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# ETHNIC CONTRACT ENFORCEABILITY

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## Abstract

Many states struggle to enforce contracts. The origin of the state’s “legal capacity” to enforce contracts is often explained as a result of past choices by rulers. However, after transactions are made, contracts are enforced by administrators, whose incentives to enforce them differ from those of rulers (Greif, 2007). I randomly introduce state-backed contracts into the agency relationships between traders and customers of a market I created in the Democratic Republic of the Congo. The patterns of agents’ shirking reflect that they expect contracts to be enforceable, but only by traders from ethnic groups who control the administration. Furthermore, state contracts, when applied among groups who can enforce them, generate higher volumes of trade specifically by improving the expectations about the traders’ future behavior, and can substitute for informal ethnic based contract enforcement, absent between ethnic groups. The results suggest that while social institutions govern agency relations, social institutions also govern the administration, which limits the impact of state capacity on contract enforceability and distorts the patterns of trade.

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Social institutions are often ineffective to solve commitment problems that prevent trade in the absence of states (Bates, 2011, Dixit, 2003, Greif, 1993). The state can protect property rights and improve contract enforceability. Thus, state expansion can reduce the extent of commitment problems and induce trade and investment that would otherwise not occur. However, social groups often control the administration, thus expanding legal capacity may increase the ability of such groups to protect their own property, and better expropriate others (Greif, 2007, Tilly, 1985). Estimating the impact of gaining access to the state system of contract enforcement is challenging, because systematic data do not usually exist when the state is ineffective, and because state formation is endogenous (Gambetta, 1993, Tilly, 1990).

I create a new home delivery market involving traders and customers in Eastern Democratic Republic of the Congo (DRC). The DRC economy has developed in the absence of a functioning state since its collapse in the nineties, and social networks dominated by ethnicities are the basis of economic relations and control the administration.<sup>1</sup> A commitment problem is intrinsic to the newly created agency relations between the traders and the customers. The design allows me to estimate beliefs about state contract enforceability, as well as their implication for trade, in the context of a real economic transaction.

In the first part of the paper, I show how administrative ethnic bias can shape contract enforceability. I examine how the introduction of state contracts into the principal-agent relationship between traders and customers affects the rates of defection by the agents. Traders visit 971 customers and offer cell phone credit at a discount. The customer (the agent) needs to pay within two days using a cell phone payment system. At the time of presenting the sale, the trader explains that the customer will be required to sign a state-backed contract, exposing the customer to legal action if he fails to pay on time. Among customers *who accept the sale*, the trader then randomizes whether the requirement to sign the contract is withdrawn. The selected customers receive the phone credit and do not sign a contract. The rest of customers who have accepted the sale sign the contract and receive the phone credit. This design, à-la Karlan and Zinman (2009), allows me to separate the incentive effect of state contracts from their effect on customers' self-selection. I first focus on the payment rates to traders from "autochthonous" ethnic groups, which dominate the state administration. I find that 24% of the customers who did not sign a state contract pay. In contrast, payment rates are 50% higher for customers who signed the state contract.

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<sup>1</sup>See Stearns (2011), Ngonzola-Ntalaja (2002), Newbury (1992).

In addition to the autochthonous traders, I also hire an equal number of traders from ethnic groups which are known to be excluded from the state (Tutsi) and deploy them simultaneously to the “autochthonous” traders to implement sales separately. Using random assignment of customers to traders, I find that while state contracts decrease defection rates to “autochthonous” (non-Tutsi) traders, state contracts have zero effect on payment to Tutsi traders. I provide additional behavioral and survey evidence to support the view that customers rely on their own ethnicity and the trader’s to infer about the enforceability of state contracts in each particular relationship. The core results, as well as the auxiliary results, support the interpretation that customers are sure that Tutsi traders will be unable to enforce state contracts, while Bantu traders will. This result suggests that control of the administration by ethnic groups governs the perceptions about the enforceability of state contracts.

In the second part of the paper, I examine whether the impact of state contracts on trade, among ethnic groups who can enforce them (“autochthonous”, non-Tutsi ethnic groups). I focus on relationships where the agent faces a commitment problem that prevents trade. Traders now first collect payments, and promise to deliver a household good within two days. I recruit the traders (now the agents) from the population in which I recruited the customers in the first part of the paper, and deploy them to collect payments door-to-door from potential customers (now the principals). In a random sample of customers, the trader introduces a state contract that exposes the trader to legal action if he fails to deliver the good, and offers to sign the state contract. I exploit the presence of historically salient ethnic divisions between multiple “autochthonous” non-Tutsi groups, centered around land conflicts and unrelated to control of the state. To estimate a coethnic effect among “autochthonous” populations, I randomly assign customers to traders. The decision of the customers to accept the sale allows me to examine whether state contracts solve commitment problems, and whether state contracts substitute for salient coethnicity. I find that 33% of customers who are approached by a non-coethnic are willing to accept the trade if the trader does not offer to sign a state contract. In contrast, sales are 97 % higher if the non-coethnic trader introduces a state contract. Sales are also 97 % higher if customers are instead approached by coethnic trader, whether or not the trader offers to sign a state contract. This suggests that state contracts and coethnicity are substitutes. However, these results may simply capture taste-based discrimination?: customers may simply prefer to trade with partners who appear have links to the state. To rule out taste-based mechanisms and isolate the expectations about delivery

channel, I extend the paper to include transactions where expectations are not affected.

In the last part of the paper, I thus change the design of the transaction in order to separate commitment problems from preference mechanisms. I randomly assign potential customers to an alternative type of sales, in which a commitment problem is not present, but in which state formalization is nonetheless equally random. In these alternative sales, customers know at the time of their decision to engage in trade that traders deliver the good *before* receiving customers' payment. State contracts and coethnicity have no effect on trade, when sales lack commitment problems. This establishes that state contracts and ethnic-based social institutions are substitutes to increase trade through their effects at solving commitment problems.

While a large number of studies document how individuals and groups solve commitment problems outside a legal framework (Alesina, Baqir and Easterly, 1999, Greif, 1993, Habyarimana et al., 2007, Hjort, 2013, Miguel and Gugerty, 2005), this paper explores empirically the impact of state-backed contract enforcement on commitment problems and trade.

Furthermore, this study relates to capture of the state in ongoing debates in economic history and political economy. First, the paper links contract enforceability with capture of the state administration. Gonzalez de Lara, Greif and Jha (2008), Greif (2007) have argued that the power of the administrators is a determinant of policy implementation, and for the emergence of constitutions. In contrast, the literature on contract enforceability does not usually focus on capture of the administration (Greif, 1993). Exploiting the fact that the administration is controlled by non-Tutsi "autochthonous" groups, this paper sheds light on the administrative foundations of contract enforceability. As my results show the economic effects of the biases of administrators, they resonate with research demonstrating the presence of ethnic bias by judges (Abrams, Bertrand and Mullainathan, 2012, Shayo and Zussman, 2011). Second, the paper links the literature on ethnic diversity to control of the administration (Alesina, Baqir and Easterly, 1999, Habyarimana et al., 2007, Miguel and Gugerty, 2005). As the paper suggests, administrative capture could explain why heterogeneous populations are often unable to cooperate: legal instruments may be biased in favor of population sub-groups having captured the state.

This paper also also contributes to existing literature on the grounds of causal identification. First, observational studies that discuss the effect of contracts on economic behavior often face endogeneity in the selection of contracts (Fafchamps, 2000). Joining a growing literature on contract enforcement that is concerned with causality, I use random assignment to address this challenge

(Banerjee and Munshi, 2004, Chandrasekhar, Kinnan and Larreguy, 2015). Second, estimating the effect of the social structure is also challenging because social interaction is endogenous (Chandrasekhar, Kinnan and Larreguy, 2015). Drawing on groups whose divisions have historical roots, I randomly match traders and customers who have not previously met and belong to different ethnic groups. This allows me to estimate the effect of ethnic-based social institutions on trade, while avoiding endogeneity issues arising from network formation. Third, due to implementation constraints, researchers interested in establishing causal identification usually draw on laboratory environments to study ethnicity or commitment devices (Habyarimana et al., 2007). However, laboratory environments set the underlying parameters of the problem at arbitrary levels that are difficult to interpret (Haley K. J., 2005). To reduce the risk of such concerns, I create a real market that mimics replicates the typical home delivery business that operates in this environment. The new market I create allows me to observe behavior of buyers and sellers who face an inherent agency relation. In doing so, I also relate to observational studies of contract enforcement, which examine behavior outside the lab (Banerjee and Munshi, 2004, McMillan and Woodruff, 1999, Morjaria and Macchiavello, 2014).

Finally, this paper also relates to theoretical literature on contracts. First, Tirole (1996) and Greif (1993) explain how trading partners who share a social structure may be able to solve commitment problems by exploiting features of repeated interaction. In this context, third-party contract enforcement could introduce outside options to existing relationships, thus potentially undermining the conditions that sustain trade within groups (Dixit, 2003, Kranton, 1996). This paper does not examine repeated interaction, but takes it as given, and the behavioral change that I observe can reflect internalized repeated interaction. As my contracts do not crowd-out trade, this is encouraging for the debate about displacement. Second, a growing strand of the literature shows that co-ethnics may be able to solve contracting problems because of group norms and in-group altruism (Bernhard, Fischbacher and Fehr, 2006, Bowles, 2006, Bowles and Polania-Reyes, 2012, Charness and Rabin, 2002, Chen and Li, 2009, Fehr and Gaechter, 1999, Tajfel and Turner, 1979). Introducing the state into social relations can introduce a crowding out of intrinsic motivation in the same way that extrinsic incentives crowd out pro-social behavior. This paper shows that the incentive effects introduced by state contracts do not have such displacement effects (Lowe et al., 2015). Third, another strand of the literature explores how groups are able to solve contracting problems by appealing to self-enforcing equilibria that are sustained on belief systems (Greif, 1993,

Habyarimana et al., 2007). Formal contracts in such settings could crowd-out trade by changing information sets, and thus changing the meaning of actions (Bénabou and Tirole, 2003, Gneezy and Rustichini, 2000). My results provide an optimistic picture of the effect of state contracts, while they caution about the impacts of administrative control on contract enforceability.

The paper proceeds as follows. Section 2.1 presents the context. Section 1 presents a simple theoretical framework for ethnic contract enforceability. Section 2 presents the main empirical strategy aimed to uncover the enforceability of state contracts, whose results I present in Section 3 and mechanisms in Section 4. Section 5 explores the implications of contract enforceability for the patterns of trade and welfare. Section 6 concludes.

## 1 Theoretical framework

To characterize present the argument in its simplest form, I draw on a modified version of Besley and Persson (2009).

### 1.1 Setup

The economy is composed of two groups,  $G \in \{A, B\}$ . Each group is respectively the shares  $\beta^B$  and  $\beta^A$  of the entire population. There is one period.

Individuals of groups  $G \in \{A, B\}$  are endowed with initial wealth  $w_A$  and  $w_B$ , and have linear preferences in consumption. Individuals can borrow  $b^G \in \{A, B\}$  and lend  $l^G \in \{A, B\}$  in competitive capital markets, and invest  $I^G$  of their wealth into their own projects. A fraction  $\sigma$  of individuals in each group has access to projects with return  $r_I = r^H$ , while the rest of the group has access to projects with return  $r_I = r^L$ , where  $r^H > r^L$ . The interest rate that clears the market is  $r_M$ .

