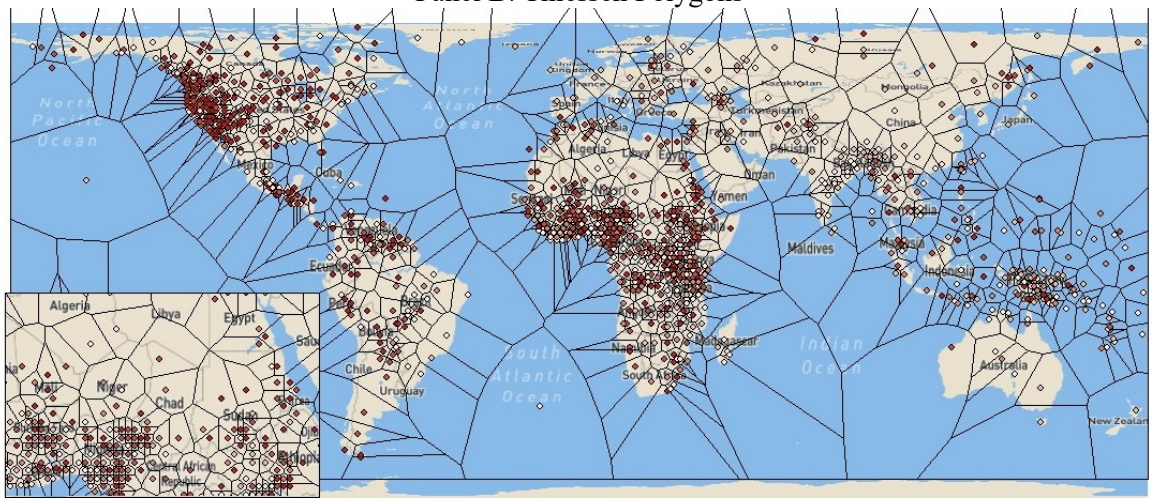
Notes: This figure depicts the distribution of kinship in the Ethnographic Atlas across countries.

Figure 2
The Three Matching Approaches

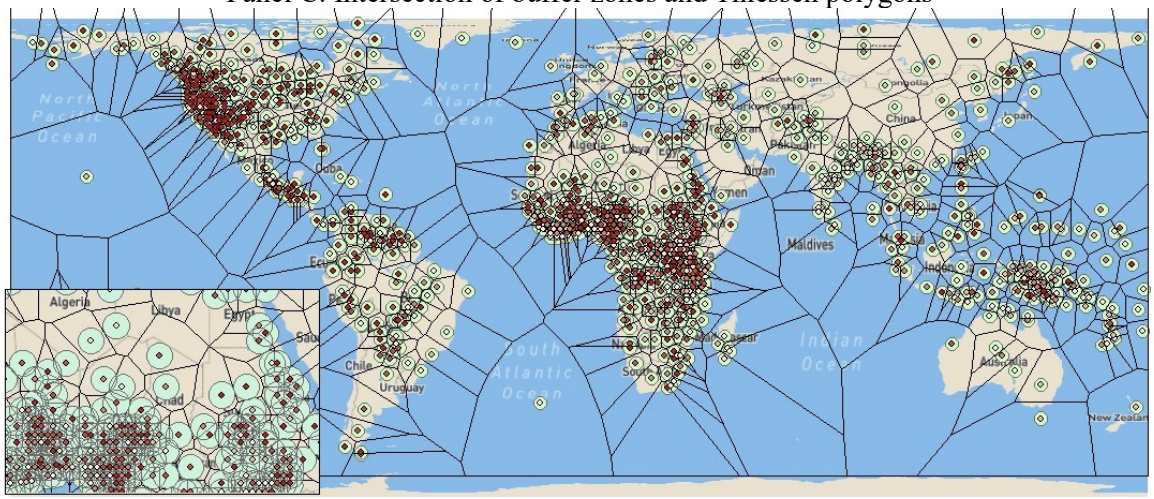
Panel A: Buffer Zone with 200 KM



Panel B: Thiessen Polygons

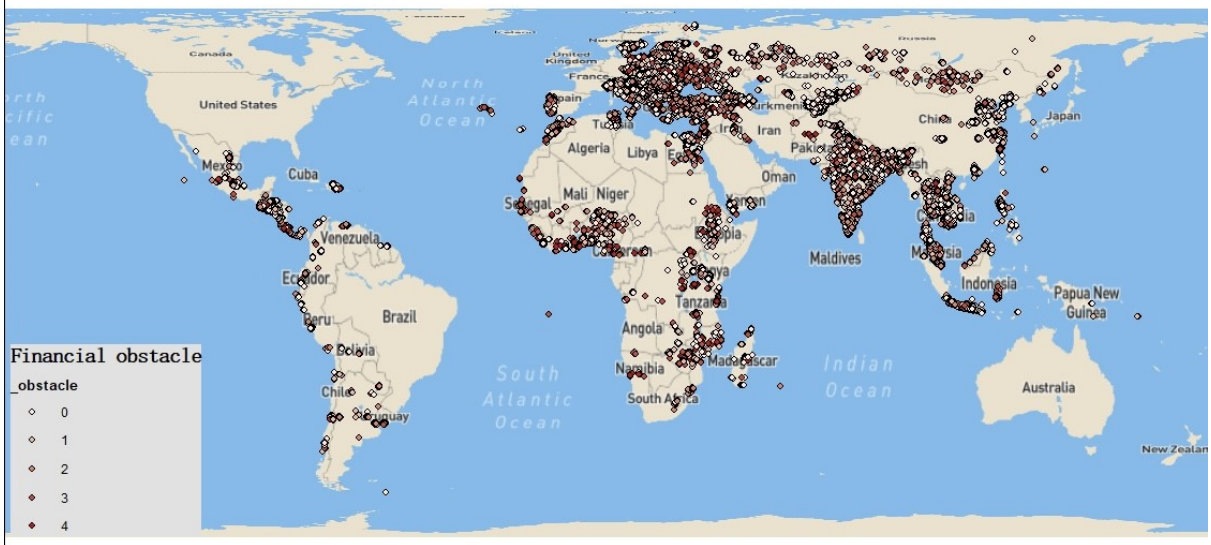


Panel C: Intersection of buffer zones and Thiessen polygons



*Note*s: This figure compares the coverage of Murdock's (1967) ethnic groups constructed by 200-kilometer buffer zone in Panel A, by Thiessen polygons in Panel B, and by a combination of the two approaches in Panel C.

