# Market Exposure, Civic Values, and Rules

Devesh Rustagi*

**Abstract**

When societies transition from exchange based on communal relationships to that based on impersonal interactions in markets, does it affect their civic values and rules? What are the underlying mechanisms? I answer these questions using a natural experiment in Ethiopia, where markets evolved accidentally from garrisons established by Menelik. I show that market exposure fosters civic value and formation of rules that are conducive for collective action. These results arise because market failure from asymmetric information and weak state capacity engender a cooperation problem, to alleviate which, societies develop different kinds of exchange structures. In societies further away from markets, individuals rely on eponymous exchange with known individuals from their social network, resulting in *limited* morality. In societies near markets, impersonal exchange creates a demand for civic values, which together with community sanctioning fosters *generalized* morality. Distance from markets without asymmetric information has no effect on civic values and rules, which allows me to separate the effect of market failure from market place and prosperity.

**JEL:** C93, D8, N97, Z13

**Keywords:** Markets, civic values, rules, cooperation, market failure, asymmetric information, Ethiopia

*Corresponding author: Devesh Rustagi, devesh.rustagi@warwick.ac.uk. Department of Economics, University of Warwick. I am especially thankful to Dave Donaldson, James Fenske, Bob Gibbons, Joseph Henrich, Stelios Michalopoulos, Nathan Nunn, Silvia Sonderegger, Hans Joachim Voth, and Noam Yuchtman for detailed feedback and discussions on the paper. I am also thankful to Klaus Desmet, Andrew Foster, Simon Gächter, Oded Galor, Ed Glaeser, Claudia Goldin, Dilip Mukherjee, Elias Papaioannou, Matthias Schief, Uwe Sunde, David Weil, and Ekaterina Zhuravskaya for helpful discussions and comments. I am thankful to seminar participants at Boston University, Brown University, Harvard University, London Business School, MIT Sloan, University of Nottingham, University of Manchester, University of Strathclyde, and University of York. Nathan Waller provided excellent research assistance for this paper.

# I. Introduction

What happens to civic values and rules when societies transition from exchange based on communal relationships to that based on impersonal interactions in markets?[1] The link between market exposure and civic values is one of the most debated topics in economics with rival interpretations (see Hirschman, 1982). While the *doux commerce* hypothesis argues that market exposure fosters civility and cooperation (Montesquieu, 1748; Smith, 1763), the destructive hypothesis argues that it erodes civic values and gives rise to envy, coercion, and exclusion (Marx, 1872; Veblen, 1899). In a seminal study, Henrich et al. (2010) shed light on this debate by documenting a positive association between calories purchased from markets and experimental measures of fairness. Subsequently, Enke (2022) found a positive association between market related concepts in a society's folklore and folklore-based measures of morality, and Agneman and Chevrot-Bianco (2022) between occupational choice and honesty in experiments.[2]

While impressive, these findings raise a number of important questions. What causes these associations to be positive rather than being negative? Thus far, we know little about the mechanisms underlying the positive effect of market exposure on civic values and rules. Relatedly, market are not homogeneous but differ in their characteristics. As an example, some are more competitive, whereas others trade in products whose quality is difficult to verify at the time of purchase. Are all of these markets expected to affect civic values and rules in the same way? In other words, do market characteristics play a role in determining the direction of the market effect? Crucially, transition to market exchange is not random but may itself depend on pre-existing differences, whereby those stuck in "feudal shackles" may lag behind, resulting in reverse causality (see Hirschman, 1982). Moreover, markets typically co-evolve with states and are usually located in urban areas, so their effect may be confounded with state capacity, schooling, and access to religious places. There is rarely compelling evidence from exogenous variation in market exposure.

In this paper, I use the context of market places from Ethiopia to make three contributions. First, I use a natural experiment on market emergence and location to show that individuals who are less exposed to markets have lower civic values and likelihood of forming rules. Second, local people trade primarily in livestock, which is prone to asymmetric information. Weak state capacity in Ethiopia means there are no impartial third parties to remedy this situation. These features lock buyers and sellers in a cooperation problem. Using vignette studies, I show that societies develop different kinds of exchange patterns to mitigate this cooperation problem. In societies further away from markets,

[1] Civic values are persistent and shared values that help societies achieve cooperation with group members as well as outsiders (generalized cooperation) (Guiso, Sapienza and Zingales, 2011) Rules are formal written down constraints (regulations, laws) that structure human interactions (North, 1991).

[2] A parallel literature uses lab experiments to examine how markets affect morals towards third parties, such as environment, child labor, and animals. Falk and Szech (2013) find that markets erode moral values, but Bartling, Fehr and Özdemir (2020) find that this is due to repeated play and not markets.

individuals rely on eponymous exchange with known individuals from their social network, resulting in *limited* morality. In societies near markets, impersonal exchange with strangers creates a demand for civic values, which together with community sanctioning fosters *generalized* morality. Heuristics acquired from exposure to these exchange structures shapes differences in civic values and rules. Third, some markets do not trade in livestock but in goods of verifiable quality. I develop a falsification test showing that exposure to such markets has no effect on civic values and rules. This test further allows me to separate the effect of market failure from market place and prosperity.

The findings from this study are likely to be of general interest. Livestock markets are widespread in Africa, providing livelihood to over 30 percent of the continent's population and accounting for 35 percent of its agricultural GDP [3] Moreover, asymmetric information and weak state capacity are common throughout Africa, affecting many other goods and services besides livestock.(Fafchamps, 2003; Gennaioli and Rainer, 2007; Michalopoulos and Papaioannou, 2014).

The study takes place in the homeland of Arsi Oromo, who reside in clan-based settlements. Because of the topography, these settlements were fragmented into hamlets. Over time, hamlets from adjacent clan homelands coalesced to form a group. I capture market exposure as the average time it takes individuals from a group to access the nearest market on foot. This means the further the individuals are from markets the lower is their market attendance and hence poorer exposure. Importantly, despite belonging to the same clan, some individuals happen to be closer, but others happen to be further away from markets. Furthermore, individuals from different groups attend different markets. These features allow me use clan and market fixed effects to absorb time invariant unobserved clan and market specific differences. Since within a clan individuals were homogeneous from common patrilineal descent and exposure to common religious and political leadership (Hassen, 1994; Gnamo, 2014), it mitigates the concern over pre-existing differences driving changes in civic values and rules today.

Conditional on clan and market fixed effects, market distance is plausibly exogenous because of three reasons. First, until the early 20th century, there were no markets, towns, and trading centers in the Arsi homeland. During this period, trade with outsiders was discouraged and was restricted to exchange within the community. Second, markets evolved inadvertently from garrisons that emperor Menelik II built after defeating the Arsi in the 1890s. These garrisons brought hundreds of soldiers, creating opportunities for exchange. When Menelik died in 1913, the garrisons lost their military character and transformed fully into market places. Menelik chose garrison locations on the basis of geographical suitability to defence, resulting in their placement in areas without any link to pre-existing routes for trade, slavery, and coffee cultivation. Since, it was not the intention of Menelik to build markets, their emergence was accidental and their locations

[3]FAO 2020. https://www.fao.org/faostat/en/#data/QV

had nothing to do with potential for trade. Third, the garrisons not induce sorting in the Arsi settlements. The Arsi formed settlements before the markets emerged at locations determined by clan leaders following a well-respected custom, which forbade inter-clan warfare, thereby ensuring that clan boundaries remained stable even after Menelik's invasion (Gnamo, 2014). Movement across the groups was rare because of the belief that the spirit of one's ancestors lives with them (Gnamo, 2014). To this end, I find no association of market distance with group size, population size, population density, and migration.

I measure civic values as a propensity to cooperate if others do the same (conditional cooperation or positive reciprocity).[4] I use a two-player public goods game in which individuals take two decisions on their contribution in a one-shot, anonymous interaction, which rules out benefits from repeated interaction and reputation formation (Fischbacher, Gächter and Fehr, 2001; Fischbacher and Gächter, 2010; Rustagi, 2022*a*). In the first decision, players decide simultaneously on their contribution, so it confounds civic values with beliefs about other players' contribution. In the second decision, I shut down beliefs by eliciting each players' contribution in response to every contribution level of the other player (strategy method). I measure civic values as the Spearman rank correlation between self and other players' contribution in the second decision.

I complement the experimental measure with two additional context specific measures of civic values and rules. Since 2000 onwards, all groups are engaged in a forest commons management program, which requires each group to maintain its existing forest cover and prevent outsiders from using their forest. This calls for group members to engage in decentralized monitoring. Since monitoring is individually costly but generates benefits for the entire group, it serves as a proxy for civic values. I use household surveys to collect data on time spent monitoring in a month (hours). Next, I consider formal written down rules that restrict livestock grazing inside the group managed forest. These rules promote natural forest regeneration by mitigating the damage caused by livestock to young trees (Amente, 2006). Since rule following requires constraints on opportunistic behavior, it is also individually costly and generates benefits for the group. I combine official records maintained by each group with household surveys to collect data on the presence and quality of formal grazing rules.

I find that one standard deviation increase in market distance (1.1 hours) results in a decline in conditional cooperation by 0.16 points, time spent monitoring by 6 hours, and the likelihood of forming grazing rules by 22 percentage points. These are large effects in relation to the mean of these variables. The results are robust to controlling for geography, forest condition, Gini of cattle and land holding, education, program duration, and fixed effects for clan and market. To rule out confounding with urbanization or the direct effect

[4]Laboratory and field evidence highlight the importance of conditional cooperation for the provision of public goods (Fehr and Gächter, 2000; Rustagi, 2022*a*), donations (Frey and Meier, 2004; Rustagi, 2022*a*), common property resources (Rustagi, Engel and Kosfeld, 2010; Kosfeld and Rustagi, 2015).

of short-lived garrisons, I show that the results hold when I control for distance from administration, schools, and religious places, as well as for population density and trust in government.

This is not a study on persistence, as there has been no infrastructure development since Menelik's time to reduce the opportunity cost of market attendance. That being said, market distance shapes civic values and rules both directly through exposure today, as well as indirectly through the exposure of ancestors from cultural transmission. To this end, I show that market distance has a similar effect across the different age groups.

I conduct vignette studies imitating local livestock exchange to shed light on plausible mechanisms. I find that livestock exchange is prone to cooperation problem from asymmetric information and weak state capacity. Depending on market distance, groups have developed different kinds of exchange structures to mitigate this problem. In groups further away from markets, higher opportunity cost of attending markets means individuals enter into eponymous exchange with others from their social network, which fosters cooperation via reputation (Polanyi, 1944; Granovetter, 1985; North, 1991). This means, individuals learn to cooperate parochially resulting in *limited* morality (Platteau, 2000). However, in groups near markets, lower opportunity cost of attending markets means individuals can enter into impersonal exchange. Achieving cooperation in this situation calls for mechanisms that go beyond in-group trading. It is possible that efficiency gains from trade create a demand for civic values and rules, in the absence of which individuals would have to forego these gains (Arrow, 1970; Bowles, 1998). Thus, individuals learn to cooperate in impersonal interactions, resulting in *generalized* morality (Platteau, 2000). Heuristics acquired from exposure to these exchange structure determines behavior in similar situations to avoid cognitive dissonance (Festinger, 1957). This is especially relevant for the public goods game, which mimics market exchange in being one-shot, anonymous, and prone to asymmetric information from player type being not known.

Vignette studies further reveal that civic values are bolstered by a sanctioning mechanism that threatens dishonest traders with exclusion from future exchange. Targeting sanctions requires information on the identity of dishonest traders, but the impersonal nature of market exchange makes this difficult. The Oromo custom of announcing one's clan while meeting other Oromo people and use of ethnic markers while meeting non-Oromo people makes it possible to know a trader's clan and ethnic group. This information can foster cooperation through community responsibility, whereby the entire community of the defector is held responsible and faces punishment (see Greif, 2006; Deb, 2020). The presence of community sanctioning could have led to common knowledge and internalization that traders will be better off from being honest. To this end, I provide evidence using data from the first decision of the public goods game. I show that individuals who live further away from markets contribute less to the public good and hold pessimistic beliefs about other players' contribution.

The above findings suggest that market failure from asymmetric information is the underlying mechanism behind the negative effect of market distance on civic values and rules. However, this result may be tampered with other mechanisms such as prosperity and contact hypothesis (see Allport, 1954). I construct a falsification test using distance from two additional markets in the study area. These markets are as well attended and have a similar effect on prosperity as livestock markets, but they differ in an important dimension – they trade mainly in products of verifiable quality like aluminium utensils and polyester textiles, which the sellers do not manufacture themselves. I show that distance to markets without asymmetric information has no effect on civic values and rules, and controlling for it does not change the main results. These results bolster the importance of market failure as the underlying mechanism.

**Related Literature.** This paper contributes to the literature on the determinants of civic values and pro-social behaviors. Previous studies focus on the role of slavery in eroding trust (Nunn and Wantchekon, 2011), trade in reducing religious riots (Jha, 2013), central institutions in crowding out honesty (Lowes et al., 2017), and self-governance in fostering donations and norms of cooperation (Guiso, Sapienza and Zingales, 2016; Rustagi, 2022*a*). This paper highlights the role of market exchange in shaping civic values and rules (Montesquieu, 1748; Smith, 1763; Hirschman, 1982; Bowles, 1998; Platteau, 2000). The paper distinguishes itself from previous studies (Henrich et al., 2010; Enke, 2022; Agneman and Chevrot-Bianco, 2022) in several ways. First, this paper sheds light on the mechanism through which market exchange shapes civic values and rules. In particular, it highlights he importance of market characteristics such as market failure from asymmetric information in explaining the positive effect of market exposure. These results help us understand the direction of the market effect. They also lend empirical support to the conjecture that market failure fosters civic values (Arrow, 1970; Bowles, 1998; Platteau, 2000).

Second, the paper documents the emergence of different kinds of exchange structures to mitigate cooperation problems from market failure. This offers novel empirical evidence in support of many influential studies suggesting the importance of economic organization for cultural change (Polanyi, 1944; Granovetter, 1985; North, 1991; Greif, 2006), as well as studies on cooperation and self-governance under weak states (Ostrom, 1990; Greif, 2006; Dixit, 2009; Deb, 2020). Since the exchange structures affects who cooperates with whom, the paper also contributes to the literature on the origins of limited and generalized cooperation (Platteau, 2000; Tabellini, 2010; Enke, 2023).

Third, the paper highlights the importance of market exposure in shaping both cultural norms and formal written down rules. These findings are significant given the recent evidence on the interplay between culture and institutions in sustaining collective action (Bisin and Verdier, 2017; Acemoglu and Robinson, 2019; Rustagi, 2022*b*).

Finally, the paper builds on the research of Rustagi, Engel and Kosfeld (2010) and

(Kosfeld and Rustagi, 2015), who map the variation in civic values to successful commons management. This study goes a step deeper and asks what explains variation in civic values by examining the role of market exposure.

The paper is organized as follows. Section II discusses the natural experiment on market exposure, Section III the field setting, and Section IV the measures of civic values, rules, and market distance. Section V presents the empirical strategy, Section VI the main results, and Section VII the potential channels. Section VIII offers concluding remarks.

# II. Historical Background

## II.A. The Arsi Homeland

The study takes place in the homeland of the Arsi (Arusi), who form the largest branch of the Oromo people. The Arsi settled in their homeland in ca 17-18th century. At the time of settling, they split into two branches called *moieties* whose territories were separated by the river Wabe Shebele. Those who descended patrilineally from the ancestor named *Siko* live to the north of the river, whereas those who descended patrilineally from the ancestor named *Mando* live to the south of the river. The study area lies entirely to the south of the river and comprises exclusively of the Mando Arsi.

The Arsi formed settlements along patrilineal kinship ties called *Gosa* ($\sim$ clan) (Gnamo, 2014). It included all individuals descending from a common ancestor and had a well defined geographical territory. These settlement patterns have persisted, such that land ownership rights today can be traced to the early settling process (Gnamo, 2014). Because of their location in the Bale mountains, the clan-based settlements were fragmented into hamlets (Hodson, 1927). Over time, hamlets from adjacent clan homelands coalesced to form a group. I capture market exposure as the average time it takes individuals from a group to access the nearest market on foot. The further the groups are from markets the higher is their opportunity cost of market attendance and hence poorer exposure. Subsequently, I verify that market attendance declines steeply with market distance.

Figure 1 shows the location of groups and markets in the study area. It is evident that despite belonging to the same clan, some individuals happen to be closer, but others happen to be further away from markets. Furthermore, individuals from different groups attend different markets. These features allow me use clan and market fixed effects to absorb time invariant unobserved clan and market specific differences. This means, I compare individuals who are from the same clan and attend the same market, but vary in their distance to that market.