In order to be able to borrow, individuals need to put a share of their wealth,  $c^G$ , as collateral. The borrower can keep a share of the collateral ex-post. This imperfect protection of the creditor's right is represented by the share,  $\tilde{p}^G$ . A better enforcement of property rights is associated with a higher  $\tilde{p}^G, \forall G$ . The level of property rights protection is limited by an implementation capacity constraint by the state:  $\tilde{p}^G \in [0, P]$ , with  $P \leq 1$ . If lenders of both groups invest a fixed share of

their wealth  $l$ , the capital market equilibrium is pinned down by the following equality:

$$\sigma^A \beta^A \tilde{p}^A w^A + \sigma^B \beta^B \tilde{p}^B w^B = l[(1 - \sigma^A) \beta^A w^A + (1 - \sigma^B) \beta^B w^B] \quad (1)$$

The first term is the demand for credit. Clearly, high return individuals invest all of their wealth, demand up to  $\sigma^G \beta^G \tilde{p}^G w^G$  in credit, and low return individuals lend all their wealth up to  $l$ . Competitive markets imply that price equals to marginal cost, hence  $r_M = r_L$ . Group  $G$  average individual's indirect utility is:  $v^G = (1 - t^G)(r_H + (1 + \tilde{p}^G)(r_H - r_L) - r_L)w^G$

Private agents operate in an institutional framework that is chosen by a ruler, and influenced by an administrator. The ruler can tax realized income of both groups separately,  $t_A$  and  $t_B$ , and can choose a *desired* level of property rights protection,  $p_G \in \{A, B\}$ . The administrator chooses  $\tilde{p}_A(p_A)$  and  $\tilde{p}_B(p_B)$  after loans have been made at the time when creditors attempt to enforce their contracts. Effective contract enforcements,  $\tilde{p}_G(p_G)$ ,  $G \in \{A, B\}$ , are modeled below.

There are limits to the policies that the ruler and administrators can choose. When facing a tax, individuals can go informal. If individuals go informal, the friction of hiding the income implies a decrease in the return, so that an individual who goes informal earns  $(1 - T)$  of the normal returns. It is straightforward to show that the state can only tax up to  $T$  beyond which point the group whose income tax is higher than  $T$  goes informal. Similarly, the ruler can choose the desired level of creditor property rights protection,  $p_s^G$ , up to the maximum that he can enforce,  $P$ .  $P$  is thus the upper bound of desired and implementable contract enforcement.

The ruler's objective function may be biased towards one of the two groups. To simplify exposition, assume that the ruler maximizes  $\rho_A(1 - t_s^A)Y_s^A + \rho_B(1 - t_s^B)Y_s^B$ , where  $\rho_G$ ,  $G \in \{A, B\}$  is the weight that the ruler assigns to each population group in his objective function. I assume  $\rho_A > \rho_B$ . Similarly, the administrator may also be captured by social groups. The administrator maximizes  $\rho_A^a(1 - t_s^A)Y_s^A + \rho_B^a(1 - t_s^B)Y_s^B - \sum_{G \in \{A, B\}} \frac{\gamma}{2}(p_G - \tilde{p}^G)^2$  after loans have been made, where  $\gamma$  captures the corruptibility of the administrator — high values indicate that it is costly for the administrator to deviate from policy. Thus, the fact that the administrator optimizes after investments are made introduces the standard holdup problem into the administration.

## 1.2 Timing

**Step 1:** The ruler chooses  $t^A, t^B, p^A, p^B$  to maximize:

$$\rho^A(1 - t_s^A)Y_s^A + \rho^B(1 - t_s^B)\beta_B Y_s^B \quad (2)$$

subject to:  $t^A\beta^A Y^A + t^B\beta^B Y^B = 0$ ,  $p^G \leq P, t^G \leq T$ , where  $Y^G$  indicates the output (income) by group  $G$ , and  $\rho^G \in \{A, B\}$  is the weight that the ruler puts on the welfare of group  $i$  ( $\rho^A + \rho^B = 1$ ). Since the individuals with high return projects invest all their wealth and obtain in addition  $p^G w^G$  in borrowing, and have to repay at interest rate  $r_L$ , and since households with low return make  $r_L$  on their borrowed and borrowed wealth, group  $G$ 's output is  $Y^G = w^G[\sigma^G(1 + p_s^G)(r_H - r_L) + r_L]$ .

It is straightforward to see that since increasing  $p^G$  relaxes the budget constraint of the ruler (through  $Y^G$ ) and the objective function is increasing in  $p^G$ , the optimal level of property rights protection is the maximum allowed by the institutional constraint  $p^G \leq P$ , thus  $p^G = P$ . Precisely because the ruler is residual claimant through taxation, he internalizes the effect of improving economic activity through protection of creditor's rights. Furthermore, all of the tax extraction occurs in order to redistribute as much as possible to group  $A$ . In that case group  $B$  is taxed at full capacity,  $t^B = T$  and all the tax revenues are used for the group's  $A$  consumption:  $t^B = -\frac{T\beta^B Y^B}{\beta^A Y^A}$ .

**Step 2:** Private agents choose  $b^G, I^G, c^G, d^G, n^G, l^G$  and markets clear. Private agents maximize:

$$u^G = (1 - t^G)(r_I I^G - r_M b^G + r_M l^G) + (t^G - T)b^G + r_M(b^G - \tilde{p}^G c^G w^G)d^G$$

subject to an incentive compatibility constraint (they can borrow until they have incentives to default),  $b^G \leq \tilde{p}^G c^G w^G$  and a budget constraint  $I^G + l^G \leq w^G + b^G$ . From this and the incentive compatibility constraint, it is straightforward to derive aggregate demand and supply for credit.

**Step 3:** After loans have been made and investments have yielded returns, individuals can choose whether default and lose their collateral  $\tilde{p}^G w^G$ , or instead return the amount owed,  $b^G r_M$ . The administrator thus chooses the effective enforceability of contracts  $\tilde{p}_A, \tilde{p}_B$  to maximize:  $\rho_A^a(1 - t_s^A)Y_s^A + \rho_B^a(1 - t_s^B)Y_s^B - \sum_{G \in \{A, B\}} \frac{\gamma}{2}(p_i - \tilde{p}^G)$ , anticipating that individuals in the last step (after

investments yield) decide whether to default or not, and their payoffs are of the form:

$$u_{end}^G = (1 - t^G)(r_M l^G - r_M b^G) + r_M(b^G - \tilde{p}^G c^G w^G) d^G$$

The administrator cannot influence the payment of the debt if individuals do not default, but only the share of the collateral to be expropriated if individuals default.

### 1.3 Equilibrium

From this setup, it is straightforward to characterize equilibrium. High return individuals invest all their wealth in their projects, put all their collateral to borrow to  $\tilde{p}^G w^G$ , and do not lend. Low return individuals lend up to share  $l$ , constrained. Markets clear, and the market return is  $r_L$ .

The optimal desired policy by the ruler is straightforward. Since there is no public goods motive, and since  $\rho^A > \rho^B$ , the ruler taxes as much as possible from  $B$  in order to redistribute it to  $A$ , from whom he raises a negative tax. The optimal tax rates are:  $t^A = -\frac{T\beta^B Y^B}{\beta^A Y^A}$  and  $t^B = T$ .

Since collateral protection increases output, through the increase in lending, and since the ruler taxes the output of group B and values the output of group A, the optimal desired collateral protection is the maximum allowed by its legal capacity, ie:  $p^G = P$ ,  $\forall i = A, B$ .

Finally, the administrator, however, does not internalize the effect of protecting property rights on taxation, nor does he internalize the fact that by potentially choosing a lower protection of collateral of group A, he is thereby undermining group A's ability to borrow. The administrator, who chooses in the last step, replicates the standard holdup problem, because his preferences better reflect group A, and is tempted in the last step to protect collateral at a level that benefits group A. His chosen level of collateral protection is:

$$\tilde{p}_A = P - \frac{\sigma \beta_A r_L w_A}{\gamma} (1 - \beta_A) (\rho_A^a - \rho_B^a)$$

and

$$\tilde{p}_B = P$$

For the share of group A's collateral that the administrator chooses to enforce, there are two steps. First, some of the redistribution occurs to creditors of group A, and is thus neutral for the administrator's objective function. Second, a share  $\beta_B$  of loans in the hands of group A

members has to be transformed into payments to group B lenders. The administrator would like to prevent such redistribution from happening, and this force thus tends to decrease the effective enforcement,  $\tilde{p}_A$ . For the protection of property rights over the collateral posted by group B, the opposite forces are at play: the administrator would like to have as high as possible rate of property rights protection, since that means a transfer to A. However, the administrator is constrained by legal capacity, and cannot increase  $p_B$  beyond P.

The distortion introduced by the administrator creates a wedge  $\Delta W$  between the welfare that would be attained by the ruler if he was able to implement his desired policy, and the case in which he faces an administrator:

$$\Delta W = -\frac{\sigma\beta_A(1-\beta_A)r_L w_A^2}{\gamma}(\rho_A^a - \rho_B^a)(1-t_A^*)(r_H - r_L)$$

The strategic manipulation of contract enforceability in the last period thus introduces a holdup problem that reduces welfare. Trying to improve the indirect utility of individuals of group A, the administrator makes it harder for them to attract borrowing, reducing group A's output and welfare. Such welfare loss is larger the larger is the return from the foregone economic opportunities ( $r_H - r_L$ ), the wealthier is group A,  $w_A$  (because the foregone opportunities in terms of posted collateral are larger), the higher the share of high return individuals  $\sigma$ , and the higher the corruptibility of the administrator (inversely related to  $\gamma$ ). In the utilitarian social planner benchmark,  $t_A^* = 0$ , and thus  $|\Delta W| > |\Delta^{Utilitarian} W|$ , since  $t_A^* < 0$  in the case of biased ruler. It is straightforward to see why this is the case: the administrator maximizes the *net* payoff of group A, discounted by taxation. Since every dollar that group A can keep is multiplied by a negative tax rate, this increases the distortion generated by the administrator.

## 2 Empirical strategy

### 2.1 Context

The Democratic Republic of Congo has been considered a “failed state” since its collapse in the nineties (Fund For Peace, 2013). The economy organized around informal ethnic networks in order to cope with a predatory state, unable to protect property rights, as well as with the presence of armed groups (Mathys, 2014, Verweijen, 2013). The pervasiveness of holdup problems is often

argued to be a major factor that led the economy to specialize in small-scale transactions with minimal investments and risk (Geenen, 2013, Nest, Grignon and Kisangani, 2011).

The history of the Tutsi illustrates one of the major ethnic divides in Eastern Congo (consider the Tutsi to be group B in the framework of Section 1). Tutsi of Eastern Congo are historically cattle herders who migrated from Rwanda.<sup>2</sup> Tutsi populations in Eastern Congo are marginalized, often persecuted.<sup>3</sup> Except for certain battalions of the Congolese Army, Tutsi are largely excluded from the state administration in Eastern Congo and the administration's networks of patronage. For instance, the state administration of the Province of Sud Kivu is disproportionately composed of Bashi civil servants. The other ethnic groups are often portrayed as true autochthonous groups (consider such groups as belonging to group A in the framework of Section 1). Different conflicts characterize relationships among the "autochthonous" (non-Tutsi) groups. Batembos have a long history of struggle against (non-state) domination from Bahavus since the 1940s (Mathys, 2014, Newbury, 1992).<sup>4</sup> Conflicts over land and power involving the Batembos against other Bantu groups are still relevant today. Batembos also played a key role in the mobilization of local ethnic militias. Nevertheless, in contrast to the Tutsi, Batembos' citizenship and access to the state is uncontested.<sup>5</sup> In this paper, I refer to the "autochthonous" populations as Bantus, only to distinguish them from Tutsi.<sup>6</sup>

Batembos represent the most salient Bantu ethnic divide with deep historical roots. While Batembos have historical grievances with Bahavus and Bashi peoples, the Batembos cannot distinguish Bahavus from Bashis.<sup>7</sup>

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<sup>2</sup>The Eastern Province of Sud Kivu in the Democratic Republic of the Congo is composed of Bashis, Bahavus, Balegas, Batembos, Bafuliros, Pygmies, Tutsi, and to a lesser extent, Hutus, Babembes, Babuyus Babwaris, Bamasanze, Barundis and Baviras. Congolese Tutsi self-identify as belonging to Banyarwandas, Banyabwishas, or Banyamulengues depending on their location and the migration wave from which they arise.

<sup>3</sup>See Commission de l'immigration et du statut du réfugié au Canada (2013): "According to Minority Rights Group International (MRG), the population throughout much of the territory of both Kivus lives 'in a state of permanent insecurity.' The Banyamulenge and other ethnic groups in the DRC are identified on the MRG's list of the people most under threat. The DRC is ranked as the country with the seventh highest level of risk."