Figure 3
Distribution of Financial Development



Notes: This figure depicts distribution of firms in the World Enterprise Survey (WES) across countries.

Table 1
Summary Statistics

This table presents summary statistics of our main variables at the country, ethnic group, firm, household, and individual levels.

	# of countries	Obs	Mean	Stdev	25%	Median	75%
Panel A. Country-Level Data							
Extended family adj.	119	5,297	0.725	0.274	0.561	0.796	0.968
Co-residence adj.	119	5,297	0.549	0.354	0.235	0.571	0.914
Unilineal descent adj.	119	5,297	0.540	0.358	0.196	0.539	0.928
Clans adj.	119	5,297	0.270	0.264	0.027	0.231	0.417
Family structure adj.	119	5,297	1.274	0.446	1.000	1.201	1.631
Descent system adj.	119	5,297	0.810	0.537	0.314	0.889	1.188
Kinship tightness adj.	119	5,297	0.521	0.211	0.301	0.521	0.710
Private credit/GDP	119	5,297	24.301	19.043	10.077	18.508	34.005
Deposit/GDP	119	5,297	31.863	24.036	13.411	25.085	45.105
Property rights	109	4,858	49.964	17.705	38.300	46.100	60.400
Rule of law	113	2,023	36.058	23.289	16.827	33.173	51.675
Contract enforcement	103	4,585	5.833	0.600	5.624	5.900	6.184
Actual openness	70	3,369	55.560	34.576	28.530	49.580	70.630
Natural openness	70	3,369	18.275	15.017	8.840	12.970	23.560
Vol. precipitation$_{500\text{-}1500}$	89	4,030	4.557	3.042	2.650	3.595	5.427
GDP per capita	118	5,041	5,171.414	8,395.400	858.367	2,084.635	4,943.770
GDP growth	119	5,041	4.121	6.150	1.818	4.224	6.521
Income level	119	5,297	2.759	1.029	2.000	3.000	4.000
English legal origin	103	4,585	0.316	0.465	0.000	0.000	1.000
French legal origin	103	4,585	0.597	0.491	0.000	1.000	1.000
Scandinavian legal origin	103	4,585	0.010	0.098	0.000	0.000	0.000
Socialist legal origin	103	4,585	0.044	0.206	0.000	0.000	0.000
Buddhist	103	4,585	0.049	0.216	0.000	0.000	0.000
Muslim	103	4,585	0.289	0.453	0.000	0.000	1.000
Panel B. Ethnic Group-Level (Source: Ethnographic Atlas)							
Extended family		1,263	0.698	0.460	0.000	1.000	1.000
Co-residence		1,267	0.762	0.426	1.000	1.000	1.000
Unilineal descent		1,274	0.716	0.451	0.000	1.000	1.000
Clans		1,102	0.459	0.499	0.000	0.000	1.000
Family structure		1,275	0.884	0.320	1.000	1.000	1.000
Descent system		1,228	0.753	0.431	1.000	1.000	1.000
Kinship tightness		1,070	0.654	0.331	0.500	0.750	1.000
Latitude		1,291	15.368	22.690	-1.000	11.000	35.000
Longitude		1,291	2.500	84.635	-72.170	13.000	38.790
# of years since obser.		1,283	1,891.859	195.468	1,881.000	1,920.000	1,930.000
Distance from coast		1,291	436.969	430.827	53.852	289.631	745.108
Slope		1,291	2.117	2.537	0.449	1.099	3.022
Elevation		1,291	651.132	662.257	160.101	422.436	998.410
Depend. on hunt. & gather.		1,220	0.162	0.369	0.000	0.000	0.000
Ethnic population		953	433.511	3,202.996	1.400	16.000	100.000
Avg. temperature		1,291	18.470	8.784	14.052	21.660	24.828
Vol. temperature		1,291	35.386	58.843	1.444	5.384	47.223
Avg. precipitation		1,291	114.440	71.810	62.329	103.446	154.403
Vol. precipitation		1,291	9,861.661	11,260.124	2,207.125	8,010.072	13,498.190

Panel C. Firm-Level Data (Source: World Bank's Enterprise Survey)

Firm size	71	45,213	1.720	0.770	1.000	2.000	2.000
Firm age	71	44,485	19.706	15.483	9.000	16.000	25.000
Business group	70	43,980	0.208	0.406	0.000	0.000	0.000
Manager experience	71	44,241	18.381	11.260	10.000	16.000	25.000
Ownership type	71	44,662	87.537	30.616	100.000	100.000	100.000
finance obstacle	71	45,213	0.191	0.393	0.000	0.000	0.000
Line of credit	71	43,659	0.294	0.455	0.000	0.000	1.000
Overdraft	71	42,481	0.361	0.480	0.000	0.000	1.000
Checking	71	44,792	0.839	0.367	1.000	1.000	1.000
% inputs paid after	69	39,781	33.451	36.022	0.000	20.000	60.000
% supply chain credit	71	45,192	9.018	20.965	0.000	0.000	5.000
% internal credit	71	45,192	71.056	36.762	50.000	95.000	100.000
% bank credit	71	45,192	9.417	21.718	0.000	0.000	5.000
% other source	71	45,192	1.095	5.326	0.000	0.000	0.000
Apply for any loan last year?	71	43,427	0.200	0.400	0.000	0.000	0.000
Reasons: did not need a loan	71	33,970	0.639	0.480	0.000	1.000	1.000
Reasons: application procedure	71	33,970	0.075	0.263	0.000	0.000	0.000
Reasons: collateral requirement	71	33,970	0.123	0.329	0.000	0.000	0.000
Reasons: interest rate	71	33,970	0.061	0.239	0.000	0.000	0.000
Reasons: insufficient size	71	33,970	0.016	0.125	0.000	0.000	0.000
Reasons: informal payment	71	33,970	0.027	0.161	0.000	0.000	0.000
Reasons: would not be approved (supply)	71	33,970	0.060	0.238	0.000	0.000	0.000

