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Empirical approaches to trust and relational contracts☆

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ABSTRACT

Broadly speaking, economists have studied trust in two somewhat distinct ways. One approach is best captured by notions of generalized trust; another approach places trust at the core of relational contracts. After reviewing two empirical approaches to the study of relational contracts, we provide a preliminary attempt to bridge these two strands of the literature in the context of Rwanda's coffee supply chain.

> Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence. Arrow (1972)

1. Introduction

Trust is widely believed to be a cornerstone for economic development. Broadly speaking, economists refer to trust in two somewhat distinct ways. One strand of work notes that in many circumstances market participants trust others even in one-shot interactions due to, e.g., fairness concerns, internalize norms or heuristics under imperfect information (Boyd and Richerson, 1988). Measures of generalized trust, such as those in the World Values Survey, capture this notion of trust and are often used in empirical studies. For example, Knack and Keefer (1997) established a positive correlation between economic development and generalized trust (see also Guiso et al., 2004; Guiso et al., 2009).[1]

In many commercial transactions, however, legal enforcement is too costly or impractical to access (if not altogether unavailable) and parties remain exposed to each other's opportunism. In such circumstances, the decision of whether to trust a counter-party becomes strategic. The theory of repeated games formalizes trust as beliefs about the likelihood that the counter-party in an economic transaction cooperates out of strategic motives. Bilateral long-term relationships have received the most theoretical attention. Following Baker et al. (2002), we refer to those arrangements as relational contracts - "informal agreements sustained by the value of future relationships". Dynamic incentive compatibility constraints are a central feature of this approach.

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[1] Questions on trust along similar lines to those in the World Value Survey are also asked with respect to specific groups. We provide an example below.

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This theoretical body of work is consistent with accounts of the importance of long-term relationships in numerous industries. Macaulay (1963) first introduced the term "non-contractual relations" to study repeated, often informal, arrangements between businesses. Long-term relationships between firms are common and have been documented, e.g., by Richardson (1993); Nishiguchi (1994); MacDuffie and Helper (1997) and Helper and Henderson (2014) and Calzolari et al. (2021) in the automotive sector; Toni and Nassimbeni (1999) in electronics and machinery; Masten (1984) in aerospace; Banerjee and Duflo (2000) in software; Argyres et al. (2021) in airlines; Gereffi (1999); Amengual and Distelhorst (2020) and Cajal-Grossi et al. (2020) in apparel. Lafontaine and Slade (2007) and MacLeod (2007) provide classic reviews, Gil and Zanarone (2016) and Gil and Zanarone (2017) more recent ones. These arrangements could be particularly relevant in contexts in which the two main alternative ways to organize transactions – the market and the integrated firm – do not function well, as is often believed to be the case in developing countries. Macchiavello (2022) discusses the evidence on relational contracts and development.

The empirical study of relational contracts must confront a number of challenges. A first problem is data availability, as transaction records that identify buyers and sellers have been rarely available. In recent years, however, the situation has improved significantly, first with the diffusion of customs records and later with data on value added taxes and other sources. These data confirm that long-term relationships are very common. For instance, Monarch and Schmidt-Eisenlohr (2020) find that 80% of U.S. imports occur in pre-existing relationships. Although the majority of relationships are newly formed, in any given year pre-existing relationships that are three years or older account for roughly half of imports.

A second challenge, however, is that – even when transaction data are available – the value of future relationships is unobserved. For this reason, many existing studies rely on measures of a relationship's age to infer that a relational arrangement is in place. This is somewhat unsatisfactory since repeated trade *doesn't* imply relational trade.

This paper provides a preliminary attempt to build a bridge between the two strands of empirical literature on trust mentioned above: the literature on *generalized trust* and the literature on *relational contracts*. Before we do so, Section 2 reviews two empirical approaches to study relational contracts. The first approach, introduced in Macchiavello and Morjaria (2015), focuses on calibrating the dynamic incentive compatibility constraint that is at the heart of models of relational contracts. The second approach, of which Macchiavello and Morjaria (2021) provide an example, measures relational contracts through surveys. After reviewing these approaches, Section 3 revisits the measurement of relational contracts in Macchiavello and Morjaria (2021) using questions on bilateral and generalized trust along the lines of those in the World Value Surveys. In the context of the Rwanda coffee supply chain, we find that bilateral measures of trust correlate well with observed relational contracts, while measures of generalized trust do not. Section 4 offers concluding remarks.