<sup>4</sup>See Commission de l'immigration et du statut du réfugié au Canada (2013): "According to MRG [Minority Rights Group International], 'prejudice against Banyamulenge interests remains entrenched in Kinshasa, including within the administration.'"

<sup>5</sup>See Mathys (2014): "Whilst in the case of the [Ba]tembo [...] this led to the emergence of local conflicts and local contestations of belonging, this did not lead to a contestation of the 'ethnic' (and thus 'civic') citizenship of these populations on the national scene."

<sup>6</sup>While the Tutsi can be considered Bantu, unlike other Bantu, they have strong genetic links with Nilo-Saharan populations, which underpins frequent discriminatory distinctions between the "autochthonous" Bantus and the Tutsi (Luis, J., Rowold, D., Regueiro, M., Caeiro, B., Cinniolu, C., Roseman, C., 2004). See Stearns (2011), Ngonzola-Ntalaja (2002), and Newbury (1992) for accounts of current ethnic relations in Sud-Kivu and their historical foundations.

<sup>7</sup>The language of Bahavus and Bashis is 80% identical according to Ethnologue (2016).

Acknowledging the context-specific meaning and interpretation of ethnicity, this paper does not aim at providing an externally valid estimate of the effect of ethnicity. Instead, given a particular social structure in which there are well-documented salient historical divisions, I examine the impact of state contracts within and across the groups defined by the socially relevant divisions.

## **2.2 Design: measuring the impact of state contracts on defection rates**

I organize a real delivery business, in which traders and customers are residual claimants, and observe the behavior of traders and customers.

### *The organization*

In June 2013, I recruited two Bukavu-based managers to create a new organization focused on selling cell phone credit recruiting customers door-to-door. I had pre-existing relationships with the managers, based on previously implemented research projects under their management. The managers rented an office in downtown Bukavu, and obtained all required authorizations to operate in Bukavu and the province. The managers created a system, drawing on Frontline SMS software and on direct cell phone transfers that allows to monitor payments. They then proceeded to mapping all neighborhoods of Bukavu in September, in collaboration with the local administrative authorities, in order to identify the ethnic composition of the neighborhoods. The organization aimed to sell to more than 1,000 customers, and recruited 20 traders for the task.

### *Recruitment of traders*

Having designed the protocols for the prospective sellers in the business to operate in such neighborhoods, the managers proceeded under my supervision to recruit the potential traders. The managers proceeded like local firms to recruit the traders: through social networks. Thus, they “posted” job openings in their social networks, and received calls by potential applicants. Since the design of the organization aims to capture the differential perception about contract enforceability by traders’ ethnicity, I randomly sampled pre-selected applicants by blocks defined by ethnicity. In order to maximize the statistical power to estimate such effect, I organized recruitment to achieve balance on ethnicity across traders: while 10 traders were Tutsi, 10 other traders belonged to the remaining Bantu groups (Bashi/Bahavu, Batembo) mostly. Importantly, all applicants were pre-screened on their levels of education, in order to avoid concerns about unobserved variables correlated with ethnicity. All traders were required to have a University degree. Finding applicants of both groups was equally straightforward.

### *Sampling of households*

Having established the organization, the team then proceeded to select potential households. Given the potential complexity of the operation, and in order to avoid potential concerns with the artificiality of the operations, I sampled like usual street sellers usually do: door-to-door. Thus, I preselected neighborhoods, and then randomly assigned each avenue of the neighborhood (which we had previously mapped) to a team of two traders. Teams were composed of one Tutsi trader and one Bantu trader, in order to reduce the variance of the estimator (introducing the possibility to use avenue fixed effects to absorb avenue specific characteristics that may correlate with outcomes). The manuals included protocols of how to sample households within each avenue. Using a list of pre-selected random numbers, I created a trader “dictionary” that indicated for each household in the sequence of households of the avenue, which of the two traders was assigned to it.

### *The transaction*

Traders sell a basic consumption good, door to door, to 971 randomly selected customers in ethnically diverse semi-urban neighborhoods of Bukavu. Traders offer discounted cell phone credit cards for sale on the spot. The customers who accept the deal commit to pay by cell phone within two days through a central payment system. The payment system allows to monitor payments made by each household.

### *The traders’ incentives*

While traders receive a fixed wage of 10 USD per day, they are also residual claimants on sales. The management kept detailed accounting of the transfers made by each household until the end of the study. Traders derive the largest part of their daily income through the cell phone credit card sales. Daily revenues from sales can oscillate between 0 if the trader is unsuccessful, and 50 USD if the trader sells in all targeted customers.

### *The contract intervention*

Absent enforceable state contracts or social sanctions, it is in the customer’s best interest to make the purchase while also renegeing on payment. At the time of presenting the sale to customers, traders explain that customers are required to sign a state-backed contract that exposes the customers to legal sanctions if they do not make the payment.<sup>8</sup>

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<sup>8</sup>A local lawyer drafted the state contract and the Ministry of the Interior certified it. The Ministry of the Interior stamped all contracts with the seal of the Ministry to certify their legal validity. One version of the state contracts used is shown in Figure A.4.

### *Ruling out selection*

The design tackles a selection problem. If traders would request customers to sign the contract only in some cases, a different pool of customers who were presented the sale with the requirement to sign a contract may opt-out of the sale. Thus, the composition of customers who accepted the sale and signed a contract may be different than the composition of customers who accepted the sale and did not sign a contract. I exploit the timing of the transaction to isolate the incentive effect of contracts. In Step 1, traders introduce the sale on credit and the state contract, and explain that signing the contract will be required in order to proceed with the purchase. The contract stipulates that the customer exposes himself to legal sanctions if he fails to pay within two days. Customers accept,  $B_{t=1} = 1$ , or reject the offer,  $B_{t=1} = 0$ . Once the customer has decided and the trader has recorded its decision, traders then examine a pre-recorded dictionary that randomly assigns customers who accepted the sale to one of two groups in Step 2a: those who proceed to sign the contract,  $F = 1$ , and those who no longer need to sign the contract,  $F = 0$ . To assign households to contract treatment status, I randomly generated a treatment roster using a statistical package. Based on the treatment roster, traders knew whether they had to use the contract or not. Traders were instructed that they could not find out about the specific treatment status of a household prior to offering the sale. Traders announce to the selected customers that while they lack enough contracts, their sales protocol specifies that they should nevertheless proceed with the transaction. The traders then record the final decision of the customer  $B_{t=2}$ . Analogously, at Step 2b, traders randomly lift the requirement to sign the contract among customers who rejected the initial offer,  $B_{t=1} = 0$ . Traders then allow these selected customers to reconsider their decision and traders record the final decision of the customer  $B_{t=2}$ . Immediately after, at Step 3, traders supply the cell phone credit cards to the customers who have accepted the purchase, and provide the payment instructions. All customers then respond to an exit survey. Furthermore, for all customers, the trader offers a predetermined amount of phone cards in exchange for immediate payment. I use this baseline sale to isolate the preference biases in the absence of agency relations. Due to the importance of expectations for the contract randomization, the activity was implemented fast (one day for each avenue) in order to prevent information spillovers between customers. The exit survey suggests that only 5% of customers had heard about the sale. Only one customer had heard that a state contract was being signed. Figure A.1 in the online appendix provides a graphical representation.

## 2.3 Conceptualizing empirical bias

There are  $n$  ethnicities. The term  $E_{i,j} \in \mathbb{R}^{n \times n}$  denotes the ethnic composition of the match between trader  $i$  and customer  $j$ . The terms  $F \in \{0; 1\}$  and  $C \in \{0; 1\}$  indicate respectively whether the transaction is formalized by a contract, and whether the sale is on credit. Let  $v(E_{i,j}, F) \in \mathbb{R}$  be the customer's valuation of the good, and  $\wp$  the price. Let  $B = 1$  denote whether the customer finally buys the good and 0 otherwise. The term  $l(E_{i,j}) \in \mathbb{R}$  denotes the expected cost of cheating arising from the legal system. The expected legal cost is a function of the ethnic group match, which can affect ex-post bargaining power to enforce contracts. Let  $P = \{0; 1\}$  indicate whether the customer implements the payment, and  $\theta(E_{i,j}, F)$  the expected cost from informal sanctions incurred by the buyer if he reneges payment,  $P = 0$ . The cost  $\theta(E_{i,j}, F)$  captures the sanctioning technology available to the ethnic match. This technology can consist of the activation of internalized social norms, or the activation of extrinsic social sanctions. The buyer's von Neumann-Morgenstern utility is:  $u_{BP} = B [v(E_{i,j}, F) - \wp P - (1 - P) (\theta(E_{i,j}, F) + Fl(E_{i,j}))]$ . Table 1 maps the parameter space onto the strategy set.<sup>9</sup> There are three possible strategies:  $\{B = 1, P = 1\}$ ,  $\{B = 1, P = 0\}$ ,  $\{B = 0, P = 0\}$ . The terms  $\alpha_i \in \{1, 2, 3, 4, 5\}$  denote the mass of agents in each strategy set as a function of state contracts. For instance,  $\alpha_3$ ,  $\alpha_4$ , and  $\alpha_5$  prefer to accept the offer and renege payment in the absence of state contracts. However,  $\alpha_3$  value the product enough that they are willing to accept a sale that requires to sign an a state contract that will force them to pay. In contrast,  $\alpha_4$  would not purchase the good if they were required to sign a state contract, since legal sanctions are sufficiently high to force them to pay, which would be dominated by rejecting the offer altogether. Finally,  $\alpha_5$  purchase the good and renege payment, because the legal sanctions are not high enough for them to pay. The term  $\alpha_3$  indicates the mass of customers who accept the offer, pay when they sign a contract, but do not pay if the have not signed a contract. Table 2 presents the selection and incentive effects.

I next discuss four testable implications. First, contracts have incentive effects if and only if  $\alpha_3(E_{i,j}) > 0$ . Second,  $E_{i,j}$  influences the incentive effect of state contracts through  $v(E_{i,j})$ ,  $\theta(E_{i,j})$ , and  $l(E_{i,j})$ . Since the state is captured by Bantus the ex-post power to enforce a state contract should be weaker for Tutsi than for Bantus, for a given customer. If  $v \perp l$  and  $v \perp \theta$ , then  $\frac{\alpha_3}{\alpha_3 + \alpha_4 + \alpha_5} |_{E_j=Tutsi} < \frac{\alpha_3}{\alpha_3 + \alpha_4 + \alpha_5} |_{E_j=Bantu}$  and  $\frac{\alpha_5}{\alpha_3 + \alpha_4 + \alpha_5} |_{E_j=Tutsi} > \frac{\alpha_5}{\alpha_3 + \alpha_4 + \alpha_5} |_{E_j=Bantu}$  if and only if:  $l(E_{i,j}) |_{E_j=Tutsi} < l(E_{i,j}) |_{E_j=Bantu}$ . Third, enforceable state contracts are a screening

<sup>9</sup>Figure A.2 in the online appendix provides a graphical representation.

device to attract customers with a higher likelihood to pay. To see this, note that the pool of customers who accept the offer when traders do not require a signature on a state contract,  $\alpha_1 + \alpha_3 + \alpha_4 + \alpha_5$  contains a larger fraction of customers who will not pay if a contract is lifted than the pool of customers who accept the offer when traders require state contracts,  $\alpha_1 + \alpha_3 + \alpha_5$ . Furthermore, if state contracts allow to cream-skin good customers, I can measure the quality improvement in the customer pool induced by contracts. The trader randomly lifts the requirement to sign a contract both among customers who initially refused and customers who initially accepted the sale. Thus, some of the customers who initially rejected the sale are now in the pool of customers who finally accepted the sale. This produces two self-selected groups of customers who finally accepted the sale (those who initially accepted and those who initially refused). Payment *rates* must be higher among customers who initially accept the offer and ended up not signing a contract  $\alpha_1 + \alpha_3 + \alpha_5$ , than among customers *only* accept the offer once the trader lifted the requirement to sign the contract in the second step,  $\alpha_4$ . Fourth, if state contracts are harder to enforce by Tutsi traders, then state contracts are a weaker screening device when they are used by Tutsi traders. Estimating the impact of traders' ethnicity on the screening power of contracts is challenging, because  $\theta(E_{i,j})$ ,  $v(E_{i,j})$ , and  $l(E_{i,j})$  are potentially arbitrarily correlated. Using sales on the spot, I can isolate whether ethnicity works through a pure ethnic preference channel. If customers have a preference bias against trading with Tutsi traders,  $v(E_{i,j})|_{E_j=Tutsi} < v(E_{i,j})|_{E_j=Bantu}$ , the mass of customers in sales on the spot who accept the sale when the trader is Tutsi must be lower than when the trader is Bantu. In the absence of preference-based discrimination, I can more comfortably rule out that arbitrary correlations linked to  $v$  and  $l$  explain the heterogeneous screening effect of contracts across groups. Indeed, in the absence of preference-based discrimination, I can exploit the following relationships. If Tutsi and Bantus are equally able to activate legal sanctions, then if  $\theta$  is lower for Tutsi traders, contracts will have a *stronger* screening effect for Tutsi traders. Also, if Tutsi and Bantus are equally able to activate informal sanctions, then if  $l$  is lower for Tutsi traders, contracts will have a *weaker* screening effects for Tutsi traders – since Tutsi are less likely to enforce state contracts and customers anticipate that.