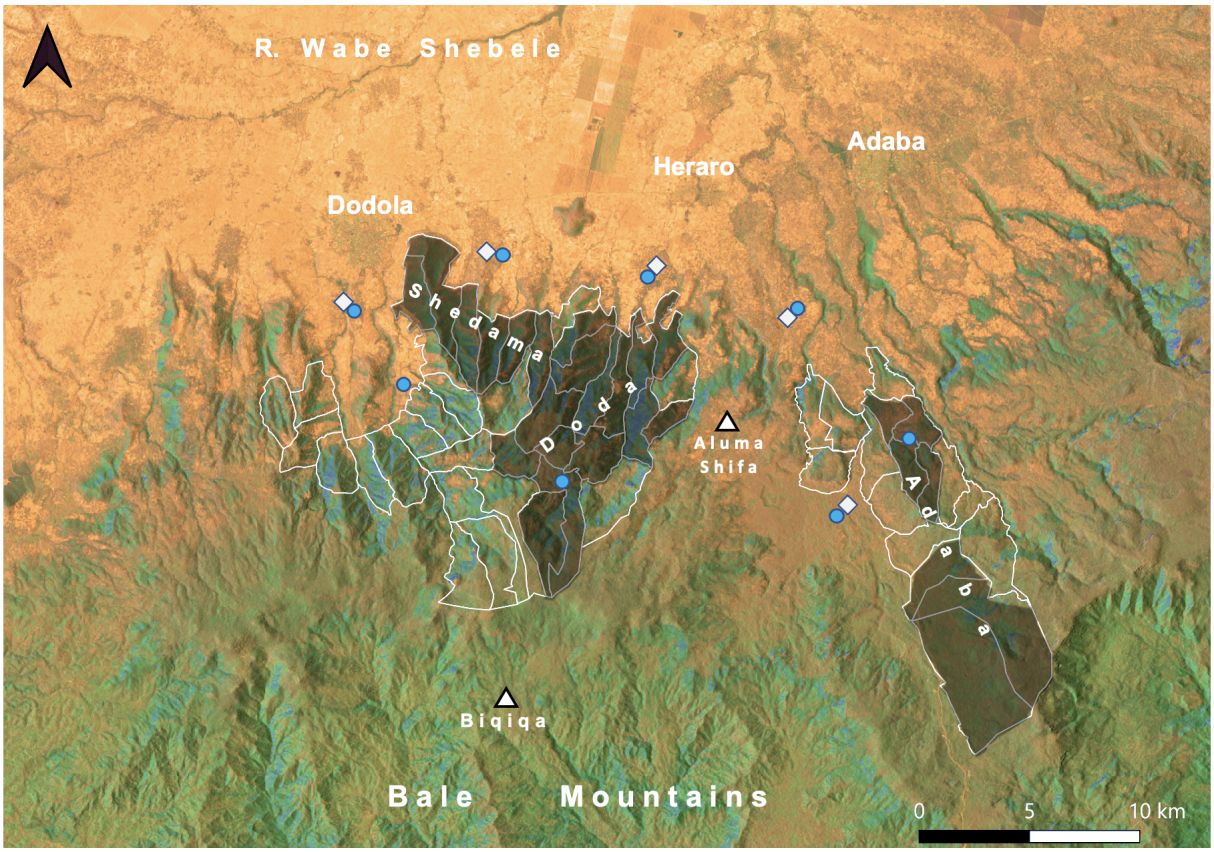



Figure 1: Location of Groups, Clans, Markets, Administration, and Schools

*Notes:* The figure shows the location of groups (white boundaries), homeland of three major clans: Doda, Adaba, and Shedama (shaded area embossed with clan's name), and three market towns: Dodola, Heraro, and Adaba. The locations of village administration offices are in solid white diamonds, primary schools in solid blue circles, and alternative markets in solid white triangles.

The use of fixed effects has many attractive features. In particular, it allows me to mitigate the concern that pre-existing differences in culture and institutions drive changes in civic values and rules today. This is because individuals within a clan can be considered culturally homogeneous from common patrilineal descent. Clan was and continues to be an important aspect of communal identity. This is also underscored by it's use in greeting. As Gnamo (2014, p63) writes "...when two individuals who do not know each other meet, the first question they ask each other is not about personal name, but about their membership in Gosa..." Moreover, because religious institution (Qallu) and political leadership (Gada) among the Arsi operate at the clan level, individuals from the same clan were also homogeneous with respect to exposure to common institutions (Hassen, 1994).

## II.B. Market Emergence and Location

I argue that conditional on clan and market fixed effects, market distance is plausibly exogenous because of a natural experiment, which determined the emergence and location

of markets.

*Market Emergence*.- Until the 19th century, the Arsi society was a paramount chiefdom (Murdock, 1967). It did not form any princely states (Gnamo, 2014, p68) or centers of trade or towns (Horvath, 1968). An Italian map from 1894 confirms this (see Figure 2). On the map, the study area is labeled as "Monti degli Arussi". It stands out as an empty space without any towns. This is not due to an omission by cartographers, as the map does include towns like Arbegoma and Chevena, which are over 80 km away in the homeland of the ethnically distinct Sidamo people. The main occupation of the Arsi was livestock herding, subsistence agriculture, and forest gathering. Trade was restricted to livestock exchange within the community, as exchange with outsiders was discouraged (Gnamo, 1982).

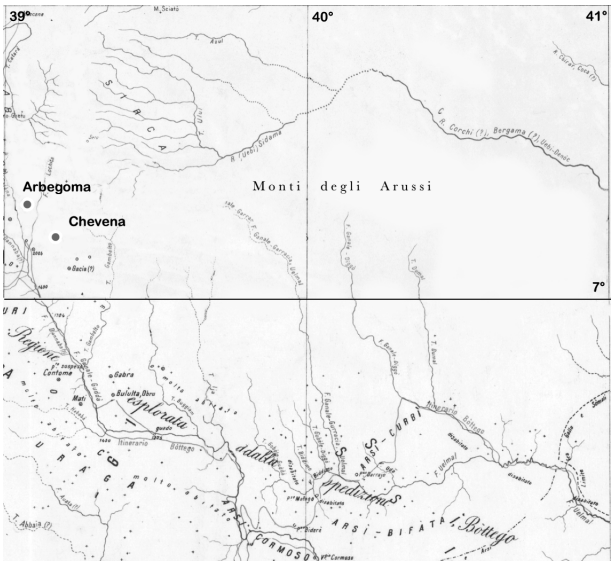



Figure 2: The Study Area Before the Conquest by Menelik

*Notes:* The map shows the study area as "Monti degli Arussi" and its surroundings in 1894 before the invasion by Menelik. Source: Corpo di stato maggiore, Ministero della guerra, Italy, 1894.

In the late 1880s, Menelik, the king of Shoa (1865-1889) and the emperor of Ethiopia (1889-1913), began expanding the southern boundaries of his kingdom by waging wars against different ethnic groups including the Arsi Oromo. The spear wielding Arsi were no match for Menelik's army with superior European firearms and therefore lost the war (Pankhurst, 1998; Perham, 1948). To maintain his hold over the subjugated lands, Menelik built garrison camps called *ketemas* which brought hundreds of soldiers and their families.[5] This influx of people created opportunities for exchange between locals and outsiders, leading gradually to the emergence of market places. Since it was not the intention of Menelik to build centers of trade, the emergence of markets was unintended.

[5]These garrisons were not permanent but temporary structures.

Menelik died soon after the garrisons were built 's death in 1913. After his death, the garrisons lost their military purpose and transformed fully into market places (Akalou, 1973). The Italian tourist guide to East Africa (1935-1941) described the garrisons as thriving market centers rather than as military establishments (Italiana et al., 1938, p464). As such, Menelik had limited resources and weak state capacity. He ruled the subjugated areas indirectly through local clan leaders (see Gnamo, 2014, p162). The clan leaders resided locally, so the indirect rule affected the entire clan homeland and not just places that were relatively close to the garrisons. This implies that market distance is unlikely to be confounded with state capacity.

*Market Location.*- The garrison locations were determined by Menelik on the basis of geographical suitability to defense. Figure 3 offers a 3-D view of the wider geographical context in which the garrisons (black circles) are located. There are five garrisons, of which three are in the study area (enclosed in a dashed red line). All garrisons are on a 2400m high plateau bounded to the west by the Rift Valley, to the east by the gorge of the river Wabe Shebele, to the south by the 4000m high Bale Mountains, and to the north by equally high Mt. Kaka and Mt. Enkolo. These geographical features offered the garrisons protection in the event of an attack, ensuring at the same time connectivity to Addis Ababa (Menelik's capital) through a 3000m high saddle.

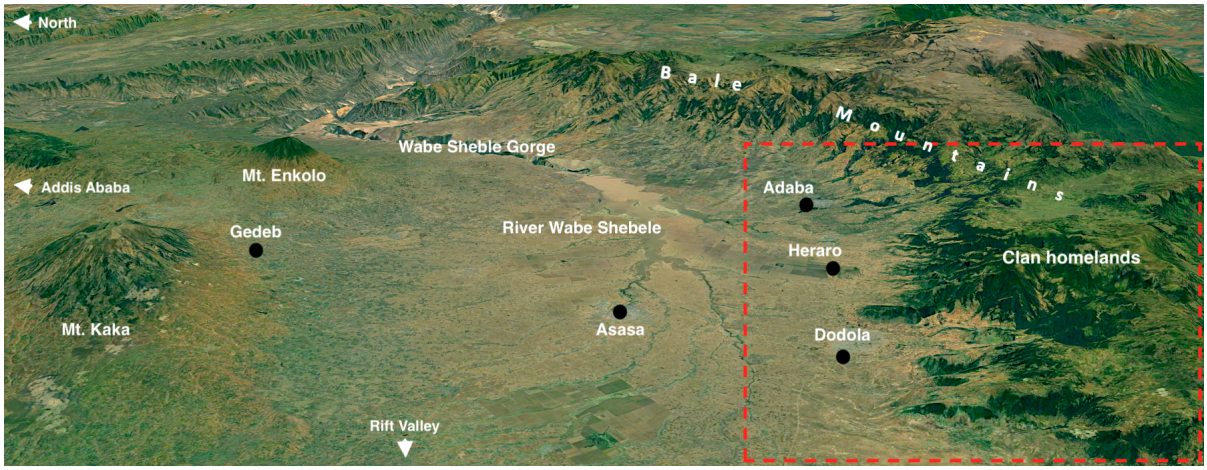



Figure 3: The Location of Garrisons in the Study Area

*Notes:* The figure shows the geographical context in which the garrisons were placed by Menelik. The study area is enclosed by a dashed red line and the garrisons are in black circles. Baseline map source: Google Earth 2023.

The garrison were not placed in areas with potential for trade. Their locations did not intersect any pre-existing trade routes (see Zewde, 2002, p23) or routes used for the Red Sea slave trade (see Shell, 2018, p66) or areas with coffee forest.[6]

[6]The trade routes were far from the homeland of Mando Arsi. The altitude of the area is not suitable for coffee cultivation or for coffee forest. While coffee does grow naturally to the south of the Bale mountains in the Harenna forest, which is on a steep escarpment with a fall of over 1000 meters.

The Mando Arsi are unlikely to have played a role in the location of garrisons. The wars between Menelik and the Arsi were not fought in the Mando homeland but 150 km to the north of the study area in the Siko homeland (see Gnamo, 2014, p146). Moreover, Menelik's decisive victory in these wars led to mass surrender by the remaining Arsi.

## II.C. Sorting by Market Distance

I find no evidence of sorting either through the shifting of clan boundaries or movement of people across groups within the clan homeland. As mentioned above, the Mando Arsi formed settlements before the markets emerged on the basis of their clan. The location of clan homelands were determined by a custom called *Baala Buusa* (leaf laying ceremony) through which clan leaders (*Abba baala*) declared communal property rights to land on a first-come first-served basis by placing a leaf. *Baala Buusa* forbade clans from conquering each others' territories and ensured that subsequent descendants inherited these rights. As Gnamo (2014, p33) writes "*Gosa* [clan], however strong and powerful it might have been, did not have the right to conquer and occupy the land belonging to the descendants of *Abba baala*." The Arsi clans also bonded over strong regional identity (*Arsooma*), friendship (*firooma*), marriage (*soddomaa*) and matrimonial alliances (*dhalooma*), which further prevented territorial take overs. This means, clan homelands have remained stable over time and their locations were not disrupted when Menelik defeated the Arsi (Gnamo, 2014, p63).

Individuals rarely moved across groups within their clan homeland, as they preferred to reside in the area where their forefathers once lived, died, and were buried. This was because of the belief that the spirit of one's ancestors lives with them. As Gnamo (2014, P63) writes, "the residence rule is patrilocal among the Oromo, where men are expected to be born, grow up, live, bring their wives to their residence, and die." An in depth survey with the elderly in each group shows that only 1.5 percent of the households have out-migrated in the past six decades. Under sorting, I expect groups nears markets to be larger in size, have higher population density, and be negatively associated with out-migration. Table 1 presents the results. I find that there no association of market distance with group size, population size, population density, and out-migration. The coefficients are very small in magnitude and are always statistically insignificant. These results alleviate concerns over sorting by market distance.

Table 1: Sorting and Migration by Market Distance

| | Group size | Population size | Population density | Migrant share |
|---|---|---|---|---|
| | (1) | (2) | (3) | 4 |
| Market distance | 0.157 | 3.998 | -1.468 | -0.115 |
| | (0.531) | (7.147) | (1.053) | (0.235) |
| Constant | 25.860 | 169.795 | 18.174 | 1.802 |
| | (1.648) | (18.375) | (2.938) | (0.790) |
| Obs. | 52 | 52 | 52 | 52 |

*Notes:* OLS estimates with robust standard errors in parentheses. Group size is the number of households in a group. Population size is the number of individuals residing in a group. Population density is number of individuals per $km^2$. Migrant share is the percentage of households who have left the group in the past 55 years.

# III. The Field Setting

This section provides an overview of the groups in the study area, as well as the nature of market interactions. It is based on data from the forest management program office, discussions with group members, and vignette studies (see Appendix C).

## III.A. Groups

The Arsi homeland lies mostly in the Bale Mountains which reach up to 4000 meters in height. Because of the mountainous terrain, the clan-based settlements were fragmented into hamlets (Hodson 1927). Over time, hamlets from adjacent clan homelands coalesced to form settlement units called *group*. Thus, a group typically comprises of individuals from different clans.

There are 56 groups in the study area. All of them are located inside the Adaba-Dodola Forest Protection Area in the West Arsi administrative zone. Of these, 52 groups are in the sample; three groups in which a pilot study was conducted were excluded and data were not available for the fourth group. Figure 1 shows the location of these groups.

The groups cover an area of 4.5 $km^2$ on average. Their boundaries follow geographical features, such as mountain ridges, rivers, and valleys. The groups range in size from 16 to 30 households, which are often organized into hamlets. Some of these hamlets are from the homeland of the adjacent clan. As a consequence, group boundaries often intersect clan boundaries. The groups comprise of 1368 households. These households speak the Arsi dialect of Oromo language and follow Sunni Islam mixed with Oromo beliefs. All households practice subsistence agriculture and forest gathering, but the main occupation is small-scale herding which involves both buying and selling of livestock. 80 percent of the households are from ten clans: *Doda* (30%), *Adaba* (13%), and *Shedama* (9%), *Holbatana* (7%), *Abena* (6%), *Bidika* (4%), *Angiso* (3%), *Magda* (3%), *Doyo* (3%), and *Weqe* (2%).

The first three clans alone account for over 50 percent of the households (see Figure 1). The level of socio-economic development is poor: except for primary schools and mosques, infrastructure like roads, electricity, mobile towers, tap water, dispensary, irrigation, and veterinary care are completely lacking.

All groups are engaged in a forest commons management program which was rolled out from 2000-2005. Under the program, each group was given property rights to manage the forest in its boundary. The group members are allowed to use their forest to graze livestock, harvest timber and non-timber forest products, and maintain existing homesteads and farms inside the forest. In return for these benefits, the groups are required to maintain existing forest cover, restrict further expansion of agriculture and settlement by members inside the forest, and prevent outsiders from accessing the forest.

All groups have the same organizational structure: an elected five-member executive committee headed by a leader. This committee is responsible for administering forest related decisions. All other administrative decisions are taken in consultation with the village to which the groups belong. There are five villages and their administrative centers are located some distance away from the groups (see Figure 1).

As mentioned in Section II.C, migration across the groups is rare. Households are required to maintain residence inside their group to benefit from the commons management program. Out-migration for over three months comes with a penalty of expulsion from the program.

## III.B. Market Interactions

The markets are held on two days in a week called 'market days', which brings together thousands of buyers and sellers who are not known to each other from adjoining areas. The markets are held on a large ground(s), which is over 12 times the size of a standard football field. Sellers do not have a fixed location from which they operate; rather locations are taken on the basis of arrival. The first day of the market is reserved for livestock trade. The number of individuals attending the market on this day is also larger than on the second day. For instance, the market in Dodola attracts as many as 5,000 people on the first day. Livestock includes cattle, horses, donkey, pony, goat, and sheep. Other prominent items include butter, honey, fuel wood, charcoal, bamboo, rubber boots, synthetic textiles, candles, and utensils. Individuals from the study area attend markets to both buy and sell livestock, which typically comprises exchange of a single livestock.

Since livestock exchange forms the cornerstone of markets, several features are worth noting. First, market exchange occurs among strangers in the form of impersonal interactions that cease to exist once the exchange is over. Livestock is inspected on the spot and exchange takes place against instant payment in cash. There are no orders in advance and sellers do not offer credit. Second, livestock exchange is prone to asymmetric infor-

mation, as the seller has more information about livestock quality than the buyer. This problem is further aggravated by the absence of quality guidelines, lack of veterinarian checks before purchase, and primitive patterns of production that produce highly uneven quality of livestock. While there are some cues that the buyers may use to adjudge livestock quality, however the vignette studies show that these are far from perfect and the problem remains (c.f. Vignette A6, B1, B6, B8). Third, livestock exchange is riddled with informal agreements that cannot be verified and enforced by impartial third parties. As such, there are no impartial third parties in the form of courts or police. Even if such third parties did exist, the small size of transactions does not merit formal action, as this would make exchange costly and inefficient. Informal enforcement agencies like mafias or private armies are absent. Fourth, there are no middlemen in the markets and trade happens directly between buyers and sellers. Fifth, markets attract a large fluctuating population of buyers and sellers who could be Oromo people from different clans, as well as non-Oromo people (Amhara, Gurage, Sidamo).

These features imply that buyers and sellers are locked in a cooperation problem. If buyers do not trust sellers, they will not be willing to pay a high price. Knowing this, sellers have no incentive to produce high quality livestock. Under these circumstances, markets may end up trading only in poor quality livestock or may even fail to exist altogether (Akerlof, 1970). However, individuals have clearly managed to avoid this fate as markets not only exist but are also thriving. This is not because of personalized relationships based on long-term exchange, which the vignettes reveal to be rare (c.f. Vignette B10). As I discuss in section VII, this is due to civic values reinforced by community sanctioning.