2. Two empirical approaches to relational contracts

2.1. Basic concepts and empirical challenges

Basic concepts The simplest repeated game framework that formalizes trust is the infinitely repeated prisoner dilemma. Consider two symmetric players with common discount factor δ. With a (not so) slight abuse of notation, let us define actions and associated payoffs in the stage-game as follows: cooperation (C) when both parties take the actions they promised each other, defection (D) when one player deviates from the promised action while the opponent does not, and punishment (P) when both parties defect. If defection by one party is forever followed by defection by the other, a necessary condition for cooperation is

$$C + \frac{\delta}{1-\delta} C \geq D + \frac{\delta}{1-\delta} P \tag{1}$$

which we reorganize as

$$\underbrace{\frac{\delta}{(1-\delta)}(C-P)}_{\text{Value of the Relationship}} \geq \underbrace{D-C}_{\text{Temptation to Deviate}} \tag{2}$$

This simple reorganization has enormous intuitive appeal. An informal cooperative agreement between two parties can be sustained if, for each party, the net present value of cooperation (relative to mutual punishment) – which we label the *value of the relationship* – is larger than the *temptation to deviate*. In the words of Baker et al. (2002), page 40: *the value of the future relationship must be sufficiently large that neither party wishes to renege*. The future value of the relationship V thus pins down the extent to which parties can expose themselves to opportunism.

The theoretical literature captured salient features of real-life relationships, extending the simplistic framework above to consider monetary transfers between parties, imperfect information, risk sharing considerations, etc. (see Mailath and Samuelson, 2006; Malcomson, 2012 for reviews). While these models differ in important ways, they share the common tension between future rewards and current temptations captured by the dynamic incentive compatibility constraint in (2).[2]

[2] The constraint provides a necessary, but not sufficient, condition for cooperation: the repetition of mutual defection – the equilibrium of the stage game – is also an equilibrium of the repeated prisoner dilemma. We return to this issue below.

Empirical challenges The key difficulty in applying incentive constraint (2) to the data is that neither its left-hand side nor its right-hand side are (meant to be) observed in the data. The temptation to deviate on the right-hand side depends on off-the-equilibrium path payoffs associated with defection. By definition, off-the-equilibrium path actions are not supposed to be realized and thus observed in the data. Similarly, the relationship value V on the left-hand side depends, *inter alia*, on discount rates that are difficult to estimate and on beliefs about other players' future behavior on- and off- the equilibrium path. Those are also typically unobserved. We now review two distinct approaches that offer an explicit empirical characterization of relational contracts.

2.2. Inferring V from the data

The central idea in Macchiavello and Morjaria (2015) is that much can be learned if temptations to deviate are observed. At a minimum, temptations to deviate identify lower bounds to relationship value V. With further structure and in combination with shocks, however, they might help us distinguish between competing models and uncover the nature of the underlying relational contract.

The paper studies the export of roses from Kenya. Flowers being highly perishable and fragile, both trading parties are exposed to opportunism: the seller might not deliver flowers reliably and/or the buyer could claim that flowers did not arrive in the appropriate conditions and withhold payment while the seller could always claim otherwise. It would be difficult for anyone outside the relationship to adjudicate disputes - a problem exacerbated by the cross-border nature of the transaction.

Roses are thus exported in one of two ways: the *Flower Auction* in the Netherlands and direct long-term relationships with foreign buyers. These two channels have similar logistics but differ in terms of contractual arrangements. The *Flower Auction* provides institutional support for contract enforcement: flowers are inspected and graded, buyers bid for flowers, delivery is guaranteed and payments are enforced before the flowers are transferred to the buyers. Using the *Flower Auction* incurs higher transport costs (as the flowers travel through the Netherlands), fees, and prevents buyers and sellers from agreeing to long-term plans. Direct relationships on the other hand bypass these problems but expose parties to opportunism (indeed a survey we conducted with exporters revealed that formal, enforceable, contracts are not available to these relationships).

The key advantage of this context is that reference prices quoted in the spot market - the *Flower Auction* - allow to proxy for *a* temptation to deviate in the relational contracts. Consider a buyer and a seller that have agreed to trade a certain quantity q of roses at price p. In our context what do cooperation and defection imply? Cooperation entails that the seller delivers the flowers as promised and the buyer pays the promised amount upon receiving the flowers. The buyer could defect by withholding the promised payment. The seller could renege in many ways. One way would be to sell the roses promised to the buyer on the *Flower Auction* at price p^a – a deviation which is particularly profitable when the price at the auction is sufficiently high. Relating back to the inequality in (2), the incentive compatibility constraints for the seller and the buyer are given, respectively, by

$$V^s \geq (p^a - p)q \tag{3}$$

$$V^b \geq pq \tag{4}$$

Both temptations to deviate are directly observed in the data: they depend on actual trade between parties (p and q) and on prevailing prices at the *Flower Auction* p^a. Under certain conditions (3) and (4) can be aggregated (see, e.g., Malcomson, 2012) yielding

$$V \geq p^a q \tag{5}$$

The total value of the relationship $V = V^s + V^b$ has to be larger than that of flowers valued at the *Flower Auction* price: $p^a q$ provides a lower bound to the relationship value V.[3]