## 2.4 Econometric specification

Let  $B_i \in \{0, 1\}$  indicate whether customer  $i$  accepts the sale offer from trader  $j$  in sales where delivery is on the spot. For sales on credit,  $B(t = 1)_i$  indicates whether the customer initially

accepts the sale and  $B(t = 2)_i$  indicates whether the customer accepts the sale in step 2, after the trader implements the randomization. Let  $P_i \in \{0, 1\}$  indicate whether the customer pays, which is only observed if the customer accepts the purchase. Let  $T_j \in \{0, 1\}$  denote whether the trader is Tutsi,  $F_i \in \{0, 1\}$  whether the trader maintains the requirement to sign a formal state contract to customer  $i$ , and  $C_i \in \{0, 1\}$  whether the sale is on credit. I randomly assign teams of two traders (one Tutsi, one non-Tutsi) to urban avenues, and I randomly assign customers within each avenue to one of the traders. The two traders in each team work separately. Finally, I randomly assign customers to withdrawal of the requirement to sign a state contract in step 2, within avenue  $\times$  trader. Avenue fixed effects are  $\eta_a$ , and team fixed effects are  $\phi_e$ . I run the following linear probability model:

$$P_i = c_0 + c_1 F_i + c_2 T_j + c_3 F_i T_j + \eta_a + \phi_e + e_{i,j} \quad (3)$$

conditioning on  $C_i = 1$  and  $B(t = 1)_i = 1$ . The parameter  $c_1$  captures the incentive effect of contracts requested by Bantu traders, while  $c_1 + c_3$  captures the incentive effect of contracts requested by Tutsi traders. A negative value for  $c_3$  indicates that contracts are less effective on the agent's behavior for Tutsi traders than for Bantu traders. To capture preference biases against Tutsi traders, I run the following linear probability model:

$$B_i = b_0 + b_1 T_j + \eta_a + \phi_e + e_{i,j} \quad (4)$$

conditioning on  $C_i = 0$ . The parameter  $b_1$  captures the mass of customers who would prefer to purchase if the trader was Tutsi, but not otherwise. A negative value for  $b_1$  indicates preference bias against Tutsi. To capture the screening effects of contracts, I run the following linear probability model:

$$P_i = d_0 + d_1 B(t = 1)_i + d_2 T_j + d_3 T_j B(t = 1)_i + \eta_a + \phi_e + e_{i,j} \quad (5)$$

conditioning on  $C_i = 1$  and  $F_i = 0$ . Payment,  $P_i$ , is only observed when  $B(t = 2)_i = 1$ . Hence,  $d_1$  captures the difference in payment rates among customers approached by Bantu traders, between customers who accepted head on and customers who accepted only when the trader lifted the state contract. Finally,  $d_1 + d_3$  captures the same effect for Tutsi traders.<sup>10</sup>

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<sup>10</sup>For all three specifications, a conditional logit produces analogous results.

### 3 Results

On average, 72% of customers are willing to accept the sale offer. Table 3 presents the result from econometric specification 3. Column (1) presents the baseline specification. Column (2) includes team fixed effects, column (3) also includes avenue fixed effects, column (4) includes both, as well as household-level controls. Household controls include size of the household in order to proxy for income, and a dummy indicating whether the customer purchased the phone credit when the trader offered it on the spot, to capture unobservable characteristics correlated with purchasing power. The coefficient on *Contract* in columns (1) to (4) shows that for Bantu traders, the requirement to sign a state contract increases the probability that the customer implements the payment by 38 percentage points, and I can reject the null that state contracts have no effect on payment at conventional levels. The coefficient on *Tutsi* is zero, suggesting Tutsi traders are equally able to obtain payment when no contract is requested. The coefficient on *Contract X Tutsi* is negative and significant, suggesting the effect of state contracts on payment is 58% weaker for Tutsi traders. Columns (5) to (8) restrict the sample to sales by Tutsi traders, and show that state contracts have no effect on payment when traders are Tutsi.

These results are consistent with the interpretation that the enforceability of contracts is heterogeneous, and depends on state capture by coethnics. Furthermore:  $\frac{\alpha_1}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Bantu} = \frac{\alpha_1}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Tutsi} = .24$ ,  $\frac{\alpha_3}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Tutsi} = 0 < \frac{\alpha_3}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Bantu} = .1$ , and  $\frac{\alpha_5}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Tutsi} = .75 > \frac{\alpha_5}{\alpha_1+\alpha_3+\alpha_5}|_{E_j=Bantu} = .65$ , consistent with  $l(E_{i,j})|_{E_j=Bantu} > l(E_{i,j})|_{E_j=Tutsi} = 0$ .

### 4 Mechanisms: ethnic contract enforceability

I next provide additional evidence suggesting that the results reflect the impact of state capture on contract enforceability.

#### 4.1 Beliefs

At the end of each transaction, the trader asked customers about the likely consequences of renegeing the payment. Table 4 presents the result from econometric specification 4 where the dependent variables are dummies indicating the consequences of renegeing payment. Columns (1) to (4) report the results on dummies indicating the answer of the customer to the following

question: “What consequences will there be if you do not pay?”<sup>11</sup> Column (5) includes as a dependent dummy indicating whether the customer answer yes to the question: “Will there be legal consequences if you sign this state contract and fail to pay?”<sup>12</sup> Column (1) shows 23% of customers report that there would be legal sanctions if they renege on payment.<sup>13</sup> Bantu customers are 53% less likely to expect legal consequences when asked by Tutsi traders, and the difference is statistically significant. Furthermore, Bantu traders are expected to be 45% more likely to activate legal sanctions among Tutsi customers than among non-Tutsi customers, and the difference is statistically significant. The effect of the customer ethnicity drops to zero when the trader is Tutsi ( $Tutsi\ Customer + Tutsi\ Trader \times Tutsi\ Customer$ ): customers of both ethnicities believe that Tutsi traders will not have much success if they tried to activate legal sanctions. Columns (2) to (3) suggest that Tutsi traders are less likely to be able to activate shame or loss of friends among Bantu customers who would renege payment. Furthermore, Tutsi customers fear physical violence if they renege payments, but only if they renege payment on a Bantu trader. This is again consistent with the main interpretation: Bantu traders are able to exert violence against Tutsi customers with impunity (not against Bantu traders), while Tutsi traders are not able to exert violence with impunity against any customer. Finally, column (5) indicates that 67% of Bantu customers believe that there will likely be legal sanctions if they signed a state contract and renege payment. This proportion drops by 17% when the customers signed a contract for Tutsi traders, and the difference is statistically significant. The coefficient on *Tutsi Customer* indicates that Tutsi customers are 11% more likely than Bantu customers to believe that contracts will lead to legal sanctions, when they the sale was implemented by a Bantu trader. This difference drops to zero for Tutsi traders. Figure 1 provides a graphical representation. In sum, customer beliefs are fully consistent with Tutsi traders being less able to enforce state contracts.

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<sup>11</sup>I include all customers across columns (1) to (4), because I am unable to link the exit survey to customer identifiers, which are linked to treatment assignment.

<sup>12</sup>Results are identical when I add controls for customer’s gender, age, and education.

<sup>13</sup>The sample also includes customers who did not sign a contract, suggesting 46% of those who sign a state contract expect legal sanctions.

## 4.2 Tastes

Traders may attract customers with different potential outcomes. Indeed, if the ethnicity of the trader induces customers to self-select, customers may differ in their private valuations for the sale and in the expected costs from legal sanctions, the main result could reflect selection bias induced by the ethnicity of traders. Table 5 presents the results from econometric specification 4. I focus on transactions in which the payment is immediate, in order to measure taste bias on traders' ethnicities. Columns (1)-(3) show the results on *Contract*, *Tutsi* and their interaction. As expected, the coefficient on *Contract* in column (1) is negligible.<sup>14</sup> Columns (2) and (3) show that traders' ethnicity has no effect on customers' willingness to accept the purchase. Columns (4)-(6) add team and avenue fixed effects and the results are identical. Thus, customers do not have an ethnic preference bias.

Having established that customers have no preference bias against Tutsi traders, the results from econometric specification 3 are simpler to interpret. Suppose that the absence of mean difference in purchase rates for Tutsi and Bantu traders in sales on the spot reflects that Tutsi traders do not induce self-selection in the form of a mean-preserving shift in the distribution of private valuations.<sup>15</sup> It must be that the distribution of  $\theta$  for customers who accept the sale from a Tutsi trader first order stochastically dominates the distribution of  $\theta$  for customers who accept the sale from a Bantu trader. Alternatively, it may be that the expected costs from legal sanctions  $l$  are lower for Tutsi traders. Table 3 showed that customers are equally likely to pay to Tutsi and Bantu traders when customers do not sign state contracts. This suggests that the mass of  $\theta$  without state contracts is comparable for Tutsi and Bantus, ruling out selection, and suggesting that the main result reflects that Tutsi traders are unable to enforce state contracts.

## 4.3 Screening

Even in the absence of ethnic tastes, the results may still reflect that traders may attract customers with different potential outcomes. Trader's ethnicity may change the composition of customers who self-select and induce a mean-preserving shift in the distribution of private valuations of customers who accept the sale. If private valuations are correlated with the expected costs from

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<sup>14</sup>I randomize the contracts after the sales on the spot are implemented.

<sup>15</sup>True if  $v$  follows a homogeneous distribution.

legal sanctions, selection could explain why customers purchasing from a Tutsi trader respond differently to signing a contract. I next provide additional behavioral evidence consistent with the main interpretation: the screening effects of contracts.

To identify the screening effects of contracts, I focus on acceptance at Step 2b. I use a linear probability model to regress a dummy indicating whether the customer ultimately accepts the deal,  $B(t = 2)$ , on the following dummy variables: Contract ultimately requested,  $Contract$ , whether the trader is Tutsi,  $Tutsi$ , and their interaction,  $Contract \times Tutsi$ . Table A.2 in the online appendix presents the results. Columns (1) to (3) report respectively the average effects of  $Contract$  on trade for Bantu traders, for Tutsi traders, and for all traders. Columns (4)-(6) follow the same logic, but include team and avenue fixed effects. Column (1) shows that customers are 13% less likely to accept to trade at this second step if a Bantu trader maintains the contract requirement. Column (2) shows that contracts have no effect on selection for Tutsi trader, and columns (3)-(6) confirm this result. This suggests that state contracts effectively help Bantu traders screen customers, potentially attracting better customers, but do not have such effect for Tutsi traders. Thus,  $\alpha_4|_{E_j=Tutsi} = 0$  and  $\alpha_4|_{E_j=Bantu} = .13$ . This, again, is consistent with  $l(E_{i,j})|_{E_j=Bantu} > l(E_{i,j})|_{E_j=Tutsi} = 0$ .