# IV. Data

I use a group level survey to measure market distance and combine this with a behavioral experiment and household level survey to measure civic values and rules. Table A.1 reports summary statistics on these variables. I append this with data on group level characteristics and naming patterns of individuals from the forest management program office. Finally, I use vignette studies imitating local livestock exchange to study mechanisms. The experimental instructions and procedures are described in Appendix B and vignette studies in Appendix C.

## IV.A. Market Distance

The three livestock markets in the study area on average 12 km apart from each other. Since there are no roads connecting groups to markets, households tend to attend the market that is closest to their group on foot. I measure market distance as the number

of hours households take on average to cover a one-way market trip on foot. Market distance ranges from less than 1 hour to 5 hours, the average being 2.85 hours (s.d. 1.11). Market distance is expected to affect the opportunity cost of market attendance. This is confirmed by household data on market trips, which decline steeply with market distance.

## IV.B. Civic Values and Rules

I measure civic value primarily as the individual propensity to cooperate conditionally (positive reciprocity). I complement this measure with two additional measures that are in the context of forest commons management: time spent monitoring the forest and formation of rules regulating grazing inside the forest.

### Propensity for Conditional Cooperation

Conditional cooperation is defined as the individual willingness to cooperate provided others do the same, even when the payoff maximizing strategy is to defect on others' cooperation. Measuring conditional cooperation in the field is challenging due to confounding motivations operating at the same time. Individuals who appear cooperative might do so not because they have civic values but because of benefits from repeated interaction and reputation formation. Another concern is confounding of conditional cooperation with beliefs. Individuals with similar levels of conditional cooperation might behave differently because of differences in beliefs about others' cooperation. For instance, conditional cooperators with optimistic beliefs would cooperate, but those with pessimistic beliefs would defect. These concerns imply that observed cooperation behavior is a poor proxy for conditional cooperation. I overcome these concerns using a behavioral experiment described below.

*The Experiment.*– I use a one-shot anonymous public goods game in the strategy method (Fischbacher, Gächter and Fehr, 2001; Fischbacher and Gächter, 2010). This allows me to rule out repeated interaction, reputation formation, and beliefs from playing a role. During the game, two players were randomly assigned to an experimental group. Each player received an endowment of six bills of one Ethiopian Birr and had to decide on his contribution to the public good in the units of 1 Birr. Any amount in the public good was multiplied by 1.5 and then distributed equally between the two players, regardless of their contribution. The payoff function of player $i$, where $i = (1, 2)$ is given by:

$$\pi_i = 6 - C_i + 0.75(C_i + C_i) \tag{1}$$

where $C_i$ denotes the contribution of player $i$ to the public good and $(C_1 + C_2)$ is the total value of the public good. Because the marginal per capita return from contributing one Birr to the public good was 1.5/2 or 0.75, it was in the self-interest of players to contribute nothing. Yet, if both players contributed their entire endowment, each player's earnings

increased from 6 to 9 Birr; this created a cooperation dilemma.

Each player took two decisions: unconditional and conditional. In the unconditional decision, players contributed simultaneously and stated their beliefs about the other players' contribution. In the conditional decision, I used the strategy method to shut down beliefs: players reported their contribution in response to each possible contribution of the other player. To ensure incentive compatibility, both decisions were made payoff relevant. A die was rolled to determine for which player the unconditional decision is taken; this was matched with the other players' conditional decision to calculate payoffs.

The experiments were conducted in 2008. This was the first time ever that individuals took part in an experiment, so I ensured they understood the game (see Appendix B for procedures). On average, each player earned 7.5 Birr, which was slightly over one day's wage in Dodola, the largest town. 720 individuals took part in the experiment, representing 53 percent of the households. Given the importance of clan in the organization of the Arsi society, I test for sample representation by comparing clan proportions in the sample to those in the population. Figure A.1 in Appendix A shows the proportion of ten major clans in the sample is the same as in the population ($p$-value = 0.45).

*Measuring conditional cooperation.–* The conditional decision allows me to obtain a revealed measure of civic values: (i) *free riders* are expected to always contribute zero regardless of the other players' contribution; (ii) *altruists* are expected to always contribute their full endowment regardless of what the other player does; and (iii) *conditional cooperators* are expected to increase their contribution in the increasing contribution of the other player. I find that a large fraction of individuals behave either as free riders or as conditional cooperators, but only a handful behave as altruists. Accordingly, I use the Spearman correlation between self and other players' contribution in the conditional decision as a measure of an individuals' propensity for conditional cooperation. The higher the Spearman $\rho$ the higher is the propensity to cooperate conditionally, whereas zero correlation implies a tendency for free riding.[7] The average propensity to cooperate conditionally turns out to be 0.499 (s.d. 0.518). While conducting robustness checks, I use an indicator for conditional cooperator – individuals for whom the Spearman $\rho$ is positive and statistically significant at $p$-value <0.05. I find that 47 percent of the individuals behave as conditional cooperators and 11 percent as free riders.

### Time Spent Monitoring

Maintaining the existing forest cover requires groups to restrict overuse by members and prevent outsiders from neighboring groups to access their forest. This calls for group members to engage in decentralized monitoring, whereby individuals patrol the forest in

[7]The Spearman $\rho$ is also zero for altruists and flat contributors (individuals who contribute the same amount that is different from zero and full endowment). Only 1.8 percent of the individuals behave as altruists and 2.3 percent as flat contributors.

small teams. Monitoring is prone to a second order free rider problem: it is individually costly but generates group level benefits. Individuals are better off if others engage in monitoring while they can do something else in the meantime. If every individual thinks like that, there will be no monitoring, resulting in poor forest management. Moreover, monitoring is akin to providing public goods in anonymous interactions because it is not directly observable as there is no monitoring of monitors and so on so forth. I use data from a household survey conducted in private with 508 individuals to elicit time spent monitoring in a month, which turns out to be 27.80 hours (s.d. 15.48) on average. As before, the frequency of different clans in this sample is similar to that in the population, underscoring the representativeness of the sample ($p$-value = 0.38, see Figure A.2).

**Rules on Resource Use**

Rules regulating resource use are considered critical for the management of public goods and commons. In my setting, the single biggest cause of deforestation is the disappearance of young trees from the forest due to browsing by livestock. To mitigate this deforestation, ecologists recommend rules regulating livestock grazing inside the forest (Amente, 2006). Since rule following requires constraints on opportunistic behavior, it is also individually costly but group beneficial behavior. I use household surveys conducted privately to assess whether a group has rules restricting grazing inside the forest and on the same spot, as well as the duration of these restrictions. 511 households took part in this survey, of which 44.6 percent (s.d. 49.8) reported having grazing rules in their group. Grazing was restricted, on average, for 1.76 months in a year (s.d. 1.698). I confirm this using books maintained by groups. Rustagi (2022*b*) show that these rules matter for successful management of commons. As before, the proportion of different clans in this sample is the same as in the population ($p$-value = 0.44, see Figure A.3).

## IV.C. Descriptive Results

Figure 4 present maps and binscatter plots to show the association of civic values and rules with market distance. It is evident from the figure that both civic values and rules decline steeply with market distance ($p$-value $< 0.001$).

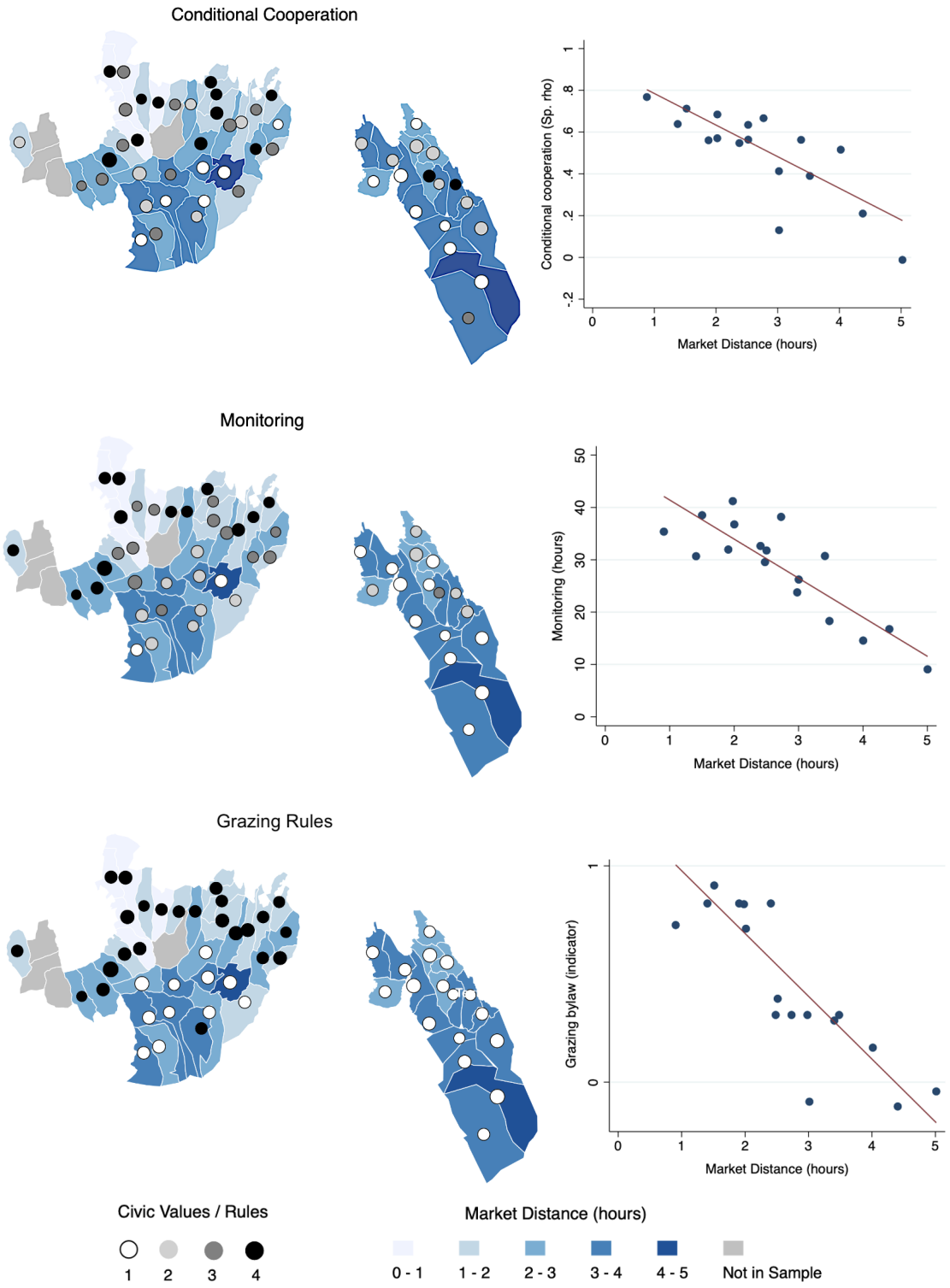



Figure 4: Civic Values and Grazing Rules by Market Distance

*Notes:* The maps show market distance (hours) in shades of blue, whereby a darker shade implies higher distance from market. Circles indicate civic value or rule in shades of grey, where a darker shade implies stronger civic value (quartile) or rule (indicator). The bin scatter plots show the corresponding association of civic values and rules with market distance after accounting for market fixed effects.

# V. Empirical Specification and Strategy

I study the effect of market distance on civic values and rules using the following OLS specification:

$$y_{igcm} = \alpha_0 + \beta MD_g + \mathbf{X}_{gcm}\gamma + \mathbf{H}_{igcm}\delta + \theta_c + \eta_m + \epsilon_{igcm} \quad (2)$$

where $y_{igcm}$ is the civic value or rule (conditional cooperation, monitoring, grazing bylaw) reported by individual $i$ from group $g$, clan $c$, and attending market $m$. *MD* is one-way market distance measured in hours. $\mathbf{X}$ and $\mathbf{H}$ are a vector of household and group specific characteristics that are considered as key determinants of civic values and rule formation in the literature. In the main specification, these include altitude, group size, group fragmentation into hamlets, share of females in a group, Gini of cattle ownership, Gini of land ownership, years of education, and duration for which a group has been under the commons management program. Table A.1 reports the definition and summary statistics on these variables. $\theta_c$ is a fixed effect for the clan of an individual. In the main specification, I consider three clans that account for over 50 percent of the households in the study area: *Doda*, *Shedama*, and *Adaba*. $\eta_m$ is a fixed effect for the market that the individual attends. I cluster standard errors at the group level, which is the treatment unit. The results hold when I cluster standard errors on the group and the market, the group and the village, the group and the clan, or when I use spatial cutoffs at 2-10 km distance.[8] The coefficient of interest is $\beta$, which captures the effect of market distance on civic values and rules.

While conducting robustness checks, I consider additional proxies of: a) *Forest condition*: in groups closer to markets, there could have been more pressure on forest, resulting in greater need for civic values and rules. While altitude already captures the variation in forest type, I additionally control for plantation forest type using data from the program office and initial forest condition at the start of the program using data on median tree cover in 2000 from (Hansen et al., 2013); b) *Geography*: in addition to altitude, I include latitude and longitude; and c) *Clan composition*: in addition to the fixed effects for the three clans, I consider clan fragmentation and fixed effects for seven others clans that account for additional 30 percent of the household population. Table A.2 reports the definition and summary statistics on these variables.

The natural experiment described in section II suggests that market distance is plausibly exogenous. A balance check in Table A.3 shows that, with the exception of latitude, market distance is uncorrelated with a variety of geographical, social, and economic variables.

Market distance could be picking the effect of opportunities associated with urbanization, such as access to administration, schooling, and religious places. The field setting

[8] Moran's I turns out to be statistically insignificant for these cutoffs.

allows me to separate these effects. The administrative offices relevant to the households are located in the main settlement of the village (see Figure 1). Also, households rarely have more than 3 years of education, so access to primary school is of utmost importance. The primary schools are located either in the group or in the neighboring groups or in the main settlement of the village (see Figure 1). Individuals do not rely on market places for mosque attendance. Friday is the preferred day for attending mosques, but this does not coincide with market day(s). Instead, individuals attend local mosques dispersed throughout the study area. While reporting robustness checks, I control for distance to village administration, local primary school, and local mosque. To further ensure that market exposure is not capturing the effect of urbanization operating through density and short-lived garrisons, I control for population density per $km^2$ and trust in government. Table A.2 reports the definition and summary statistics on these variables.

# VI. Results

## VI.A. Main Results

Table 2 presents results on the effect of market distance on conditional cooperation in Panel A, time spent monitoring in panel B, and formation of grazing rules in Panel C. Table A.4 reports the coefficients on covariates. Column 1 is without any controls and shows that market distance has a strongly negative coefficient, which is statistically significant at the 1 percent level in all the three panels. Market distance explains large variation in civic values and grazing rules, which ranges from 12-51 percent.

In column 2, I introduce clan and market fixed effects. The coefficient on market distance changes little in magnitude and remains statistically significant throughout, suggesting that market distance is not capturing unobserved clan and market specific differences. The fixed effects are jointly statistically significant in panel B-C, where their inclusion leads to a jump in the $R$-squared by 6-7 percentage points.

In column 3, I introduce main control variables. Although the coefficient on market distance declines slightly in magnitude in panel A and loses over one-third of its magnitude in panels B-C, it remains statistically significant at the 1 percent level. The controls variables are jointly statistically significant in all the panels and their inclusion raises the $R$-squared by 4-5 percentage points. According to the estimates in column 3, a one standard deviation increase in market distance (1.11 hours) leads to a decline in conditional cooperation by 0.16 points, time spent monitoring by 6 hours, and the likelihood of forming grazing rules by 22 percentage points. These are large effects in relation to the mean of the dependent variables. Results from a randomization inference test with 5000 repetitions show that these results are always statistically significant ($p$-value $< 0.001$).

Table 2: Market Distance, Civic Values, and Rules

| | No controls (1) | Fixed Effects (2) | Control variables (3) | Median split (4) | Tercile split (5) |
|---|---|---|---|---|---|
| | Panel A: Conditional Cooperation (Spearman *rho*) | | | | |
| Market distance | -0.158 | -0.159 | -0.146 | | |
| | (0.022) | (0.024) | (0.027) | | |
| Above median market distance | | | | -0.271 | |
| | | | | (0.088) | |
| Second tercile of market distance | | | | | -0.178 |
| | | | | | (0.088) |
| Third tercile of market distance | | | | | -0.552 |
| | | | | | (0.087) |
| $R^2$ | 0.12 | 0.12 | 0.16 | 0.14 | 0.15 |
| Observations | 720 | 720 | 720 | 720 | 720 |
| | Panel B: Time Spent Monitoring (hours) | | | | |
| Market distance | -8.527 | -7.437 | -5.615 | | |
| | (1.091) | (1.026) | (1.047) | | |
| Above median market distance | | | | -11.419 | |
| | | | | (3.347) | |
| Second tercile of market distance | | | | | -8.985 |
| | | | | | (3.958) |
| Third tercile of market distance | | | | | -19.594 |
| | | | | | (2.201) |
| $R^2$ | 0.39 | 0.46 | 0.54 | 0.52 | 0.53 |
| Observations | 508 | 508 | 508 | 508 | 508 |
| | Panel C: Grazing Rules (indicator) | | | | |
| Market distance | -0.317 | -0.280 | -0.197 | | |
| | (0.029) | (0.031) | (0.051) | | |
| Above median market distance | | | | -0.425 | |
| | | | | (0.139) | |
| Second tercile of market distance | | | | | -0.365 |
| | | | | | (0.127) |
| Third tercile of market distance | | | | | -0.628 |
| | | | | | (0.234) |
| $R^2$ | 0.51 | 0.57 | 0.66 | 0.65 | 0.65 |
| Observations | 511 | 511 | 511 | 511 | 511 |
| Controls | No | No | Yes | Yes | Yes |
| Fixed Effects | No | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market.