The model in the paper provides additional empirical guidance. In brief, prices at the auctions fluctuate seasonally but are predictable: parties thus structure their relationship taking into account such fluctuations. The time of the largest aggregate temptation to deviate provides the tightest bound to V. For most relationships, the week of Valentine's Day is the time in which the temptation to deviate is the largest – both because prices at the *Flower Auctions* are highest and because suppliers have planned to increase traded volumes to meet the peak demand. A structural test reveals that Eq. (5) is binding and, therefore, roses exchanged on Valentine's Day and valued at the prevailing *Flower Auction* prices identify the value of the relationship value V.[4]

The left panel in Fig. 1 illustrates the estimated relationship values. Estimated V is 384% of weekly turnover in the average relationship (270% and 161% for the average buyer and seller respectively). Relative to estimates of the fixed costs of

[3] Note that this formulation allows us to remain agnostic on what happens after a party deviates – in practice, firms could terminate the relationship or temporarily suspend, or reduce, cooperation, (e.g., lowering trade volumes).

[4] If small fluctuations in p^a do not change V, a binding *DICC* implies $\frac{\partial \ln(q)}{\partial p^a} = -1$ in the week in which the temptation is largest and not in other weeks. This hypothesis is not rejected by the data.

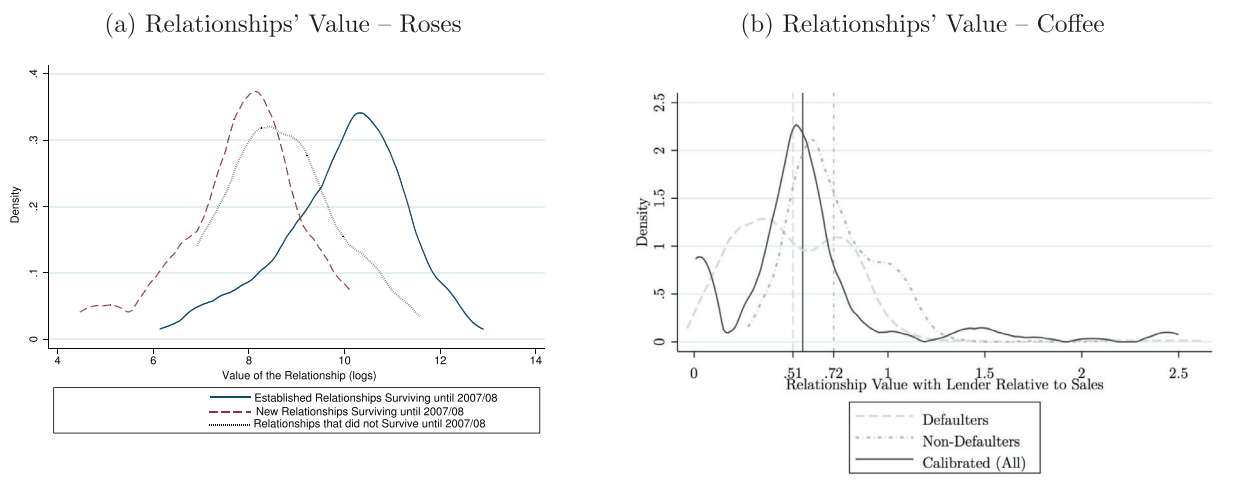

Fig. 1. Value of relationships. The left panel reproduces Figure 7 from Macchiavello and Morjaria (2015). The Figure illustrates the distribution of the value of relationships for the 2006/07 harvest season. The figure distinguishes established relationships that survive into the following season (solid line); newly formed relationships (dashed line); and relationships that do not survive onto the next season (grey line). Relationships that survive have higher value than relationships that do not (p-value < 0.01). Established relationships have higher value than newly formed ones (p-value < 0.01). The right panel reproduces Figure 11 from Blouin and Macchiavello (2019). The Figure compares estimated relationship values obtained from the approach that infers relationship values from temptations to deviate with estimates obtained from fitting a structural model of contract choice. In Blouin and Macchiavello (2019) actual defaults are observed in the data. The approach based on temptations to deviate thus allows us to recover a higher and a lower bound for the value of the relationship for defaulters and non-defaulters respectively. The calibrated relationship values are within the bounds obtained from the revealed preference approach despite the two approaches relying on different sources of identification. Vertical lines report average estimated relationship values for the three different estimates.

exporting in the literature, estimated V appear to be substantial. Estimated V increase with relationship's age. While this is to some extent driven by selection (less valuable relationships are less likely to survive into the following growing season), V increases as parties trade over time.[5]

Dynamic incentive compatibility constraints can be taken to the data in other contexts. The bulk of the variation in estimated relationship values V stems from variation in the amount of flowers traded on Valentine's Day - in this context, this is the relevant dimension that captures how parties expose themselves to opportunism. In other contexts, the relevant observable terms will be different. Detailed institutional knowledge of the context is needed to capture the salient aspects of the underlying relational contract (see Barron et al., 2020 for a nice example in the movie industry).