I then estimate the magnitude of this selection effect on customer quality. Among customers who ultimately accepted but did not have to sign a state contract, I compare the payment rates of customers who initially accepted the purchase to customers who initially rejected it. Table A.3 in the online appendix presents the result from econometric specification 5. Columns (1) to (3) show the baseline specification, and columns (4) to (6) add avenue and team fixed effects. Columns (1) and (4) focus on sales by Bantu traders, columns (2) and (5) restrict the sample to sales by Tutsi traders, and columns (3) and (6) include sales by all traders. The variable  $B(t = 1)$  indicates whether the customer accepted the initial offer when signing the contract was required for all. The coefficient on  $B(t = 1)$  measures the effect of screening on likelihood to pay, holding constant that a state contract was not signed. Columns (1) to (3) suggest that there is no effect of the contract requirement on the quality of the selected customers. With avenue and team fixed effects, columns (4) and (5) suggest that Bantu traders can use contracts to screen better customers. This section has shown that state contracts are enforceable, but only by groups who have captured the state.

## 5 Implications for trade and welfare

Having established that populations behave as if “autochthonous” groups can enforce state contracts, in this section I examine the impact of state contracts on the willingness of principals from “autochthonous” ethnic groups to engage in transactions where agency relations expose them to the risk of holdup.

### 5.1 Design: measuring the impact of state contracts on trade

Traders offer a household good at a discount door-to-door, with the requirement that customers must pay first, in order for the trader to deliver the good within two days (sales on debit). Traders visited 1,700 randomly selected customers near Bukavu and sold soaps. Soaps are particularly attractive items because they are relatively scarce in the areas in which the sales took place.<sup>16</sup> Traders offer five soaps to each customer (whose market price is 2.5 USD) for the price of two (1 USD). If customers accept the offer, they expect the trader to deliver the soaps within two days. This design creates a commitment problem that allows me to observe the behavior of the principals, the customers, caught in agency relations with the agents, the traders. In the absence of social or state-based mechanisms that provide traders with incentives to deliver the soaps, customers would refuse the offer even if they would prefer to purchase the soaps at that price in the absence of an agency relation with the trader. After the traders presented the offer and collected the payments, traders implemented an exit survey. Traders were recruited from the population of customers in which I implemented the activity in the first part of the paper. I thus exploit the behavior of the customers to draw inferences on their beliefs about the incentives of the agents, selected from the same population as the agents in the first part of the paper. I randomize customers to traders and require the trader to sign a state contract for a randomly selected customers as part of the sales protocol before the customer makes a decision. The state contract exposes the trader to legal sanctions if he does not deliver the soaps.<sup>17</sup> Upon delivering the soaps, the customers sign a receipt that certifies that the trader has delivered the soaps. This design allows me to identify the marginal effect of contracts on trade between coethnics and non-coethnics, and the interaction

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<sup>16</sup>Soaps are of comparable value in relative terms, and even at market prices, were in excess demand in semi-urban areas of Sud Kivu.

<sup>17</sup>A local lawyer drafted the contract, and the contract was validated and stamped by the Ministry of the Interior. Figure A.4 in the online appendix shows the state contract.

between state contracts and coethnicity in the presence of commitment problems. Traders explain that they need to collect the cash in order to purchase the soaps below market price from their supplier. I recorded whether the customers found this transaction strange. Less than 5% did.

To disentangle whether contracts and coethnicity improve the customers' beliefs about the behavior of the trader or they simply affect the customers' preferences, I implement sales without commitment problems to a random sample of customers. In such sales (sales on the spot), the trader offers the soaps on the spot in exchange for payment. If coethnicity increases trade because of a preference bias in favor of coethnics, coethnics should also be more successful in sales on the spot. I use the same contract in sales on the spot as for sales on debit. Since there is no longer uncertainty whether the trader will deliver the soap, I can estimate the effect of state contracts on sales, stemming from preferences of customers, which is unrelated to customers' delivery risk. Figure A.5 and Table A.4 in the online appendix provide respectively graphical representation, and the factorial design.

## 5.2 Econometric strategy

I examine the impact of state contracts and coethnicity on whether customer  $i$  visited by trader  $j$  buys the soaps,  $B_i \in \{0; 1\}$ . Let  $E_{i,j} \in \{0; 1\}$  denote whether customer  $i$  and trader  $j$  are coethnics,  $F_i \in \{0; 1\}$  whether customer  $i$  is assigned to a state contract, and  $D_i \in \{0; 1\}$  whether customer  $i$  is assigned to sale on debit, all of which are randomized at the customer level within village blocks. I sometimes include  $T_{vt}$ , a vector of village and trader fixed effects. I implement the following linear probability model:<sup>18</sup>

$$B_i = a_0 + a_1 E_{i,j} + a_2 F_i + a_3 D_i + a_4 E_{i,j} F_i + a_5 E_{i,j} D_i + a_6 F_i D_i + a_7 E_{i,j} F_i D_i + T_{vt} + e_{i,j} \quad (6)$$

State contracts solve commitment problems among non-coethnics if  $a_6 > 0$ .

## 5.3 Results

**Main result: impact of state contracts on trade.** I first estimate the effect of contracts and coethnicity on trade, in the presence of agency relations. Figure 2 presents the main result.

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<sup>18</sup>Results using conditional logit are identical.

When traders do not use state contracts, 48% of non-coethnics and 62% of coethnics accept to trade, and this difference is statistically significant. If, however, the trader uses a state contract, there is no statistically distinguishable difference between coethnics and non-coethnics in the rate of successful sales. The proportion of non-coethnics who accepts the sale rises from 48% to 69%, while the proportion of coethnic customers who accepts the deal remains unchanged. This suggests state contracts and coethnicity are substitutes.

**Mechanism: endogenous preferences vs incentives:** Some customers could have social preferences that are biased in favor of coethnics or in favor of traders who have state-backed contracts. Preferences could lead contracts and coethnicity to increase trade, without having any effect on commitment problems. In order to disentangle preferences from trust, I compare the effect of state contracts and coethnicity for sales in which commitment problems are present to sales in which they are not. I formalize the quantities that the experimental design aims to estimate.

The customer's utility depends on the monetary payoff of the trader, through a separable social preference parameter à-la Charness and Rabin (2002). The social preference weight depends on the ethnic characteristic of the match and whether the sale is formalized,  $F$ . For simplicity, let  $E = \|E_j - E_j\| \in \mathbb{R}$  denote the ethnic distance between the trader and the customer. Let  $\lambda(E, F)$  be the weight that the buyer assigns to the monetary payoff of the trader. The dummy  $D$  indicates whether the sale is on debit. Customers discount the future value of consumption by their subjective probability that the trader will deliver the good  $\eta(E, F, D)$  and by their discount factor,  $\beta(E, F, D)$ . In sales on the spot,  $\eta(E, F, D = 0) = 1, \forall E, F$ , and since the delivery is immediate  $\beta(E, F, D = 0) = 1, \forall E, F$ . The customer's utility is:  $U_B = B(\beta(E, F)\eta(E, F)v - \varphi + \lambda(E, F)\varphi)$ . In sales on the spot, the buyer's utility is:  $U_B = B(v - \varphi + \lambda(E, F)\varphi)$ .

I next describe straightforward testable implications. First, introducing an agency relation (sale on debit vs. sale on the spot) reduces the expected payoff that customers derive from the deal. This effect is larger the smaller is subjective probability that the trader will deliver the good as promised,  $\eta$ . Second, if the time preference parameter of the customer is unaffected by the characteristics of the trader, the effect of coethnicity in sales on the spot is smaller than the effect of coethnicity in sales on debit, if and only if coethnicity increases  $\eta(E, F)$ . Third, if the time preference parameter is independent of whether the trader signs a state contract, the effect of the state contract among sales on the spot is smaller than the effect of the state con-

tract among sales on debit if and only if the state contract increases the subjective probability of delivery,  $\eta(E, F = 1) > \eta(E, F = 0)$ ,  $\forall E$ . Finally, the state contract affects *less* among co-ethnics than among non-coethnics the impact of whether the delivery is uncertain, if and only if:  $\eta(E_i \neq E_j, F = 0) - \eta(E_i \neq E_j, F = 1) - (\eta(E_i = E_j, F = 0) - \eta(E_i = E_j, F = 1)) < 0$ .

I can now present the results. Table 6 reports the results from econometric specification 6, which includes both sales on debit and sales on the spot. Column (1) presents the main effect of *Sale on Debit* on trade in the whole sample. Column (2) restricts the sample to sales made on the spot and reports the main effect of *Contract*. Column (3) restricts the sample to sales made on debit and reports the main effect of *Contract*. In columns (4) and (5), I restrict the sample similarly, but focus on the coefficient on *Coethnicity*. Column (6) presents the coefficients in the fully saturated model, Column (7) adds household-level controls to the fully saturated model (age of customer, number of children in the household, and number of wives as proxies for household wealth), and Column (8) adds trader fixed effects. All columns include village fixed effects. The coefficient on *Sale on Debit* suggests that the proportion of customers who accepts the trade decreases by 19% when delivery is not immediate. Columns (2) and (3) show that contracts increase trade by 23 percentage points when delivery is in the future, but have no effect when delivery is on the spot. Columns (4) and (5) show the identical pattern for *Coethnicity*. Columns (6)-(8) show the fully specified model. The coefficients on *Sale on Debit X Contract* and *Sale on Debit X Coethnic* are both .32 and statistically significant. However, the coefficients on *Contract* and *Coethnic* are negative and insignificant, suggesting they do not affect trade when sale is on the spot. Thus, contracts and coethnicity increase trade, only when agency relations are inherent to the relationship between customers and traders. Finally, the negative coefficient on *Sale on Debit X Contract X Coethnic* suggests that the overall impact of contracts on trade is zero for coethnics in sales on debit. Results are unchanged with household-level controls or trader fixed effects in Columns (7) and (8).

This section established that introduction of state contracts where they were previously unused can increase trade among partners who do not share social institutions that govern agency relations. Furthermore, state contracts and coethnicity increase trade *because* they solve trade-related commitment problems. As a matter of fact, state contracts and coethnicity have no effect on customers' preferences for trade. The results suggest that state contracts and coethnicity are substitutes in order to solve commitment problems that prevent trade.

## 6 Conclusion

The state may have the capacity to enforce contracts, but enforcement ultimately relies on administrators. The administration is often in the hands of individuals, and especially social groups who use it to achieve their own goals (Greif, 2007). My results suggest that accounting for implementation, *effective* legal capacity of the state reflects underlying social equilibria that pre-exist in the absence of the state, and can generate distortions to incentives, even if the state has the capacity to enforce contracts.

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## TABLES

Table 1: Characterization of customers — customers as agents

<b>Stateless Strategies</b>	$B = 1,$ $P = 1$	$B = 0,$ $P = 0$		$B = 1,$ $P = 0$	
<b>Stateless Preference Ordering</b>	$1, 1 \succeq 1, 0$	$0, 0 \succeq 1, 0$		$1, 0 \succeq 1, 1$	
	$1, 1 \succeq 0, 0$	$0, 0 \succeq 1, 1$		$1, 0 \succeq 0, 0$	
			$1, 1 \succeq 0, 0$	$0, 0 \succeq 1, 1$	
<b>Conditions</b>	$\theta > \wp$ $v > \wp$	$\theta > v$ $v < \wp$		$\wp > \theta$ $v > \theta$	
			$\theta + l \geq \wp$ $v > \wp$	$\theta + l \geq \wp$ $v < \wp$	$\theta + l < \wp$
<b>Mass</b>	$\alpha_1$	$\alpha_2$	$\alpha_3$	$\alpha_4$	$\alpha_5$
<b>Label</b>	Honest peaches	Honest lemons	Dishonest peaches	Dishonest lemons	State indifferent

*Notes:* This table characterizes the strategies in the parameter space.