## VI.B. Robustness Checks

I carry out a number of robustness checks which include: a) alternative forms of clustering; b) alternative measures of market distance; c) alternative measures of civic values

and rules; d) introduction of additional controls for forest, geography, clans; and d) introduction of additional controls for other distances and urbanization.

*Alternative forms of clustering.–* I show in Table A.5 that the main results are robust to clustering at different levels including different spatial cutoffs.

*Alternative measures of market distance.–* The effect of market distance may not be linear. To alleviate this concern, I consider an indicator variable for above median market distance in column 4 of Table 2. It enters with a large negative and statistically significant coefficient. Similar results are obtained when I consider terciles of market distance in column 5. With respect to the first tercile as the benchmark category, civic values and rules decline in the second and more steeply in the third tercile. Together, these results imply that individuals more exposed to markets hold stronger civic values and rules.

*Alternative measures of civic values and rules.–* Table A.6 shows that the results hold when I consider an indicator for conditional cooperator (column 1) and number of months grazing is forbidden in the group managed forest (column 2). One standard deviation increase in market distance leads to a decline in the share of conditional cooperators by 10 percentage points and grazing ban by 0.74 months.

*Additional control variables.–* In Table 3, I introduce plantation forest and median tree cover in column 1, latitude and longitude in column 2, clan fragmentation in column 3, and fixed effects for seven other clans in column 4. This does not lead to any major changes in the magnitude of the coefficient on market distance, which remains statistically significant at the 1 percent level. The additional clan fixed effects are jointly statistically significant in panels A and C ($p$-value $< 0.05$), but are close to the 10-percent level of significance in panel B ($p$-value $= 0.11$). In contrast, the additional controls are jointly statistically insignificant in all the panels. Notice that the coefficient on latitude is always very small in magnitude and is never statistically significant. These results suggest that market distance is not capturing the effect of forest, geography, and clan specific factors.

*Distance from administration, school, and mosque.–* In Table 4, I control for distance to local administration in column 1, primary school in column 2, and local mosque in column 3. These variables have a jointly statistically significant effect in all the panels. Despite this, the coefficient on market distance retains its magnitude and significance. Market distance could be confounded with population density and trust in government, which may have been shaped by proximity to urbanization or short lived garrisons. Accordingly, I control for these variables in columns 4-5 of Table 4. This does not lead to any major changes in either the magnitude or the significance of the coefficient on market distance. These results suggest that market distance is not capturing the effect of other services offered by urban areas or that of urbanization.

Table 3: Market Distance, Civic Values, and Rules: Robustness Checks

| | Forest condition (1) | Latitude and longitude (2) | Clan fragmentation (3) | Add. Clan FE (4) |
|---|---|---|---|---|
| | Panel A: Conditional Cooperation (Spearman *rho*) | | | |
| Market distance | -0.150 | -0.172 | -0.171 | -0.180 |
| | (0.028) | (0.040) | (0.040) | (0.038) |
| Plantation forest | -0.031 | -0.023 | -0.024 | 0.049 |
| | (0.046) | (0.051) | (0.054) | (0.054) |
| Median tree cover | -0.000 | -0.002 | -0.002 | -0.000 |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| Latitude | | -2.177 | -2.143 | -2.317 |
| | | (2.228) | (2.307) | (2.133) |
| Longitude | | -0.463 | -0.457 | -0.498 |
| | | (1.038) | (1.038) | (1.033) |
| Clan fragmentation | | | -0.010 | 0.004 |
| | | | (0.127) | (0.119) |
| $R^2$ | 0.16 | 0.16 | 0.16 | 0.18 |
| | Panel B: Time Spent Monitoring (hours) | | | |
| Market distance | -5.923 | -5.075 | -5.422 | -5.807 |
| | (1.102) | (1.358) | (1.323) | (1.254) |
| Plantation forest | -3.227 | -2.865 | -1.661 | 0.941 |
| | (1.557) | (1.543) | (1.709) | (2.931) |
| Median tree cover | -0.106 | -0.161 | -0.249 | -0.212 |
| | (0.146) | (0.132) | (0.128) | (0.126) |
| Latitude | | -15.386 | -52.313 | -60.270 |
| | | (61.376) | (60.455) | (58.318) |
| Longitude | | -76.802 | -86.234 | -71.078 |
| | | (33.884) | (32.819) | (34.210) |
| Clan fragmentation | | | 10.182 | 9.573 |
| | | | (4.067) | (4.172) |
| $R^2$ | 0.55 | 0.57 | 0.58 | 0.59 |
| | Panel C: Grazing Rules (indicator) | | | |
| Market distance | -0.205 | -0.180 | -0.181 | -0.167 |
| | (0.044) | (0.048) | (0.048) | (0.052) |
| Plantation forest | -0.118 | -0.120 | -0.114 | -0.181 |
| | (0.065) | (0.071) | (0.076) | (0.090) |
| Median tree cover | -0.008 | -0.007 | -0.008 | -0.009 |
| | (0.006) | (0.006) | (0.006) | (0.006) |
| Latitude | | 1.515 | 1.326 | 2.062 |
| | | (1.952) | (1.946) | (1.718) |
| Longitude | | -0.479 | -0.527 | -0.583 |
| | | (0.941) | (0.931) | (0.825) |
| Clan fragmentation | | | 0.052 | 0.051 |
| | | | (0.158) | (0.161) |
| $R^2$ | 0.68 | 0.68 | 0.68 | 0.70 |
| Controls and FE | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects (FE) are for clan and market. The number of observations is 720 in Panel A, 508 in Panel B, and 511 in Panel C.

Table 4: Market Distance, Civic Values, and Rules: Other Distances

| | Village administration | Primary school | Local mosque | Population density | Trust in government |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| | Panel A: Conditional Cooperation (Spearman) | | | | |
| Market distance | -0.180 | -0.185 | -0.132 | -0.160 | -0.154 |
| | (0.038) | (0.039) | (0.037) | (0.039) | (0.040) |
| Village distance | 0.060 | 0.058 | 0.009 | 0.011 | -0.004 |
| | (0.052) | (0.053) | (0.047) | (0.047) | (0.054) |
| School distance | | 0.047 | -0.011 | -0.006 | -0.037 |
| | | (0.081) | (0.074) | (0.068) | (0.072) |
| Mosque distance | | | -0.311 | -0.299 | -0.290 |
| | | | (0.049) | (0.047) | (0.061) |
| Population density | | | | -0.011 | -0.010 |
| | | | | (0.004) | (0.004) |
| Trust in government | | | | | -0.069 |
| | | | | | (0.043) |
| $R^2$ | 0.16 | 0.16 | 0.20 | 0.21 | 0.19 |
| | Panel B: Monitoring (hours) | | | | |
| Market distance | -8.468 | -9.425 | -9.467 | -8.913 | -8.899 |
| | (1.423) | (1.196) | (1.301) | (1.400) | (1.306) |
| Village distance | 4.955 | 4.701 | 4.738 | 4.708 | 5.256 |
| | (1.442) | (1.439) | (1.530) | (1.515) | (1.444) |
| School distance | | 7.276 | 7.316 | 7.118 | 6.039 |
| | | (3.082) | (3.258) | (3.278) | (3.246) |
| Mosque distance | | | 0.248 | -0.063 | 0.069 |
| | | | (2.563) | (2.563) | (2.476) |
| Population density | | | | 0.211 | 0.223 |
| | | | | (0.153) | (0.140) |
| Trust in government | | | | | 4.614 |
| | | | | | (1.573) |
| $R^2$ | 0.57 | 0.59 | 0.59 | 0.59 | 0.61 |
| | Panel C: Grazing Rules (indicator) | | | | |
| Market distance | -0.135 | -0.190 | -0.174 | -0.140 | -0.137 |
| | (0.058) | (0.044) | (0.049) | (0.050) | (0.050) |
| Village distance | -0.107 | -0.122 | -0.136 | -0.137 | -0.130 |
| | (0.044) | (0.044) | (0.044) | (0.043) | (0.042) |
| School distance | | 0.422 | 0.406 | 0.395 | 0.376 |
| | | (0.114) | (0.116) | (0.110) | (0.105) |
| Mosque distance | | | -0.092 | -0.111 | -0.107 |
| | | | (0.101) | (0.097) | (0.097) |
| Population density | | | | 0.013 | 0.014 |
| | | | | (0.005) | (0.005) |
| Trust in government | | | | | 0.079 |
| | | | | | (0.043) |
| $R^2$ | 0.68 | 0.74 | 0.74 | 0.76 | 0.76 |
| Controls and FE | Yes | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects (FE) are for clan and market. In columns 1-4, the number of observations is 720 in Panel A, 508 in Panel B, and 511 in Panel C. In column 5, the no. of observations are 482 in Panel A, 500 in panel B, and 503 in panel C.

There could an issue of over controlling when introducing simultaneously both additional and distance related controls. Nonetheless, the results hold when I carry out such an exercise in Table A.7.

*Discussion.*– Since Menelik's time, there has been no infrastructural development affecting the opportunity cost of market attendance for individuals in groups located further away from markets. Since there are still no roads in the study area, the exchange structures continue to shape civic values by affecting who trades with whom.

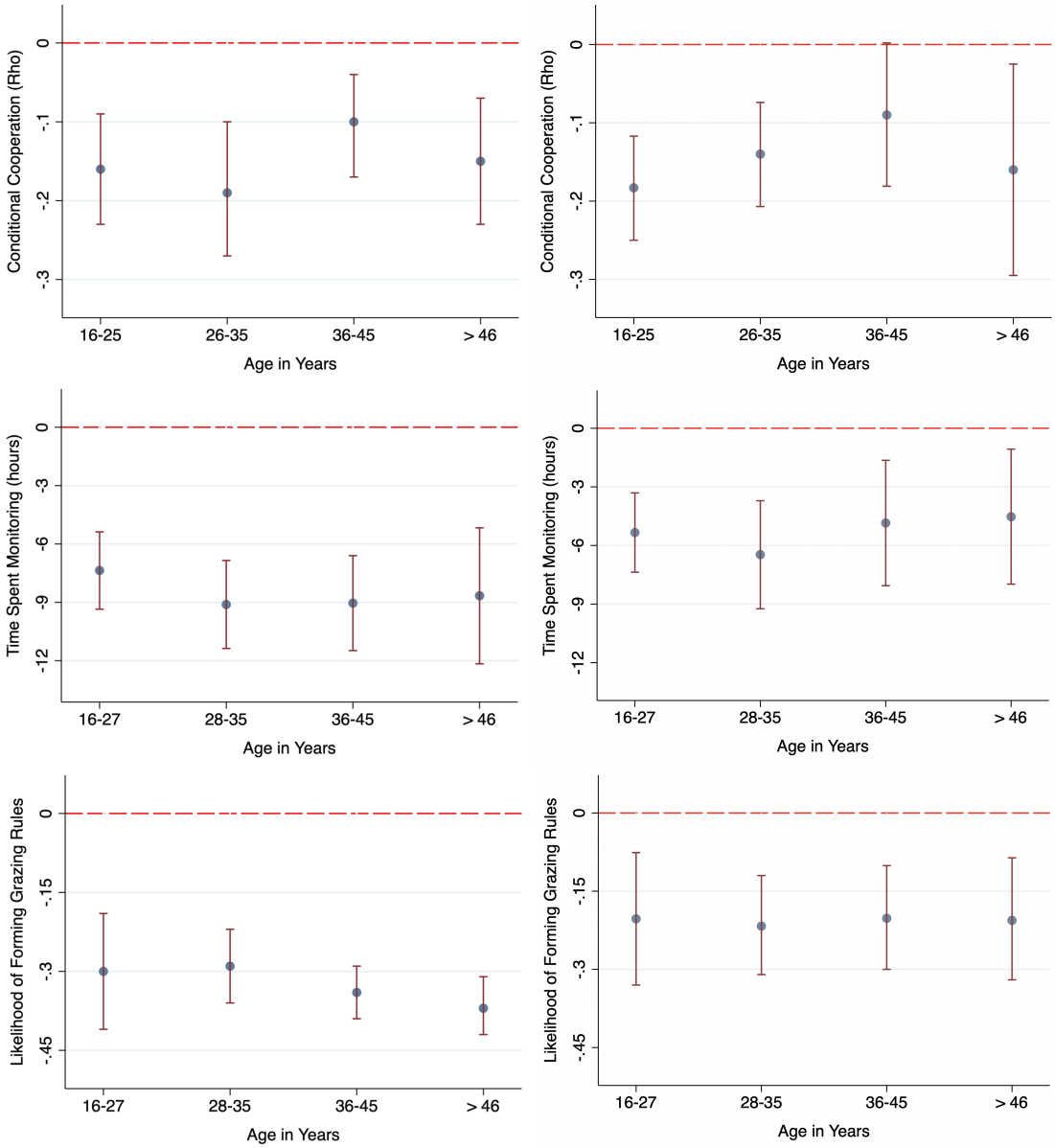



Figure 5: Effect of Market Distance on Civic Values and Rules by Age

*Notes:* The figure plots the coefficient on market distance by quartiles, without controls (left panel) and with the main controls (right panel). The dotted red line indicates zero difference. The capped bars indicate 95 percent confidence bands. The age-groups are slightly different in panels A and B-C because of a larger sample in panel A.

This means, the results reflect the cumulative effect of markets operating directly through exposure today and indirectly through exposure of ancestors in the past, for instance, through cultural transmission (Bisin and Verdier, 2001). If individuals acquire civic values culturally then the effect of market distance should be similar across individuals from different age groups, especially between younger and older individuals who differ in their length of exposure to markets. Figure 5 indeed shows a negative and significant effect of market distance on civic values and rules across individuals from all age groups. The coefficient on market distance is statistically indistinguishable across the different age groups. The results hold even when I introduce control variables or restrict the sample to individuals 60 years old and above (see Table A.8).

# VII. Plausible channels

Why does market exposure foster civic values and rules? I focus on three possible explanations: a) individuals acquire heuristics from their exposure to different kinds of exchange structures; b) prosperity from proximity to markets; and c) exposure to the outside world (contact hypothesis Allport (1954). Finally, I construct a falsification test to show that prosperity and contact hypothesis are unlikely to play a role.

## VII.A. Exchange Structures

Livestock exchange is prone to cooperation problem from market failure (asymmetric information and lack of third party verification). To resolve this problem, groups evolved different kinds of exchange structures depending on market distance: those further away from markets rely on limited morality whereas those closer to markets rely on generalized morality. It is plausible that individuals acquire heuristics from exposure to these exchange structures and apply them in similar situations to avoid cognitive dissonance Festinger (1957). This explains differences in civic values and rules.

I use data from vignette studies, household surveys, and behavioral experiments to provide evidence in support of this channel. The vignette studies were based on local livestock exchange and were used to map out the differences in exchange structures by market distance. I presented members from each group two different scenarios listed below. This was followed by a series of questions covering topics like scope of asymmetric information in livestock exchange, scope of third party enforcement, frequency of market attendance, exchange with outsiders, and enforcement. These questions are listed in Appendix C. The vignettes were very popular among the participants and took up to 2 hours.

**Vignette Studies**

Market Exchange 1: *One day an Oromo man called Ibsaa decided to sell his cows to earn money. He went to a market where he met Barentu, another Oromo man. Barentu wanted to buy Ibsaa's cows. The cows looked healthy from outside, but they were actually sick. No one except for Ibsaa knew that. Ibsaa decided not to tell this to anyone. Barentu bought the cows. Some months later, the cows died. This was a big loss to Barentu.*

Market Exchange 2: *One day an Oromo man called Ibsaa decided to sell his cows to earn money. He went to a market where he met Barentu, another Oromo man. Barentu wanted to buy Ibsaa's cows. Barentu bought the cows. Some months later, the cows died of sickness. This was a big loss to Barentu. Barentu thinks that Ibsaa cheated him by selling him sick cows.*

*Exchange Structures and Demand for Generalized Morality.–* The vignette studies reveal that individuals from groups further away from markets attend markets less often because of high opportunity cost. This is evident from column 1 of Table A.9 which shows that market attendance declines steeply with increase in market distance. Consequently, in groups further away from markets individuals enter into livestock exchange eponymously with other individuals from their social network. This is confirmed by results in column 2, which show that trade with outsiders declines with increase in market distance. Such an exchange pattern makes it easier to acquire information on traders' identity and past transaction history. As a result, reputation within the network makes dishonest behavior costly for traders (Polanyi, 1944; North, 1991). It is likely that from exposure to such an exchange structure, individuals learn to cooperate but parochially, resulting in limited morality (Platteau, 2000). Granovetter (1985) also writes that in these situations, individuals don't have to "rely on either generalized morality or institutional arrangements to guard against trouble".

In contrast, in groups near markets, the lower opportunity cost of attending market makes it possible to trade with outsiders who are not part of the social network (see columns 1-2 of Table A.9). Since market exchange is ephemeral and impersonal (fluctuating population of strangers), enforcing cooperation in such situations calls for a new set of solutions that go beyond in-group trading. One possibility is that the prospect of efficiency gains from trade creates a demand for civic values and rules, in the absence of which trading parties would have to forego gains from cooperation. For instance, Arrow (1970) writes, "Norms of social behavior, including ethical and moral codes [may be].....reactions of society to compensate for market failure." Similarly, Bowles (1998) notes that "when contracts are incompletely specified and costly to enforce, the ex-post terms of exchange may depend on normative commitments of the parties to exchange." Studies based on laboratory experiments provide evidence in support of this hypothesis.