Panel D. Household-Level Data (Source: World Bank Global Financial Inclusion (GFI) database)

Trust in financial institution	144	60,890	0.155	0.362	0.000	0.000	0.000
Financial institution account	144	145,927	0.600	0.490	0.000	1.000	1.000
Debit card ownership	144	144,337	0.459	0.498	0.000	0.000	1.000
Credit card ownership	144	143,718	0.193	0.395	0.000	0.000	0.000
Mortgage loan	144	144,872	0.099	0.299	0.000	0.000	0.000
Fintech adoption	109	11,744	0.557	0.497	0.000	1.000	1.000
Gender	144	145,927	0.458	0.498	0.000	0.000	1.000
Education	144	145,917	1.830	0.717	1.000	2.000	2.000
Age	144	145,499	41.987	18.053	27.000	39.000	55.000
Income	144	145,927	3.177	1.422	2.000	3.000	4.000

Panel E. Individual-Level Data (Source: World Values Survey)

Gender	22	35,743	0.481	0.500	0.000	0.000	1.000
Education	22	35,549	3.142	1.971	2.000	3.000	5.000
Age	22	35,496	41.225	15.869	28.000	39.000	53.000
Income	22	22,621	3.121	0.749	3.000	3.000	4.000
General trust	22	35,438	0.177	0.381	0.000	0.000	0.000

Table 2
Kinship Tightness and Trust

This table examines the relation between kinship tightness and trust. In columns (1) to (3), the sample is based on individual survey data from the World Values Survey (WVS). *General trust* is a dummy variable equal to 1 if the respondent believes that most people can be trusted, and 0 otherwise. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the respondents at the ethnic group level using their geographical information. In columns (4) to (6), the sample is based on household survey data from the World Bank's Global Financial Inclusion (GFI) database. *Trust in financial institutions* is a dummy variable equal to 1 if the respondent reported that she does not have a bank account due to a lack of trust in banks, and 0 otherwise. The main independent variables are the migration-adjusted overall index of kinship tightness (*Kinship tightness adj.*) and the two subindexes based on family structure (*Family structure adj.*) and descent system (*Descent system adj.*), merged to the households based on their countries. The country controls include four legal-origin dummy variables (*English legal origin*, *French legal origin*, *Scandinavian legal origin*, and *Socialist legal origin*), two religion dummy variables (*Buddhist* and *Muslim*), GDP per capita (*GDP per capita*), GDP growth (*GDP growth*), and income level (*Income level*). We aggregate the ethnic group-level controls to the country level (also adjusting for migration), including longitude (*Longitude*), latitude (*Latitude*), log number of years since observation in the EA (*# of years since obser.*), historical dependence on hunting and gathering (*Depend. on hunt. & gather.*), historical ethnic population (*Ethnic population*), distance from the coast (*Distance from coast*), slope (*Slope*), elevation (*Elevation*), the mean and volatility of temperature (*Avg. temperature* and *Vol. temperature*), and the mean and volatility of precipitation (*Avg. precipitation* and *Vol. precipitation*). Individual- and household-level control variables include: Gender (*Gender*), education (*Education*), age (*Age*) and its squared term (Age^2), and the income (*Income*) of the respondents. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level in columns (1) to (3) and at the country level in columns (4) to (6). Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	General trust			*Trust in financial institutions*		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure	-0.035**					
	(0.017)					
Descent system		-0.061***				
		(0.022)				
Kinship tightness			-0.014			
			(0.025)			
Family structure adj.				-0.022***		
				(0.003)		
Descent system adj.					-0.006	
					(0.004)	
Kinship tightness adj.						-0.041***
						(0.008)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual/Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Individual	Individual	Individual	Household	Household	Household
Observations	11,397	11,564	9,314	37,742	37,742	37,742
R-squared	0.122	0.123	0.133	0.055	0.054	0.055

Table 3
Kinship Tightness and Institutions

This table reports results from country-level regressions examining the relation between kinship tightness and two measures of the quality of modern institutions. The dependent variables are two country-level measures capturing the extent to which private property rights are protected and contracts are enforced. *Property rights* is an index ranging from 0 to 100, with higher values indicating better protection of private property rights. *Contract enforcement* is the log number of days a contract is enforced, with higher values indicating more robust contract enforcement. The main independent variables are the migration-adjusted overall index of kinship tightness (*Kinship tightness adj.*) and the two subindexes based on family structure (*Family structure adj.*) and descent system (*Descent system adj.*). The baseline country and ethnic group-level control variables as in those used in Table 2 are included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the country level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Property Rights Institution

	Property rights			*Rule of law*		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure adj.	-3.404			-6.698*		
	(3.066)			(3.668)		
Descent system adj.		-9.884***			-9.339***	
		(2.733)			(3.146)	
Kinship tightness adj.			-17.998**			-23.373***
			(7.182)			(7.601)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Country	Country	Country	Country	Country	Country
Observations	3,952	3,952	3,952	1,670	1,670	1,670
R-squared	0.612	0.652	0.635	0.634	0.643	0.647