Table 2: Screening and Incentives – customers as agents

<b>Step 1</b>	<b>F=1</b>				
	$B = 0$		$B = 1$		
Selection: Who buys?	$\alpha_2 + \alpha_4$		$\alpha_1 + \alpha_3 + \alpha_5$		
<b>Steps 2a, 2b</b>	<b>F=0</b>		<b>F=1</b>	<b>F=0 F=1</b>	
	$B = 0$	$B = 1$	$B = 0$	$B = 1$	
Selection: Who buys?	$\alpha_2$	$\alpha_4$	$\alpha_2 + \alpha_4$	$\alpha_1 + \alpha_3 + \alpha_5$	
<b>Step 3</b>					
Incentives: Who pays?			$\alpha_1$	$\alpha_1 + \alpha_3$	

*Notes:* This table presents the selection and incentive effects when customers are agents. Traders request customers to sign a contract. Customers  $\alpha_2$  and  $\alpha_4$  reject the offer. Once customers have self-selected, the trader announces in a randomly selected subset of customers that he can no longer request a contract,  $F = 0$ , but the sale proceeds anyway. Customers  $\alpha_3$  take the opportunity offered by the contract withdrawal to avoid making a payment, despite they planned to pay, had they signed the contract.

Table 3: The determinants of shirking on payment — customers as agents

VARIABLES	(1) Pay	(2) Pay	(3) Pay	(4) Pay	(5) Pay	(6) Pay	(7) Pay	(8) Pay
Contract	0.09** (0.04)	0.08* (0.04)	0.09** (0.04)	0.09** (0.04)	-0.06 (0.05)	-0.07 (0.05)	-0.07 (0.05)	-0.06 (0.05)
Tutsi	-0.01 (0.04)	0.00 (0.04)	0.01 (0.04)	0.01 (0.04)				
Contract X Tutsi	-0.14** (0.06)	-0.16** (0.06)	-0.16** (0.06)	-0.15** (0.06)				
Constant	0.24*** (0.03)	0.41*** (0.07)	0.44* (0.22)	0.48** (0.23)	0.24*** (0.03)	0.44*** (0.09)	0.44 (0.27)	0.52* (0.29)
Observations	668	668	668	667	295	295	295	294
R-squared	0.18	0.17	0.22	0.22	0.18	0.13	0.19	0.20
Team FE	NO	YES	YES	YES	NO	YES	YES	YES
Avenue FE	NO	NO	YES	YES	NO	NO	YES	YES
Household controls	NO	NO	NO	YES	NO	NO	NO	YES

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This table presents the result from econometric specification 3, where the dependent variable is whether the customer pays. Column (1) presents the baseline specification. Column (2) includes team fixed effects, column (3) also includes avenue fixed effects, column (4) includes both, as well as household-level controls. Household controls include size of the household in order to proxy for income, and a dummy indicating whether the customer purchased the phone credit when the trader offered it on the spot, to capture unobservable characteristics correlated with purchasing power. Columns (5) to (8) restrict the sample to sales by Tutsi traders, and show that state contracts have no effect on payment when traders are Tutsi.

Table 4: Belief about contract enforceability, by trader's ethnicity – customers as agents

VARIABLES	(1) Legal sanctions	(2) Shame	(3) Loss of friends	(4) Physical violence	(5) Legal sanctions yes/no
Tutsi Trader	-0.13*** (0.03)	-0.08*** (0.02)	0.09*** (0.02)	0.01 (0.01)	-0.11*** (0.04)
Tutsi Customer	0.11* (0.06)	0.01 (0.06)	-0.02 (0.05)	0.10*** (0.03)	0.07 (0.09)
Tutsi Trader X Tutsi Customer	-0.10 (0.07)	0.01 (0.07)	0.07 (0.06)	-0.12*** (0.04)	-0.07 (0.11)
Constant	0.22*** (0.02)	0.16*** (0.02)	0.04*** (0.01)	0.03*** (0.01)	0.67*** (0.02)
Observations	971	971	971	971	764
R-squared	0.03	0.01	0.03	0.01	0.01

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This table presents the result from econometric specification 3 where the dependent variables are dummies indicating the consequences of renegeing payment. Columns (1) to (4) report the results on dummies indicating the answer of the customer to the following question: “What consequences will there be if you don’t pay?” I include all customers across columns (1) to (4). Column (5) includes as a dependent dummy indicating whether customers answer yes to the question: “Will there be legal consequences if sign this contract and fail to pay?” Results are identical when I add controls for customer’s gender, age, and education.

Table 5: Customers' ethnic bias in the absence of agency relations

VARIABLES	(1) Trade	(2) Trade	(3) Trade	(4) Trade	(5) Trade	(6) Trade
Contract	-0.04 (0.03)		-0.05 (0.04)	-0.03 (0.03)		-0.05 (0.04)
Tutsi		-0.04 (0.03)	-0.05 (0.04)		-0.04 (0.03)	-0.06 (0.04)
Contract X Tutsi			0.02 (0.06)			0.04 (0.05)
Constant	0.33*** (0.02)	0.33*** (0.02)	0.35*** (0.03)	0.10 (0.15)	0.10 (0.15)	0.13 (0.15)
Observations	1,010	1,010	1,010	1,009	1,009	1,009
R-squared	0.00	0.00	0.00	0.20	0.20	0.20
Team FE	NO	NO	NO	YES	YES	YES
Avenue FE	NO	NO	NO	YES	YES	YES
Traders	ALL	ALL	ALL	ALL	ALL	ALL

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This table presents the result from econometric specification 4. All regressions consider only sales on the spot, in which the trader provided the good on the spot in exchange of immediate payment. I regress a dummy variable indicating whether the trade occurred (Trade) on the dummy Contract, Tutsi, and their interaction. Contract indicates whether the household ultimately was requested to sign the contract in which he commits to pay by cell phone. Randomization was implemented by withdrawing the requirement to sign the contract in some households after they had accepted the deal. Tutsi indicates whether the trader is Tutsi, and Contract X Tutsi is their interaction. In column (1) I regress Trade on Contract only. Column (2) I regress Trade on Tutsi only. In column (3) I report the fully saturated regression model. Columns (4)-(6) replicate Columns (1)-(3) but include in addition team and avenue fixed effects.

Table 6: Effect of contracts and coethnicity on trade – customers as principals

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Trade	Trade	Trade	Trade	Trade	Trade	Trade	Trade
Sale on debit	-0.13*** (0.03)					-0.46*** (0.13)	-0.45*** (0.13)	-0.47*** (0.13)
Contract		0.06 (0.04)	0.12*** (0.03)			-0.03 (0.15)	-0.01 (0.15)	-0.03 (0.15)
Coethnic				-0.10 (0.09)	0.11* (0.05)	-0.13 (0.12)	-0.06 (0.12)	-0.13 (0.12)
Contract X Coethnic						0.09 (0.15)	0.06 (0.16)	0.11 (0.15)
Sale on credit X Contract						0.32* (0.17)	0.29* (0.17)	0.31* (0.17)
Sale on debit X Coethnic						0.32** (0.14)	0.25* (0.14)	0.34** (0.13)
Sale on debit X Contract X Coethnic						-0.28 (0.18)	-0.27 (0.18)	-0.29 (0.18)
Constant	0.70*** (0.02)	0.64*** (0.03)	0.53*** (0.02)	0.76*** (0.09)	0.50*** (0.05)	0.79*** (0.11)	0.79*** (0.12)	0.92*** (0.25)
Observations	1,854	622	1,232	622	1,232	1,854	1,188	1,854
R-squared	0.05	0.07	0.09	0.07	0.08	0.06	0.08	0.08
Household controls	NO	NO	NO	NO	NO	NO	YES	NO
Trader FE	NO	NO	NO	NO	NO	NO	NO	YES
Sample	ALL	SPOT	DEBIT	SPOT	DEBIT	ALL	ALL	ALL

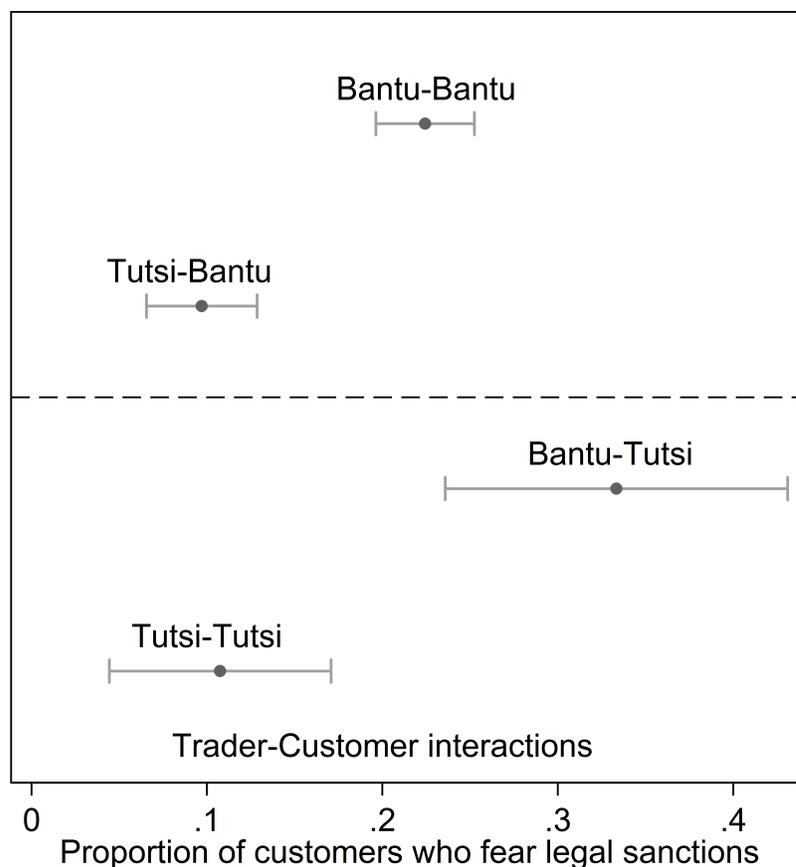
Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

This table presents the result from econometric specification 6. Column (1) presents the average effect of Sale on Debit in the whole sample. Columns (2) and (3) present respectively the average effect of Contract, in the sample of sales on the spot and the sample of sale on debit. Columns (4) and (5) present respectively the average effect of Coethnic in the sample of sales on the spot and the sample of sale on debit. Column (6) presents the fully saturated model. Column (7) includes household level controls (age, number of children, number of wives) and Column (8) adds trader fixed effects. All regressions include village/neighborhoods fixed effects. Customers are assigned to traders within villages/neighborhoods.

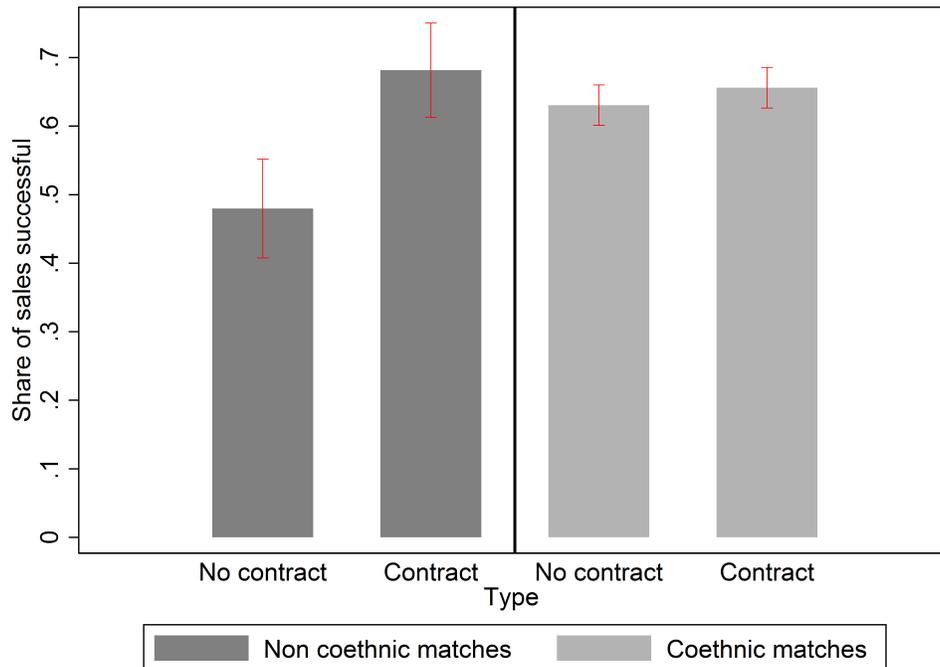
# FIGURES

Figure 1: Beliefs about contract enforceability – customers as agents



This figure presents the proportion of customers who believe that there will be legal sanctions if they do not pay, by the ethnic composition of the customer-trader match. I separate matches by whether the customer belongs to an “autochthonous ” ethnic group (Bantu), and whether the customer is Tutsi. For each type of customer, I include the proportion who believe that there will be legal consequences when the trader that visited the customer is Bantu, and the proportion who believe that there will be legal consequences when the trader that visited the customer is Bantu. I label each of the four interactions according to the ethnicity of the trader, followed the ethnicity of the customer. For instance, for a Bantu customer visited by a Tutsi trader, I label the interaction: Tutsi-Bantu. Intervals indicate the 95% confidence interval.