In a seminal study, Kollock (1994) conducted a laboratory experiment in which individuals were randomly assigned to trade in products of certain or uncertain quality without any third party involvement. He found trust in strangers to be higher among those exposed to uncertain product quality. In another laboratory experiment, Fehr, Gächter and Kirchsteiger (1997) used a gift exchange game to show that civic values play an important role in the enforcement of contracts in labor markets with asymmetric information and absence of third party enforcement. It is likely that from exposure to such an exchange structure, individuals learn to extend cooperation in impersonal interactions, resulting in generalized morality (Platteau, 2000). Column 3 of Table A.9 also shows that increase in market distance is negatively associated with the importance of markets in fostering civic values.

Individuals may apply heuristics acquired from exposure to these exchange structures to similar situations. This is particularly the case for the public goods game, which mimics market exchange in being one-shot, anonymous (identity of the other player is not know), and prone to asymmetric information (player type is not known – could be free rider or conditional cooperator). Similarly, since there is no monitoring of monitoring and so on so forth, time spent monitoring is akin to cooperating in an anonymous interaction with the belief that others are doing their part.

Table 5: Exchange Structures, Civic Values, and Market Distance

| | Market attendance | Trade with outsiders | Markets foster civic values |
|---|---|---|---|
| | (1) | (2) | (3) |
| Market distance | -0.271 | -0.325 | -0.341 |
| | (0.040) | (0.050) | (0.041) |
| $R^2$ | 0.22 | 0.66 | 0.78 |
| Controls | Yes | Yes | Yes |
| Fixed Effects | Yes | Yes | Yes |
| Observations | 497 | 52 | 52 |

*Notes:* OLS estimates with robust standard errors clustered on the group in column 1. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market.

*Community Sanctioning.–* Civic values alone are unlikely to sustain market exchange, especially when there are plenty of opportunities to cheat in interactions that are ephemeral and impersonal. In such situations, cooperation is possible when civic values are backed by some kind of punishment-based mechanism (Fehr and Schmidt, 1999; Fehr and Gächter, 2000). Vignette studies reveal that punishment plays an important role in facilitating exchange in livestock markets. Groups rely on punishment based on multilateral reputation which threaten dishonest traders with exclusion from future exchange (see Greif,

2006). Punishment requires information on identity and past transactions of traders, but the impersonal nature of market exchange makes this difficult. The Oromo custom of announcing one's clan while meeting other Oromo people (see Gnamo, 2014) and use of ethnic markers (languages, accents) while meeting non-Oromo people helps in mitigating this hurdle by generating information on trader's clan and ethnic group.[9] This information can play an important role in fostering cooperation through a credible threat in which the entire community of the defector is held responsible and faces punishment by the victim and his clan (see Greif, 2006; Deb, 2020). It is likely that these punishments take the form of graduated sanctioning, starting with a warning, followed by fines, and then expulsion from the group.[10] Greif (2006) writes that "a credible threat of collective, multi-lateral punishment [could have] supported the beliefs that the short-run gain from cheating today was less than the long-run benefit of being honest."

Since monitoring of defectors is imperfect, there could be mistakes in declaring a trader dishonest (see Greif, 2006). To mitigate these shortcomings and also to rule out malicious intentions, the communities intervene only when the scope of moral hazard on the part of the victim is unlikely. For instance, community members expressed reluctance to intervene if a cow died several months after purchase.

*Additional evidence.–* Individuals seem to have internalized civic values because both the behavioral games and monitoring lack explicit punishment. If so, then individuals from groups closer to markets are expected to display stronger trust in others and also cooperate more in impersonal interactions than individuals from groups further away from markets. One way to test this hypothesis is to conduct a field experiment in which individuals are invited to interact in a one-shot market exchange of products with asymmetric information, without third party enforcement. This approach, while appealing, allows researchers to study civic values in the same domain that engendered these values – market exchange. To the extent civic values acquired via market exchange become a generalized reason for behavior through a process called dissonance reduction, a stronger test lies in studying these values using a different domain than markets (Festinger, 1957).

Following Camerer and Fehr (2004), I argue that interaction in a one-shot, anonymous public goods game provides such a domain. Since player type in the game is not known and there is no third party to enforce cooperation, the game mirrors cooperation dilemma of market exchange.[11] Thus far, the evidence from the game suggests that individuals

[9]If the other individual is from the same clan then the individuals kiss on cheek or hand, otherwise not. One may argue that knowing this custom, individuals have an incentive to lie about their clan. However, this is clearly not happening because lying would have made the custom of announcing one's clan redundant.

[10]Ostrom (1990) notes that this kind of graduating sanctioning in prevalent among the users of commons. The Mando Arsi also use this kind of sanctioning mechanism while managing their forest as a common property resource. For example, violations of grazing rules start with a warning, followed by a fine of 2 Birr per cow, followed by a fine of 4 Birr per cow, and then expulsion from the program.

[11]The concern that experiments induce demand effect arises in situations where experiments are used

have indeed internalized these values because they cooperate conditionally even in a one-shot, anonymous interaction without punishment, where defection would have yielded a higher payoff. I now provide additional evidence in support of this result using data from the first decision of the public goods game, where the players decided simultaneously on their contribution to the public good in a one-shot, anonymous interaction. Since the game rules out repeated interaction, reputation formation, and punishment, cooperation in the game can be seen as reflecting internalized trust and values.

Table 6 reports the results. Columns 1-2 show that beliefs about other players' contribution decline with market distance. One standard deviation increase in market distance leads to a decline in beliefs about other players' contribution by about 0.42 Birr (column 2). This is a large effect given the mean belief is 2.67 Birr (s.d. 1.71). Columns 3-4 show that consistent with the decline in beliefs, own contribution to the public good also declines with market distance. According to the estimates in column 4, one standard deviation increase in market distance leads to a decline in contribution by 0.48 Birr. This is also a large effect in relation to the mean contribution of 2.05 Birr (s.d. 1.51). These results confirm that individuals closer to markets display stronger trust (belief) in impersonal interactions and also contribute more for the provision of public goods.

Table 6: Market Distance, Beliefs about Others' Contribution, and Own Contribution

| | Beliefs about others' contribution | | Own contribution | |
|---|---|---|---|---|
| | No Controls | Controls and fixed effects | No Controls | Controls and fixed effects |
| | (1) | (2) | (3) | (4) |
| Market distance | -0.419 | -0.377 | -0.451 | -0.429 |
| | (0.074) | (0.096) | (0.100) | (0.107) |
| $R^2$ | 0.07 | 0.11 | 0.10 | 0.18 |
| Controls | No | Yes | No | Yes |
| Fixed Effects | No | Yes | No | Yes |
| Observations | 704 | 704 | 704 | 704 |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market. Beliefs and own contribution are from the first decision of the public goods game. This data is missing for 16 observations from one group, so the number of observations is 704.

to assign treatments and participants are aware of this. There is no treatment manipulation in the public goods game I used in this paper. All participants confronted the same decision situation regardless of their distance from market.

## VII.B. Prosperity and Outside Exposure

*Prosperity.*– Another possibility is that market exposure makes individuals prosperous and this causes them to have higher civic values and form rules. To test the scope of this channel, I start by investigating if there is a positive effect of market distance on proxies of prosperity. Measuring prosperity in resource poor environments is difficult. Following studies in similar environments from sub-Saharan Africa (see Lowes et al., 2017) and in anthropology (Ensminger and Knight, 1997), I consider three different proxies[12]:

- Self-reported financial rating: poor, middle class, rich. Though self-reported, financial rating serves as a good proxy for prosperity, as richer individuals own more land, cattle, horses, donkeys, goats, and sheep.
- Livestock units with weights based on their market price: horse (1), cattle (0.8), donkey (0.7), sheep (0.2), goat (0.2)
- Land holding

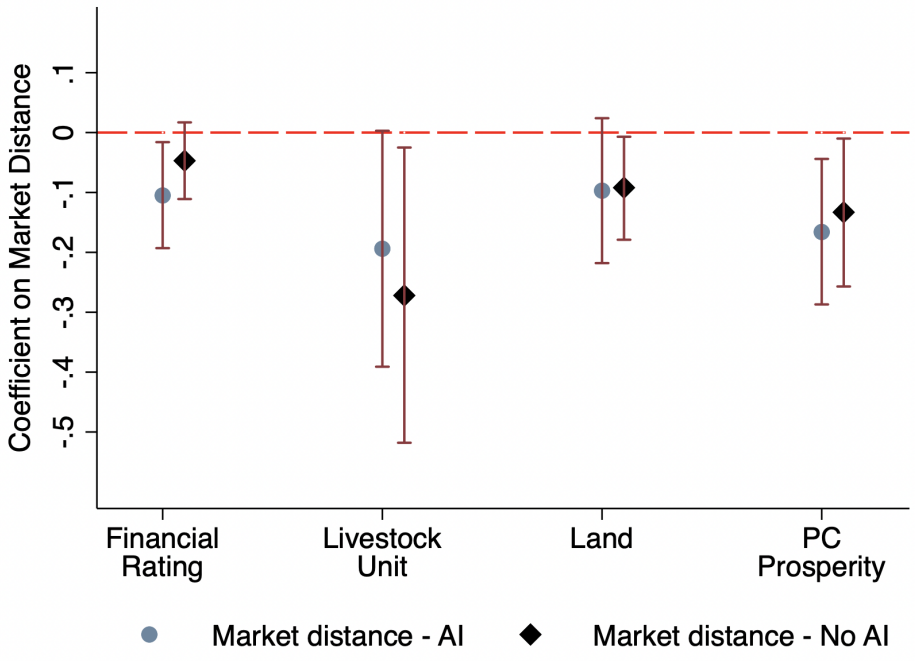



Figure 6: Market Distance and Prosperity

*Notes:* The figure plots the coefficient on market distance after including controls and fixed effects. The dotted red line indicates zero difference. The capped bars indicate 95 percent confidence bands.

Fig 6 presents results from a regression of each of these proxies on market distance as well as their principal component with a full set of control variables. As expected,

[12]I do not consider housing quality as all households live in dwellings with mud floor and thatched roofs.

market distance has a negative and statistically significant effect. Individuals further away from markets rate themselves as poorer, have fewer livestock units, and also smaller land holdings. Moreover, one standard deviation increase in market distance is associated with lower principal component of prosperity by nearly 20 percentage points. Given these results, I investigate if the effect of market distance on civic values and rules diminishes once I introduce the different proxies of prosperity as additional controls, acknowledging that Table A.10 reports the results. Column 1 includes financial rating, column 2 livestock units, column 3 land holding, and column 4 their principal component. The coefficient on market distance retains its magnitude and significance in all the three panels. These results suggest that prosperity does not seem to be the channel underlying the effect of market distance on civic values and rules.

*Outside Exposure.–* Markets could have also affected civic values and rules by exposing individuals to outsiders. As individuals get to learn more about outsiders, they update their beliefs, and eventually cooperate with them. However, studying the scope of outside exposure is very difficult. Following (Algan et al., 2022) I use naming patterns of individuals as a proxy for the extent of outside exposure. The assumption being if market distance does not affect naming patterns then the scope of outside exposure in shaping civic values and rules may be limited. In the study area, individuals can take either Oromo (Cushitic) or Arabic (Semitic) names.[13] I test if the proportion of individuals with Arabic names differs by market distance. Using a unique database on the name of each household (available for 27 groups), I show that there is no difference in the frequency of Arabic names by market distance. Table A.11 shows that the coefficient on market distance is very small and is also statistically insignificant (coef. 0.015, s.e. 0.002).[14] These results suggest that market distance is unlikely to affect civic values and rules through exposing individuals to outsiders.

## VII.C. Falsification Test

The above results are appealing, but given the challenges in measuring prosperity and contact to the outside world, a superior approach to separating the different channels is warranted. I ask: what would happen to civic values and rules if I take distance to markets that are not prone to asymmetric information but are otherwise similar.

Manipulating market characteristics exogenously in the field is difficult, so I use distance from two additional periodic markets. These markets do not trade in livestock but in polyester textiles and aluminium utensils, both of which are of verifiable quality. As such, the sellers do not manufacture these items and even if they did it will be difficult to replace polyester and aluminium with cheaper materials. These markets are therefore not

[13]Individuals rarely give their children Amharic or Tigray sounding names.

[14]I replicate the main results using this sub-sample.

prone to asymmetric information. To account for unobserved differences across markets without and with asymmetric information, I control for market fixed effects.[15] Before I proceed, I verify that these markets are as well attended as livestock markets and also have similar effects on prosperity. Fig 6 clearly shows that there is no difference in prosperity by distance from the different kinds of markets.

Table 7 reports the results. Column 1 is without any controls and includes only distance to markets without asymmetric information (No AI).

Table 7: Market Distance, Civic Values, and Rules:
Other Market Distance

| | No controls | Market distance | Controls and FE | Other distances |
|---|---|---|---|---|
| | (1) | (2) | (3) | 4 |
| | Panel A: Conditional Cooperation (Spearman *rho*) | | | |
| Market distance - No AI | 0.020 | 0.012 | 0.064 | 0.054 |
| | (0.031) | (0.031) | (0.037) | (0.033) |
| Market distance- with AI | | −0.164 | −0.176 | −0.163 |
| | | (0.023) | (0.028) | (0.041) |
| $R^2$ | 0.00 | 0.12 | 0.17 | 0.20 |
| | Panel B: Monitoring (hours) | | | |
| Market distance - No AI | 1.584 | 2.581 | 2.195 | 2.517 |
| | (1.240) | (0.962) | (1.217) | (1.036) |
| Market distance- with AI | | −8.831 | −6.665 | −11.097 |
| | | (1.105) | (1.008) | (1.274) |
| $R^2$ | 0.01 | 0.42 | 0.57 | 0.61 |
| | Panel C: Grazing Rules (indicator) | | | |
| Market distance - No AI | 0.009 | 0.046 | 0.044 | 0.001 |
| | (0.059) | (0.037) | (0.028) | (0.025) |
| Market distance- with AI | | −0.323 | −0.214 | −0.203 |
| | | (0.028) | (0.048) | (0.058) |
| $R^2$ | 0.00 | 0.53 | 0.67 | 0.75 |
| Controls | No | No | Yes | Yes |
| Other market FE | No | No | Yes | Yes |
| Clan FE | No | No | Yes | Yes |
| Market FE | No | No | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Market distance - No AI is the distance to markets that do not trade in livestock but in products of verifiable quality and hence are not prone to asymmetric information. Market distance - with AI is the distance to markets that trade in livestock and are therefore prone to asymmetric information. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Other market FE includes fixed effects for non-livestock markets, clan FE includes fixed effects for clans, and market FE includes fixed effects for livestock markets prone to asymmetric information. The number of observations is 720 in Panel A, 508 in Panel B, and 511 in Panel C.

[15]It is highly unlikely that the location of these markets was chosen by individuals. The groups are very small to wield any influence on the location of markets. Endogenous placement is possible only if groups coordinate with neighboring groups on providing a public good like market. In this case, distance from such markets should also have a negative coefficient. However, as the results below show, the coefficient turns out to be positive.

It enters with a positive sign, but is close to zero in magnitude and is never statistically significant in any of the three panels. When I additionally introduce distance to markets with asymmetric information (with AI) in column 2, the coefficient on market distance – No AI remains positive and statistically insignificant. In contrast, the coefficient on market distance – with AI enters with a negative sign and is statistically significant at the 1-percent level. When I introduce control variables and fixed effects in column 3, the coefficient on market distance – No AI rises in magnitude and is now marginally statistically significant in panel A and B. However, these gains mostly disappear when I include distance to village administration, school, and mosque in column 4. This is in contrast to the coefficient on market distance – with AI, which remains negative and statistically significant throughout. These results allow me to rule out the effect of prosperity and contact to the outside world as plausible channels and show that only markets with asymmetric information foster civic values and rules. These results make sense because if product quality is verifiable then there is no need for civic values (Bowles, 1998).

# VIII. Conclusions

I study a long standing question in economics on whether market exposure fosters or erodes civic values and rules. Major challenges in conducting this study lies in unbundling market characteristics to identify mechanisms and in establishing causality. I resolve these challenges using the context of livestock markets in rural Ethiopia that are prone to market failure from asymmetric information and absence of third party verification. I exploit a natural experiment on the emergence and location of markets, which mitigates concerns over pre-existing differences and sorting, and allows me to hold clan and market specific differences fixed.

Using market distance as a proxy for market exposure, I show a strong negative effect of market distance on experimental and survey measures of civic values and rules. The further the individuals are from markets, the lower is their propensity to cooperate conditionally in a public goods game, spend time monitoring their forest, and form rules regulating grazing inside their forest. These results are robust to controlling for a variety of geographical, economic, forest, and clan specific variables, as well as distance from local administration, schools, and religious places, population density, and trust in government.

The results arise because livestock exchange is prone to asymmetric information and lack of third party verification from weak state capacity - a characteristic that is common across markets in sub-Saharan Africa and other developing economies. These features lock buyers and sellers in a cooperation problem. To mitigate this problem, groups developed different kinds of exchange structures depending on their distance from markets. In groups further away from markets, individuals trade in livestock eponymously within their social network, whereby reputation sustains cooperation. However, in groups located closer to

markets, individuals have the option to trade with strangers in impersonal interactions. In these situations, the efficiency of exchange creates demands for civic values and rules which make it possible for individuals to extend cooperation to outsiders. I show that individuals from groups located close to markets have internalized these values such that they display higher trust and cooperation even when repeated interaction, reputation, and punishment are absent. A placebo test shows that distance from markets that are not prone to asymmetric information has no effect on civic values and rules.

These results fill an important gap in the literature and highlight the importance of asymmetric information and market distance in the economic organization of societies which ultimately shapes cultural values. Future studies can use randomized control trials to experimentally vary the opportunistic cost of market attendance through infrastructure development and then test how this affects civic values and rules. The findings could be useful in studying if infrastructure projects contribute to growth and development (see Donaldson, 2018) through shaping of civic values and rules.