Panel B. Contract Enforcement

	Contract enforcement		
	(1)	(2)	(3)
Family structure adj.	0.079***		
	(0.018)		
Descent system adj.		0.009	
		(0.021)	
Kinship tightness adj.			0.135***
			(0.050)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Unit of analysis	Country	Country	Country
Observations	4,236	4,236	4,236
R-squared	0.333	0.33	0.331

Table 4
Kinship Tightness and Financial Development: Country-Level Analysis

This table reports results of country-level regressions examining the relation between kinship tightness and financial development. The dependent variables are the countries' ratios of total private credit to GDP (*Private credit/GDP*) and total deposits to GDP (*Deposits/GDP*). The main independent variables are the migration-adjusted overall index of kinship tightness (*Kinship tightness adj.*) and the two subindexes based on family structure (*Family structure adj.*) and descent system (*Descent system adj.*). The baseeline country and ethnic group-level control variables identical to those used in Table 2 are included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the country level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Private credit/GDP			*Deposit/GDP*		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure adj.	-1.607			-2.839		
	(2.367)			(3.625)		
Descent system adj.		-9.510***			-11.106***	
		(2.781)			(3.730)	
Kinship tightness adj.			-14.987**			-19.003**
			(5.740)			(8.856)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Country	Country	Country	Country	Country	Country
Observations	4,236	4,236	4,236	4,236	4,236	4,236
R-squared	0.404	0.436	0.418	0.446	0.473	0.461

Table 5
Kinship and Firms' Access to Finance

This table reports results from regressions examining the relation between kinship tightness and firms' access to finance. The sample is constructed based on firm-level survey data from the World Enterprise Survey (WES) database for the period from 2010 to 2022. In Panel A, the dependent variable is *Finance obstacle*, which is an index of financial constraint reported by firms to the WES, ranging from 0 to 4, with higher values indicating greater constraint. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. The same set of baseline country and ethnic group-level controls is included. Firm-level controls include firm size (*Firm size*), firm age (*Firm age*), business group (*Business group*), manager experience in years (*Manager experience*), and ownership by private (*% private ownership*). In Panel B, we present results examining the relation between kinship tightness and other financing variables. Each cell represents an individual regression with the variable in the first column as the dependent variable. *Line of credit* is a dummy variable equal to 1 if the firm has a line of credit or loan from a financial institution, and 0 otherwise. *Overdraft* is a dummy variable equal to 1 if the firm has an overdraft facility at the time of the survey, and 0 otherwise. *Checking* is a dummy variable equal to 1 if the firm has a checking and/or savings account, and 0 otherwise. *% inputs paid for* is the proportion of working capital purchased with credit. *% supply chain credit* is the proportion of working capital financed with trade credit from suppliers. *% internal credit* is the proportion of working capital financed with internal funds. % *bank credit* is the proportion of working capital financed with bank credit. *% other source* is the proportion of working capital financed with other sources, such as funds provided by relatives and/or friends. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. *Finance Obstacle*

	Finance obstacle		
	(1)	(2)	(3)
Family structure	0.119***		
	(0.040)		
Descent system		0.272***	
		(0.028)	
Kinship tightness			0.164**
			(0.066)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income FE	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm
Observations	42044	42044	38497
R-squared	0.158	0.168	0.159

Panel B. Other Financing Variables

Dependent variable	*Family structure*	*Descent system*	*Kinship tightness*
(1) *Line of credit*	-0.060	0.029	-0.108**

	(0.062)	(0.025)	(0.046)
(2) *Overdraft*	-0.083*	-0.004	-0.017
	(0.046)	(0.030)	(0.046)
(3) *Checking*	0.015	-0.003	-0.012
	(0.028)	(0.028)	(0.032)
(4) *% inputs paid after*	-11.333**	-1.605	-2.462
	(4.399)	(2.463)	(4.563)
(5) *% supply chain credit*	-10.174***	-1.376*	-4.292*
	(3.495)	(0.832)	(2.408)
(6) *% internal credit*	20.564***	0.067	12.655***
	(4.506)	(2.456)	(4.838)
(7) *% bank credit*	-6.802*	0.126	-10.533***
	(4.066)	(1.764)	(3.738)
(8) *% other source*	-0.946	0.135	0.417
	(0.626)	(0.321)	(0.398)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income FE	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm

Table 6
Reasons for Not Applying For A Loan

This table examines the relation between kinship tightness and the reasons for the inability of firms to access bank credit. Each cell represents an individual regression. The sample is based on firm-level survey data from the WES for the period from 2010 to 2022, with the variable in the first column of the same row as the dependent variable. *Apply for any loan last year?* is a dummy variable equal to 1 if the firm applied for new loans or lines of credit during the last fiscal year, and 0 otherwise. *Reasons: did not need a loan* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to no such demand, and 0 otherwise. *Reasons: application procedure* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to a complex application procedure, and 0 otherwise. *Reasons: collateral requirement* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to unfavorable collateral requirement, and 0 otherwise. *Reasons: interest rate* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to an unfavorable interest rate, and 0 otherwise. *Reasons: insufficient size* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to insufficient loan size, and 0 otherwise. *Reasons: informal payment* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to additional informal payment, and 0 otherwise. *Reasons: would not be approved* is a dummy variable equal to 1 if the firm reports that it did not apply for a loan due to expecting the application would be rejected, and 0 otherwise. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. The same set of baseline country-, ethnic group-, and firm-level controls is included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*Family structure*	*Descent system*	*Kinship tightness*
(1) *Apply for any loan last year?*	-0.018	0.043***	-0.050***
	(0.012)	(0.013)	(0.019)
(2) *Reasons: did not need a loan*	-0.083***	-0.109***	-0.065**
	(0.019)	(0.016)	(0.027)
(3) *Reasons: application procedure*	0.010	0.028***	0.023
	(0.011)	(0.009)	(0.014)
(4) *Reasons: collateral requirement*	0.053***	0.017**	-0.007
	(0.010)	(0.007)	(0.015)
(5) *Reasons: interest rate*	0.028**	0.052***	0.063***
	(0.013)	(0.012)	(0.020)
(6) *Reasons: insufficient size*	0.014*	0.008**	0.005
	(0.007)	(0.004)	(0.007)
(7) *Reasons: informal payment*	0.012**	0.007*	0.000
	(0.006)	(0.004)	(0.008)
(8) *Reasons: would not be approved*	-0.035***	-0.003	-0.019
	(0.012)	(0.008)	(0.014)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes

Year FE	Yes	Yes	Yes
Income FE	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm

Table 7
Kinship Tightness and Households' Access to Finance

This table examines the relation between kinship tightness and households' access to finance. Each cell represents an individual regression using the variable stated in the first column of the same row as the dependent variable. The sample is based on household survey data from the World Bank's GFI database. *Financial institution account* is a dummy variable equal to 1 if the household borrowed money from a bank or other formal financial institution in the previous year, and 0 otherwise. *Debit card ownership* is a dummy variable equal to 1 if the household reported having a savings card, and 0 otherwise. *Credit card ownership* is a dummy variable equal to 1 if the household reported having a credit card, and 0 otherwise. *Mortgage loan* is a dummy variable equal to 1 if the household took a loan from a financial institution to purchase a house and/or flat, and 0 otherwise. *Fintech adoption* is a dummy variable equal to 1 if the household has a mobile money account and 0 otherwise. The main independent variables are the migration-adjusted overall index of kinship tightness (*Kinship tightness adj.*) and the two subindexes based on family structure (*Family structure adj.*) and descent system (*Descent system adj.*). The based country and ethnic group-level control variables identical to those used in Table 2 are included. The baseline country-, ethnic group-, and household-level controls are included. The detailed definitions of variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the country level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*Family structure adj.*	*Descent system adj.*	*Kinship tightness adj.*
(1) *Financial institutional account*	-0.088***	-0.072***	-0.230***
	(0.004)	(0.004)	(0.010)
(2) *Debit card ownership*	-0.053***	-0.040***	-0.134***
	(0.004)	(0.004)	(0.009)
(3) *Credit card ownership*	-0.032***	0.011***	-0.034***
	(0.002)	(0.002)	(0.006)
(4) *Mortgage loan*	-0.011***	-0.017***	-0.040***
	(0.001)	(0.001)	(0.002)
(5) *Fintech adoption*	-0.049**	0.009	-0.057
	(0.024)	(0.023)	(0.058)
Country controls	Yes	Yes	Yes
Ethnicity controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Unit of analysis	Household	Household	Household

Table 8
Kinship Tightness, External Finance Dependence, and Firms' Access to Finance

This table examines the moderating role of external finance dependence in the relation between kinship tightness and credit availability. The analysis is performed at the firm level. The dependent variable is *Finance obstacle*, which is an index of financial constraints reported by firms to the WES, ranging from 0 to 4, with higher values indicating greater constraints. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. *Dependence* is a dummy variable equal to 1 if the firm's industry external dependence in finance is above sample median, and 0 otherwise. Industries' external dependence is the fraction of capital expenditures not financed with internal funds by U.S. firms in the same industry during the 1980s, calculated by Rajan and Zingales (1996). The same set of baseline country, ethnic group, and firm-level controls is included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Finance obstacle		
	(1)	(2)	(3)
Family structure	0.117**		
	(0.051)		
Family structure × Dependence	-0.0008		
	(0.018)		
Descent system		0.227***	
		(0.031)	
Descent system × Dependence		0.030***	
		(0.007)	
Kinship tightness			0.063
			(0.072)
Kinship tightness × Dependence			0.066***
			(0.016)
Dependence	0.032*	0.005**	-0.015
	(0.017)	(0.002)	(0.009)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Income fixed effect	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm
Observations	42,044	42,044	38,497
R-squared	0.155	0.166	0.157

Table 9
Kinship Tightness, Trade Openness, and Firms' Access to Finance

This table examines the moderating effect of country openness on the relation between kinship tightness and financial development. The analysis performed at the firm level. The dependent variable is *Finance obstacle*, which is an index of financial constraints reported by firms to the WES, ranging from 0 to 4, with higher values indicating greater constraints. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. Columns (1) to (3) and (4) to (6) report results where the country openness measure is *Actual openness* and *Natural openness*, respectively. *Actual openness* is the ratio of the sum of imports and exports to GDP. *Constructed openness* is measured as the share of constructed trade developed by Frankel and Romer (1999) based on a country's distance from its trading partners. The baseeline country, ethnic group-, and firm-level control variables identical to those used in Table 5 are included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively

	Finance obstacle					
	Actual openness			*Natural openness*		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure	0.232***			0.220***		
	(0.042)			(0.041)		
Family structure × Openness	-0.268***			-0.256***		
	(0.048)			(0.047)		
Descent system		0.372***			0.394***	
		(0.037)			(0.031)	
Descent system × Openness		-0.136***			-0.167**	
		(0.048)			(0.041)	
Kinship tightness			0.313***			0.554***
			(0.104)			(0.120)
Kinship tightness × Openness			-0.302**			-0.578***
			(0.152)			(0.152)
Openness	-0.465**	-0.477***	-0.621***	1.364***	1.120***	1.577***
	(0.201)	(0.180)	(0.226)	(0.315)	(0.276)	(0.305)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Income fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm	Firm	Firm	Firm
Observations	24,402	24,402	21,636	24,402	24,402	21,636
R-squared	0.173	0.179	0.182	0.173	0.179	0.186