Blouin and Macchiavello (2019) estimate relationship values in the international coffee market with a similar approach to Macchiavello and Morjaria (2015) (see Fig. 1, right panel). Unlike Macchiavello and Morjaria (2015), however, their data contain information on defaults. Typical datasets only record the trade that takes place – not the trade that *was supposed* to take place. When defaults are observed it becomes possible to investigate the extent to which parties engage in off-the-equilibrium path behavior. Exploiting unanticipated changes in international coffee prices, Blouin and Macchiavello (2019) estimate that around 50% of observed defaults are strategic – i.e., the seller fails to deliver the agreed-upon amount of coffee even when it would have been feasible to do so. Buyers respond to instances of strategic default by terminating the relationship and to the possibility of default by modifying contract terms – i.e., offering price-indexed contracts (instead of fixed-price ones) that are robust to strategic default. Observed defaults thus understate the substantial efficiency losses that arise in anticipation of the possibility of strategic default.

2.3. Using surveys to measure relational contracts

In many contexts data on transactions between parties with information on relevant temptations to deviate might not be available. A distinct approach is to measure relational contracts through appropriately designed surveys. Relational contracts allow parties to utilize knowledge of their particular situation and are deeply rooted in parties' specific circumstances. Measuring relational contracts through surveys thus also requires detailed contextual knowledge and bespoke survey tools tailored to the relevant relational practices. It might be difficult to standardize questions about relational contracting across a wide range of industries. This approach might be best suited to "within-industry" studies.

[5] An important question is, of course, why are relationships so valuable in this context? Macchiavello and Morjaria (2015) exploit an exogenous supply shock to answer the question. The data reveal an inverted-U pattern between relationship's age and reliability at the time of the shock – a pattern best accounted for by a relational contract in which exporters build a reputation for reliability over time. Enforcement and insurance considerations alone cannot account for the importance of relational contracts in this context.

The use of surveys has a long tradition, particularly so in development economics (see, e.g., Banerjee and Duflo, 2000; McMillan and Woodruff, 1999). Calzolari et al. (2021) and Ghani and Reed (2022) provide two recent examples more directly focused on relational contracting. The former studies the role of trust (and competition) in enhancing relationship-specific investments in the automotive industry using a novel survey of first-tier buyer-supplier procurement in the German automotive industry. They find that higher trust enables more competition in the procurement of parts. Ghani and Reed (2022) study how relational contracts evolve in response to changes in market conditions in the market for ice in Sierra Leone's fishing industry. Detailed interviews with fishermen and ice sellers illustrate how parties were able to successfully restructure their relationships on new terms following a break-down caused by a change in competition.

Macchiavello and Morjaria (2021) focus on a sector – coffee mills in Rwanda – in which around 200 coffee mills (buyers) source coffee cherries at harvest from around 400,000 coffee farmers (suppliers). Due to widespread market failures, the sale of coffee at harvest would ideally be bundled with the exchange of credit and services in both directions over the course of the entire coffee season. Such exchange cannot be supported by formal, enforceable contracts and must thus rely on relational contracts.

The authors survey managers and a random sample of farmers around each mill to measure multiple relational practices: (a) mill's provision of credit and inputs to farmers before harvest; (b) farmers selling on credit to mills during harvest and mills paying second payments/bonuses post-harvest; (c) other forms of mill's assistance to farmers post-harvest. Reports of the adoption of such relational practices by mills' managers and surrounding farmers is strongly correlated in the data – giving confidence that the survey captures the actual use of relational contracts. Furthermore, the adoption of these relational practices correlates strongly with mill performance measured both as unit cost of production (unit cost per kg of coffee output) and capacity utilization.

The central focus in Macchiavello and Morjaria (2021) is to test the prediction that, if relational contracts matter, an (exogenous) increase in competition raises temptations to deviate and potentially lowers relationship value – thus making it harder to sustain relational contracts. The authors test this hypothesis measuring mill-level competition with the number of mills within a 10-km radius from the mill. To deal with endogeneity concerns, they propose an instrument based on the idea that – conditional on suitability for mill's placement within a mill's catchment area – suitability in the (doughnut) region around a mill provides an instrument for competition. Conditional on the suitability for mills' placement within the catchment area, mills surrounded by more suitable areas: (i) face more competition from other mills; (ii) use fewer relational contracts with farmers; and (iii) exhibit worse performance. Further tests suggest that an additional competing mill reduces the aggregate quantity of coffee supplied in the local market and makes farmers worse off.