# References


**Acemoglu, Daron, and James A Robinson.** 2019. *The narrow corridor: How nations struggle for liberty.* Penguin UK.

**Agneman, Gustav, and Esther Chevrot-Bianco.** 2022. "Market Participation and Moral Decision-Making: Experimental Evidence from Greenland." *The Economic Journal.*

**Akalou, Wolde Michael.** 1973. "Urban development in Ethiopia 1889–1935: Early phase." *Journal of Ethiopian Studies*, 11(1): 1–16.

**Akerlof, George A.** 1970. "The Market for Lemons: Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics*, 84(3): 488–500.

**Algan, Yann, Clément Malgouyres, Thierry Mayer, and Mathias Thoenig.** 2022. "The economic incentives of cultural transmission: Spatial evidence from naming patterns across france." *The Economic Journal*, 132(642): 437–470.

**Allport, Gordon Willard.** 1954. *The Nature of Prejudice.* Reading: Addison-Wesley.

**Amente, Girma.** 2006. "Rehabilitation and sustainable use of degraded community forests in the Bale Mountains of Ethiopia." PhD diss. Freiburg (Breisgau), Univ., Diss., 2005.

**Arrow, Kenneth.** 1970. "Political and economic evaluation of social effects and externalities." In *The Analysis of Public Output.* 1–30. NBER.

**Bartling, Björn, Ernst Fehr, and Yagiz Özdemir.** 2020. "Does market interaction erode moral values?" *The Review of Economics and Statistics*, 1–32.

**Bisin, Alberto, and Thierry Verdier.** 2001. "The economics of cultural transmission and the dynamics of preferences." *Journal of Economic theory*, 97(2): 298–319.

**Bisin, Alberto, and Thierry Verdier.** 2017. "On the joint evolution of culture and institutions." National Bureau of Economic Research.

**Bowles, Samuel.** 1998. "Endogenous preferences: The cultural consequences of markets and other economic institutions." *Journal of Economic Literature*, 36(1): 75–111.

**Camerer, Colin F, and Ernst Fehr.** 2004. "Measuring social norms and preferences using experimental games: A guide for social scientists." *Foundations of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies*, 97: 55–95.

**Deb, Joyee.** 2020. "Cooperation and Community responsibility." *Journal of Political Economy*, 128(5): 1976–2009.

**Dixit, Avinash.** 2009. "Governance institutions and economic activity." *American economic review*, 99(1): 5–24.

**Donaldson, Dave.** 2018. "Railroads of the Raj: Estimating the impact of transportation infrastructure." *American Economic Review*, 108(4-5): 899–934.

**Enke, Benjamin.** 2022. "Market exposure and human morality." *Nature Human Behaviour*, 1–8.

**Enke, Benjamin.** 2023. "Moral Boundaries."

**Ensminger, Jean, and Jack Knight.** 1997. "Changing social norms: Common property, bridewealth, and clan exogamy." *Current anthropology*, 38(1): 1–24.

**Fafchamps, Marcel.** 2003. *Market Institutions in Sub-Saharan Africa.* Cambridge, MA: MIT Press.

**Falk, Armin, and Nora Szech.** 2013. "Morals and markets." *science*, 340(6133): 707–711.

**Fehr, Ernst, and Klaus M Schmidt.** 1999. "A theory of fairness, competition, and cooperation." *The Quarterly Journal of Economics*, 114(3): 817–868.

**Fehr, Ernst, and Simon Gächter.** 2000. "Cooperation and punishment in public goods experiments." *American Economic Review*, 90(4): 980–994.

**Fehr, Ernst, Simon Gächter, and Georg Kirchsteiger.** 1997. "Reciprocity as a contract enforcement device: Experimental evidence." *Econometrica*, 65(4): 833–860.

**Festinger, Leon.** 1957. *A Theory of Cognitive Dissonance.* Stanford: Stanford University Press.

**Fischbacher, Urs, and Simon Gächter.** 2010. "Social preferences, beliefs, and the dynamics of free riding in public goods experiments." *American Economic Review*, 100(1): 541–56.

**Fischbacher, Urs, Simon Gächter, and Ernst Fehr.** 2001. "Are people conditionally cooperative? Evidence from a public goods experiment." *Economics Letters*, 71(3): 397–404.

**Frey, Bruno S, and Stephan Meier.** 2004. "Social comparisons and pro-social behavior: Testing" conditional cooperation" in a field experiment." *American Economic Review*, 94(5): 1717–1722.

**Gennaioli, Nicola, and Ilia Rainer.** 2007. "The modern impact of precolonial centralization in Africa." *Journal of Economic Growth*, 12(3): 185–234.

**Gnamo, Abbas.** 1982. "The History of the Arssi 1880-1935." *Addis Ababa University Thesis.*

**Gnamo, Abbas.** 2014. *Conquest and Resistance in the Ethiopian Empire, 1880-1974: the Case of the Arsi Oromo.* Brill.

**Granovetter, M.** 1985. "Economic action and social structure: the problem of embeddedness." *American Journal of Sociology*, 91: 481–510.

**Greif, Avner.** 2006. *Institutions and the path to the modern economy: Lessons from medieval trade.* Cambridge University Press.

**Guiso, Luigi, Paola Sapienza, and Luigi Zingales.** 2011. "Civic Capital as the Missing Link." *Handbook of Social Economics*, 1: 417–480.

**Guiso, Luigi, Paola Sapienza, and Luigi Zingales.** 2016. "Long-term persistence." *Journal of the European Economic Association*, 14(6): 1401–1436.

**Hansen, Matthew C, Peter V Potapov, Rebecca Moore, Matt Hancher, Svetlana A Turubanova, Alexandra Tyukavina, David Thau, Stephen V Stehman, Scott J Goetz, Thomas R Loveland, et al.** 2013. "High-resolution global maps of 21st-century forest cover change." *science*, 342(6160): 850–853.

**Hassen, Mohammed.** 1994. *The Oromo of Ethiopia: A History, 1570–1860.* NJ: Red Sea Press.

**Henrich, Joseph, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, Natalie Henrich, et al.** 2010. "Markets, religion, community size, and the evolution of fairness and punishment." *Science*, 327(5972): 1480–1484.

**Henrich, Joseph, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, and Richard McElreath.** 2001. "In search of homo economicus: behavioral experiments in 15 small-scale societies." *American Economic Review*, 91(2): 73–78.

**Hirschman, Albert O.** 1982. "Rival Interpretations of Market Society: Civilizing, Destructive, or Feeble?" *Journal of Economic Literature*, 20(4): 1463–1484.

**Hodson, Arnold Wienholt.** 1927. *Seven Years in Southern Abyssinia.* London: Fisher Unwin Ltd.

**Horvath, Ronald J.** 1968. "Towns in Ethiopia (Städtische Siedlungen in Äthiopien)." *Erdkunde*, 42–51.

**Italiana, Consociazione Turistica, et al.** 1938. *Africa Orientale Italiana.* Consociazione Turística Italiana.

**Jha, Saumitra.** 2013. "Trade, institutions, and ethnic tolerance: Evidence from South Asia." *American Political Science Review*, 107(4): 806–832.

**Kollock, Peter.** 1994. "The emergence of exchange structures: An experimental study of uncertainty, commitment, and trust." *American Journal of Sociology*, 100(2): 313–345.

**Kosfeld, Michael, and Devesh Rustagi.** 2015. "Leader punishment and cooperation in groups: Experimental field evidence from commons management in Ethiopia." *American Economic Review*, 105(2): 747–83.

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

**Marx, Karl.** 1872. *Das Kapital.* Wien-Berlin: Verlag fur Literatur und Politik.

**Michalopoulos, Stelios, and Elias Papaioannou.** 2014. "National institutions and subnational development in Africa." *The Quarterly Journal of Economics*, 129(1): 151–213.

**Montesquieu, Charles.** 1748. *De l'esprit des lois.* Paris: Ganier Frères, reprint 1961.

**Murdock, George Peter.** 1967. "Ethnographic atlas: a summary." *Ethnology*, 6(2): 109–236.

**North, Douglass C.** 1991. "Institutions." *Journal of Economic Perspectives*, 5(1): 97–112.

**Nunn, Nathan, and Leonard Wantchekon.** 2011. "The slave trade and the origins of mistrust in Africa." *American Economic Review*, 101(7): 3221–52.

**Ostrom, Elinor.** 1990. *Governing the commons: The evolution of institutions for collective action.* Cambridge university press.

**Pankhurst, R.** 1998. *The Ethiopians: A History.* Oxford: Blackwell.

**Perham, Margery Freda.** 1948. *The Government of Ethiopia.* Oxford: Oxford University Press.

**Platteau, Jean-Philippe.** 2000. *Institutions, social norms and economic development.* Routledge.

**Polanyi, Karl.** 1944. *The Great Transformation.* Boston: Beacon.

**Rustagi, Devesh.** 2022*a*. "Historical self-governance and norms of cooperation." *CEDEX working paper.*

**Rustagi, Devesh.** 2022*b*. "The interdependence of rules and civic capital in commons management." *CEDEX working paper.*

**Rustagi, Devesh, Stefanie Engel, and Michael Kosfeld.** 2010. "Conditional cooperation and costly monitoring explain success in forest commons management." *Science*, 330(6006): 961–965.

**Shell, Sandra Rowoldt.** 2018. *Children of Hope: The Odyssey of the Oromo Slaves from Ethiopia to South Africa.* Ohio University Press.

**Smith, Adam.** 1763. *Lectures on Jurisprudence.* Oxford: Oxford University Press, reprint 1978.

**Tabellini, Guido.** 2010. "Culture and institutions: economic development in the regions of Europe." *Journal of the European Economic association*, 8(4): 677–716.

**Veblen, Thorsten.** 1899. *Theory of the Leisure Class.* New York: The Macmillan Company.

**Zewde, Bahru.** 2002. *A History of Modern Ethiopia, 1855–1991.* Ohio University Press.

ONLINE APPENDIX

# Market Exposure, Civic Values, and Rules

Devesh Rustagi

# Appendix A

## I. Data

Figures A.1 - A.3 test the representativeness of the experimental and survey samples. They show that the frequency of clans observed in the different samples is the same as the frequency of clans in the population.

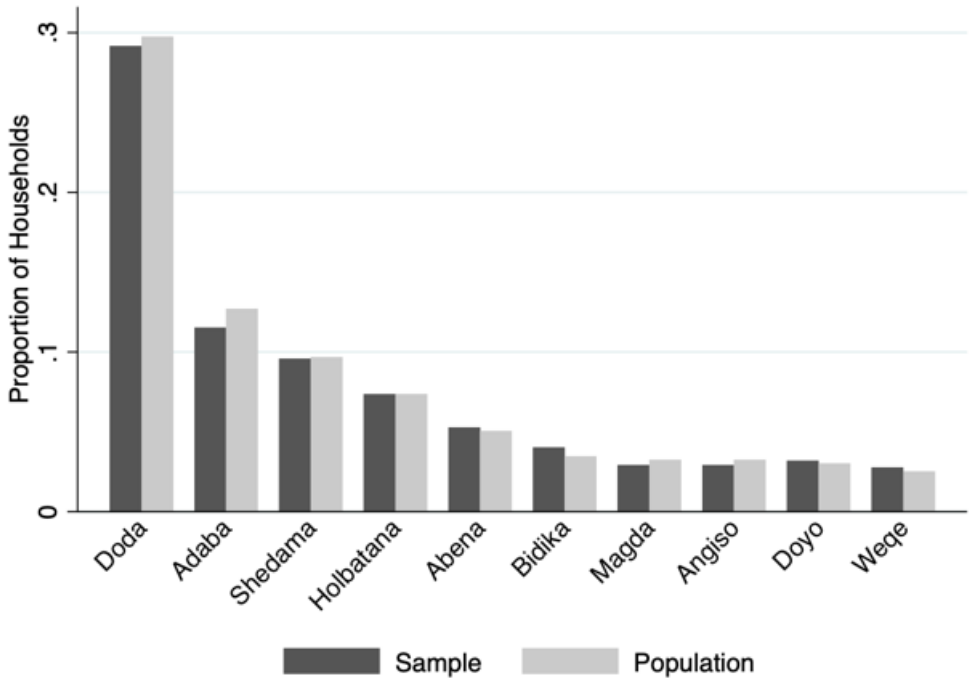



Figure A.1: Proportion of Households from Main Clans in the Experimental Sample and the Population

*Notes:* The bar graph shows the proportion of households from ten main clans in the experimental sample used to measure conditional cooperation and the population of interest.

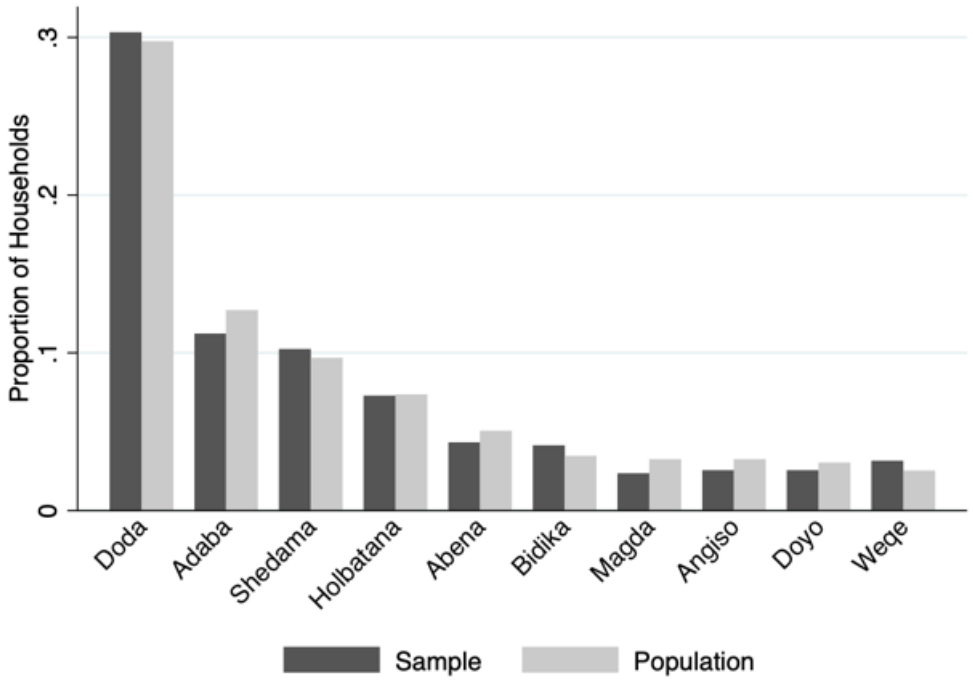



Figure A.2: Proportion of Households from Main Clans in the Monitoring Survey Sample and the Population

*Notes:* The bar graph shows the proportion of households from ten main clans in the sample used to measure monitoring and the population of interest.

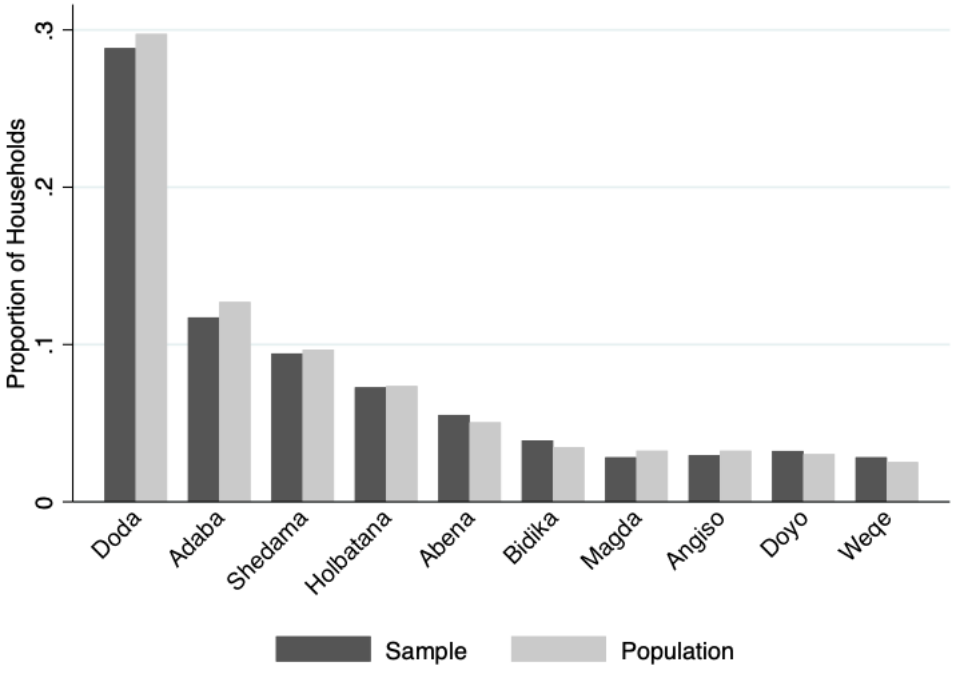



Figure A.3: Proportion of Households from Main Clans in the Grazing Rules Survey Sample and the Population

*Notes:* The bar graph shows the proportion of households from ten main clans in the sample used to measure grazing rules and the population of interest.

## II. Summary Statistics

Table A.1 reports summary statistics of main control variables. Table A.2 reports summary statistics of control variables used for testing the robustness of the main results and also for testing the channels through which markets affect civic values and rules.