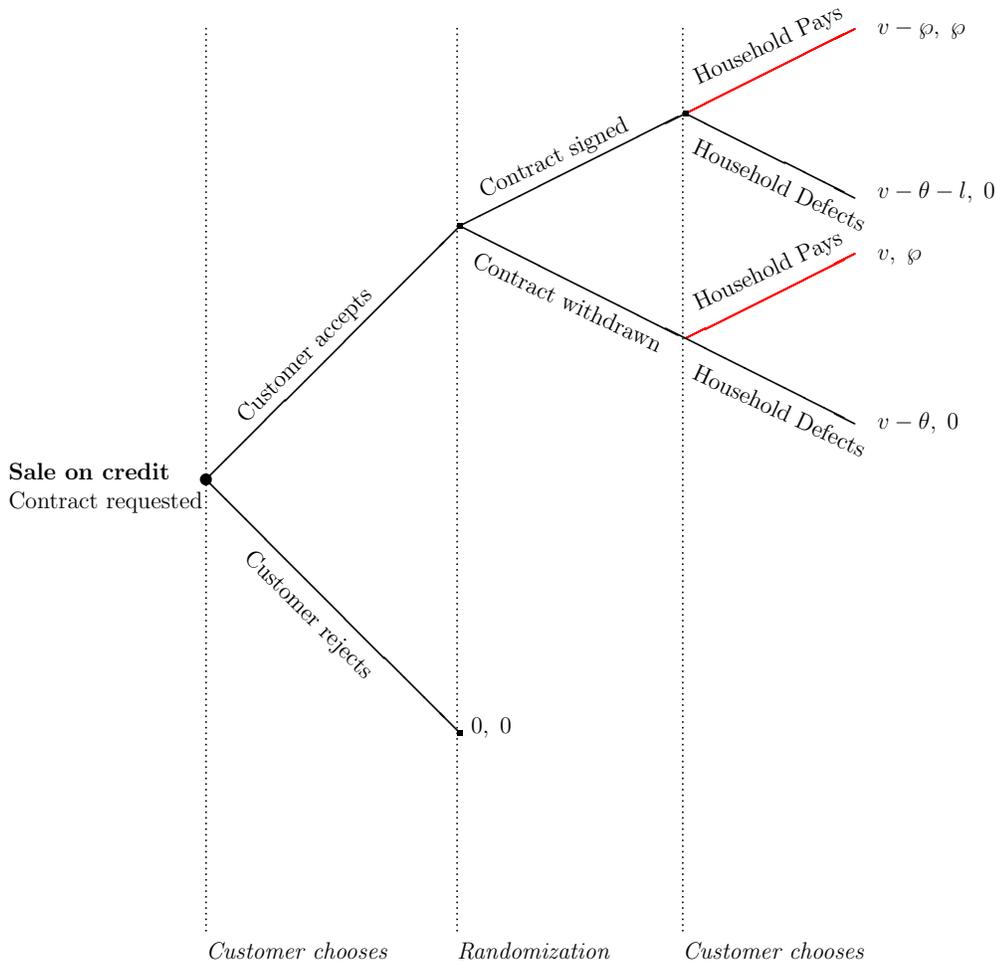
Figure 2: Effect of contracts and coethnicity on trade – customers as principals



This figure presents the main result when customers are principals. Traders implement sales on debit. In sales on debit, the trader promises to deliver the good in two days, in exchange of immediate payment by the customer. The vertical axis indicates the share of attempted sales that were successful. The first two columns show the share of successful sales among customers that are non-coethnics of the traders. Among these customers, the first column reports the share of successful shares for customers in which traders did not sign a contract, and the second, the share for customers in which the traders signed a contract. Columns 3 and 4 have the same interpretation, for sales in which traders and customers are coethnics. Intervals indicate the 95% confidence interval.

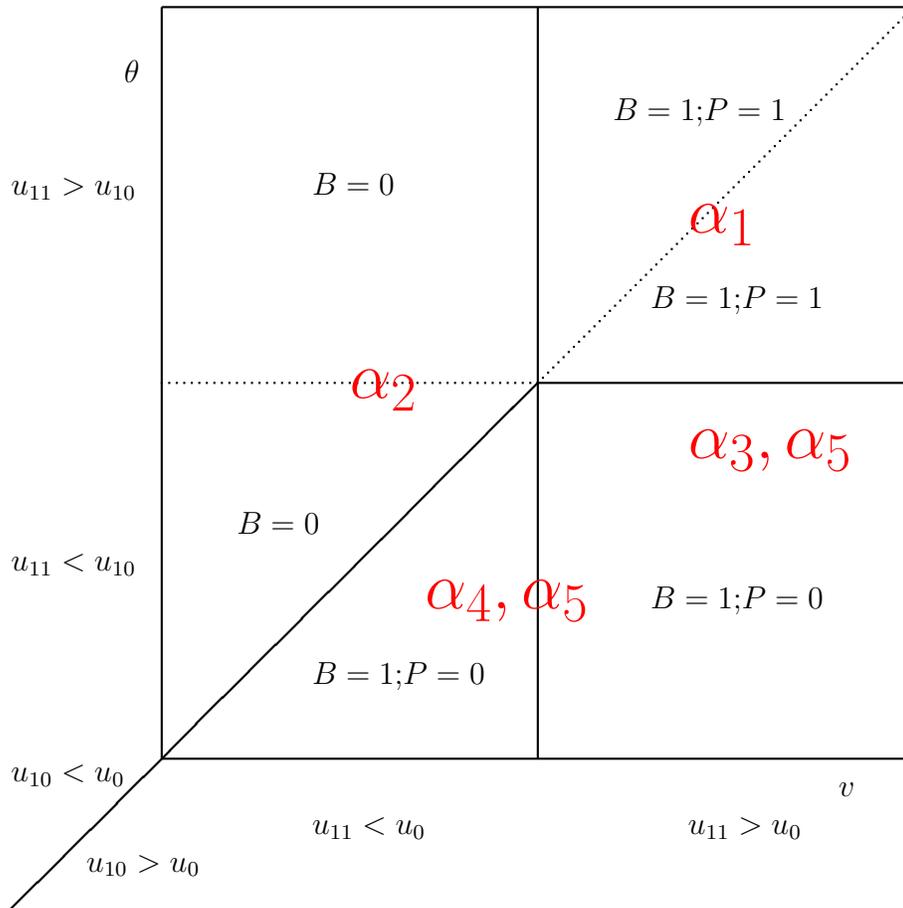
Figure A.1: Experiment design – customers as agents

## A For Online Publication



This graph illustrates the structure of sales when customers are agents. Traders present the offer to the customer. The trader informs the customer that he will make the good immediately available to the customer, if the customer promises to pay by cell phone in the near future (two days). However, all customers are informed that in order for the sale to be possible, the customer needs to sign a state-backed contract in which he commits to pay within two days. This is the sale on *credit*. The customer then accepts or rejects. Once the decision has been recorded, a random sample of customers is selected in which the requirement to sign the contract is withdrawn. To these customers, the trader announces “I see I do not have enough contracts. It is therefore not necessary to sign this contract and my protocol stipulates that in such cases we shall proceed with the transaction.” To the remaining customers, the requirement to sign the contract is maintained. The trader then leaves and the customer can pay or defect. The figure includes the payoffs that the trader and the customer would obtain.

Figure A.2: Customers' best responses in the parameter space – customers as agents



This figure maps the parameters to the best responses of the customer. Thick lines delineate areas where the observed strategies are different. Dotted lines delineate areas where the preference ordering change when state contracts are required, but leads to no change in observed behavior.  $\alpha_i \in 1, 2, 3, 4$  are the mass of customers in each of the cells. For instance, while  $\alpha_3$  and  $\alpha_4$  display the same behavior in the absence of contracts,  $\alpha_3$  values the good enough that he would be willing to accept a purchase requiring enforceable contract while  $\alpha_4$  would not.

Figure A.3: Instructions for payment by cellphone — customers as agents

**Coupon d'instruction pour payer les unites**

**1. PREMIER MESSAGE : Envoi de code de Ménage**

1. Entrer dans le menu message
2. Composer un nouveau message
3. Ecrire le code du ménage Exemple. A1.23
4. Envoyer message au +234 971 924 941

**2. DEUXIEME MESSAGE : Paiement (airtel)**

1. Entrer dans Outil ou STK, ou encore AIRTEL/ZAIN
2. Choisir C pour Toi
3. Entrer le nombre d'Unités a envoyer
4. Entrer le numéro de réception/ Destinataire : +234 971 924 941
5. Entrer le mot de passe (si pas personnel c'est généralement 1234)
6. OK ou YES

This figure shows the payment instructions given to the customer, when customers are the agents.

Table A.1: Testable Implications – customers as agents

Hypothesis	Testable implication
Preferences-based ethnic bias	$b_1 < 0$
Contracts have incentive effects when trader is Bantu	$c_1 > 0$
Contracts have incentive effects when trader is Tutsi	$c_1 + c_3 > 0$
Contracts have screening effects when trader is Bantu	$d_1 > 0$
Contracts have screening effects when trader is Tutsi	$d_1 + d_3 > 0$
Contracts have stronger incentive effects when trader is Bantu	$d_1 + d_3 > 0$
Smaller screening effect for Tutsi traders	$d_3 < 0$

This table presents the testable implications when customers are principals. Sales are either *on credit* or on the spot. In sales on credit, the trader first provides the good, and asks the customer to pay in the future by cellphone. In sales on the spot, the trader provides the good on the spot immediately upon receiving payment. The left column describes the hypothesis. The right column indicates the implied sign of the parameter in the corresponding specification. Let  $B_i \in \{0, 1\}$  indicate whether the customer accepts to buy. For sales on credit,  $B(t = 1)_i$  indicates whether the customer accepted the sale initially (when signing the contract was requested) and  $B(t = 2)_i$  indicates whether the customer accepted the sale after the randomization was implemented and they were asked to reconsider their choice. Let  $P_i \in \{0, 1\}$  indicate whether the customer pays for the transaction. This is only observed if the customer accepted the purchase. Let  $T_j \in \{0, 1\}$  denote whether the trader is Tutsi,  $F_i \in \{0, 1\}$  whether formal contracts are used, and  $C_i \in \{0, 1\}$  whether the sale is made on credit. In addition, let  $T_a \in \{0, 1\}$  be avenue fixed effects and  $T_e \in \{0, 1\}$  denote team fixed effects. Trader teams of two are randomly assigned to avenues. Within each avenue, traders are randomly assigned to customers. Finally the contract treatment is randomly assigned within avenue for each trader. The linear probability model specifications are as follows. To capture the incentive effects:  $P_i = c_0 + c_1 F_i + c_2 T_j + c_3 F_i T_j + A_a + T_e + e_{i,j}$  where I condition the sample on  $C_i = 1$  and  $B(t = 1)_i = 1$ . To capture ethnic preferences:  $B_i = b_0 + b_1 T_j + A_a + T_e + e_{i,j}$  where I condition the sample on  $C_i = 0$ . To capture the screening effects of contracts:  $P_i = d_0 + d_1 B(t = 1)_i + d_2 T_j + d_3 T_j B(t = 1)_i + A_a + T_e + e_{i,j}$  where I condition the sample on  $C_i = 1$  and  $F_i = 0$ .