In sum, we have reviewed two distinct approaches to the empirical study of relational contracts. Macchiavello and Morjaria (2015) infer the value of relational contracting from transaction records that allow for a calibration of dynamic incentive compatibility constraints. Macchiavello and Morjaria (2021), instead, measure the appropriate relational contracting practices through surveys in the field. Besides measurement, the two papers also differ in focus and empirical strategy. The former asks whether trading parties behave as if relational contracting considerations are important and use a supply shock to distinguish between different theoretical mechanisms. The latter, instead, asks whether markets behave differently when relational contracting is important by exploring the comparative static effect of competition on whether dynamic incentive constraints can be satisfied.

3. Relational contracts and trust in Rwanda

This section returns to the coffee mills and their surrounding farmers in Rwanda studied in Macchiavello and Morjaria (2021) and attempts to build a (preliminary) bridge between the two empirical literatures mentioned above: the literature on *generalized trust*, and the literature on *relational contracts*.

Such a bridge would be useful for two reasons. First, there is a large literature that relies on questions from, or similar to, those in, the World Value Survey to measure generalized trust as well as trust towards particular groups. Given the central role that trust plays in relational contracting, it is natural to ask whether measures of relational contracts correlate with trust elicited through standard questions.[6]

Second, establishing the extent to which generalized trust correlates with the adoption of relational contracts might inform us about the barriers that prevent relational contracts from emerging. As noted above, the dynamic incentive compatibility constraint provides a necessary – but not sufficient – condition for relational contracts to emerge. In many contexts, particularly so in developing countries, there appear to be valuable relational agreements that *do not* take place. For example, Bubb et al. (2018) experimentally show that limited enforcement of water transactions causes significant output losses between neighbouring farmers in rural India. It is remarkable that farmers living next to each other with plenty of opportunities to interact repeatedly fail to develop well-functioning relational contracts.

Could a lack of generalized trust hinder the emergence of relational contracts? The answer is not obvious. Generalized trust could increase the *supply* of relational contracts, e.g., by leading to more optimistic beliefs about the counter-party's trustworthiness thereby encouraging experimentation with new relationships. For example, Blouin (2021) combines lab-in-the-field and historical natural experiments to document how a negative inter-ethnic history between the two salient ethnic

[6] For example, Calzolari et al. (2021) interpret an increase in the discount factor δ – which makes it easier to satisfy the dynamic incentive compatibility constraint – as an increase in trust. Other formalizations of trust are also possible (see, e.g., Guiso and Makarin, 2020 for a recent example).