Table A.1: Summary Statistics

| | Measurement unit | Obs. | Mean | Standard deviation |
|---|---|---|---|---|
| | A: Civic Values | | | |
| *Main dependent variables* | | | | |
| Conditional cooperation (Spearman *rho*) | individual | 720 | 0.499 | 0.518 |
| Monitoring (hours per month) | individual | 508 | 27.804 | 15.480 |
| Grazing Rules (indicator) | individual | 511 | 0.446 | 0.498 |
| *Alternative dependent variables* | | | | |
| Conditional cooperator (indicator) | individual | 720 | 0.468 | 0.499 |
| Grazing ban (months in a year) | individual | 509 | 1.472 | 1.761 |
| | B: Market Distance | | | |
| Market distance (hours) | group | 52 | 2.851 | 1.111 |
| | C: Main Covariates and Fixed Effects | | | |
| Altitude | group | 52 | 0.231 | 0.425 |
| Group size | group | 52 | 26.308 | 4.625 |
| Group fragmentation | group | 52 | 0.489 | 0.246 |
| Female share | group | 52 | 0.202 | 0.113 |
| Gini of Cattle ownership | group | 52 | 0.334 | 0.083 |
| Gini of Land ownership | group | 52 | 0.298 | 0.077 |
| Program duration (months) | group | 52 | 23.000 | 19.623 |
| Education (years) | individual | 720 | 3.369 | 3.063 |
| Doda | individual | 720 | 0.292 | 0.455 |
| Shedama | individual | 720 | 0.100 | 0.295 |
| Adaba | individual | 720 | 0.120 | 0.320 |

*Notes: Main dependent variables*: Conditional cooperation is the Spearman *rho* between own and other players' contribution in the conditional decision of the public goods game. Monitoring is time spent in hours per month by individuals while managing their forest commons. Grazing rules is an indicator which equals 1 if a group has grazing rules, otherwise 0. *Alternative dependent variables*: conditional cooperator is an indicator for an individual who behaves as a conditional cooperator in the conditional decision of the public goods game, otherwise 0. Grazing ban is the number of months grazing is forbidden in the group managed forest. *Market distance* is one-way walking distance to market (hours on foot). *Main Covariates*: Altitude is an indicator for groups above 3100 meters, as it is beyond this altitude that forest type changes from a mix of broadleaf and coniferous to Erica heather. Group size is the number of households in a group. Group fragmentation is a Herfindahl index – the probability that two persons selected randomly from a group will not be from the same hamlet. Female share is the share of female household heads in a group. Gini of cattle and land are the Gini indices. Program duration is the number of months a group has been under the commons management program. Education is years of schooling. Doda, Shedama, and Adaba are indicators variables for three most widespread clans in the study area. Measurement unit indicates the level at which the data were collected.

Table A.2: Summary Statistics: Additional Control Variables

| | Measurement unit | Obs. | Mean | Standard deviation |
|---|---|---|---|---|
| *Forest* | | | | |
| Plantation forest | group | 52 | 0.085 | 0.353 |
| Median tree cover in 2000 (%) | group | 52 | 39.701 | 9.788 |
| *Geography* | | | | |
| Latitude | group | 52 | 6.896 | 0.033 |
| Longitude | group | 52 | 39.299 | 0.083 |
| *Other* | | | | |
| Clan fragmentation | group | 52 | .405 | .240 |
| Population density | group | 52 | 13.988 | 8.738 |
| Trust in Government | individual | 503 | .406 | .491 |
| *Distances* | | | | |
| Village distance | group | 52 | 1.644 | 1.094 |
| School distance | group | 52 | 0.827 | 0.384 |
| Mosque distance | group | 52 | 0.709 | 0.456 |
| *Prosperity* | | | | |
| Financial rating | individual | 672 | 2.036 | 0.740 |
| Livestock units | individual | 697 | 14.135 | 10.535 |
| Land ownership | individual | 600 | 0.334 | 0.083 |
| Family size | individual | 671 | 8.548 | 4.176 |
| Polygamy prevalence | group | 52 | 0.452 | 0.191 |
| Bride Price | group | 52 | 1.031 | 0.359 |
| *Occupation structure* | | | | |
| Cow | individual | 720 | 11.208 | 10.191 |
| Horse | individual | 708 | 2.576 | 2.037 |
| Donkey | individual | 697 | 0.700 | 1.013 |
| Goat | individual | 705 | 2.526 | 4.942 |
| Sheep | individual | 705 | 7.091 | 7.616 |
| Forest dependence | individual | 508 | 46.397 | 17.481 |
| *Outside exposure* | | | | |
| Marriage ratio | group | 52 | 0.872 | 0.075 |
| Clan endogamy | group | 52 | 0.173 | 0.382 |
| Clan preference | group | 52 | 0.423 | 0.499 |

*Notes: Forest*: plantation forest is the ratio of area under plantation forest to area under natural forest. Median tree cover is the forest cover in in percentage in a group in 2000 from (Hansen et al., 2013). *Geography*: Latitude and longitude are measured in degrees. *Other*: clan fragmentation is a Herfindahl index – the probability that two persons selected randomly from a group will not be from the same clan. Population density is number of persons per $km^2$. Trust in government is a binary variable, where 1 implies the government is cooperative and 0 otherwise. It was collected using a household survey in which individuals were asked to rate the district government on a 5 point scale: very cooperative, cooperative, neutral, dominating, very dominating. Most respondents chose either cooperative or dominating. *Distances*: Administrative, school and mosque distance are local distances measured in hours. *Prosperity*: financial rating is the self-reporting rating by an individual as poor (1), middle class (2), or rich (3). Livestock unit is the total livestock weighted as 1 for horse, 0.8 for cow, 0.7 for donkey, and 0.1 each for goat and sheep. Land ownership is measured as land area held by an individual. Family size is the number of individuals in a family. Polygamy prevalence is the proportion of men with more than one wife. Bride price is the average price paid to the bride's family at the time of marriage/10000. *Occupation structure*: Cow, Horse, donkey, goat and sheep are the number of animals in the respective categories. Forest dependence is the self-reported share of income from forest. *Outside exposure*: Marriage ratio is the ratio of age at which women marry relative to men is a group. Clan endogamy is an indicator that equals 1 if a group practices clan endogamy in marriage. Clan preference is an indicator for groups that prefer certain clans in marriage. Measurement unit indicates the level at which the data were collected.

## III. Empirical Strategy

Table A.3 reports balance check by market distance.

Table A.3: Balance Check

| | Coefficient on Market Distance |
|---|---|
| *Geographical variables* | |
| Altitude | -0.088 |
| | (0.069) |
| Latitude | -0.010 |
| | (0.002) |
| Longitude | 0.011 |
| | (0.009) |
| *Forest condition* | |
| Plantation forest | -0.090 |
| | (0.079) |
| Median tree cover | -2.644 |
| | (2.235) |
| *Social and Economic heterogeneity* | |
| Group size | 0.378 |
| | (1.146) |
| Group fragmentation | 0.045 |
| | (0.053) |
| Female share | -0.002 |
| | (0.030) |
| Gini of Cattle ownership | 0.011 |
| | (0.022) |
| Gini of Land ownership | -0.003 |
| | (0.017) |
| Education | -0.019 |
| | (0.042) |
| Program duration | 0.079 |
| | (1.557) |
| Clan fragmentation | 0.051 |
| | (0.045) |
| Population density | -0.437 |
| | (1.038) |
| Trust in government | -0.081 |
| | (0.053) |

*Notes:* OLS estimates with robust standard errors in parentheses. The estimates are obtained from a regression of each covariate on market distance after controlling for the other remaining covariates, clan and market fixed effects. The regressions are run at the group level. The number of observations is 52. The definition of these variables is in Tables A1-A2.

## IV. Main Results

Table A.4 shows the coefficients on control variables. Table A.5 shows the coefficient on market distance is robust to using different kinds of clustering of standard errors. Table A.6 shows the results are robust to using alternative dependent variables. Table A.7 shows the coefficient on market distance is robust to simultaneously controlling for both additional controls and those related to distance and urbanization. Table A.8 shows the effect of market distance is similar by different age-groups.

Table A.4: Market Distance, Civic Values, and Bylaws: Coefficients on Control Variables

| | Dependent variable: | | |
|---|---|---|---|
| | Conditional cooperation | Monitoring | Grazing rules |
| | (1) | (2) | (3) |
| Market distance | -0.146 | -5.615 | -0.197 |
| | (0.027) | (1.047) | (0.051) |
| Altitude | -0.108 | -5.017 | -0.076 |
| | (0.083) | (2.656) | (0.140) |
| Group size | -0.005 | -0.558 | 0.001 |
| | (0.005) | (0.218) | (0.007) |
| Group fragmentation | 0.246 | 5.398 | -0.010 |
| | (0.105) | (3.692) | (0.121) |
| Female share | -0.091 | 8.932 | -0.151 |
| | (0.246) | (10.214) | (0.243) |
| Gini of cattle ownership | 0.548 | 0.119 | -0.971 |
| | (0.355) | (10.732) | (0.502) |
| Gini of land ownership | 0.276 | 7.064 | 0.677 |
| | (0.370) | (13.448) | (0.397) |
| Education | -0.005 | 0.330 | 0.005 |
| | (0.007) | (0.167) | (0.004) |
| Program duration | 0.000 | 0.247 | 0.014 |
| | (0.004) | (0.082) | (0.004) |
| $R^2$ | 0.16 | 0.54 | 0.66 |
| Market fixed effects | Yes | Yes | Yes |
| Clan fixed effects | Yes | Yes | Yes |
| Observations | 720 | 508 | 511 |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses.

Table A.5: Market Distance, Civic Values, and Rules: Clustering standard errors on markets, village, clans, and space

| | Clustering on markets | Clustering on village | Clustering on clans | Clustering on space |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Panel A: Conditional Cooperation | | | |
| Market distance | -0.146 | -0.146 | -0.146 | -0.146 |
| | (0.036) | (0.041) | (0.032) | (0.034) |
| | Panel B: Monitoring | | | |
| Market distance | -5.615 | -5.615 | -5.593 | -5.615 |
| | (2.072) | (2.172) | (1.154) | (1.488) |
| | Panel C: Grazing Rules | | | |
| Market distance | -0.197 | -0.197 | -0.196 | -0.197 |
| | (0.032) | (0.043) | (0.042) | (0.049) |
| Controls | Yes | Yes | Yes | Yes |
| Fixed effects | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors in parentheses clustered on the group and market in column 1, the group and village in column 2, the group and clans in column 3, and on space using a cut-off of 2 km in panel A and 4 km in panels B-C of column 4. The results hold when other cutoffs are chosen. Control variables include altitude, population density, livestock ownership, land holding, share of female members, group fragmentation, education, and program duration. Fixed effects are for clan and market.

Table A.6: Market Distance, Civic Values, and Rules: Alternative Dependent Variables

| | Share of conditional cooperators | Grazing ban (months) |
|---|---|---|
| | (1) | (2) |
| Market distance | −0.093 | −0.667 |
| | (0.031) | (0.158) |
| $R^2$ | 0.10 | 0.65 |
| Mean | 0.108 | 1.472 |
| Controls | Yes | Yes |
| Fixed effects | Yes | Yes |
| Obs. | 720 | 509 |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. The dependent variable in column 1 is an indicator for conditional cooperator and in column 2 the number of months grazing is banned inside the group managed forest. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market. Mean refers to the sample average of the dependent variable listed in the column heading.

Table A.7: Market Distance, Civic Values, and Rules: All Controls

| | Dependent variable: | | |
|---|---|---|---|
| | Conditional cooperation | Monitoring | Grazing rules |
| | (1) | (2) | (3) |
| Market distance | -0.195 | -9.099 | -0.112 |
| | (0.056) | (1.556) | (0.054) |
| $R^2$ | 0.21 | 0.65 | 0.78 |
| Additional controls | Yes | Yes | Yes |
| Distance controls | Yes | Yes | Yes |
| Market fixed effects | Yes | Yes | Yes |
| Clan fixed effects | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. Additional controls include plantation forest, median tree cover in 2000, latitude, longitude, clan fragmentation, and fixed effects for seven other clans. Distance related controls include distance to village administration, primary school, and mosque, as well as population density and trust in government.

Table A.8: Market Distance, Civic Values, and Rules: Effects by Age Quartile

| | First Quartile | Second Quartile | Third Quartile | Fourth Quartile | 60 and above |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | 4 | 5 |
| | Panel A: Conditional Cooperation (Spearman *rho*) | | | | |
| Market distance | -0.183 | -0.140 | -0.090 | -0.160 | -0.124 |
| | (0.033) | (0.033) | (0.045) | (0.067) | (0.065) |
| Obs. | 177 | 188 | 170 | 154 | 82 |
| | Panel B: Monitoring (hours) | | | | |
| Market distance | -5.340 | -6.470 | -4.851 | -4.526 | -4.265 |
| | (1.006) | (1.377) | (1.596) | (1.716) | (1.485) |
| Obs. | 131 | 137 | 130 | 110 | 36 |
| | Panel C: Grazing Rules (indicator) | | | | |
| Market distance | -0.203 | -0.217 | -0.202 | -0.206 | -0.197 |
| | (0.063) | (0.048) | (0.050) | (0.059) | (0.055) |
| Obs. | 132 | 138 | 132 | 109 | 36 |
| Controls and FE | Yes | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. See Figure 5 for age-groups in different quartiles in different panels. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects (FE) are for clan and market.

Table A.9: Exchange Structures, Civic Values, and Market Distance

| | Market attendance | Trade with outsiders | Markets foster civic values |
|---|---|---|---|
| | (1) | (2) | (3) |
| Market distance | -0.271 | -0.325 | -0.341 |
| | (0.040) | (0.050) | (0.041) |
| $R^2$ | 0.22 | 0.66 | 0.78 |
| Controls | Yes | Yes | Yes |
| Fixed Effects | Yes | Yes | Yes |
| Observations | 497 | 52 | 52 |

*Notes:* OLS estimates with robust standard errors clustered on the group in column 1. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market.

# V. Plausible Channels

Table A.10: Market Distance, Civic Values and Rules, and Prosperity

| | Financial rating | Livestock units | Land holding | PC Prosperity |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Panel A: Conditional Cooperation (Spearman *rho*) | | | |
| Market distance | -0.155 | -0.155 | -0.147 | -0.159 |
| | (0.026) | (0.024) | (0.027) | (0.026) |
| Observations | 650 | 675 | 720 | 641 |
| | Panel B: Time Spent Monitoring (hours) | | | |
| Market distance | -5.492 | -5.637 | -5.683 | -5.605 |
| | (1.087) | (1.052) | (1.031) | (1.097) |
| Observations | 488 | 507 | 508 | 487 |
| | Panel C: Grazing Rules (indicator) | | | |
| Market distance | -0.187 | -0.196 | -0.194 | -0.186 |
| | (0.051) | (0.051) | (0.050) | (0.051) |
| Observations | 491 | 510 | 511 | 490 |
| Controls | Yes | Yes | Yes | Yes |
| Fixed Effects | Yes | Yes | Yes | Yes |

*Notes:* OLS estimates with robust standard errors clustered on the group. Control variables include altitude, group size, group fragmentation, share of female members, Gini of livestock ownership, Gini of land holding, education, and program duration. Fixed effects are for clan and market. The number of observations differ within panels because data on prosperity was not available for all individuals

Table A.11: Market Distance and Exposure to the Outside World: Frequency of Arabic Names

| | Dependent variable: Indicator for Arabic Name | |
|---|---|---|
| | (1) | (2) |
| Market distance | 0.017 | 0.016 |
| | (0.018) | (0.017) |
| $R^2$ | 0.001 | 0.004 |
| Market FE | No | Yes |
| Obs. | 735 | 735 |

*Notes:* OLS estimates with robust standard errors clustered on the group in parentheses. FE stands for fixed effects. Source: Adada-Dodola Forest Management Office.

# Appendix B Experimental Procedures and Instructions

## I. Experimental Procedures

I conducted three experiments, of which the paper uses data from the experiment that was conducted first. The household and community surveys were carried out after the experiments were conducted. I adopted several procedures to ensure that experimental measures are comparable across different groups and were not affected by contagion and contamination. Wherever possible, I followed the approach pioneered by Henrich et al. (see 2001, 2010) to conducting experiments in the field. This involved the following steps:

First, I used fixed written instructions, set of examples, and control test questions to conduct the experiments. This ensured uniformity in procedures and verbal explanations across groups. The written instructions were tested in a pilot study in the Yayu-Metu region of Ethiopia, which is linguistically similar but 400 km away from the study area. Based on the feedback, the instructions were fine-tuned and tested again in three groups that were excluded from the sample.

Second, the participants in experiments are familiar with money, especially small currency bills. I used actual bills of one Ethiopian Birr while delivering instructions, examples, testing, and for playing the actual game. This also made it easier for the participants to make simple calculations.

Third, the scope of contagion and contamination is larger if there is a wide gap separating the dates on which experiments are held in neighboring groups, as this leaves more time to discuss with future participants. To mitigate these concerns, whenever possible, I invited individuals from neighboring groups either at the same time or just the day after. The experiments were conducted right after the invitations were sent and were run each day, without a break, till all groups from a village had taken part. Once this was achieved, I moved to the next village and followed similar procedures there. Because the experiments lasted an entire day, individuals were left with less time to communicate with those yet to take part. Absence of electricity and mobile reception were of further help in achieving this. I find no difference in behavior when two groups were invited to take part in the experiment the same day or when one group was invited. The share of conditional cooperators or free riders is similar across these two situations.

Fourth, all experiments were run by me together with the main assistant. When two groups were invited at the same time, one group was guided through the experiment by me and the other group by the main assistant.I do not find any evidence of an experimenter effect on either the share of conditional cooperators (P-value $> 0.7$) or free riders (P-value $> 0.6$).

Fifth, participants were ensured that their decisions will be anonymous to each other as well as to the research assistants. Moreover, even though the main assistant is a native speaker, he is not from the study area and hence was not personally known to any of the participants.

Sixth, we employed community mobilizers, one from each village, to organize appointments with groups on our behalf. The community mobilizers knew nothing about the experiments or the surveys. They were informed: (a) to invite group members to arrive at an appointed date to play some games in which they could earn some money, (b) participation in the games was entirely voluntary, (c) the games could last an entire day. The mobilizers were given strict instructions to invite 15-25 households from each group. In addition, group leader, vice leader, and group committee members were highly encouraged to take part in the experiments. In some cases, household heads could not show up and sent a representative from their household. Representatives above 18 years old were allowed to take part in the experiments. Most experiments took place at administrative offices and camps. This did not affect any behavior in the experiment.