Table A.2: Screening effect of state contracts, sales – customers as agents

VARIABLES	(1) Trade	(2) Trade	(3) Trade	(4) Trade	(5) Trade	(6) Trade
Contract	-0.10*** (0.04)	-0.01 (0.04)	-0.10*** (0.04)	-0.10*** (0.04)	-0.02 (0.04)	-0.08** (0.04)
Tutsi			-0.09** (0.04)			-0.08** (0.04)
Contract X Tutsi			0.10 (0.06)			0.06 (0.05)
Constant	0.79*** (0.03)	0.70*** (0.03)	0.79*** (0.03)	1.21*** (0.20)	1.29*** (0.20)	1.22*** (0.16)
Observations	525	436	961	525	435	960
R-squared	0.01	0.00	0.01	0.24	0.21	0.20
Team FE	NO	NO	NO	YES	YES	YES
Avenue FE	NO	NO	NO	YES	YES	YES
Traders	BANTU	TUTSI	ALL	BANTU	TUTSI	ALL

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This table presents the basic screening results. Columns (1) to (3) report the average effects of *Contract* on trade respectively for Bantu traders, Tutsi traders, and all traders. Columns (4)-(6) follow the same logic, but include team and avenue fixed effects. Column (1) shows that customers are 13% less likely to accept to trade at this second step if a Bantu trader maintains the contract requirement. Column (2) shows that contracts have no effect on selection for Tutsi trader, and columns (3)-(6) confirm this result.

Table A.3: Screening effect of state contracts, customer quality – customers as agents

VARIABLES	(1) Pay	(2) Pay	(3) Pay	(4) Pay	(5) Pay	(6) Pay
B(t=1)	0.24 (0.22)	0.25 (0.43)	0.25 (0.19)	0.39* (0.21)	0.00 (0.41)	0.35* (0.18)
Constant	0.00 (0.21)	0.00 (0.43)	0.00 (0.19)	-0.04 (0.22)	0.43 (0.42)	-0.06 (0.21)
Observations	201	154	355	201	154	355
R-squared	0.01	0.00	0.00	0.38	0.38	0.27
Team FE	NO	NO	NO	YES	YES	YES
Avenue FE	NO	NO	NO	YES	YES	YES
Traders	BANTU	TUTSI	ALL	BANTU	TUTSI	ALL

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

This table presents the result from econometric specification 5. Columns (1) to (3) show the baseline specification, and columns (4) to (6) add avenue and team fixed effects. Columns (1) and (4) focus on transactions with Bantu traders, columns (2) and (5) restrict the sample to sales by Tutsi traders, and columns (3) and (6) include sales by all traders. The variable  $B(t = 1)$  indicates whether the customer accepted the initial offer, in which signing the contract was required. The coefficient on  $B(t = 1)$  indicates the effect of screening on likelihood to pay, holding constant that a state contract was not signed. Columns (1) to (3) suggest that there is no effect of contract requirement on the quality of the selected customers. When I add avenue and team fixed effects, the coefficient in column (4) is positive and significant and the coefficient in column (5) is zero, suggesting that Bantu traders can use contracts to screen better customers, but Tutsi traders cannot.



Figure A.5: Experiment design: customers as principals



This graph illustrates the sale when customers are principals. I randomly allocate customers to either sale on debit or sale on the spot. In sale on debit, the trader makes the offer and requests payment immediately, in exchange for the promise of delivering the good to the customer in the near future (in two days). In sale on the spot, the trader makes the offer and requests payment immediately, but makes the good available to the customer immediately upon payment. Once the offer has been made, the customer can choose to accept it, in which case trade occurs, or reject it. In sales on debit, if the customer rejects, the sale ends, and if the customer accepts, then the customer makes the payment to the trader. Later, the trader may deliver the good, or may defect. In sales on the spot, if the customer rejects, the sale ends, and if the customer accepts, then the customer makes the payment to the trader and the trader immediately provides the good. The figure includes the payoffs that the trader and the customer would obtain.

Table A.4: Experiment design – customers as principals

	Coethnic trader	non-Coethnic trader
<b>Contract</b>	I	II
<b>No contract</b>	III	IV
<b>Sales on the Spot</b>		

	Coethnic trader	non-Coethnic trader
<b>Contract</b>	V	VI
<b>No contract</b>	VII	VIII
<b>Sales on Debit</b>		

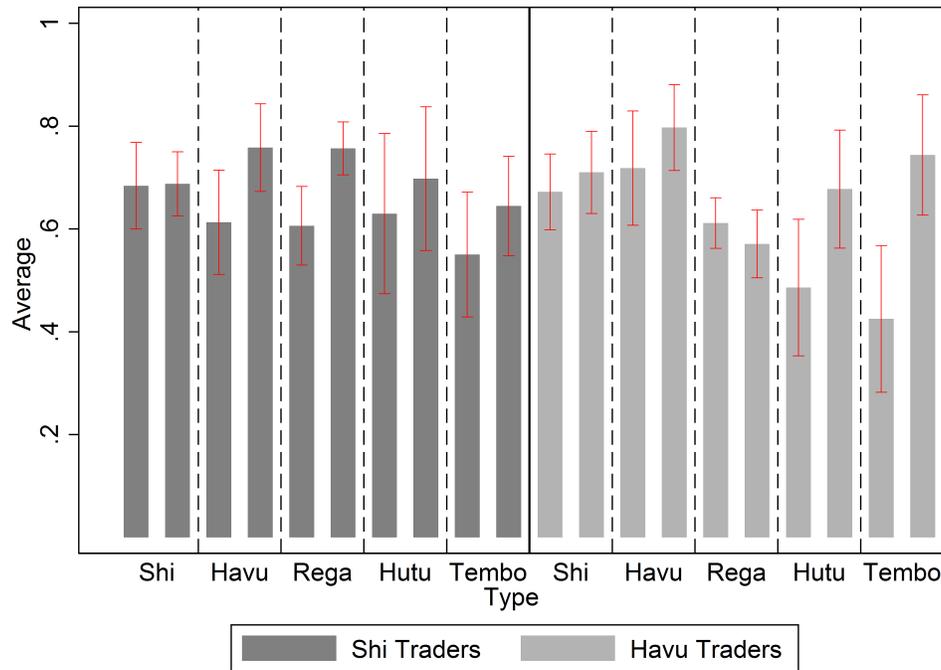
This table presents the factorial design when customers are principals.

Table A.5: Testable Implications – customers as principals

<b>Hypothesis</b>	<b>Testable implication</b>
Customers prefer to trade with traders of their ethnic group	$a_1 > 0$
Customers prefer to trade with traders that demonstrate to have state contracts	$a_2 < 0$
Contract dis-taste is larger among coethnics	$a_4 < 0$
Customers value more immediate delivery than future delivery	$a_3 < 0$
Customers trust more traders of their own ethnic group	$a_5 < 0$
Customers trust more traders who use contracts to back their delivery promise	$a_6 < 0$
Contracts improve trust less among coethnics	$a_7 < 0$
Contracts increase trust among coethnics	$a_6 + a_7 > 0$

This table presents the testable implications when customers are principals. The left column describes the hypothesis. The right column describes the testable implication in the framework of the econometric specification. Let  $E_{i,j} \in \{0;1\}$  denote whether the interaction is coethnic,  $F_i \in \{0;1\}$  whether formal contracts are used, and  $D_i \in \{0;1\}$  whether the sale is made on debit. In addition, let  $T_{vt}$  be village and trader fixed effects. The regression specification is:  $B_i = a_0 + a_1 E_{i,j} + a_2 F_i + a_3 D_i + a_4 E_{i,j} F_i + a_5 E_{i,j} D_i + a_6 F_i D_i + a_7 E_{i,j} F_i D_i + T_{vt} + e_{i,j}$ . Sales are either on debit or on the spot. In sales on debit, the trader promises to deliver the good in two days, in exchange of immediate payment by the customer. In sales on the spot, the trader provides the good on the spot immediately upon receiving payment.

Figure A.6: Disaggregation of the main effect by ethnic sub-group – customers as principals



This figure presents the main result when customers are principals, dis-aggregated by customers' and traders' ethnicity. Sales are implemented on debit. In sales on debit, the trader promises to deliver the good in two days, in exchange of immediate payment by the customer. The vertical axis indicates the share of attempted sales that were successful. There are two groups of columns. The first group columns on the left (dark columns) indicate the share of successful sales among customers visited by a Bashi trader. Columns are grouped in two for each ethnic group of the customer: the first column reports the share for customers in which traders did not show a contract, and the second, the share for customers in which the traders showed a contract. The second group columns on the left (light columns) indicate the share of successful sales among customers visited by a Bahavu trader and its interpretation is identical. Intervals indicate the 95% confidence interval.

## A.1 Incentive compatibility of traders

When traders are the agents, if traders accept payments and do not deliver the goods, their profits increase. To avoid traders reneging on their delivery promises, I design a cell phone monitoring system. Traders provide customers with a project cell phone number and instructions for how to register a complaint. In addition, I require traders to collect the customers' cell phone numbers during the exit survey. I inform the traders that the supervisor will contact a random sample of respondents to check whether the sales were implemented as planned.<sup>19</sup> I inform traders that their salaries would be withdrawn if they fail to deliver the soaps. Finally, traders collect the GPS coordinates of every customer in both the urban and rural areas. More importantly, traders work in a long-term basis for various research projects for the authors and fear huge losses in reputation if caught cheating.

Traders may be tempted to accept payments below the price set by the research project, hence extracting strictly positive surplus from customers that would otherwise have refused the purchase. To avoid this, I require traders to pay a fixed amount that is lower than the sales price for each pack of 5 soaps they sell. The supervisor verifies the stock of soaps and traders pay in proportion to the missing soaps. This strategy reduces the set of prices below the recommended price at which the traders would make positive profit. I recorded no sales at lower prices than recommended.

Traders may be tempted to sell above the price set by the project to extract additional surplus. I allow traders to sell above the price set by the project if customers agree to pay the higher price. To reduce the risk that traders would reallocate soaps to customers offering higher prices, I give traders enough soaps for all households that they had to visit. Also, traders could be tempted to violate the random allocation of households and select richer households to extract higher surplus. However, discovering the wealth distribution in the village is difficult.<sup>20</sup> Furthermore, I inform traders that researchers use statistical techniques such as randomization to verify implementation violations. Traders felt under very strict monitoring, especially by the data collection equipment they had at hand (tablets, gps devices).

## A.2 Sampling of customers

Traders randomly sample customers within each village in rural areas, and within urban avenues for urban neighborhoods. In the first day in the village (or in each urban neighborhood), traders establish a village census with assistance from village (or neighborhood) authorities. Traders based the random selection of households and their treatment on a list of randomly selected numbers that were previously created using a statistical package.<sup>21</sup>

## A.3 Script for contracts

The contract reads as follows: *“I, the undersigned... , recognize to have received ... cell phone units of the company ... from ... , for a value of 500 Congolese Francs per unit. I hereby commit*

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<sup>19</sup>I recorded no instance of fraud or cheating by traders, among all customers in which the Supervisor implemented the verification.

<sup>20</sup>See Sanchez de la Sierra (2015) for a description of how armed groups who are settled in the village struggle to discover the wealth distribution.

<sup>21</sup>For each village size, I generated a sequence of random numbers lower than the total number of households. Traders then selected the households whose numbers in the census they drew coincides with the randomly selected numbers.

*to pay ... in exchange of these cell phone units to ... in the interval of TWO days at most. I am ready to bring this contract, if necessary, to a legal representative. I recognize that in case of no payment, I am exposed to the prosecutions and sanctions that the Congolese law considers for these cases. Done in... . Date ... . Signature of debtor... Signature of creditor... Signature of witness... .”*

#### **A.4 Script for withdrawing contracts**

The script reads as follows: *“I see I do not have enough contracts. It is therefore not necessary to sign this contract and my protocol stipulates that in such cases we shall proceed with the transaction.”*