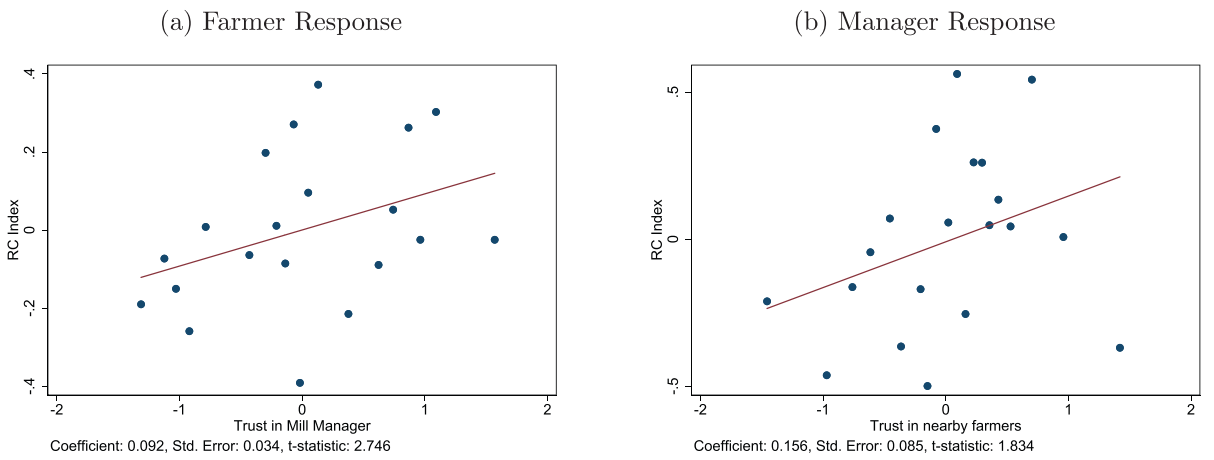

Fig. 2. Trust and relational contracting. Binned scatter plot of farmer (Subfigure a.) and mill (Subfigure b.) level regressions. All regressions control for mill characteristics (NGO-support, cooperative status, mill age, mill age squared and mill coordinates). Geographical controls also include average engineering suitability score, average spring presence, road density, tree density, rivers, a flexible control of FAO-GAEZ coffee suitability, elevation and slope, all within 5 km of the mill. The dependent variable in both regressions is the Relational Contracting (RC) Index. The RC Index is an aggregate of farmer- and mill manager- based indicators of mill-provided inputs, second payments, and post-harvest loans. Farmer and mill manager responses are equally weighted. Trust in the mill manager is a survey measure of trust in people from Kigali reported by farmers on a 1–4 scale (where 1 = Not at all, and 4 = Completely). For managers, we use a survey measure of trust in nearby farmers recorded on a 1–4 scale (where 1 = Not at all and 4 = Completely). For additional details on the 2012 mill and farmer survey, please refer to Macchiavello and Morjaria (2021).

groups in Rwanda and Burundi lowers trust and relationship formation between farmers. On the other hand, generalized trust might also lower the *demand* for relational contracts – if parties can trust each other even in one-shot transactions, there might be less of a need for relational arrangements.

Trust and relational contracts Our first step is thus to check whether the measure of relational contracts correlates with answers to trust questions. The survey asked both farmers and managers a battery of trust questions along the lines of those asked in the WVS. Fig. 2 reports the results. We keep the same baseline specification as in Macchiavello and Morjaria (2021), i.e., control for the local suitability for coffee cultivation and mill placement, as well as for various mill characteristics. The survey asked both mill managers about their trust towards surrounding farmers and farmers about their trust towards the manager of the coffee mill.[7] In both cases, Fig. 2 documents a positive and statistically significant correlation between trust measures and the use of relational contracts at the mill. This suggests that the relational contract measure picks up practices that rely on parties trusting each other.

This reassuring aspect of the measurement is confirmed by looking at the reduced form relationship between Macchiavello and Morjaria (2021)'s instrument for competition – the suitability for mill's placement in the doughnut around the mill mentioned above – and the bilateral trust measures. In Fig. 3 competition lowers trust reported by farmers towards managers and by managers towards farmers (the latter is not statistically significant at conventional level). This further corroborates the idea that the trust questions indeed proxy for the degree of trust in these relationships.

Generalized trust and relational contracts We use data from the World Value Survey 2012 (coincidentally, 2012 is also the year we fielded our surveys) in Rwanda to explore the extent to which generalized trust correlates with the adoption of relational contracts. The World Value Survey allows us to construct measures of generalized trust in the local Rwandan population. Unfortunately, the WVS is representative at the district-level and data are thus released with the district as the lowest administrative unit identifying the location of the interview. We can thus only conduct our analysis at the district level, a unit of observation that is wider than the typical catchment area of a coffee mill.[8] Nevertheless, we correlate the average measure of generalized trust in the population with the use of relational contracts at the coffee mill.

Fig. 4, Subfigure (a) reports the results using the standard question about generalized trust from the 2012 WVS (*'Generally speaking, would you say that most people can be trusted or that you need to be very careful?'*). We find no correlation between the general trust in the district and the adoption of relational contracts by mills located in the district. There is a negative slope between lower generalized trust and prevalence of relational contracts, but one that is far from being statistically significant.

One possibility is that the measure of generalized trust confounds the demand and supply effects mentioned above – yielding a null correlation. One way to check this is to consider a more refined notion of generalized trust: trust in new

[7] In practice, because there is only one mill manager, the survey team advised us to ask farmers about their trust towards people from the capital city, Kigali, to reduce concerns that farmers might feel inappropriate to truthfully reveal their (low) trust towards the mill managers.

[8] Catchment area of a typical mill is approx. 79 km^2; a typical district is approx. 800 km^2.