Table 10
Instrumental Variable (IV) Estimation

This table reports results for our IV estimation of the relation between financial development and kinship tightness at the country (Panels A1 and A2), firm (Panels B1 and B2), and household (Panels C1 and C2) levels. The dependent variables are *Private credit to GDP*, *Deposit to GDP*, firms' *financial obstacles*, and households' *bank account*. The instrumental variable is *Var. precipitation*$_{500\text{-}1500,}$ a measure of climate-related risk. We first compute the average daily precipitation for each month over the period from 500 CE to 1,500 CE. We then calculate the variance in average daily precipitation for each of the 12 months across the 1,000 years, obtaining 12 month-specific variances of precipitation, one for January, one for February, and so on. We then average the 12 month-specific variances of precipitation to obtain *Var. precipitation*$_{500\text{-}1500.}$ In Panels A1 and A2 (country-level analysis) and C1 and C2 (i.e., household-level analysis), *Var. precipitation*$_{500\text{-}1500}$ is migration-adjusted and merged onto the dataset by country. The main independent variables are the migration-adjusted overall index of kinship tightness (*Kinship tightness adj.*) and the two subindexes based on family structure (*Family structure adj.*) and descent system (*Descent system adj.*), merged based on countries. In Panels B1 and B2 (i.e., firm-level analysis), *Var. precipitation*$_{500\text{-}1500}$ is merged with the firms at the ethnic group level using their geographical information. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. The same set of baseline country, ethnic group, and firm-level controls is included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the country level in Panels A1, A2, C1, and C2 or at the ethnic group level in Panels B1 and B2. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A1. Country Level - IV Second Stage

	2nd stage					
	Private credit/GDP			*Deposit/GDP*		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure adj.	-74.214***			-35.727*		
	(25.173)			(20.483)		
Descent system adj.		-22.419***			-10.793**	
		(4.583)			(5.243)	
Kinship tightness adj.			-68.870***			-33.155**
			(14.973)			(16.443)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Country	Country	Country	Country	Country	Country
Observations	1,223	1,223	1,223	1,223	1,223	1,223

Panel A2. Country Level - IV First Stage

	1st stage		
	Family structure adj.	*Descent system adj.*	*Kinship tightness adj.*
	(1)	(2)	(3)
Var. precipitation$_{500\text{-}1500}$	-0.017***	-0.055***	-0.018***
	(0.005)	(0.006)	(0.002)
Kleibergen-Paap rk LM statistic	11.76***	75.75***	54.51***
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes

Year FE	Yes	Yes	Yes
Unit of analysis	Country	Country	Country
Observations	1,223	1,223	1,223

Panel B1. Firm Level - IV Second Stage

	2nd stage		
	Finance obstacle		
	(1)	(2)	(3)
Family structure	0.963*		
	(0.547)		
Descent system		-6.423	
		(6.822)	
Kinship tightness.			1.363**
			(0.651)
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income FE	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm
Observations	10,215	10,215	9,326

Panel B2. Firm Level - IV First Stage

	1st stage		
	Family structure	*Descent system*	*Kinship tightness*
	(1)	(2)	(3)
Vol. precipitation$_{500\text{-}1500}$	-0.031	0.005	-0.026***
	(0.028)	(0.005)	(0.008)
Kleibergen-Paap rk LM statistic	1.43	1.00	4.87**
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Income FE	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm
Observations	10,215	10,215	9,326

Panel C1. Household Level - IV Second Stage

	2nd stage		
	Financial institution account		
	(1)	(2)	(3)
Family structure adj.	-0.077*		
	(0.044)		
Descent system adj.		-0.038*	
		(0.022)	
Kinship tightness adj.			-0.102*
			(0.058)
Country controls	Yes	Yes	Yes
Ethnicity controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Unit of analysis	Household	Household	Household
Observations	18,729	18,729	18,729

Panel C2. Household Level - IV First Stage

	1st stage		
	Family structure adj.	*Descent system adj.*	*Kinship tightness adj.*
	(1)	(2)	(3)
Var. precipitation$_{500\text{-}1500}$	-0.084***	-0.170***	-0.063***
	(0.003)	(0.002)	(0.001)
Kleibergen-Paap rk LM statistic	771.78***	3234.29***	2155.96***
Country controls	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Unit of analysis	Household	Household	Household
Observations	18,729	18,729	18,729

Table 11
Sensitivity Analysis: Alternative Matching Methods

This table examines the robustness of our firm-level tests (row 1 of Table 5) to using alternative single matching methods based on buffer zones (columns 1 to 3) and Thiessen polygons (columns 4 to 6). The dependent variable is *Finance obstacle,* which is an index of financial constraint reported by firms to the WES, ranging from 0 to 4, with higher values indicating greater constraint. The main independent variables are the overall index of kinship tightness (*Kinship tightness*) and the two subindexes based on family structure (*Family structure*) and descent system (*Descent system*), merged with the firms at the ethnic group level using their geographical information. The same set of baseline country, ethnic group, and firm-level controls is included. The detailed definitions of the variables are provided in Appendix A.1. Standard errors reported in parentheses are clustered at the ethnic group level. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Finance obstacle					
	200km buffer zone			Thiessen polygons		
	(1)	(2)	(3)	(4)	(5)	(6)
Family structure	0.119***			-0.014		
	(0.040)			(0.032)		
Descent system		0.272***			0.226***	
		(0.028)			(0.015)	
Kinship tightness			0.164**			0.133***
			(0.066)			(0.048)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Income FE	Yes	Yes	Yes	Yes	Yes	Yes
Unit of analysis	Firm	Firm	Firm	Firm	Firm	Firm
Observations	42,044	42,044	38,497	62,903	63,809	55,789
R-squared	0.158	0.168	0.159	0.135	0.154	0.146