Seventh, once enough participants had arrived, we invited them to a room and requested them to sit according to their group affiliation. Participants were not allowed to enter the room if they were late by 15 or more minutes. Two local field assistants made sure that latecomers were sent back with a show up fee. After this, we requested the leaders or vice leader to check if: (i) all participants were from the invited group/s, (ii) did not belong to the same household, and (iii) were at least 18 years old. Participants who did not meet these criteria were sent back. In addition, nursing mothers with babies, sick participants, very old, and those with other health problems were also sent back with a show up fee.

Eight, before the experiments began, the main author and the main assistant introduced themselves in the local language, Afaan Oromo. After this, the main assistant took over the task of reading out the written instructions to the entire group. Because most of our subjects had limited literacy, we designed instructions didactically. During the instructions, the participants were given lots of opportunities to ask questions. Any unexpected question, for which we did not have a script, was answered first by the main author and then translated by the main assistant. This was followed by a fixed set of examples, which were illustrated by me. This had many advantages: (a) participants got used to me speaking in Afaan Oromo. I consider this important because when two groups were invited, I took over the responsibility of testing and engaging members from one of the two invited groups in the game; (ii) it gave some respite to the main assistant; and (iii) I gained participants' trust. The main assistant made sure that participants understood my accent; none of the participants complained about this. Moreover, the participants were very happy that I could speak their language.

ninth, before the actual game, the participants were tested one by one for their game

comprehension using a fixed set of control questions. These questions focused on testing a participant's basic understanding of the game, such as addition, multiplication, division, and other skills. While the main assistant tested this for households from one group, I did so simultaneously for households from another group. All participants rejected by me were tested again by the main assistant. Those who could not answer the questions correctly were given a show up fee and sent back. Further, two local assistants made sure that the rejected participants and uninvited persons had left the experimental venue.

tenth, depending on their group, the selected participants were given plastic identity cards bearing names of Swiss Cantons and German States. Before the actual game began, the selected participants were given another opportunity to ask further questions. During the actual game, participants were called one by one to a room / secluded area. Inside the room, subjects were given six bills of one Birr and then asked to make an unconditional decision to contribute to the public good. Once all participants had taken part in this decision, they were called one by one again to take the conditional decisions. In the meanwhile, the local assistants made sure that no one discussed the game. As in the experiments, anonymity was also ensured during the interviews. We were able to match a participant's behavior in the game with the interview through his/ her experimental identity (Swiss Cantons or German States).

## II. Experimental Instructions

### Introduction

Greetings and welcome to all of you. My name is Devesh Rustagi and I am a student from a university in Switzerland. I am here for a research concerning livelihood improvement through forest conservation. For my research, I would like to play a few games with you. Depending on the decisions made by you and other players in these games, you can win some money. The payment that you receive from these games is not from my own pocket, but sponsored by the German government. Before we proceed with the games, I would like to tell you some important things.

### General instructions

1. In all games, your identity will be kept anonymous. This means that except for me and my assistant, no one will come to know of your identity. I am interested only in the decisions made by you in these games and not your identity. This is the reason that we will not ask your name in any of the games. We will identify your decision in the game with an identity card like this (show plastic cards). Please do not lose this card.

2. All games will be played for one round only. This means that after you have played the first game, we will begin with the second game. Likewise, after the second game is

over, we will begin with the third game. This means that after a game is over, there is no subsequent interaction.

3. We will play three games with you, but you will receive your money only in the end. We will keep a record of your earnings in all the games on a sheet like this (show payoff sheets for clarity) to make sure that you receive the correct amount.

4. We will give you separate instructions and examples on how to play each of these games. The instructions for each game will be given before we play the game. For instance, before we play the first game, we will give you the instructions on how to play the first game. Likewise, when we play the second game, we will give you the instructions for the second game, and so on. It is very important that you listen to these instructions carefully. In case you do not understand the game, please stop us and ask us. We will be happy to help you.

5. Before we play the actual game, we will check if you have understood the game or not. In case you do not understand the game, we will give the instructions again. However, if you are still not able to understand the game, we will have no choice but to request you to leave the venue. In this case, you will receive five Birr from us. Therefore, it is important that you listen to the instructions carefully.

6. We would like to keep the game anonymous, therefore, please do not discuss the game with each other. But you may discuss about politics, rainfall, market, cattle, WAJIBS, and other such things. In case we find that you are discussing the game with other players, we will exclude you immediately from the game. In this case, you will not receive any money.

7. We also request you to not to discuss the game with other WAJIB members as this will spoil my study.

8. (Read this only when two societies are invited) You will play the games only with the members of your own society.

9. I repeat again, please do not hesitate to ask any questions. We encourage you to ask as many questions concerning the games as possible. In case you have any questions at this stage, you may ask them now. Otherwise, we will begin with the instructions for the first game.

**Experimental instructions**

We will now give you instructions and examples for the first game. There are two parts in this game. We will now give you instructions for the first part. This is followed by a test in which we will check if you have understood the game or not. Once we are

sure that you have understood the game, we will begin playing the game.

In this game, we will divide you into groups of two players. You will not come to know to which group you belong. Likewise, you will not come to know the identity of the other (partner) player in your group. Similarly, the other player will not come to know your identity.

At the beginning of the game, each player will receive six Birr from us. Now you have to decide how many from the six Birr to put into your pocket and how many into a project. You may put any amount between 0 and 6 Birr into the project.

Now we will show you how this is done. Please note that since this is an example, we will tell the player how many Birr to put into the project. But when we play the actual game, you will have to decide this on your own, without any help from us. (Randomly select a player and give him six bills of one Birr each. Please make sure that each time YOU tell the person on how much he should put into the project. Do not allow the player to take a decision because this may influence the decision of other potential players). Suppose you are a player in this game. As mentioned before, you receive an endowment of six Birr from us. Now let us assume that out of six Birr, you put zero Birr into the project. Please put zero birr into the project. Ask the group: Can you tell me how many Birr there are in the project? How many Birr does the player have in his pocket? Have you understood this?

Now, let us assume that out of six, you put one Birr into the project. Please put one Birr. How many Birr are in the project? How many Birr does the player have in his pocket? (Carry on this procedure till 6 Ethiopian Birr). Have you understood this part? Do you need additional examples? (If yes, select another person and repeat the examples in the same order).

Any amount in the project will be increased by the same number of Shillingis as the number of Birr in the project. For example, if you put 0 Birr into the project, the project amount will be increased by 0 Shillingis. Now, the final amount of money in the project is 0 Birr. If you put 1 Birr into the project, the project amount will be increased by 1 Shillingi. Now, the final amount of money in the project is 1.5 Birr (Carry on till 6 Birr). I repeat, the project amount will be increased by the same number of Shillingis as the number of Birr in the project. Have you understood this? Do you need additional examples? (If yes, select another person and repeat the examples in the same order).

After the project money has increased, it will be divided equally between you and your partner player, irrespective of how much you have put into the project (Please repeat this again). For example, if the project contains 0 Birr, it will be increased by 0 Birr and then divided equally between you and your partner player. However, since zero does not

increase, both you and your partner will get zero Birr from the project. For example, if the project contains 1 Birr, it will be increased by 1 Shillingi. Now the total value of the project is 1.5 Birr, and both you and your partner player get 0.75 Birr each from the project (carry on till 6 Birr). Have you understood this part? Do you need additional examples? (If yes, select another person and repeat the examples in the same order).

Please remember that any money that you put into the project is first increased and then divided equally among the players in your group. Any amount that you put in your pocket remains the same. If you put 1 Birr in your pocket, it remains 1 Birr. It neither increases nor is it divided.

Your final earning from the game is the sum of the amount you have in your pocket and the amount you receive from the project.

We will now give you three examples. Please note that since now we are learning how to play this game, you can see the identity of each player as well as the decisions made by them. When we play the actual game, you will not come to know of this. Do you understand this? We will now select two people and tell them to take the following decisions in the game. You are player I and you are player II (look for participants with weak comprehension and always give them a chance to act as player I and II). We give you 6 Birr each at the start of the game.

Example 1: Now we will see what happens if both players put zero Birr into the project. Player I and II: Please put zero Birr into the project. Now, can you tell me how many Birr did player I put into the project? How many Birr does he have in his pocket? How many Birr did player II put into the project? How many Birr does he have in his pocket? How many Birr are in the project? We have zero Birr in the project. Since zero Birr does not increase and cannot be divided, each player gets zero Birr back from the project.

Player I has put zero Birr into the project, so he has six Birr in his pocket. He gets zero Birr from the project. Can you tell me, what is his income? Since player I has six Birr in his pocket and he gets zero Birr from the project, his final income is six Birr. (Please repeat the procedure to calculate the income of the second player.)

Example 2: Now we will show you the second example. You are player I and you are player II. You get six Birr from us at the beginning of the game. Now we will see what happens if both players put six Birr into the project. Player I and II please put six Birr into the project. Now, can you tell me how many Birr did player I put into the project? How many Birr does he have in his pocket? How many Birr did player II put into the project? How many Birr does he have in his pocket? How many Birr are in the project?

We have 12 Birr in the project. The project amount will now be increased by 12

Shillings. The final amount in the project is 12 Birr + 12 Shillings = 18 Birr. Now 18 Birr is divided equally among both the players. So, each player gets 9 Birr.

Now, can you tell me, how many Birr does player I have in his pocket? How many Birr does he get from the project? What is his final income? We repeat, since player I has zero Birr in his pocket and he gets nine Birr from the project, his final income is nine Birr. (Please repeat the procedure to calculate the income of the second player.)

Example 3: Now we will show you the third example. You are player I and you are player II. We will see what happens if player I puts zero Birr into the project and Player II puts six Birr into the project. Player I, please put zero Birr into the project and Player II, please put six Birr into the project. Now can you tell me how many Birr did player I put into the project? How many Birr does he have in his pocket? How many Birr did player II put into the project? How many Birr does he have in his pocket? How many Birr are in the project? We have six Birr in the project. The project amount will be increased by 6 Shillings. So the final amount in the project is 6 Birr + 6 Shillings = 9 Birr. Now 9 Birr is divided equally among both the players. So, each player gets 4.5 Birr. Now, how many Birr does player I have in his pocket? How many Birr does he get from the project? So, what is his final income? We repeat, since player I has 6 Birr in his pocket and he gets 4.5 Birr from the project, his final income is 10.5 Birr. How many Birr did player II put into the project? How many Birr does he get from the project? So, what is his final income? I repeat, since player II has zero Birr in his pocket and he gets 4.5 Birr from the project, his final income is 4.5 Birr.

We will now summarize the key results from these examples:

a) If both players put zero Birr into the project, they both earn 6 Birr.

b) If both players put 6 Birr into the project, they both earn 9 Birr.

c) If one player puts zero and the other player puts six Birr into the project, the player who puts zero Birr earns 10.5 Birr, while the player who puts 6 Birr, earns 4.5 Birr.

d) If you and your partner player put the same amount into the project, you both earn the same income.

e) If you put less than what your partner puts into the project, you earn a higher income.

f) If you put more into the project than your partner, you earn a lower income.

If you have any questions, you may ask them now. Otherwise, we will call you one by one and ask six questions to check if you have understood the game or not. Please note that if you answer these questions wrong, we will give you 5 Birr and request you to leave

the game venue. Therefore, please tell us if we need to repeat the examples or not (If yes, repeat the examples in the same order).

**Control questions**

1. How much money do you get at the start of the game? / What decision do you have to take in the game?

2. Suppose, you decide to put X Birr into the project, how much is left in your pocket?

3. What happens to the money in the project?

4. If you put X Birr into the project, by how much will this increase? What happens after the money is increased?

5. If you put X Birr into the project and your partner also puts X Birr into the project, who earns more?

6. If you put Y Birr into the project and your partner puts Z Birr into the project, who earns more?

(For those who answer 5-6 questions correctly, ask them to sit back in the room. Pay the remaining players 5 Birr and request them to leave. After this, repeat the control questions and let the selected players answer in a chorus. Ask again, if everyone understands. If yes, give them the identity cards).

**Actual Game**

We will now call you one by one to enter this room and play the game. Please remember that you will not come to know the identity of your partner player or the amount they put in the project.

We will also ask you a question: How many Birr do you believe your partner player will put into the project? This is an important question, so please think before you answer this question.

While you wait for your turn, two assistants will conduct interviews with some of you. They will also check if you discuss the game with each other or not. If they find you discussing the game, we will have to expel you from the game.

When entering the room, please keep your identity card ready.

**Unconditional decision**

Hello! Have a seat please. I hope you have understood the game. Your identity card, please? Here are your six Birr. Now you have to decide out of six Birr how much you

would like to put into the project. Please put the amount here on the table. How many Birr do you believe your partner player will put into the project? Thank you. Please do not discuss this with the other players.

Additional experimental instructions for the conditional decision

We will now give you instructions to play a slightly different version of the decision that you just played. In the first decision, you did not know the amount your partner player puts into the project. But in this game, we will tell you how many Birr your partner player puts into the project. After you have seen this, you can decide on how many Birr you would like to put into the project. There are seven decisions to be made in this game. Each decision is independent of the other. Please note that you will get a fresh endowment of six Birr at the start of each decision. We will now give you illustrations on how this game is played. Please listen carefully. While we give examples, no one is allowed to speak.

Decision 1: Your partner player in the game puts out of six - zero Birr into the project (put no money on the table). Now, out of six Birr, how much would you like to put into the project? After you have made your decision, the decision is over.

Decision 2: Your partner player in the game puts out of six - one Birr into the project (put one Birr on the table). Now, out of six Birr, how much would you like to put into the project? After you have made your decision, the decision is over. (Carry on till 6 Birr.)

Do you have any questions?

There are seven decisions to be taken in this game. Please watch our fingers for why there are seven decisions. Your partner player puts 0, how much would you like to put; Your partner player puts 1, how much would you like to put; Your partner player puts 2, how much would you like to put; Your partner player puts 3; how much would you like to put; Your partner player puts 4, how much would you like to put; Your partner player puts 5, how much would you like to put; Your partner player puts 6, how much would you like to put. Can you count our fingers now? How many decisions do you have to take in this game? At the beginning of each decision, you will get 6 Birr, just like in the examples you saw. Each decision is independent of the other. A very important point is that we will pick only one of these seven decisions to decide your earnings. So please take all the decisions seriously. Do you have any questions?

We will now call you one by one to play this game. As usual, please keep your identity

card ready.

**Conditional decision**

Hello! Please take a seat. I hope you have understood the game. Your identity card, please? Here are your six Birr. Now we will show you one by one how much your partner player puts into the project. After you have seen this, you can decide how many Birr you would like to put into the project. Please put the amount here on the table.

Decision 1: Your partner player in the game puts out of six - zero Birr into the project (put no money on the table). Now, out of six Birr, how much would you like into put in the project? Now this decision is over. Please return all the money you have in your hand to me.

Decision 2: Here are your six Birr. How many Birr do you have in your hand? Your partner player in the game puts out of six - one Birr into the project (put one Birr on the table). Now, out of six Birr, how much would you like to put into the project? Now this decision is over. Please return all the money you have in your hand to me.

(And so on till 6 Birr.)

# Appendix C Vignette Study

**Vignette A: Market Exchange 1**

One day an Oromo man called Ibsaa decided to sell his cows to earn money. He went to a market where he met Barentu, another Oromo man. Barentu wanted to buy Ibsaa's cows. The cows looked healthy from outside, but they were actually sick. No one except for Ibsaa knew that. Ibsaa decided not to tell this to anyone. Barentu bought the cows. Some months later, the cows died. This was a big loss to Barentu.

1) In your opinion, what Ibsaa did to Barentu was right or wrong?

2) Are you pleased or displeased with Ibsaa?

3) Will you say anything to Ibsaa if you met him? What will you say?

4) What should Barentu do?

a) find Ibsaa and get his money back
b) go to the police
c) stop buying from Ibsaa in the future
d) tell everyone that Ibsaa cheated so that everybody is aware
e) contact the leader of the group to which Ibsaa belongs

f) contact the leader of the group to which Barentu belongs
g) Other

5) What will happen to Ibsaa? Will Ibsaa be punished?

6) What happens if Ibsaa says he did not know that his cows were sick? After all, there is no proof of this. Will you agree with him?

7) If you go to a market, will you buy cows from Ibsaa? Why / Why not?

8) Do you think other people will buy cows from Ibsaa?

9) Will you buy other products from Ibsaa?

10) If Barentu told everyone that Ibsaa cheated, will Ibsaa take revenge?

**2B: Market Exchange 2**

One day an Oromo man called Ibsaa decided to sell his cows to earn money. He went to a market where he met Barentu, another Oromo man. Barentu wanted to buy Ibsaa's cows. Barentu bought the cows. Some months later, the cows died of sickness. This was a big loss to Barentu. Barentu thinks that Ibsaa cheated him by selling him sick cows.

1) Do you think Ibsaa cheated Barentu or was Barentu just unlucky?

2) Whom are you going to support? Why?

3) Do you think Ibsaa knew his cows were sick and did not tell this to Barentu? After all, it is difficult to prove that Ibsaa knew it.

4) Does Barentu have any option to get justice? What should Barentu do?

5) After this incident, will other people buy cows from Ibsaa?

6) Will people buy other products from Ibsaa?

7) Would it have been possible to avoid this situation? How?

8) How easy is it for people to sell sick cows in the market?

9) Do you have a mechanism to detect people who cheat in the market? How does it work?

10) Do you think that people who buy livestock mostly buy from the same seller/s? Why?

11) Does market exchange (buying-selling) teaches you not to cheat? How?

12) Do you implement the social norm of not to cheat in others areas of your life, outside the market exchange. For example, in dealing with people from your group or people

from other group? How?