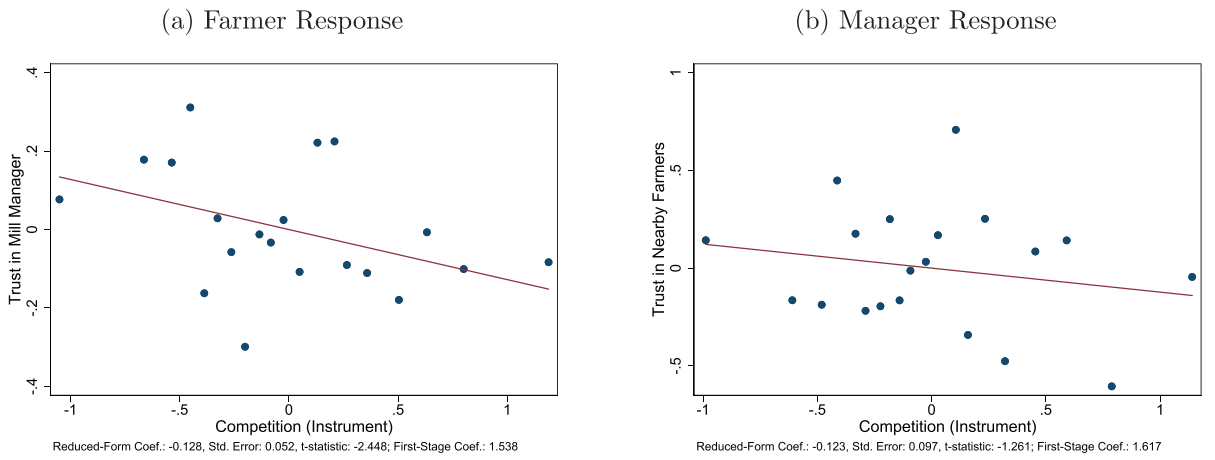

Fig. 3. Trust and competition. Binned scatter plot of farmer (Subfigure a.) and mill (Subfigure b.) level regressions. All regressions control for mill characteristics (NGO-support, cooperative status, mill age, mill age squared and mill coordinates). Geographical controls also include average engineering suitability score, average spring presence, road density, tree density, rivers, a flexible control of FAO-GAEZ coffee suitability, elevation and slope, all within 5 km of the mill. Additional farmer controls in Subfigure (a) include farmer age, education, gender, schooling, cognitive score, cooperative membership and number of coffee trees (in logs). Manager controls in Subfigure (b) include manager age, education, tenure at the mill, training received, months of full-time employment and total income (in logs). Competition is measured as the number of mills within 10 km radius, and is instrumented with the engineering model score in locations 5 to 10 km away from the mill. Trust in the mill manager is a survey measure of trust in people from Kigali reported by farmers on a 1–4 scale (1 = Not at all and 4 = Completely). For managers, we use a survey measure of trust in nearby farmers recorded on a 1–4 scale (1 = Not at all and 4 = Completely). For additional details on the 2012 mill and farmer survey and instrumental variable construction, please refer to Macchiavello and Morjaria (2021).

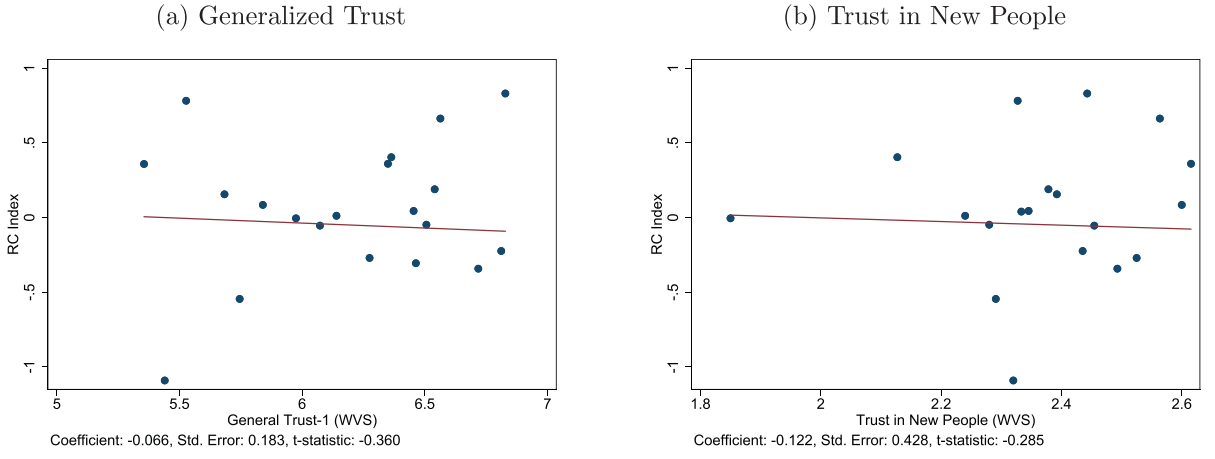

Fig. 4. General trust and relational contracts, WVS Binned scatter plot of mill-level regressions. All regressions control for mill characteristics (NGO-support, cooperative status, mill age, mill age squared and mill coordinates). Geographical controls also include average engineering suitability score, average spring presence, road density, tree density, rivers, a flexible control of FAO-GAEZ coffee suitability, elevation and slope, all within 5 km of the mill. The RC Index is an aggregate of farmer- and mill manager- based indicators of mill-provided inputs, second payments, and post-harvest loans. Farmer and mill manager responses are equally weighted. For additional details on the RC index please refer to Macchiavello and Morjaria (2021). Subfigure (a) uses a World Values Survey (2012) self-reported measure of trust in most people question, (where 1 = Most People Can be Trusted; 2 = Need to be Very Careful). Subfigure (b) uses another measure from WVS (2012) which is on a scale of 1–4 scale, to the question would you trust 'People You Meet for the First Time' (where 1 = Trust Completely; 4 = Do not Trust at All).

people. Subfigure (b) of Fig. 4 reports results with this measure. Again, the estimated coefficient is small and far from statistically significant.