Appendix A.1
Variable Definitions and Data Sources

Variable	Definition	Data Source
Panel A. Country-Level Variables		
Extended family adj.	The migration-weighted averages of the Extended family indicators across all ethnic groups within each country that capture the dominant form of domestic or family organisations in that country. To be more specific, we compute the averages of the kinship tightness measures across all ethnic groups within each country's borders, then adjust our country-level measures of kinship tightness for population flows and migration, and compute weighted averages of the kinship tightness measures based on Putterman and Weil's (2010) migration matrix, which provides the proportion of the country's population descended from people in different countries in the year 1500.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Co-residence adj.	The migration-weighted averages of the co-residence indicators across all ethnic groups within each country that capture the common pattern of residence transfer during the marriage in that country.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Unilineal descent adj.	The migration-weighted averages of the unilineal descent indicators across all ethnic groups within each country that capture the main descent tracking mode in that country.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Clans adj.	The migration-weighted averages of the clans indicators across all ethnic groups within each country that capture the predominant patterns of residence with kin in that country.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Family structure adj.	The unweighted average of Adj. extended family and Adj. co-residence	Ethnographic Atlas, Murdock (1967); Enke (2019)
Descent system adj.	The unweighted average of Adj. unilineal descent and Adj. clans	Ethnographic Atlas, Murdock (1967); Enke (2019)
Kinship tightness adj.	The unweighted average of Adj. extended family, Adj. co-residence, Adj. unilineal descent and Adj. clans	Ethnographic Atlas, Murdock (1967); Enke (2019)
Private credit/GDP	The total amount of credit issued to the private sector by domestic money banks, commercial banks, and other deposit-taking financial institutions accounted for the average share of GDP from 1996 to 2017.	The World Bank's Global Financial Development Database

Deposit/GDP	The average share of demand deposits, time deposits, and savings deposits of deposit currency banks and other financial institutions in GDP from 1996 to 2017.B4	The World Bank's Global Financial Development Database
Property rights	An index that ranges from 0 to100, the greater the scores, the more secure the country's property rights protection.	Heritage's Index of Economic Freedom database
Rule of law	An index that ranges from 0 to100, the greater the scores, the more secure the country's property rights protection.	World Bank's Worldwide Governance Indicators (WGI)
Contract enforcement	Logarithm of days to enforce a contract. The number of days to resolve a payment dispute through courts. The data are based on the methodology in Djankov and others (2003) but describe the number of calendar days to enforce a contract of unpaid debt worth 50% of the country's GDP per capita. The variable is constructed as at January 2003.	Djankov et al., (2007)
Actual openness	The ratio of imports plus exports to GDP.	Frankel and Romer (1999)
Natural openness	Constructed trade share based on a country's distance from its trading partners.	Frankel and Romer (1999)
Var. precipitation$_{500\text{-}1500}$	The average month-specific variance of precipitation from 500 CE to 1,500 CE. We first compute the average daily precipitation for each month over the period from 500 CE to 1,500 CE. We then calculate the variance in average daily precipitation for each of the 12 months across the 1,000 years, obtaining 12 month-specific variances of precipitation, one for January, one for February, and so on. We then average the 12 month-specific variances of precipitation to obtain *Var. precipitation*$_{500\text{-}1500}$.	National Oceanic and Atmospheric Administration (NOAA)
GDP per capita	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2015 U.S. dollars.	World Bank national accounts data, and OECD National Accounts data files.
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars.	World Bank national accounts data, and OECD National Accounts data

Income level	Adjusted net national income is GNI minus consumption of fixed capital and natural resources depletion.	The World Bank's World Development Indicators (WDI)
English legal origin	English legal origin dummy	Djankov et al., (2007)
French legal origin	French legal origin dummy	Djankov et al., (2007)
Scandinavian legal origin	Scandinavian legal origin dummy	Djankov et al., (2007)
Socialist legal origin	Socialist legal origin dummy	Djankov et al., (2007)
Buddhist	Buddhist religion dummy	Djankov et al., (2007)
Muslim	Muslim religion dummy	Djankov et al., (2007)

Panel B. Ethnic Group-Level Variables

Extended family	The dominant form of domestic or family organizations, and it equals 1 when the domestic family structure is extended family.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Co-residence	The common pattern of residence transfer during the marriage, and it equals 1 if newlyweds need to join the residential relationship of the husband (or wife) group.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Unilineal descent	The main descent tracking mode and it equals to 1 when the major mode of descent is unilineal lineage.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Clans	The predominant patterns of residence with kin can reveal the specific structure of the clan, whether ambilocal, matrilocal, or patrilocal.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Family structure	A dummy measures intra-generational kinship tightness. It equals 1 if extended family equals 1 or co-residence equals 1, and 0 otherwise.	Ethnographic Atlas, Murdock (1967); Enke (2019)
Descent system	A dummy measures inter-generational kinship tightness. It equals 1 if unilineal descent equals 1 or clans equals 1, and 0 otherwise.	Ethnographic Atlas, Murdock (1967); Enke (2019)

Kinship tightness	The unweighted average of Extended family, co-residence, unilineal lineage, and clans (Enke, 2019)	Ethnographic Atlas, Murdock (1967); Enke (2019)
Latitude	The approximate geodesic centroid latitude of a ethnicity.	Ethnographic Atlas, Murdock (1967)
Longitude	The approximate geodesic centroid longitude of a ethnicity.	Ethnographic Atlas, Murdock (1967)
# of years since obser.	Number of years since observation in the EA	Ethnographic Atlas, Murdock (1967)
Distance from coast	Distance to coast (km)	High-resolution Geography Database
Slope	Mean incline (in degrees) in the terrain	Global Multi-resolution Terrain Elevation Data (2010)
Elevation	Meters above sea level (masl)	Global Multi-resolution Terrain Elevation Data (2010)
Depend. on hunt. & gather.	A dummy variable that equals one if the ethnic group's subsistence is dependent on hunting and gathering	Murdock (1962-1971); Gray (1999)
Ethnic population	Population of ethnic group as a whole	Murdock (1962-1971); Ember (1992)
Avg. temperature	Mean value of monthly temperature across the year	Baseline Historical (1900-1949), CCSM ecoClimate model
Vol. temperature	Variance in monthly temperature means	Baseline Historical (1900-1949), CCSM ecoClimate model
Avg. precipitation	Mean monthly precipitation in l/m2/month	Baseline Historical (1900-1949), CCSM

		ecoClimate model
Vol. precipitation	Variance in annual precipitation means	Baseline Historical (1900-1949), CCSM ecoClimate model
Panel C. Firm-Level Variables		
Firm size	A firm size categorical variable, taking the value of 0 for the small firms, 1 for the medium firms, and 2 for the large firms, based on the number of employees.	World Bank Enterprise Survey (2010-2020)
Firm age	The number of years since the firm has first operated.	World Bank Enterprise Survey (2010-2020)
Business group	The legal status of the firm	World Bank Enterprise Survey (2010-2020)
Manager experience	The top manager's experience working in the firm's sector (in number of years).	World Bank Enterprise Survey (2010-2020)
% private ownership	Percentage of firms' shares owned by private domestic individuals, companies, or organizations.	World Bank Enterprise Survey (2010-2020)
Finance obstacle	The level of finance constraints reported by the firm to the WES database. It is an index with values ranging from 0 to 4. A higher value indicates more severe finance constraint.	World Bank Enterprise Survey (2010-2020)
Line of credit	A dummy variable that equals 1 if the firm has a line of credit or loan from a financial institution, and 0 otherwise.	World Bank Enterprise Survey (2010-2020)
Overdraft	A dummy variable that equals 1 if the firm has an overdraft facility, and 0 otherwise.	World Bank Enterprise Survey (2010-2020)
Checking	A dummy variable that equals 1 if the firm has a checking and/or saving account, and 0 otherwise.	World Bank Enterprise Survey (2010-2020)
% inputs paid after	The proportion of inputs purchased on credit.	World Bank Enterprise

		Survey (2010-2020)
% supply chain credit	The proportion of working capital financed by supplier credit.	World Bank Enterprise Survey (2010-2020)
% internal credit	The proportion of working capital financed by internal funds.	World Bank Enterprise Survey (2010-2020)
% bank credit	The proportion of working capital financed by banks.	World Bank Enterprise Survey (2010-2020)
% other source	The proportion of working capital is financed by other sources like relatives and friends.	World Bank Enterprise Survey (2010-2020)
Apply for any loan last year?	A dummy variable that equals one if a firm apply for new loans/ lines of credit last fiscal year.	World Bank Enterprise Survey (2010-2020)
Reasons: did not need a loan	A dummy variable that equals one if a firm reports that it did not apply for a loan due to no such demand	World Bank Enterprise Survey (2010-2020)
Reasons: application procedure	A dummy variable that equals one if a firm reports that it did not apply for a loan due to a complex application procedure	World Bank Enterprise Survey (2010-2020)
Reasons: collateral requirement	A dummy variable that equals one if a firm reports that it did not apply for a loan due to unfavorable collateral requirement	World Bank Enterprise Survey (2010-2020)
Reasons: interest rate	A dummy variable that equals one if a firm reports that it did not apply for a loan due to an unfavorable interest rate	World Bank Enterprise Survey (2010-2020)
Reasons: insufficient size	A dummy variable that equals one if a firm reports that it did not apply for a loan due to insufficient loan size	World Bank Enterprise Survey (2010-2020)
Reasons: informal payment	A dummy variable that equals one if a firm reports that it did not apply for a loan due to additional informal payment	World Bank Enterprise Survey (2010-2020)

Reasons: would not be approved	A dummy variable that equals one if a firm reports that it did not apply for a loan due to expecting the application would be rejected	World Bank Enterprise Survey (2010-2020)
Dependence	A dummy variable that equals one if the industry is largely dependent on external finance and is based on the study of Rajan and Zingales (1996).	Rajan and Zingales (1996)
Panel D. Household-Level Variables		
Trust in financial institution	A dummy variable that equals zero if a respondent does not have a bank account due to a lack of trust in banks and one otherwise.	World Bank's GFI Database
Financial institution account	A dummy variable that equals one if the household members of the household have at least one of a bank or postal account or saving account, otherwise it equals zero	World Bank's GFI Database
Debit card ownership	A dummy variable that equals one if the household members hold at least one debit card (ATM), otherwise it equals zero	World Bank's GFI Database
Credit card ownership	A dummy variable equals one if the household members hold at least one credit card, otherwise it equals zero	World Bank's GFI Database
Mortgage loan	A dummy variable equals one if the household members have debt owed to financial institutions for the purchase of buildings, otherwise it equals zero	World Bank's GFI Database
Fintech adoption	A dummy variable that equals one if the household members has remote connect with financial institutions, otherwise it equals zero	World Bank's GFI Database
Gender	A dummy variable that equals one if the respondent is a male, otherwise it equals zero	World Bank's GFI Database
Education	Respondent's education qualification	World Bank's GFI Database
Age	Respondent's age	World Bank's GFI Database
Income	The quintiles of respondents' household income	World Bank's GFI Database
Panel E. Individual-Level Variables		
Gender	A dummy variable that equals one if the respondent is a male, otherwise it equals zero	World Value Survey Wave 7)
Education	Respondent's education qualification	World Value Survey Wave 7)
Age	Respondent's age	World Value Survey Wave 7)
Income	The quintiles of respondents' income level	World Value Survey Wave 7)
General trust	A dummy variable that equals one if the respondent believes that most people can be trusted	World Value Survey Wave 7)