One possibility is, of course, that measuring trust at the district level does not yield sufficient variation in the data. In the surveys we conducted with farmers and managers we also solicited responses to generalized trust questions along the lines of those fielded by the WVS. We can thus check whether the in-sample measures of generalized trust correlate with the use of relational contracts. Of course, any such correlation should be interpreted cautiously due to the possibility that the relational contract itself impacts parties' generalized trust – for example, a mill manager that has had a good experience dealing with surrounding farmers might become more trusting in general.

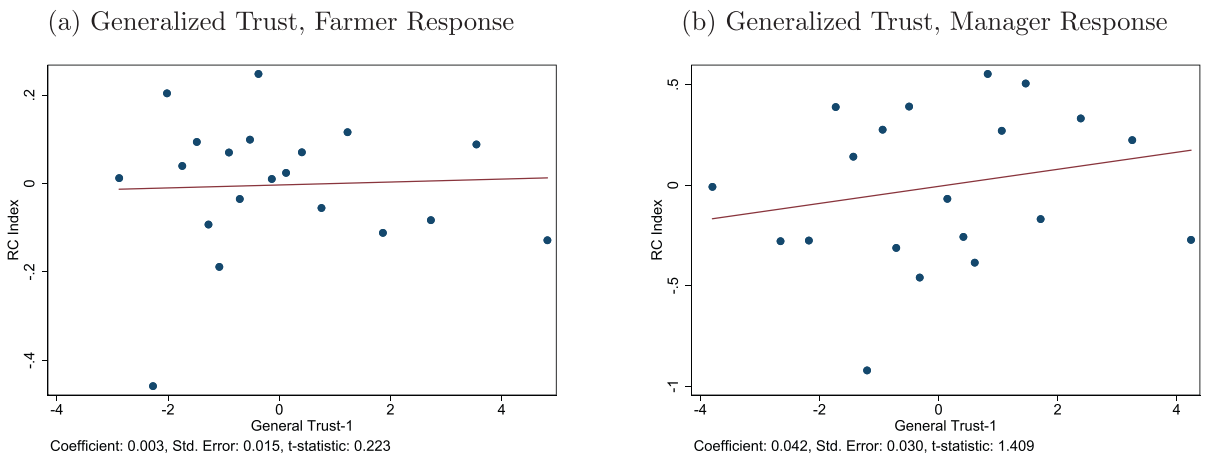

Fig. 5. General trust and relational contracts, surveys Binned scatter plot of farmer (Subfigure a.) and mill (Subfigure b) level regressions. All regressions control for mill characteristics (NGO-support, cooperative status, mill age, mill age squared and mill coordinates). Geographical controls also include average engineering suitability score, average spring presence, road density, tree density, rivers, a flexible control of FAO-GAEZ coffee suitability, elevation and slope, all within 5 km of the mill. The RC Index is an aggregate of farmer- and mill manager- based indicators of mill-provided inputs, second payments, and post-harvest loans. Farmer and mill manager responses are equally weighted. For additional details on the RC index please refer to Macchiavello and Morjaria (2021). General Trust-1 is our survey measure of trust that is consistent with the WVS (2012) measure of generalized trust. It is a 1–10 scale response to the question, *"Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?"* (where 1 = People would try to take advantage; 10 = People would try to be fair). Responses to this measure were reported by both farmers (Subfigure a) and mill managers (Subfigure b).

Fig. 5 shows the results. Our survey measure of trust is consistent with the WVS (2012) measure of generalized trust. It is a 1–10 scale response to the question, *"Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?"*, where 1 = People would try to take advantage; 10 = People would try to be fair. Subfigure (a) provides responses from farmers. Again, we find no relationship between generalized trust and the use of relational contracts. Subfigure (b) provides responses from the mill managers, on the same question. We find a positive correlation, albeit not statistically significant different from zero at conventional level (p-value = 0.159). This provides suggestive evidence that generalized trust might be correlated with the adoption of relational contracts.

4. Conclusions

Trust plays a central role in economic prosperity. At a more micro level, trust is also a constitutive feature of relational contracts. We have reviewed different approaches to measure relational contracts – using empirical proxies for temptations to deviate in the Kenyan flower industry and field surveys in the Rwandan coffee supply chain. In the latter context the paper was able to attempt a first, preliminary step towards bridging the two literatures on trust. Knowing the extent to which norms of generalized trust alter the demand and supply of relational contracting would provide us with a much richer understanding of how the market functions, of the drivers of relational contracts adoption and of how culture impacts economic outcomes. Much remains to be done in this exciting field.

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